

**AGENDA ITEM EXECUTIVE SUMMARY**

Agenda Item number: 5a

Title:

Recommendation to approve the Purchase of a Replacement Breathing Air Compressor from Air One Equipment in the amount of \$40,380

Presenter:

Fire Chief Joseph Schelstreet

Meeting: Government Operations Committee

Date: May 7, 2018

Proposed Cost: \$40,380

Budgeted Amount: \$42,000

Not Budgeted: ☐**Executive Summary** *(if not budgeted please explain):*

The Fire Department is replacing its 16 year old breathing air compressor as part of the overall upgrade of the Self Contained Breathing Apparatus units. The compressor allows both individual and mobile cascade tanks to be filled and kept at the ready. Bids were requested and two respondents replied with proposals. The low bid submitted by Air One Equipment proposes a compressor that meets department specifications, is expected to have a 20 year service life, and is over \$1,000 under the budgeted amount. This is a movement away from our current vendor however; service time will be cut as the new vendor is local and the old dealer maintained offices in the central part of the state.

Attachments *(please list):* Bid packages from Air One and Breathing Air Systems**Recommendation/Suggested Action** *(briefly explain):* Recommendation to approve the Purchase of a Replacement Breathing Air Compressor from Air One Equipment in the amount of \$40,380



Air One Equipment, Inc.
360 Production Drive, South Elgin IL 60177
Telephone: (847) 289-9000 Fax: (847) 289-9001
website: www.aoe.net

Quotation

TO: ST. CHARLES FIRE DEPT
112 NORTH RIVERSIDE AVENUE
ST. CHARLES, IL 60174

Date: 4/13/2018

ATTN: JASON PETERSON

Ref: MAKO AIR COMPRESSOR

Qty	Part Number	Description	Each	Extended
1	BAM07HE3	MAKO MODEL BAM07HE3 BREATHING AIR MODULE COMPRESSOR COMPLETE WITH 4 STAGE; AIR COOLED COMPRESSOR 20.7 CFM @ 6000 PSI - 15 H.P. ELECTRIC MOTOR(208-230V/3PHASE) MK5C PURIFICATION SYSTEM(82,000CF W/70F INLET TEMP)	\$24,990.00	\$24,990.00
1	* CO *	ADD MAKO CO MONITORING SYSTEM TO AIR COMPRESSOR	\$3,495.00	\$3,495.00
		**REQUIRED TO MEET NFPA 1989, 2008 EDITION **		
1	SCFS2	MAKO MODEL SCFS CONTAINMENT FILL STATION W/4-BANK MANUAL CASCADE CONTROLS, FILL PANEL WITH GAUGES, FILLING WHIPS AND HIGH PRESSURE (5500 PSI) REGULATOR; 2 POSITION FILL STATION	\$7,295.00	\$7,295.00
1	ADD	UPGRADE FILL STATION TO SCUBA FILL CAPABILITY	\$1,050.00	\$1,050.00
1	ADD	UPGRADE FILL STATION TO THREE POSITION	\$1,050.00	\$1,050.00
1	STORAGE	USE EXISTING STORAGE BANK. (4) 6000 PSI CYLINDERS	NO CHARGE	\$0.00
1	INST/FRT	DELIVERY, FREIGHT, AND INSTALLATION OF COMPLETE SYSTEM	\$2,500.00	\$2,500.00

Total of All Equipment: 40,380.00

NOTES:

1. INCLUDES TRADE IN AND REMOVAL OF EXISTING AIR COMPR.
2. INCLUDES INSTALLATION OF 3" FRESH AIR INTAKE.
3. NFPA 1989 NOW REQUIRES CO MONITOR

Thank You!

Estimated Delivery:

ON REQUEST

By: Martin Svihra

Air One Equipment, Inc.



Breathing Air Solutions

We've Got Your Back





LIFE COMES WITH ENOUGH RISKS
THE AIR YOU BREATHE
SHOULD NOT BE ONE OF THEM.

Contents

PRODUCTS

Compressors	3
Specialty Compressors	12
Fill Stations	14
Air Management Systems	16

AFTERMARKET PRODUCTS & PROGRAMS

Lubricants	17
Blocks	18
Genuine OEM Parts	18
Warranty	18

ENGINEERING SIZING DATA

Sizing a System	19
-----------------------	----

Proven Technology

For well over 50 years, MAKO has been the trusted breathing air system supplier to Fire and Safety, Recreational and Professional Dive, Marine, Offshore and Defense industries across the globe.

With an installed base in a diverse range of environments and applications, our Breathing Air Solutions have been proven in the field to provide high quality breathing air you can trust, every time.

How do we accomplish this? Through engineering and manufacturing excellence!



The Heart of the MAKO Design

Over 100 years experience engineering & manufacturing compressor blocks.

The result is a 3 or 4 stage compressor block with:

- Long operating life
- Continuous duty
- Extended service intervals and easy access for maintenance
- Low vibration and noise levels
- Proven technology for safe and reliable operation
- High quality manufacturing with ISO 9001 Quality Management System



Breathe Easy with MAKO Filtration

Designed and manufactured by MAKO, the filtration exceeds international standards EN 12021/CGA Grade D&E/NFPA 1989/CSA.

- Filtration manufacturing process uses no adhesives ensuring there are no odors or taste carried over
- Filters mounted inside cabinet to safeguard against accidental damage

STANDARD FEATURES

- Visual CO and moisture indicators do not require depressurization
- System inoperable without cartridge in chamber when cartridge CMM monitor option is used
- Non-corrosive replaceable cartridge
- Anodized aluminum alloy chambers rated for 6000 psig with a 4 to 1 safety factor

PURIFICATION CARTRIDGE CAPABILITIES

Model	Capability at 70° F Inlet Cubic Ft.
MK2C	34,200
MK5C	82,000
MK10C	171,425
MK420C	428,570

EconoAir™ [EA] Engineered to fit your budget



Incorporating our MAKO compressor and purification system ensures the highest quality product, yet offered at a price suitable for the most frugal budget.

