OPERATION/MAINTENANCE MANUAL

PORTABLE TRITIUM MONITOR

MODEL 400SBDγC

CE

RoHS

OVERHOFF TECHNOLOGY CORPORATION
1160 US ROUTE 50, MILFORD, OHIO, USA

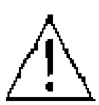
SAFETY NOTICE

This Tritium Monitor has been designed and tested in accordance with EN 61010-1. To ensure that the monitor is used safely, follow all safety and operating instructions in this manual. If the monitor is not used as described in this manual, the safety features of the monitor might be impaired.

- Do not use the monitor unless it is fully assembled, housed inside the case secured with the screw fasteners it was supplied with.
- Turn off the power and remove the plug connection from the AC power converter before removing batteries.
- Make sure the battery covers are properly closed and secured.
- Remove the battery from the monitor if the monitor is to be stored for long periods.
- This instrument has not been designed for indiscriminate opening or disassembly of the internal parts. The bias voltage batteries are always connected to the ionization chamber cans, even when the instrument is switched OFF. The electronics contains highly sensitive semiconductors which are destroyed by even the slightest electrostatic discharge
- Not suitable for use in wet locations
- Not suitable for use in explosion hazard environments
- Refer to instruction label when connecting to the external jack for supplementary power input. DO NOT EXCEED 3.5VDC! Use only the AC power converter that was supplied with the monitor.

SYMBOLS

The following international symbols are used with this manual and equipment:



Important Safety Information in Manual

DC (direct current)

REVISION INDEX

Rev	Date	Section/Page	Details	Appvd By
-	10-15-2019	All	Original document	DW

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1.0. INTRODUCTION

The Model 400SBDγC portable tritium monitor is a small, high sensitivity, hand held, battery operated fully gamma compensated survey meter. The instrument case is constructed of light weight aluminum. A handle is attached for hand held survey use. The instrument measures Total Tritium; elemental plus oxide form.

Note: This special version of the Model 400SBDγC has the Alkaline Battery Option.

1.1. PHYSICAL DESCRIPTION

The Model 400SBDγC uses four identical ionization chambers arranged in a cruciform pattern. Two ionization chambers, with a total volume of 400 cc, are used for measurement; the other two chambers serve for gamma compensation.

The sample stream is drawn through the ionization chambers by means of a small rotary vane pump, which is always plumbed at the outlet of the furthest down stream ionization chamber. Attaching a good quality particulate filter ahead of the instrument sampling inlet prevents entry of dust particulates.

A large easy to read liquid crystal digital panel meter with a range from 1 to 19,999 $\mu Ci/m^3$ is used for measurement display.

Other units of measurement, such as MPCa, MBq/m^3 and $\mu Sv/hr$, or others may be specified by the user at time of requesting a unit. The instrument exhibits a basic sensitivity of the order of 2 $\mu Ci/m^3$, which it is able to attain due to the fact that it is immune to response to both radon and cosmic ray noise.

A pair of “D” size batteries supplies power. While it is recommended that Alkaline cells be used, the instrument will also operate with any type of D-cell batteries, although operating duration maybe vary. Onset of battery depletion is signaled by illumination of an LED located next to the meter face. An external power supply can be used by attaching to a small receptacle the side of the instrument case. The same LED also signals red when the high voltage power supply (HVPS) used for ionization chamber bias has a malfunction.

DO NOT SUBSTITUTE, use only the recommended power supply

A ten-position alarm level stepped attenuator, adjustable over partial scale (2 to 1,000 $\mu Ci/m^3$) is located on the front panel. An OFF position is included. An acoustic signaler emits a steady tone if the measurement exceeds the set point. An intermittent tone is heard if the sample air flow has been interrupted. The acoustic alarm is silenced by a “MUTE” push button. The alarms are non-latching.

External connections for remote display of the meter reading, and for a remote alarm have been provided.

Gas flow connections are made externally to the instrument by appropriate attachment of flexible plastic hose. See Figure 2.

2.0. TECHNICAL SPECIFICATIONS, MODEL 400SBDγC

MEASUREMENT DISPLAY	4 1/2 digit LCD
MEASUREMENT RANGE	1 to 19,999 $\mu Ci/m^3$
SENSITIVITY	2 $\mu Ci/m^3$
ACCURACY	±10%
GAMMA COMPENSATION	multiple chambers in a cruciform pattern to reduce errors due to external gamma radiation Gamma response less than 0.2 $\mu Ci/m^3$ per mR/hr for any field direction.
RESPONSE RATE	30 seconds to reach 90% of final reading,
NOISE LEVEL	± 2 $\mu Ci/m^3$, 1 S.D. (10 second electronic time constant)
ZERO STABILITY	± 2 $\mu Ci/m^3$ after 3 minutes (or less) warm-up
ALARM (ACOUSTIC)	1. ten position stepped attenuator set point for signal alarm 2 to 1,000 $\mu Ci/m^3$, steady tone. OFF position included. 2. low flow produces an intermittent tone 3. Mute switch silences audible tone
ALARM (VISUAL)	LEVEL: red LED; when tritium level exceeds set point FLOW: yellow flashing LED; low pump flow LOW BAT: red LED; D-cell batteries need to be replaced **-AND-** HVPS: red LED illuminates to indicate a malfunction with the high voltage power supply (HVPS) used to bias the ionization chambers
EXTERNAL CONNECTIONS	miniature DIN plug with analog signal and alarm outputs
DUST FILTER	In-line cartridge, Pall P/N: 12082
SAMPLING SYSTEM	2 hose barb ports are located on the front panel
PUMP	miniature internal pump for 3 to 5 volume changes per minute

TECHNICAL SPECIFICATIONS, MODEL 400SBDγC, continued

IONIZATION CHAMBER VOLUME	effective volume: 400 cm^3 port to port volume: 440 cm^3
POWER	**Alkaline Battery Option** Requires two “D” size batteries Alkaline type with external jack for supplementary power input
ENVIRONMENTAL	0° C to +40° C 20 to 90 % R.H. Non-Condensing
CASE	light weight aluminum
SIZE AND WEIGHT	7.6" L, 5.2" W, 6.9" H excluding handle, 6.5 lbs (3 kg)

ACCESSORIES

- 2 “D” size batteries, Alkaline type, removed from battery compartments during shipment
- Sniffer hose
- Dust filter
- 2.3 meter long cable with pre-wire Mini-DIN plug for J2 output connector at one end
- Power converter
  100-240 VAC, 50/60 Hz, .50 A to 3.3 Vdc @ 1.5A
  5.5 mm O.D. x 2.1 mm I.D. Plug
  Center pin is positive

DO NOT SUBSTITUTE, use only the recommended power supply

3.0. CIRCUIT DESCRIPTION

CAUTION: This instrument has not been designed for indiscriminate opening or disassembly of the internal parts. Electrostatic charge from the bias voltage on the ionization chamber cans will be present even when the instrument is switched OFF. The detector pre-amp contains highly sensitive semiconductors which are destroyed by even the slightest electrostatic discharge.

