"Save Your Breath With MST®"
MODERN SAFETY TECHNIQUES

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MODEL RP050BMST-S1/4
RESPIRATORY PROTECTOR®
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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CONTENTS

SPECIFICATIONS
RESPIRATORY PROTECTOR®
MODEL RP050BMST-S1/4

INLET PRESSURE (MAX.)	**150 PSIG STATIC (10.4bar)**
RATED AIR FLOW (MAX.)	**200 SCFM (94.4L/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	**48"L x 16"W x 10 3/4" D (1219mm x 406mm x 273mm)**
	SEE FIGURE NO. 3 - GENERAL LAYOUT
WEIGHT (UNIT WITH MONITOR)	**91 LBS. (41.4 kg.)**
(PREFILTER ASSEMBLY)	**27 LBS. (12.3 kg.)**
GRADE 10 ELEMENT FOR 80409 PREFILTER	**80400**
GRADE 6 ELEMENT FOR 80113 PREFILTER	**80238-B**
THIRD STAGE CHARCOAL CARTRIDGE W/ GASKETS	**8001303**
FOURTH STAGE CATALYST CARTRIDGE W/ GASKETS	**8001304**

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 a Panel Board, 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 and 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. 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 the air quality checked per OSHA/CSA requirements for Carbon Monoxide. The monitor digitally displays the amount present, and an audible alarm **(Q)** will alert operators if any dangerous levels of Carbon Monoxide exist.