STANDARD FEATURES

- MAKO's MK2C purification system
- MAKO industrial-duty 3 or 4-stage compressor block
- NEMA design ODP 1.15 SF electric motor
- Open design, rugged structural steel frame with heavy duty powder coat finish
- Easy accessibility to all maintenance items
- Auto-drain with muffler/reservoir system for collection of condensate
- Small package footprint and overall dimensions

- Anti-vibration mounts
- Fully automatic control system
- Instrumentation & controls:
 - » PLC controller
 - » Illuminated on/off push buttons
 - » Hours run meter
 - » Emergency stop button
 - » Final stage pressure gauge
 - » Individual shutdown indicators for High Air Temperature, High Air Pressure, and Low Oil Level/Pressure

OPTIONAL EQUIPMENT

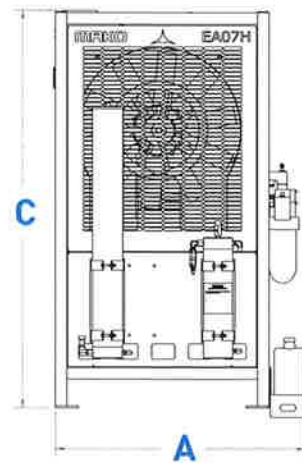
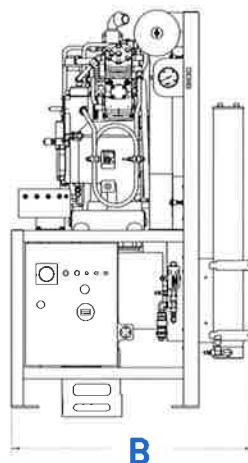
- MK5C purification
- Wall-mount CO & Moisture (CMM) Mounting System

TECHNICAL DATA

Model	Max Pressure		Stages	Charging Rate (0 - max pressure)			Compressor rpm	Drive		Weight		Sound Level dba
	bar	psi		m /hr	l/min	cfm		kW	hp	kg	lb	
EA05	350	5000	3	14.6	243	8.6	1300	5.5	7.5	284	626	83
EA06X	414	6000	4	16.7	278	10.2	1100	5.5	7.5	255	560	84
EA06H	414	6000	4	23.8	397	14	1340	7.5	10	260	570	84
EA07H	414	6000	4	35.2	587	20.7	1800	11	15	266	585	85

DIMENSIONS (A x B x C)

	In	mm
A	32.6	829
B	31.7	806
C	52.0	1,322



AirCharge [AC] Compact, fully integrated solution

The AirCharge is specifically designed for the 5000 psi user where quality, convenience and low noise are paramount and space is tight.

STANDARD FEATURES

- MAKO's MK2C purification system
- MAKO industrial-duty 3-stage compressor block
- NEMA design ODP 1.15 SF electric motor
- Fully enclosed, sound attenuating enclosure with heavy-duty powder-coated finish
- Hinged & removable panels allows quick access to routine maintenance items
- Auto-drain with muffler/reservoir system for collection of condensate
- Compact package footprint and overall dimensions
- Anti-vibration mounts

- UL Listed, NEMA 4 Electrical Enclosure
- Fully automatic control system
- Instrumentation & controls:
 - » PLC controller
 - » Illuminated on/off push buttons
 - » Hours run meter
 - » Emergency stop button
 - » Inter-stage & final-stage pressure gauges
 - » Individual shutdown indicators for High Air Temperature, High Air Pressure, and Low Oil Level/Pressure



OPTIONAL EQUIPMENT

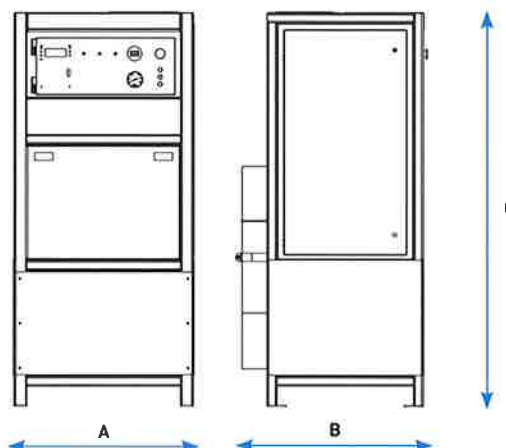
- MK5C purification
- Integrated or wall-mounted CO & Moisture (CMM) Monitor
- Shutdown audible alarm
- Dual pressure switch

TECHNICAL DATA

Model	Max Pressure		Stages	Charging Rate (0 - max pressure)			Compressor rpm	Drive		Weight		Sound Level dba
	bar	psi		m/hr	l/min	cfm		kW	hp	kg	lb	
AC04	350	5000	3	9.9	165	5.8	1300	4	5	268	591	69
AC05	350	5000	3	14.6	243	8.6	1300	5.5	7.5	284	626	70

DIMENSIONS (A x B x C)

In	mm
28 x 29 x 61½	711 x 737 x 1550





Breathing Air Module [BAM]

Unsurpassed value, peace of mind

The BAM is a high quality breathing air package combining high capacity filling with low sound levels and a flexible modular design.

STANDARD FEATURES

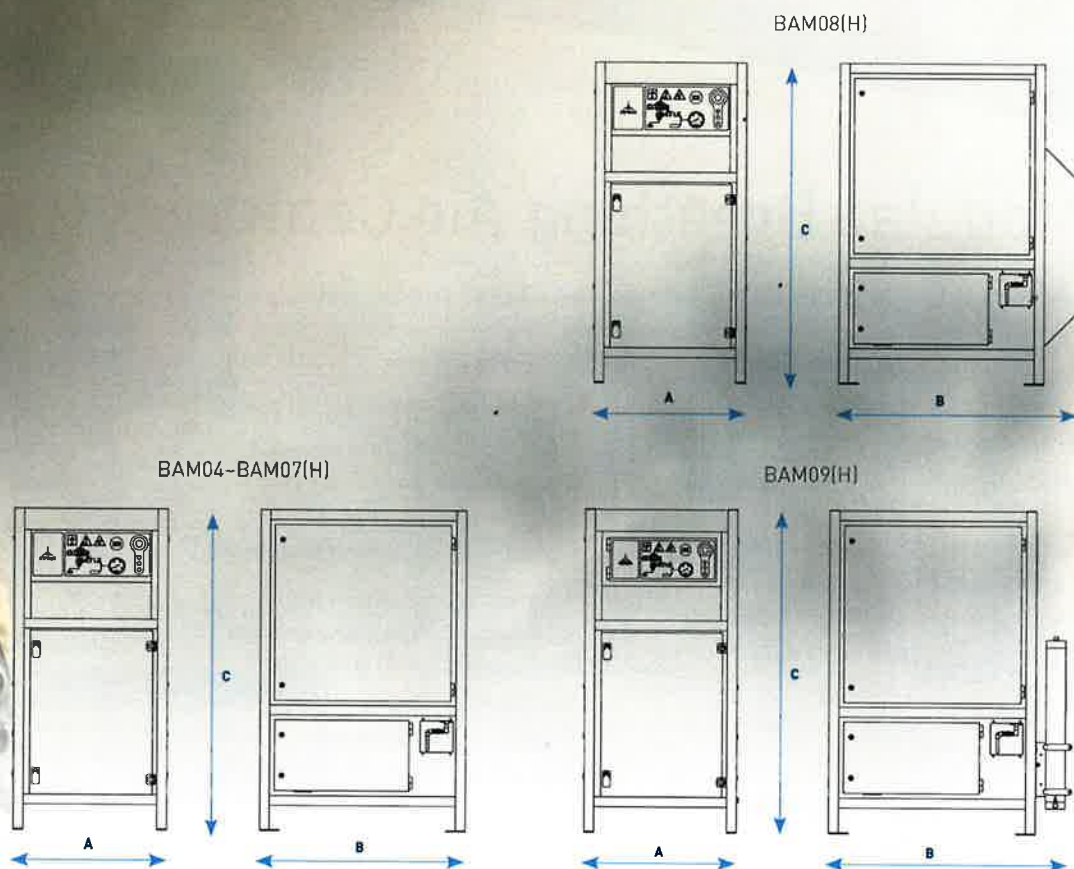
- MAKO's MK2C purification system [models BAM04–BAM06(H)]
- MAKO's MK5C purification system [models BAM07(H)–BAM09(H)]
- MAKO's industrial-duty 3- or 4-stage compressor block
- NEMA design ODP 1.15 SF electric motor
- Fully enclosed, sound attenuating enclosure with heavy-duty powder-coated finish
- Hinged and removable panels allow quick access to routine maintenance items
- Auto-drain with muffler/reservoir system for collection of condensate
- Compact design, with small overall footprint
- Anti-vibration mounts
- UL Listed, NEMA 4 Electrical Enclosure
- Fully automatic control system

