Model 26S Integrated Scintillator User's Manual

Ludlum Measurements

June 2025

Serial Number: PF014896 and Succeeding

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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

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INTRODUCTION

The Model 26S is an ergonomic, lightweight instrument, which can be used for locating gamma radiation or for measuring gamma exposure or dose. It features the ability to measure radiation in count rate, exposure/dose rate, activity rate, integrated exposure/dose, time-averaged rates, and scaler counts. The Model 26S utilizes a CsI(Tl) crystal detector, a rugged, improved version of the classic 1x1 NaI scintillator for detection and measurement of gamma radiation. The scintillator is energy-dependent, and will over-respond to energies in the 100 keV region.
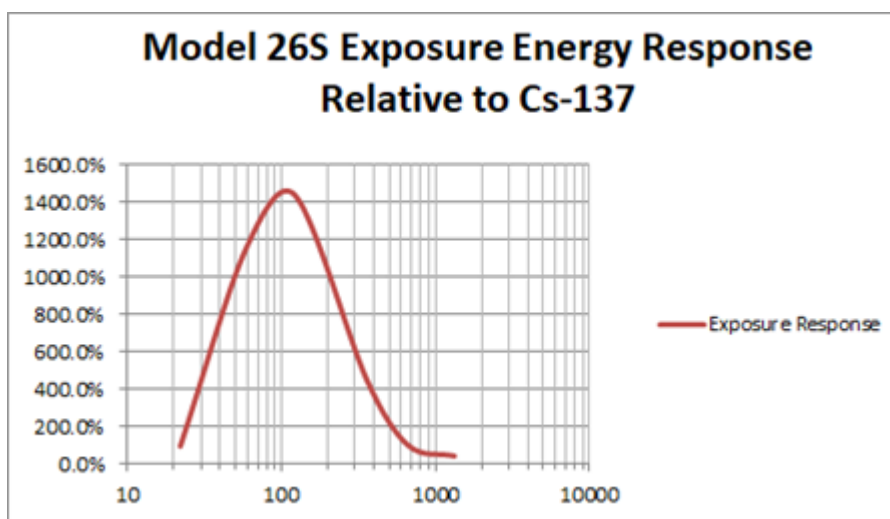
Three modes of operation are available for the Model 26S – RATE, MAX, and COUNT. RATE mode operation will display the current count, exposure, or activity rate. MAX mode is used to capture the highest count, activity, or exposure rate detected – useful for finding a peak rate, or frisking when the display is not visible. Primary and Secondary Units for RATE and MAX modes can be chosen from c/s, c/m, d/m, d/s, μR/h, or μSv/h. COUNT mode allows the user to perform a count for a predetermined time. Depending on the Count Units chosen, the result can be a scaler count (in counts or disintegrations), a time-averaged rate (c/m, d/m, d/s, c/s), a time-averaged exposure or dose rate (μR/h, μSv/h), or an integrated exposure or dose (μR or μSv).

The instrument features a large backlit LCD (liquid crystal display), a piercing audio warning, and easy, intuitive use in a single-handed platform. A comfortable wrist strap and lanyard

are also included for keeping the instrument close and secure. The unit body is made of lightweight but durable plastic. It is intended for outdoor use and can resist splashing water.

There is also a headphone option available (not included). The instrument can be modified to include a standard 1/8 inch headphone jack (part number 4498-538).

The display will be automatically backlit if light levels are low. The display backlight can also be configured for "Continuous On" operation. RATE and MAX modes can be silent or utilize a "click" or a sigma audio; the audio is always silent during COUNT mode. The "click" audio produces a short sound for each gamma ray detected. The default sigma audio measures the radiation level on power-up and, when a sudden increase is detected, emits a short beep every quarter-second.

Setup of the instrument is accomplished through the front-panel buttons. (Setup can be disabled via the internal switch on the Model 26S in order to protect settings.) The advanced user or administrator can set calibration constant, dead time correction, efficiency, primary and secondary units, primary and secondary unit alarm levels, primary and secondary count units, primary and secondary count alarm levels, response time, auto-response rate (Fast or Slow), available operational modes, count time, and click or sigma audio.

The unit is operated with two AA batteries for operation from -20 to 50 °C (-4 to 122 °F) . Battery life should be approximately 250 hours under normal usage with a low-battery indicator on the LCD warning when less than 16 hours of battery life remain.

GETTING STARTED

2.1 Unpacking and Repacking

Remove the calibration certificate and place it in a secure location. Remove the instrument and ensure that all of the items listed on the packing list are in the carton. Check individual item serial numbers and ensure calibration certificates match between instruments and detectors (if applicable). The Model 26S serial number is located on a label on the front side of the unit.

To return an instrument for repair or calibration, provide sufficient packing material to prevent damage to the instrument during shipment. Every returned instrument must be accompanied by an Instrument Return Form, which can be downloaded from the Ludlum website at `www.ludlums.com`. Find the form by clicking the "Support" tab and selecting "Service Department" from the drop-down menu. Then choose the appropriate form located under the "Returned Goods Form" heading.

