"Save Your Breath With"

MODERN SAFETY TECHNIQUES

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MODEL RP200CA-S1/8
RESPIRATORY PROTECTOR®
MANUAL

****

WARNING: **Do not attempt to operate this equipment without first reading and understanding the manual enclosed with this device. Suitability for use of this device lies solely with user.**

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CONTENTS

SPECIFICATIONS
RESPIRATORY PROTECTOR®
MODEL RP200CA-S1/8

INLET PRESSURE (MAX.)	**150 PSIG STATIC (10.4bar)**
RATED AIR FLOW (MAX.)	**1000 SCFM (472.0 L/s)**
OPERATING PRESSURE	**100 PSIG DYNAMIC (6.9bar)**
OUTLET PRESSURE RANGE	**0-125 PSIG (0-8.6 bar)**
OPERATING RELATIVE HUMIDITY (INLET AIR)	**30-100% RH**
OPERATING TEMPERATURE RANGE (INLET AIR)	**68-150°F (20-65°C)**
INLET CARBON MONOXIDE CONCENTRATION (MAX.)	**40 PPM (VOLUME)***
OUTSIDE DIMENSIONS	**SEE FIGURE NO. 3 - GENERAL LAYOUT FOR APPROXIMATE DIMENSIONS**
WEIGHT (INCLUDING MONITOR)	**1570 LBS. (714 kg.)**
GRADE 10 ELEMENT FOR 80453 PREFILTER	**80461**
GRADE 6 ELEMENT FOR 80454 PREFILTER	**80462**
THIRD STAGE CHARCOAL CARTRIDGE W/ GASKETS	**80174-203**
FOURTH STAGE CATALYST CARTRIDGE W/ GASKETS	**80174-204**

***BASED ON MAXIMUM FLOW CONDITIONS (1000 SCFM) FOR 40 HOURS MINIMUM CONTINUOUS PERFORMANCE**

GENERAL SAFETY WARNINGS

WARNING: The MST RESPIRATORY PROTECTOR MODELS:

1) SHOULD NOT be used when the air entering the filtering system is oxygen deficient. The MST Respiratory Protector® will not increase the oxygen content of the air.
2) SHOULD NOT be used in an Immediately Dangerous to Life and Health Atmosphere (IDLH) unless it is used in conjunction with a Back-Up Escape system or a supplied air Self-Contained Breathing Apparatus (SCBA), where applicable.
3) CARBON MONOXIDE MONITOR will alarm if Carbon Monoxide levels exceed requirements for Grade "D" Breathing Air set fourth by OSHA/CSA. If alarm should sound, remove respirator or activate SCBA and immediately move to safe breathable atmosphere. Have the proper qualified personnel examine the equipment and make the appropriate corrections before using again.
4) SHOULD NOT have air inlet pressure greater than 150 PSIG static (10.4bar). Personal injury could result.
5) SHOULD NOT have air outlet pressure that exceeds Manufacturers' Respirator/Hose Assembly pressure requirements. Personal injury could result.

GENERAL OPERATION

The MST Respiratory Protector, a compressed breathing air purifier, is a system designed to remove or reduce selected contaminates, including Carbon Monoxide that is found in standard compressed air lines. The Respiratory Protector gives you the advantage of connecting directly to shop air from a standard compressed air source to help provide breathing quality air to face masks, helmets, hoods and other supplied air breathing devices. This eliminates the necessity of providing a separate breathing air compressor or air supply to your workers.

The Respiratory Protector is a Four Stage Purification System, mounted on floor stand(s), with the purified air being monitored continuously for carbon monoxide.

GENERAL FILTER SYSTEM DESCRIPTION

(Refer to Figure No. 1 & 2)

Air entering the Respiratory Protector purification system at the inlet **(A)** is usually contaminated with oil, water, dirt, rust, scale and often deadly Carbon Monoxide gas. As the air passes through the Prefilter Stage **(B)**, particulates and liquid contaminates will be trapped - coalesced out (0.7 micron max. solids and liquids down to 2.0 microns at an efficiency rating of 95%). The liquids are trapped and expelled through the Automatic Float Drain **(C)**. The Differential Pressure Gauge (DPG) at **(D)** will indicate when element requires changing. The First Stage **(E)** traps and retains particulate matter down to 0.3 microns. As air enter the Second Stage **(F)**, liquid contaminates are coalesced down to 0.75 microns with an efficiency rating of 99.97% (meets Underwriters Laboratories Specification UL 586 for High Efficiency, Particulate, Air Filter Units). The liquids are trapped and expelled through Automatic Float Drain **(G).** The "DPG" at **(H)** will indicate when element requires changing. The Third Stage **(I)** contain an odor absorbing activated charcoal which also collects various gaseous Hydrocarbons (such as oil fumes, benzene, etc.). The Fourth Stage **(J)** contains a low temperature catalyst which converts Carbon Monoxide gas into Carbon Dioxide. The unique catalyst also coverts or absorbs Ozone, Nitric Oxide, Sulfur Dioxide, Nitrogen Dioxide, Hydrogen Sulfide, Ammonia, Acetaldehyde, Methyl Chloride, Methyl Ketone, Acetone and Methyl Alcohol. Finally, the air passes through a one (1) micron Filtration Disk **(K)** to complete the purification of the compressed air. The mounted gauges at **(L)** are supplied to determine the pressure drop across the Third and Fourth Stages for maintenance reference. A sample of the purified air is taken at **(M)** and is regulated at **(N)** to provide a constant air pressure to the Air Sample Flow Meter at **(O)**. The metered air sample is then continuously monitored by the Carbon Monoxide Monitor **(P)**, and checks the air quality per OSHA/CSA requirements for Carbon Monoxide. The monitor digitally displays the amount present. An audible alarm **(Q)** will alert operators if any dangerous levels of Carbon Monoxide exist.

