sonitron®

Excellence in physical acoustics

Buzzers & Transducers

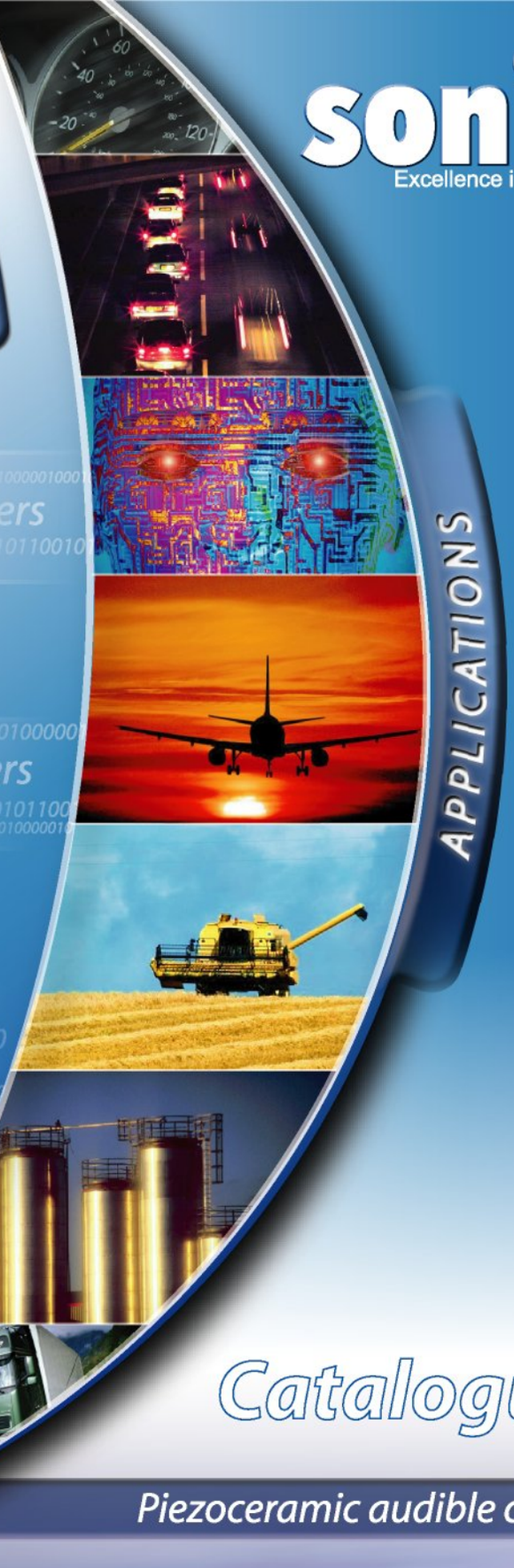
RoHS compliant

Panel Buzzers

SMA-Buzzers

Sound Transducers

SMB-Buzzers



APPLICATIONS

Catalogue 2006

Piezoceramic audible components

TÜV CERT

DIN EN ISO 9001:2000

Zertifikat: 01 100 010603

From crystals to sound

INTRODUCTION

Founded by Mr. Hugo Michiels in 1977, Sonitron have become the leading European manufacturer of piezoceramic audible components. Continuous research, intensive development and specialist know-how have resulted in a wide range of high quality and reliable products from the smallest and most cost effective buzzer to highly sophisticated alarms. This allows Sonitron to meet the needs of many applications, such as industrial, medical, consumer and military.

Today, almost 30 years after the initial success, SONITRON released their new SMAC-25, a very stable buzzer with a lifetime of more than 1000 hours in continuous use. It will be the best available piezo alarm for life supporting systems on the market. This buzzer is IP67-rated, dust and waterproof and has a sound output of about 94 dB(A) @ 30 cm !

Sonitron's customers are offered full service through a worldwide sales network of distributors and representatives. Ongoing investment in the in-house disciplines, enables Sonitron to maintain their market reputation and being your first choice supplier of audible components and application support in acoustic technology. Our future activities will further be focused on research and development, on new applications and the expansion of our sales network.

We thank our customers and sales network throughout the world for the confidence shown in our company and products. They can be assured of our continuous efforts to generate "excellence in physical acoustics", creating an added value to your application.

SONITRON is ISO 9001:2000 certified by TÜV Rheinland.

TÜV CERT
DIN EN ISO 9001:2000
Zertifikat: 01 100 010603

Dr. Hugo R. Michiels
President
SONITRON N.V.

Family range Sonitron products

CONTENTS

SMAT SERIES

SMAC-SERIES

MULTI-FREQUENCY BUZZERS (SMB)

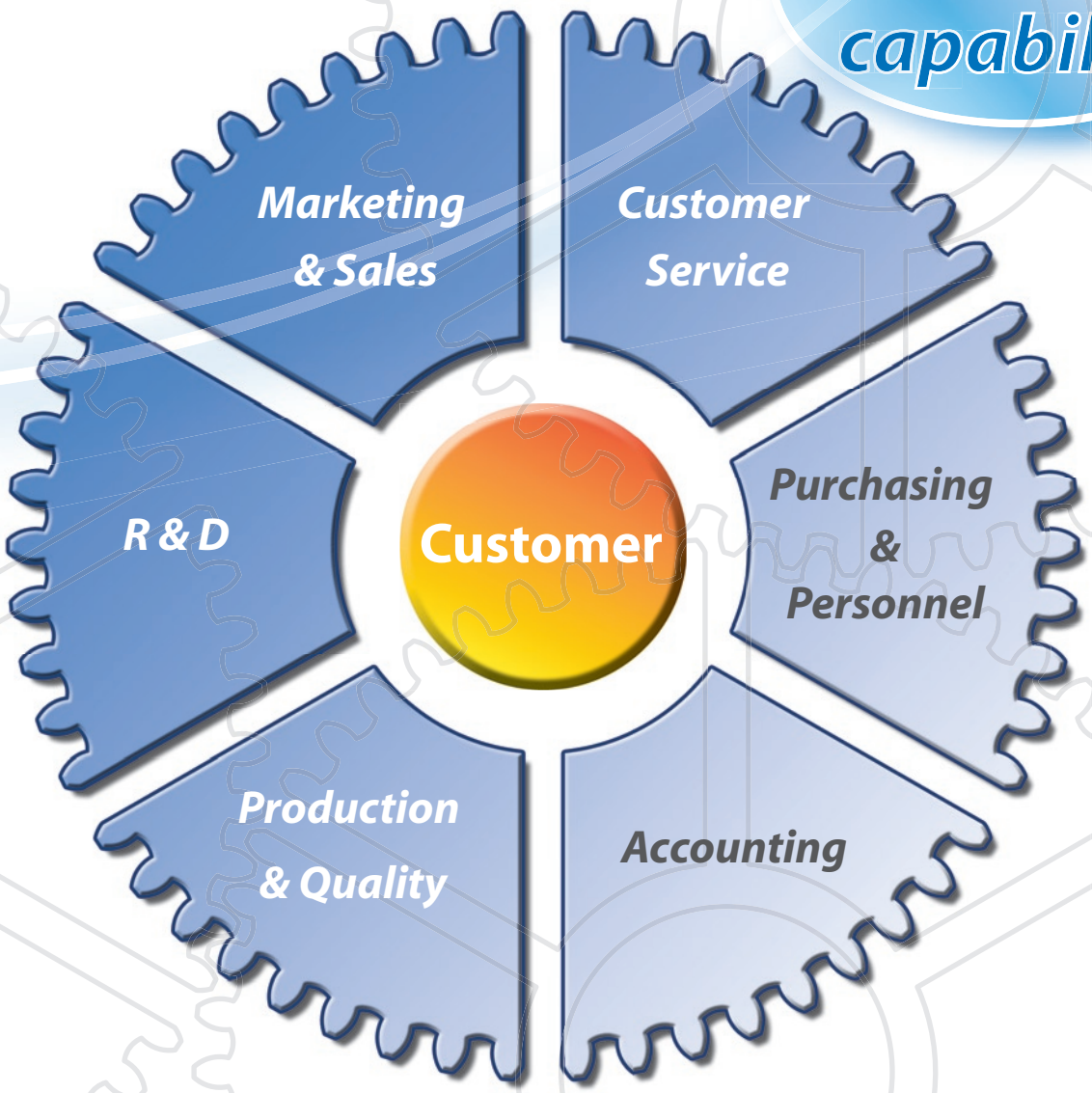
ADDENDUM

COMPANY ORGANISATION

Sonitron manufactures their products in Belgium and sells them through an international network of distributors and representatives.
Our distributors and representatives give excellent sales and technical service.
They provide our customers with price quotations, samples, catalogues, technical assistance,...
Please check the distributors and representatives list to look for your nearest contact person at
http://www.sonitron.be/index.cfm?pageID=2519
However, if there is no distributor or representative in your country or should you require more detailed information, do not hesitate to contact our headquarter in Belgium.
Send your request to sales@sonitron.be or info@sonitron.be and we will be pleased to help you further !

Sonitron has the following departments to assist you...

Total in-house capability

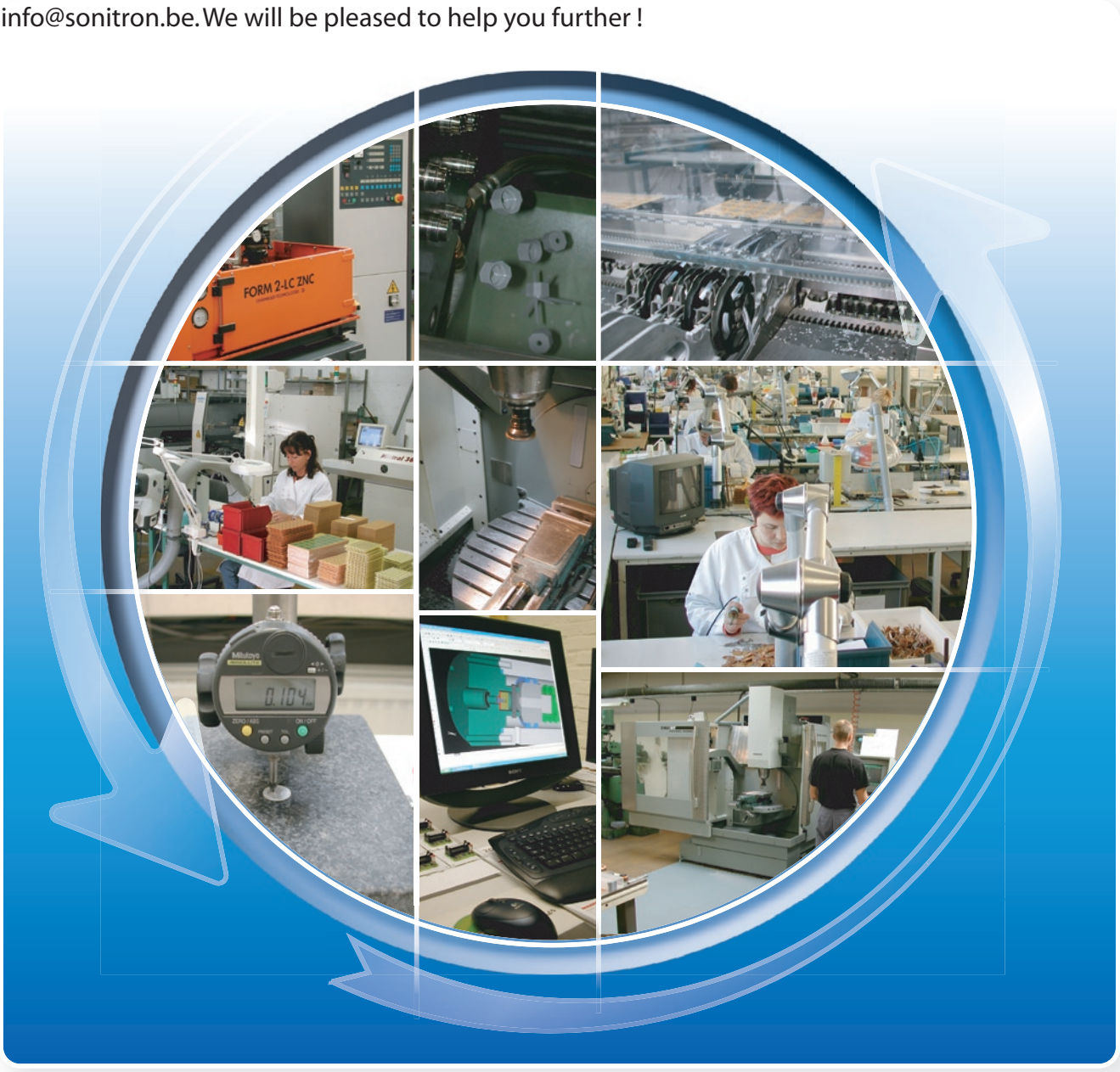


MODELS ON REQUEST

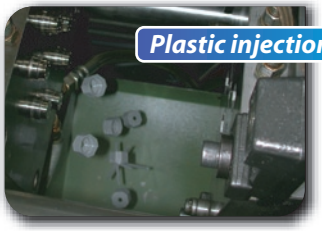
Continuous research, intensive development and specialist know-how have resulted in a wide range of high quality and reliable products, from the smallest and most cost effective buzzer to highly sophisticated alarms. This allows Sonitron to meet the needs of many different applications within the industrial, consumer, medical and military industry.

Ongoing investments in the in-house disciplines enables Sonitron to maintain their market reputation and being your first choice supplier of audible components and application support in acoustic technology.

Our future activities will be focused not only on research and development of new applications and products, but also on the development of buzzers or speakers for special customer requests. Our engineers will carefully study your application and give their support for the realisation of your audio-project with Sonitron products. Please send your request on sales@sonitron.be or info@sonitron.be. We will be pleased to help you further !



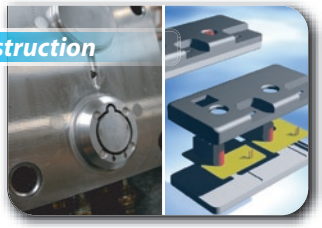
KNOW-HOW AND EQUIPMENT



Plastic injection

Sonitron studied the use of numerous plastic materials for buzzer housings, resulting in the use of the highest quality materials. Sonitron has a fully automated plastic injection department, which guarantees full of all the dimensions and acoustic properties of the housings of our products.

Mould development and construction

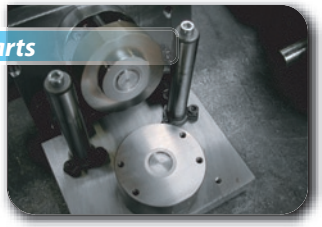


Sonitron develop and produce themselves the mouldings for the plastic housings and pin terminals used in their buzzers.
This in-house knowledge and expertise in moulding technology enables Sonitron to manufacture customized products.

CNC milling machine

The fully automatic Milling Station with 5 axis is used to create new prototypes and plastic injection moulds. A continuous milling productivity is guaranteed due to the 16 load tool exchanger.

Pressing and cutting metal parts

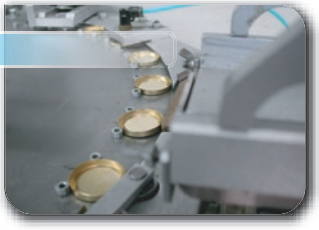


Sonitron develop specially shaped and formed membranes for use in their products. These membranes are produced in-house, enabling to maintain the high quality in large quantities, required for mass production of membranes with specific resonant frequencies.

Pick & place machine

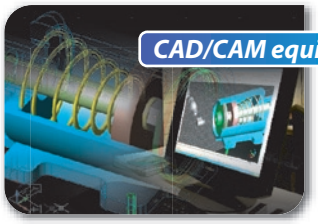
The electronic circuits produced and incorporated in Sonitron's acoustic components are designed in-house and are fully automatically realised with the latest surface mount and soldering equipment.

Automatic gluing



As the process of gluing the ceramic onto the membrane is of essential importance for the reproduction of the requested frequency, Sonitron developed special gluing equipment. This equipment enables full control of perfect adhesion between the piezo disc and the membrane.

KNOW-HOW AND EQUIPMENT



CAD/CAM equipment

The latest software programs and computing technologies are used for the in-house 3D-design of PC-boards, metal parts, moulds and automation equipment.

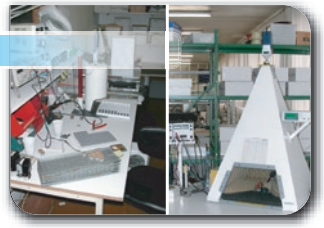
Electronic discharge machine (EDM)

The electronic discharge machine makes it possible to create very complex shapes.
With this equipment, Sonitron is able to construct the moulds for special designs.

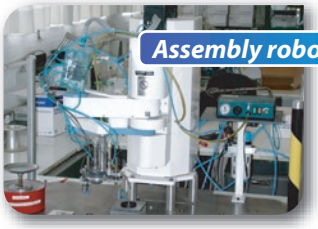
Test & measurement equipment

The anechoic room provides acoustic isolation from all background noises.
The real time audio analyser can measure each type individually for frequency response, harmonic distortion and phase shift. All parameters such as dB(A), frequency, supply voltage are programmable. A printed copy of specific measurement reports is obtainable upon request.

Final quality control



Final testing of Sonitron's products is done in a special pyramid shaped sound absorption environment, avoiding reflection and standing wave patterns. This method guarantees very accurate SPL measurements.



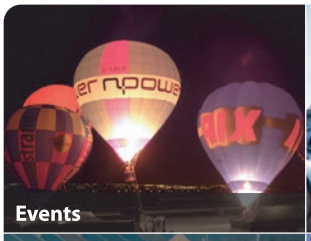
Assembly robot

This multifunctional programmable assembling robot is ideal for automation of Sonitron's production.

Ultrasonic equipment

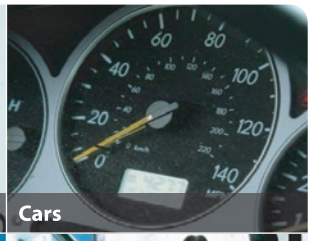
This equipment is used for ultrasonic gluing of plastic parts to obtain very strong watertight sealing.

APPLICATION FIELDS FOR BUZZERS & TRANSDUCERS


Events


Aircraft cockpit


Door access

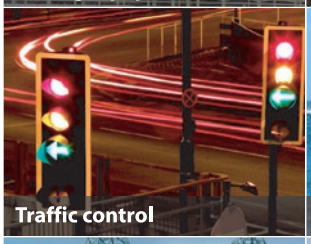

Cars


Mining equipment


Process control


Radar control device


Moving staircase alarm


Traffic control


Boat alarm

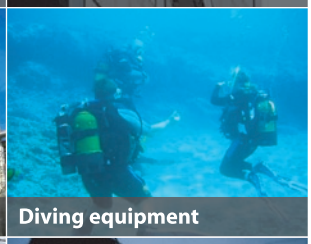

Busses


Tower waggon


Mobile data communication


Pipeline monitoring


Hoisting crane alarm

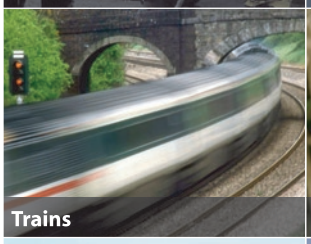

Diving equipment


Gas detection


Camera surveyance


Baggage claim alarm

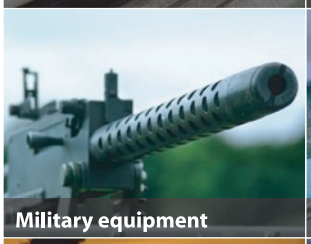

Medical equipment


Trains


Electronic portable equipment

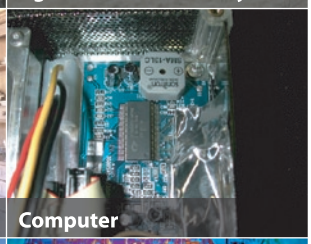

Control station


Agricultural machinery


Military equipment


Trucks


Household equipment


Computer


Industrial equipment


Research equipment


Weather control station


Specials

APPLICATION FIELDS

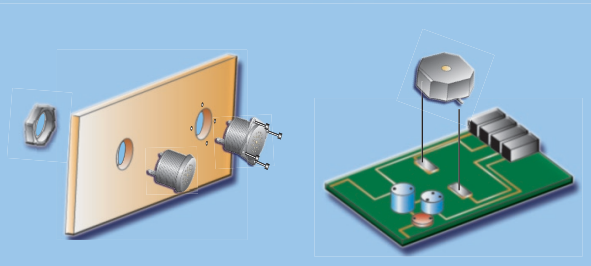
- ACCESS CONTROL
- ADVERTISING MESSAGE EQUIPMENT
- AGRICULTURAL EQUIPMENT
- AIRCRAFTS
- ALARMS
- AMBULANCE SIREN
- ANSWERING MACHINE
- ASSEMBLING EQUIPMENT
- AUTOMATIC DOORS
- AUTOMATIC GUIDED VEHICLES
- AUTOMATION EQUIPMENT
- AUTOMOBILES
- BAGGAGE CLAIM ALARM
- BATTERY LOADERS
- BATTERY OPERATING BUZZERS
- BICYCLES
- BIO-FEEDING PUMPS
- BOAT ENGINE ALARM
- BOATS
- BUS
- CABLE TESTER
- CAMERA
- CAMERA SURVEYANCE
- CAR SPEAKERS
- CARD READER SYSTEMS
- CAR-WASH
- CASH REGISTERS
- CENTRAL HEATING CONTROL PANELS
- CLEANING MACHINES
- CLOCKS
- COCKPIT ALARM
- CODIFICATION SYSTEM
- COIN-TESTER
- COMMUNICATION EQUIPMENT
- COMPUTER EQUIPMENT
- CONSTRUCTION MACHINES
- CONSUMER ELECTRONICS
- CONTROL EQUIPMENT
- CONTROL PANEL
- CONTROL STATION
- COOLING MACHINES
- COPIERS
- DASHBOARD
- DIGITAL SPEECH PROCESSING
- DIVING EQUIPMENT
- DOOR ACCESS
- DOOR LOCK ALARM
- DOORBELL
- ELECTRONIC GAMBLING MACHINE
- ELECTRONIC PORTABLE EQUIPMENT
- ELECTRONIC TIMERS
- ELEVATORS
- EMBARKATION DEVICE
- EMERGENCY STOP
- ENTERTAINMENT SYSTEM
- EVENT ALARM
- FIRE ALARM
- FIRE DETECTORS
- FISH FINDER
- FORKLIFT
- GAMES AND TOYS
- GAS DETECTORS
- GAS SENSOR
- GAS STATION
- GOLF CARTS
- HAND HELD COMPUTER
- HEATERS
- HELMETS
- HIGH PRESSURE CLEANERS
- HIGHWAY TOLL CARD SYSTEM
- HOISTING CRANE ALARM
- HOME EQUIPMENT & DOMOTICS
- HOME SPEAKERS
- HOOTER FOR BLIND PEOPLE
- HOSPITAL MESSAGE SYSTEM
- HOUSEHOLD EQUIPMENT
- INDUSTRIAL EQUIPMENT
- INDUSTRIAL WASHING MACHINES
- INSTRUMENTATION
- INTERCOM SYSTEMS
- KEYBOARD
- KEYPAD
- LANDING GEAR
- MEASUREMENT EQUIPMENT