3.1. IONIZATION CHAMBERS

In its simplest form, an ionization chamber is an enclosed volume with two electrodes. Voltage is applied between the electrodes, generating an electric field, which will segregate and collect electric charges, which are created by nuclear events occurring inside the chambers. Nuclear events may consist of ionization of air molecules by external or internal alpha, beta or gamma radiation.

The 400 Series monitors are designed to measure tritium. Activity of tritium decay is such that a concentration of 1 $\mu Ci/m^3$ in a volume of one liter will generate an ionization current of about 0.95 x 10^{-15} amperes. This is a very weak current.

Alpha pulses from naturally occurring radon, are much more energetic, they can produce short current bursts of up to 10^{-13} coulombs during decay, and therefore appear as large noise "spikes" which can seriously impair tritium measurement.

Gamma radiation also has a strong effect. In practice, a gamma radiation field of 1 mR/hr will create the same amount of ionization as 90 $\mu Ci/m^3$ of tritium.

A tritium monitor, in order to measure to low concentrations, must be able to respond only to tritium and be immune to alpha or gamma radiation. For this purpose, a second ionization chamber system has been included to balance out any ionization current contribution from external gamma radiation.

In the 400 Series instruments, the four ionization chambers are arrayed in a cruciform pattern, ensuring almost perfect gamma compensation in all directions and even for high gradient non-uniform fields.

The ionization chamber polarizing voltage is supplied by an electronic high voltage power supply. The surfaces of the ionization chambers have a thin coat of paint for insulation, but it is best to avoid touching them.

3.2. ELECTROMETER

Also known as a transimpedance amplifier, it serves the purpose of converting the extremely feeble ionization current into a voltage suitable for further signal processing and measurement display.

The heart of the electrometer consists of a specially selected dual ultra high impedance semiconductor device which has been chosen both for ultra low internal current leakage as well as long term d.c. stability. The semiconductors used in the 400 Series instruments are suitable for measurement of currents as low as10^{-16} amperes.

In the 400 series instruments, the electrometer is directly attached to the ionization chamber cluster and is protected by a rectangular metal cover.

3.3. SIGNAL PROCESSING AMPLIFIER

A single printed circuit board attached directly to the front face of the instrument contains all power supply and signal processing electronics.

Proprietary circuitry is used for the recognition and elimination of transient signals due to radon or high-energy cosmic ray pulses. The 400 Series instruments, with digital display, use a dedicated internal circuit to disable the pulse rejection circuit when the measured signal reaches approximately 60 $\mu Ci/m^3$.

An OFFSET control is furnished in order to adjust the reading to zero in case of offsets caused by tritium contamination of the chambers or otherwise.

A front panel control has been provided for adjustment of the set point (level) at which the acoustic alarm is desired to sound. The acoustic signaler has the second function of alerting the user that sample gas flow is impeded.

All power supplies are regulated. A warning LED on the front panel will illuminate red when the battery terminal voltage has dropped to about 2.2 V. This signals that the batteries should be replaced – WITHIN 1 HOUR AFTER THE WARNING LED ILLUMINATES. It will also illuminate when the high voltage power supply (HVPS) operates outside of specified voltage range.

Two plug and jack connections are found on the sides of the instrument. One is for an external power adapter, and the other is for remote meter display and alarm.

4.0. CONFIGURATION

4.1. EXTERNAL FEATURES

The front panel features include:

1. the digital panel meter, 1 to 19,999 μCi/m^3
2. function control knob
3. alarm level control knob, 2 to 1,000 μCi/m^3
4. red LED; dual function; low battery, indicates when the D-cell batteries need to be replaced and indicates red if the high voltage power supply (HVPS) has a malfunction
5. red LED; tritium level alarm
6. yellow flashing LED; low flow alarm
7. acoustic signaler
8. mute push-button
9. calibration potentiometer (under phillips head screw)
10. offset potentiometer (small knob)
11. two sample hose barbs
12. two D-cell battery compartments

Side features include:

13. jack for external power, 3.3Vdc, 1.2A to 3A, **DO NOT SUBSTITUTE, use only the recommended power supply**
14. jack for remote meter and alarm connections
15. GAMMA CHECK label for position of check source, refer to section 6.0.
16. snap holder for dust filter

4.2. HOSE CONNECTIONS

The instrument will respond to any radioactive gas passing through the instrument as well as tritium.

REFER TO FIGURE 2

A sniffer hose is attached to a small in line dust filter, which is directly attached to the "IN" hose barb.

NOTE 1: NEVER OPERATE THE INSTRUMENT WITHOUT A DUST FILTER IN THE SAMPLE STREAM

NOTE 2: THE INSTRUMENT MUST BE IN THERMAL EQUILIBRIUM WITH ITS SURROUNDINGS.

5.0. OPERATION

Ensure that a dust filter is connected in line ahead of this instrument flow inlet in use. The following steps are necessary and sufficient to operate the instrument:

1. Set measurement alarm level to desired value.

2. Rotate mode switch to “MEASURE”. The “low flow” LED will flash, since the pump is inactive. The “mute” switch will silence the intermittent tone if desired.

Allow 30 seconds for the instrument to be ready to sample. **Allow an additional two to three minutes for the instrument to stabilize.** Readjust (if necessary) by turning OFFSET control knob to achieve a zero reading on the meter

NOTE: The rotation direction for the adjustment is clockwise for change in a positive direction. Use very small amounts of rotation, the display will not react immediately because there is a 30 second time constant.

The instrument is now ready for use. In this mode the ionization chambers are active, but the pump is not. The instrument is in a so-called “standby mode” ready to sample the instant the mode switch is advanced to the next position.

3. Rotate the mode switch to the sample position. Now, the pump is operating and the low flow indication will be eliminated.

If it is desired to operate the instrument continuously on an external power supply, only a source of 3.3VDC, 3A current capacity should be used. Attaching the external power plug will automatically disconnect the D-cell batteries.

NOTE: If the audible alarm is an intermittent tone, sample flow through the chambers is below specification. This could be an obstructed sampling hose or other.

