Product Data and Specifications

Typical applications

- Permanent outdoor-noise monitoring
- Community-noise monitoring
- IEC 60651 Type 1 noise measurements

The Outdoor Microphone System Type 41CN (Fig. 1) is for outdoor use whenever trouble-free acoustic measurements and, in particular, community and trafic noise monitoring are required.

It complies with IEC 651 Type 1 and ANSI S1.4 1983 Type 1 requirements and can be used with any suitable electronic sound or vibration measurement system. It is PTB approved as part of an IEC 651 Type 1 system.

A ¹/₂-inch precision condenser microphone and thickfilm preamplifier ensure maximum stability and performance. Both microphone and casing are made of stainless steel.

Precise *in-situ* calibration checks at 1000 Hz are enabled any time via a built-in electrostatic actuator and test oscillator.

The Type 41CN is fitted with anti-bird spikes, a windscreen, and a rain cap which is an integral part of its acoustic omnidirectional characteristics. The rain cap, which contains the electrostatic actuator, remains in position while calibrating the microphone with a pistonphone.

The large dynamic range of the Type 41CN is obtained via a twin circuit board with a DC converter for supplying 200 V for microphone polarization as well as a 120 V supply for the preamplifier. The sensitivity of the amplifier can be adjusted by 12 dB and the gain changed by $\pm 20 \text{ dB}$ (via a pair of circuit-board jumpers) to give optimum signal-tonoise ratios on long cables. The gain is normally set to 0 dB on leaving the factory.



Fig. 1 Outdoor Microphone System Type 41CN. Inset shows reference direction

An A-weighting filter for increased dynamic capability is included in the Type 41CN. A circuit-board jumper is used to select either the A-weighting or linear frequency response. A-weighting or linear response can be specified when ordering, otherwise Lin-weighting will be active on delivery.

The built-in calibration oscillator can be switched on or off by short-circuiting a pin to ground in the output socket of the Type 41CN. The electrostatic actuator is factory set to a calibration level of 90 dB re. 20μ Pa at 1000 Hz. A calibration level of 94 dB can be specified when ordering.

The electrostatic actuator and microphone assembly is electrically isolated from the casing of the Type 41CN; thus eliminating EMC and ground loops.

A silica-gel desiccator is located inside the lower half of the casing and a humidity-indicator window

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Skovlytoften 33 2840 Holte, Denmark Tel +45 45 66 40 46 Fax +45 45 66 40 47 e-mail: gras@gras.dk www.gras.dk for checking the condition of a second desiccator is located in the top half.

The internal venting of the Type 41CN is via a capillary tube which terminates under the rain cap, it also carries the calibration-signal connection to the electrostatic actuator. By removing the rain cap (left-hand thread), the connection to the actuator is accessible.

With the windscreen removed, the unit can be readily re-calibrated using a pistonphone (fitted with Adaptor RA0041); though rarely necessary since actuator calibration is normally done on a regular basis. The Pole Adapter has a G 1¹/₂-inch thread (ISO 228/1). The Tripod Adapter can be screwed directly to the Pole Adapter. The output connector of the Type 41CN is located under the Pole Adapter and both plug and cable are well protected.

Among the available accessories is a Calibration Control Box AC0001. This has a lead which plugs directly into the output socket of the Type 41CN. The AC0001 has sockets for signal output, remote-control calibration and external power (12 – 18V DC, e.g. from a G.R.A.S. Mains/line Adapter AB0002/AB0003 *). It also has an on/off switch for local calibration control.