MODEL RP050BMST-S1/4
RESPIRATORY PROTECTOR®

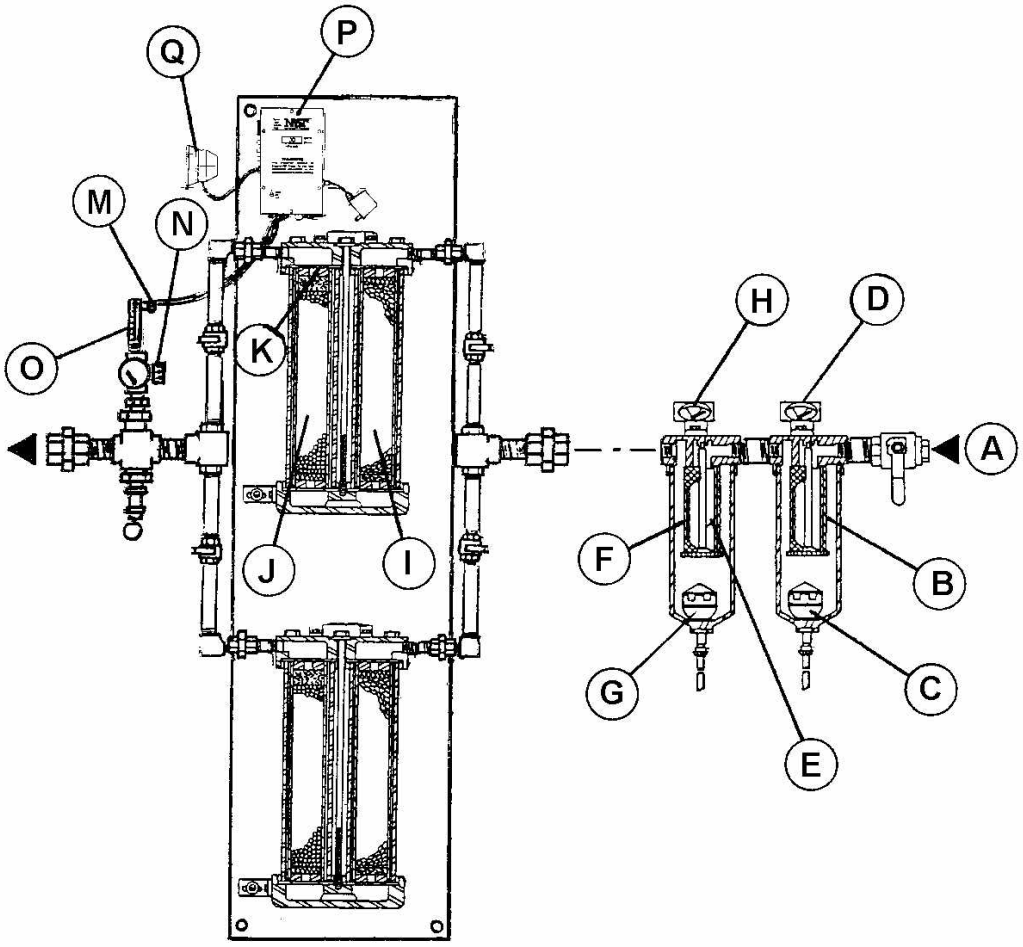

FIGURE NO. 1

MODEL RP050BMST-S1/4
RESPIRATORY PROTECTOR®

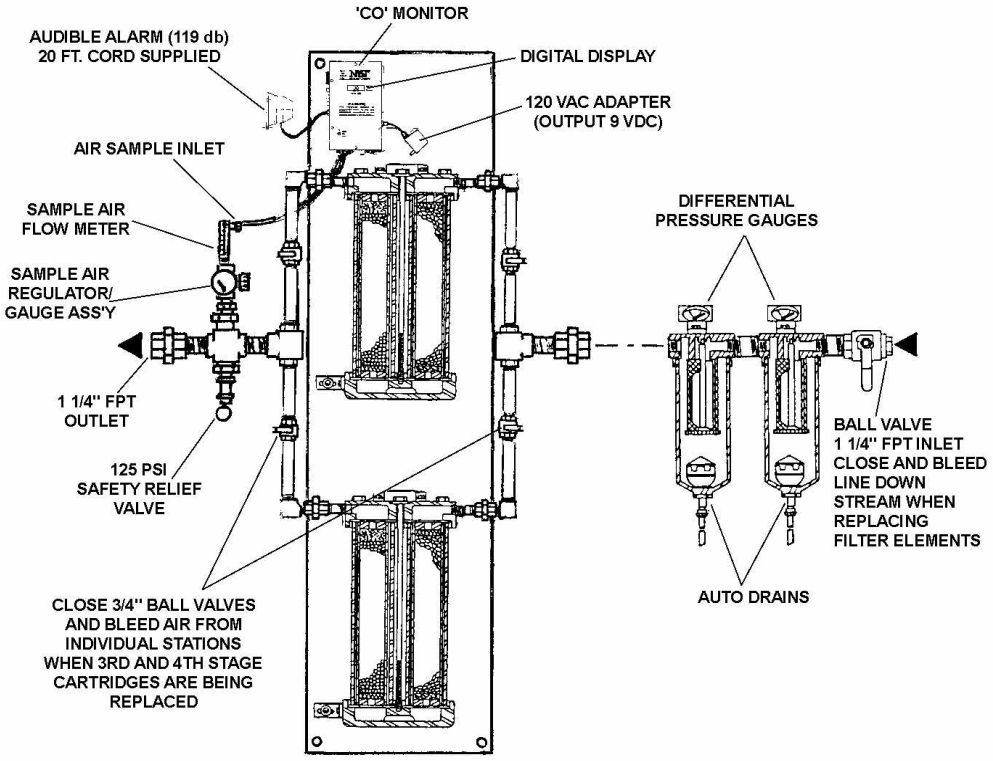

FIGURE NO. 2

MODEL RP050BMST-S1/4
RESPIRATORY PROTECTOR®

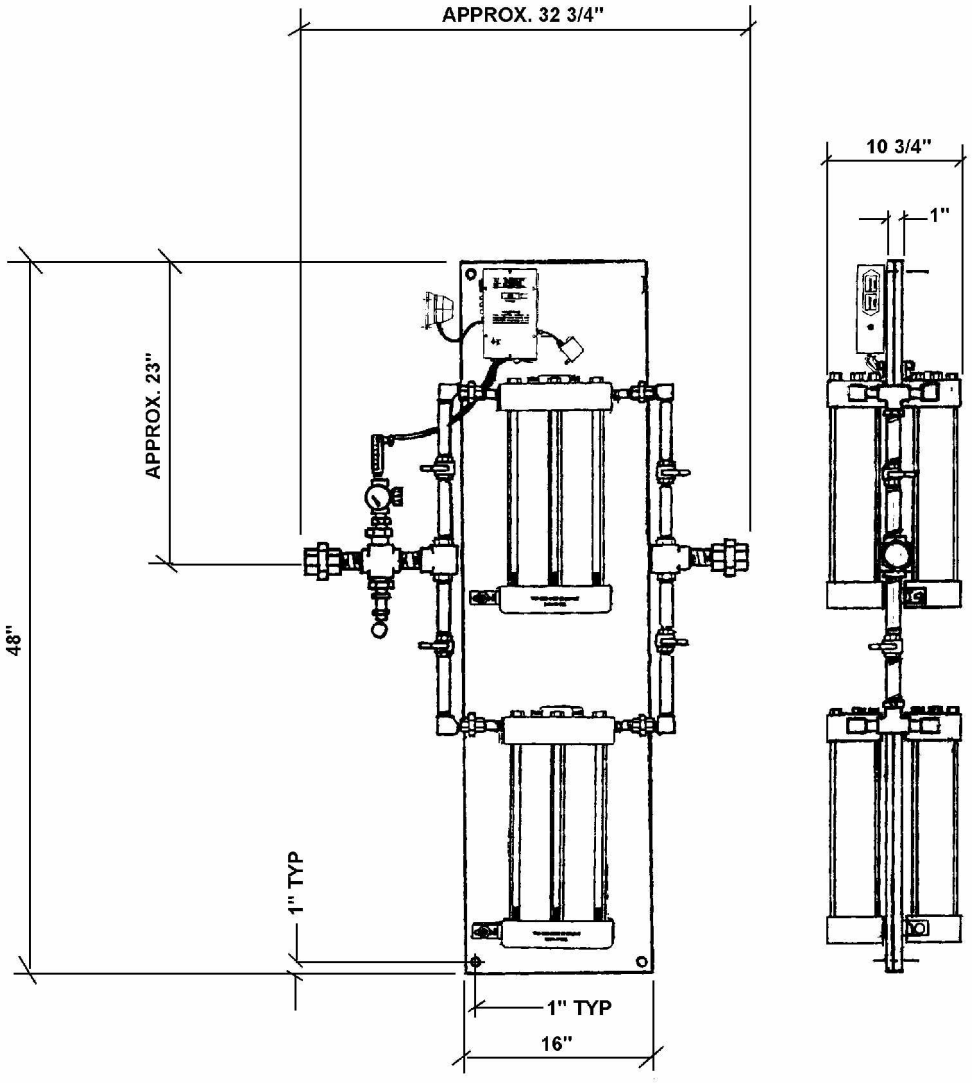

FIGURE NO. 3

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 1 1/4" 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 valve rated at 125 PSIG.
3) SUPPLIED INLET AIR TEMPERATURE RANGE - 68 to 150ºF (20-65ºC).
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 and 5)

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 - Supply a dedicated 120 VAC switched outlet for the 120 VAC Adapter that comes with unit (adapter will convert the 120 Vac to a 9 VDC output). See MST MONITOR MANUAL, Accessories Section, for further details. Plug the 120 VAC Adapter cord into the right side of monitor at jack located below the monitor's battery compartments. Two 9-volt batteries are supplied with unit and can be installed in monitor to provide a back-up power source if the main 120 VAC power source fails or is shut-off by mistake. The batteries will power monitor continually for 30-35 hours. After connecting monitor to power source, turn on and leave warm-up for (5) minutes. Now check monitor's circuits/audible-visual alarm system by pressing "ON/OFF TEST" switch up and hold. If monitor OK, the following will occur:
    1) Red/Amber LED - will come on steady
    2) Green LED - will blink, then come on steady
    3) Audible alarm will sound and the remote alarm jack will be energized.

