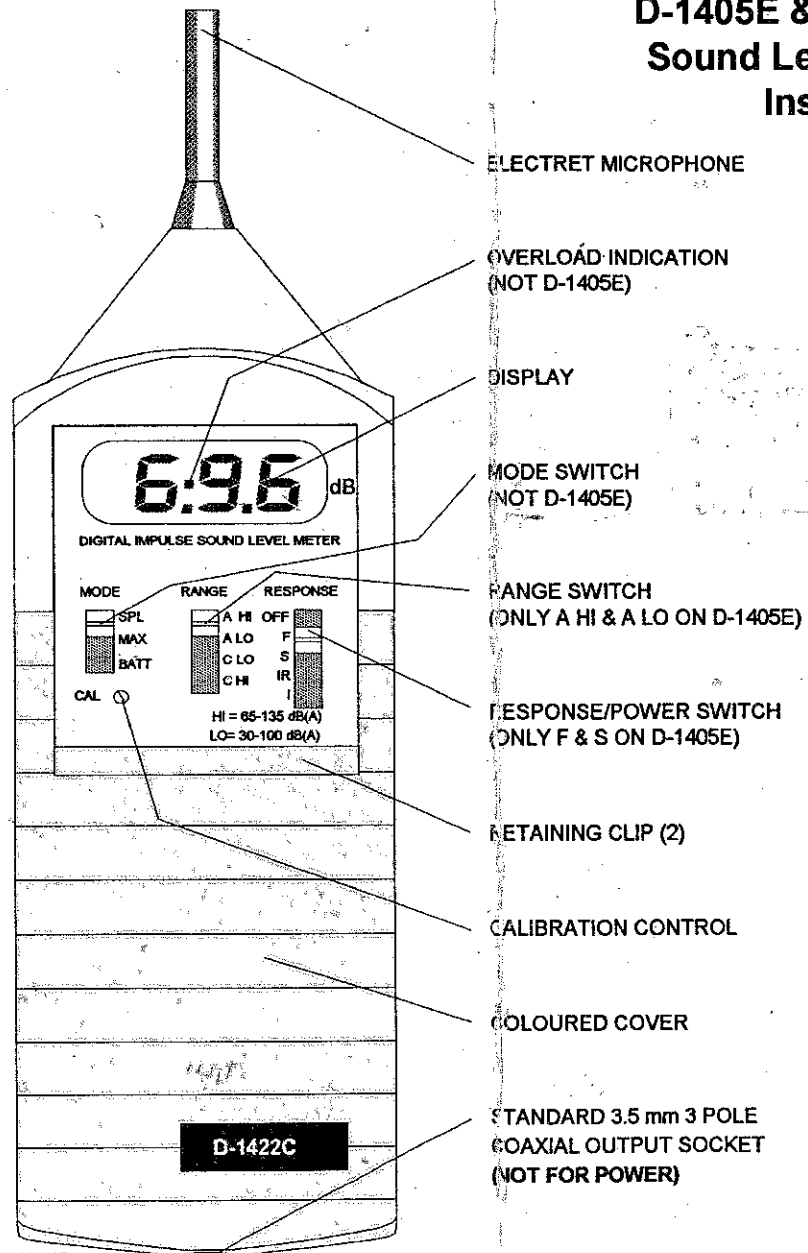


DAWE INSTRUMENTS

D-1405E & D-1422C Sound Level Meter Instructions

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D-1405E DIGITAL SOUND SURVEY METER & D-1422C DIGITAL IMPULSE SOUND LEVEL METER Instructions

INTRODUCTION

The D-1405E Digital Sound Survey Meter has been designed to meet the sound survey requirements of Safety Engineers and Occupational Nurses, while the more powerful D-1422C Digital Impulse Sound Level Meter is designed for Industrial Safety Officers.

These specialists require inexpensive and easily used instruments to check whether industrial noise exposure areas require a more detailed investigation.