2.2   Battery Installation

A low-battery indicator appears at the bottom of the LCD when less than 16 hours of battery life remain. When this indicator is present, follow these steps to replace the four standard AA batteries:

1. Grab the ring on the screw.

2. Turn the ring one quarter turn counter-clockwise.

3. Release and remove the battery cover

4. Replace the two AA batteries.

5. Firmly insert the barb of the battery cover completely into the body of the Model 26.

6. Replace the cover and turn ring one quarter of a turn clockwise to secure.

> ⚠ If the battery installation procedure is not followed correctly, and the barb is not inserted into the body of the instrument correctly, the barb may break off.

2.3   Instrument Operational Test

Turn the instrument ON by pressing the ON/ACK button for about a second, and then releasing. The instrument should display "888" and activate the audio. Observe the device during this time. If any LCD segments are missing, or audio fails to work, the device is in need of repair. Please refer to the figure below.

Figure 2.1: Startup display for Model 26S.

The instrument then displays the firmware version number and activates the Alarm LED briefly. Should the Alarm LED fail to turn on, the device is in need of repair. Please refer to the figure below.

Figure 2.2: Firmware version display and ALARM LED check shown.

If sigma audio mode is active, then the unit will beep for 8 seconds while it measures the current radiation level. The audio will then be silent and the instrument will move to normal operation, displaying the current rate for the Primary units (default: μR/hr). The user may select the Secondary units (default: c/m) by pressing the Units button.

Ensure that the low-battery indicator is not present. If the low-battery indicator is present, replace the batteries as soon as possible. Should the instrument detect a battery voltage that is high enough to power on, but too low to safely operate, the display will blank and the low-battery icon will flash. Normal operation will not be available until the batteries have been replaced. Under extreme low-battery conditions, be aware that the unit may not even turn on or may turn itself off abruptly.

A reference reading with a check source, 1 μCi (37 kBq) of ^{137}Cs for example, should be obtained at the time the instrument is received in the field. Small check sources of radiation are available from Ludlum Measurements. While exempt from many regulations because of their small size, these sources are large enough to produce a response on this instrument.

The detector's position is indicated by the circular screen on the back of the Model 26S: the seam between the enclosure halves indicates the approximate center of the detector. If this procedure is done routinely with the same radiation source, instrument malfunction may be detected when anomalous readings are observed. If at any time the instrument fails to read within 20% of the reference reading when using the same check source, it should be sent to a calibration facility for recalibration and/or repair.

Example of log reading:

Check Source #_____ Rate_____ Units_____

Once this procedure has been completed, the instrument is ready for use.

2.4   Detector Failure Diagnostic

Note that the Model 26S has its own diagnostic tests to ensure that the detector is functioning correctly. The Model 26S can detect when the radiation detector is malfunctioning and will flash the display to indicate a fault. If the detector completely stops detecting radiation for 60 seconds, the Model 26S will flash a zero reading for the currently selected units. If this indication is observed, remove the unit from service and have it evaluated by a qualified repair and calibration technician.

Figure 2.3: Detector Failure display (shown for c/m); will also flash.

2.5   Detector Over Range

If the unit is exposed to high levels of radiation or has an internal malfunction that causes it to count high or excessively, the unit flashes the maximum rate for the currently selected units as a warning. The user should ensure whether this is being caused by a high radiation field or by internal malfunction.

Figure 2.4: Detector Over Range (shown for µSv/h); will also flash.

2.6   Instrument Use And Controls

With three front-panel buttons, the Ludlum Model 26S is simple and easy to use with minimal training required. Default operation is RATE mode, and the display shows the current rate using the Primary units. Pressing the UNITS button will switch between Primary and Secondary units. Pressing the MODE button will switch the instrument to MAX mode, which will display the highest rate detected. Pressing the MODE button again will switch it to COUNT mode, which will display the COUNT timer. Note that, to provide the simplest operation, either or both of the MAX and COUNT modes can be locked out in the setup process.

See the Model 26S drawing at the beginning of this manual to reference the following controls:

ON/ACK Button: Used to power the Model 26S ON and OFF, silence click audio, reset/retake sigma count, reset MAX mode, start/reset the COUNT Timer, and acknowledge audio alarms.

- Power On: Press for approximately one second and release (all LCD segments will activate, and firmware version will be shown).

- Power Off: Press for approximately five seconds. The display will show a 3, 2, 1 countdown for the final three seconds of shutdown. Releasing the ON/ACK button during shutdown will return the device to the previous state of operation, but will retake the sigma audio count if sigma audio is enabled. At completion of the shutdown count, the LCD will go blank.

- Normal Operation: Will silence 'click' audio in RATE and MAX modes, reset MAX mode display, start/reset COUNT Timer in COUNT mode, and acknowledge/silence audio in all modes of operation.