Instrumentation and controls

- » PLC controller
- » Illuminated on/off push buttons
- » Emergency stop button
- » Inter-stage and final-stage pressure gauges
- » Individual shutdown indicators for High Air Temperature, High Air Pressure, and Low Oil Level/Pressure

OPTIONAL EQUIPMENT

- MK5C or MK10C purification [models BAM04–BAM06(H)]
- MK10C purification [models BAM07(H)–BAM09(H)]
- Integrated or wall-mounted CO & Moisture (CMM) Monitor
- Shutdown audible alarm
- Dual pressure switch



TECHNICAL DATA

Model	Max Pressure		Stages	Charging Rate [0 - max pressure]			Compressor rpm	Drive		Weight		Sound Level dba
	bar	psi		m /hr	l/min	cfm		kW	hp	kg	lb	
BAM04	350	5000	3	9.9	165	5.8	1300	4	5	461	1017	69
BAM05	350	5000	3	14.6	243	8.6	1300	5.5	7.5	471	1039	70
BAM06	350	5000	4	22.3	372	13.1	1340	7.5	10	526	1160	72
BAM07	350	5000	4	31.8	530	18.7	1800	11	15	541	1193	74
BAM08	350	5000	4	43	717	25.3	1530	15	20	576	1270	76
BAM09	350	5000	4	52	867	30.6	1800	18.5	25	592	1305	78
BAM06X	414	6000	4	16.7	278	10.2	1100	5.5	7.5	485	1070	72
BAM06H	414	6000	4	23.8	397	14	1340	7.5	10	526	1160	72
BAM07H	414	6000	4	35.2	587	20.7	1800	11	15	541	1193	74
BAM08H	414	6000	4	45.9	765	27	1530	15	20	576	1270	76
BAM09H	414	6000	4	56.4	940	33.2	1800	18.5	25	592	1305	78

DIMENSIONS [A x B x C]

	In	mm
BAM04 BAM05 BAM06(H)(X) BAM07(H)	31¼ x 42 x 65¾	794 x 1067 x 1673
BAM08(H) BAM09(H)	31¼ x 50 x 65¾	794 x 1255 x 1673

Modular Breathing Air Center

[M-BAC] A Uniquely Integrated, Total Air System Solution

The Modular Breathing Air Center offers the flexibility to accommodate your exact requirements in proven technology with the integrated system including the Air Compressor, Containment Fill Station, and Storage Rack, all enclosed within a uniquely designed envelope.

STANDARD FEATURES

- Your choice of Breathing Air Module (BAM) compressor (refer to the BAM Standard Features and Optional Equipment sections for details)
- Your choice of stationary SCBA or SCUBA Containment Fill Station (CFS) (refer to the Stationary CFS Standard Features and Optional Equipment sections for details)

Package

- » Vertical, in-line 4-bottle rack with up to (4) UN or ASME storage cylinders
- » Center storage module
- » Modular integration kit

OPTIONAL EQUIPMENT

- 50, 75 or 100' spring rewind hose reel

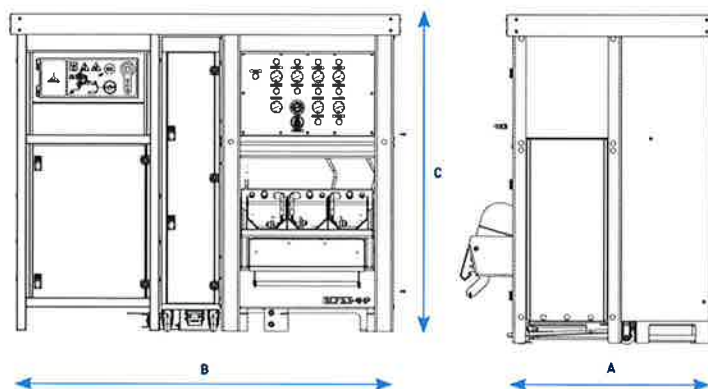
TECHNICAL DATA - COMPRESSORS

Model	Max Pressure		Stages	Charging Rate (0 - max pressure)			Compressor rpm	Drive		Weight		Sound Level dba
	bar	psi		m /hr	l/min	cfm		kW	hp	kg	lb	
BAM04	350	5000	3	9.9	165	5.8	1300	4	5	461	1017	69
BAM05	350	5000	3	14.6	243	8.6	1300	5.5	7.5	471	1039	70
BAM06	350	5000	4	22.3	372	13.1	1340	7.5	10	526	1160	72
BAM07	350	5000	4	31.8	530	18.7	1800	11	15	541	1193	74
BAM08	350	5000	4	43	717	25.3	1530	15	20	576	1270	76
BAM09	350	5000	4	52	867	30.6	1800	18.5	25	592	1305	78
BAM06X	414	6000	4	16.7	278	10.2	1100	5.5	7.5	485	1070	72
BAM06H	414	6000	4	23.8	397	14	1340	7.5	10	526	1160	72
BAM07H	414	6000	4	35.2	587	20.7	1800	11	15	541	1193	74
BAM08H	414	6000	4	45.9	765	27	1530	15	20	576	1270	76
BAM09H	414	6000	4	56.4	940	33.2	1800	18.5	25	592	1305	78





BAM04-BAM07(H)