APPLICATION FIELDS

- MEDICAL EQUIPMENT
- MESSAGE RECORDING
- METAL DETECTOR GATE
- METAL DETECTORS
- METRO DOORS
- MICROPROCESSOR DEVICE
- MILITARY EQUIPMENT
- MILITARY RADIO
- MILITARY VEHICLE
- MINING EQUIPMENT
- MOBILE DATA COMMUNICATION
- MOBILE PHONE
- MONITORING & TEST EQUIPMENT
- MOTOR CONTROL
- MOTORCYCLES
- MOVING STAIRCASE
- MOWING-MACHINE
- MRI DEVICE
- MULTI-MEDIA EQUIPMENT
- NAVIGATION SYSTEM
- NOISE CANCELLATION UNIT
- NURSE CALL SYSTEM
- OFFICE EQUIPMENT
- PASSENGER INFORMATION SYSTEM
- PC MOTHERBOARD
- PET PUMP
- PETROL STATION
- PIPELINE MONITORING
- PORTABLE ANALYSERS
- POWER SUPPLY
- PRINTERS
- PROCESS CONTROL
- PROJECTOR
- PUBLIC MESSAGE SYSTEMS
- PUBLIC TELEPHONES
- PUMP STATIONS
- PUMP STEERING
- RADAR CONTROL DEVICE
- RADIO
- RAILWAY DOOR SYSTEM
- REMOTE CONTROL
- RESEARCH EQUIPMENT
- RESPIRATOR
- RUNWAY LIGHTING
- SAFETY SYSTEMS
- SATELLITE SYSTEM
- SECURITY DEVICES
- SECURITY GATES (WALK THROUGH)
- SECURITY SYSTEMS
- SIGNAL EQUIPMENT
- SIGNALIZATION & PROCESS CONTROL EQUIPMENT
- SIGNALIZATION STICK FOR BLIND PEOPLE
- SOLAR PANELS AND SOLAR TRACKING SYSTEM
- SOLAR POWERED EMERGENCY PHONE
- SOLID STATE TIMER
- SUPERSONIC RECEIVER
- SURROUND STEREO SPEAKERS
- SURVEYANCE EQUIPMENT
- SWITCH BOARD
- TALKING BUZZER
- TELECOMMUNICATION
- TELEMETRY
- TELEPHONE EQUIPMENT
- TEST EQUIPMENT
- TICKET AUTOMAT
- TIMERS
- TOWER WAGGON
- TRACTORS
- TRAFFIC EQUIPMENT
- TRAINS
- TRANSMISSION SYSTEMS
- TRANSPONDER
- TRUCKS
- TV/HIFI MONITOR
- ULTRASONIC LEVEL DETECTION
- UNDERGROUND
- UTILITY METERS
- VEHICLE ACCESS CONTROL
- VENDING-MACHINES
- VENTILATOR
- VIDEO CONFERENCE SYSTEMS
- WEATHER CONTROL STATION
- WEIGHING EQUIPMENT
- WHEEL LOADER

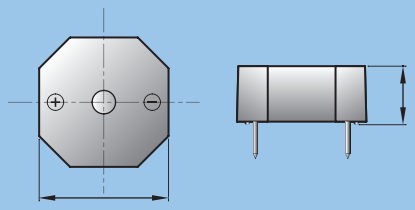
KEY QUESTIONS FOR BUZZER DETERMINATION

1. Mounting method: panel ? wall ? PCB ?

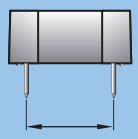


2. Connection method: wires ? pins (= through hole) ? fast-on ? SMD?

3. Maximum dimensions (in mm): diameter x height

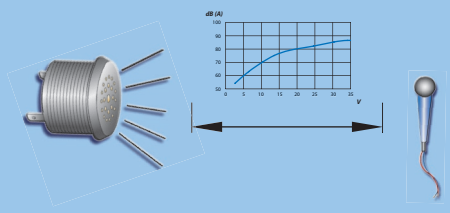


4. Pin distance (in mm)

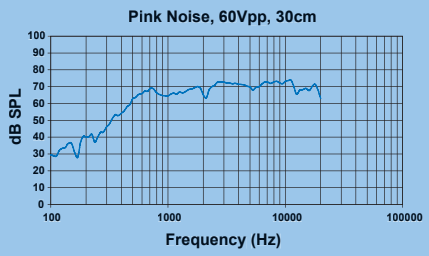


5. Supply voltage: DC for buzzers or AC for transducers

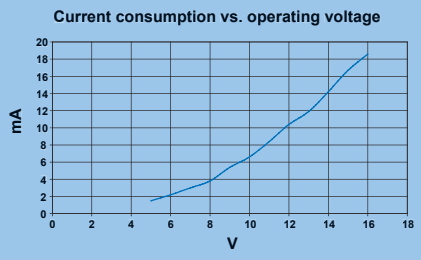
6. SPL – dB(A) @ 12Vdc, @ 30 cm or 1 meter



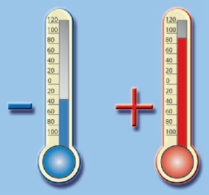
7. Sound frequency in Hz



8. Current consumption in mA



9. Temperature range in °C



sonitron® PRODUCT SELECTION GUIDE

BUZZERS & TRANSDUCERS

STANDARD SERIES >

Dimensions overview (in mm)

Ø x H


Round Ø36.5x26


Square ⍁38x26

SMA-SERIES >


SMA-13 ⍁14x6.5


SMA-17 ⍁17.5x8.5


SMA-21 ⍁21x9.5


SMA-24 ⍁24x15.5


SMA-30 ⍁30x10.5

SMAT-SERIES >


SMAT-13 ⍁14x6.5


SMAT-17 ⍁17.5x8.5


SMAT-21 ⍁21x9.5


SMAT-24 ⍁24x15.5


SMAT-30 ⍁30x10.5

SMB-SERIES >


SMB-17 ⍁ 18.6x9.7


SMB-32 ⍁ 33.5x9.7

SMAC-SERIES >


SMAC-25 Ø26.5x18

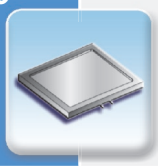
PIEZOCERAMIC SPEAKERS

SPS-SERIES >

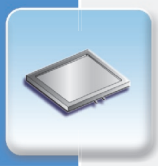
Dimensions overview (in mm)

⍁ x H

SPS-10080


100x80x6.8

SPS-8770


87x70x6.8

SPS-4640


47x41x5.25

SPS-3035


32x36x0.2

SPS-27


Ø27x4.15

SCS-SERIES >


SCS-17 ⍁ 18.6x9.7


SCS-24 ⍁ 25x9.7


SCS-32 ⍁ 33.5x9.7

SPECIALS >

Underwater speaker


87x70x11

For more information !

See PIEZO SPEAKER Catalogue

ALARMS & SIRENS

SAS-SERIES >

Dimensions overview (in mm)

Ø x H

SAS-2835


Ø56x63

SAS-2154


Ø54x19.6

SAS-325A-6


108x85x69

SAS-87


Ø110x45

SAS-RL-72


47x39x23

SAS-RH72


47x39x23

SAS-81


75x70x51

For more information !

See ALARMS & SIRENS Catalogue

RoHS *(RESTRICTION OF HAZARDOUS SUBSTANCES)*

I herewith declare that as from october 1, 2005, all of our products are in compliance with the new directive 2002/95/EC (restricting hazardous materials).

We confirm that none of our buzzers (SMA, SMAT, SMAC, panel/standard series), speakers (SCS and SPS series) or alarms (SAS series) contain any of the following substances:

- mercury (Hg)
- cadmium (Cd)
- hexavalent chromium (Cr (VI))
- polybrominated biphenyls (PBB)
- polybrominated diphenyl ethers (PBDE)
- lead

Sonitron N.V. cannot be held responsible for any deviations in raw materials or components used in their products.

Additional information or reports can be supplied after written and motivated request, provided it does not concern classified unreleased production information and subject to cost calculation when information is requested from third parties.

Dr. Hugo Michiels
President
SONITRON N.V.

STANDARD SERIES

Since 1977, Sonitron continuously invested in research and development, optimising their standard series which are used today under the most extreme and difficult environmental circumstances, by clients such as the Nato, Airbus, Volvo Penta, Dräger, Knogo,…

During the last 30 years, the standard series have proved to be the prime alarm, giving your equipment an added value. Several thousands of clients all over the world have chosen for the reliability and the excellent quality of piezoceramic buzzers of Sonitron.

The range has recently expanded with a new 1700 Hz standard buzzer, which produces a very pleasant low frequency intermittent tone at reasonable sound output.
Moreover, several of the standard buzzers are also available in a 110/220 VAC version.

INTRODUCTION

The standard series are based on the highest piezo technology and are considered as most robust series for industrial applications. The standard buzzers use a special shaped membrane (curved edge), which is fixed and glued into the housing. They are shock proof, as well as dust and waterproof (IP67). The different standard models cover a wide range of applications, offering functions such as continuous, intermittent, sweep and warbler, with a sound output more than 100 dB(A).
All standard buzzers are available with various mounting methods, such as PCB or panel mounting and therefore are equipped with either pins or fast-on terminals. The standard series include military models, extra loud types, as well as models operating at very low voltage consumption (SC 0715 BL at 0.7V) and very low current (SP27 = 4,8 mA at 9V).

ADVANTAGES

- Extremely high sound pressure level with a very clear and penetrating sound output
- Solid state shock proof buzzer
- Dust and waterproof, rated to IP67
- PCB and panel mounting; pin or fast-on terminals
- Very high reliability
- Low power consumption
- Wide operating supply range
- Wide temperature range
- Electronics potted in epoxy
- Small in dimensions

APPLICATIONS

- Alarms
- Agricultural equipment
- Monitoring and test equipment
- Medical equipment
- Military equipment
- Trucks & automobiles
- Boats & airplanes
- Signalling & process control equipment
- Fire detectors
- Vending-machine
- Cockpit alarm
- Surveyance equipment
- Underground
- Traffic control
- Industrial washing machine

SPECIFICATIONS

Model	Function	Operating ** Voltage		Frequency ± 15% (Hz)	Pulse rate (Hz)	Operating Current (mA)		SPL (dB(A)*
		min. Vdc	max. Vdc			@ V min.	@ V max.	
SC 235 A	contin.	2	35	2500	-	0.3	8.6	73
SC 235 B	contin.	2	35	3500	-	0.4	8.4	87
SXLC 515 C	contin.	5	15	3000	-	25	130	102
SCI 535 A1	multif.	5	35	2500	1	1.4	12.5	77
SCI 535 B1	multif.	5	35	3500	1	1.4	12.2	86
SXLI 515 C1	multif.	5	15	3000	1	13	70	96
SCI 535 A5	multif.	5	35	2500	5	1.4	12.5	77
SCI 535 B5	multif.	5	35	3500	5	1.4	12.2	86
SCR 535 A	multif.	5	35	2500	20	1.4	12.6	82
SCR 535 B	multif.	5	35	3500	20	1.4	12.6	84
SW 535 B	warbler	5	35	3500	-	1.3	10.6	87
SXLW 515 C	warbler	5	15	3000	-	30	120	104
SUC 516 A	contin.	5	16	2500	-	1.8	13.3	92
SUC 516 B	contin.	5	16	3500	-	0.8	13.0	90
SULC 516 B	contin.	5	16	3500	-	2.0	13.3	97
SULI 516 B1	intermit.	5	16	3500	1	1.2	11.6	94
SULI 516 B5	intermit.	5	16	3500	5	1.2	11.6	94
SUM 516 A1	multif.	5	16	2500	1	1.8	11.6	93
SUM 516 A5	multif.	5	16	2500	5	1.8	11.6	93
SULM 516 B1	multif.	5	16	3500	1	2.4	14.2	96
SULM 516 B5	multif.	5	16	3500	5	2.4	14.2	96
SC 0715 BL	contin.	0.7	15	3500	-	0.3	13.4	98
SXLP 515 C	sweep	5	15	3000	-	55	110	102
SP27	contin.	3.5	9	3500	-	1.6	4.8	94(9V)
SCI 535 1700	multif.	5	35	1700	1	1.4	12.2	67

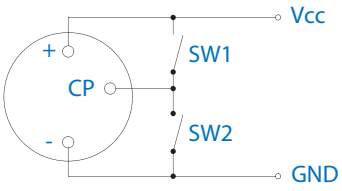
Operating temperature	-35°C to +75°C
Storage temperature	-40°C to +85°C
Life time (at 21°C)	See expected life time curve in addendum
Case material	ABS (UL rating: 94 HB)
Standard colour of case	Grey (except the SP27 which is black)
Terminal material	Tinned brass for both pin terminals and fast-on terminals
Supply voltage	The standard buzzers are not damaged by reverse voltage connection (except the SP27 types).
Mounting	PC-board: by soldering the terminals. Front panel mounting: the buzzers can be mounted in panels up to 14 mm thickness (SP27 max. 7 mm). They are locked with a locking pin (dimensions 0.8x2.3mm) and secured to the panel with a plastic nut. Foresee a hole of diameter 32 mm (1.14"). Maximum torque on plastic nut: 6 Nm (wrench size 38mm) The step of the thread is 1.5 mm

*All measurements are made @ 1 meter @ 12 Vdc in free air @21°C, except for the SP27. Please note that for applications objects in close proximity of the buzzer or objects in a room cause reflections thereby increasing or decreasing the SPL. The weight of the standard buzzers varies from 13 g to 24 g.

**Operating voltage 110/220 VAC: see models on request.

MULTI-FUNCTIONALITY OF THE STANDARD SERIES

The standard series offer the client several functions in one single buzzer. The selection of a function is illustrated in the scheme below.



SW1	SW2	SCI 535	SCI 515	SCR	SU(L)M
open	open	intermittent	intermittent	cricket	intermittent
closed	open	stop	continuous	stop	stop
open	closed	continuous	stop	continuous	continuous

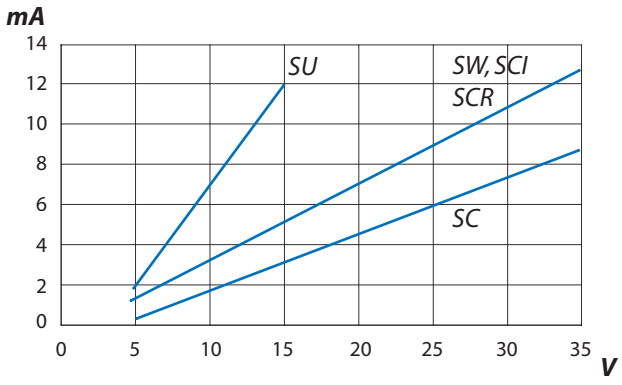
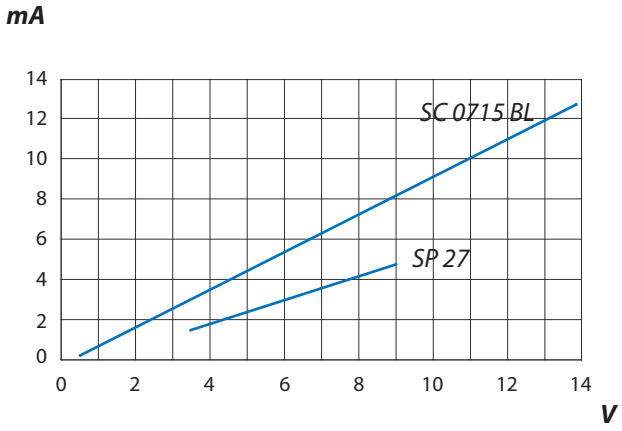
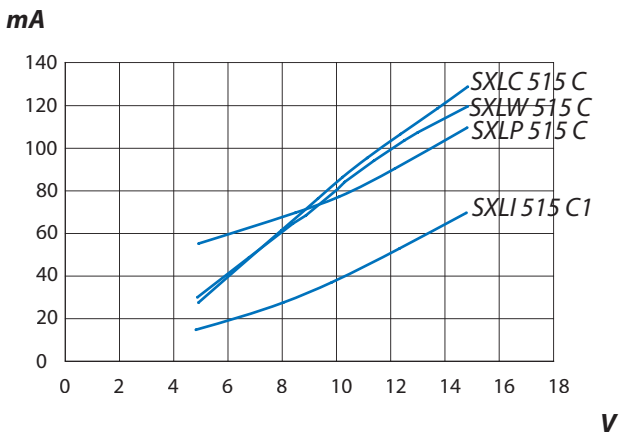
SELECTION GUIDE

The selection of an acoustic signal can be complex. That is why we present below our standard models with their most appropriate application.

SC 235 A SCI 535 A1/A5	General purpose buzzer with medium sound output for soft alarm in industrial and military applications where a high reliability is requested. These buzzers can be used in a wide supply voltage range.
SC 235 B SCI 535 B1/B5	General purpose buzzer with high sound output for low power consumption. Ideally suitable for alarm and industrial sound signals. These models combine high performances and great reliability. Today, the SC 235 B is considered as the most popular type.
SW 535 B SCR 535 A/B	A warbler or cricket tone with a special sound effect for warning and alerting devices.
SP 27	Small sized buzzer to be used in applications where space is limited. Max. supply voltage is 9 Vdc. See also information in addendum.
SUM 516 A1/A5	A universal buzzer type with a selection mode of three functions: continuous, intermittent or stop. High sound output for low power consumption and low supply voltages. This type can be used for multiple applications where a soft signal is required and a high reliability is a must.
SULM 516 B1/B5 SULC 516 B SUC 516 A/B SULI 516 B1/B5	A universal buzzer with a selection mode of different functions: continuous, intermittent or stop. High sound output at very low power consumption. It can be used in all alarm and warning signals where performance, power consumption and size are important. The SULI and the SUC models are simplified versions of the SULM 516 B5 that can be used when mode control is not required.
SC 0715 BL	Special loud buzzer that functions at very low voltage (0.7 Vdc), going up to 15 Vdc, producing 98 dB(A) @ 1 meter @ 12Vdc. Wide range of applications, including battery powered alarms.
SXLC 515 C SXLI 515 C1	Extreme loud buzzers for multiple applications requiring a high penetrating sound. The SXLI model has an intermittent sound, creating more attention.
SXLW 515 C SXLP 515 C	Extreme loud buzzer with warbler or sweep tone. These buzzers produce a very aggressive sound. They are perfect alarm bells and warning devices for all kinds of applications.

ELECTRICAL PARAMETERS

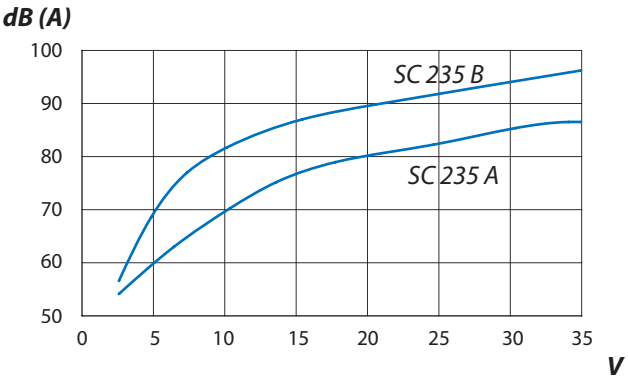
Current consumption vs. operating voltage

Models	Current consumption vs. operating voltage
SC, SCI, SCR, SU, SW	
SP 27 & SC 0715 BL	
SXLC 515 C SXLI 515 C1 SXLW 515 C SXLP 515 C	

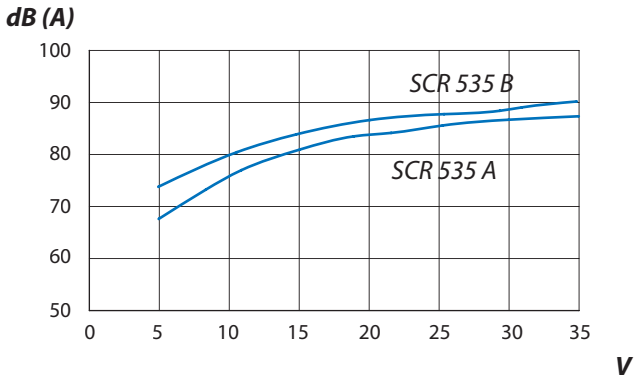
All measurements are made @ 12Vdc @ 1 meter in free air @ 21°C, except for the SP 27.