MODE Button: Used to advance between the three operating modes, RATE, MAX, and COUNT. Note that MAX and/or COUNT mode may be disabled from use by the administrator or calibrator.

UNITS Button: Used to switch between Primary and Secondary units in RATE and MAX modes. In COUNT mode, the UNITS button will switch between Primary and Secondary units unless a countdown is active. The UNITS button is disabled during an active countdown.

2.7 RATE Mode Operation

In RATE mode the current count rate will be displayed. Pressing the UNITS button will switch the displayed value between the Primary and Secondary Units.

Under a non-alarm condition, the Alarm Status LED will be off; pressing the ON/ACK button will turn the audio on/off. If an alarm condition is present, pressing the ON/ACK button will acknowledge and turn off the continuous tone alarm audio. Under an alarm condition, the ALARM display indicator will remain on, and the Alarm Status LED will be flashing. Alarms are non-latching in RATE mode.

If other operational modes are available, pressing the MODE button will move to the next available operational mode.

Figure 2.5: RATE mode display showing typical background radiation rate and the low-battery icon.

2.8 MAX Mode Operation

While in MAX mode, the highest detected count rate (since the last reset) is displayed. The word MAX will be displayed when in MAX mode.

Pressing the UNITS button will switch the displayed value between the Primary and Secondary Units. Under a non-alarm condition, the Alarm Status LED will be off; pressing the ON/ACK button will turn the audio on/off. Pressing the ON/ACK button a second time will reset the display and will enable the audio.

If an alarm condition is present, pressing the ON/ACK button once will acknowledge and turn off the audio. Pressing the ON/ACK button a second time will reset the display and clear the alarm condition. Under an alarm condition, the ALARM display indicator will remain on, and the Alarm Status LED will be flashing. Alarms in MAX mode latch with the display.

If other operational modes are available, pressing the MODE button will move to the next available operational mode.

Figure 2.6: MAX Mode operation display with ALARM indicator and alarm LED.

2.9 COUNT Mode Operation

When entering COUNT Mode from another operational mode, the currently selected COUNT Units will be displayed for approximately one second. The purpose of COUNT mode is to count for a predetermined amount of time, and to display the results on the display. Note that the predetermined count time can be from 1 second to 9:59 minutes, or can be set to zero to enable continuous counting until stopped by the user.

Count mode operation is very flexible, depending on the units chosen. A common choice is for the count mode to just perform a scaler count for a specified time, with a resulting answer in counts (equaling detected radiation events). If a result in terms of activity is desired, the scaler count can also be in units of "d" or disintegrations. But if the count units are chosen to be c/m or c/s, then the resulting answer is an averaged count rate over the time interval. Similarly, if count units of d/s or d/m are chosen, the resulting answer is an averaged disintegration rate.

> If the user desires the instrument to show results in terms of disintegrations/area (eg. dpm/100 cm^2 or dps/cm^2), then the appropriate factor should be placed in the Efficiency parameter.

Other choices are to have count mode units of μR/h or μSv/h, in which case the COUNT mode result is an averaged exposure or dose rate. But if count mode units of μR or μSv are chosen, the result is shown in accumulated exposure or accumulated dose over the chosen count time. The following tables lists the possibilities:

UNITS	RESULT
c	counts per count time
d	disintegrations per count time
c/m, c/s	count rate averaged over the count time
d/m, d/s	disintegration rate, averaged over the count time
μR/h, μSv/h	exposure or dose rate, averaged over the count time
μR, μSv	integrated exposure or dose over the count time

Audio is disabled in COUNT mode.

In COUNT mode, operation depends on the current state of the Count Timer.

When the Count Timer is Ready:

- The display will show the Count Time, and the Alarm Status LED will be off.

- Pressing the UNITS button will switch between the Primary and Secondary Count Units. The newly selected Count Units will be displayed for approximately one second, and the display will then return to the Count Timer.

- Pressing the ON/ACK button starts the Count Timer.

- If other operational modes are available, pressing the MODE button will move to the next available operational mode.

When the Count Timer is Active:

- The display will show the Count Time remaining.

- Pressing the ON/ACK button will reset the Count Timer.

- The UNITS button is disabled.

- If an alarm condition occurs, the display will alternate between the Count Time remaining and the Count value. The ALARM display indicator and the Alarm Status LEDs will turn on. Alarms are latching in COUNT mode.

- If other operational modes are available, pressing the MODE button will cancel the current Count Timer and move to the next available operational mode.

When the Count Timer is Finished:

- The display will show either the accumulated total for c, d, μR, and μSv, or the timed ratemeter average for c/s, c/m, d/s, d/m, or the average exposure or average dose rate in μR/h and μSv/h.

- Pressing the UNITS button will switch between the Primary and Secondary Count Units. The newly selected Count Units will be displayed for approximately one second, and the display will then return to the accumulated total or timed ratemeter average, depending on the newly selected Count Units.