**DIMENSIONS** (A x B x C)

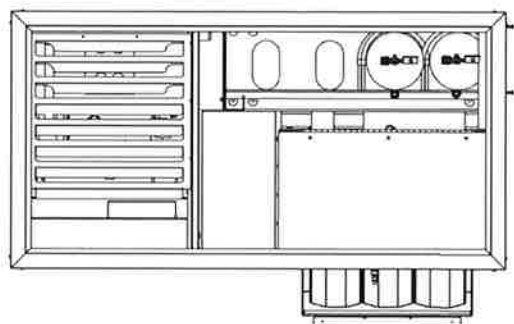
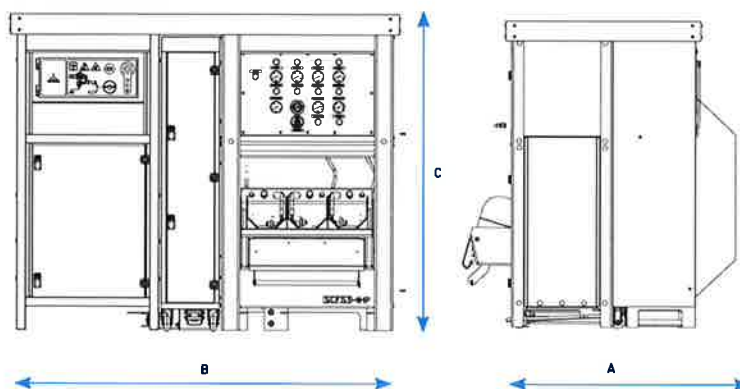
BAM with SCFS2 or SCFS3

	In	mm
BAM04-07H	45½ x 86 x 70	1156 x 2185 x 1778
BAM08-09H	52½ x 86 x 70	1334 x 2185 x 1778

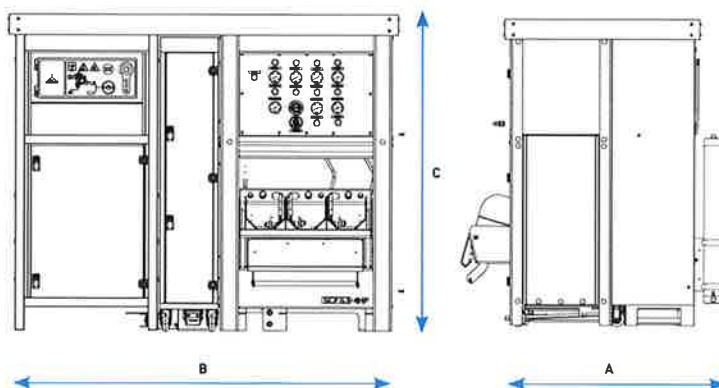
BAM with SSCFS2 or SSCFS3

	In	mm
BAM04-07H	45½ x 90 x 70	1156 x 2286 x 1778
BAM08-09H	52½ x 90 x 70	1334 x 2286 x 1778

BAM08(H)



BAM09(H)





Horizontal Breathing Air [HBA]

High Quality, Low Profile Compressor Solution

Our open frame, low profile compressor provides a lower cost breathing air solution without sacrificing quality, flexibility or filling capacity,

STANDARD FEATURES

- MAKO's MK2C purification system [models HBA04-HBA06(H)]
- MAKO's MK5C purification system [models HBA07(H)-HBA09(H)]
- MAKO's industrial-duty 3- or 4-stage compressor block
- NEMA design ODP 1.15 SF electric motor
- Open design, rugged structural steel frame with heavy duty powder coat finish
- Auto-drain with muffler/reservoir system for collection of condensate
- Compact design, with small overall footprint
- Anti-vibration mounts
- UL Listed, NEMA 4 Electrical Enclosure
- Fully automatic control system

Instrumentation and controls

- » PLC controller
- » Illuminated on/off push buttons
- » Hours run meter
- » Emergency stop button
- » Inter-stage and final-stage pressure gauges
- » Individual shutdown indicators for High Air Temperature, High Air Pressure, and Low Oil Level/Pressure

OPTIONAL EQUIPMENT

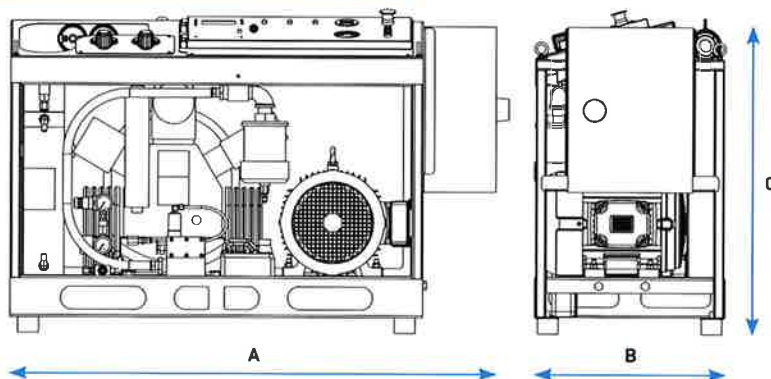
- MK5C or MK10C purification [models HBA04-HBA06(H)]
- MK10C purification [models HBA07(H)-HBA09(H)]
- Diesel or gas engine drive
- Integrated or wall-mounted CO & Moisture (CMM) Monitor
- Shutdown audible alarm
- Dual pressure switch

TECHNICAL DATA

Model	Max Pressure		Stages	Charging Rate (0 - max pressure)			Compressor rpm	Max. Integrated fill hoses
	bar	psi		m /hr	l/min	cfm		
HBA04	350	5000	3	9.9	165	5.8	1300	2
HBA05	350	5000	3	14.6	243	8.6	1300	2
HBA06	350	5000	4	22.3	372	13.1	1340	4
HBA07	350	5000	4	31.8	530	18.7	1800	4
HBA08	350	5000	4	43	717	25.3	1530	6
HBA09	350	5000	4	52	867	30.6	1800	6
HBA06H	414	6000	4	23.8	397	14	1340	72
HBA07H	414	6000	4	35.2	587	20.7	1800	72
HBA08H	414	6000	4	45.9	765	27	1530	74
HBA09H	414	6000	4	56.4	940	33.2	1800	76

Model	Electric				Diesel				Petrol/Gasoline			
	Power		Weight		Power		Weight		Power		Weight	
	kW	hp	kg	lbs	kW(b)	hp	kg	lbs	kW(b)	hp	kg	lbs
HBA04	4	5	200	435	7.5	10	320	710	6	8	310	680
HBA05	5.5	7.5	210	460	7.5	10	330	725	8.2	11	330	725
Dimensions A x B x C mm / in	1228 x 470 x 800 / 48 x 18.5 x 31.5				1473 x 738 x 1130 / 58 x 29 x 44.5				1473 x 738 x 1130 / 58 x 29 x 44.5			
HBA06(H)*	7.5	10	315	690	11	15	560	1240	15	20	320	710
HBA07(H)*	11	15	335	735	15	20	625	1380	15	20	335	740
Dimensions A x B x C mm / in	1473 x 738 x 1130 / 58 x 29 x 44.5				1575 x 1054 x 1181 / 62 x 41.5 x 46.5				1473 x 738 x 1130 / 58 x 29 x 44.5			
HBA08(H)*	15	20	380	835	22	30	655	1440				
HBA09(H)*	18.5	25	400	880	22	30	685	1510				
Dimensions A x B x C mm / in	1473 x 738 x 1130 / 58 x 29 x 44.5				1575 x 1054 x 1181 / 62 x 41.5 x 46.5							

* For models indicated, control box is mounted within the frame.





