"Save Your Breath With"

MODERN SAFETY TECHNIQUES

11388 Breininger Rd.
P.O. Box 87
Hicksville, OH 43526
Website: www.modsafe.com

Phone: (800) 542-6646
(888) mod-safe
(419) 542-6645
Fax: (419) 542-6475

Email: modsafe@bright.net

MODEL RP200CMST/O2-S1
RESPIRATORY PROTECTOR®
(CO/O2 MONITOR VERSION MANUAL)

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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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4/04

CONTENTS

SPECIFICATIONS
RESPIRATORY PROTECTOR®
MODEL RP200CMST/O2-S1

INLET PRESSURE (MAX.)	**150 PSIG STATIC (10.4bar)**
RATED AIR FLOW (MAX.)	**200 SCFM (94.4 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^{O}F (20-65^{O}C)**
OUTSIDE DIMENSIONS	**36"L x 36"W x 7.75" D (915mm x 915mm x 197mm)**
WEIGHT (INCLUDING MONITOR)	**125 LBS. (56.7 kg.)**
REPLACEMENT FILTER SET (INCLUDES ALL ELEMENTS)	**FX200C**
REPLACEMENT PREFILTER ELEMENT ONLY	**80238-B**

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) OXYGEN MONITOR MODULE will alarm if oxygon level falls to 19.5% or less. If alarm should sound remove respirator or activate SCBA and immediately move to a safe breathing atmosphere. Have the proper qualified personnel examine the equipment and make the appropriate corrections before using again.
5) SHOULD NOT have air inlet pressure greater than 150 PSIG static (10.4bar). Personal injury could result.

The MST Respiratory Protector® is a Four Stage Purification System designed to remove or reduce select contaminates including Carbon Monoxide that is found in compressed air lines while monitoring for carbon monoxide/oxygen percentage through the Carbon Monoxide/Oxygen Monitor. The Respiratory Protector can be connected 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 apparatus.

GENERAL FILTER SYSTEM DESCRIPTION

(Refer to Figure No.1 & 2)

Air entering the MST Respiratory Protector® at the inlet **(A)** is usually contaminated with oil, water, dirt, rust, scale, gaseous Hydrocarbons and often deadly Carbon Monoxide. As the air passes through the First Stage **(B)** of the MST Prefilter, particulate matter is trapped and retained down to 0.3 microns. The air then enters the Second Stage **(C)** of the Prefilter which coalesces liquid contaminates 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 liquid contaminates are trapped in the lower chamber of the prefilter and expelled out through the Automatic Float Drain **(D)**. The Differential Pressure Gauge (DPG) at **(E)** will indicate when prefilter element requires changing. The Third Stage **(F)** contains a deep bed of odor absorbing activated charcoal which collects various gaseous Hydrocarbons (such as oil vapors, benzene, etc.). The Fourth Stage **(G)** contains a low temperature catalyst which converts Carbon Monoxide gas into Carbon Dioxide. The unique catalyst also converts or absorbs ozone, Nitric Oxide, Sulfur Dioxide, Nitrogen Dioxide, Hydrogen Sulfide, Ammonia, Acetaldehyde, Methyl Chloride, Methyl Ethyl Ketone, Acetone and Methyl Alcohol. The air then passes through a final particulate filter disc **(H)** before entering the Regulator **(I)**, which may be used to adjust the air pressure going to the respirator(s). A sample of the filtered air is taken at **(J)** and passed through the Carbon Monoxide/Oxygen Monitor **(K)**. The Carbon Monoxide/Oxygen Monitor continuously checks the air quality, per OSHA/CSA requirements for Carbon Monoxide and Oxygen, and digitally displays the amount present. An audible and visual alarm will alert operators if any dangerous levels of Carbon Monoxide or Oxygen deficiency exist.