It is IMPERATIVE that the sample stream be free from dust, dirt or moisture. Not only will the instrument show erratic behavior, but also it may cease to function entirely. If moisture is ingested, then continued pumping to evaporate and expel the moisture can be attempted. If this fails, the instrument must be returned to the factory for service.

Condensation can occur if an instrument is brought from a cold environment into warmer surroundings.

Furthermore, temperature changes to the instrument, both lower to higher as well as higher to lower will create transient currents in the electrometer which can appear as large phantom measurement signals.

The instrument must be allowed to thermally equilibrate to its surroundings prior to use. When there is an OFFSET due to thermal disequilibrium, use the following procedure:

OFFSET COMPENSATION:

1. Switch the instrument into the measure model.

2. After approximately three minutes. The instrument should indicate 0000 on the digital panel meter. An offset of 4-6 $\mu Ci/m^3$ is typical for situations due to temperature changes. This offset should disappear as thermal equilibrium is attained.

3. Adjust the “offset” compensation potentiometer as required. The location is shown in Figure 1.

NOTE: The rotation direction for the adjustment is clockwise for change in a positive direction. Use very small amounts of rotation, the display will not react immediately because there is a 30 second time constant.

GENERAL OPERATION NOTES:

NOT SUITABLE FOR USE IN WET LOCATIONS

NOT SUITABLE FOR USE IN EXPLOSION HAZARD ENVIRONMENTS

The following information is provided to the user to ensure stable and accurate performance.

The monitor can be located on any flat surface, such as a table top, or, it can be mounted to a wall bracket or shelf, or on a small moveable cart. In all cases, the instrument must be protected against vibration, shock, moisture and dirt.

ELECTRICAL GROUNDING

The electrical and electronic equipment grounding is often considered only from the viewpoint of hazard and safety. Indiscriminate or excessive grounding may actually enhance the potential of danger and disturb the proper internal operation of the instrument. The electronic circuitry, including logic, adjustment controls, local and remote displays, are centrally and all inclusively grounded at the ionization chamber module. The circuit system common line is electrically connected to the metal frame or housing of the electrometer module. When signal outputs are connected to remote displays, computer interfaces, or similar devices, it is necessary that no significant ground potential differences exist between the monitor and other equipment. If significant potential ac or dc differences exist, shifts in the instrument “zero” can appear.

THE FOLLOWING IS RECOMMENDED

1. Make all interconnections. Normally the instrument operates on (2) “D” cell batteries. If it is desired, the instrument can operate continuously by connecting to the AC power converter provided. Use only the AC converter that is provided. Activate the instrument. Allow ten minutes “warm-up”. Adjust zero if needed.

2. Attach remote connections (devices) and verify absence of change in zero.

If zero has changed, check for ground loops and spurious ac or dc potential differences from one location to the other.

6.0. CALIBRATION

6.1. METHOD

Tritium monitors employing ionization chambers, such as the 400 series portable instruments may be calibrated with either of two methods.

The first method consists of injecting a known activity of tritium gas; the second method uses external gamma radiation of known field strength.

To ensure traceability to National Standards, the first method must be employed. This method is time consuming, and is quite difficult to perform with precision. This first method is, however, useful as a “type” test, and can serve as a basic accurate calibration from which the gamma response (the second method) can be cross-correlated.

The second method uses an external gamma field. In this instance, the polarization of the compensation ionization chambers is reversed to coincide with that of the measurement ionization chambers.

In this condition, the effect of external gamma radiation now adds rather then cancels, and a known gamma field should produce a predetermined measurement indication.

6.2. GAS CALIBRATION

Since the instrument is essentially linear, a relatively high concentration can be used for most accurate results. Values between 100 – 1,000 $\mu Ci/m^3$ are convenient, but any other values from 20 – 5,000 $\mu Ci/m^3$ can be used.

The manufacturer of the gas calibrator generally provides instructions for the use of gas calibrators, and these should be followed.

Some general hints can be given.

It is important that the calibration sample be well circulated through the entire calibration system loop.

Adequate time should be allowed for the system pressure and temperature to come to equilibrium, and that no excess pressure is built up.

The inclusion of a previously calibrated "master" or "reference" tritium monitor in the sampling loop is highly recommended.

The calibration can actually be repeated for several levels of tritium activity. This is not done to verify the linearity of the tritium monitor (which is highly linear) but to ensure that the calibration process itself is free from subtle errors.

6.3. GAMMA CALIBRATION

If the unit has previously been calibrated with tritium gas, then it is sufficient to use a gamma radiation source to produce a response when placed at a specified location relative to the instrument under test. Lead shielding is advised since the compensation chambers will cancel the measurement. It is best to shield both of the compensation chambers plus one of the measurement chambers. Use a minimum of ½" thick lead. For the highest value response, the gamma source should be directed through the bottom of the case to minimize interaction with the compensation chambers. If the gamma source is long lived, no chronological correction is needed. To verify calibration at a future date, the original gamma source must be used. Records must be kept to identify relative location of the source and the expected result. Be sure that temperature and pressure variations are taken into account.

If calibration by either of these methods is performed, and the instrument response is somewhat different from the expected value, then small adjustments can be made by turning the calibration potentiometer with a small screwdriver. The calibration potentiometer is accessed by removing the small Phillips head screw on the front panel located above the label **CAL**.

Large changes in calibration are evidence of malfunction. The factory should be consulted immediately.

OVERHOFF TECHNOLOGY CORPORATION
Telephone (513) 248-2400
Facsimile (513) 248-2402
Email: support@overhoff.com

6.4. GAMMA CHECK

If a tritium monitor has previously been calibrated by any other method, gas or gamma, a low intensity gamma radiation source check can be used as a quick verification of monitor performance. On the left side of the instrument case towards the front which is the defined location for "**GAMMA CHECK**". When using the identical gamma check source, at the defined spot, it should always produce the same instrument response, provided, of course, temperature and pressure variations are taken into account. This source check may be performed at a frequency of your choice, it could be daily, weekly or monthly. We recommend a low intensity gamma check source of the type which is commonly intended for G-M counters or other survey instruments. For example; a 10 micro Curie, Cesium-137 check source should be sufficient for a monitor reading of 100-200 $\mu Ci/m^3$.

IMPORTANT: Do not adjust the calibration when performing a gamma check.

7.0. MAINTENANCE

Overhoff 400 series portable instruments have been designed for many years of trouble free service. Very little maintenance is required, but some periodic attention may be necessary, especially if the instrument is to be used in adverse environments.

Pump life is in excess of 1000 hours of actual use; ensuring that the instrument is operated only with dust filters in line preserves its life.

When not in use, the monitor should be stored in a cool dry environment.