Sound pressure level vs. voltage

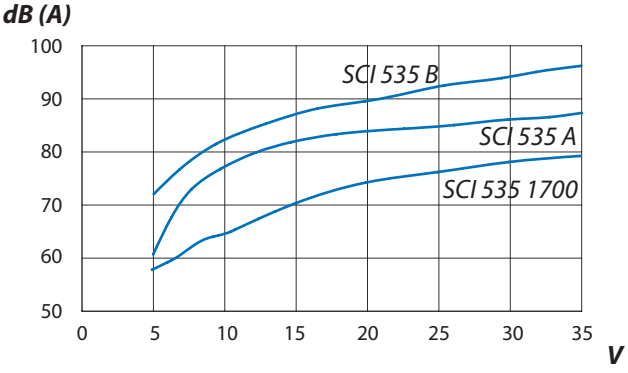
SC 235 A/B



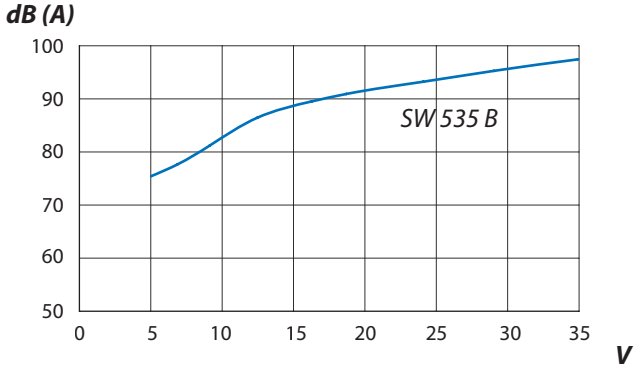
SCR 535 A/B



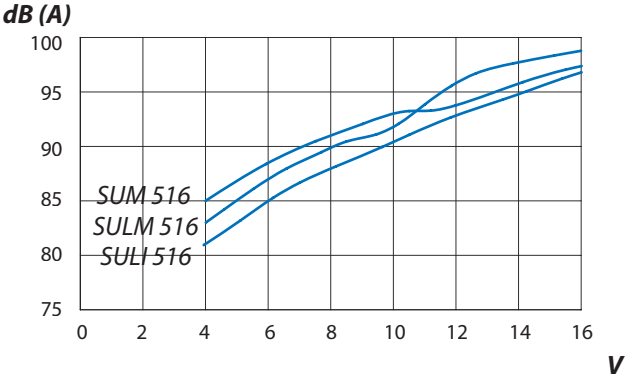
SCI 535 A/B



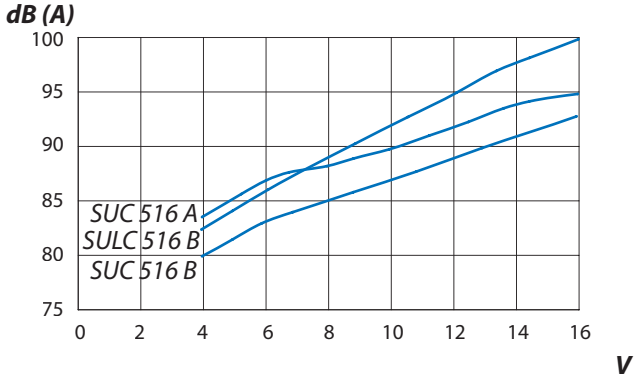
SW 535 B



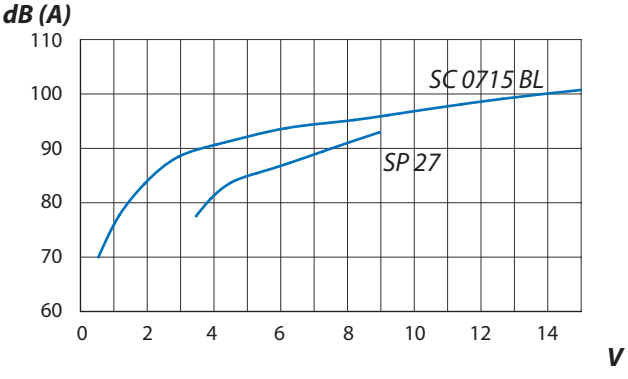
SUM 516 A1/A5, SULM 516 B1/B5, SULI 516 B1/B5



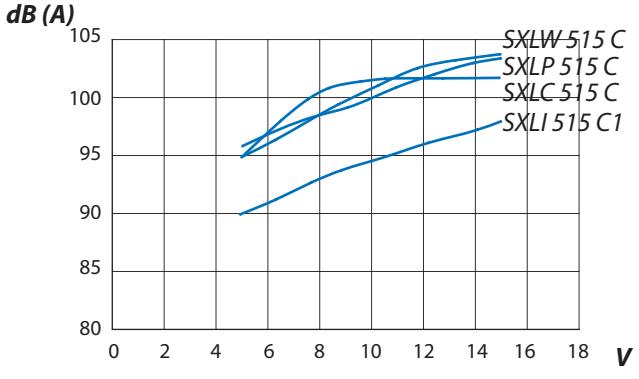
SULC 516 B, SUC 516 A/B



SP 27 & SC 0715 BL



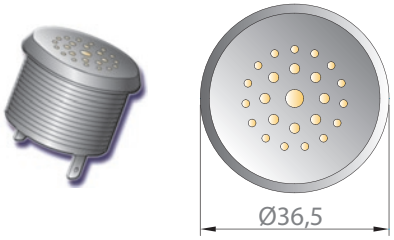
SXLC 515 C, SXLI 515 C1, SXLW 515 C, SXLP 515 C



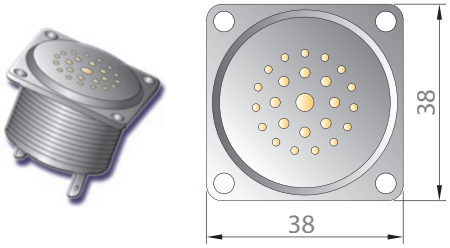
All measurements are made @ 12Vdc @ 1 meter in free air @ 21°C, except for the SP 27.

DIMENSIONS (All dimensions are in mm)

Round



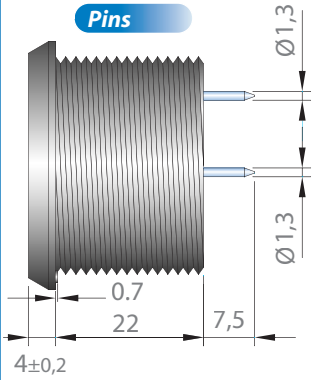
Square

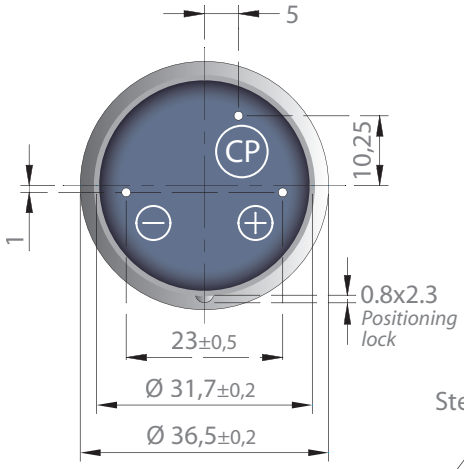


mounting nut

Models SC, SXLC, SCI, SXLI, SCR, SW, SXLW & SXLP

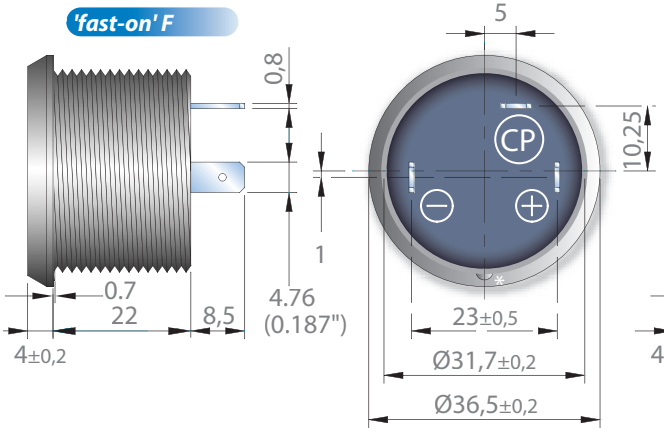
Pins



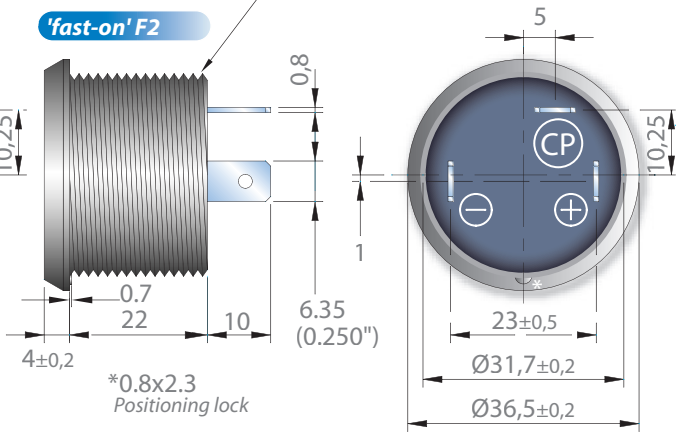


Step 1.5mm

'fast-on' F

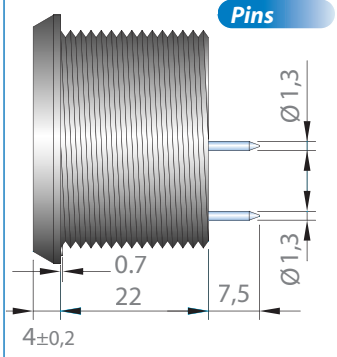


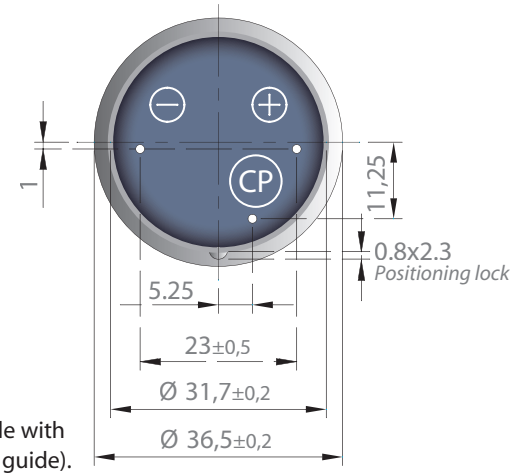
'fast-on' F2



Models SU, SUC, SULC, SULI, SUM & SULM

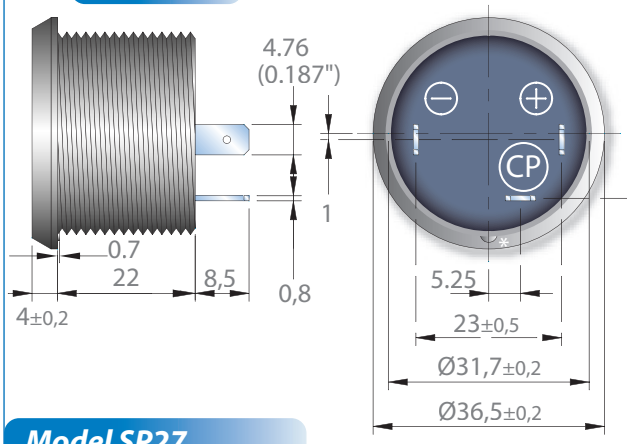
Pins



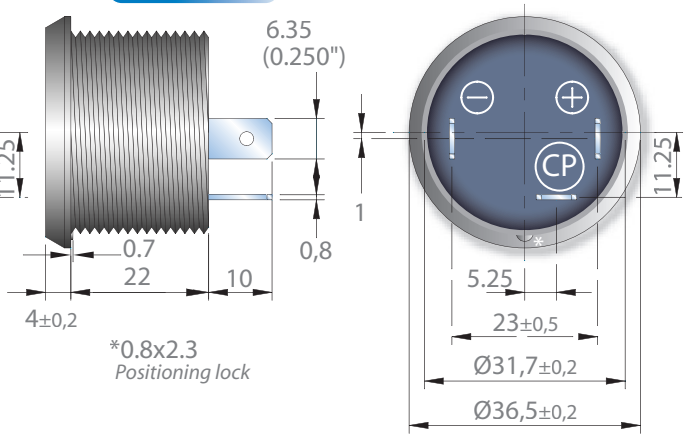


Note: the control pin (CP) is only available with the multifunction buzzers (see selection guide).

'fast-on' F

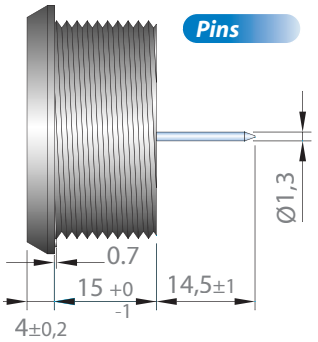


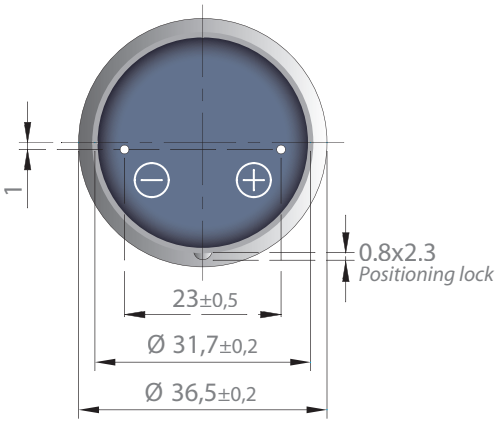
'fast-on' F2



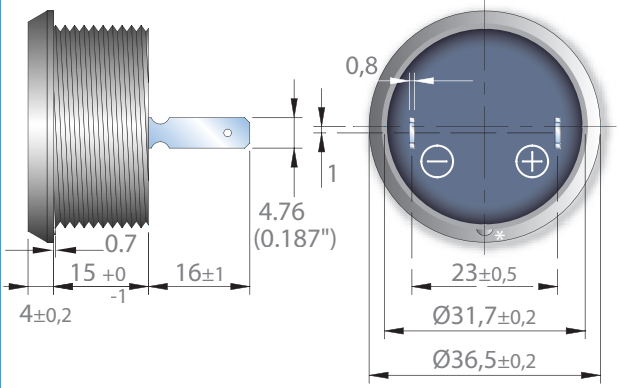
Model SP27

Pins

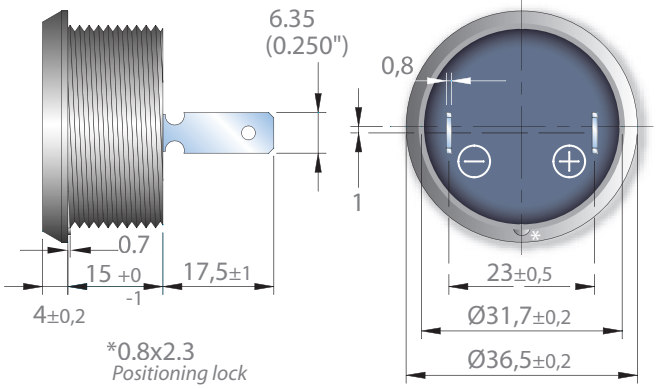




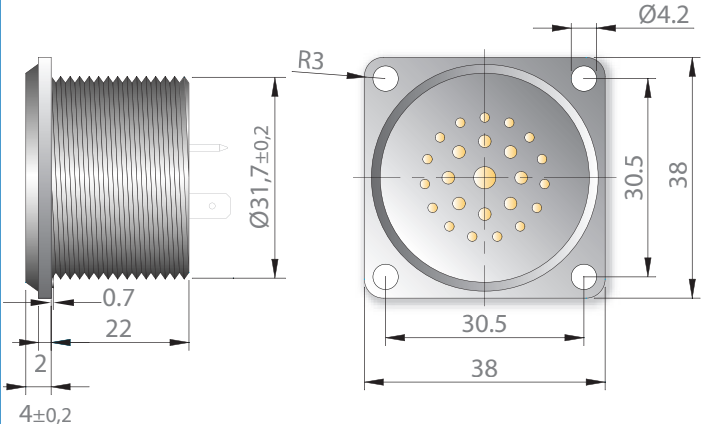
'fast-on' F



'fast-on' F2



Square flange model



Note: the square flange model is available with all kinds of pin terminals.

PRODUCT CODIFICATION

S	U(L)M	5	16	A	1	–	F**	M***
	CI	0.7*	15	B	5		F2	S
	W	2	35					MS***
	CR							
	C							
	U(L)C							
	ULI							
	XL							
Sonitron	C: continuous U: universal W: warbler I: intermittent CR: cricket & continue M: multifunctional L: loud XL: extra loud	Min. voltage (Vdc)	Max. voltage (Vdc)	A: freq. 2500 Hz B: freq. 3500 Hz	Pulsation 1=1 Hz 5=5Hz		'fast-on' terminals F: 4.76 mm F2: 6.35 mm	M: military S: Square front MS: military & square front

SP27: special model (see specifications)

*0.7: 0.7 Vdc minimum voltage of the SC 0715 BL

F** If no terminal specification, the model is standard delivered with round pins, diameter 1.5 mm. Fast-on terminals are available in 2 dimensions: F= 4,76 mm (0,187 inch) or F2 = 6,35 mm (0,250 inch).

M*** Military norm MIL STD 202

LIST OF AVAILABLE PRODUCT TYPES

SC 235 A	SC 235 B	SC 0715 BL	SP27	SCI 535 A1	SCI 535 A5
SC 235 A F	SC 235 B F	SC 0715 BL F	SP27 F	SCI 535 A1 F	SCI 535 A5 F
SC 235 A F2	SC 235 B F2	SC 0715 BL F2	SP27 F2	SCI 535 A1 F2	SCI 535 A5 F2
SC 235 A F M	SC 235 B F M	SC 0715 BL F M	SP27 F M	SCI 535 A1 F M	SCI 535 A5 F M
SC 235 A F2 M	SC 235 B F2 M	SC 0715 BL F2 M	SP27 F2 M	SCI 535 A1 F2 M	SCI 535 A5 F2 M
SC 235 A S	SC 235 B S	SC 0715 BL S	SP27 S	SCI 535 A1 S	SCI 535 A5 S
SC 235 A F S	SC 235 B F S	SC 0715 BL F S	SP27 F S	SCI 535 A1 F S	SCI 535 A5 F S
SC 235 A F2 S	SC 235 B F2 S	SC 0715 BL F2 S	SP27 F2 S	SCI 535 A1 F2 S	SCI 535 A5 F2 S
SC 235 A F MS	SC 235 B F MS	SC 0715 BL F MS	SP27 F MS	SCI 535 A1 F MS	SCI 535 A5 F MS
SC 235 A F2 MS	SC 235 B F2 MS	SC 0715 BL F2 MS	SP27 F2 MS	SCI 535 A1 F2 MS	SCI 535 A5 F2 MS
				SCI 535 1700	
SCI 535 B1	SCI 535 B5	SCR 535 A	SCR 535 B	SUC 516 A	SUC 516 B
SCI 535 B1 F	SCI 535 B5 F	SCR 535 A F	SCR 535 B F	SUC 516 A F	SUC 516 B F
SCI 535 B1 F2	SCI 535 B5 F2	SCR 535 A F2	SCR 535 B F2	SUC 516 A F2	SUC 516 B F2
SCI 535 B1 F M	SCI 535 B5 F M	SCR 535 A F M	SCR 535 B F M	SUC 516 A F M	SUC 516 B F M
SCI 535 B1 F2 M	SCI 535 B5 F2 M	SCR 535 A F2 M	SCR 535 B F2 M	SUC 516 A F2 M	SUC 516 B F2 M
SCI 535 B1 S	SCI 535 B5 S	SCR 535 A S	SCR 535 B S	SUC 516 A S	SUC 516 B S
SCI 535 B1 F S	SCI 535 B5 F S	SCR 535 A F S	SCR 535 B F S	SUC 516 A F S	SUC 516 B F S
SCI 535 B1 F2 S	SCI 535 B5 F2 S	SCR 535 A F2 S	SCR 535 B F2 S	SUC 516 A F2 S	SUC 516 B F2 S
SCI 535 B1 F MS	SCI 535 B5 F MS	SCR 535 A F MS	SCR 535 B F MS	SUC 516 A F MS	SUC 516 B F MS
SCI 535 B1 F2 MS	SCI 535 B5 F2 MS	SCR 535 A F2 MS	SCR 535 B F2 MS	SUC 516 A F2 MS	SUC 516 B F2 MS
SULC 516 B	SUM 516 A1	SUM 516 A5	SULI 516 B1	SULI 516 B5	SULM 516 B1
SULC 516 B F	SUM 516 A1 F	SUM 516 A5 F	SULI 516 B1 F	SULI 516 B5 F	SULM 516 B1 F
SULC 516 B F2	SUM 516 A1 F2	SUM 516 A5 F2	SULI 516 B1 F2	SULI 516 B5 F2	SULM 516 B1 F2
SULC 516 B F M	SUM 516 A1 F M	SUM 516 A5 F M	SULI 516 B1 F M	SULI 516 B5 F M	SULM 516 B1 F M
SULC 516 B F2 M	SUM 516 A1 F2 M	SUM 516 A5 F2 M	SULI 516 B1 F2 M	SULI 516 B5 F2 M	SULM 516 B1 F2 M
SULC 516 B S	SUM 516 A1 S	SUM 516 A5 S	SULI 516 B1 S	SULI 516 B5 S	SULM 516 B1 S
SULC 516 B F S	SUM 516 A1 F S	SUM 516 A5 F S	SULI 516 B1 F S	SULI 516 B5 F S	SULM 516 B1 F S
SULC 516 B F2 S	SUM 516 A1 F2 S	SUM 516 A5 F2 S	SULI 516 B1 F2 S	SULI 516 B5 F2 S	SULM 516 B1 F2 S
SULC 516 B F MS	SUM 516 A1 F MS	SUM 516 A5 F MS	SULI 516 B1 F MS	SULI 516 B5 F MS	SULM 516 B1 F MS
SULC 516 B F2 MS	SUM 516 A1 F2 MS	SUM 516 A5 F2 MS	SULI 516 B1 F2 MS	SULI 516 B5 F2 MS	SULM 516 B1 F2 MS
SULM 516 B5	SW 535 B	SXLC 515 C	SXLI 515 C1	SXLW 515 C	SXLP 515 C
SULM 516 B5 F	SW 535 B F	SXLC 515 C F	SXLI 515 C1 F	SXLW 515 C F	SXLP 515 C F
SULM 516 B5 F2	SW 535 B F2	SXLC 515 C F2	SXLI 515 C1 F2	SXLW 515 C F2	SXLP 515 C F2
SULM 516 B5 F M	SW 535 B F M	SXLC 515 C F M	SXLI 515 C1 F M	SXLW 515 C F M	SXLP 515 C F M
SULM 516 B5 F2 M	SW 535 B F2 M	SXLC 515 C F2 M	SXLI 515 C1 F2 M	SXLW 515 C F2 M	SXLP 515 C F2 M
SULM 516 B5 S	SW 535 B S	SXLC 515 C S	SXLI 515 C1 S	SXLW 515 C S	SXLP 515 C S
SULM 516 B5 F S	SW 535 B F S	SXLC 515 C F S	SXLI 515 C1 F S	SXLW 515 C F S	SXLP 515 C F S
SULM 516 B5 F2 S	SW 535 B F2 S	SXLC 515 C F2 S	SXLI 515 C1 F2 S	SXLW 515 C F2 S	SXLP 515 C F2 S
SULM 516 B5 F MS	SW 535 B F MS	SXLC 515 C F MS	SXLI 515 C1 F MS	SXLW 515 C F MS	SXLP 515 C F MS
SULM 516 B5 F2 MS	SW 535 B F2 MS	SXLC 515 C F2 MS	SXLI 515 C1 F2 MS	SXLW 515 C F2 MS	SXLP 515 C F2 MS

MILITARY MODELS

All standard models can be delivered in a military version. All military models have flame retardant ABS housings in olive green, fast-on terminals and the membrane is foreseen with a special protective coating.

