

**LUDLUM MODEL 203
SHIELDED WELL SCINTILLATOR**

October 2012

**LUDLUM MODEL 203
SHIELDED WELL SCINTILLATOR**

October 2012



LUDLUM MEASUREMENTS, INC
501 OAK STREET, P.O. BOX 810
SWEETWATER, TEXAS 79556
325-235-5494, FAX: 325-235-4672

STATEMENT OF WARRANTY

Ludlum Measurements, Inc. warrants the products covered in this manual to be free of defects due to workmanship, material, and design for a period of twelve months from the date of delivery. The calibration of a product is warranted to be within its specified accuracy limits at the time of shipment. In the event of instrument failure, notify Ludlum Measurements to determine if repair, recalibration, or replacement is required.

This warranty excludes the replacement of photomultiplier tubes, G-M and proportional tubes, and scintillation crystals which are broken due to excessive physical abuse or used for purposes other than intended.

There are no warranties, express or implied, including without limitation any implied warranty of merchantability or fitness, which extend beyond the description of the face there of. If the product does not perform as warranted herein, purchaser's sole remedy shall be repair or replacement, at the option of Ludlum Measurements. In no event will Ludlum Measurements be liable for damages, lost revenue, lost wages, or any other incidental or consequential damages, arising from the purchase, use, or inability to use product.

RETURN OF GOODS TO MANUFACTURER

If equipment needs to be returned to Ludlum Measurements, Inc. for repair or calibration, please send to the address below. All shipments should include documentation containing return shipping address, customer name, telephone number, description of service requested, and all other necessary information. Your cooperation will expedite the return of your equipment.

**LUDLUM MEASUREMENTS, INC.
ATTN: REPAIR DEPARTMENT
501 OAK STREET
SWEETWATER, TX 79556**

**800-622-0828 325-235-5494
FAX 325-235-4672**

Model 203 Shielded Well Scintillator
October 2012

Table of Contents

1. GENERAL.....	1
2. PACKING AND UNPACKING.....	1
3. ASSEMBLY AND DISASSEMBLY.....	2
4. SPECIFICATIONS.....	3
5. MODEL 203 PARTS LIST	4
6. DRAWINGS AND DIAGRAMS.....	4

Model 203 Shielded Well Scintillator

October 2012

1. GENERAL

The Model 203, along with a pulse height analyzer system, is used for gamma ray assay and wipe test analysis. The Model 203 is shielded with 3.8 cm (1.5 in.) of lead to improve sensitivity by reducing background and other external radiation.

The detector is a 4.4 cm (1.75 in.) diameter by 5.1 cm (2 in.) thick NAI (TI) crystal scintillator optically coupled to a 5.1 cm (2 in.) diameter, 10-stage photomultiplier tube. The Model 203 uses a series "C" type connector for both signal and high-voltage lines. Pulse height analyzer systems that have separate signal and HV connectors will require a signal splitter box (Model 297 or equivalent).

The stand for the Model 203 allows the detector to be rotated for ease of positioning detector at target.

2. PACKING AND UNPACKING

Note:

The Model 203 is shipped in two boxes, one containing the lead shield and stand, the other containing the well detector.

Warning:

The well detector contains a fragile crystal, and may be damaged by a shock or direct impact.

Warning:

If the instrument has to be returned, it must be disassembled and packaged sufficiently to prevent damage.

Remove the calibration certificate or detector functional check certificate and place it in a secure location. Remove the detector(s) and accessories (if applicable) and ensure that all items on the packing list are in the carton. If multiple detectors are included, refer to the calibration certificates for the serial number (SN) matches. To return an instrument or detector for repair or calibration, provide sufficient packing material to prevent damage during shipment, and affix appropriate warning labels to promote careful handling. The following items and information should also be included to ensure quick turn-around time of your equipment:

- instrument(s) and related cables
- brief description as to the reason for return
- description of service requested
- return shipping address
- customer name and telephone number

Model 203 Shielded Well Scintillator
October 2012

3. ASSEMBLY AND DISASSEMBLY

Note:

This instrument is shipped disassembled to prevent damage.

Tools Required:

- Large flat blade screwdriver
- Allen-head wrench



Ludlum Model 203



Lead Plug



Rear Cap



Collimator



Well Detector

ASSEMBLY:

1. Place the lead shield on the stand; remove the lead plug from the top and rotate 180° so that the rear cap is on the top.
2. Remove three each 10-32 x 1 inch screws from the base.
3. Remove the rear cap.
4. Carefully place the well detector inside the lead shield.
5. Place the bottom foam pad on top of the well detector; replace the rear cap and the three screws.

Model 203 Shielded Well Scintillator
October 2012

6. Carefully turn the instrument right side up and remove two each 6-32 x 3/16 socket set screws and the lead collimator, and place the foam ring around the well detector.
7. Replace the collimator, the two screws, and the lead plug.