Water-Cooled Packages

Quiet, durable, reliable, continuous duty

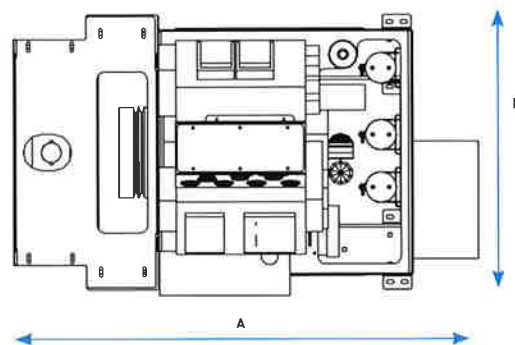
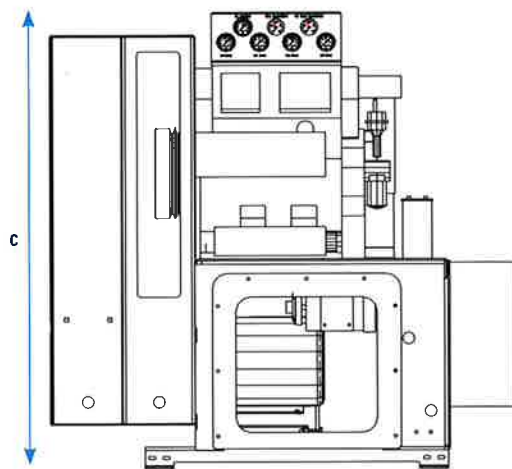
For the user whose demands include "around the clock" operation PLUS high capacity, look to our water-cooled packages to fulfill those needs.

STANDARD FEATURES

- MAKO's MK10C purification system (model 5417)
- MAKO's MK420C purification system (models 5437 and 5437H)
- MAKO's industrial 4-stage compressor block
- NEMA design ODP 1.15 SF electric motor
- Compressor cooling system built into block for improved efficiency
- Auto-drain with muffler/reservoir system for collection of condensate
- Anti-vibration mounts
- Fully automatic control system
- Closed loop cooling system integrated to compressor skid
- Instrumentation & Controls:
 - » Illuminated on/off push buttons
 - » Hours run meter
 - » Emergency stop button
 - » Inter-stage and final stage pressure gauges
 - » Individual shut down indicators for High Air Temperature, High Air Pressure, and Low Oil Level/Pressure

OPTIONAL EQUIPMENT

- CO monitor and calibration kit
- Shutdown audible alarm
- Dual pressure switch



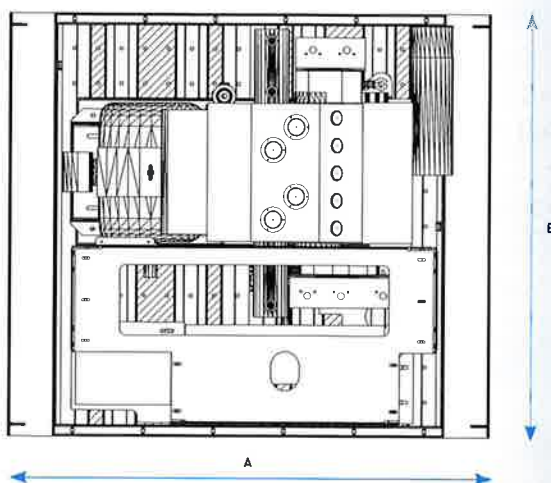
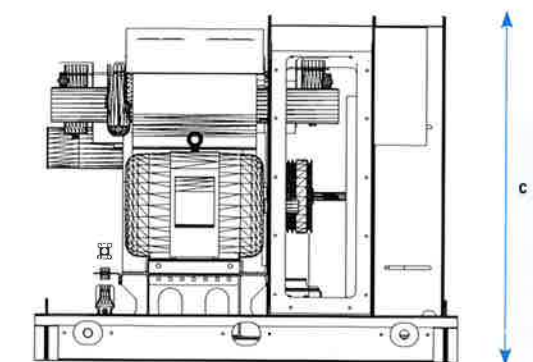
5417BA

TECHNICAL DATA

Model	Max Pressure		Stages	Charging Rate (0 - max pressure)			Compressor rpm	Drive		Weight	
	bar	psi		m ³ /hr	l/min	cfm		kW	hp	kg	lb
5417BA	345	5000	4	74	1233	44	1800	30	40	1320	2900
5437BA	345	5000	4	143	2380	84	1500	55	75	2177	4800
5437HBA	414	6000	4	144	2400	85	1500	55	75	2177	4800

DIMENSIONS (A x B x C)

In		mm
5417BA	64,34 x 38 x 64	1635 x 966 x 1626
5437BA & 5437HBA	82 x 72 x 36	2083 x 1829 x 915



5437BA & 5437HBA



Fill Stations

The ultimate in safe and convenient filling

Our enclosed steel chamber fill-stations are proven to protect against and contain the full impact of a catastrophic cylinder, valve or hose failure (NFPA 1901 compliant). In addition, the loading heights are ergonomically designed to reduce operator fatigue.

Standard Construction – double walled construction, single-action door latch, gas strut assisted carriage assembly, easy access panels for maintenance, and automatic safety interlock mechanism.

Stationary SCFS

STANDARD FEATURES

- 2 or 3 positions
- SCBA (SCFS) or SCUBA (SSCFS) compatibility
- 0-6000 psi "push action" regulator
- 3-Bank cascade control system allowing for simultaneous storage and cylinder filling
- Fill panel with easy to read silk screen overlay
- Inlet / outlet gauges
- Fill control valve and gauge
- Color-zoned gauges
- Auxiliary outlet
- Fill whips with fill adapters
- Air storage bypass

OPTIONAL EQUIPMENT

- 2-4 Bank automatic cascading control
- Pressure selector valve
- Fire to SCUBA adapters

Stationary Dual-Pack HDCFS

STANDARD FEATURES

- 2 or 3 positions
- SCBA (SCFS) or SCUBA (SSCFS) compatibility
- 0-6000 psi "push action" regulator
- 3-Bank cascade control system allowing for simultaneous storage and cylinder filling

- Fill panel with easy to read overlay
- Inlet / outlet gauges
- Fill control valve and gauge
- Auxiliary outlet
- Fill whips with fill adapters
- Air storage bypass

OPTIONAL EQUIPMENT

- 2-4 Bank automatic cascading control
- Pressure selector valve
- Fire to SCUBA adapters

Mobile MCFS

STANDARD FEATURES

- 1, 2, or 3 positions
- SCBA (MCFS) or SCUBA (MSCFS) compatibility
- Single or dual pressure
- Fill whips with fill adapters

OPTIONAL EQUIPMENT

- Fire to SCUBA adapters
- 6" Stand

Oxygen CFS

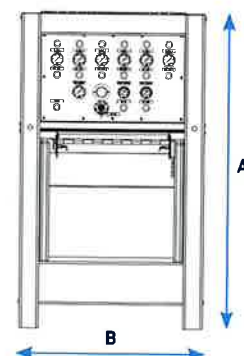
STANDARD FEATURES

- 1 or 2 positions
- Fill whips with fill adapters (approved for oxygen use)
- Fill whip line valve(s)