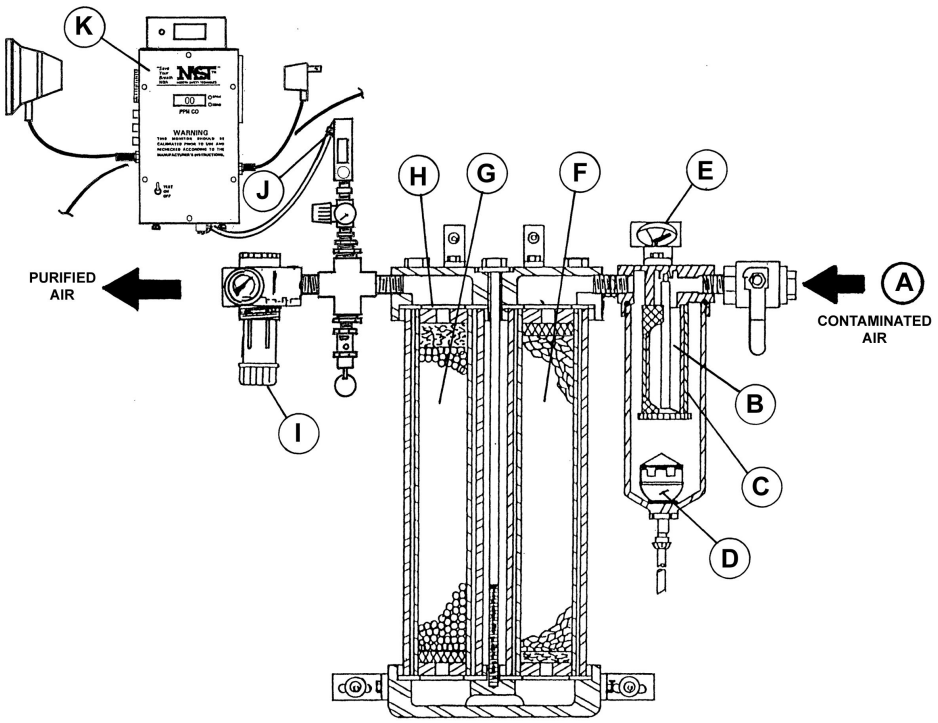

FIGURE NO.1

MODEL RP200CMST/O2-S1
RESPIRATORY PROTECTOR®

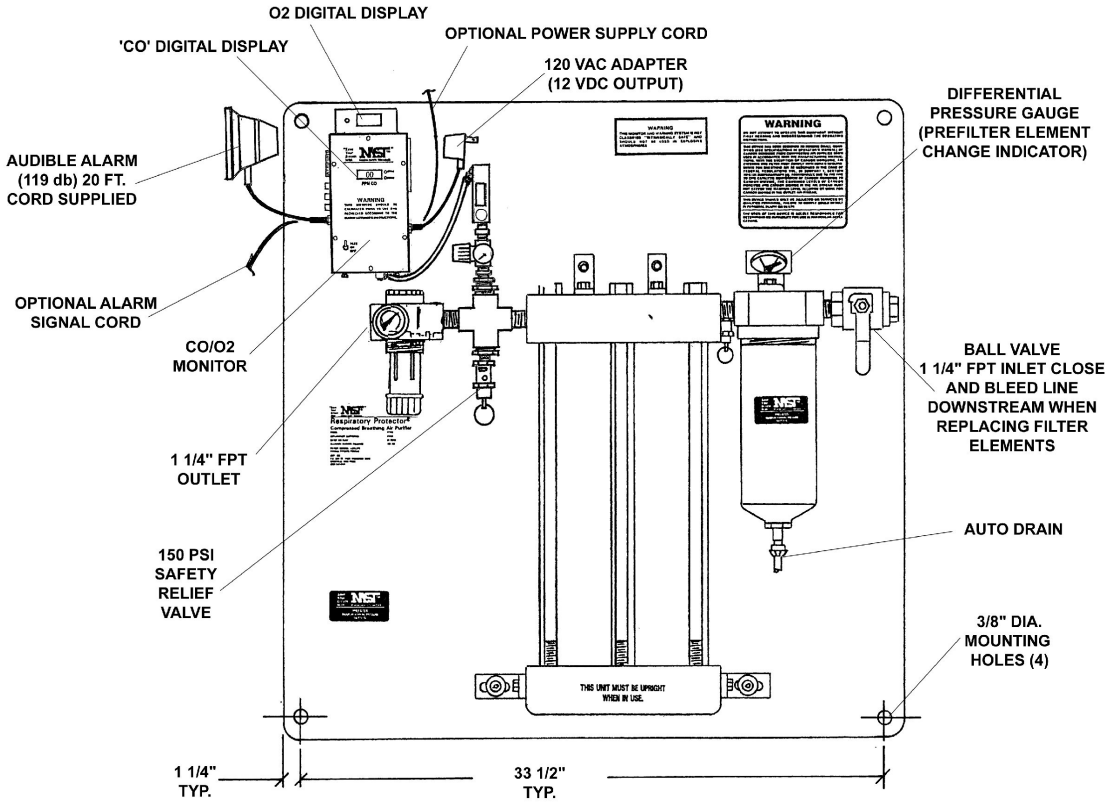

FIGURE NO. 2

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. 3)

1) SUPPLIED AIR LINE - Use minimum 1 1/4" I.D. pipe to MST Unit.
2) SUPPLIED AIR LINE PRESSURE - Maximum air pressure at MST Unit's inlet should not exceed 150 PSIG. As a Safety Back-Up, MST Units incorporates a pressure relief valve 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 Unit to control:
    a) Inlet air temperature.
    b) Large Volumes of oil/water from entering MST Unit. A coarse oil/water extractor, (rated at 2-microns abs.), may be required if excessive oil/water conditions are present. Installation of the extractor should be located as close to MST Unit's inlet hook-up as possible. MST, Inc. has coarse oil/water extractors available as an option.
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. 3)