   Monitor's calibration should be checked now. Refer to MST MONITOR MANUAL.
4) CALIBRATION GAS REQUIREMENTS - "Zero" Gas (or nitrogen, free of "CO"); "Span" Gas (50 to 150 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 for proper air flow to breathing air system and then 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 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.
7) EXTREME TEMPERATURE CHANGES - Avoid; Monitor best performs at a temperature range of 32-104^{o}F (0-40^{o}C). Always calibrate monitor after it has stabilized in the surrounding temperature where system is to be used.

RESPIRATORY PROTECTOR ®
MODEL RP050BMST-S1/4

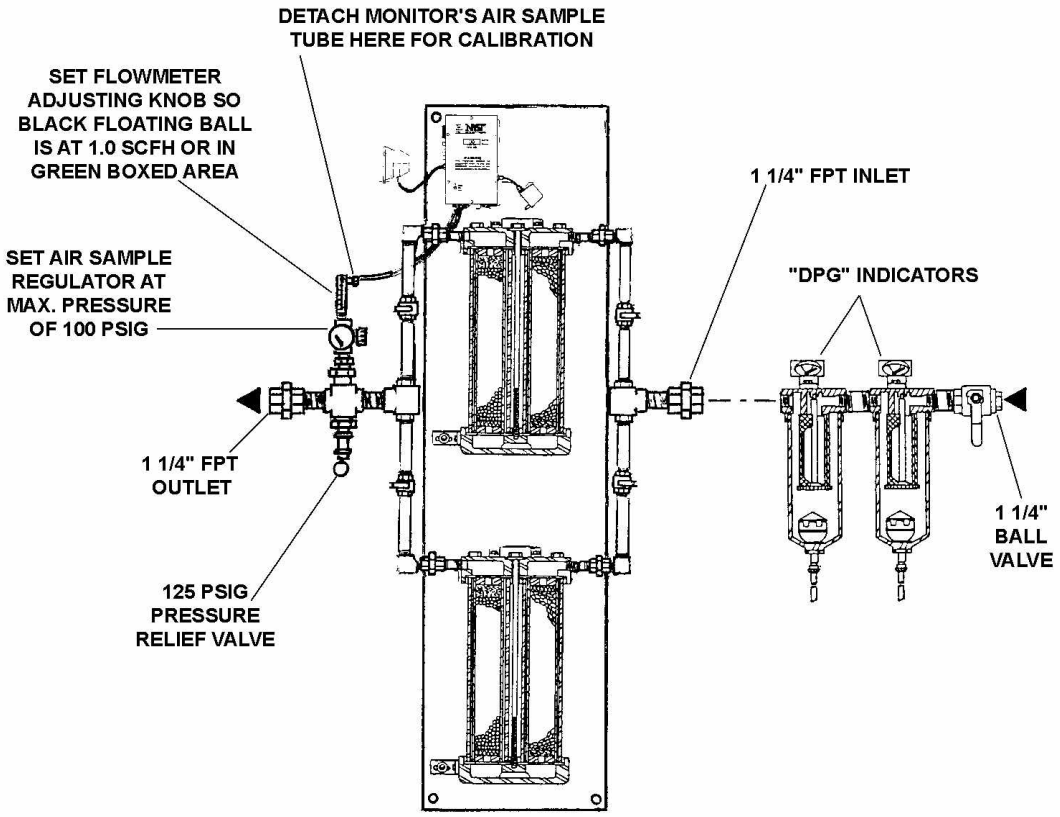

FIGURE NO. 4

RESPIRATORY PROTECTOR®
MODEL RP050BMST-S1/4

AIR SAMPLE TO MONITOR ADJUSTMENT

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WARNING : SERIOUS INJURY could result if the AIR SAMPLE METERING VALVE is not properly adjusted. Proper sample air flow to 'CO' monitor is required for monitor to give correct 'CO' level readout.

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AIR SAMPLE METERING VALVE ADJUSTMENT

1) Pressurize system and set regulator for proper air flow to respirator(s).
2) Adjust Air Sample Metering Valve's adjustment knob so the black floating ball is within the GREEN BOXED area etched on valve body. Proper air sample is now being metered to the 'CO' Monitor. Periodically check to be sure ball is floating in this area.