OPERATOR MAINTENANCE

The following operational checks may be performed at daily, weekly or monthly intervals to suit.

Inspect dust filter for excessive dust build up. Check the flow rate. Does the pump have sufficient flow such that the Low Flow Alarm is not indicated when 10ft of the sniffer hose is connected to the inlet of the dust filter?

GAMMA CHECK, If a tritium monitor has previously been calibrated by any other method, gas or gamma, a low intensity gamma radiation source check can be used as a quick verification of monitor performance. On the side of the instrument case towards the front which is the defined location for "**GAMMA CHECK**". When using the identical gamma check source, at the defined spot, it should always produce the same instrument response, provided, of course, temperature and pressure variations are taken into account. This source check may be performed at a frequency of your choice, it could be daily, weekly or monthly. We recommend a low intensity gamma check source of the type which is commonly intended for G-M counters or other survey instruments. For example; a 10 micro Curie, Cesium-137 check source should be sufficient for a monitor reading of 100-200 uCi/m^3.

IMPORTANT: Do not adjust the calibration when performing a gamma check.

Manipulate the alarm set point to verify correct functioning of the alarm.

If the instrument is suspected of DRIFT, the zero reading may be verified. This should be done by an instrument engineer or technician.

SUPERVISORY MAINTENANCE

The following tasks are the responsibility of the supervisory engineering staff.

1. Calibration verification is to be performed at yearly intervals, or as otherwise specified.
2. Response checks (in case of need for cursory verification of the operational status of the ionization chambers and of the whole system), of the system may be tested by using a low strength gamma radiation check source. This must be done under the strict supervision of a health physicist. The gamma source is brought into proximity of each ionization chamber and the response is observed.

FACTORY MAINTENANCE

A determination that the system appears to have suffered a functional failure should require that the factory be notified (telephone (513) 248-2400, facsimile (513) 248-2402). Engineering assistance via telephone or facsimile, will be supplied by the manufacturer OVERHOFF TECHNOLOGY CORPORATION.

Should it appear to be necessary to return the instrument to our factory, authorization for the return must be obtained from Overhoff Technology Corporation prior to shipping. In-freight charges will be borne by the customer.

7.1. D-CELL BATTERY REPLACEMENT

The Model 400 Series monitors use (2) “D” size Alkaline batteries. The batteries will need to be replaced within an hour after the low battery light illuminates.

NOTE: Remove the batteries before shipment or inactive storage of more than 30 days

This instrument contains components that are easily destroyed if the case is opened and handled without proper precaution. If damage occurs, the repair will not be covered under warranty. Avoid touching the ionization chambers and the PC Board Assemblies to reduce the risk of damage.

8.0. SERVICE AND SUPPORT

This instrument contains highly sensitive semiconductors which are destroyed by even the slightest electrostatic discharge if the case is opened and the instrument is handled without proper precaution.

Special training can be given to qualified technical personnel who are entrusted with instrument service and repair responsibility.

Warranty is void if maintenance or repair (other than that which is listed in this manual) is performed by an unauthorized repair facility.

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Telephone (513) 248-2400
Facsimile (513) 248-2402
Email: support@overhoff.com

9.0. WARRANTY

All instruments built by Overhoff Technology Corporation are warranted to perform as claimed.

Defective components or workmanship of the instrument will be corrected free of charge for parts or labor within a period of one year from delivery. Nonperformance of the instrument as a result of negligence on behalf of the customer is not covered by this warranty.

Should it appear to be necessary to return the instrument to our factory, authorization for the return must be obtained from Overhoff Technology Corporation prior to shipping. In-freight charges will be borne by the customer.

10.0. REPLACEABLE PARTS

The following parts and components are disposable items and may be obtained from Overhoff Technology Corporation or from any original supplier:

Battery, "D" size, alkaline	P/N EN95,(qty 2 req'd)
Dust Filter	P/N 9900-05-BK
Ionization Chamber Can	P/N 1020686
Pump	P/N 50084
Hose Barb, Sample Inlet	Brass, P/N 22BH-4-2
Hose Barb, Sample Outlet	Brass, P/N 230-4-2
Panel Meter	P/N DMO-742W
AC power converter	P/N KTPS05-03315U Input: 100-240 VAC, 50-60Hz, 0.19A Output: 3.3 Vdc @ 1.5A, Output Plug: 5.5 mm O.D. x 2.1 mm I.D. Plug Center pin is positive

DO NOT SUBSTITUTE, use only the recommended power supply

Fuse, 2 Ampere	P/N MDL-2
J2 Cable	P/N J2-STD-400-2M (2.3 meter length cable is standard, a maximum length of 15 meters is available)