MODEL RP200CA-S1/8
FILTER SYSTEM

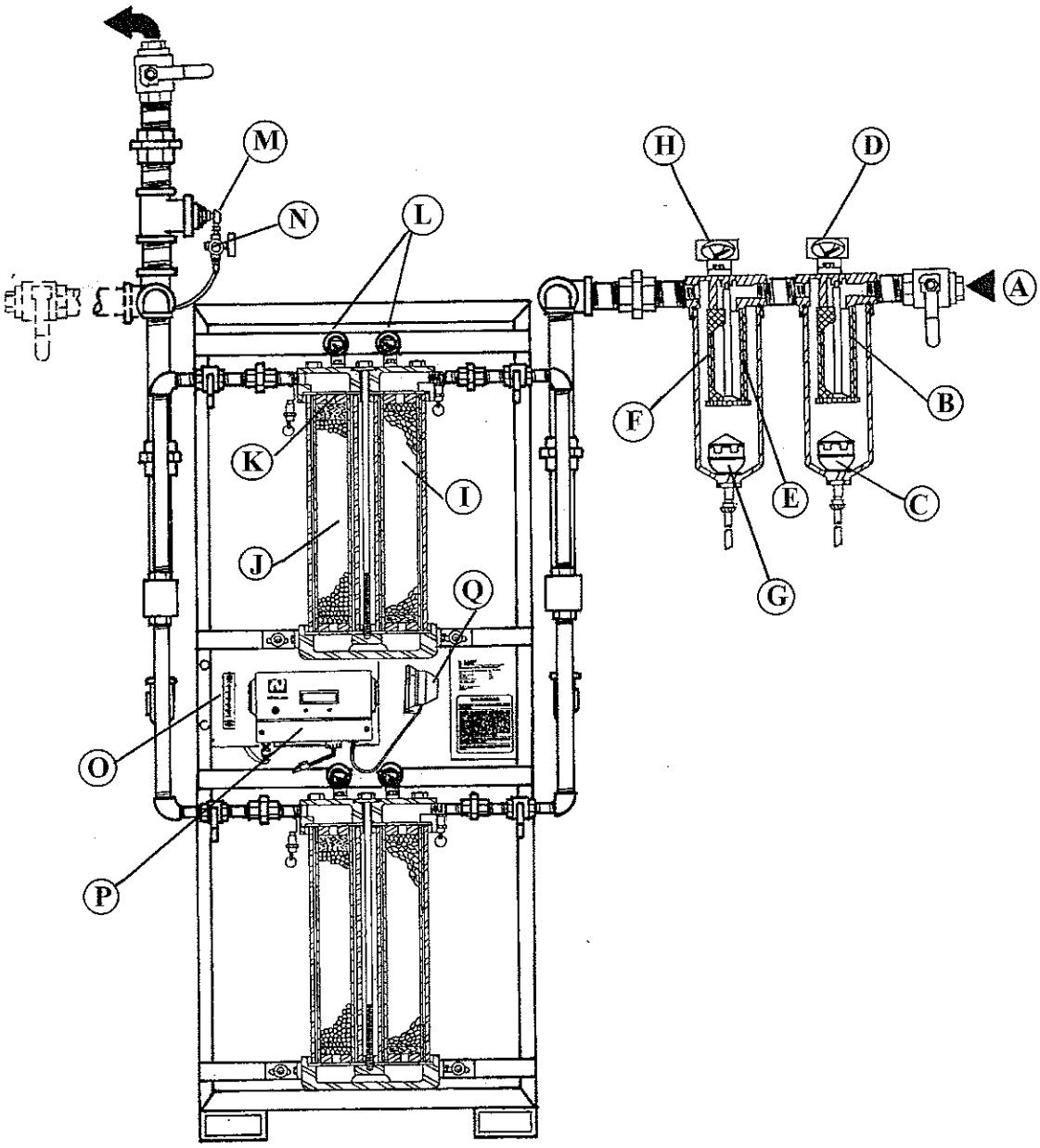

FIGURE NO. 1

MODEL RP200CA-S1/8
RESPIRATORY PROTECTOR®

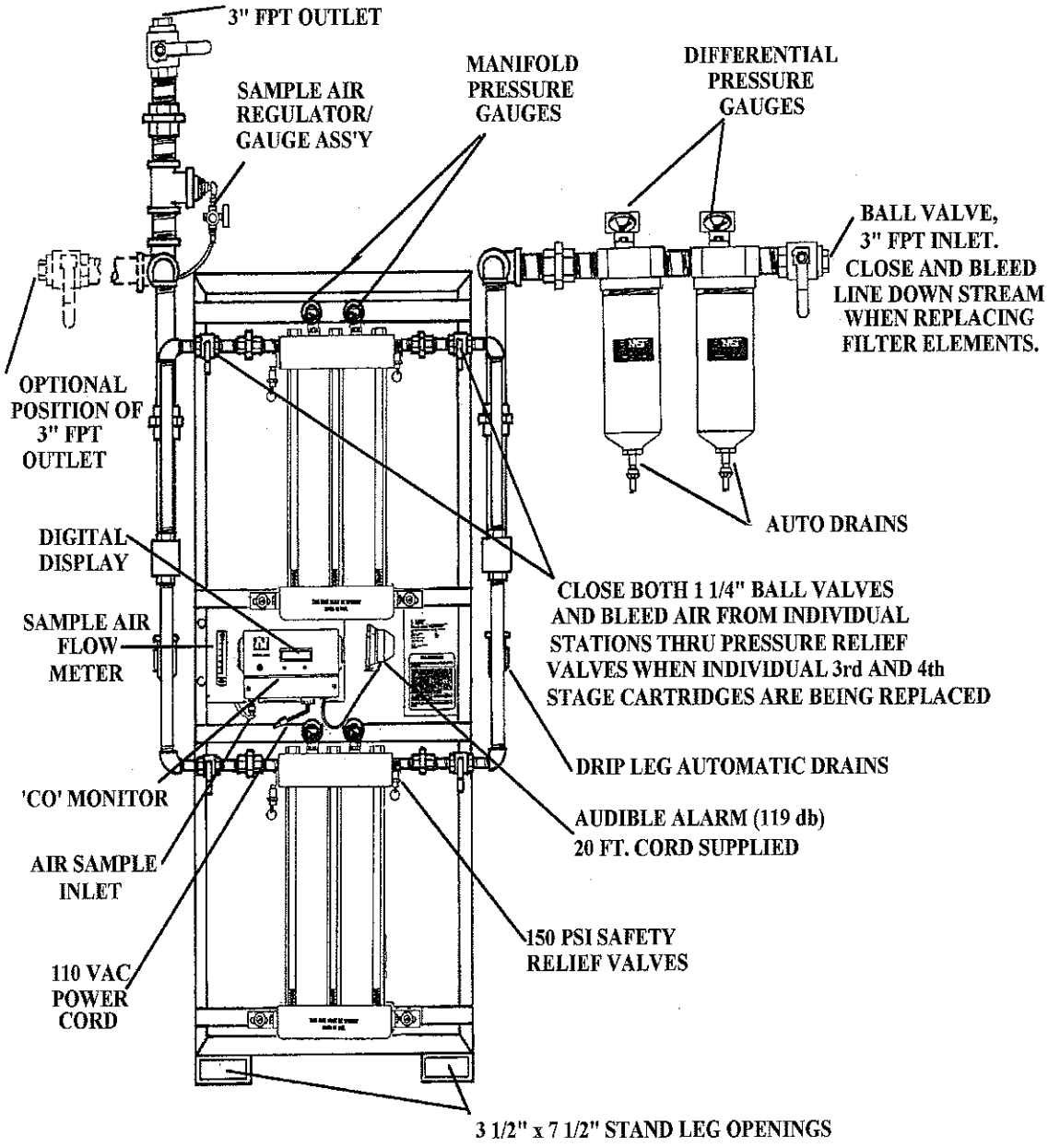

FIGURE NO. 2

GENERAL LAYOUT
(See Figure No. 3)

The Respiratory Protector System will be shipped generally in four sections: the Prefilter Inlet Piping Assembly, The Left and Right Stand Assemblies and the Outlet Piping Assembly.

First install the Prefilter Inlet Piping Assembly, being sure the winged 2" piping sections are level and equal distance from floor. Note: the 3" inlet piping section has a 3" union which can be disconnected to help install the Prefilter Inlet Piping Assembly.

Now install the Left and Right Stand Assemblies so the 2" inlet pipes of each stand assembly match up with the Prefilter winged piping 2" unions. Be sure each stand assembly is square - parallel to each other.