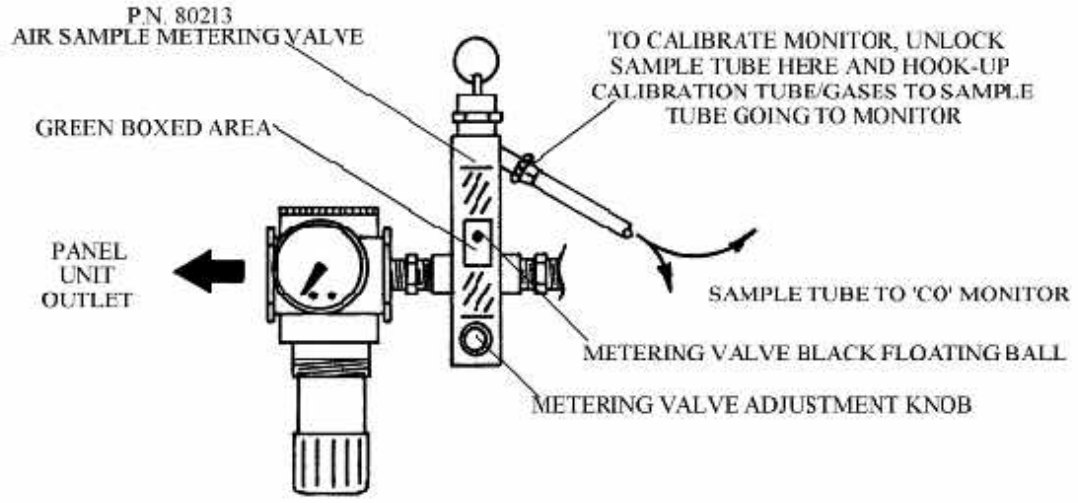

FIGURE NO. 5

MST RESPIRATORY PROTECTOR®
GENERAL OPERATION AND MAINTENANCE

1) MST 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 MST MONITOR MANUAL.
    b) If the monitor can be and is calibrated, but the alarm still sounds, the filter cartridge life is exhausted. Replace all filter cartridges as outlined in the FILTER REPLACEMENT INSTRUCTIONS, page 14.
    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 one (1) 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 36ºF (20ºC) 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 0 to 105ºF (-17 to 40ºC).
    5) 'RF' signals causing interference to monitor through Remote Alarm Options and/or Optional Power Adapter cords. Contact factory if this is occurring.
2) MST MONITOR - Alarms should be checked prior to use.
3) MST MONITOR - Power supply is (2) 9-volt transistor - type batteries, (unless optional power supply used). The batteries will power the monitor continuously for approximately (30-35) hours. When the batteries output fall below (7.3) volts, the Amber LED "Low Battery" light will come on, indicating the batteries require replacement. When installing the new batteries into the battery holders, review polarity position marked inside holders and install batteries accordingly.
4) MST MONITOR - Flow of the air sample to monitor should be checked periodically to ensure sample air flow meter 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 the regulator/air flow meter for proper setting/location of air flow meter floating ball and general appearance (presence of excessive oil, water).
5) MST RESPIRATORY PROTECTOR® SYSTEM - Filters should be replaced every (9) months unless the air quality conditions warrant more or less frequent replacement. Replace all (10) 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).
6) MST RESPIRATORY PROTECTOR® SYSTEM - New filter set:
    a) Has an indefinate 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.

FILTER SET
SERVICE INSTRUCTIONS

(Refer To Figure No. 6 and 7)

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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 (10) 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.