- Under a non-alarm condition, the Alarm Status LED will be off; pressing the ON/ACK button will reset the Count Timer.

- If an alarm condition occurred during the Timed Count, a continuous audio tone will sound, and the ALARM display indicator and the Alarm Status LED will turn on. Pressing the ON/ACK button once will acknowledge and turn off the continuous tone alarm audio. Pressing the ON/ACK button a second time will clear the alarm condition and reset the Count Timer. Alarms are latching in COUNT mode.

- If other operational modes are available, pressing the MODE button will move to the next available operational mode.

Figure 2.7: COUNT mode opeartion showing COUNT Timer of 10 minutes, 30 seconds.

SPECIFICATIONS

Detector: 2.5 x 1.9 cm (1 x 0.75 in.) (diameter x length) CsI(Tl) scintillator (energy dependent)
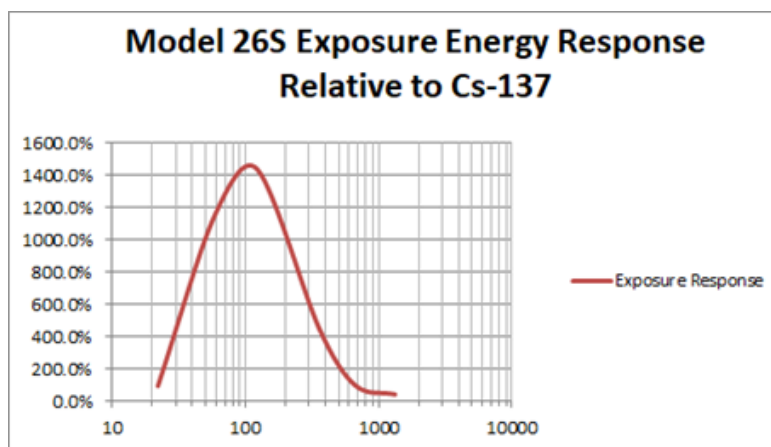
Exposure Linearity: ±10% from background to 200 μSv/h (20 mR/hr)

Count Rate Linearity ±10% from 8 c/s to 8 kc/s (200 c/m to 999 kc/m)

Energy Range: from 40 keV to 3 MeV

Operating Exposure Rate Range: from .05 to 200 μSv/h (5 μR to 20 mR/hr)

Energy Response: energy-dependent, will over-respond to energies in the 100 keV region (see chart below)

GammaSenstivity: approximately 165 kcpm/mR/hr (^{137}Cs)

Alarms: count rate and scaler alarm setpoints adjustable over the display range

Loss of Count Protection: after 60 seconds of no pulses from detector, unit will flash a zero reading and the alarm audio will be triggered

LCD Display: 3½ digit LCD with large 12.7 mm (0.5 in.) digits, (k)c/s, (k)c/m, (k)d/s, (k)d/m, μR(/h), μSv(/h), low-battery indicator, MAX, ALARM

Display Range:

- 0.00 c/s to 19.9 kc/s

- 000 c/m to 999 kc/m

- 0.00 d/s to 19.9 kd/s

- 000 d/m to 999 kd/m

- 0.00 to 200 μSv/h (0.00 - 999 μSv in COUNT MODE)

- 000 μR to 20.0 mR/h (0.00 – 999 mR in COUNT MODE)

- MAX RATE of 200 μSv/h or 20 mR/hr flashes and the alarm is triggered if the radiation field exceeds the display range.

Backlight: built-in ambient light sensor automatically activates low-power LED backlight, unless internal dip switch 1 is set to continuous-on

User Controls:

- ON/OFF/Quiet - press to turn ON, tap to alternate between 'click' audio and QUIET, hold for OFF

- MODE - alternates between RATE (count rate), MAX (captures peak rate), and COUNT (preset count time) modes

- UNITS - alternates between Primary and Secondary units

Count Time Range: 1 second to 9:59 minutes, or "0" enables continuous counting until stopped by user

Response Time: user-selectable from 1 to 60 seconds, or Auto-Response Rate FAST or SLOW

Sigma Audio: greater than 60 dB at 0.6 m (2 ft); approximately 4.5 kHz

Power: two "AA" batteries

Battery Life: approximately 200 hours of operation (less with backlight configured for continuous on), 16-hour low-battery warning

Construction: high-impact plastic with water-resistant rubber seals and separate battery compartment

Environmental Rating: NEMA (National Electrical Manufacturers Association) rating of 3 or IP (Ingress Protection) rating of 53

Size: 4.6 x 6.9 x 27.2 cm (1.8 x 2.7 x 10.7 in.) (H x W x L)

Weight: 0.35 kg (0.75 lb)

SETUP MODE

Only advanced users or administrators should consider changing any of the parameters in the following section. Incorrect settings could jeopardize the safety of users depending on this instrument.