Finally install the Outlet Piping Assembly 2" unions to the stand Assemblies 2" outlet piping. Check system for leaks by shutting off 3" outlet ball valve and pressurizing system.

MODEL RP200CA-S1/8
GENERAL LAYOUT

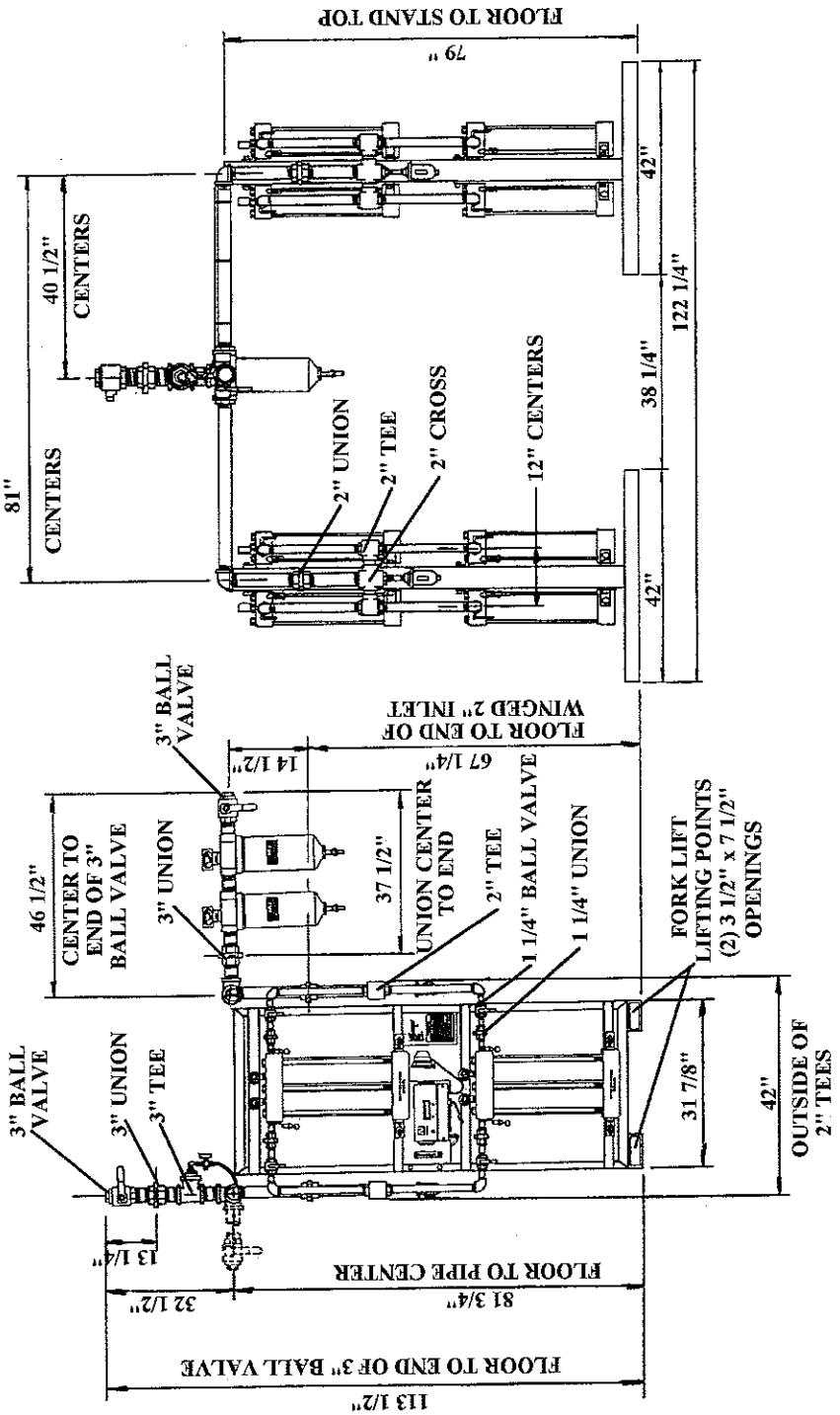

FIGURE NO. 3

GENERAL OPERATIONS

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WARNING: The MST Respiratory Protector should not:

1) be used when the air entering MST's Unit is oxygen deficient. MST's Unit will not increase the oxygen content of the oxygen deficient air.

2) be used in an "Immediately Dangerous to Life and Health" atmosphere, (IDLH), unless it is used in conjunction with a back-up escape system or a supplied air self-contained breathing apparatus, (SCBA), where applicable.