The military models guarantee a quality superior to the classic models. On top of the standard specifications, the military models are tested as follows:

Test	Method MIL STD202	Test conditions
Thermal Shock	107	A
Humidity	103	B
Salt Spray	101	A
Shock	213 B	H
Vibration	201 A	none
Terminal strength	211	A (10 Lbs, 2 cycles)

See also information about military norms in addendum.

MODELS ON REQUEST

The standard buzzers can be modified upon request in order to deliver a product meeting the requirements of the customer's application.

- Upon special request all standard models are also available in GREY, BLACK or GREEN (khaki). Please add GREY, BLACK or GREEN to the part number if the required colour is different from the one specified as standard.
- For applications under aggressive humid conditions, Sonitron also deliver a special model in which the piezo element is covered with a protective coating. Add ACR to the part number. The protective coating gives a complementary assurance against smog; all standard models are perfectly waterproof (IP67) without the mentioned coating.
- Different pin terminal lengths, straight or bent, can be custom made.
- The frequency, indicated in the present catalogue, has an accuracy of ±15%. Standard buzzers with an improved frequency accuracy (up to ±2%) are available upon special customer request.
- All these models are also available as a 110/220 VAC version: *SC 235 A*, *SC 235 B*, *SCI 535 B1*, *SCI 535 A5*, *SW 535 B*, *SULM 516 B5*, *SC 0715 BL*

PACKAGING

All standard buzzers are packed in polystyrene boxes of 26.5 x 26.5 mm; 25 pieces per box.

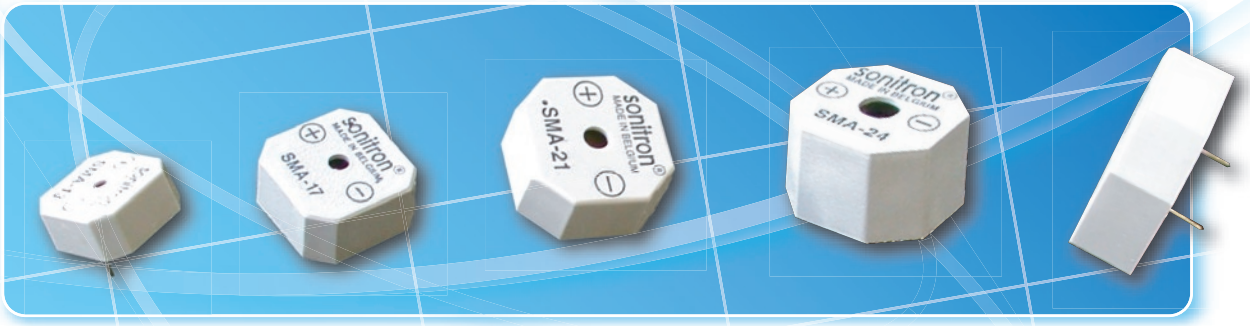
MULTI-APPLICATION SERIES SMA, SMAT & SMAC

INTRODUCTION

The Sonitron Multi-Application (SMA) series are specifically developed to meet a wide range of requirements in sound pressure, dimensions and mounting methods. This series produce highly reliable audible signals, giving either an extremely clear penetrating tone or a soft sound output. Both, buzzers and transducers, are available in five sizes, 13 mm, 17 mm, 21 mm, 24 mm and 30 mm. All SMA products are manufactured to meet various mounting styles such as through-hole or surface mounting technologies (SMD). Therefore they are equipped with either pin or SMD terminals.

The Multi-Application series present the following advantages:

- The octagonal housing provides alignment with pick & place machines for SMD models, which are packed in trays and protected with a heat resistant label for automatic soldering.
- The miniature models SMA-13 and SMA-17 offer a high sound pressure level together with a clear audible tone.
- The LT-versions of the models SMA-13, SMA-17 and SMA-21 generate an increased sound output. The LC-versions of the same models operate at extremely low current consumption; ideal for battery operated applications.
- The LV versions of the model SMA-21 generate an extremely loud sound output at very low battery voltage starting at 2 Vdc up to 6 Vdc.
- Because of the same case style for buzzers and transducers with different pin pitches per model, the user is offered a great deal of flexibility and can switch over to a buzzer or transducer at any time.
- The piezo audio technology can be qualified as solid state, highly reliable, without EMI and is able to withstand temperatures from -40°C to +85°C. The MTBF exceeds in reality several times the figure indicated in this catalogue. Lifetime depends on different factors and is described more in detail in the addendum.
- The electronics of the SMAC-25 are potted in epoxy, which ensures full protection against dust, humidity and water (IP67).



SELECTION GUIDE

The selection of an acoustic signal can be complex. The list below indicates the use of a certain buzzer model at a certain distance and frequency. It is important to take into account that every application is different and that the perception of a sound is very subjective.

frequency	Average distance from the source in free air				
	0 to 1m	1 to 2m	2 to 3m	3 to 4m	4 to 5m
2 kHz to 3 kHz	SMAT-13 SMAT-17 SMA-13 SMA-17	SMAT-13 SMAT-17 SMAT-21 SMA-13LC SMA-17LC SMA-17L SMA-21LV	SMAT-13 SMAT-17 SMAT-21 SMA-13LC SMA-17LC SMA-17L SMA-21LV	SMAT-30 SMA-21LV SMA-30 SMA-30L	SMAT-30 SMA-21LV SMA-30 SMA-30L
2.5 kHz to 3 kHz	SMAT-17 SMA-17LC SMA-17L SMA-21 SMA-21LC SMA-21L SMA-21LV	SMAT-17 SMA-17LC SMA-17L SMA-21 SMA-21LC SMA-21L SMA-21LV	SMA-24 SMA-24L SMA-17LC SMA-17L SMA-21LV	SMA-24 SMA-24L SMA-17LC SMA-17L SMA-21LV	SMA-24 SMA-24L SMA-17LC SMA-17L SMA-21LV
3 kHz to 3.8 kHz	SMAT-17 SMAT-21 SMA-17 SMA-17LT SMA-21 SMA-21LT	SMAT-17 SMAT-21 SMA-17 SMA-17LT SMA-21 SMA-21LT	SMAT-17 SMAT-21 SMAT-24 SMAT-30 SMAC-25 SMA-17LT SMA-17LC SMA-17L SMA-21LT SMA-21LC SMA-21L SMA-30 SMA-30L	SMAT-17 SMAT-21 SMAT-24 SMAT-30 SMAC-25 SMA-17LT SMA-17LC SMA-17L SMA-21LT SMA-21LC SMA-21L SMA-30 SMA-30L	SMAT-17 SMAT-21 SMAT-24 SMAT-30 SMAC-25 SMA-17LT SMA-17LC SMA-17L SMA-21LT SMA-21LC SMA-21L SMA-30 SMA-30L

SMA SERIES

The Sonitron Multi-Application buzzers are low cost commercial grade components for large volume applications. The SMA series are designed to meet various requirements such as current consumption, voltage, sound pressure, mounting methods, connection, dimensions and packaging. They are available in five sizes: 13 mm, 17 mm, 21 mm, 24 mm and 30 mm.
The buzzers have a built-in oscillator generating their working frequency. They produce a highly reliable audible tone signal, giving either an extremely clear and penetrating tone or a soft sound for non-aggressive signals.

ADVANTAGES & APPLICATIONS

ADVANTAGES :

- Octagonal form
- Models with different pin pitches
- Light but solid state construction
- Little power consumption, especially the Extra loud LC-versions
- Wide voltage range (1,5V to 24V)
- Easy mountable
- SMA-13 and SMA-17 for applications with limited space
- SMD models with heat resistant label for protection during automatic soldering
- Automatic pick & place

APPLICATIONS :

- Automatic doors
- Alarms
- Gas & metal detectors
- Weighing & measuring equipment
- Medical instrumentation
- Timers & clocks
- Control instrumentation & systems
- Copiers
- Automobiles & trucks
- Games & toys
- Computer peripherals
- Cash registers

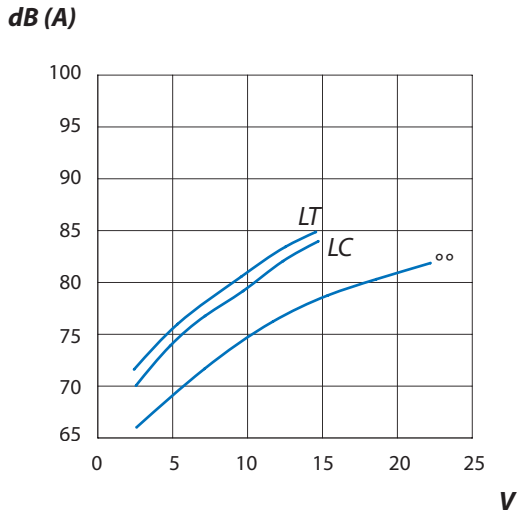
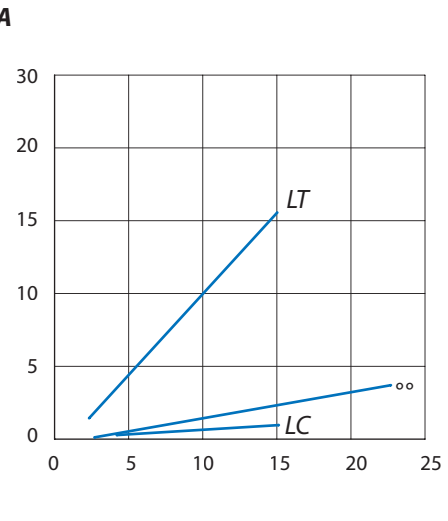
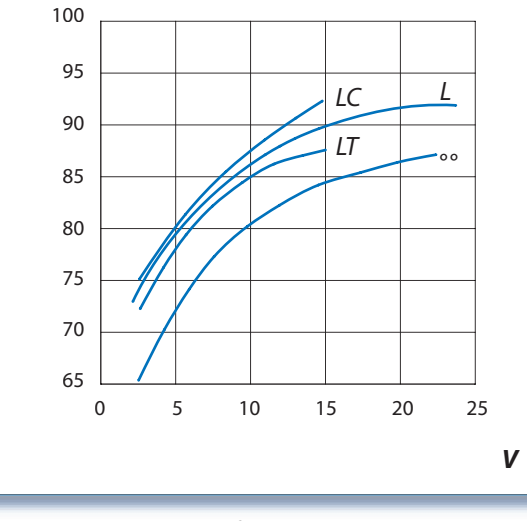
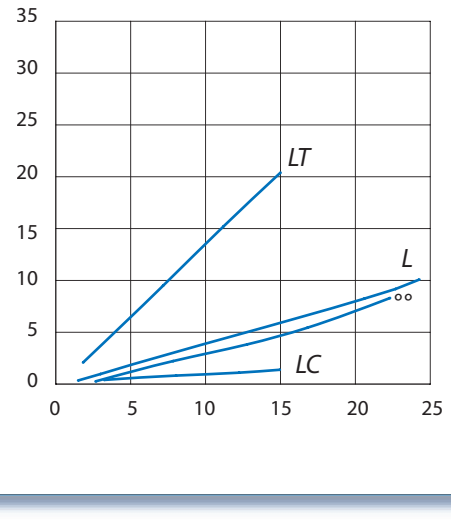
SPECIFICATIONS

Model	SPL * (dB(A)	Frequency (+/-15%) Hz)	Operating Voltage (min.-max.)	Operating current (mA)	Weight (g)
SMA-13	75	3000	1.5 to 24	1.8	1
SMA-13LT	82	3000	1.5 to 15	11.6	1
SMA-13LC	81	3000	1.5 to 15	0.7	1
SMA-17	82	3000	1.5 to 24	3.3	2
SMA-17L	88	3000	1.5 to 24	5	2
SMA-17LT	86	3000	1.5 to 15	15	2
SMA-17LC	89	3500	1.5 to 15	0.8	2
SMA-21	85	3300	1.5 to 24	3.8	2.5
SMA-21L	91	3300	1.5 to 24	5	2.5
SMA-21LT	90	3300	1.5 to 15	12.5	2.5
SMA-21LC	91	3800	1.5 to 15	1.1	2.5
SMA-21LV	87 @ 3V	3000	2 to 6	13 @ 3V	2.5
SMA-24	92	3000	1.5 to 24	4.2	4
SMA-24L	98	3000	1.5 to 15	6.7	4
SMAI-24	92	**3500	5 to 24	6.2	4
SMA-30	87	2500	1.5 to 24	4.1	5
SMA-30L	97 @ 9V	2500	3 to 9	5 @ 9V	5

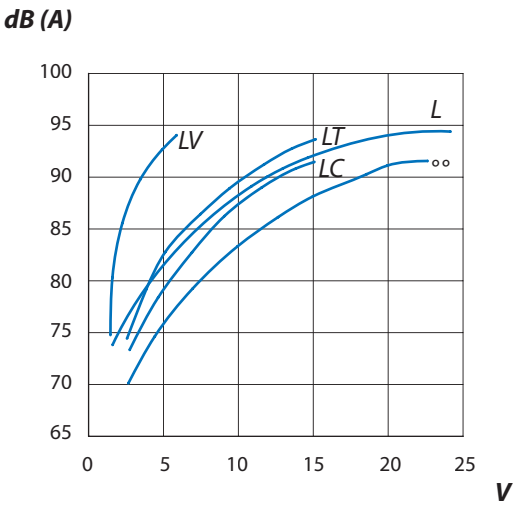
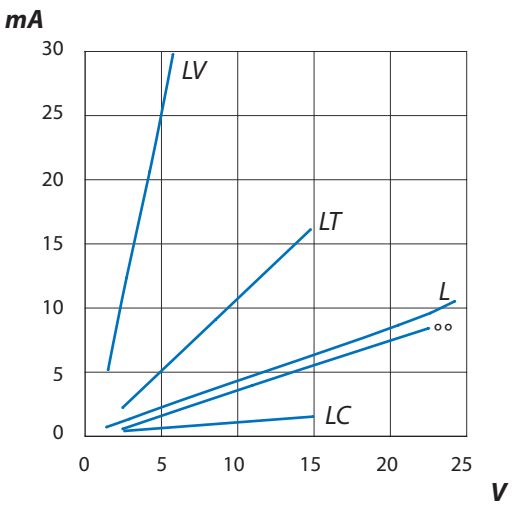
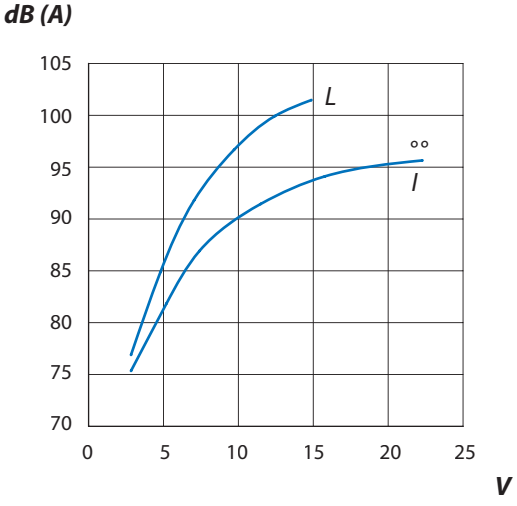
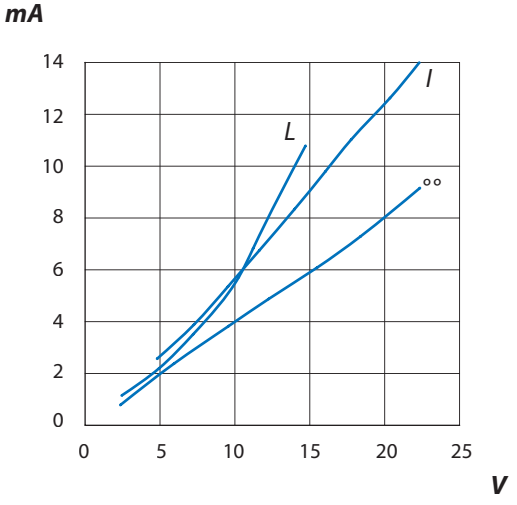
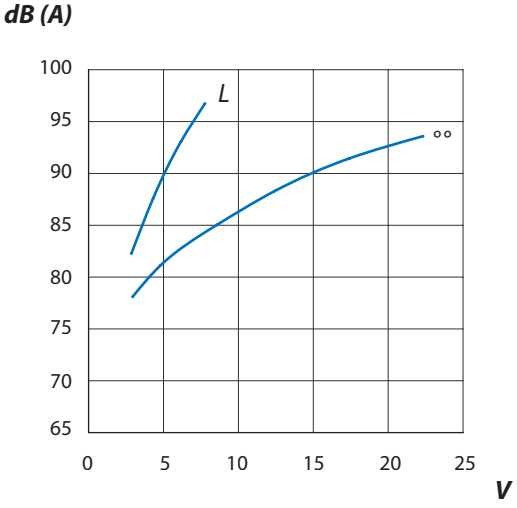
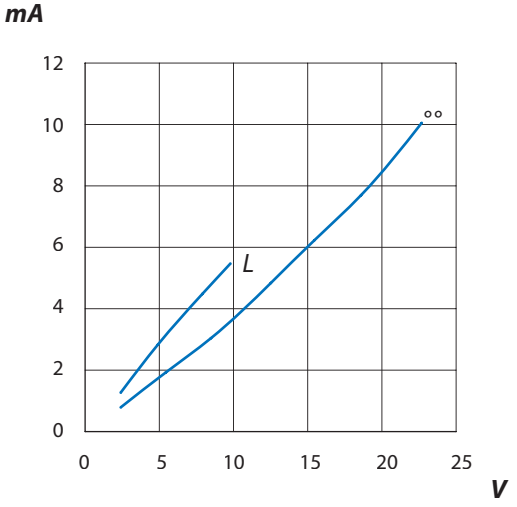
* All measurements are made in free air @ 21°C @ 30cm @ 12Vdc (Except for the SMA-21LV & SMA-30 L). Buzzers soldered on a PCB board with dimensions of 24cmx11cm.
** SMAI 24: intermittent pulse rate of 5Hz (@ 15Vdc). All the other models have a continuous tone.

Operating temperature	-20°C to +70°C
Storage temperature	-40°C to +85°C
Life time (@ 21°C)	See expected life time curve in addendum
Case material	ABS (UL rating: 94 HB) for pin-versions, SMA-13/21/30 PBT (UL rating: 94 HB) for pin versions, SMA-17/24 PPS (UL rating: 94 V0/5V) for SMD-versions, SMA-13/17/21/24/30
Standard colour of case	Grey

ELECTRICAL PARAMETERS

Models	Sound pressure level vs. operating voltage	Current consumption vs. operating voltage
SMA-13		
SMA-17		

All measurements are made @ 30 cm in free air @ 21°C.
°°: standard versions, respectively SMA-13, SMA-17.

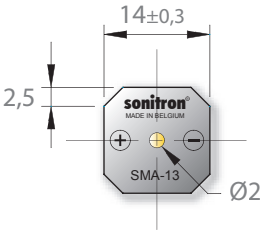
Models	Sound pressure level vs. operating voltage	Current consumption vs. operating voltage
SMA-21		
SMA-24		
SMA-30		

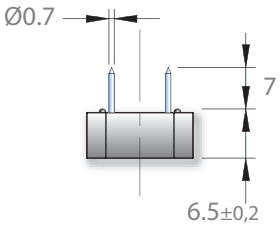
All measurements are made @ 30 cm in free air @ 21°C.
°°: standard versions, respectively SMA-21, SMA-24, SMA-30.