4.1 Setup Overview

Your instrument has been shipped from Ludlum Measurements only after passing electronic checkout, a 30-hour burn-in process, and a careful calibration process. Calibration papers are supplied with each instrument shipped from Ludlum Measurements.

Recalibration should be accomplished after a predetermined calibration frequency (Ludlum Measurements, Inc. recommends no more than a one-year interval), or when the operation of the instrument is suspect or maintenance has been performed on the instrument. Recalibration is not normally required following instrument cleaning or battery replacement.

Ludlum Measurements offers a full-service repair and calibration department. Not only do we repair and calibrate our own instruments, we also service most other manufacturers' instruments. Calibration procedures are available upon request for customers who choose to calibrate their own instruments.

Ludlum Measurements, Inc. recommends recalibration at intervals no greater than one year, assuming that regular operational checks are performed. Check the appropriate local, state, and federal regulations to determine required recalibration intervals.

4.2   Default Setup Values

Setup Parameter	Default Value	Notes
Calibration Constant	165	kcpm per mR/h
Dead Time Correction	8	Microseconds
Efficiency	15.0	Efficiency %
Primary Units	µR/hr	Non-SI exposure rate
Primary Units RATE/MAX Mode Alarm Point	000	Disabled
Primary Count Units	µR/h	Non-SI exposure rate
Primary Count Alarm Point	000	Disabled
Secondary Units	c/m	Counts per minute
Secondary Units RATE/MAX Mode Alarm Point	000	Disabled
Secondary Count Units	c	Counts per minute
Secondary Count Alarm Point	000	Disabled
Response Time	0	Enable Auto Response
Auto-Response Rate	F	Fast Auto Response
Operational Modes	0	All Modes Available
Count Time	1:00	One Minute
Low Light Threshold	55	
Click Audio Enable	OFF	Sigma Audio Enabled

4.3   Entering Setup Mode

To enter setup mode, power down the Model 26S, then turn the unit back ON. Following the display of the Firmware version, when the instrument has begun normal operation, press the MODE button three times (within four seconds) to enter Setup mode. Entry to Setup mode can be confirmed when the numeric portion of the display shows the Calibration Constant parameter, and no units (c/s, c/m, d/s, d/m, µR/h, or µSv/h) are displayed. If you simply wish to view the parameters, you may do so by not pressing any other buttons. The parameters will change every four seconds when no buttons are pressed, or the UNITS button can be pressed to advance to the next parameter. The unit will return automatically to normal operation after the last parameter is presented.

SETUP PROTECT: The Model 26S parameters can be protected from unauthorized changes via the internal switch located on the Model 26S circuit board. To change the switch, open the battery compartment and remove the batteries from the Model 26S . Next, loosen the four captive Phillips head screws which fasten the detector cover.

Now turn the Model 26S over so that the detector is facing up. Gently remove the plastic case that covers the back of the instrument and then remove the four slotted screws from the detector retainer and gently lift the detector and detector retainer being careful to not tug on the wiring harness. The DIP (dual inline position) switch should now be visible below the detector retainer.

To protect the Model 26S from changes in Setup mode, slide DIP Switch 2 (closest to the battery compartment) to the ON (right) position. If DIP Switch 2 is in the OFF (left) position,

changes are allowed in Setup mode. Once the DIP Switch is set as desired, gently replace the detector and the detector retainer, and fit the plastic case on the back of the instrument. Turn the instrument over and tighten the four Phillips head screws. Install the batteries, and replace the battery cover. Note that with the DIP Switch 2 in the ON position. Setup mode may be entered and parameters viewed, but changes cannot be made.

DISPLAY BACKLIGHT 'Continuous On': The Model 26S display backlight can be set to remain on continuously during operation. Follow the steps above for **SETUP PROTECT**, but use DIP Switch 1 for display backlight selection. Setting DIP Switch 1 to the ON (right) position will configure the display backlight to remain on during operation. Set DIP Switch 1 to the OFF (left) position, and the display will be backlit only when light levels are low.

> **i** | Setting the display backlight for continuous-on operation can result in reduced battery life.

4.4 Setup Mode Operation

Once the Model 26S is in Setup mode, the Calibration Constant will be displayed on the LCD, and the hundredths digit will be blinking, indicating it as the selected item. Use the MODE button to adjust the value for the selected item. When the appropriate value is selected for that item, press the ON/ACK button to move to the next item. When the desired value is displayed, either wait for four seconds for the Model 26S to switch to the next parameter, or press the UNITS button to advance to the next parameter. To end Setup mode and save the current setting, press and hold the UNITS button for approximately 5 seconds. When the Model 26S is in PROTECT mode (dipswitch setting), the Setup parameters will cycle through to display the set values, but changes are not possible.