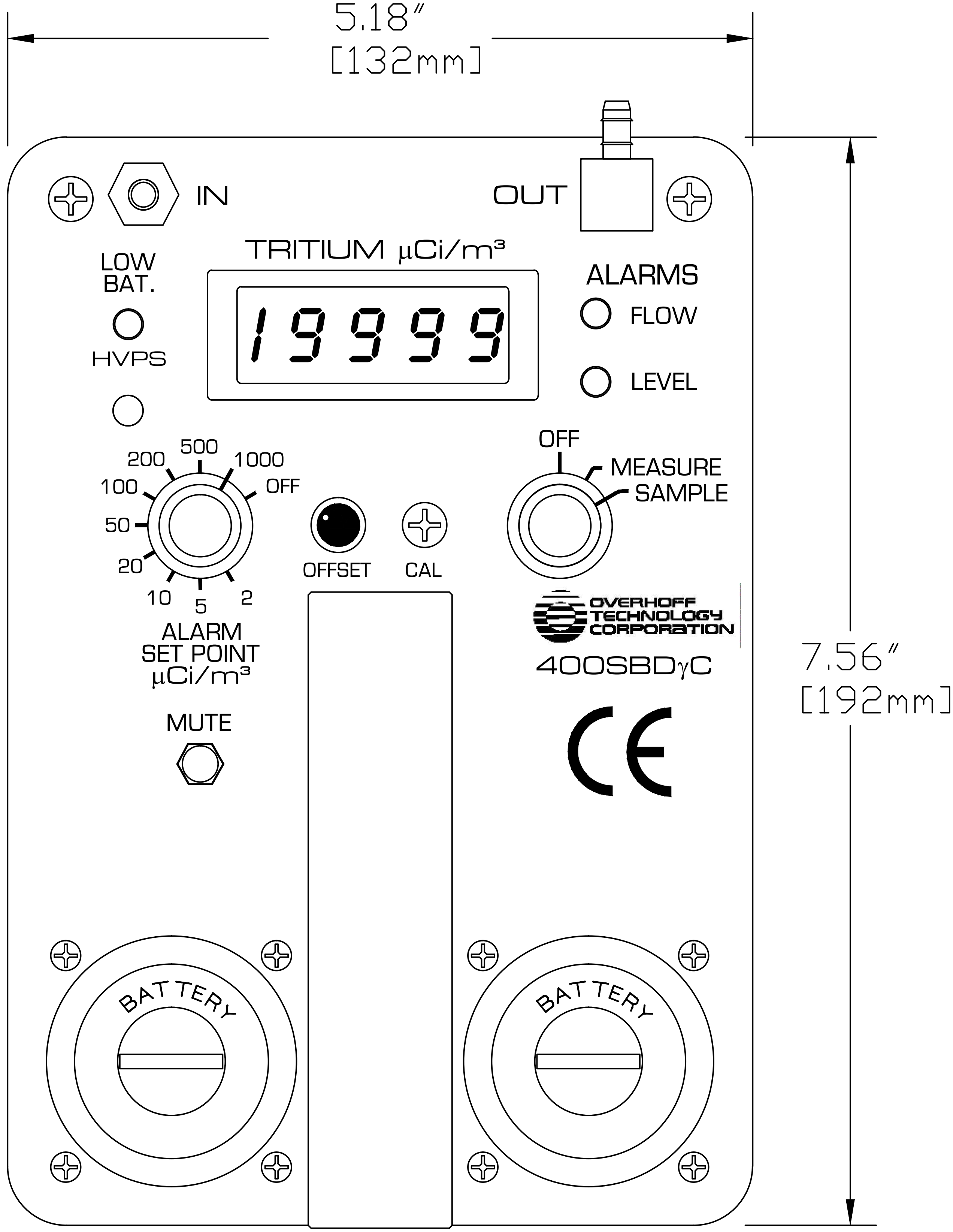


FIGURE 1
FRONT PANEL CONTROLS
MODEL 400SBDγC

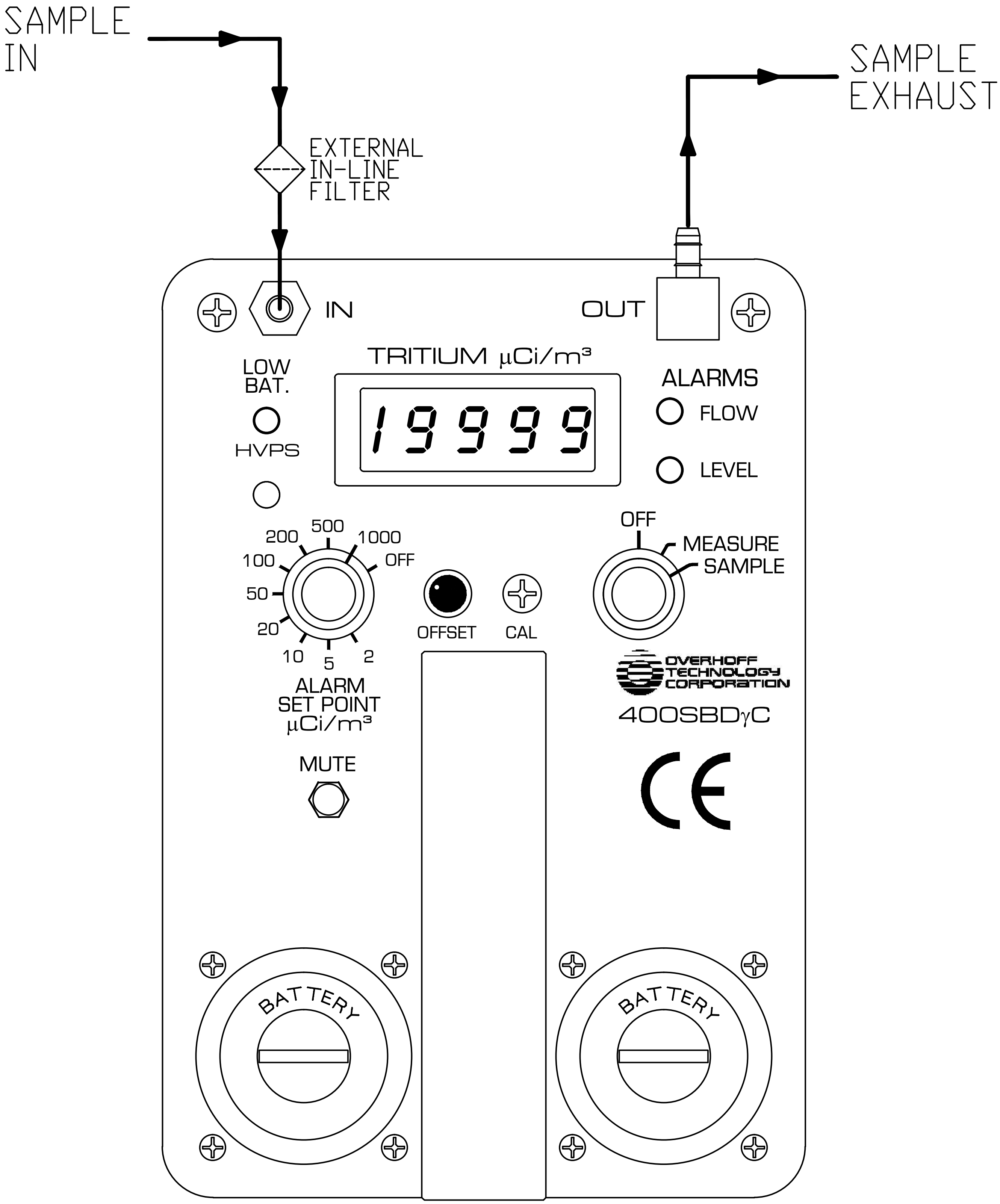
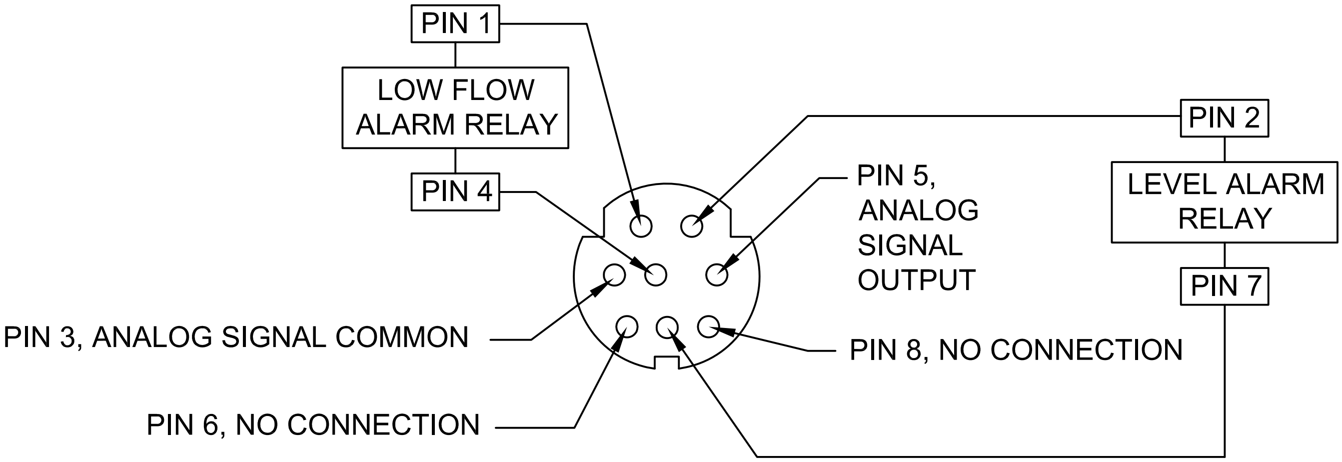