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MST, Inc. strongly recommends that a complete safety program be instated to ensure that the respiratory air is in compliance with all OSHA/CSA standards and other applicable laws regulating the use of supplied air respiratory systems. MST, Inc. recommends that the air quality be tested upon installation and periodically re-tested to ensure that the minimum requirements for breathing air are maintained.

MST, Inc. will not assume any liability for accidents or personal injury resulting from the improper use of this equipment. Service on this equipment should only be performed by qualified personnel. This system is to be used only by trained qualified personnel in accordance with a respiratory program as outlined in OSHA Regulation 29 CFR 1910.134(b).

CUSTOMER AIR SUPPLY

(Refer To Figure No. 4)

1) SUPPLIED AIR LINE - Use minimum 3" I.D. pipe to MST System.
2) SUPPLIED AIR LINE PRESSURE - Maximum air pressure at MST System's inlet should not exceed 150 PSIG. As a Safety Back-Up, MST Systems incorporate pressure relief valves rated at 150 PSIG.
3) SUPPLIED INLET AIR TEMPERATURE RANGE - 68 to 150°F (20-65°C).
4) SUPPLIED AIR CONDITIONING - May be required ahead of MST's System to control:
    a) Inlet air temperature.
    b) Large Volumes of oil/water liquid created by cooling the inlet air will be removed by the System's Prefilter Stage (rated at 2 microns abs).
5) AVOID INSTALLING MST UNIT AFTER DESICCANT DRYER - The Desiccant Dryer will produce extremely dry air, (4% R.H. or less), and MST's fourth stage catalyst requires 30-90% R.H. in the supplied air for the catalyst to work and remove Carbon Monoxide efficiently. The extremely dry air produced by a Desiccant Dryer will also cause worker discomfort, i.e. dry throat, etc.

MST RESPIRATORY PROTECTOR INITIAL INSTALLATION AND START-UP

(Refer To Figure No. 4)

1) INLET SUPPLIED AIR HOOK-UP - Prior to installing to MST's System be sure all solvent fumes and gross particulates (that could build up when initially assembling inlet piping) are purged out of line(s). This will prevent premature overloading of MST System's filter elements.
2) NEW FILTER SYSTEM CONDITIONING - Flow supplied air through new filter sets for several minutes to condition.
3) POWER MONITOR/CALIBRATE - Connect the 110 VAC/12VDC power cord to the correct switched outlet power source. Be sure the monitor's "Red Power On Light" is on, and after a (5) minute warm-up, calibrate monitor. Refer to OTOX 2002 Monitor Manual.
4) CALIBRATION GAS REQUIREMENTS - Zero Gas: Nitrogen, free of "CO". Span Gas:50 to 100 PPM of "CO" concentration in air. Calibration gas flow to monitor should be 1.0 SCFH (472 cc/minute).
5) RESPIRATOR/HOOD/HOSE ASSEMBLY HOOK-UP - If an outlet piping network system is used after MST's System, a regulator at each drop will be needed so the proper air pressure requirements per the Manufacturer's respirator manual are met. The air should be dynamically flowing through respirator/hose assemblies when the air pressure is set. DO NOT EXCEED RESPIRATOR/HOSE ASSEMBLY MANUFACTURER'S REQUIREMENTS FOR OUTLET PRESSURE. PERSONAL INJURY COULD RESULT.
6) EXTREME TEMPERATURE CHANGES - Avoid; Monitor best performs at a temperature range of 32-104°F (0-40°C). Always calibrate monitor after it has stabilized in the surrounding temperature where system is to be used.

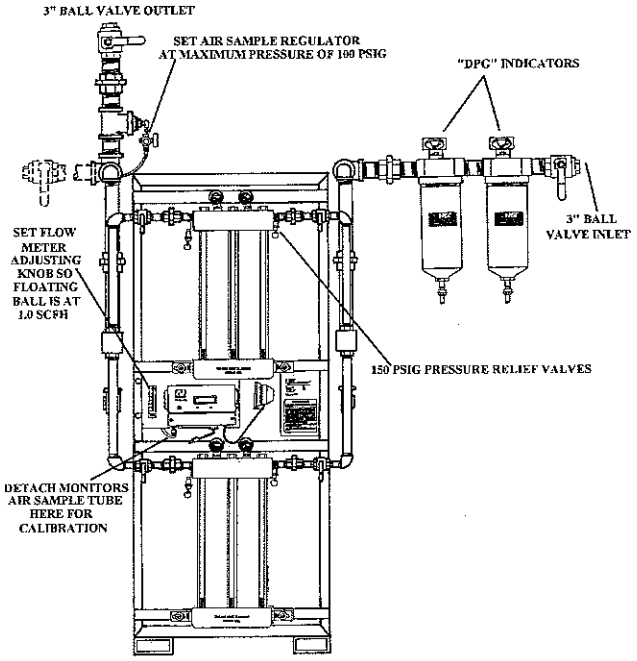
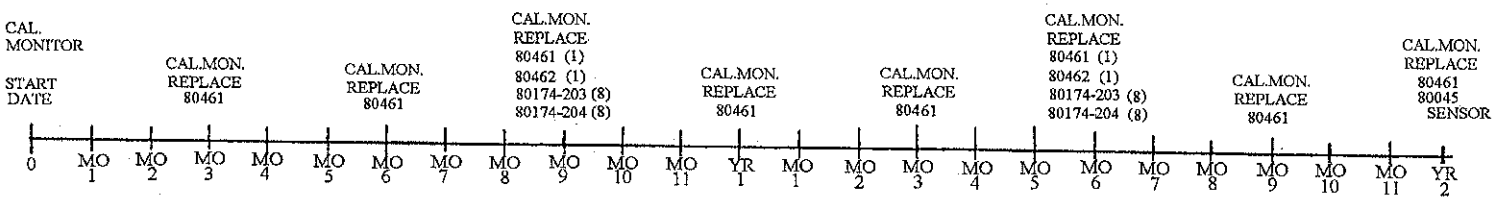