STATIONARY (SCFS)

Model	Dimensions (A x B x C)		Weight	
	In	mm	lbs	kg
SCFS2	66 x 29½ x 23½	1677 x 750 x 597	1010	458.13
SSCFS2	68 x 31 x 24	1726 x 787 x 610	1077	488.52
SCFS3	66 x 38½ x 23½	1677 x 978 x 597	1480	671.32
SSCFS3	67½ x 41 x 28	1715 x 1042 x 712	1690	766.57



DUAL PACK STATIONARY (HDCFS)

Model	Dimensions (A x B x C)		Weight	
	In	mm	lbs	kg
HDCFS2	67¾ x 32¾ x 26½	1721 x 832 x 673	1650	748.43
HDCFS3	67¾ x 42¾ x 26½	1721 x 1086 x 673	2200	997.90



MOBILE (MCFS)

Model	Dimensions (A x B x C)		Weight	
	In	mm	lbs	kg
MCFS1	38½ x 20½ x 23½	978 x 521 x 597	362	164.20
MCFS2	38½ x 29½ x 23½	978 x 750 x 597	723	327.95
MSCFS2	40¾ x 41 x 24½	1035 x 1041 x 622	928	420.93
MCFS3	38½ x 38½ x 23½	978 x 978 x 597	1148	520.72
MSCFS3	40¾ x 31½ x 24½	1035 x 800 x 622	1405	637.30

OXYGEN (CFS-OXY)

Model	Dimensions (A x B x C)		Weight	
	In	mm	lbs	kg
CFS1-OXY	38½ x 20½ x 23½	978 x 521 x 597	362	164.20
CFS2-OXY	38½ x 29½ x 23½	978 x 750 x 597	723	327.95

Air Management Systems



Air Storage

Maximize the output of your breathing air system to cope with unpredictable or peak filling requirements.

- Horizontal or vertical storage tanks
- Configurations of 2, 3, 4, 5 or 6 cylinders
- UN or ASME storage cylinders

Cascade Controls

Designed to optimize air storage and filling capacity, our cascade controls allow the operator to refill a depleted storage bank while simultaneously filling SCBA's from a full storage bank.

- Either integrated into a Containment Fill Station or remotely mounted
- Containment Fill Station Auto-Cascade Control option
 - » Reduces the potential for operator error
 - » Simplifies and eases the filling operation
 - » Automatically controls air storage consumption and replenishment



Electronic CO & Purification Monitoring

CO & MOISTURE MONITOR (CMM)

- Easy to read, simple to use
- Straight forward CO sensor/cell replacement
- Automatic shutdown
- Automatic calibration - the CO sensor automatically adjusts to ensure accurate measurement of CO by checking itself against two preset levels

OPTIONAL MONITORS

- CO only
- Moisture only
- Wall-mounted (remote)

TECHNICAL DATA

CO Monitor Performance	
Detection Range	0-100 ppm
Factory Alarm Setting	10 ppm
Display Type	LCD
Alarms	Visual: LEDs and digital LCD Audible: Case-mounted horn



MAKO Blue lubricant is approved
for breathing air applications

Aftermarket Products & Programs

MAKO Blue Diester Based Synthetic Lubricant

Protecting your investment... from the inside

MAKO Blue synthetic lubricant combines highly stable oils with unique additive technologies to create a product that provides excellent thermal and oxidative stability while delivering superior anti-wear and anti-corrosion protection.

LUBRICANT CHART

Features	Mineral Oil	PAO	MAKO
Wide Temperature Performance	na	✓	✓
High Lubricity	na	✓	✓
Low Evaporation	na	✓	✓
Increased Efficiency	na	✓	✓
Excellent Solvency	na	na	✓
Clean Lubrication (no deposits)	na	na	✓
Biodegradability	na	na	✓
Extreme High-Temperature Performance	na	na	✓

✓ = applicable; na = **not** applicable

SELECTED PHYSICAL PROPERTIES

Property	Test Method	Results
Viscosity, cSt. @ 40°C	ASTM D445	91.4
Viscosity, cSt. @ 100°C	ASTM D445	9.3
ISO Viscosity Grade	100	
Pour Point °C/°F	ASTM D97	-29 / -30
Flash Point °C/°F	ASTM D92	-260 / 500
Demulsibility @ 130°F	ATSM D1401	Excellent

CONVENIENT PACKAGE SIZES

Package Size	Part Number
Quart	003MBQ-S
Gallon	003MBG-S
55 Gallon Drum	003MBD-S

Compressor Blocks

If a replacement compressor block is required, rely on MAKO 2-year standard warranty:

Replacement Block	Warranty
Factory NEW	24-month
Factory REPAIR & RETURN	90-day

Genuine OEM Replacement Parts

Don't take a chance... maintain the MAKO performance advantage and reliability with genuine MAKO replacement parts available through our authorized sales and servicing distributor partners.

All proprietary and consumable parts are designed and/or specified specifically for MAKO products, ensuring operational efficiencies and longevity.

MAKO.5
5-YEAR EXTENDED WARRANTY

Product Warranty

Standard 24-Month Warranty

MAKO warrants its compressors and fill-stations to operate in accordance with its specifications free from defects in material and workmanship under normal operating conditions, for twenty-four (24) months from initial start-up or thirty (30) months from shipment by MAKO.



OPTIONAL 5-Year Extended Warranty

(available in the USA and Canada only)

The MAKO5 is offered exclusively to the municipal fire market, and it covers MAKO's full line of stationary breathing air compressors, containment fill stations, air storage systems, and select accessory products.

Engineering Sizing Data

COMPRESSOR SIZING CHART

Instructions: Circle the closest answer(s) to each question. The column in which the most answers are circled should be the smallest system to be considered. If the majority of your SCBA's are 4500 psi choose a compressor from Column 4 or higher.