DISASSEMBLY:

1. Rotate the lead shield 180 degrees.
2. Remove three each 10-32 x 1 inch screws.
3. Remove the rear cap and bottom foam pad.
4. Carefully remove the well detector from the lead shield assembly.

4. SPECIFICATIONS

DETECTOR: 5.1 cm x 4.6 cm (2. 1.8 in.) (Dia x L) thick integral NaI (Tl) scintillator

WELL SIZE: 1.7 x 3.9 cm (0.66 x 1.6 in.) (Dia x L)

SCINTILLATOR CONSTRUCTION: 0.025 cm (0.010 in.) thick aluminum well

LEAD SHIELDING:

3.8 cm (1.5 in.) thick lead with removable cap

EFFICIENCY (4 π): 65% for ^{129}I ; 33% for ^{137}Cs ; 43% for ^{60}Co

DETECTOR OPERATING VOLTAGE: 500-1200 Vdc

BACKGROUND: 500 cpm or less

SIZE:

Body: 41.9 x 30.5 x 34.3 cm (16.4 x 12 x 13.5 in.) (H x W x L)

WEIGHT: 68.2 kg (150 lb)

Model 203 Shielded Well Scintillator
October 2012

5. MODEL 203 PARTS LIST

	<u>Description</u>	<u>Part No.</u>
Unit	Completely Assembled Model 203 Shielded Well Scintillator	47-1638
	Model 203 HV SIGNAL SPLITTER ASSY (Optional-For use w/Analyzers w/separate signal & HV connectors)	4379-038
	4.4 x 5.1 cm (1.75 x 2 in.) Integral Line Detector	01-5130
	5.1 cm (2 in.) Tube Socket Board	5002-233
	Model 203 Shield Assembly	2379-005
	Model 203 Lead Plug	7379-030
	Model 203 Foam Ring	7090-015
	Model 203 Stand Right	7379-065
	Model 203 Stand Left	7379-064
	Splice Plate	7379-066
	Bottom Foam Pad	7260-001-05
	“C” Connector UG706/U	13-7751
	Black Bumper	21-9376
	7.6 cm (3 in.) Hand Knob	08-6684
	5/8 Beveled Washer	20-9118
	8-32 x 3/8 BH	17-8525
	#8 ITLW	20-9010