FIGURE NO. 4

MST RESPIRATORY PROTECTOR
GENERAL OPERATION AND MAINTENANCE

1) OTOX 2002 MONITOR - Utilizes an electrochemical sensor to measure the carbon monoxide content of the respirable air. If a problem has developed in the system, the monitor will alarm due to one or more of the following conditions:
   a) Monitor is out of calibration. The monitor should be calibrated monthly if used continuously and prior to use if used on a non-continuous basis. Calibrate monitor as outlined in the OTOX 2002 MONITOR MANUAL.
   b) If the monitor can be and is calibrated, but the alarm still sounds, the 4th stage filter cartridge life is exhausted. Replace cartridges as outlined in the FILTER REPLACEMENT INSTRUCTIONS/ESTIMATED MAINTENANCE REQUIREMENTS, pages (13 - 16) .
   c) If the monitor can not be calibrated, the carbon monoxide sensor may require replacement. See OTOX 2002 MONITOR MANUAL for replacement instructions and other troubleshooting information. The OTOX 2002 MONITOR has a two (2) year warranty. All warranty work must be performed at factory.
   d) If the monitor was calibrated in a surrounding temperature other than where the system was being used and the temperature difference was 36°F (20°C) or greater, the monitor may give a false alarm due to its characteristics. Always calibrate the monitor in the temperature conditions where the monitor is to be used in. Monitor best performs at temperature range of 32 to 104°F (0 to 40°C).
2) OTOX 2002 MONITOR - Alarms should be checked prior to use. See OTOX 2002 Monitor Manual.
3) OTOX 2002 MONITOR - POWER MONITOR/CALIBRATE - Connect the 110VAC/12VDC to the correct switched outlet power source. Be sure the monitor's "Red Power On Light" is on, and after a (5) minute warm-up, calibrate monitor. Refer to OTOX 2002 Monitor Manual.
4) OTOX 2002 MONITOR - Flow of the air sample to monitor should be checked periodically to ensure air sample is flowing to monitor at 1.0 SCFH. The air sample regulator at the 3" tee outlet should be set at a maximum pressure of 100 psig.
5) MST RESPIRATORY PROTECTOR® SYSTEM - All filters should be replaced every (9) months unless the air quality conditions warrant more or less frequent replacement. Replace all (18) filter cartridges if:
   a) The "CO" monitor alarms (fourth stage catalyst is used up).
   b) The operator detects a petroleum smell and or taste in his purified air (third stage charcoal is used up).

ESTIMATED MAINTENANCE REQUIREMENTS - MODEL RP200BA-S1/8 1000 SCFM RESPIRATORY PROTECTOR AIR PURIFICATION SYSTEM



THE ABOVE IS A RECOMMENDED MAINTENANCE SCHEDULE AND IS FOR ESTIMATING PURPOSES ONLY. ADVERSE CONDITIONS, UNEXPECTED AIR CONTAMINATION, ETC. CANNOT BE CONTROLLED BY MST, AND MST CANNOT WARRANT ACTUAL FILTER LIFE OR EQUIPMENT LIFE EXCEPT FOR OUR STANDARD WARRANTY ON DEFECTS IN MATERIALS AND WORKMANSHIP DURING OUR STANDARD WARRANTY PERIOD. CUSTOMER MUST EVALUATE THEIR OWN PARTICULAR CONDITIONS TO DETERMINE THEIR SPECIAI REQUIREMENTS. PLEASE SEE OUR STANDARD WARRANTY POLICY.

FILTER SET
SERVICE INSTRUCTIONS

(Refer To Figure No. 5 and 6)

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WARNING: Always turn off air supply and bleed air pressure before disassembling unit or SERIOUS INJURY COULD RESULT.

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MST, Inc. recommends replacing all (18) filter cartridges after (9) months of use unless conditions warrant more or less frequent replacement. To replace the filter cartridges in the RESPIRATORY PROTECTOR® follow these steps:

1) PREFILTER STAGE, GRADE 10, ELEMENT REPLACEMENT
   Element change is required when the Differential Pressure Gauge ('DPG') indicates a 6 - 10 PSID, 12 PSID max., (Refer to Figure No. 5).

   a) First unscrew Bowl Assembly **(1)**. A strap wrench may be required to break bowl, O-ring/manifold seal. Clean bowl ass'y in mild soap and water and blow dry with low pressure air.
   b) Remove Coalescing Element **(2)** by unscrewing End Cap Retaining Nut **(3)**.
   c) Inspect the Filter Manifold **(4)** for dirt/contaminates and clean as required. Inspect O-ring **(5)** for cuts etc. and replace if required. Clean and apply light film of petroleum jell on O-ring before re-installing.
   d) Install new Coalescing Element and tighten End Cap Retaining Nut. Be sure Element is seated squarely on Manifold's boss and End Cap.
   e) Apply light film of petroleum jell on Bowl's beveled edge and threads to provide good seal. HAND TIGHTEN ONLY to Manifold.
   f) Dispose of used Coalescing Element according to local, state and federal regulations.

2) THE FIRST/SECOND DUAL STAGE, GRADE 6, ELEMENT REPLACEMENT
   The Dual stage element change is required when the Differential Pressure Gauge ('DPG') indicates an 8 -10 PSID, (Refer to Figure No. 5).

   a) Replace the Dual Stage Element **(6)** using the above "Prefilter Stage Element" replacement instructions.
   b) Dispose of used Prefilter Dual Stage Element according to local, state and federal regulations.

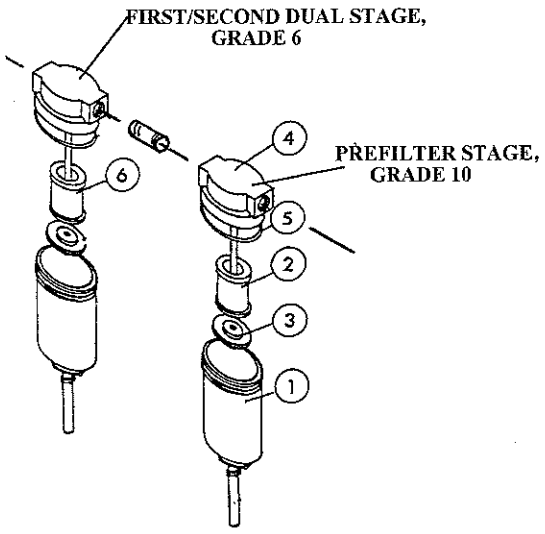


FIGURE NO. 5

3) THIRD/FOURTH STAGE CARTRIDGE REPLACEMENT
(Third Stage - Charcoal, Fourth Stage - Catalyst, Refer to Figure No. 6)