1) INLET SUPPLIED AIR HOOK-UP - Prior to installing to MST's Unit 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 Unit's filter elements.
2) NEW FILTER SYSTEM CONDITIONING - Flow supplied air through new filter sets for several minutes to condition.
3) POWER MONITOR/CALIBRATE - Plug the 120 VAC Adapter into right side of monitor and into switched 110 VAC outlet power source (Installing the two 9 VDC batteries in monitor is optional). Switch monitor's toggle switch into the "ON" position and leave monitor warm-up for (5) minutes. Initially the monitor's green LED will blink and then come on full bright. The RED Alarm Led will flicker faintly (approx. every 0.7 senconds). Plug in the Remote Alarm (supplied with 20 ft. cord) into the "REM ALARM" jack located on the left side of monitor. After the warm-up period, check monitor's circuits/audible-visual alarm system by pushing the toggle switch up into the "TEST" position and hold. If the monitor is functioning properly, the following will occur:
    a) Red/Amber LED - will come on steady
    b) Green LED - will blink briefly, then come on steady
    c) Audible alarm will sound and the remote alarm jack ("REM ALARM") will be energized.

   Monitor's calibration should be checked now. Refer to MST Monitor Manual.
4) CALIBRATION GAS REQUIREMENTS - Zero Gas: 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) REGULATOR/SAMPLE AIR FLOW METER - Needs to be set so proper air sample flow will be metered to the monitor. The regulator needs to be adjusted up to a maximum 100 psig and the air flow meter ball set between 0.5 - 1.5 SCFH or in the green boxed area, (depending on style of scale meter has).
6) RESPIRATOR/HOOD/HOSE ASSEMBLY HOOK-UP - If an outlet piping network system is used after MST's Unit, 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.
7) After pressurizing system and respirators air flow set, adjust the air sample metering's adjustment knob so the black floating ball is within the GREEN BOXED area etched on valve body.
8) 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.