	Column	1	2	3	4	5	6	7
How many SCBA cylinders are in service, or are expected to be, within 12 months?		6 - 12	13 - 20	21 - 30	31 - 40	41 - 60	61 - 100	101 & UP
What working pressure are these SCBA cylinders rated for?	psi	2216	2216 3000	2216 3000	2216 3000 4500	2216 3000 4500	2216 3000 4500	2216 3000 4500
How many working calls has the department logged in the last 12 months?		20 - 60	61 - 80	81 - 100	101 - 120	121 - 170	171 - 225	226 & UP
How many SCBA's are being refilled each month?		4 - 20	20 - 40	40 - 60	60 - 80	80 - 100	100 - 400	400 & UP
What is the maximum number of refills made in one operation in recent months?		4 - 9	10 - 15	16 - 25	26 - 35	36 - 45	46 - 55	56 & UP
If you have been purchasing breathing air in cascade cylinders, how many of these were purchased in the last 12 months?		6 - 12	13 - 30	31 - 40	41 - 50	51 - 60	61 - 100	101 & UP
How many active fire fighters are on the staff of this department (count all shifts)?		4 - 8	9 - 12	13 - 20	21 - 30	31 - 45	46 - 65	66 & UP
How many stations does this department operate?		1	1	1 - 2	1 - 2	1 - 3	2 - 4	5 & UP
What is the population in this department's district?		1000 - 4000	4000 - 8000	8000 - 16,000	16,000 - 25,000	25,000 - 50,000	50,000 - 200,000	200,000 & UP
If a department has an existing compressor in service, what is it's output range?	cfm	3.0 - 5.0	5.0 - 7.0	8.0 - 10.0	10.0 - 12.0	13.0 - 15.0	16.0 - 18.0	19.0 - 20.0
Compressor Output Recommended								
cfm		5.8	8.6	13.1	14.0	20.7 - 27.0	27.0 - 33.2	33.2 & UP
psi		5000	5000	5000	6000	6000	6000	6000
Cascade System Recommended								
Cyl		3 - 4	4	4 - 6	4 - 6	4 - 6	6 - 8	6 - 8
psi		5000	5000	5000	6000	6000	6000	6000



MAKO Compressors

MAKO Compressors is part of Gardner Denver, Inc. specializing in Breathing Air Systems since 1952.



CompAir Reavell

CompAir Reavell is part of Gardner Denver, Inc. From their state-of-the-art facility in Ipswich, England, CompAir Reavell designs and manufactures high quality reciprocating piston compressors.

Compressor Notes

1. All technical details are subject to change.
2. Performance figures are typical and are not the full range available.
3. Figures based on inlet conditions of 20°C/68°F, 1,013 Bar/14.7 PSL.
4. Charge rates measured in accordance with CompAir Ipswich standard No. 27 Type 'A'.
5. Electric motors are available in 50 & 60 Hz, Single & 3 Phase versions and with multiple voltage options.
6. Tested and certified to equivalent of UL 1450 Standards. Conforms to all applicable TUV directives.
7. Sound pressure level at 1m/3 ft.

CFS (Containment Fill Station) Notes

1. All technical details are subject to change.
2. Tested and certified to equivalent of UL 1450 Standards. Conforms to all applicable CE directives.
3. Rupture test certificate available on request.



BREATHING AIR SOLUTIONS



www.makocompressors.com

MAKO Compressors
1301 North Euclid Avenue
Princeton, Illinois 61356 USA
217-222-5400
217-224-7814 fax
www.makocompressors.com/ContactUs.aspx

DISTRIBUTOR PARTNER



BREATHING AIR SYSTEMS

Division of Sub-Aquatics, Inc.

210 N. Main Street, Moweaqua, IL 61951

Sales: (217) 768-4408 Fax: (217) 768-3351 Net: www.breathingair.com

Reynoldsburg, OH • Ocala, FL • Chattanooga, TN • Moweaqua, IL • White Oak, PA

DATE: Dec 20, 2017

PROPOSAL
SUBMITTED TO:

ST. CHARLES FIRE DEPT.
105 N. FIRST AVE.
SAINT CHARLES, IL 60174

REQUESTED BY: Jason Peterson

TITLE:

EMAIL:

PHONE: (630) 377-4413

MOBILE PHONE:

FAX:

ESTIMATED DELIVERY TIME: TBD

F.O.B.: Dest.

TERMS: Net30

ITEMS QUOTED: MVT25 System

JOB LOCATION:

ACCOUNT # 510234

NOTE: Our quote does not include off loading, uncrating, placement or the wiring to or into an electrical compressor to the electrical supply. Warranty is as proposed.

QUOTE

Part Number	Description	Price	Discount %	Qty	Extended Price
S7-25E3-EV	Compressor - 6000 - 25.2 cfm. Bauer Maxi Verticus fully Enclosed Air System 6000 psi. 25.2 cfm. charging rate with pressure switch for automatic start & stop control. Locally mounted interstage pressure gauges. P5S 150,000 cu ft purification system with SECURUS electronic cartridge monitor. Pressure lubricated with low oil protection. Automatic condensate drain system and PLC controller with smart pad operator interface console and E-Stop Button. Entire electrical assembly is UL LISTED. All in an attractive sound attenuating enclosure. Three phase electric.	\$43,098.00	10%	1	\$38,788.20
CFS5.5-3SX4X4	Fill Station - Bauer - Class 2. Independently tested containment fill station meets NFPA 1901. Fills three SCBA cylinders and has four cascade controls with valves and gauges. Features cylinder scuff guard - fill control panel with adjustable regulator - SCBA fill connection - top mounted cascade control panel with regulated remote outlet - Three fill hoses with bleed valves and safety door interlock. 5500 psi fill pressure.	\$12,917.00	10%	1	\$11,625.30
BAS218	Monitor, Carbon Monoxide Installed per NFPA 1989 to alarm and shut down compressor when 10 ppm of CO is registered in produced air.	\$2,575.00	10%	1	\$2,317.50

April 17, 2018

Quote Total \$52,731.00

PAYMENT TO BE MADE AS FOLLOWS: (UNLESS OTHERWISE NOTED, TERMS ARE NET PAYMENT DUE WITHIN 30 DAYS AFTER DELIVERY)

Note: Payment by Credit Card will incur a convenience fee totaling 3.0% of the transaction amount on all transactions exceeding \$1,500.00.

Proposal Submitted By: Mitch Hartman Prices Good For 60 Days

MINI AND MAXI VERTICUS™

3, 4 AND 5-STAGE HIGH PRESSURE BREATHING AIR COMPRESSORS

MINI VERTICUS and MAXI VERTICUS combine compressor, air purification, SECURUS electronic moisture monitoring system and motor in a space saving, sound attenuated vertical cabinet designed to diminish operating sound levels. The MINI VERTICUS sound level is approximately 70 dBA and the MAXI VERTICUS is less than approximately 79 dBA (both at 3 ft/1 meter distance).