The order of Setup parameters for the Model 26S is as follows:

Calibration Constant (Default 165 kcpm per mR/h) - Use ON/ACK to select the value to adjust, and MODE to adjust the value. Value is in kcpm per mR. Available values are:

- Ones Place (**0-9**)

- Tens Place (**0-9**)

- Hundreds Place (**1-9**)

Dead Time Correction (Default 8 microseconds) - Use ON/ACK to select the value to adjust, and MODE to adjust the value. Value is in microseconds. Available values are:

- Tenths Place (**0-9**)

- Ones Place (**0-9**)

- Tens Place (**0-9**)

Efficiency (Default 15.0%) - Use ON/ACK to select the value to adjust, and MODE to adjust the value. Available values are:

- Tenths Place (**0-9**)

- Ones Place (**0-9**)

- Tens Place (**0-9**)

- Number of Decimal Places (1)

Normally the efficiency is used on a per detector basis, i.e. the efficiency of the detector is calculated by dividing the count rate received from a source by the total disintegration rate of the source.

Primary Units (Default µR/hr) - Use MODE to select. Available values are c/s, c/m, d/s, d/m, µR/h, and µSv/h.

Primary Units RATE/MAX Mode Alarm Point (Default 000) - Use ON/ACK to select the value to adjust, and MODE to adjust the value. Units will be the same as selected earlier with Primary Units. The ALARM LCD Segment will be on to indicate an Alarm parameter. Set this Alarm Point to 000 to disable. Available values are:

- Ones Place (**0-9**)

- Tens Place (**0-9**)

- Hundreds Place (**0-9**)

- Number of Decimal Places (0, 1, or 2 - decimals only available for count/activity units if the **k** multiplier is selected.)

- Range (**k**, µ, m, and off - available multipliers are dependent on the unit selected.)

> ℹ️ If the Primary Units has changed to a value other than that used to previously set this Alarm Point, the Alarm Point will be reset to 000. If the Alarm Point it set above the maximum range, the alarm point will be reset to the maximum value allowed for that unit.

Primary Count Units (Default µR/hr) - Use MODE to select. Available values are dependent on the selected Primary Units:

Primary Units	Primary Count Units Available
c/s	c/s, c
c/m	c/m, c
d/s	d/s, d

Primary Units	Primary Count Units Available
d/m	d/m, d
μR/h	μR/h, μR
μSv/h	μSv/h, μSv

Primary Count Alarm Point (Default 000) - Use ON/ACK to select the value to adjust, and MODE to adjust the value. Units will be the same as selected earlier with Primary Count Units. Primary Count Units of c or d will not be displayed, but μR or μSv will. The ALARM LCD Segment will be on to indicate an Alarm parameter. Set this Alarm Point to 000 to disable. Available values are:

- Ones Place (**0-9**)

- Tens Place (**0-9**)

- Hundreds Place (**0-9**)

- Thousands Place (**1** on or off)

- Number of Decimal Places (0, 1, or 2 - only available if **k** is selected)

- Range (**k**, μ, m, and off - available multipliers are dependent on the unit selected.)

> If the Primary Count Units has changed to a value other than that used to previously set this Alarm Point, the Alarm Point will be reset to 000. If the Alarm Point it set above the maximum range, the alarm point will be reset to the maximum value allowed for that unit.

Secondary Units (Default c/m) - Use MODE to select. Available values are c/s, c/m, d/s, d/m, μR/h, μSv/h, and off (no units displayed), excluding the units selected as Primary Units.

Secondary Units RATE/MAX Mode Alarm Point (Default 000) - Use ON/ACK to select the value to adjust, and MODE to adjust the value. If the Secondary Units is off, this parameter will be skipped. Otherwise, units will be the same as selected earlier with Secondary Units. The ALARM LCD Segment will be on to indicate an Alarm parameter. Set this Alarm Point to 000 to disable. Available values are:

- Ones Place (**0-9**)

- Tens Place (**0-9**)

- Hundreds Place (**0-9**)

- Thousands Place (**1** on or off)

- Number of Decimal Places (0, 1, or 2 - only available if **k** is selected)

- Range (**k**, μ, m, and off - available multipliers are dependent on the unit selected.)

> **ℹ** If the Secondary Units has changed to a value other than that used to previously set this Alarm Point, the Alarm Point will be reset to 000. If the Alarm Point it set above the maximum range, the alarm point will be reset to the maximum value allowed for that unit.

Seondary Count Units (Default c) - Use MODE to select. If the Secondary Units is off, this parameter will be skipped. Otherwise, the available values are dependent on the selected Secondary Units:

Secondary Units	Secondary Count Units Available
c/s	c/s, c, off
c/m	c/m, c, off
d/s	d/s, d, off

Secondary Units	Secondary Count Units Available
d/m	d/m, d, off
μR/h	μR/h, μR, off
μSv/h	μSv/h, μSv, off

Secondary Count Alarm Point (Default 000) - Use ON/ACK to select the value to adjust, and MODE to adjust the value. If the Secondary Units is off, this parameter will be skipped. Otherwise, units will be the same as selected earlier with Secondary Count Units. Secondary Count Units of c or d will not be displayed, but μR or μSv will. The ALARM LCD Segment will be on to indicate an Alarm parameter. Set this Alarm Point to 000 to disable. Available values are:

- Ones Place (**0-9**)

- Tens Place (**0-9**)

- Hundreds Place (**0-9**)

- Thousands Place (**1** on or off)

- Number of Decimal Places (0, 1, or 2 - only available if **k** is selected)

- Range (**k**, μ, m, and off - available multipliers are dependent on the unit selected.)