FIGURE 2
HOSE CONNECTIONS
MODEL 400SBDγC



8 PIN MIN DIN CONNECTOR
LOOKING AT RECEPTACLE FROM
OUTSIDE OF INSTRUMENT

NOTES:

1. ANALOG OUTPUT; 0-3.5VDC = 0-19999 μCi/m³ DISPLAYED ON PANEL METER

2. ALARM RELAYS ARE SOLID STATE OPTO-COUPLER DEVICES
WITH THE FOLLOWING OUTPUT CHARACTERISTICS;
VOLTAGE, 250VDC OR AC (PEAK) MAX.
CURRENT, 190mA MAX.

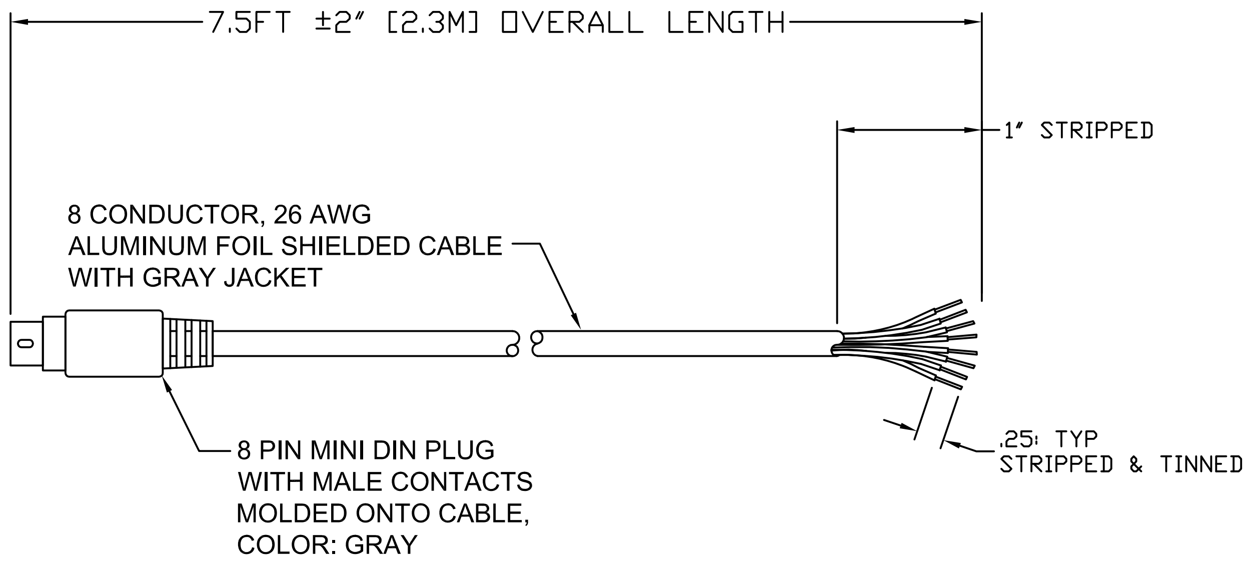
UNIT POWER	ALARM CONDITION	ALARM RELAY CONNECTION	
		LEVEL	FLOW
ON	ALARM	OPEN	OPEN
ON	NO ALARM	CLOSED	CLOSED
OFF		OPEN	OPEN

OUTPUT CONNECTIONS FOR MODEL 400SBDγC

APPLIES TO MONITORS BUILT AFTER SEPT. 2013 WITH P.C. BOARD No. 400ACMB.R1

FIGURE 3
OUTPUT CONNECTIONS
MODEL 400SBDγC

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
0	RELEASED FOR PRODUCTION	DW	01-11-10



J2 OUTPUT CONNECTOR
8 PIN MINI DIN PLUG

Function	Pin	Wire color
LOW FLOW ALARM RELAY	1	BLUE
LEVEL ALARM RELAY	2	GREEN
COMMON	3	VIOLET
LOW FLOW ALARM RELAY	4	WHITE
ANALOG SIGNAL OUTPUT	5	ORANGE
NO FUNCTION	6	YELLOW
LEVEL ALARM RELAY	7	BROWN
NO FUNCTION	8	RED