a) Loosen Bracket Bolt **(1)** from Bracket **(2)**, (do not remove), on both sides of Base **(3)**.
b) Loosen the five Manifold Bolts **(4)** and remove the front two Bolts. Now slide out the Third **(5)** and Fourth **(6)** Stage Aluminum Tube Assemblies.
c) Remove the four old Gaskets **(7)** from the recessed areas in Base **(3)** and Manifold **(8)**; cleaning sealing surfaces from any gasket material, debris.
d) Slide old Third Stage Filter Cartridge **(9)** out of aluminum tube. Clean aluminum tube in mild soap and water, dry and install new Third Stage Filter Cartridge. Be sure the Flow Direction Arrow on Third Stage Filter Cartridge is pointing down. Remove End Sealing Labels **(10)** from both ends of cartridge completely.
e) Follow same procedure for the Fourth Stage Filter Cartridge **(11)** replacement as in step (d). Be sure the Flow Direction Arrow on Fourth Stage Filter Cartridge is pointing up. Also remove End Sealing Labels **(10)** from both ends of cartridge.
f) Before sliding the Third and Fourth Stage Aluminum Tube Assemblies back in place, install Gaskets **(7)**. Coat both sides of each gasket with petroleum jelly and install in recessed areas in Base **(3)** and Manifold **(8)**. After Aluminum Tube Ass'y are installed, check to make sure the Gaskets **(7)** are positioned properly top and bottom - both ass'y.
g) Replace the front two Manifold Bolts **(4)** and tighten all bolts in sequence from center outward to 25 foot-pounds. Repeat sequence and torque bolts to 30 foot-pounds. Recheck for proper torque limit.
h) Tighten Bracket Bolts **(1)** against Brackets **(2)**, on both sides.
i) Dispose of used cartridges according to local, state and federal regulations.

3) FINAL CHECK AND CALIBRATION
   a) Pressurize system and check for leaks.
   b) Flush system with compressed air for several minutes.
   c) Calibrate Carbon Monoxide Monitor as outlined in OTOX 2002 MONITOR MANUAL.

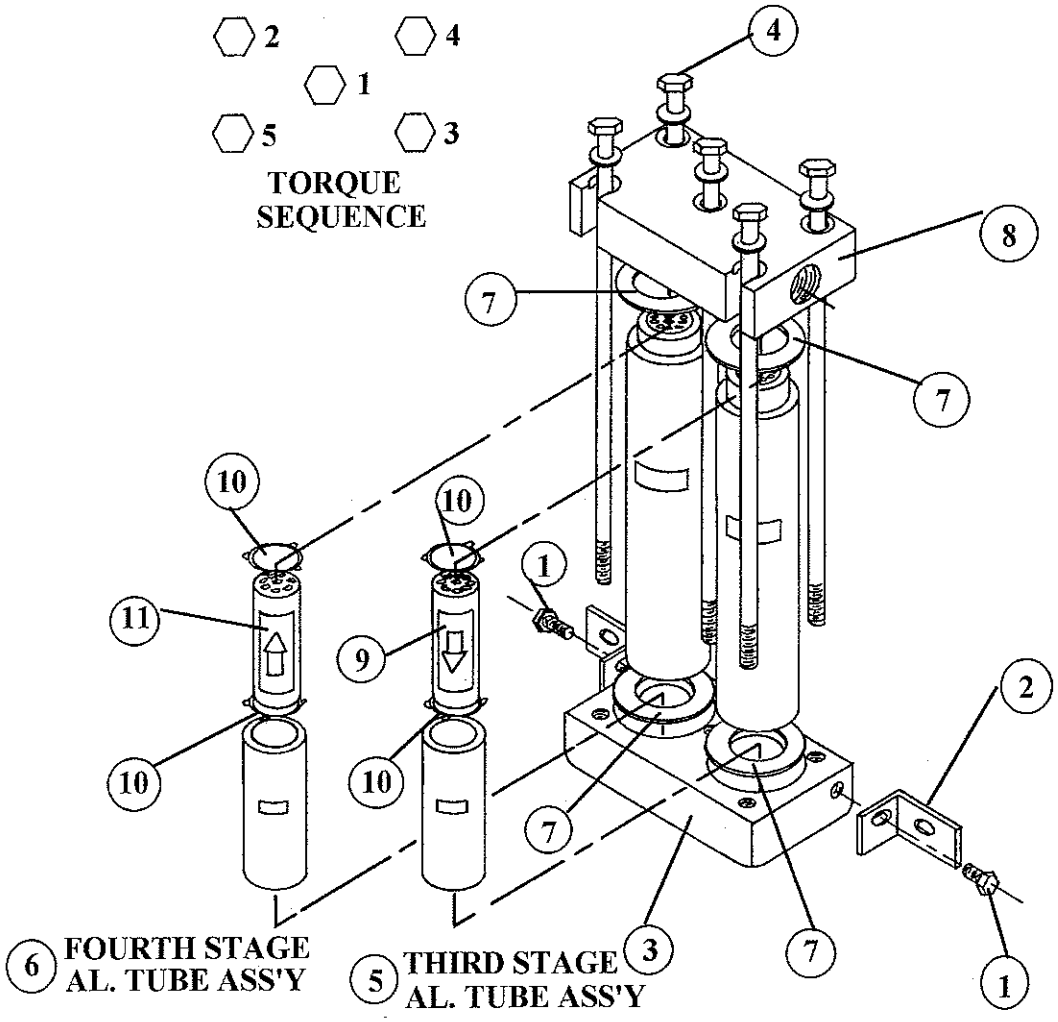


FIGURE NO. 6

RECORD KEEPING

Record all periodical air quality checks, monitor calibration date, filter cartridge change intervals and any other service performed on the MST RESPIRATORY PROTECTOR®.

MST INC. SHALL NOT BE LIABLE FOR ANY INJURY, LOSS OR DAMAGE, (DIRECT OR CONSEQUENTIAL), ARISING OUT OF THE USE OF OR THE INABILITY TO USE THIS PRODUCT, BEYOND THE REPLACEMENT OF DEFECTIVE MATERIALS OR WORKMANSHIP. USER OF SUPPLIED AIR RESPIRATORS SHOULD EVALUATE THEIR OWN PARTICULAR APPLICATION AND PERFORM THEIR OWN TESTS FOR AIR QUALITY TO DETERMINE THE SUITABILITY FOR USE OF THIS PRODUCT.