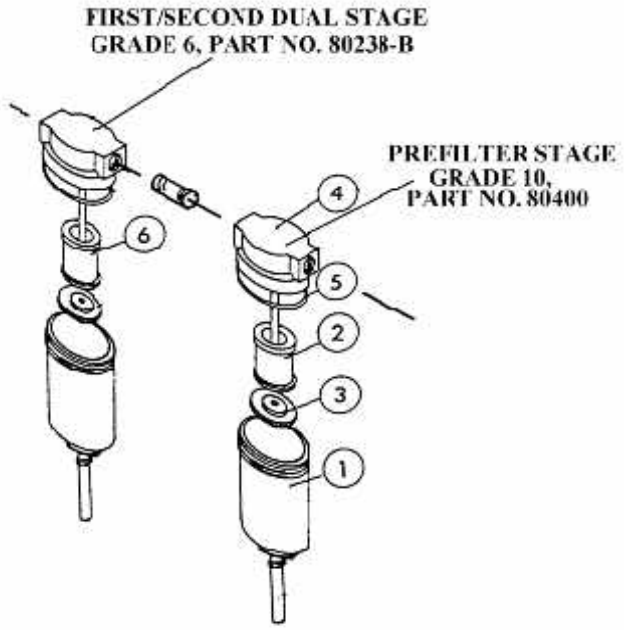


FIGURE NO. 6

3) THIRD/FOURTH STAGE CARTRIDGE REPLACEMENT
   a) Loosen Bracket Bolt 7 from Bracket 8, (do not remove).
   b) Loosen the five Manifold Bolts 9 and remove the front two Bolts. Now slide out the Third 10 and Fourth 11 Stage Aluminum Tube Assemblies.
   c) Remove the End Cap 12 from Third Stage Aluminum Tube Assembly and slide old Third Stage filter Cartridge 13 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 Label 14 and install new End Cap.
   d) Follow same procedure for the Fourth Stage Filter Cartridge 15 replacement as in step (C). Be sure the Flow Direction Arrow on Fourth Stage Filter Cartridge is pointing up. Also be sure to remove End Sealing Label before installing new End Cap.

e) Now slide the Third and Fourth Stage Aluminum Tube Assemblies back in place and install the front two Manifold Bolts.
f) Tighten Manifold Bolts in sequence from center outward to 100 inch-pounds (1.15 Kg-M). Repeat sequence and re-torque bolts to 250 inch-pounds (2.88 Kg-M).
g) Tighten Bracket Bolt 7 against Bracket 8.
h) Dispose of used cartridges according to local, state and federal regulations.

4) 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.