> **ℹ** If the Secondary Count Units has changed to a value other than that used to previously set this Alarm Point, the Alarm Point will be reset to 000. If the Alarm Point it set above the maximum range, the alarm point will be reset to the maximum value allowed for that unit.

Response Time (Default 0=auto) - Use ON/ACK to select the value to be adjusted and MODE to adjust the value. Setting the Response Time to a fixed value is useful primarily when performing surveys to a fixed MDA (Minimum Detectable Activity) level. Setting the Response Time to 0 will enable the Auto-Response mode for the Model 26S (see the next parameter). Available values for the Response Time (in seconds) are:

- Ones Place (**0-9**)

- Tens Place (**0-6, 6** forces max Response Time of 60)

Auto-Response Rate (Default F) - Use MODE to select Fast (F) or Slow (S).

When operating in Auto-Response mode, the Model 26S will vary the Response Time based on the Auto-Response Rate selected (Fast or Slow) and the current Count Rate. The Auto-Response Rate selection is:

Count Rate	Auto Resonse Time - Fast (Seconds)	Auto Response Time - Slow (Seconds)
Less than 3 kcpm (50 cps)	5	10
Between 3 kcpm and 4 kcpm (67 cps)	4	8
Between 4 kcpm and 6 kcpm (100 cps)	3	6
Between 6 kcpm and 12 kcpm (200 cps)	2	4
More than 12 kcpm	1	2

The Model 26S also utilizes a Step function in Auto Response mode, which enables faster response to a significant increase or decrease in Count Rate. When the instrument detects a sudden change in count rate from the detector, the response time is reduced to 1 second to quickly show the new value.

Operational Modes (Default 0=all modes available) - Use MODE to adjust the value. Available values are:

    0 - RATE, MAX, and COUNT Modes

    1 - RATE and MAX Modes only

    2 - RATE and COUNT Modes only

    3 - RATE Mode Only

Count Time (Default 1 minute) - Use ON/ACK to select the value to adjust, and MODE to adjust the value. Setting Count Time to 0 enables continuous count until reset. If 19 minutes are selected, then the maximum seconds value is 60; otherwise, the maximum seconds value is 59. Available values are:

- Ones Place (**0-9**)

- Tens Place (**0-5**)

- Hundreds Place (**0-9**)

Low Light Threshold (Default 55) - Use ON/ACK to select the value to adjust, and MODE to adjust the value. Available values are:

- Ones Place (**0-9**)

- Tens Place (**0-9**)

- Hundreds Place (**0-9**)

Click Audio Enable (Default OFF) - Use MODE to select On or OFF.

- On - Click Audio is enabled

- OFF - Sigma Audio is enabled

> **ℹ**   If no buttons are pressed for four seconds, the Model 26S will switch to the next parameter, and if on the last parameter, will save the parameters and exit Setup mode, returning to RATE mode operation. The UNITS button can be used to advance to the next parameter. To end Setup mode and save the current setting, press and hold the UNITS button for approximately 5 seconds.

CHAPTER **5**

SAFETY CONSIDERATIONS

5.1 Environmental Conditions for Normal Use

Indoor or outdoor use (While rain resistant, user is cautioned to avoid getting water through detector opening.)

Temperature range of -20 to 50 °C (-4 to 122 °F)

Maximum relative humidity of less than 95% (non-condensing)

Pollution Degree 3 (as defined by IEC 664): (Occurs when conductive pollution or dry nonconductive pollution becomes conductive due to condensation. This is typical of industrial or construction sites.)

Not certified for use in an explosive atmosphere

5.2 Warning Markings and Symbols

The operator or responsible body is cautioned that the protection provided by the equipment may be impaired if the equipment is used in a manner not specified by Ludlum Measurements, Inc.

The GM tube face can rupture above 8000 feet in altitude. When transporting this detector by air, use an airtight container in order to avoid sudden atmospheric changes resulting in tube failure.

The Model 26S Survey meter is marked with the following symbols:

The "crossed-out wheelie bin" symbol notifies the consumer that the product is not to be mixed with unsorted municipal waste when discarding. Each material must be separated. The symbol is placed on the label located on the side panel. See section 10, "Recycling," for further information.

The "CE" mark is used to identify this instrument as being acceptable for use within the European Union. This symbol is located on the label on the side panel.