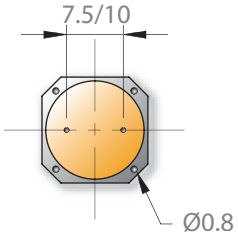
DIMENSIONS (All dimensions are in mm)

Pin version

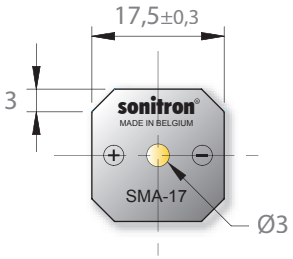
SMA-13

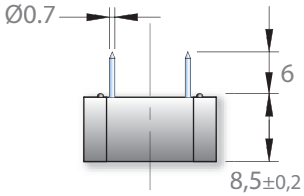


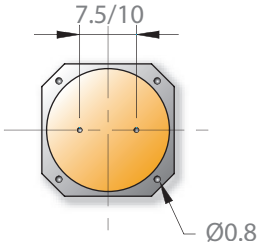




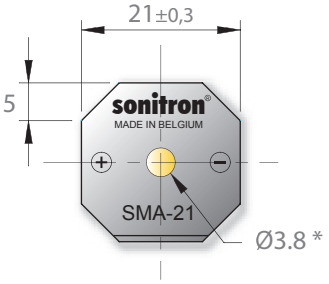
SMA-17

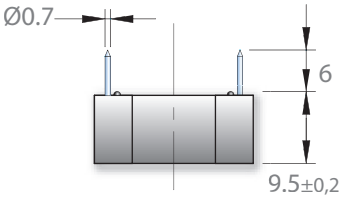


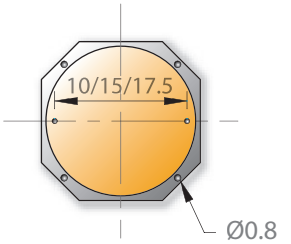




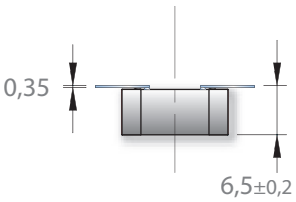
SMA-21

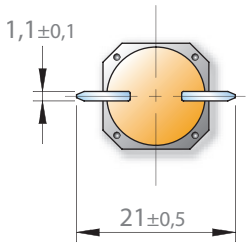




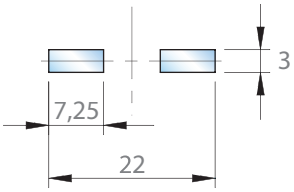


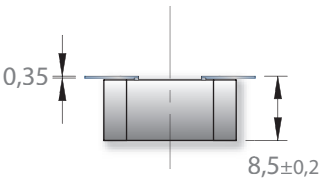
SMD version

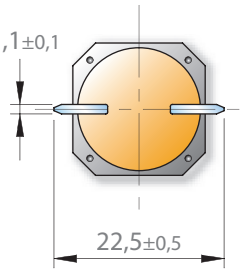




Recommended PCB lay-out







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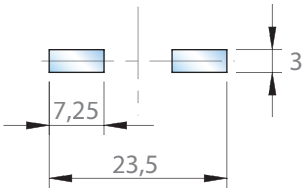
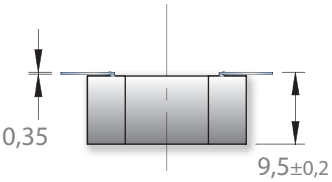
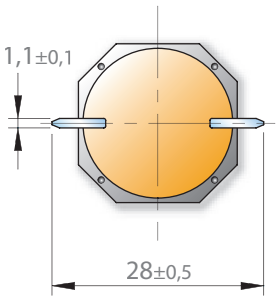
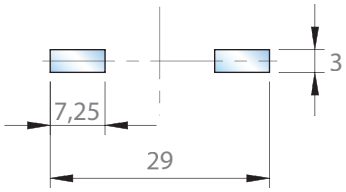






Recommended PCB lay-out

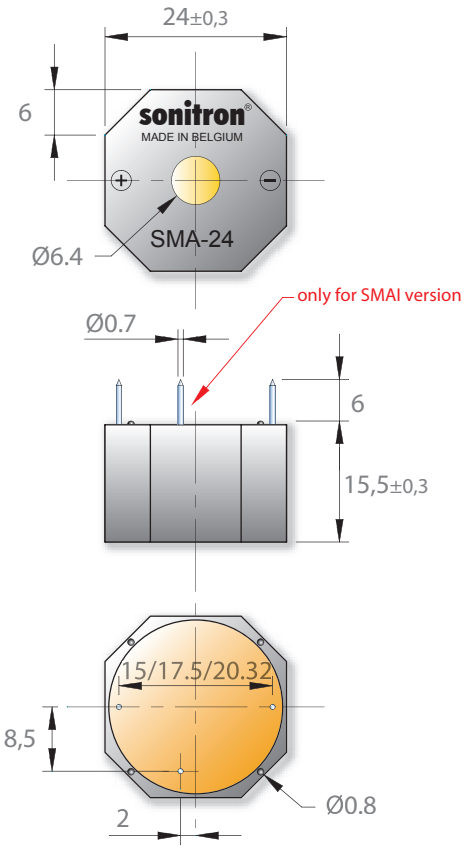


* The sound hole of SMA-21 LV has a diameter of 3 mm, whereas the other SMA-21 types have a 3,8 mm sound hole.

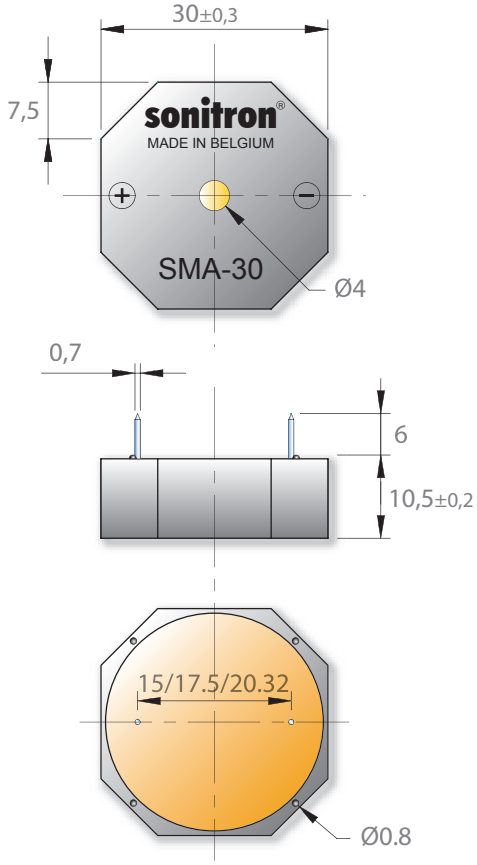
(All dimensions are in mm)

Pin version

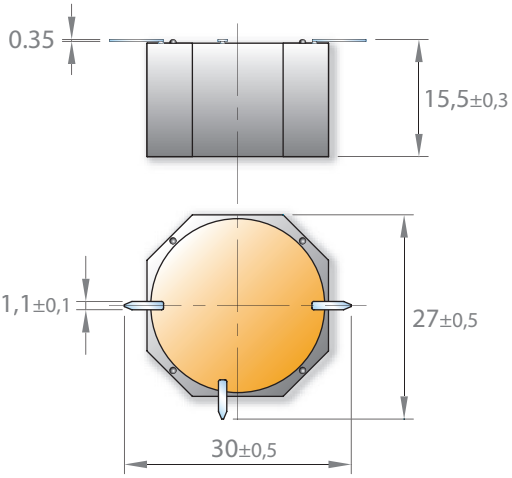
SMA-24



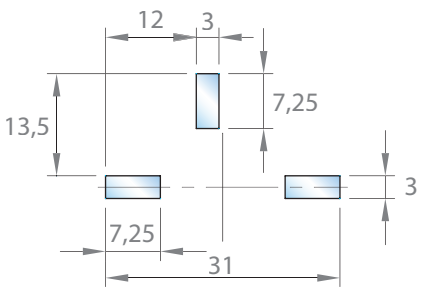
SMA-30

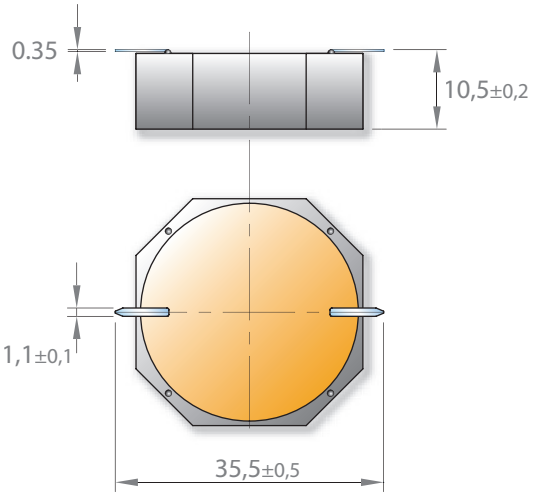


SMD version

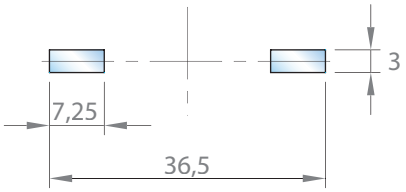


Recommended PCB lay-out





Recommended PCB lay-out



PRODUCT CODIFICATION

SMA	I -	13 17 21 24 30	L LV	C T	P7.5 P10 P15 P17.5 P20.32 S
Sonitron **M**ulti- **A**pplication	**I**ntermittent	Square diameter (mm)	**L**: Loud **LV**: Low voltage	**C**: C-MOS **T**: Transistor	**P**: Pin distance (in mm) **S**: SMD terminals

LIST OF AVAILABLE PRODUCT TYPES

Version	Standard (°°)	Loud (L)	Transistor (LT)	Low Current (LC)	Intermittent (I) (*)	Low Voltage (LV)
SMA-13 series	SMA-13 P7.5 SMA-13 P10 SMA-13 S		SMA-13LT P7.5 SMA-13LT P10 SMA-13LT S	SMA-13LC P7.5 SMA-13LC P10 SMA-13LC S		
SMA-17 series	SMA-17 P7.5 SMA-17 P10 SMA-17 S	SMA-17L P7.5 SMA-17L P10 SMA-17L S	SMA-17LT P7.5 SMA-17LT P10 SMA-17LT S	SMA-17LC P7.5 SMA-17LC P10 SMA-17LC S		
SMA-21 series	SMA-21 P10 SMA-21 P15 SMA-21 P17.5 SMA-21 S	SMA-21L P10 SMA-21L P15 SMA-21L P17.5 SMA-21L S	SMA-21LT P10 SMA-21LT P15 SMA-21LT P17.5 SMA-21LT S	SMA-21LC P10 SMA-21LC P15 SMA-21LC P17.5 SMA-21LC S		SMA-21LV P10 SMA-21LV P15 SMA-21LV S
SMA-24 series	SMA-24 P10 SMA-24 P15 SMA-24 P17.5 SMA-24 P20.32 SMA-24 S	SMA-24L P10 SMA-24L P15 SMA-24L P17.5 SMA-24L P20.32 SMA-24L S			SMAI-24 P10 SMAI-24 P15 SMAI-24 P17.5 SMAI-24 P20.32 SMAI-24 S	
SMA-30 series	SMA-30 P15 SMA-30 P17.5 SMA-30 P20.32 SMA-30 S	SMA-30L P15 SMA-30L P17.5 SMA-30L P20.32 SMA-30L S				

* When the third pin of SMAI-24 is left open, the audible signal is intermittent. When the third pin is connected to the (-), the audible signal is continuous. When the third pin is connected to the (+), there is no sound (=stop).

HEAT PROTECTION & MODELS ON REQUEST

- **A heat protection label** in capton material is glued on the SMD model of the SMA buzzer.

This enables the user to pick up the buzzer by vacuum.
During the re-flow soldering process the heat shield label remains on the buzzer and must be removed after soldering. These heat protection labels are standard for all SMD buzzers.

- **Wash tabs**

A wash tab can be glued on the sound-emitting hole of the buzzer avoiding water penetration into the cavity. To order this option: add WASH TAB to the model number of the SMA series.

- **Acryl coating**

Models containing a protective acryl coated membrane are recommended for aggressive, humid or smoggy environment. To order this option: add MC to the model number of the SMA series.

PACKAGING

All models with pin terminals are put on a polystyrene board (245 L x 245 W) and sold in boxes with dimensions 250 L x 250 W x 125 H.

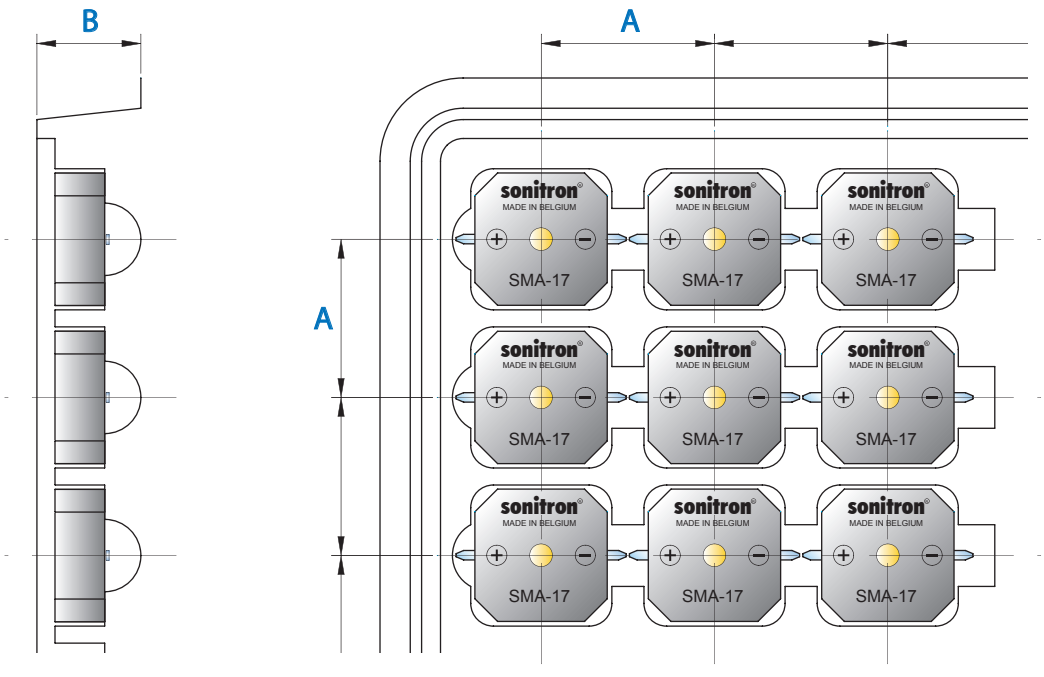
Number	SMA-13 series	SMA-17 series	SMA-21 series	SMA-24 series	SMA-30 series
per board	250	150	100	100	64
per box	(8x250) 2000	(6x150) 900	(5x100) 500	(5x100) 500	(6x64) 384

All SMD models are packed in trays (245 L x 245 W) and sold in boxes with dimensions 250 L x 250 W x 125 H.

Number	SMA-13 S	SMA-17 S	SMA-21 S	SMA-24 S	SMA-30 S
per board	100	81	49	42	25
per box	(9x100) 900	(8x81) 648	(7x49) 343	(5x42) 210	(6x25) 150

Dimensions of the tray and position of the SMD components:

Model	A	B
SMA-13 series	22 mm	16 mm
SMA-17 series	24 mm	18 mm
SMA-21 series	30 mm	16.7 mm
SMA-24 series	35 mm	22.6 mm
SMA-30 series	36 mm	19 mm



SMAT SERIES

The SMAT transducers are specifically developed to meet various requirements, such as loud sound pressure level, mounting methods, connection possibilities and dimensions. The transducers do not have a built-in oscillator. The drive frequency must be generated with electronics outside the transducer. Recommended drive circuits are described in this catalogue. Our transducers produce a highly reliable audible tone signal, giving either an extremely clear and penetrating tone or a soft sound for non-aggressive signals. They are available in five sizes: 13mm, 17mm, 21mm, 24mm and 30mm.

ADVANTAGES & APPLICATIONS

ADVANTAGES :

- Octagonal form
- Models with different pin pitches
- Light but solid construction
- Not fixed working frequency
- Easily mountable
- SMAT-13 and SMAT-17 for limited space applications
- SMD models with heat resistant labels for protection during re-flow soldering
- Automatic pick & place

APPLICATIONS :

- Alarms
- Gas & metal detectors
- Measuring & weighing equipment
- Medical instrumentation
- Timers & clocks
- Instrumentation & control systems
- Copiers
- Automobiles & trucks
- Games & toys
- Cash registers

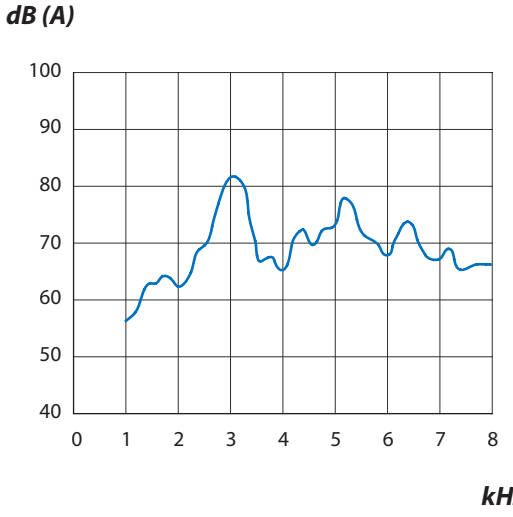
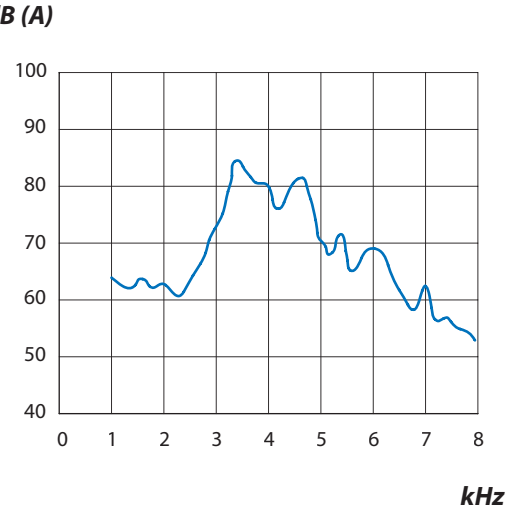
SPECIFICATIONS

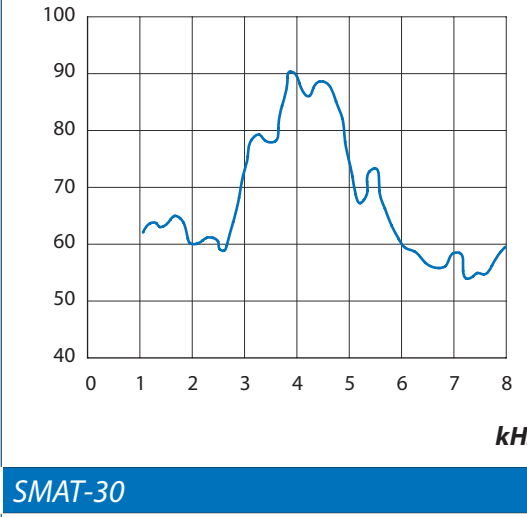
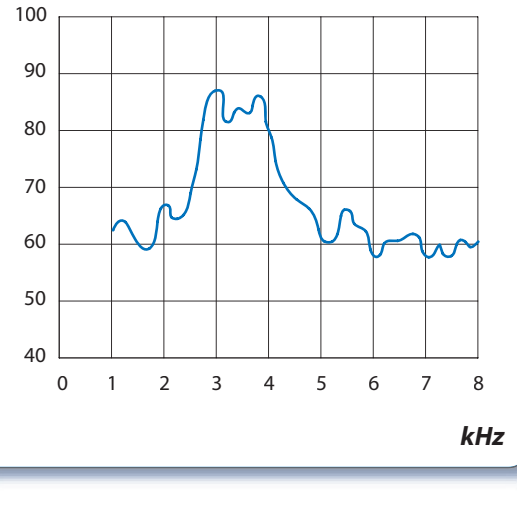
Model	SPL * (dB(A))	Frequency Range (Hz)	Capacitance (+/-30%) nF)	Operating voltage (VAC pp)	Weight (g)
SMAT-13	See graph	800-5000	7.8	0 to 30	1
SMAT-17	See graph	800-5000	17.5	0 to 30	2
SMAT-21	See graph	600-5000	12.4	0 to 30	2.5
SMAT-24	See graph	400-5000	18.6	0 to 30	4
SMAT-30	See graph	300-5000	25	0 to 30	5

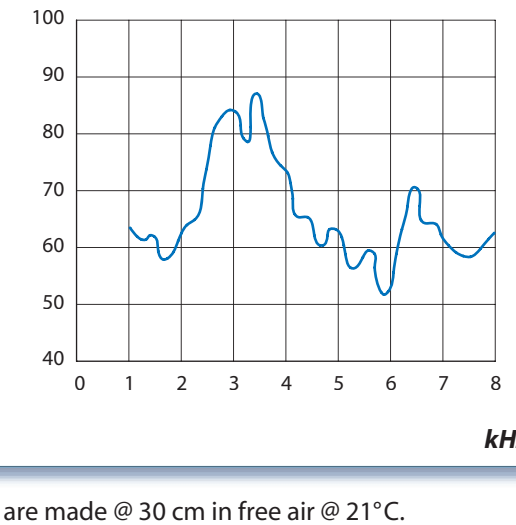
Operating temperature	-20°C to +70°C
Storage temperature	-40°C to +85°C
Life time (@ 21°C)	See expected life time curve in addendum
Case material	ABS (UL rating: 94 HB) for pin-versions, SMAT-13/21/30 PBT (UL rating: 94 HB) for pin versions, SMAT-17/24 PPS (UL rating: 94 V0/5V) for SMD-versions, SMAT-13/17/21/24/30
Standard colour of case	Grey

* All measurements are made in free air @ 21°C @ 30 cm @10 Vpp (square wave). The test buzzer is soldered on a pcb board with dimensions of 24 cm x 11 cm.

ELECTRICAL PARAMETERS

Model	SMAT-13	SMAT-17
Sound pressure vs. frequency		

Model	SMAT-21	SMAT-24
Sound pressure vs. frequency		

Model	SMAT-30
Sound pressure vs. frequency	

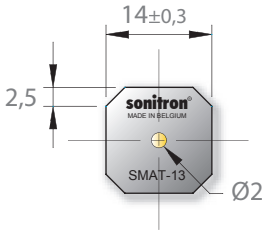
Precision of frequency: +/- 15%
Operating voltage: 10 Vpp
(square wave)

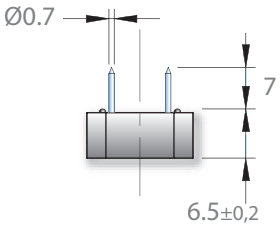
All measurements are made @ 30 cm in free air @ 21°C.