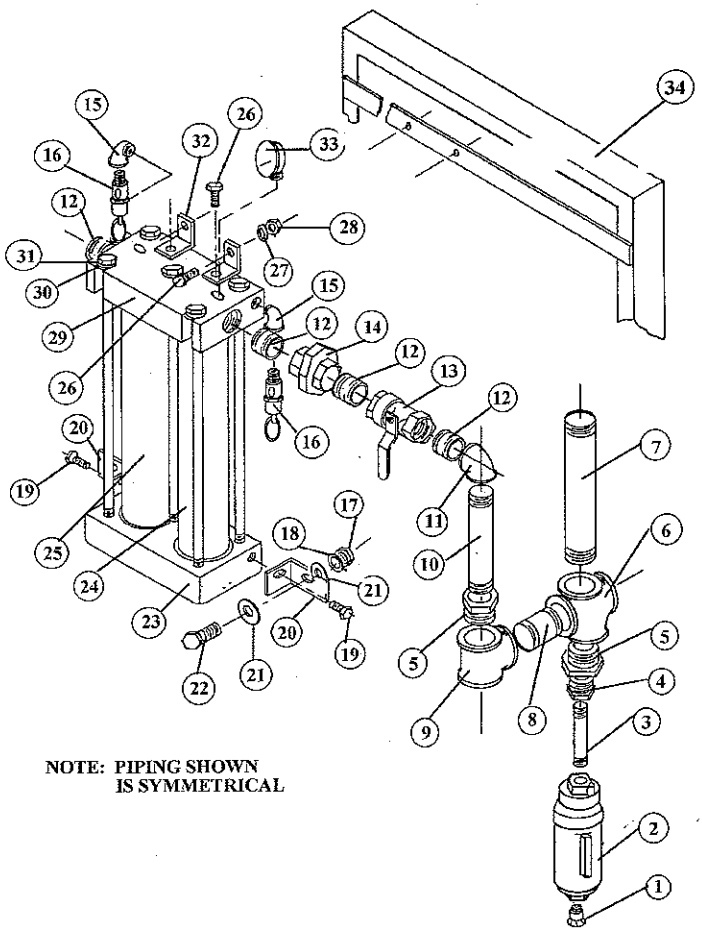
For further information, or questions about service or maintenance care of this unit, contact your local distributor or MST.

MST, INC.
SERVICE RECORD
RESPIRATORY PROTECTOR®
MODEL RP200CA-S1/8

DATE OF SERVICE	SERVICE PERFORMED

RESPIRATORY PROTECTOR® MODEL RP200CA - S1/8
UNIT'S PARTS AND PIPING (THE TWO STAND ASS'Y)

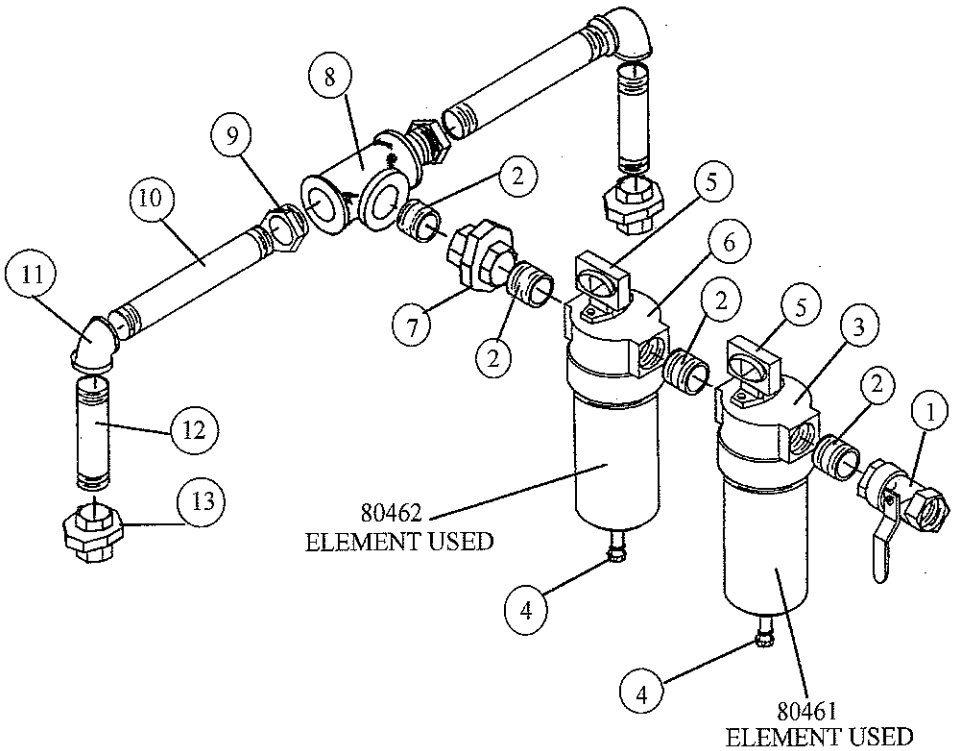
1) 80051 (4) Tube Locking Collar
2) 80446 (4) Drip Leg Drain
3) S603-039 (4) Brass Pipe, ½" x 6"
4) S638-020 (4) Brass Bushing, 1 1/4" x ½"
5) S638-019 (20) Brass Bushing, 2" x 1 1/4"
6) 80424 (4) Brass Cross, 2"
7) 80459 (4) Brass Pipe, 2" x 12"
8) S603-091 (8) Brass Pipe, 2" x 2 ½"
9) 80449 (8) Brass Tee, 2"
10) 80460 (16) Brass Pipe, 1 1/4" x 18"
11) S622-006 (16) Brass Elbow, 1 1/4"
12) S603-077 (48) Brass Pipe, 1 1/4" x 3"
13) 80221 (16) Brass Ball Valve, 1 1/4"
14) 80447 (16) Brass Union, 1 1/4"
15) S623-002 (16) Brass Elbow, 1/4"
16) 80014 (16) Pr. Relief Valve, 1/4" x 150 PSI
17) S503-010 (16) Nut, 1/4" -20
18) S412-009 (16) Locking Washer, 1/4"
19) S006-148 (16) Bolt, 5/16-18 x ½"
20) 80114 (16) Base Bracket
21) 80115 (32) Fender Washer, 1/4"
22) S005-150 (16) Bolt, 1/4"-20 x 3/4"
23) 80172 (8) Base
24) 80176-2 (8) 3rd Stage Al. Tube
25) 80176-2 (8) 4th Stage Al. Tube
26) S006-150 (32) Bolt, 5/16 - 18 x 3/4"
27) 80181(16) Locking Washer, 5/16"
28) S503-012 (16) Nut, 5/16" -18
29) 80173 (8) Manifold
30) 80197 (40) Heavy Flat Washer, 1/2"
31) 80187 (40) Bolt, ½" -13 x 24"
32) 80196 (16) Manifold Bracket
33) 80452 (16) Gauge, 1/8", 0-160 PSI
34) 80465 (2) Stands