NOTE: THE SHIELD IS CONNECTED TO COMMON WHEN THE CABLE IS ATTACHED TO THE J2 RECEPTACLE

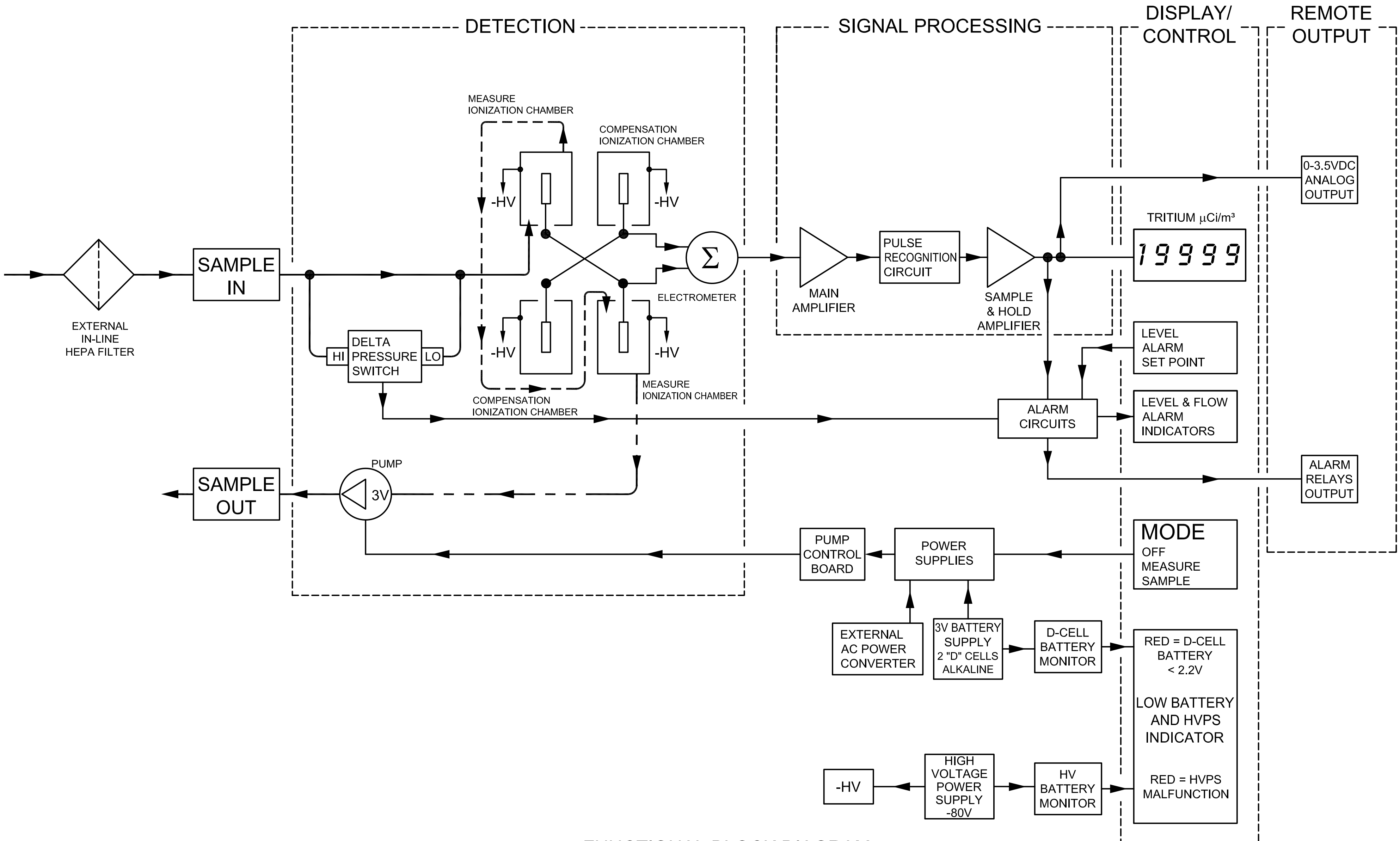
STANDARD J2 OUTPUT CABLE FOR ACCESS TO ALL CONNECTIONS MODEL 400SBDγC

NOTE: THIS CABLE IS MADE FROM L-COM PART No. DK238MM

OVERHOFF TECHNOLOGY CORPORATION
MILFORD, OHIO 45150 U.S.A.

J2 CABLE FOR STANDARD OUTPUT CONNECTIONS
ON MODELS 400SBDγC

DRAWN	DATE	SIZE	FILE NAME	DWG NO.	REV
D.WILLIAMSON	01-11-10	A	J2-400.DWG	J2-STD-400-L-COM	0
APPROVED	DATE	SCALE .66		SHEET 1 OF 1	
D.WILLIAMSON	01-11-10				