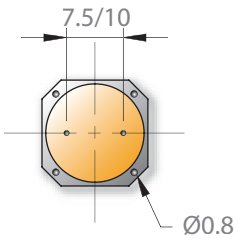
DIMENSIONS (All dimensions are in mm)

Pin version

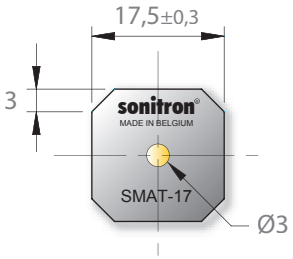
SMAT-13

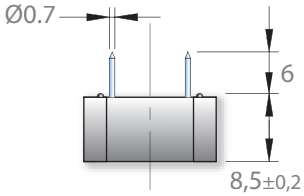


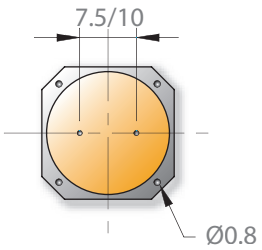




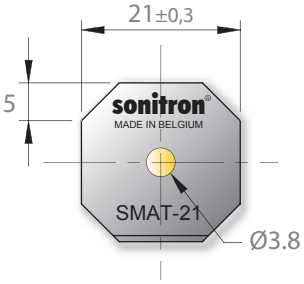
SMAT-17

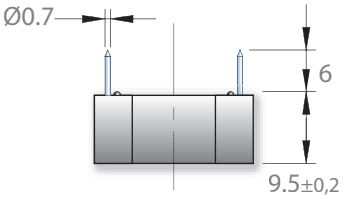


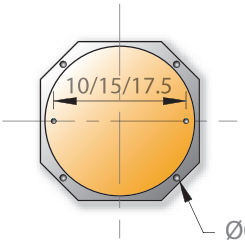




SMAT-21

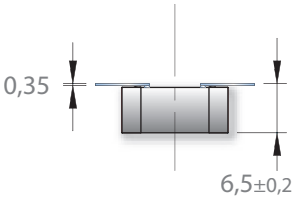


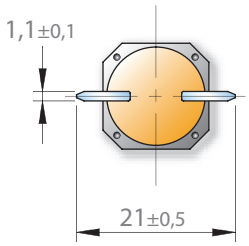




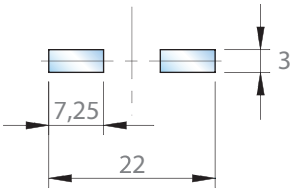
SMD version

SMAT-13

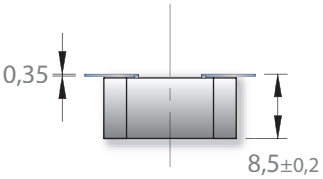


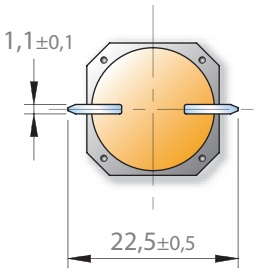


Recommended PCB lay-out

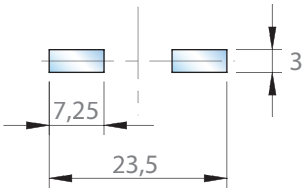


SMAT-17

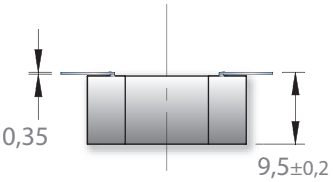


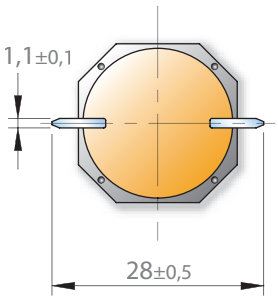


Recommended PCB lay-out

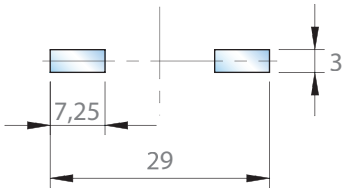


SMAT-21





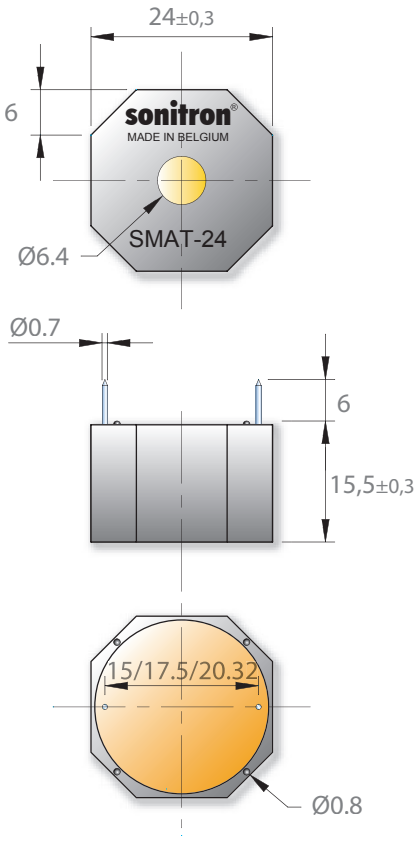
Recommended PCB lay-out



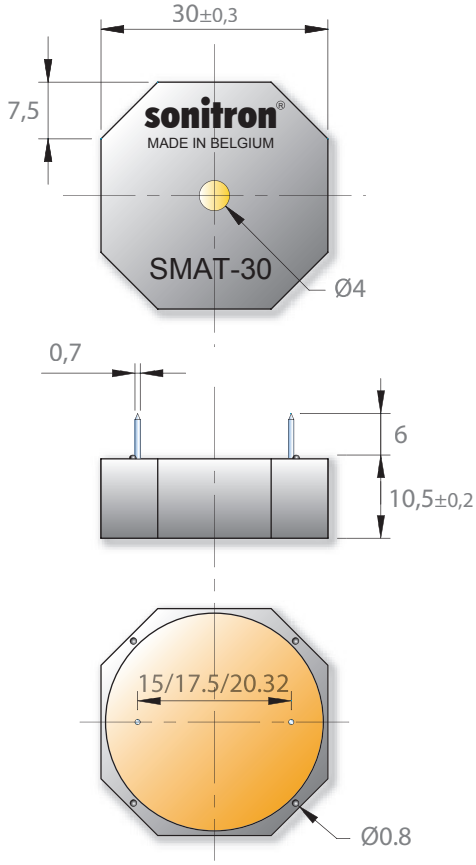
(All dimensions are in mm)

Pin version

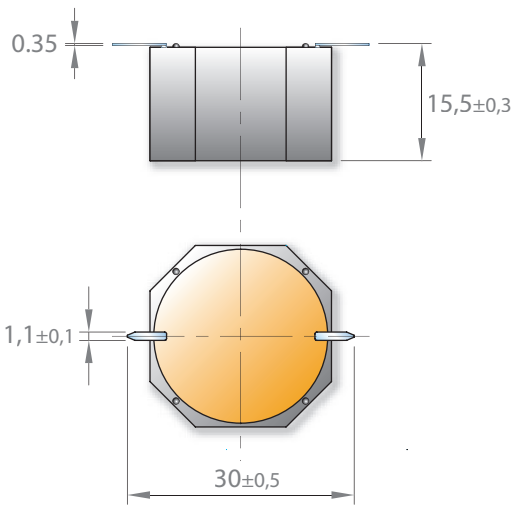
SMAT-24



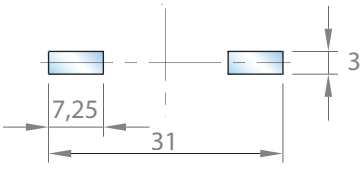
SMAT-30

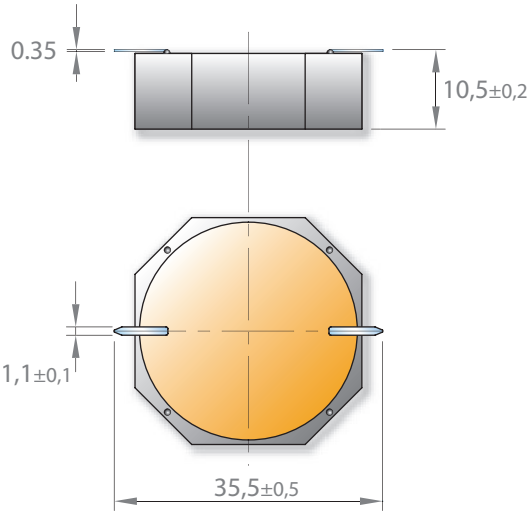


SMD version

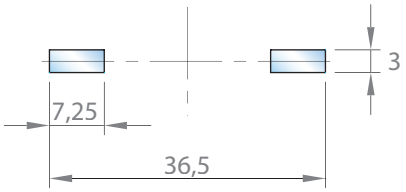


Recommended PCB lay-out



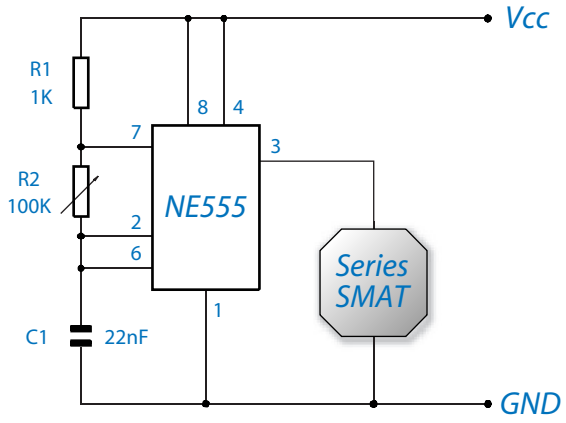


Recommended PCB lay-out

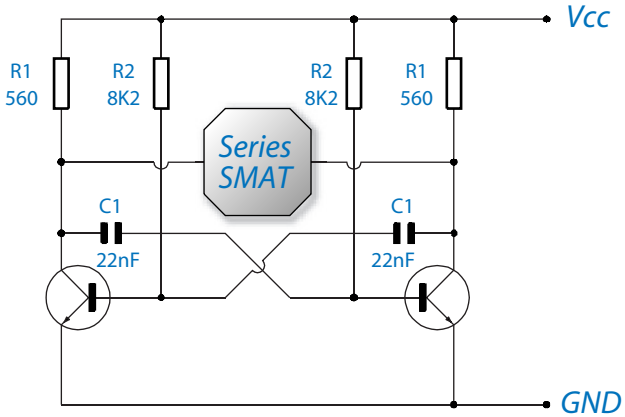


DRIVE CIRCUITS

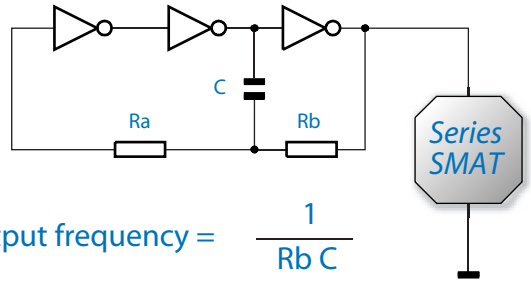
IC Oscillation Circuit



Multivibrator Circuit



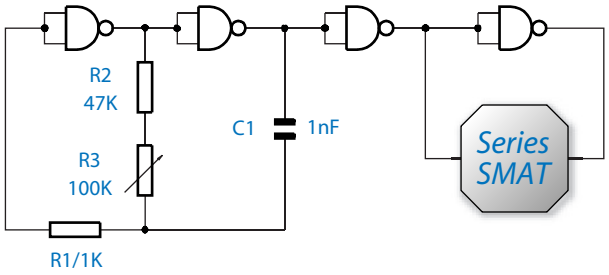
Inverter Oscillator



$$\text{Output frequency} = \frac{1}{Rb\ C}$$

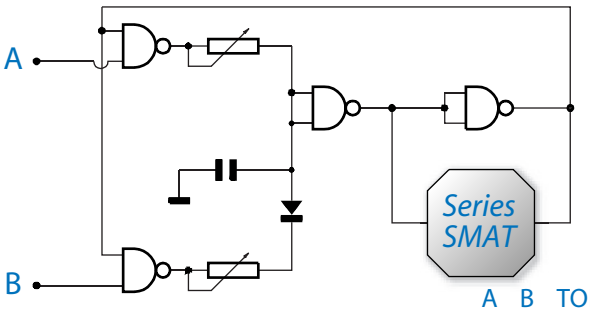
Inverters are CMOS 4049 or 4069

Nandgate Oscillator



Nandgates are CMOS 4011A

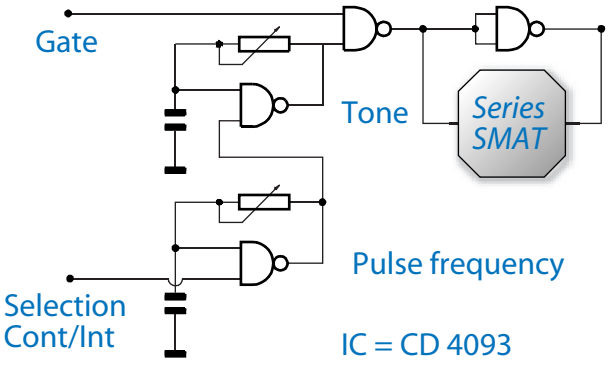
5 Nandgate Oscillator - 3 tones



IC = 4093
2 mA @ 12 Vdc (in use)

A	B	TONE
L	L	
H	L	1
L	H	2
H	H	3

Tone Generator - CMOS - Gate Multifunction



IC = CD 4093

When the transducers are used in a drive circuit at one single frequency, the designer should bear in mind that the precision of the frequency, as mentioned on the graph "sound pressure vs. Frequency" is +/- 15%. We therefore recommend to test the sound pressure level with the transducer connected to the final drive circuit.

PRODUCT CODIFICATION

SMA	T	13 17 21 24 30	P7.5 P10 P15 P17.5 P20.32 S
Sonitron **M**ulti- **A**pplication	**T**ransducer	Square diameter (mm)	**P**: Pin distance (in mm) **S**: SMD terminals

LIST OF AVAILABLE PRODUCT TYPES

SMAT-13 P7.5 SMAT-13 P10 SMAT-13 S	SMAT-17 P7.5 SMAT-17 P10 SMAT-17 S	SMAT-21 P10 SMAT-21 P15 SMAT-21 P17.5 SMAT-21 S	SMAT-24 P10 SMAT-24 P15 SMAT-24 P17.5 SMAT-24 P20.32 SMAT-24 S	SMAT-30 P15 SMAT-30 P17.5 SMAT-30 P20.32 SMAT-30 S

HEAT PROTECTION & MODELS ON REQUEST

- **A heat protection label** in capton material is glued on the SMD model of the SMAT buzzer.

This enables the user to pick up the buzzer by vacuum.
During the re-flow soldering process the heat shield label remains on the buzzer and must be removed after soldering. These heat protection labels are standard for all SMD buzzers.

- **Wash tabs**

A wash tab can be glued on the sound-emitting hole of the buzzer avoiding water penetration into the cavity.
To order this option: add WASH TAB to the model number of the SMAT series.

- **Acryl coating**

Models containing a protective acryl coated membrane are recommended for aggressive, humid or smoggy environment.
To order this option: add MC to the model number of the SMAT series.

PACKAGING

All models with pin terminals are put on a polystyrene board (245 L x 245 W) and sold in boxes with dimensions 250 L x 250 W x 125 H.

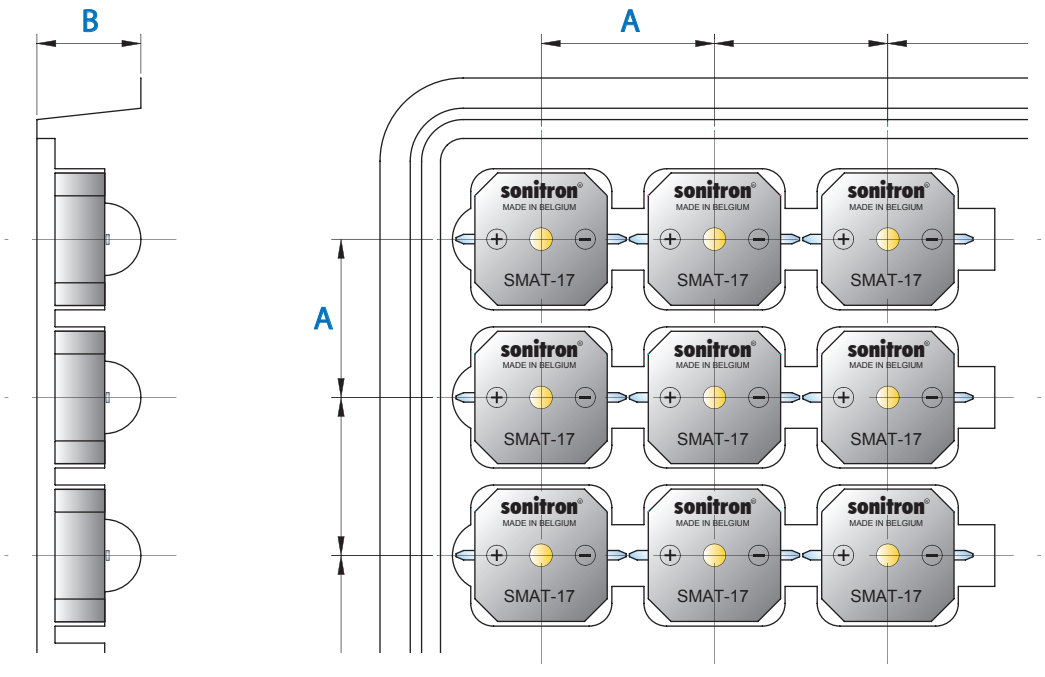
Number	SMAT-13 series	SMAT-17 series	SMAT-21 series	SMAT-24 series	SMAT-30 series
per board	250	150	100	100	64
per box	(8x250) 2000	(6x150) 900	(5x100) 500	(5x100) 500	(6x64) 384

All SMD models are packed in trays (245 L x 245 W) and sold in boxes with dimensions 250 L x 250 W x 125 H.

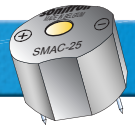
Number	SMAT-13 S	SMAT-17 S	SMAT-21 S	SMAT-24 S	SMAT-30 S
per board	100	81	49	42	25
per box	(9x100) 900	(8x81) 648	(7x49) 343	(5x42) 210	(6x25) 150

Dimensions of the tray and position of the SMD components:

Model	A	B
SMAT-13 series	22 mm	16 mm
SMAT-17 series	24 mm	18 mm
SMAT-21 series	30 mm	16.7 mm
SMAT-24 series	35 mm	22.6 mm
SMAT-30 series	36 mm	19 mm



SMAC-SERIES



Piezo acoustic components are more and more used in small portable equipment and as a critical alerting device. Reliability must be very high in the most difficult environmental circumstances, such as extreme and varying temperatures, vibrations, shocks, dust conditions, humid environment etc. The SMAC-25 buzzer, manufactured with over 30 years of experience in the field of piezo acoustic technology, is a very stable buzzer with a lifetime of more than 1000 hours in continuous use. In these small dimensions, the SMAC-25 is actually the best available piezo alarm for life supporting systems.

ADVANTAGES & APPLICATIONS

ADVANTAGES :

- Electronics included
- Rounded octagonal shape – new design !
- PCB mounting (pin version)
- Shock, dust & waterproof (IP67)
- Produces a high reliable, clear and penetrating sound
- Light but solid construction
- Low power consumption
- Easily mountable
- Low cost compared to quality

APPLICATIONS :

- Alarms
- Monitoring & test equipment
- Trucks & automobiles
- Boats & airplanes
- Signalization & process control equipment
- Fire detectors
- Battery powered handheld devices
- Gas detectors
- Life support systems
- Control instrumentation & systems
- Intensive care systems

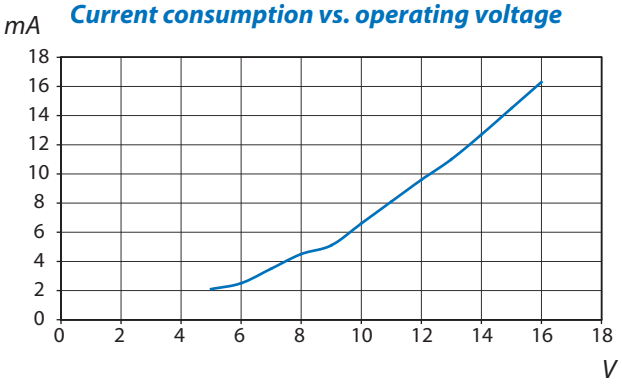
SPECIFICATIONS

Operating voltage:	5/16Vdc
Operating current:	9.7mA @ 12Vdc
Frequency:	3.35kHz ±15%
Sound pressure level:	93.5 dB (A) @12Vdc @ 30 cm
Tone:	continuous
Life time:	>1000 hours @ 21°C @12Vdc (free air) mounted on print
Terminals:	pins (tinned brass)
Operating temperature:	-20°C to +70°C
Storage temperature:	-40°C to +85 °C
Case material:	PBT (UL rating: 94 HB)
Case color:	grey
Weight:	7.8 g

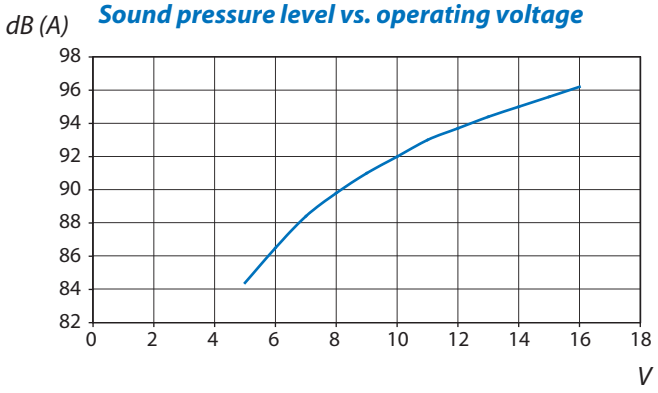
* All measurements are made in free air @ 21°C @ 30 cm @ 12 Vdc.
The test buzzer is soldered on a PCB board with dimensions of 24 cm x 11 cm.