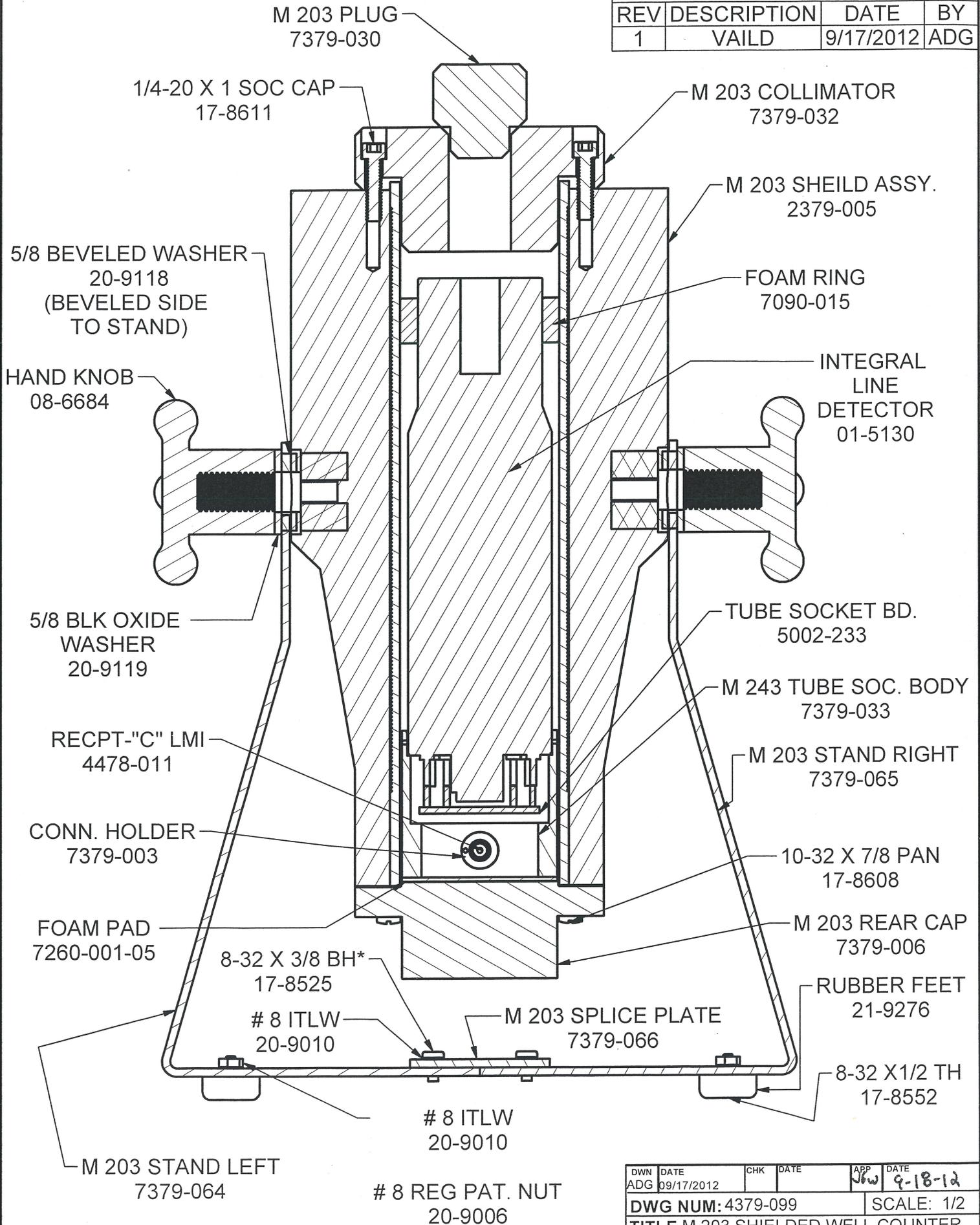
6. DRAWING AND DIAGRAMS

Assembly View Model 203, Drawing 379 x 99

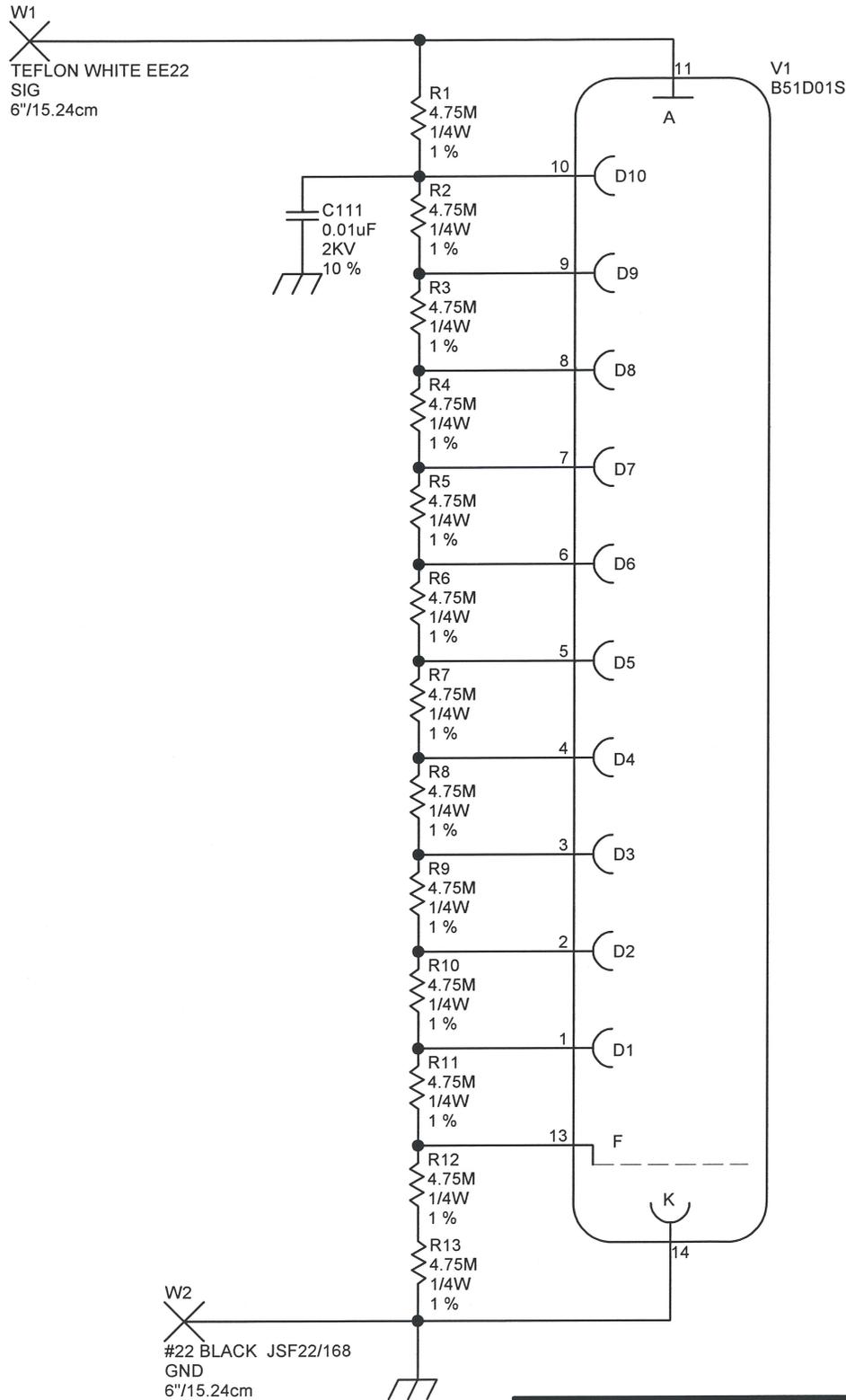
5.1 cm (2 in.) Voltage Divider 5002-934, Drawing 2 x 934