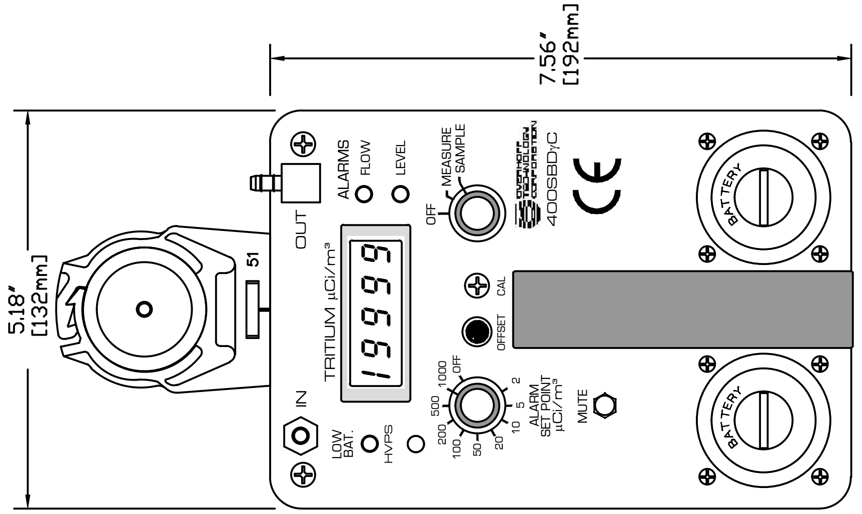


FUNCTIONAL BLOCK DIAGRAM
OVERHOFF MODEL 400SBDγC
WITH ALKALINE BATTERIES

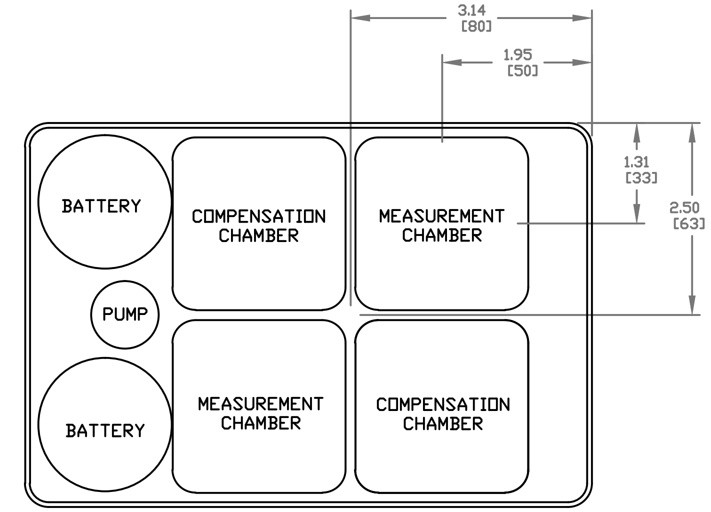
OVERHOFF TECHNOLOGY CORPORATION

DW
1-18-14

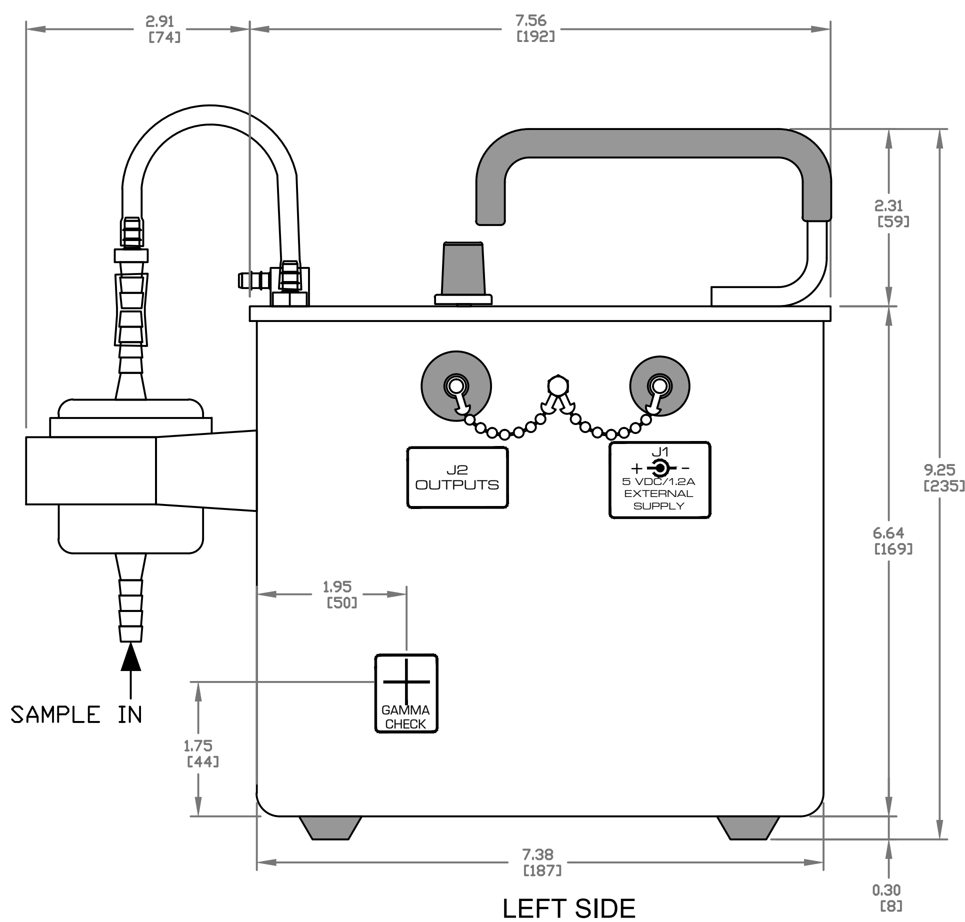
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



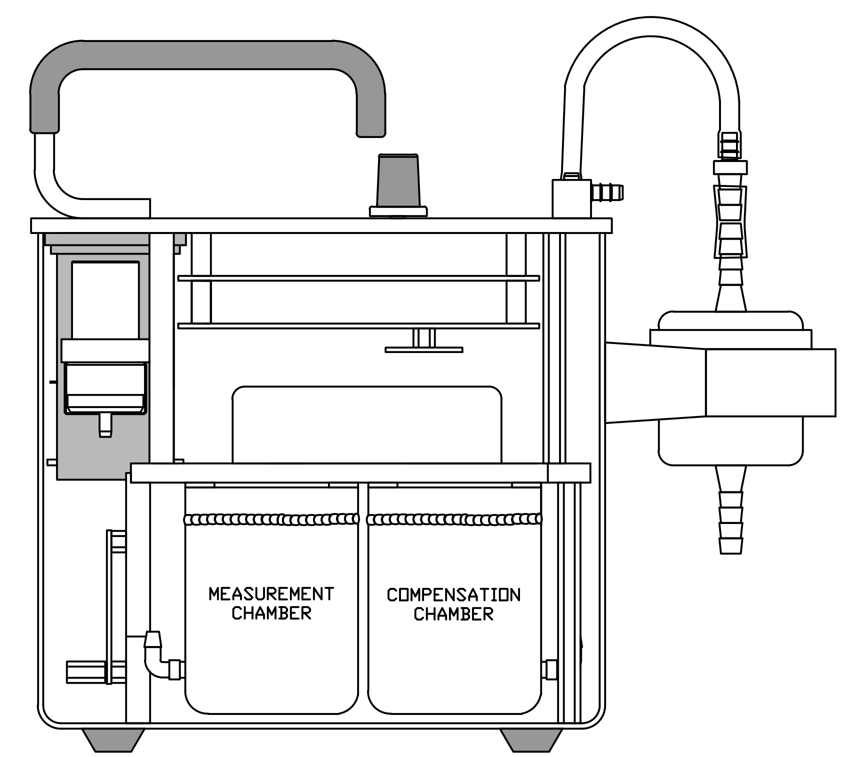
TOP VIEW
FRONT PANEL



TOP VIEW
CHAMBER POSITIONS



LEFT SIDE



SECTION VIEW
RIGHT SIDE

NOTES:

1. Dimensions: Inches[mm], FOR REFERENCE ONLY
2. Weight: 6 lbs. (2.7kg)
3. MODEL 400SBDγC, Dwg No.1021481,
   Description: quad (gamma compensation) 200 cm³ chambers (nominal volume)
   Measurement range: 1 - 19999 μCi/m³
   Display: 4½ digit LCD indicates 1 to 19999 μCi/m³
4. Includes these standard features:
   a. J2 Connector Receptacle with Remote Outputs
   b. Electronic High Voltage Power Supplies
   c. Pump Control Circuit Board
5. Includes these optional features:
   a. Modified for Alkaline Batteries in place of standard NiMH Batteries
   b. J1 accepts 5Vdc input from AC power adapter with CE Mark and compliant to RoHS
   c. The Electrical and Electronic Equipment (EEE) on this drawing is CE Marked and must comply with RoHS

⚠ Important Safety Information in Manual

MODEL 400SBDγC
PORTABLE TRITIUM MONITOR

OVERHOFF TECHNOLOGY CORPORATION

MILFORD, OHIO 45150 U.S.A.

TRITIUM MONITOR MODEL 400SBDγC
GENERAL ARRANGEMENT

DRAWN	DATE	SIZE	FILE NAME	DWG NO.	REV
J. CREECH	01-17-18	B	1021481-4008-1.DWG	1021481	0
APPROVED	DATE	SCALE N/S		SHEET 1 OF 1	
D. WILLIAMSON	01-17-18				