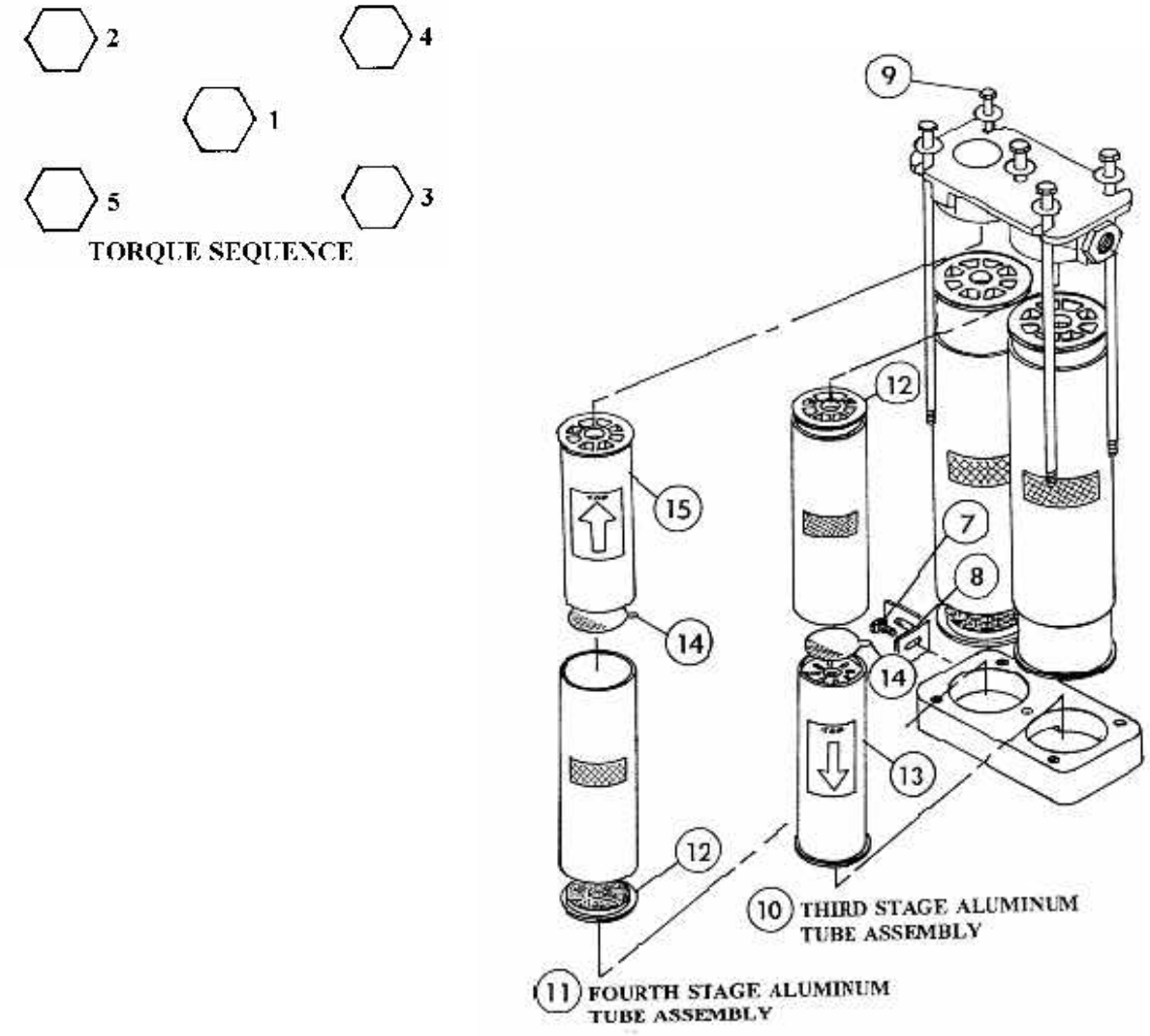


FIGURE NO. 7

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.

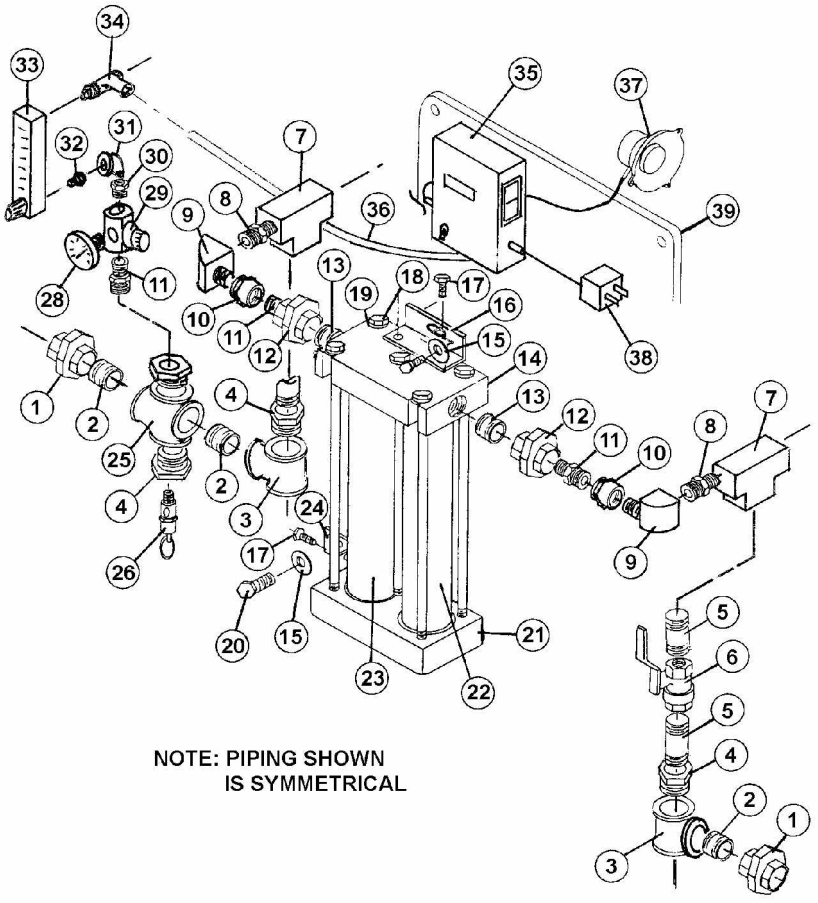
For further information, or questions about service or maintenance care of this unit, contact your local distributor or MST.