INITIAL START-UP AND INSTALLATION
MODEL RP200CMST/O2-S1 RESPIRATORY PROTECTOR

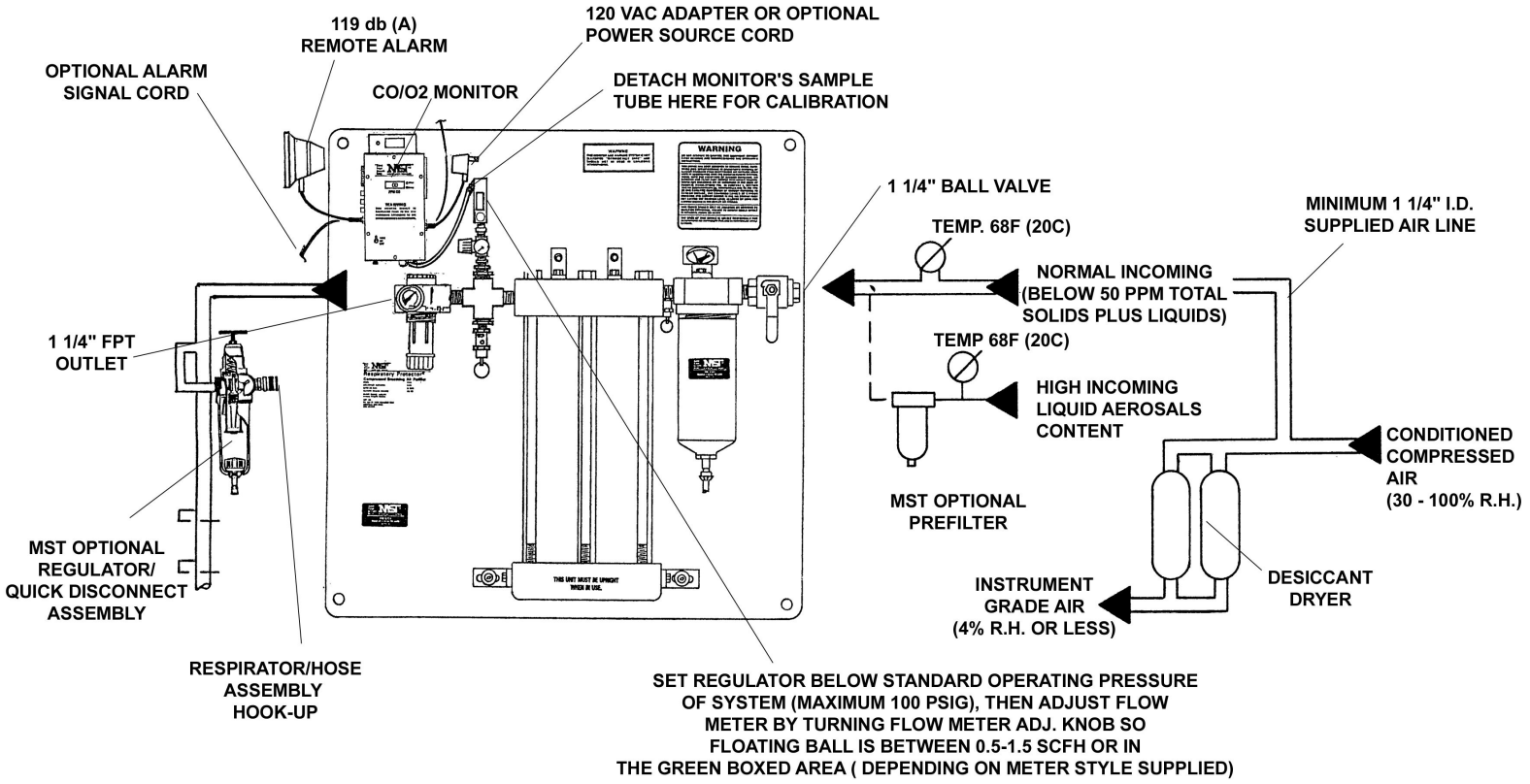

FIGURE NO. 3

MST RESPIRATORY PROTECTOR
GENERAL OPERATION AND MAINTENANCE

1) MST MONITOR - Utilizes electrochemical sensors to measure the carbon monoxide and oxygen 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 MST MONITOR MANUAL.
    b) If the monitor can be and is calibrated, but the alarm still sound, one or both conditions could exist:
        1- The filter cartridge life is exhaused; the 'CO' digital is at or greater than alarm level setting per OSHA/CSA requirements. Replace filter cartridges.
        2- Oxygen dificient air source exists; the 'O2' digital display reads 19.5% or less. Relocate air compressor intake to area not oxygen dificient.
    c) If the monitor can not be calibrated, the carbon monoxide sensor may require replacement. See MST MONITOR MANUAL for replacement instructions and other troubleshooting information. The MST 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) MST MONITOR - Alarm should be checked prior to use.
3) MST MONITOR - Power supply is (2) 9 -Volt transister-type batteries, (unless optional power supply used). The batteries will powe the monitor continuously for approximately (30-35) hours. When the batteries output falls below (7.3) volts, the Amber LED "Low Battery" light will come on, indicating the batteries require replacement.
4) MST MONITOR - Flow of the air sample to monitor should be checked periodically to ensure sample valve is not clogged. This situation normally occurs when customers' supplied air has excessive liquids in it and the filters in the MST unit are not routinely changed. Periodically check that the black floating ball is within the GREEN BOXED area etched on the valve body when air is flowing to respirators.
5) MST RESPIRATORY PROTECTOR® SYSTEM - Filters should be replaced every (6) months unless the air quality conditions warrant more or less frequent replacement. Replace all (3) 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).

    NOTE: If the supplied air entering MST's unit has high volumes of liquids in it, the filter set life may be greatly reduced. This would be indicated when the 'DPG' pointer is in the 'red' area of gauge. If this happens, the Prefilter Dual Stage Element should be changed. See FILTER SET INSTRUCTIONS.

6) MST RESPIRATORY PROTECTOR® SYSTEM - New filter set:
   a) Has an indefinite shelf life, but should be stored in a cool/dry storage area.
   b) When first installed in MST's unit the filters should be conditioned by flowing the customer's supplied air through system for several minutes.

NOTE: If MST's unit is not to be used for an extended period of time, before storing, check 3rd and 4th stage filters for presence of liquid/moisture. If moisture present, dry system and replace all filters. Also, if moisture present, consider changing filter set more frequent and or installing MST's OPTIONAL PREFILTER prior to MST's system hook-up.

FILTER SET
SERVICE INSTRUCTIONS

(Refer To Figure No. 4)

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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 three (3) filter cartridges after (6) months of use unless conditions warrant more or less frequent replacement. The Prefilter Dual Stage Element may require changing more frequent if excess particulates and/or oil is present in supplied air line. (See Item1) below for explanation. To replace the filter cartridges in the RESPIRATORY PROTECTOR® follow these steps:

1) PREFILTER FIRST/SECOND DUAL STAGE ELEMENT REPLACEMENT

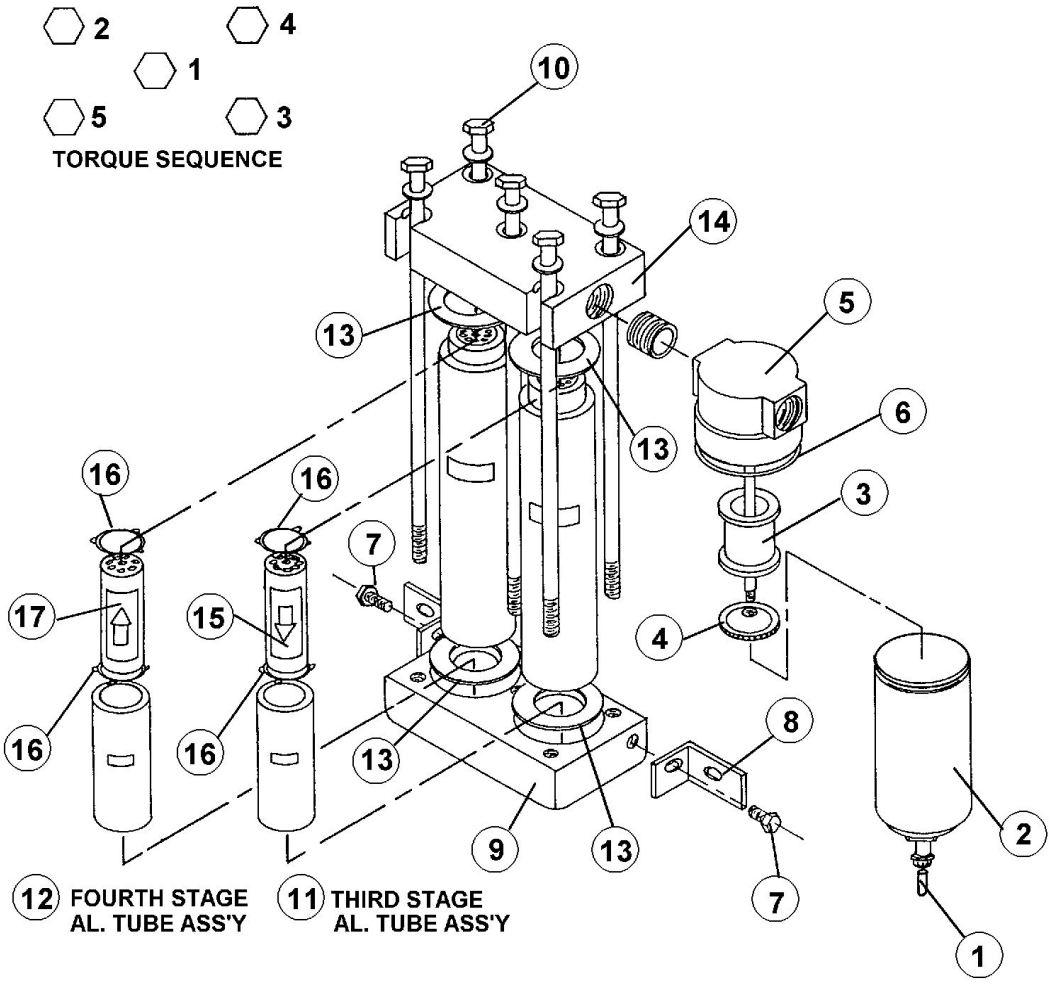
Element change may be required prior to replacing all three elements if the 'DPG' pointer is in the 'red' area of gauge. This indicates a minimum of a 12 psi pressure drop across element. Check the 'DPG' periodically and change element when pointer is in 'red', or prolonged pressure build up will "blow hole" through element and the differential pressure will dissipate and the pointer will go back to 'green' area indicating an efficient filtering element.

   a) First unlock tube locking collar and then pull Drain Tube **(1)** down. Then unscrew Prefilter Bowl Assembly **(2)**, clean in mild soap and water and blow dry with low pressure air.
   b) Remove Dual Stage Element **(3)** by unscrewing End Cap Retaining Nut **(4)** .
   c) Inspect the Prefilter Manifold **(5)** for dirt/contaminates and clean as required. Inspect O-Ring **(6)** for cuts, etc. and replace if required.
   d) Install new Dual Stage Element and Tighten End Cap Retaining Nut. Be sure Element is seated squarely on Manifold boss and End Cap.
   e) Apply light film of petroleum jelly on Bowl's beveled edge to provide good seal between Bowl and O-Ring. HAND TIGHTEN ONLY.
   f) Lock Drain Tube into tube locking collar.
   g) Dispose of used Dual Stage Element according to local, state and federal regulations.

2) THIRD/FOURTH STAGE CARTRIDGE REPLACEMENT
   a) Loosen Bracket Bolts **(7)** from Brackets **(8)**, (do not remove), on both sides of Base **(9)**.

b) Loosen the five Manifold Bolts **(10)** and remove the front two Bolts. Now slide out the Third **(11)** and Fourth **(12)** Stage Aluminum Tube Assemblies.
c) Remove the four old Gaskets **(13)** from the recessed areas in Base **(9)** and Manifold **(14)**; cleaning sealing surfaces from any gasket material debris.
d) Slide old Third Stage Filter Cartridge **(15)** 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 **(16)** from both ends of cartridge completely.
e) Follow same procedure for the Fourth Stage Filter Cartridge **(17)** replacement as in step (d). Be sure the Flow Direction Arrow on Fourth Stage Filter Cartridge is pointing up. Also remove End Sealing Labels **(16)** from both ends of cartridge.
f) Before sliding the Third and Fourth Stage Aluminum Tube Assemblies back in place, install Gaskets **(13)**. Coat both sides of each gasket with petroleum jelly and install in recessed areas in Base **(9)** and Manifold **(14)**. After Aluminum Tube Assembly are installed, check to make sure the Gaskets **(13)** are positioned properly top and bottom - both assemblies.
g) Replace the front two Manifold Bolts **(10)** 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 **(7)** against Brackets **(8)**, 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 MST MONITOR MANUAL.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TORQUE SEQUENCE
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1
12 FOURTH STAGE AL. TUBE ASS'Y
11 THIRD STAGE AL. TUBE ASS'Y

FIGURE NO.