Both instruments satisfy the requirements of the international and national IEC 651 Type 2, BS 5969 Type 2, and ANSI S1.4 Type 2A standards for both free field and random incidence sound level meters. The D-1422C also satisfies the requirements of IEC 651 Type 2I for impulse sound level meters.

The instruments provide a clear and unambiguous digital indication of the A-weighted sound level on an easily read display. They feature the standard Fast and Slow time weightings, and can measure sound levels between 30dB(A) and 135dB(A) in two ranges, at frequencies between 10Hz and 20kHz.

In addition, the D-1422C can indicate C-weighted sound levels and overload conditions, includes a standard Impulse time weighting with reset function, indicates battery voltage on the display, and has a maximum hold function that operates with all time constants.

Conditioned a.c. and logarithmic d.c. outputs are available from a single standard 3.5mm 3 pole coaxial socket in both instruments, so that they may be used with graphic level and tape recording systems.

A complete "D-1405E Sound Survey Meter" RS Stock N° 139-748 consists of the following items.

D-1405E	Sound Survey Meter,
032460	Microphone Cover,
038055	Screwdriver,
060103	Instructions.

A complete "D-1422C Digital Impulse Sound Level Meter" RS Stock N° 253-204 consists of the following items.

D-1422C	Digital Impulse SLM,
032460	Microphone Cover,

038055	Screwdriver,
060103	Instructions.

The following additional items will be found useful.

CEL-4672	Windshield
	RS Stock N° 139-760,
CEL-5894	Carrying Case
	RS Stock N° 139-754.

PREPARATION FOR USE

Install four 1.5 V (IEC LR06: ANSI L30) Manganese Alkaline batteries and the instrument is ready for use. Zinc carbon batteries are NOT suitable. The two battery compartments are exposed when the coloured cover is removed as shown. One compartment in the front of the instrument inner case houses two batteries, with an identical compartment at the back.

Observe the battery polarities indicated in the figure and in each compartment, and replace batteries when LO BAT is indicated. Having inserted a set of batteries, replace the coloured cover and ensure that it is firmly held by the retaining clips.

On the D-1422C, the battery voltage (x10) can be displayed by sliding the MODE switch to BATT.

The instrument is now ready for service.