5.1 cm (2 in.) Voltage Divider 5002-934 Component Layout, Drawing 2 x 935

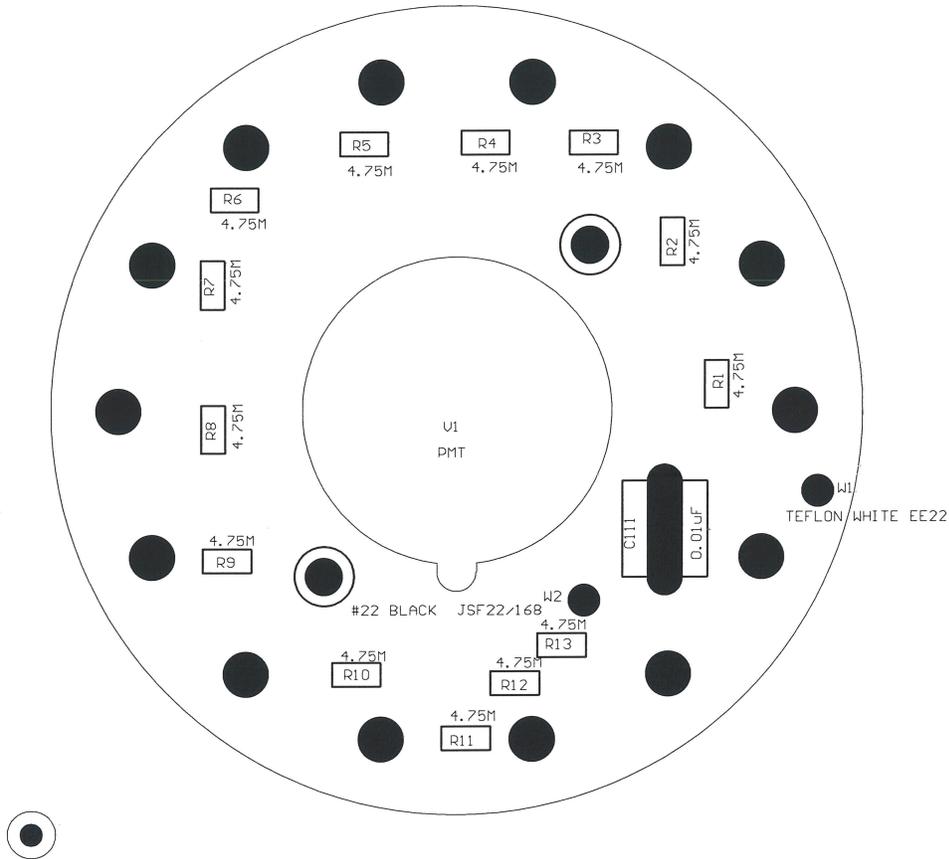
REVISION HISTORY			
REV	DESCRIPTION	DATE	BY
1	VAILD	9/17/2012	ADG



DWN	DATE	CHK	DATE	APP	DATE
ADG	09/17/2012			JW	9-18-12
DWG NUM: 4379-099				SCALE: 1/2	
TITLE M 203 SHIELDED WELL COUNTER					
LUDLUM MEASUREMENTS, INC. 501 OAK STREET SWEETWATER, TEXAS 79556			SERIES 379	SHEET 99	



		PO Box 810 501 Oak Street Sweetwater, Texas 79556 U.S.A. 1-800-622-0828	
		Title: 2" VOLTAGE DIVIDER	
Drawn: SA	09/22/06	Model: VARIOUS	
Design: RC	09/22/06	Board#: 5002-934	
Check:			
Approve:	<i>DW 8-20-10</i>	Sheet: 1 of 1	Series
13:39:11	20-Aug-2010	Rev: 2.0	Sheet 934
002934R2P1.sch			



Drawn: SA	09/22/06	Title: 2" VOLTAGE DIVIDER		
Design: RC	09/22/06	Company: LMI		
		Tube: B51D01S		
Approve: <i>√GW</i>	<i>2-17-11</i>	Board#: 5002-934		
Layer: Mech.1		Rev: 2.0	Series	Sheet
MID:		002934R2X1.Pcb	2	935