D

F

› PRESSURE:

Up to 6000 PSIG
(414 BAR)

› CHARGING RATE:

5 to 42 SCFM
(142 to 1190 L/MIN)

› POWER:

5 to 30 HP (3.7 to 22 kW)

**› MAXI VERTICUS****› MAXI VERTICUS****› MINI VERTICUS**

STANDARD SCOPE OF SUPPLY

- › BAUER breathing air purification system with SECURUS
- › BAUER PLC based controller with multicolor touchpad display
- › NEMA 4 rated electrical enclosure with **UL®** listed control panel
- › Compressor low oil pressure and high temperature safety shutdowns
- › Emergency stop push button and automatic start/stop control
- › Automatic condensate drain system with non-corrosive condensate reservoir and integrated float sensor and automatic "Full" indication and compressor shutdown
- › Interstage pressure gauges (locally mounted)

MAXI VERTICUS MODELS (ADD TO ABOVE)

- › Vertically hinged front operations panel and lift-off side maintenance access doors
- › Inlet filter maintenance indicator

AVAILABLE ACCESSORIES (FACTORY INSTALLED)

- › CO monitor

TECHNICAL DATA

Model	Charging Rate ¹		Number of Stages	Motor		FAD ²	RPM	Purification System
	SCFM	L/MIN		HP	kW			
5000 PSIG (345 BAR)								
mVT8-E1/E3	8.4	238	3	7.5	5.6	7	1250	P2 SECURUS
MVT20-E3	21	595	4	15	11	17.5	1300	P5 SECURUS
MVT26-E3	26.4	748	4	20	15	22	1350	P5 SECURUS
MVT42-E3 ³	42	1190	4	30	22	35	1300	P10 SECURUS
6000 PSIG (414 BAR)								
mVT5H-E1/E3	5	142	3	5	3.7	4	1050	P2 SECURUS
mVT10H-E1/E3	9.7	275	4	7.5	5.6	8.1	1180	P2 SECURUS
mVT13H-E1/E3	13	368	4	10	7.5	10.8	1420	P2 SECURUS
MVT18H-E3	18	510	4	15	11	15	1325	P5 SECURUS
MVT25H-E3	25.2	714	5	20	15	21	1300	P5 SECURUS
MVT35H-E3 ³	35.9	1017	4	30	22	29.8	1200	P10 SECURUS

¹) Based on recharging an 80 cubic foot tank from 500 to 3000 psig.

²) Compressor capacity referenced to standard inlet conditions.

³) 30 HP units are in a cabinet other than depicted.

E1= Single phase electric, 230 VAC/60 Hz. E3=Three phase electric, 208/230/460 VAC/60 Hz. Other voltages available on request. mVT= MINI VERTICUS. Dimensions and weight are approximate and are subject to change.

SYSTEM FOOTPRINT

MINI VERTICUS:

DIMENSIONS L X W X H inches (mm)

- › 29" x 49" x 58" (737mm x 1245mm x 1473mm)

WEIGHT pounds (kg)

- › 880 - 950 lb (400 - 432 kg)

MAXI VERTICUS:

DIMENSIONS L X W X H inches (mm)

- › 44" x 52" x 72" (1118mm x 1321mm x 1830mm)

WEIGHT pounds (kg)

- › 1050 - 1530 lb (476 - 694 kg)

D

F

CARBON MONOXIDE MONITOR

BAS218

Newly updated with digital
flow meter and flow light

- ✓ Easily retrofitted to existing compressor systems
- ✓ One touch calibration. Notifies when calibration and sensor change due
- ✓ Constant Digital Readout
- ✓ Accepts 50 to 6000 psi
- ✓ Audible and Visual Alarms
- ✓ Only one test gas needed — half the calibration cost
- ✓ No warm up necessary. Calibration can be done in less than five minutes

MONITORS ALSO AVAILABLE FOR:
Moisture - H₂O; Oxygen - O₂; and
Carbon Dioxide - CO₂

INCLUDES:

Digital Display
Regulators for Air Pressure Reduction
Alarm Light
Audible Alarm
Dual Alarm Levels
Power Cord

Solid State Electronics
Compressor Shutdown Option
All Airline Connections
NEMA 4 Enclosure
Service Shut Off Valve
Voltage (110 VAC or 12 VDC)

NFPA 1989 Compliant

Suggested purchasing specifications are on the back of this page

4/17



BREATHING AIR SYSTEMS

8855 E. Broad St., Reynoldsburg, OH 43068 - Phone: (614) 864-1235
SALES: (800) 937-2479 FAX: (614) 864-0071 sales@breathingair.com
www.breathingair.com

Ocala, FL
(352) 629-7712

Chattanooga, TN
(423) 634-3184

Moweaqua IL
(217) 768-4408

Michigan Center, MI
(517) 783-4060

Pittsburgh, PA
(412) 564-5756

Service facilities throughout the United States

**SUGGESTED PURCHASING SPECIFICATIONS
ELECTRONIC CO MONITOR**

Made in the U.S.A.

- 1 The monitor shall be designed to monitor breathing air for Carbon Monoxide. It shall have a range of 0-50 ppm.
- 2 The unit shall be powered by 12 volts VDC, 24VDC, or 120 AC. You specify power source.
- 3 The unit shall incorporate an electric-chemical sensor that puts out a digitized signal (analog signal is not acceptable as these are prone to drifting). The numerical display and the flowmeter shall be backlit.
- 4 The electronics shall be enclosed in a NEMA-4 dust and drip tight enclosure.
- 5 An audible alarm shall be standard. It shall have a sound level of 95 decibels.
- 6 The unit shall be equipped with 2 alarm levels (preset but field adjustable). There shall be a red light to indicate each alarm level. Each alarm level will have terminals that can be connected to either shutdown the compressor or to operate a remote alarm light (or audible alarm).
- 7 The monitor shall be mounted on a black control panel. This panel shall be capable of accepting inlet pressures from 50-6000 psi and regulating and controlling this to the pressure and flow required by the monitor. The minimum equipment for this shall be a regulator to drop the inlet pressure down to 100 psi, a diverter valve (for calibrations), an adjustable regulator and a flow meter.
- 8 The calibration gas will have a rigid mounted inlet connection that will allow the user to choose to leave the gas installed or to remove this gas to prevent unauthorized use.
- 9 The monitor shall incorporate one-touch calibration. No tools shall be required, except to remove the cover. One cylinder of calibration gas shall be provided with the unit.
- 10 The unit shall be designed for mounting on a vertical surface, with four screws. A 6000 psi hose shall be provided to connect to the inlet air source. A tee fitting and a service shut-off valve shall be included.
- 11 A complete, bound operators manual shall be provided.
- 12 The unit shall be covered by a 12 month warranty.
- 13 The unit shall be rated for up to a 6000 psi inlet
- 14 Installation of the unit shall be provided if purchased with a compressor system.
- 15 All monitors will be pre-calibrated prior to shipping.

*** Custom Monitors available for detection of MOISTURE, OXYGEN, CARBON DIOXIDE or HYDROCARBONS. Please call for specifications and prices 1-800-937-2479.**

Prices and Specifications are subject to change without notice
Prices and Specifications are subject to change without notice

CFS5.5-3Sx4x4

three-bottle BAUER fill station

Cascade control valves and gauges
right on top of the station

**Two year
on-site warranty!**
Explosion-tested
to 5500psi

INCLUDED:

- Easy Operating Door!!
front-loading, tilt-out
- safety interlock
- adjustable regulator
- fill control panel
- four cascade control valves and
gauges, and auxiliary fill port
- fill hoses with bleeders
- cylinder scuff guard



40.5W x
21.5D x 57.5H
905 lbs.

**Class #2 fill stations are designed to contain the debris, if a
cylinder were to burst during the refill process.**