CALIBRATION

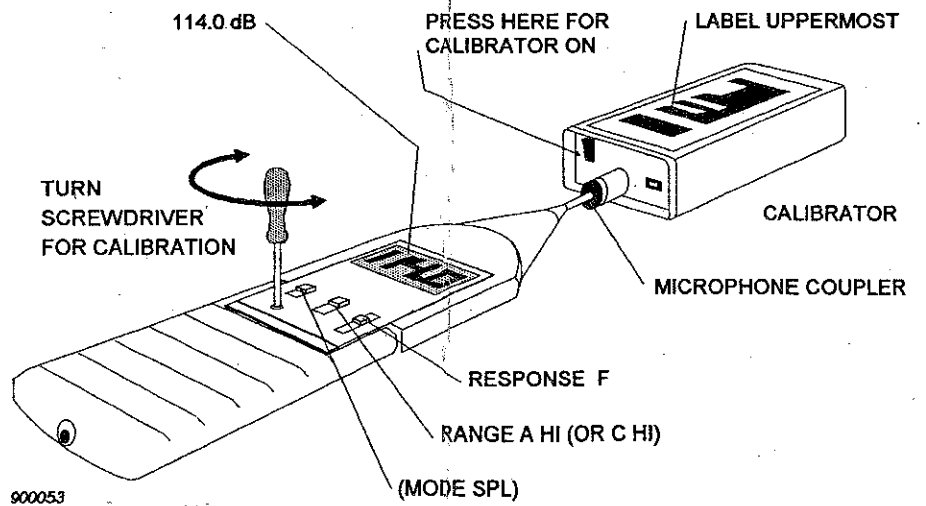
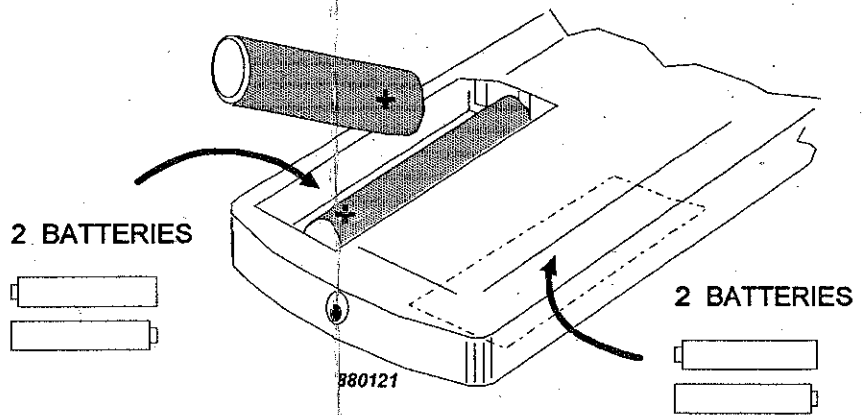
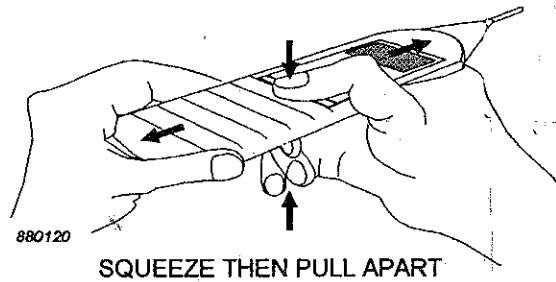
Use a D-1411E Calibrator RS Stock N° 253-210.

1. Remove the Microphone Cover.
2. Fit the Microphone Coupler on to the Calibrator.
3. Push the Calibrator and Coupler on to the Microphone, with the label at the top as shown.
4. Slide the Range switch to A HI (high range).
5. Slide the Response switch to F (fast) to switch the instrument on.

On the D-1422C, also slide the MODE switch to SPL (sound pressure level) for normal noise measurement.

6. Wait approximately 20 s for the instrument to stabilise.

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A LO BAT message indicates that the batteries should be changed.

On the D-1422C, battery voltage (x10) can be indicated on the display by sliding the MODE switch to BATT.

7. Press the bottom of the Calibrator switch to obtain the nominal 114dB at 1kHz.

On instruments supplied after 1-1-96, the meter display should read 113.6dB, while on earlier instruments it should read 114.0dB.

8. If necessary, adjust the CAL control with the screwdriver to obtain the correct indication.

Two versions of the CAL control are found. One uses $\frac{3}{4}$ turn to give 9 dB of adjustment, while the other has 4 turns for 12 dB.

9. Switch the Calibrator OFF, when not in use.

Other calibrators may be used with the Sound Level Meter, but the correct indication will depend upon the volume of the acoustic coupler used, the operating frequency, and the calibration level. It is recommended that the calibration of the instrument be verified at least every year.

OPERATION

1. Insert batteries as described above.
2. Calibrate the instrument.
3. Switch the Calibrator OFF.
4. Remove the Calibrator and Microphone Coupler.
5. Select A HI (high) Range

On the D-1422C, C HI may also be selected.

These ranges cover sound levels between 65 and 135 dB.

6. **Either:** use F (fast response) for comparatively stable noise.
Or: select S (slow response) for slowly varying noise.

On the D-1422C, I (impulse response) may be selected for more rapidly varying and impulsive noise.

Impulsive noises are captured and held on the display as A- or C-weighted levels for approximately 1.5s.

Slide the RESPONSE switch to IR (impulse reset) to clear the display for the next noise measurement.