ELECTRICAL PARAMETERS

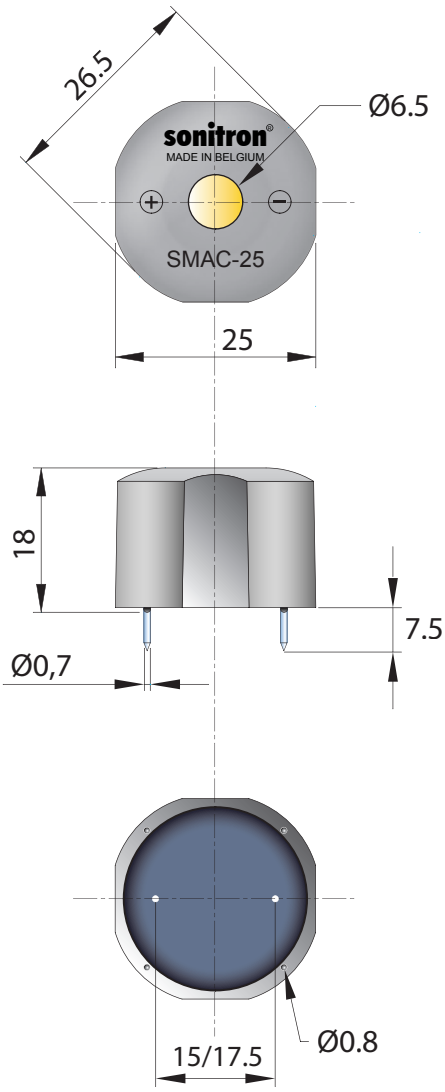
Current consumption vs. operating voltage

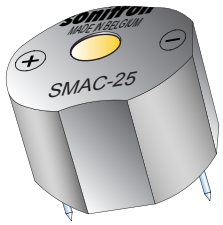


Sound pressure level vs. operating voltage



DIMENSIONS (All dimensions are in mm)





Pin material: tinned brass
Case material: grey PBT

Tolerance: +/-0.2 mm

PRODUCT CODIFICATION

SMAC -	25	P
Sonitron Multi Application Cup	Square diameter (mm)	P15: pin distance 15 mm P17.5: pin distance 17.5 mm

LIST OF AVAILABLE PRODUCT TYPES

SMAC-25-P15
SMAC-25-P17.5

MODELS ON REQUEST

The SMAC series is available, on special request, with the following protection:

- **Wash tabs**

A wash tab is glued on the sound-emitting hole of the buzzer avoiding water penetration into the cavity.
To order this option: add WASH TAB to the model number of the SMAC series.

- **Acryl coating**

Models containing a protective acryl coated membrane are recommended for aggressive, humid or smoggy environment.
To order this option: add MC to the model number of the SMAC series.

PACKAGING

The SMAC-25 buzzers are packed on a polystyrene board (245 L x 245 W) and sold in boxes with dimensions of 250 L x 250 W x 125 H.

SMAC-25	
per board	81
per box	(5x81) 405

SMB SERIES

INTRODUCTION

Audible signals are part of our daily life. More sophisticated and distinctive functions are required for industrial purposes. The choice of the frequencies is simply done by changing the capacitor value in a C-MOS driven circuit.
Our SMB-series (multi-frequency buzzers) offer the possibility to program several different frequencies. These audible signals with multi-frequency programmability will become an important component that must be considered in every design of equipment, machines, household equipment, computers, communication equipment, control panels, etc.

ADVANTAGES & APPLICATIONS

ADVANTAGES :

- Low cost
- Solid state reliability
- No EMC
- Very low current consumption
- Panel and PCB mountable
- Free programmable
- Easy integration in existing circuits
- Small dimensions
- Thin profile

APPLICATIONS :

- Automobiles & trucks
- Trains
- Office equipment
- Telephone equipment
- Toys & games
- Clocks & timers
- Alarms
- Instrumentation
- Control panels
- Medical equipment
- Video conference system
- Answering machine
- Automatic door

SPECIFICATIONS

All three multi-frequency buzzers have several peak frequencies, either producing alerting tones at high frequencies or soft signals at low frequencies down to 100 Hz (see the typical application description). The diversity in use of the three models is limited only by your imagination. The current consumption is extremely low and starts @ only 100 µA with a maximum of 4.8 mA @ maximum 15 Vdc.

Model	SPL (dB(A)	Frequency (±15%Hz)	Peak frequencies SPL **	Operating voltage (Vdc)	*Operating current (mA)	Weight (g)
SMB-17CC	See graph	See graph	2250 Hz-79 dB(A) 1670 Hz-71 dB(A) 785 Hz-69 dB(A) 325 Hz-64 dB(A)	1.5 to 15	0.2 to 1.4	2
SMB-32CC	See graph	See graph	2250 Hz-76 dB(A) 1260 Hz-89 dB(A) 785 Hz-68 dB(A) 325 Hz-66 dB(A)	1.5 to 15	0.2 to 2.7	8

Operating temperature	-40°C to +85°C
Storage temperature	-40°C to +85°C
Life time (@ 21°C)	See life time cycle in addendum
Case material	PBT (UL rating: 94 HB) for pin-versions PPS (UL rating: 94 V0/5V) for SMD-versions
Standard colour of case	Black

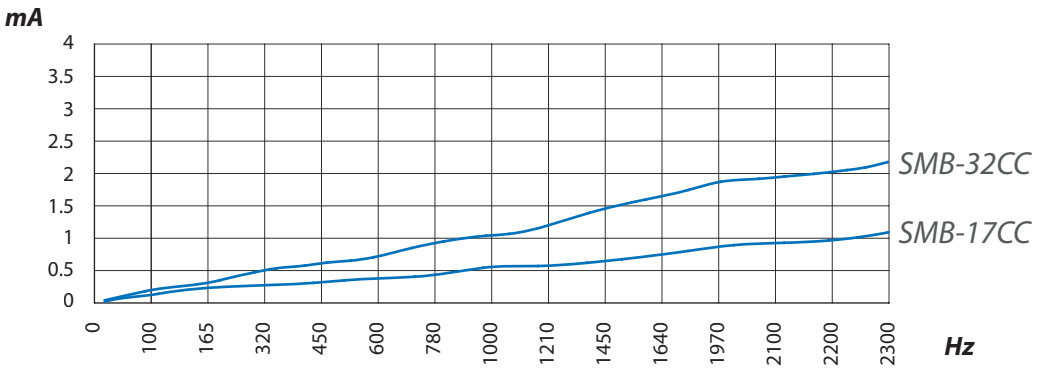
* The current consumption decreases when the frequency is lowered. See graph 'Current consumption vs. Frequency'.

** The given sound pressure values are measured @ 12 Vdc @ 30 cm distance in free air and have an accuracy of ±15%. Default factory setting of the SMB models: continuous tone

ELECTRICAL PARAMETERS

Current consumption vs. frequency

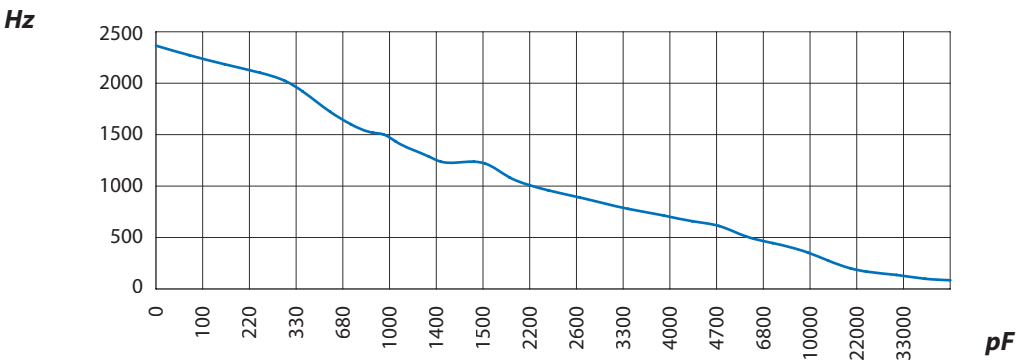
SMB-17CC
SMB-32CC



All measurements are made in free air @ 21°C @ 30 cm @ 12 Vdc.

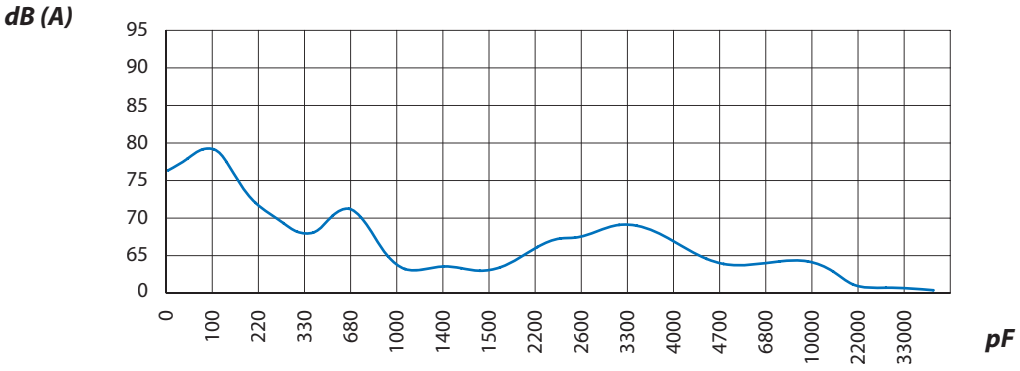
Frequency vs. external capacitor (c)

SMB-17CC
SMB-32CC

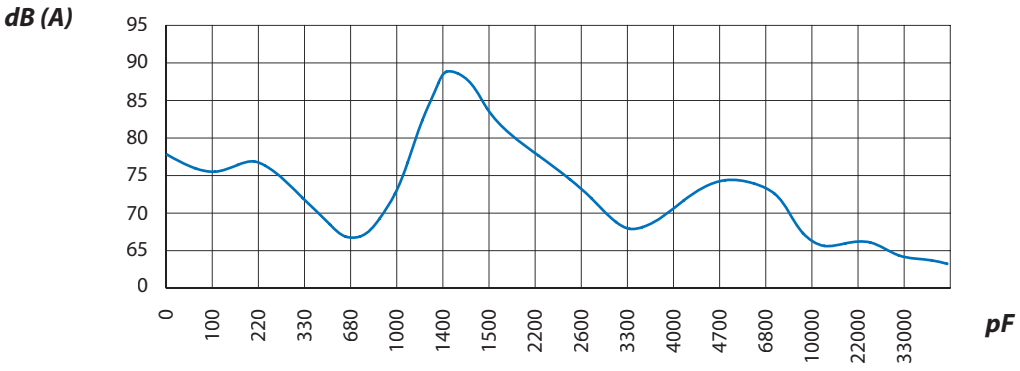


Sound pressure level vs. external capacitor (c)

SMB-17CC



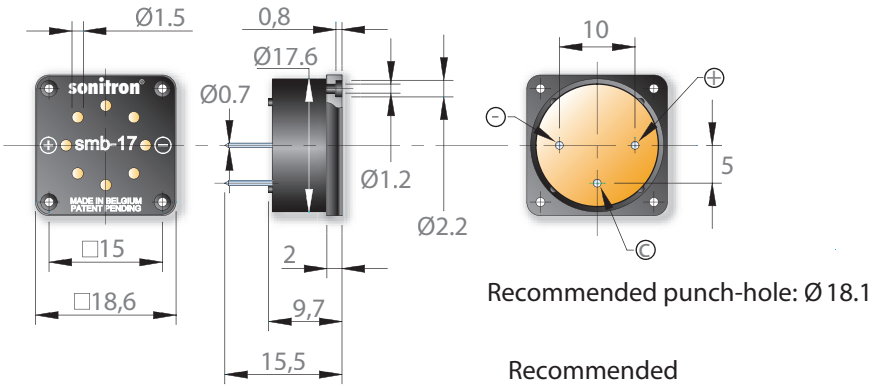
SMB-32CC



All measurements are made in free air @ 21°C @ 30 cm @ 12 Vdc.

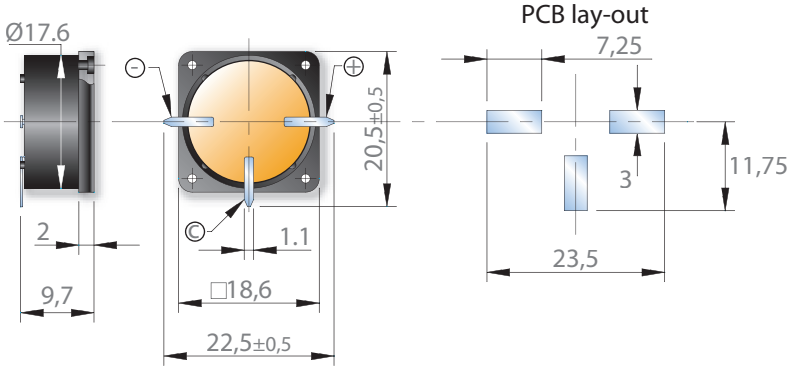
DIMENSIONS (All dimensions are in mm)

SMB-17 CC P10

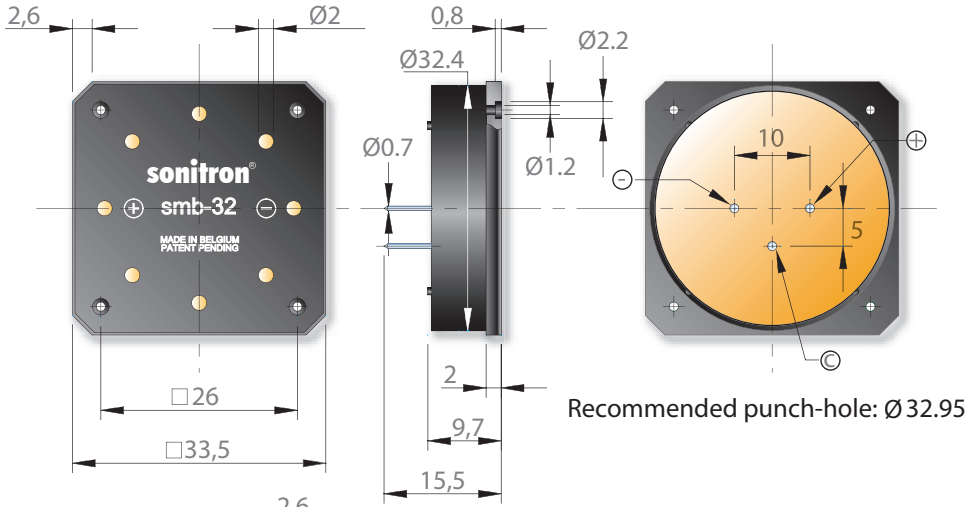


Recommended punch-hole: Ø 18.1

SMB-17 CC S

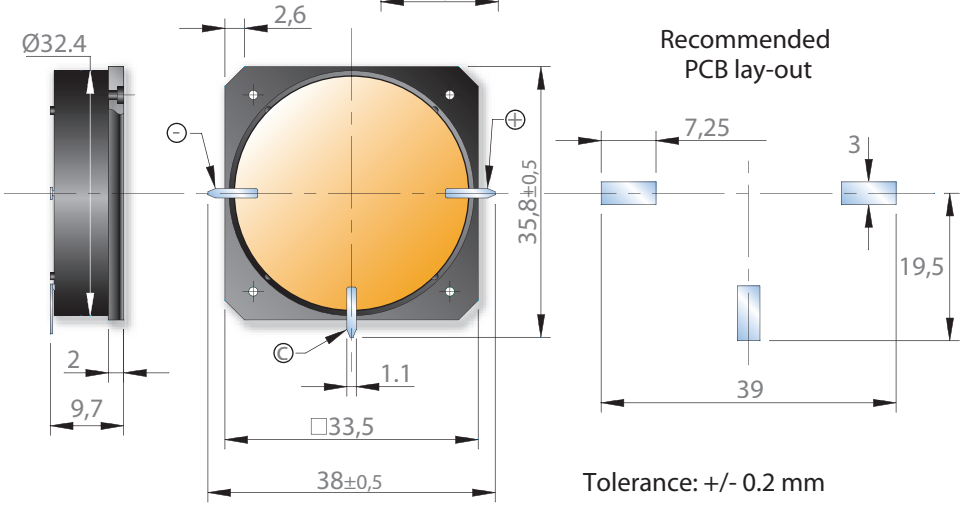


SMB-32 CC P10



Recommended punch-hole: Ø 32.95

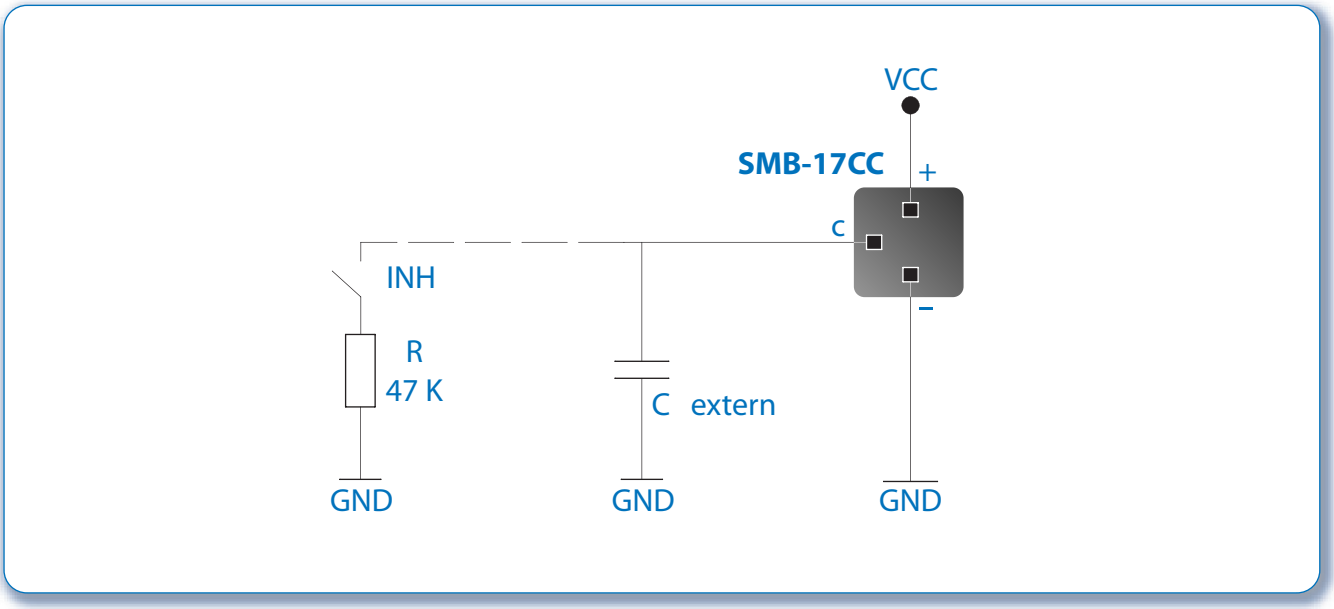
SMB-32 CC S



Tolerance: +/- 0.2 mm

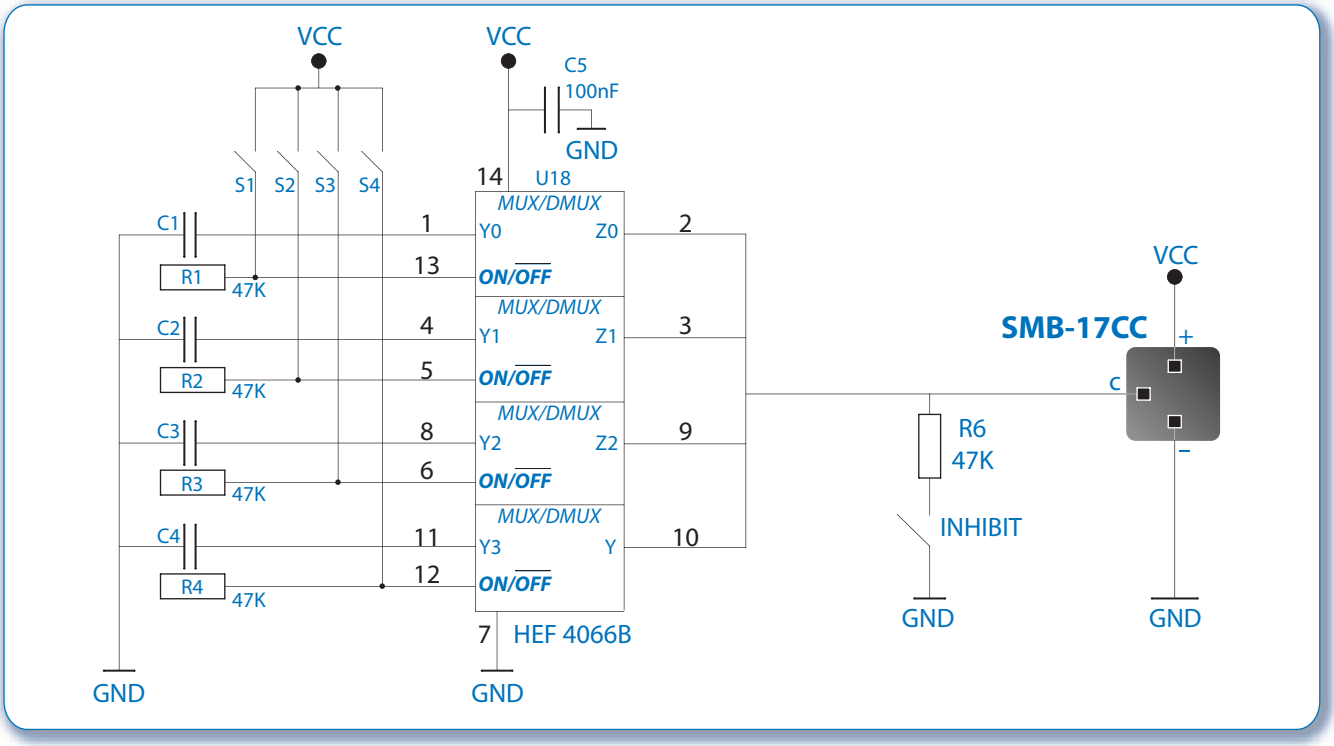
WORKING PRINCIPLE

In order to realise different frequencies with the SMB multi-frequency buzzers, the customer should simply connect a capacitor between the control pin and the ground. It is also possible to disable the SMB, by putting a resistor (47K) to the ground (INHIBIT).