CAUTION (per ISO 3864, No. B.3.1): designates hazardous live voltage and risk of electric shock. During normal use, internal components are hazardous live. This instrument must be isolated or disconnected from the hazardous live voltage before accessing the internal components. This symbol appears on the label on the side panel. Be sure to take the precautions noted in the next section whenever necessary.

5.3   Cleaning and Maintenance Precautions

The Model 26S may be cleaned externally with a damp cloth, using only water as the wetting agent. Observe the following precautions when cleaning or performing maintenance on the instrument:

- Turn the instrument OFF and remove the batteries.

- Allow the instrument to sit for one minute before cleaning the exterior or accessing any internal components for maintenance.

REVISION HISTORY

ℹ️ This section of the manual will be updated with each revision of the Model 26S in order to document changes over time. Ludlum Measurements' policy is to provide for free, the latest firmware release for an instrument for the life of that instrument. Note that not all new firmware features will be available for older instruments due to hardware design changes. If this is the case, it will be noted in the manual.

January 2023: New manual.

March 2023: Added Energy Response graph to Chapter 1 Introduction and Chapter 3 Specifications.

July 2023: Corrected Gamma Sensitivity in Chapter 3 to 275 cps/µSv/h from 27.5 cps/µSv/h.

December 2023: Added Drawing 519 x 555 in front of manual.

October 2024: Updated Drawing 519 x 555 in front of manual. Updated photos throughout manual. References to Bq units removed from manual throughout and replaced with dps or d/s. Changed cps, cpm, dps, and dpm to c/s, c/m, etc. throughout manual; also changed mR/hr to µR/hr throughout. In Chapter 1 removed Overload Setpoint in list of things the advanced user can set. In Chapter 2 under Instrument Operational Test on page 8, changed that the instrument would "display '888' and activate the audio" instead of "activate all LCD segments." On page 11 under ON/ACK Button, added reset/retake sigma count, and for Power OFF, added "...but will retake the sigma audio count if sigma audio is enabled." Changed values for Efficiency in Chapter 4. In Notes in Chapter 4 after Primary Units, Secondary Units RATE/MAX Mode Alarm Point, and Secondary Count Alarm Point, added the sentence, "If the Alarm Point is set above the maximum range..." Added Click Audio Enable as a Parameter in table on page 20 and on page 26.In Section 9 Spare Parts, changed Main Board to 5520-427 from 5520-217.

November 2024: In Chapter 3 Specifications, for Gamma Sensitivity, removed the conversion 275 cps/µSv/h. In Chapter 4 Setup Mode on page 20 and 21 changed default value for Calibration Constant to 165 from 175.

March 2025: In Chapter 8 under 8.3 Options, corrected part number for jack and added part numbers for extendable pole, as well as transport and storage case for Model 26S and extendable pole.

June 2025: Made corrections to Display Range in Chapter 3 Specifications.

RECYCLING

Ludlum Measurements, Inc. supports the recycling of the electronics products it produces for the purpose of protecting the environment and to comply with all regional, national, and international agencies that promote economically and environmentally sustainable recycling systems. To this end, Ludlum Measurements, Inc. strives to supply the consumer of its goods with information regarding reuse and recycling of the many different types of materials used in its products. With many different agencies – public and private – involved in this pursuit, it becomes evident that a myriad of methods can be used in the process of recycling. Therefore, Ludlum Measurements, Inc. does not suggest one particular method over another, but simply desires to inform its consumers of the range of recyclable materials present in its products, so that the user will have flexibility in following all local and federal laws.

The following types of recyclable materials are present in Ludlum Measurements, Inc. electronics products, and should be recycled separately. The list is not all-inclusive, nor does it suggest that all materials are present in each piece of equipment:

Batteries	Glass	Aluminum and Stainless Steel
Circuit Boards	Plastics	Liquid Crystal Display (LCD)

Ludlum Measurements, Inc. products that have been placed on the market after August 13, 2005, have been labeled with a symbol recognized internationally as the "crossed-out wheelie bin," which notifies the consumer that the product is not to be mixed with unsorted municipal waste when discarding. Each material must be separated. On the instrument, the symbol will be placed on the serial number label located on the side of the instrument.

The symbol appears as such:

MAINTENANCE AND SPARE PARTS

8.1 Maintenance

For external cleaning of the instrument, scrub with a dampened, soapy clot. This is the only regular maintenance required.

8.2 Spare Parts

Following is a list of spare parts for the Model 26S :

Description	Part Number
AA Batteries	14-5240
Model 26S Main Board	5520-427
CsI(Tl) Detector with Harness	4498-1045
Battery Cover Hook	7498-319

8.3 Options

Following is a list of optional items (not supplied) that could enhance the use of the Model 26S.

Description	Part Number
Standard 1/8 inch Jack	4498-538
Canvas Holster	2312577
Model 180-28 Sample Holder	47-3948
Extendable Pole	4519-077
Transport and Storage Case for Model 26S and Extendable Pole	2311064