RECORD KEEPING

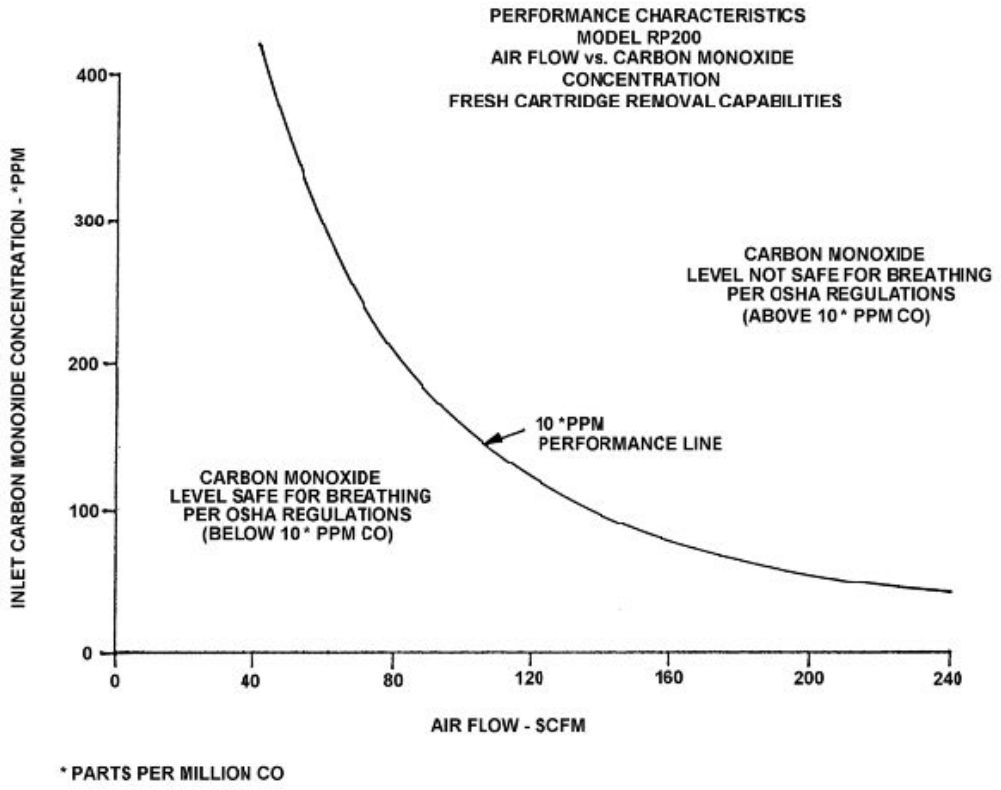
Record all periodical air quality checks, monitor calibration date, filter cartridge change intervals and any other service performed on the MST RESPIRATORY PROTECTOR®

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, Inc. at (800) 542-6646.