* AB0002 for 230 V AC; AB0003 for 120 V AC

50 mV/Pa Frequency response: IEC 651 Type 1 and ANSI S1.4-1983 Type 1 0° incidence (Fig. 1), re. 1000Hz: 20 Hz - 80 Hz:	Nominal sensitivity:	Dimensions:
Frequency response: IEC 651 Type 1 and ANSI S1.4-1983 Type 1 0° incidence (Fig. 1), re. 1000Hz: 20Hz - 80Hz: 4 kHz: ± 1 dB 80Hz - 4 kHz: ± 1.5 dB 8 kHz - 12 kHz: ± 1.5 dB 12 Hz - 20 kHz: ± 1 dB 8 kHz - 12 kHz: 	50 mV/Pa	Casing (ext. dia.): 40 mm (1.57 in)
Pole-adapter thread: $50 \text{ mm} (1.97 \text{ in}) \times G 1\frac{1}{2}$ in (ISO 228/1 0° incidence (Fig. 1), re. 1000Hz: $20 \text{ Hz} - 80 \text{ Hz}: \dots \pm 1 \text{ dB}$ $80 \text{ Hz} - 4 \text{ kHz}: \dots \pm 10 \text{ dB}$ $4 \text{ kHz} - 8 \text{ kHz}: \dots \pm 1 \text{ dB}$ $8 \text{ kHz} - 12 \text{ kHz}: \dots \pm 1 \text{ dB}$ $8 \text{ kHz} - 12 \text{ kHz}: \dots \pm 1.5 \text{ dB}$ $12 \text{ Hz} - 20 \text{ kHz}: \dots \pm 1.5 \text{ dB} - 5 \text{ dB}$ Dynamic range (upper limit): $> 156 \text{ dB}$ SPL (at -20 dB setting) re. 20 µPa Lin. 22.5 \text{ Hz} - 22.5 \text{ kHz} \dots < 23 \text{ dB} re. 20 µPa Lin. 22.5 Hz - 22.5 kHz < 23 dB re. 20 µPa Lin. 22.5 Hz - 22.5 kHz < 23 dB re. 20 µPa Cutput impedance: $< 50 \Omega$ Accessories available: Power supply: $12 - 18 \text{ VDC}$ Accessories available: Pistonphone adapter: AA0002 Calibration Control Box: AA0001 S0 m: AA0002 Calibration Control Box: AA0002 S0 m: AA0002 Calibration Control Box: AA0002 S0 m: AA0002 S0 m: AA0002 S0 m: AA0004 S0 m: AA0005 S0 m: AA0005 S0 m: AA0006 S0 m: AA0006 S0 m: AA0007 S0 m: AA0016 S0 m: AA0016	Frequency response:	Length: 520 mm (20.5 in)
0° incidence (Fig. 1), re. 1000Hz: (ISO 228/1 20 Hz - 80 Hz: ± 1 dB 80 Hz - 4 kHz: ± 0.7 dB 4 kHz - 8 kHz: ± 0.7 dB 4 kHz - 8 kHz: ± 1.0 dB 12 Hz - 20 kHz: ± 1.5 dB 2 Hz - 20 kHz: ± 1.5 dB 2 Hz - 20 kHz: ± 1.5 dB 2 Hz - 20 kHz: ± 1.5 dB > 156 dB SPL (at -20 dB setting) re. 20 μ Pa Transport protection cap: AM0033 -3 weighted -20 dB re. 20 μ Pa Lin. 22.5 Hz - 22.5 kHz <20 dB re. 20 μ Pa 0 utput impedance: $<50 \Omega$ Output current: $<250 \Omega$ 0 ver supply: $12 - 18$ VDC 20 m: $A0000$ 10 m: $A00001$ 30 m: $A00001$ 3 m: 120 mA at 15 V calibrator "on" 00 m: $A00015$ 0 operating-temperature range: -40° C to $\pm 50^{\circ}$ C $a0$ miniticure $a00016$	IEC 651 Type 1 and ANSI S1.4-1983 Type 1	Pole-adapter thread: $50 \text{ mm} (1.97 \text{ in}) \times G 1\frac{1}{2} \text{ in}$
0 Initiating (rig. 1), it rootif2. 20 Hz: 80 Hz:	0° incidence (Fig. 1) re 1000Hz.	(ISO 228/1)
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	20 Hz = 80 Hz +1 dB	Weight:
b of Hz - 8 kHz. b of Hz - 8 kHz. c of K + 10 kHz. $4 \text{ kHz} - 8 \text{ kHz}.\pm 1 \text{ dB}8 \text{ kHz} - 12 \text{ kHz}.\pm 1.5 \text{ dB}12 \text{ Hz} - 20 \text{ kHz}.\pm 1.5 \text{ dB}Dynamic range (upper limit):> 156 dB SPL (at -20 dB setting) re. 20 µPaMod33Total system-noise level:A-weighted< 20 \text{ dB re. } 20 \muPaA-weighted< 20 \text{ dB re. } 20 \muPaLin. 22.5 Hz - 22.5 kHz< 23 \text{ dB re. } 20 \muPaOutput impedance:< 50 \OmegaOutput current:< 25 \text{ mA}Power supply:12 - 18 \text{ VDC}Power consumption:120 \text{ mA at } 15 \text{ V} calibrator "on"Operating-temperature range:-40^{\circ}\text{C} to \pm 50^{\circ}\text{C}$	20112 - 30112. 100112 . 10012	1.3 kg (2.8 lbs)
4 kHz $12 kHz$ </th <th>$\frac{4 \text{ kHz}}{4 \text{ kHz}} = \frac{8 \text{ kHz}}{4 \text{ kHz}} + 1 \text{ dB}$</th> <th>A cressories included:</th>	$\frac{4 \text{ kHz}}{4 \text{ kHz}} = \frac{8 \text{ kHz}}{4 \text{ kHz}} + 1 \text{ dB}$	A cressories included:
Number of the second system - noise level:AnweightedAnweightedAnweightedA-weightedAnweightedAnweightedAnweightedOutput impedance:Spanner:AnweightedOutput impedance:AnweightedAnweightedOutput current:Spanner:AnweightedOutput current:Spanner:And003Output current:Spanner:And002Output current:SpanPower supply:And002De adapter:And003Output current:SpanPower supply:And000120 mA at 15VAllower supply:120 mA at 15VAllower supply:Power consumption:Allower supply:-40 °C to ± 50 °C	$8 \text{ kHz} - 12 \text{ kHz}$ $\pm 15 \text{ dB}$	Windscreen complete: AM0052
Dynamic range (upper limit): > 156 dB SPL (at -20 dB setting) re. 20μ Pa Total system-noise level: A-weighted	12 Hz - 20 kHz +1.5 dB -5 dB	Spanner: AM0038
Dynamic range (upper nimp). $> 156 dB SPL (at -20 dB setting) re. 20 \muPaTripod adapter:AM003Total system-noise level:ArweightedAM003A-weighted< 20 dB re. 20 \muPaLim. 22.5 Hz - 22.5 kHz< 23 dB re. 20 \muPaOutput impedance:< 50 \OmegaAccessories available:Output current:< 50 \OmegaPistonphone adapter:RA0041Foam windscreens (5 items):AM0002Output current:> 25 mAPower supply:AA0000Power consumption:120 mA at 15 V3 m:AA0000180 mA at 15 V calibrator "on"20 m:AA0001Operating-temperature range:-40 ^{\circ}C to \pm 50 ^{\circ}CA0002$	Dynamic range (unner limit):	Transport protection cap: AM0037
Total system-noise level:All reliables of the factor of the fact	>156 dB SPL (at -20 dB setting) re 20 uPa	Tripod adapter: AM0033
Iotal system-noise level: A-weighted $< 20 dB re. 20 \mu Pa$ Lin. 22.5 Hz - 22.5 kHz $< 20 dB re. 20 \mu Pa$ Calibration Control Box: $AE0001$ Accessories available: Pistonphone adapter:Output impedance: $< 50 \Omega$ $< 50 \Omega$ $AE0001$ Accessories available: Pistonphone adapter: $AE0001$ Accessories available: Pistonphone adapter:Output current: $> 25 mA$ $> 25 mA$ $A00002$ Calibration Control Box: $AO0002$ Calibration Control Box:Power supply: $12 - 18 VDC$ $10 m$: $AA00012$ $30 m$:Power consumption: $180 mA at 15 V$ calibrator "on" $20 m$: $AA00012$ $50 m$: $-40 ^{\circ}C$ to $\pm 50 ^{\circ}C$ $A00015$ $200 m$: $AA0015$	\sim 150 dD St E (at \sim 20 dD setting) te. 20 μ t a	Pole adapter: AM0029
A-weighted $< 20 \text{ dB re. } 20 \text{ µPa}$ Lin. 22.5 Hz - 22.5 kHz $< 23 \text{ dB re. } 20 \text{ µPa}$ Output impedance: $< 50 \Omega$ Output current: $< 50 \Omega$ Output current: $> 25 \text{ mA}$ Power supply: $12 - 18 \text{ VDC}$ Power consumption: $120 \text{ mA at } 15 \text{ V}$ $120 \text{ mA at } 15 \text{ V}$ $120 \text{ mA at } 15 \text{ V}$ Operating-temperature range: $-40 ^{\circ}\text{C}$ to $\pm 50 ^{\circ}\text{C}$	Iotal system-noise level:	LEMO plug FFA.2S.306: AE0001
Lin. 22.5 HZ = 22.5 KHZ $< 23 dB re. 20 \mu Pa$ Interesting a transferOutput impedance: $< 50 \Omega$ Pistonphone adapter:RA0041Foam windscreens (5 items):AM0009Calibration Control Box:AC0001Power supply: $12 - 18 \text{ VDC}$ 3 m: AA0002Power consumption: $120 \text{ mA at } 15 \text{ V}$ 30 m: AA0001 $120 \text{ mA at } 15 \text{ V}$ $180 \text{ mA at } 15 \text{ V}$ calibrator "on" $A0001$ Operating-temperature range: $-40 ^\circ\text{C}$ to $\pm 50 ^\circ\text{C}$ $A0001$	A-weighted \sim $<20 \text{ dB fe}$ 20 µPa	Accessories available:
Output impedance: $<50 \Omega$ Form windscreens (5 items):AM0009Output current: $>25 \text{ mA}$ Foam windscreens (5 items):AM0009Power supply: $>25 \text{ mA}$ Image: Calibration Control Box:AC0001Power consumption: $12 - 18 \text{ VDC}$ 3 m: AA0002Power consumption: $120 \text{ mA at } 15 \text{ V}$ 30 m: AA0001 $180 \text{ mA at } 15 \text{ V}$ calibrator "on" 30 m: AA0002Operating-temperature range: $-40 ^{\circ}\text{C}$ to $\pm 50 ^{\circ}\text{C}$ $A00016$	$Lin. 22.5 Hz - 22.5 KHz \dots < 23 dB fe. 20 \mu Pa$	Pistonphone adapter: RA0041
$ \begin{array}{c} < 50 \Omega \\ \hline \text{Output current:} \\ > 25 \text{ mA} \\ \hline \text{Power supply:} \\ 12 - 18 \text{ VDC} \\ \hline \text{Power consumption:} \\ 120 \text{ mA at } 15 \text{ V} \\ 180 \text{ mA at } 15 \text{ V} \text{ calibrator "on"} \\ \hline \text{Operating-temperature range:} \\ \hline -40 ^{\circ}\text{C} \text{ to } \pm 50 ^{\circ}\text{C} \end{array} $	Output impedance:	Foam windscreens (5 items): AM0009
Output current: $>25 \text{ mA}$ Extension cables:Power supply: $12 - 18 \text{ VDC}$ 3 m: $AA0002$ Power consumption: $120 \text{ mA at } 15 \text{ V}$ 30 m: $AA0001$ $120 \text{ mA at } 15 \text{ V}$ $180 \text{ mA at } 15 \text{ V}$ calibrator "on" $A0004$ Operating-temperature range: $-40 ^{\circ}\text{C}$ to $\pm 50 ^{\circ}\text{C}$ $A0004$	<50 \O	Calibration Control Box: AC0001
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Output current:	Extension cables:
Power supply: $12 - 18 \text{ VDC}$ 10 m: $AA0002$ Power consumption: 10 m: $AA0002$ $120 \text{ mA at } 15 \text{ V}$ 30 m: $AA0002$ $180 \text{ mA at } 15 \text{ V}$ calibrator "on" 50 m: $AA0002$ Operating-temperature range: $-40 ^{\circ}\text{C}$ to $\pm 50 ^{\circ}\text{C}$ 200 m: $AA0016$	>25 mA	3 m: AA0003
$12 - 18 \text{ VDC}$ 20 m : $AA0001$ Power consumption: 20 m : $AA0017$ $120 \text{ mA at } 15 \text{ V}$ 30 m : $AA0017$ $180 \text{ mA at } 15 \text{ V}$ calibrator "on" 50 m : $AA0017$ Operating-temperature range: $-40 \degree \text{C}$ to $\pm 50 \degree \text{C}$ 20 m : $AA0016$	Power supply:	10 m: AA0002
Power consumption: 30 m : $AA0017$ $120 \text{ mA at } 15 \text{ V}$ 50 m : $AA0004$ $180 \text{ mA at } 15 \text{ V}$ calibrator "on" 100 m : $AA0015$ Operating-temperature range: $-40 \text{ °C to } + 50 \text{ °C}$ $AA0016$	12 - 18VDC	20 m: AA0001
$120 \text{ mA at } 15 \text{ V}$ $180 \text{ mA at } 15 \text{ V calibrator "on"}$ $0 \text{ perating-temperature range:}$ $-40 ^{\circ}\text{C to} \pm 50 ^{\circ}\text{C}$ $30 \text{ m:} \qquad AA0014$ $200 \text{ m:} \qquad AA0016$	Power consumption:	30 m: AA0017
$\begin{array}{c c} 180 \text{ mA at } 15 \text{ V calibrator "on"} \\ \hline \mathbf{Operating-temperature range:} \\ \hline -40 \ ^{\circ}\text{C to} \pm 50 \ ^{\circ}\text{C} \\ \end{array} \qquad \begin{array}{c c} 100 \text{ m:} & \dots & \text{AA0015} \\ 200 \text{ m:} & \dots & \text{AA0016} \\ \hline \end{array}$	120 mA at 15 V	50 m: AA0004
Operating-temperature range: $200 \text{ m}: \dots \text{AA0016}$	180 mA at 15V calibrator "on"	100 m: AA0015 ¹
-40° C to $+50^{\circ}$ C	Onerating-temperature range:	200 m: AA0016 ¹
	-40 °C to $+50$ °C	
Calibration level of electrostatic actuator:	Calibration level of electrostatic actuator:	
90 dB re. 20 μ Pa at 1000 Hz ± 0.2 dB at 23 °C 1 Doubled screened with cable drum	90 dB re. 20 μ Pa at 1000 Hz ± 0.2 dB at 23 °C	¹ Doubled screened with cable drum

G.R.A.S. Sound & Vibration reserves the right to change specifications and accessories without notice

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Skovlytoften 33 2840 Holte, Denmark Tel +45 45 66 40 46 Fax +45 45 66 40 47 e-mail: gras@gras.dk www.gras.dk

Specifications