NOTE: PIPING SHOWN IS SYMMETRICAL

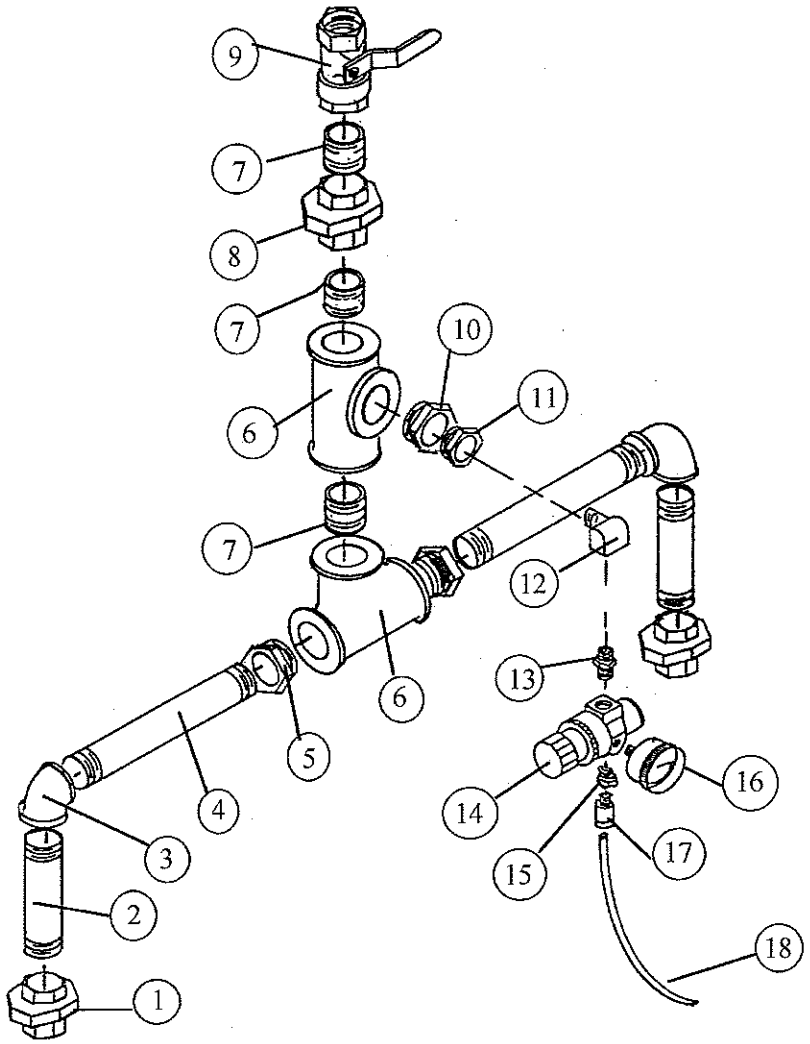
RESPIRATORY PROTECTOR® MODEL RP200CA-S1/8
INLET PIPING ASSEMBLY

1) 80455 (1) Brass Ball Valve, 3"
2) S603-114 (4) Brass Pipe, 3" x 6"
3) 80453 (1) Prefilter, Grade 10
4) 80051 (2) Tube Lock Collar
5) 80422 (2) Differential Pressure Gauge
6) 80454 (1) First/Second Stage Filter
7) 80456 (1) Brass Union, 3"
8) 80457 (1) Brass Tee, 3"
9) S638-021 (2) Brass Bushing, 3" x 2"
10) 80458 (2), Brass Pipe, 2" x 36"
11) S622-008 (2) Brass Elbow, 2"
12) 80459 (2) Brass Pipe, 2" x 12"
13) 80448 (2) Brass Union, 2"



RESPIRATORY PROTECTOR® MODEL RP200CA-S1/8
OUTLET PIPING

1)	80448 (2) Brass Union, 2"	10)	S638-022 (1) Brass Bushing, 3" x 1 1/4"
2)	80459 (2) Brass Pipe, 2" x 12"	11)	S638-020 (1) Brass Bushing, 1 1/4" x ½"
3)	S622-008 (2) Brass Elbow, 2"	12)	S623-004 (1) Brass Elbow, ½"
4)	80458 (2) Brass Pipe, 2" x 36"	13)	S608-006 (1) Brass Nipple, ½" x 3/8"
5)	S638-021 (2) Brass Bushing, 3" x2"	14)	80112 (1) Regulator
6)	80457 (2) Brass Tee, 3"	15)	S638-006 (1) Brass Bushing, 3/8" x 1/8"
7)	S603-114 (3) Brass Pipe, 3" x 6"	16)	80076 (1) Gauge, 1/4", 0 - 160 PSI
8)	80456 (1) Brass Union, 3"	17)	80398 (1) Sample Tube Connector
9)	80455 (1) Brass Ball Valve, 3"	18)	80260-B (1) Sample Air Tubing



RESPIRATORY PROTECTOR® MODEL RP200CA-S1/8
CARBON MONOXIDE - MOUNT PLATE PARTS

1) 80077 (1) 'CO' Monitor
2) 80208-B (1) Sample Tubing x 9"
3) S037-011 (2) Screw, #10-24 x 1"
4) S037-007 (1) Screw, #10-24 x ½"
5) S502-008 (3) Nut, #10-24
6) S412-007 (3) Locking Washer, #10
7) 80213 (1) Flowmeter
8) S623-001 (1) Brass Elbow, 1/8"
9) 80051 (1) Tube Locking Collar
10) 80377 (1) Elbow, Tube
11) (2) Screw - SH, #10-32 x 5/8"
12) 8008403 (1) Alarm, 20 FT Cord
13) 80466 (1) Monitor Bracket
14) (2) Bolt, 3/8" -16 x 1"
15) 12021 (2) Washer, 3/8"