7. Hold the instrument comfortably in the hand and point the microphone at the suspected noise source.

The sound level will be displayed.

8. Select A LO (low) range when the indicated sound level falls below 80dB(A).

On the D-1422C, C LO may also be selected.

If OVERLOAD is indicated on the D-1422C, reselect one of the HI ranges.

9. On the D-1422C, slide the MODE switch to MAX (maximum hold function) to capture and hold maximum noise levels for longer periods using any time weighting and range.

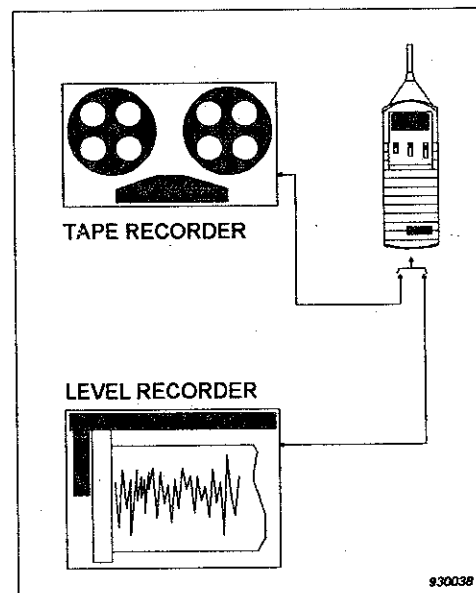
Slide the MODE switch to SPL to clear the display for the next measurement.

10. Switch the instrument OFF (RESPONSE switch to OFF) when not in use, and remove batteries when out of service for longer periods.

USE WITH RECORDERS

Connection for tape recorders and graphic level recorders is made via the same 3.5 mm 3 pole coaxial socket in the bottom of the instrument, as shown.

Connection between the Sound Level Meter and tape recorder is made via a 2 m Tape Recorder



Cable terminated with a BNC plug. The connections in this cable provide a conditioned a.c output signal proportional to indicated sound level, with 7.25 V RMS full scale deflection.

Similarly, connection between the Sound Level Meter and graphic level recorder is made via a 2 m Level Recorder Cable terminated with a BNC plug. The connections in this cable provide a logarithmic

d.c output signal proportional to the indicated sound level, with nominally 25 mV/dB.

When recordings are to be made, it is recommended that the Sound Level Meter be calibrated as described above, and a calibration level be included in the recording. For more detailed instructions refer to the relevant recorder handbook.

Specification

Type:

Sound Level Meter according to ANSI S1.4 Type 2A, IEC 651 Type 2, and BS 5969 Type 2.

The D-1422C is also an impulse sound level meter according to IEC 651 Type 2I.

Dynamic range:

70 dB.

Typical instrument frequency range: (within +0.5 to -3 dB)

Better than 10 Hz to 25 kHz in all ranges.

D-1405E Measurement ranges:

Range Setting	Frequency Weighting	Display Range	Primary Linearity Range IEC 651
A LO (low)	A	30-100 dB	30-90 dB
A HI (high)	A	65-135 dB	65-125 dB

A LO (low)	A	30-100 dB	30-90 dB
A HI (high)	A	65-135 dB	65-125 dB

Note that the lower reading is quoted at +10 dB on noise floor. Upper reading allows crest factor 3.

D-1422C Measurement ranges:

Range Setting	Frequency Weighting	Display Range	Primary Linearity Range IEC 651
A LO (low)	A	30-100 dB	30-86 dB
A HI (high)	A	65-135 dB	65-121 dB
C LO (low)	C	35-100 dB	35-86 dB
C HI (high)	C	65-135 dB	65-121 dB

A LO (low)	A	30-100 dB	30-86 dB
A HI (high)	A	65-135 dB	65-121 dB

C LO (low)	C	35-100 dB	35-86 dB
C HI (high)	C	65-135 dB	65-121 dB

Note that the lower reading is quoted at +10 dB on noise floor. Upper reading allows crest factor 5.