MST, INC.
SERVICE RECORD
RESPIRATORY PROTECTOR®
MODEL RP200CMST/O2-S1

DATE OF SERVICE	SERVICE PERFORMED


PERFORMANCE CHARACTERISTICS
MODEL RP200
AIR FLOW vs. CARBON MONOXIDE
CONCENTRATION
FRESH CARTRIDGE REMOVAL CAPABILITIES
INLET CARBON MONOXIDE CONCENTRATION - *PPM
400
300
200
100
0
0
40
80
120
160
200
240
AIR FLOW - SCFM
CARBON MONOXIDE
LEVEL NOT SAFE FOR BREATHING
PER OSHA REGULATIONS
(ABOVE 10 * PPM CO)
10 *PPM
PERFORMANCE LINE
CARBON MONOXIDE
LEVEL SAFE FOR BREATHING
PER OSHA REGULATIONS
(BELOW 10 * PPM CO)
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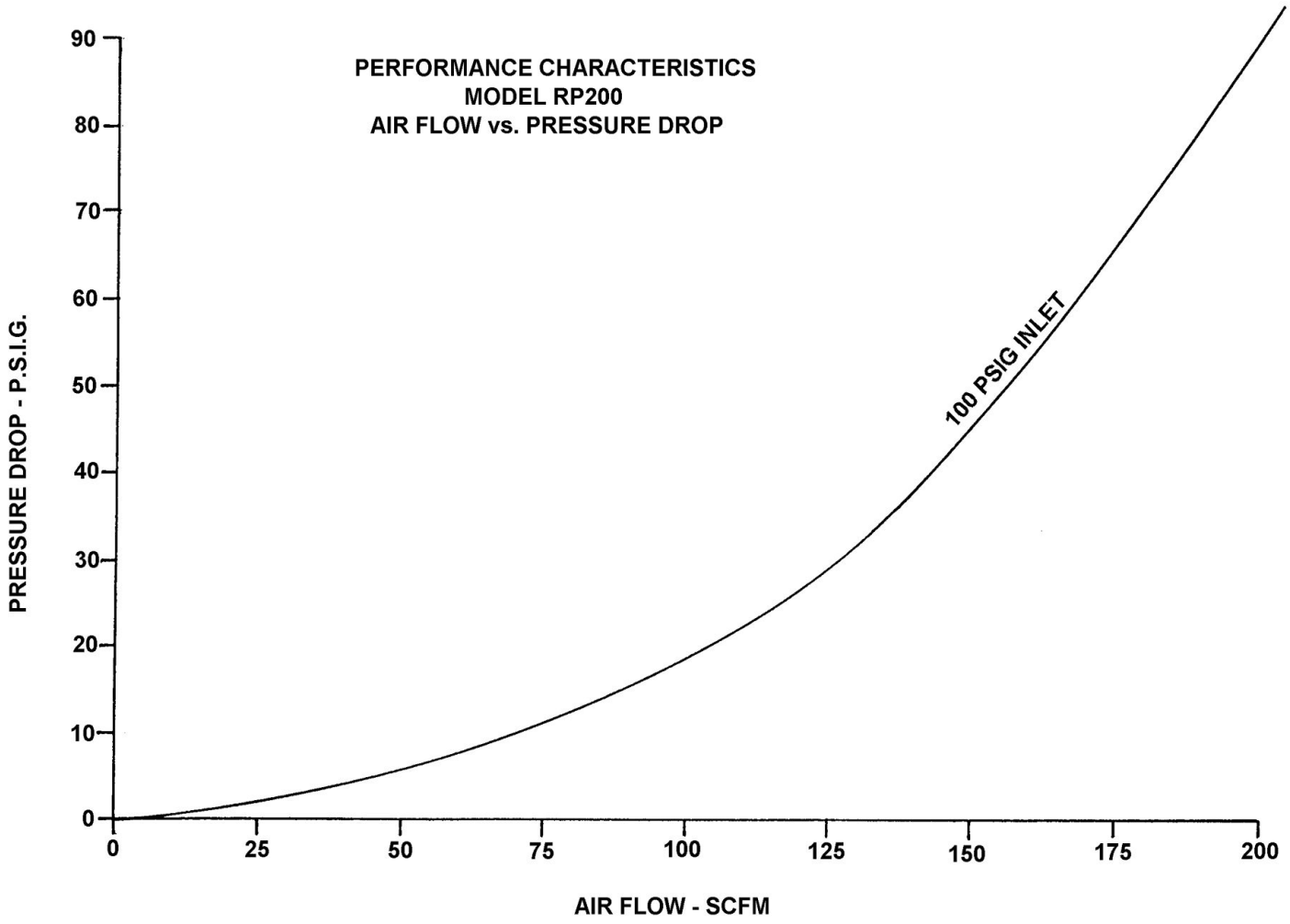
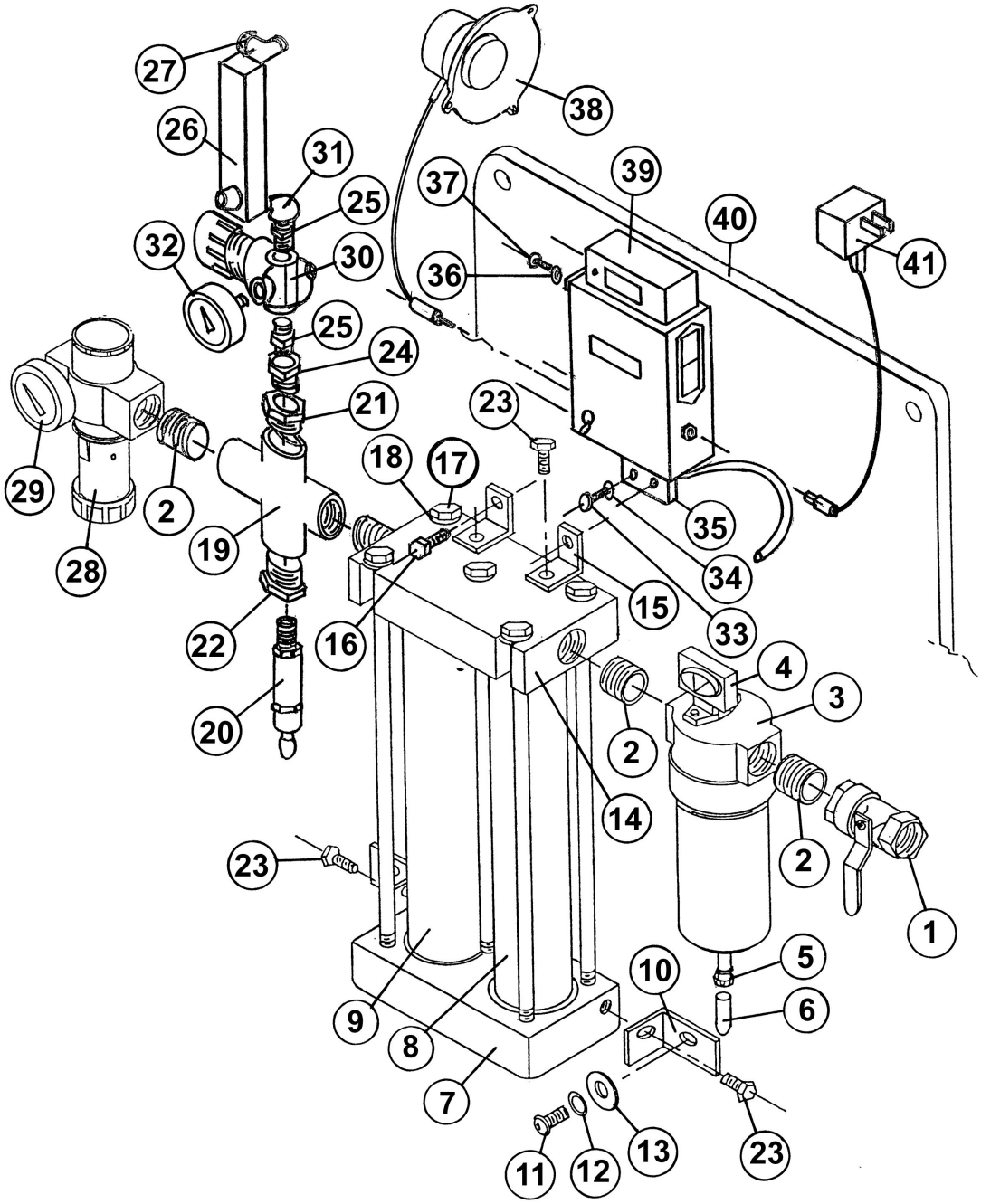