MST, INC.
SERVICE RECORD
RESPIRATORY PROTECTOR®
MODEL RP050BMST-S1/4

DATE OF SERVICE	SERVICE PERFORMED

RESPIRATORY PROTECTOR®
MODEL RP050BMST-S1/4 PARTS

1) 80447 (2) BRASS UNION, 11/4"
2) S603-075 (3) BRASS NIPPLE, 1 1/4" x 2"
3) 80215 (2) BRASS TEE, 1 1/4"
4) S638-017 (5) HEX BUSHING, 1 1/4 x 3/4"
5) S603-040 (8) BRASS NIPPLE, 3/4" x 3"
6) 80347 (4) BALL VALVE, 3/4"
7) 80067 (4) BRASS TEE, 3/4"
8) S608-009 (8) HEX NIPPLE, 3/4"
9) S623-005 (8) ST. ELBOW x 90^0, 3/4"
10) 80068 (8) BELL REDUCER, 3/4" x ½"
11) S608-006 (9) HEX NIPPLE, ½" x 3/8"
12) 80484 (8) BRASS UNION, 3/8"
13) S603-025 (8) BRASS NIPPLE, 3/8" x 2"
14) 80078 (4) MANIFOLD
15) 80115 (8) FENDER WASHER, 1/4"
16) 80009 (4) BRACKET, MANIFOLD
17) S006-148 (12) SCREW, 5/16-18 x ½" HHCS
18) S011-040 (20) SCREW, 3/8"-16 x 12 ½" HHCS
19) 12021 (20) WASHER, 3/8" FLAT
20) S037-055 (8) SCREW, 1/4"-20 x 5/8" BHCS
21) 80001 (4) BASE
22) 80005 (4) AL. TUBE, 3RD STAGE
23) 80005 (4) AL. TUBE, 4TH STAGE
24) 80114 (4) BRACKET, BASE
25) 80423 (1) BRASS CROSS, 1 1/4"
26) 80427 (1) PRV, 3/4" x 125 PSI
27) S638-020 (1) HEX BUSHING, 1 1/4 x ½"
28) 80076 (1) GAUGE, 1/4" x 0-160 PSI
29) 80112 (1) REGULATOR, 3/8" FPT
30) S638-007 (1) HEX BUSHING, 3/8" x 1/4"
31) S623-002 (1) ST. ELBOW x 90^0, 1/4"
32) S608-002 (1) HEX NIPPLE, 1/4" x 1/8"
33) 80213 (1) FLOW METER
34) 80261 (1) ELBOW, 1/4" x 1/8"
35) 80127 (1) 'CO' MONITOR
36) 80208-B (1) 1/4" PVC TUBING
37) 8008403 (1) AUDIBLE ALARM, 20ft.CORD
38) 80247 (1) 120 VAC ADAPTER
39) ------- (2) ½" x 16" x 48" BOARDS



NOTE: PIPING SHOWN IS SYMMETRICAL

RESPIRATORY PROTECTOR ®
MODEL RP050BMST-S1/4 PREFILTER PARTS

1) 80221 (1) BALL VALVE, 1 1/4"
2) S603-075 (2) BRASS NIPPLE, 1 1/4" x 2"
3) 80409 (1) PREFILTER, GRADE 10
4) 80051 (2) TUBE LOCK COLLAR
5) 80422 (2) DIFFERENTIAL PRESSURE GAUGE
6) 80113 (1) FIRST/SECOND STAGE FILTER