Accuracy: (under reference conditions)

±1 dB.

Lowest frequency for non-linear distortion <1 dB:

5 Hz.

Microphone type:

DAWE quarter-inch diameter pre-polarised electret, typically 1 0mV/Pa. Microphone permanently attached to the instrument.

This microphone meets Type 2 requirements for both free field and random incidence measurement.

Impedance to be substituted for microphone:

Not possible, microphone permanently attached.

Calibration reference conditions:

Free field perpendicular incidence,
Ambient temperature: 20°C,
Relative humidity: 65%,
Measurement Range: Hi (high),
Excitation SPL: 114 dB,
Frequency: 1 kHz.

Effect of humidity on accuracy:

Less than ±0.5 dB over the range 30 to 90% RH (provided there is no condensation), relative to the value at 65% RH and 40°C.

Storage range: 20 to 95% RH non-condensing.

Effect of temperature on accuracy:

Less than ±0.5dB over the range -10 to +40°C.

For temperatures between +40 and +50°C it is recommended that the instrument be recalibrated at the operating temperature with a D-1411E Calibrator.

However above 40°C, accuracy within the limits of IEC 651 can be obtained using the following correction, where t is °C:

Corrected reading = display reading + 0.05($t-40$).

Operating temperature range: -10 to +50°C.

Storage range: -20 to +60°C.

Effect of magnetic fields on accuracy:

Negligible at all levels and lower than a reading of 30 dB(A) when tested to IEC 651 clause 8.4.

Effect of vibration on accuracy:

Less than 3 dB when tested according to IEC 651 clause 8.3.

Directional response:

Within the limits of IEC 651.

Effect of operator:

Negligible when instrument held at arm's length with microphone pointing away from operator.

Frequency weightings:

A-weighting according to ANSI S1.4 Type 2A, and IEC 651 Type 2.

C-weighting according to ANSI S1.4 Type 2A, and IEC 651 Type 2.

Time weightings:

F (fast): 125 milliseconds,

S (slow): 1 second,

I (impulse): 35 millisecond rise time, 1.5 second decay time, with quick reset.

MAX (hold): Holds noise readings of F, S, & I, with decay <1 dB/5 minutes at temperatures <40°C.

Digital display:

3¹/₂ digits,
7 segments,
12.5mm high characters,
0.1 dB resolution.
Display updated 3 times per second.

Functions indicated:

Sound level dB(A),
Low battery level. (Indicated when battery falls below approximately 3.2 V).

Sound level dB(C),
Battery voltage (x10),
Overload,
Maximum SPL (A- or C-weighted).

Overload detection: (D-1422C Only)

Pre-weighting overload detector, with 2.5 s dwell time.

Start up stabilisation time:

20 seconds.

Outputs:

Two outputs from standard 3 pole 3.5 mm coaxial socket with a.c on pin, d.c on intermediate, and ground on sleeve.

DC: Log. signal with nominal 25 mV/dB (offset by approx. 4 to 5 V) and not exceeding 6 V, 125 ms rise and decay times for Fast, 1 s rise time and decay time for Slow.

35 ms rise time and 1.5 s decay time for Impulse.

Recommended impedance of load >27 kohms.

AC: Conditioned signal, 7.25 V RMS for FSD,

Recommended impedance of load >39 kohms.

Batteries:

4 x IEC AAA Manganese Alkaline type.

Battery life is typically better than 20 h with continuous use.

Dimensions:

258 x 70 x 21 mm, (10 x 2.75 x 0.85 inches)

Weight:

200 g, (0.45 lb) excluding batteries.

The Manufacturers reserve the right to change instrument specifications without prior notice.
DAWE noise measurement and calibration equipment is supplied to RS by CEL Instruments Limited.

**These instruments were calibrated at the time of manufacture.
For full RS Calibration Service, see Catalogue**