PERFORMANCE CHARACTERISTICS
MODEL RP200
AIR FLOW vs. PRESSURE DROP
PRESSURE DROP - P.S.I.G.
90
80
70
60
50
40
30
20
10
0
0
25
50
75
100
125
150
175
200
AIR FLOW - SCFM
100 PSIG INLET

RESPIRATORY PROTECTOR®
MODEL RP200CMST/O2-S1 PARTS

1 80221, (1), 1 1/4" Ball Valve
2 S603-074, (4), Nipple-1 1/4"
3 80113, (1), Prefilter-200 SCFM
4 80422, (1), Differential Pressure Gauge
5 80051, (1), Tube Locking Collar
6 S710-005, (1), Drain Tube
7 80172, (1), Blue Base
8 80176-2, (1), Al Tube-3rd Stage
9 80176-2, (1), Al Tube-4th Stage
10 80114, (2), Base Bracket
11 S037-056, (2), Base Brkt Bolts
12 S412-009, (2), Internal Lockwasher
13 80115, (2), Fender Washer
14 80173, (1), Blue Manifold
15 80196, (2), Manifold Bracket
16 S006-150, (2) Manifold/Base Brkt Bolts
17 80187, (5), Manifold Bolts
18 80197, (5), Manifold Washers
19 80423,(1), 1 1/4" Cross
20 80427, (1), 3/4" PVR 150 PSI
21 S638-020, (1), 1 1/4" x 1/2" Red. Bushing
22 S638-017, (1), 1 1/4" x 3/4" Red. Bushing
23 S006-148, (4) Bracket Bolts
24 S638-008, (1), 1/2" X 1/4" Red. Bushing
25 S608-003, (2), 1/4" Hex Nipple
26 80213, (1), Air Sample Metering Valve
27 80261, (1), 90^0 Tube Lock Collar
28 80214, (1), Regulator
29 80076, (1), 0-160 PSI Gauge
30 80533, (1) Regulator for Flowmeter
31 S623-010, (1), 1/4 X 1/8 90^o St. Elbow
32 80091, (1), Pressure Gauge
33 S037-009, (4), #10-24 X 3/4" BHCS
34 S037-007, (4), #10 Int. Lock Washers
35 80339, (1), Monitor Bracket
36 S412-005, (4), #6 Int. Lock Washers
37 S037-005, (4), #6-32 X ½" BHCS
38 8008403, (1), Audible Alarm w/ 20 Ft Cord
39 80313, (1), CO/O2 Monitor
40 80189, (1), 3/4" X 36" Square Board
41 80247, (1), 120 VAC Adapter

(SEE FOLLOWING PAGE FOR PARTS DRAWING).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