TYPICAL APPLICATION DESCRIPTION

With the circuit shown below, 16 possible frequencies can be generated. The values of C1, C2, C3, ... with their respective frequencies are given in the graph 'Frequency vs. external capacitor'.



This typical application description is not limited to the typical components we have illustrated. Many other possibilities exist to select and switch the capacitors and/or the resistor.

PRODUCT CODIFICATION

SMB ↓ **S**onitron **M**ulti-Frequency **B**uzzer	17 32 ↓ Square diameter (mm)	C ↓ **C**-MOS	C ↓ **C**ontrol pin	P10 S ↓ **P**: Pin distance (in mm) **S**: SMD terminals

LIST OF AVAILABLE PRODUCT TYPES

SMB-17CC P10 SMB-17CC S	SMB-32CC P10 SMB-32CC S

PACKAGING

All multi-frequency buzzers with through hole pins, are packed on a polystyrene board (245 L x 245 W) and sold in boxes with dimensions of 250 L x 250 W x 125 H.

Number	SMB-17CC P10	SMB-32CC P10
per board	100	49
per box	(5x100) 500	(5x49) 245

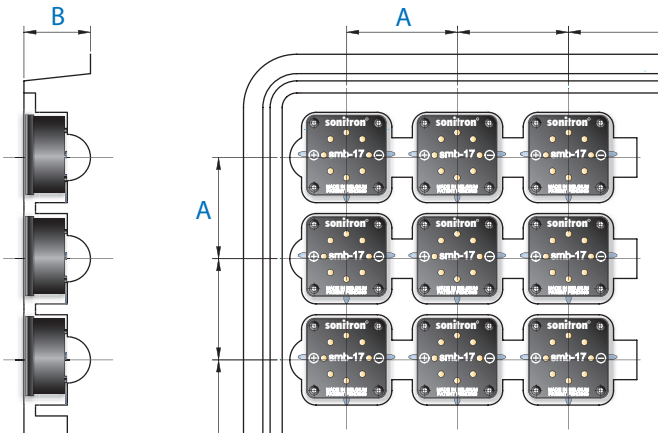
All SMD models are packed in trays (245 L x 245 W) and sold in boxes with dimensions of 250 L x 250 W x 125 H.

Number	SMB-17CC S	SMB-32CC S
per tray	49	25
per box	(8x49) 392	(6x25) 150

Dimensions of the tray and position of the SMD components of the models SMB-17CC S and SMB-32CC S are illustrated below:

SMB-17CC S: A=30 mm B=20 mm

SMB-32CC S: A=40 mm B=25 mm



ADDENDUM

CONSIDERATIONS ABOUT SOUND

Loudness

The loudness of a sound perceived by the human ear at a certain location depends on several factors, such as: distance from the source, frequency of the sound, strength of the source, ear sensitivity, conditions of the air etc.

Frequency

The human ear is more sensitive to frequencies between 2000 and 5000 Hz. This is why the operating frequency of alerting piezo buzzers is essentially chosen for this range. The human ear has a logarithmically response to sound pressure, of which the unity is expressed in decibels (dB). The sound pressure level is measured with an audiometer; an instrument developed in order to give an objective indication to sound pressure. The frequency response of this instrument is corrected by a weighing curve to match the characteristics of the human ear. The type of the weighing curve is indicated by the symbol (A) that gives the indication dB(A).

Sound pressure level and distance from the source

In a free progressive spherical sound wave the sound pressure drops by 6 dB each time the measuring distance is doubled. This condition only exists a number of wavelengths away from the source and if the source radiates spherical waves.

Sound character

The character of a sound is determined by the harmonic content, the amplitude relation between the harmonics for a steady signal when the signal varies the rate of attack and decay, and the presence of resonance.

Pulsating sounds

The human ear is particularly sensitive to changes in condition. Switching on and off a sound makes it more attention-getting than a continuous sound of the same frequency. Shifting the frequency in a rapid rate produces a similar effect.

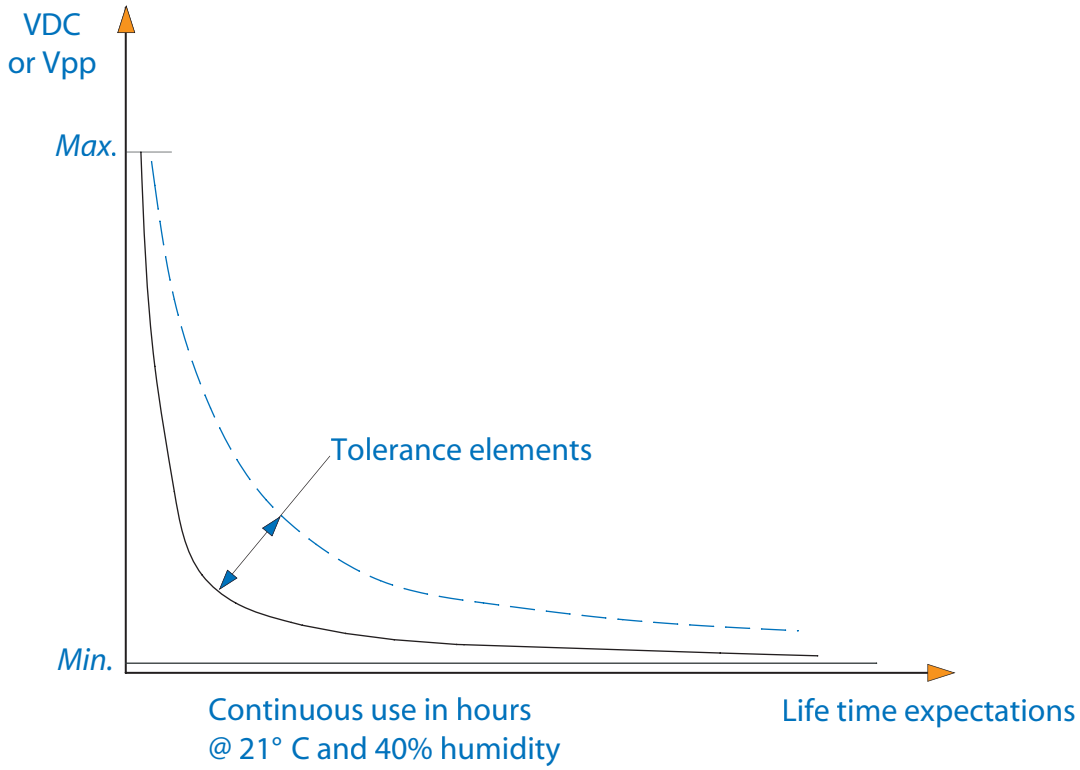
Pulsating frequency

When a pulsed sound source is placed in a reverberant room, reflections tend to fill up the pauses between the pulses. In a large, highly reverberant room, longer pauses are necessary to produce the desired effect: a slow pulsing sound source should be used.

EXPECTED LIFE TIME

The lifetime of our audible components depends on many different factors and is impossible to determine exactly. We therefore publish the expected minimum lifetime measured under specific circumstances and environmental conditions.
If customers need lifetime expectations under other circumstances, we request them to ask for our instructions before performing their own lifetime tests in order to save time and exclude wrong conclusions.
Claims will only be examined and taken into account on condition that guidelines and instructions below have been strictly applied.

Working voltage or drive signal versus expected life time:



The relationship between working voltage and expected life time is one of the prime factors on which life time depends. The curve follows an asymptotic function, strongly depending on tolerance elements published by the suppliers of several basic materials and working environmental conditions.

The expected life time of our different series is defined as follows:

- T ambient: 21°C; humidity: 40%; free air
- Voltage : see below
- Mounted as described in our catalogue

Standard series:

- mounted on panel
- working @ 12 Vdc in continuous use
- life expectations: min. 2000 hours
- The SXLC515C, SXLI515C1, SXLW515C and SXLP515C series have a minimum life time of 9 hours

SMA series:

- mounted on PCB
- working @ 12 Vdc in continuous use; L-version working @ 6 Vdc
- life expectations: min. 100 hours
- The SMA-21LV (PIN/SMD) working @ 3 Vdc in continuous use: min. 24 hours
- All tests are made @ 20°C

SMAT series

- mounted on PCB
- working @12 Vpp in continuous use at resonance frequency, tested on maximum sound pressure (eg. SMAT-21 @ 3.75 kHz).
- life expectations: min. 1000 hours

SMAC series

- mounted on PCB
-working @12 Vdc in continuous use.
-life expectations: min. 1000 hours

Remarks:

- Please contact our customer service for information and our recommendations before making life time tests at voltages exceeding the above-mentioned levels per series.
- Sonitron reserve the right to make modifications without pre-announcement to their materials, raw materials, specifications, configurations and prices.
- Applications in this catalogue are indicative and it is the responsibility of the customer to make the necessary tests with our products in order to meet the required specifications.
- If you need further information concerning product selection, performances, life time expectations and environmental situations, please contact us.
- The use of Sonitron products, as critical components in life support systems, is not authorised without the explicit written approval by Sonitron.
- If our Products are used as a critical component (final alarms in life support system), we recommend a model especially adapted to the customers' special test requirements.

SOLDERING INSTRUCTIONS WARNING !!!

IMPORTANT REMARK:

Our products are heat sensitive products. By overheating the air inside the buzzer, silver migration can occur and solder points can be destroyed.
Depolarisation of the membrane might occur if the internal buzzer temperature exceeds 210 °C.
To avoid damage to our products, the following instructions and recommendations for maximum time and temperature must be respected during soldering:

Wave Soldering.

Typical settings:
Preheat temperature:100 °C
Solder bath temperature 250 (lead)/265 °C (lead-free alloy).
Wave soldering cycle time: 4 sec. (single wave), 6 sec. (dual wave).

Typical settings:Figure1.

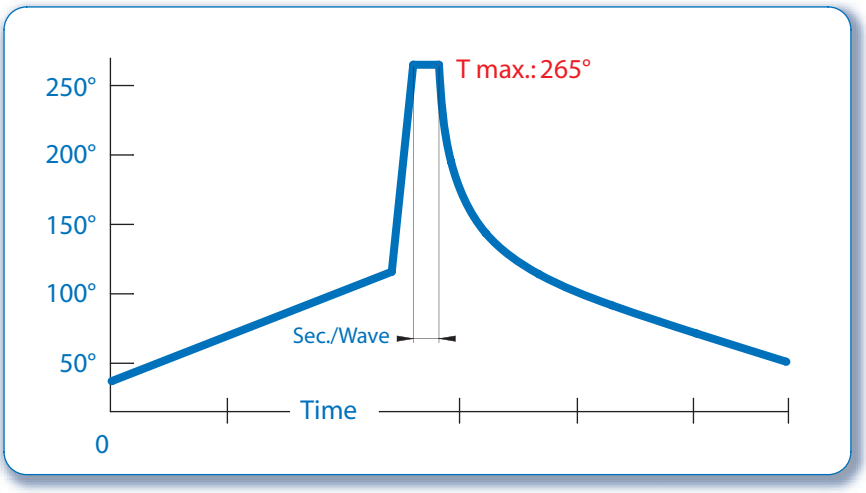


Figure 1.

Vapor Phase Soldering

Sonitron products are not suitable to be used in a vapour phase soldering process

Manual Soldering (soldering by hand)

Typical equipment settings:

-270/350 °C (lead(pb) alloys,e.g. Sn60Pb40). 50w Soldering Iron.
-285/380 °C (Lead –free alloys)e.g.. SAC305,or 96SC). 80w Soldering Iron.

Note:Temperatures may vary depending on the equipment used.

Reflow Soldering.

The SMD (PPS material) version of the Sonitron buzzers are suitable to be used in a reflow soldering process. However, the temperature of the buzzer enclosure ***should not exceed 210 °C.*** We do not recommend the use of Sonitron SMD products in a lead-free reflow process due to the risk of causing damage to internal components. A typical reflow soldering profile is displayed in Figure A1.

Note: Settings may vary depending on machine type and materials used.

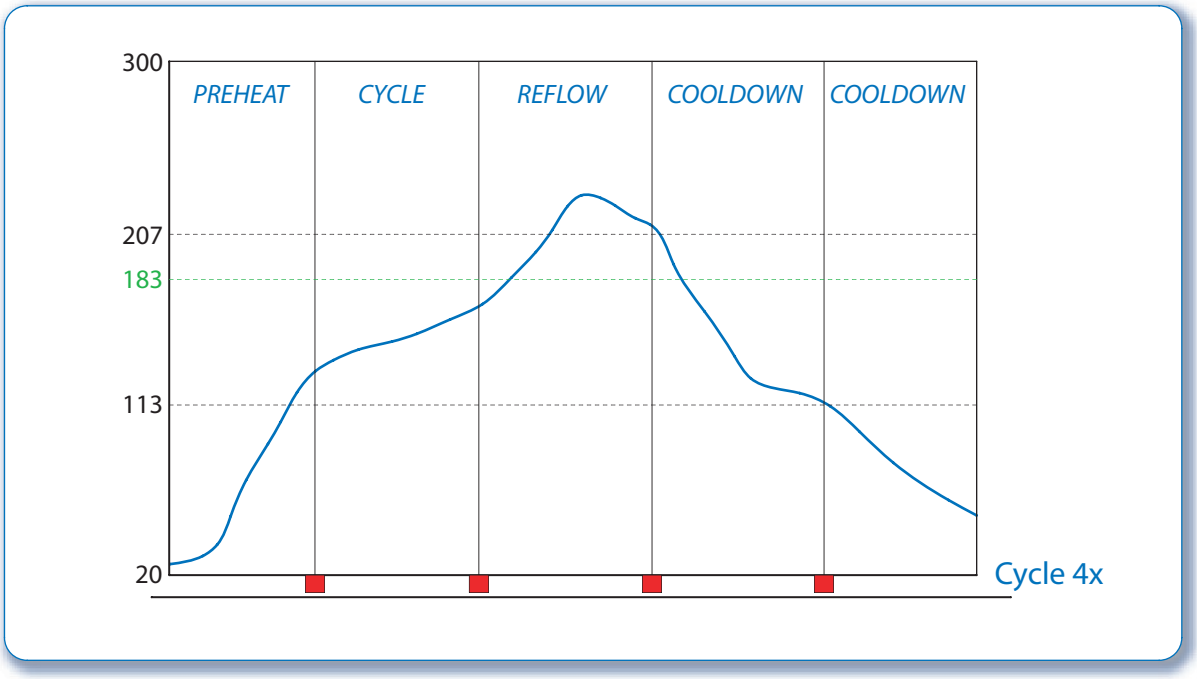


Figure A1

Infrared soldering method:

Maximum temperature of 175°C during 4 minutes or maximum temperature of ***210°C during 30 seconds*** may not be exceeded.

Remark:

1. All our speaker models can be provided with through hole terminals or flat SMD terminals. The SMD models cannot be soldered in a lead-free soldering process. These components must be soldered manually.
2. Buzzers with through hole terminals can only withstand high temperatures (up to 200 °C environmental temperature) when provided with a heat resistant PPS housing. This has to be explicitly mentioned on the order form.

Solder-paste:

Use ***solder paste with 2% silver*** content, a typical formulation is 62Sn36Pb2Ag solder paste (lead containing), or SN96C, Multicore LF320, (Lead-Free) or equivalent solder paste.
Ask your solder paste supplier for his advice before starting up your test production.

Lead free solder types:

Wave Soldering: Typical: SAC305 alloy,SN100C

Reflow Soldering: Typical: SAC305,S9M-XM3S.

Manual Soldering: Most standard lead-free solder wires are suitable.

Terminal material:

Tinned brass for both pin terminals and SMD terminals.

Recommended solder,and solderpaste suppliers:

Agmet Ltd/ESL-Europe U.K
www.electroscience.com

Balver Zinn Josef Jost GmbH
Germany
www.balverzinn.com

Indium Corporation of Europe
U.K.
www.indium.com

Cobar Europe.
www.cobar.com

Cookson Electronics
www.cooksonelectronics.com

Kester lead-free
www.kester.com

Felder lottechnik
www.felder.de

Henkel Technologies
www.loctite-europe.com

Koki company ltd
www.ko-ki.co.jp

Useful links:

www.leadfree.org

HEAT PROTECTION LABEL AND WASH TAB (SMA series)

A heat protection label in capton material is glued on the SMD model of the SMA buzzer.
This enables the user to pick up the buzzer by vacuum.
The heat shield label remains on the buzzer during the reflow solder and must be removed after soldering. These heat protection labels are standard for each SMD buzzer automatically.

If a wash tab model is ordered, the wash tab is glued on the buzzer to protect it from water penetrating into the hole of the cavity. The PCB at the back is also sealed with a silicon film.
For ordering these parts, please add Washtab to the model number (see product codification and summary).

CLEANING

At 21°C, the housing of our buzzers, transducers and speakers is not corroded or affected by oils, fuels, greases, most organic solvents or cleaning agents.

WARRANTY AND DELIVERY CONDITIONS

Our products are warranted during one year after date of shipment.
In case products are returned for quality control, the products must be sent to the factory with the following information:

- Samples of the defective pieces
- Name & address of the customer
- Application description
- Invoice-number
- Copy of the inspection sheet delivered in box
- Copy of the written complaint from the customer

and accompanied by our QD1 document, which will be sent to you immediately after registration of your complaint. This document should be duly completed, so that we have sufficient details about the problem in order to deal with the matter swiftly.

The products must be used according to the working instructions and conditions specified in this catalogue. Return shipments will only be accepted for quality control, if the products have not been physically changed, damaged or opened. They will only be accepted if all the required information is available.

MILITARY NORMS

Military norms guarantee a superior quality because they have been tested as follows:

Test	Method MIL STD202	Test conditions
Thermal Shock	107	A
Humidity	103	B
Salt Spray	101	A
Shock	213 B	H
Vibration	201 A	none
Terminal strength	211	A (10 Lbs, 2 cycles)

The different tests are summarised below. The detailed procedures are available upon special request.

Thermal shock test 107 method A: The thermal shock test is performed to determine the resistance of a part to exposures at extremes of high and low temperatures, and to the shocks of alternate exposures to these extremes, such as would be experienced when equipment or parts are transferred to and from heated shelters in arctic areas. The products are exposed to a flow of air at different temperatures for at least 5 cycles.

Humidity test 103 method B: This test is performed to evaluate the properties of materials used in components as they are influenced by the absorption and diffusion of moisture and moisture vapour.
This accelerated environmental test is accomplished by the continuous exposure of the specimen to high relative humidity at an elevated temperature during 96 hours.

Salt spray test 101 method A: The purpose of this test is to define if the product is resistant to salt spray. This accelerated laboratory corrosion test simulates the effects of seacoast atmospheres on metals. The coating of the product is subjected to a fine mist of salt solution during 96 hours.

Shock test 213B method H: The shock test (Sawtooth pulse during 6Ms) is conducted for the purpose of determining the suitability of component parts and subassemblies of electrical and electronic components when subjected to shocks such as those which may be expected as a result of rough handling, transportation and military operations. The design of the shock machine is not specified, but shock pulse waveforms are specified with tolerances.

Vibration test 201 A: The vibration test is used to determine the effects on component parts of vibration within the predominant frequency ranges and magnitudes that may be encountered during the field service. The specimen is mounted on a special apparatus and subjected to a simple harmonic motion.

Thermal strength test 211 method A: This test is performed to determine if the design of the product and its method of attachment can withstand one or more of the applicable mechanical stresses to which they will be subjected during installation or disassembly in equipment. This pull of tension test is gradually applied and then maintained for a period of 5 to 10 seconds.

NATO APPROVED MODELS

The following Sonitron products are NATO approved and obtained a special NATO number.

Sonitron number	NATO number
SC235A	6350-13-113-8057
SC235A-F2 BLACK	6350-13-116-5836
SC235A-FM	6350-13-116-8221
SC235A-M	6350-13-118-3500
SC235B-F	6350-13-113-4698
SC0715BL-F	6350-13-115-6688
SC0715BL-F2M	6350-13-116-8321
SCI535B1-FM	6350-13-113-6092
SCI535B5-FM	6350-13-113-1553
SCI535B5-F-48X05N	6350-13-118-3502
SCI535B1	6350-13-114-8156
SCI535B1-F2	6350-13-116-9171
SCI535A1-M GREEN	6350-13-118-1179
SCR535A	6350-13-113-2787
SCR535B	6350-13-115-0297
SUM516A	6350-13-113-6319
SULM516B1-FM	6350-13-113-6108
SMAT21	5965-13-117-8832
SW535B-M	6350-13-118-2999

IP RATINGS

The IP rating system provides a means of classifying the degrees of protection from dust, water and impact for electrical equipment and enclosures. The system is recognised in most European countries.

The degrees of protection are most commonly expressed as 'IP' followed by two numbers, where the numbers define the degree of protection. The first digit indicates the extent to which the equipment is protected against particles, or to which persons are protected from enclosed hazards. The second digit indicates the extent of protection against water.

DIGIT	FIRST NUMBER- SOLID	SECOND NUMBER- LIQUID
0	Not protected	Not protected
1	Protected against solid objects over 50mm, e.g. Accidental touch by hand	Protected against vertically falling drops of water
2	Protected against solid objects over 12mm diameter, not exceeding 80mm long, e.g. fingers	Protected against direct sprays of water up to 15° from the vertical
3	Protected against solid objects over 2.5mm, e.g. tools and wires	Protected against sprayed water up to 60° from the vertical
4	Protects against solid objects over 1.0mm, e.g. small wires	Protected when sprayed from any direction - limited ingress allowed
5	Protected against dust, limited ingress (no harmful deposit)	Protected against low pressure jets, from all directions - limited ingress allowed
6	Dust tight. Totally protected against dust	Protected against strong jets of water with limited ingress allowed
7	n/a	Protected against temporary immersion between 15cm and 1m for up to 30 minutes
8	n/a	Protected against long periods of immersion under pressure

SP27

All components from the buzzer SP27 were examined and tested in detail by the German laboratories:

Westfälische Berggewerkschaftskasse Bergbau - Veruchsstrecke BVS
Beylingstrasse 65
D-4600 Dordmund-Derne
Tel : 0049 231 24910

The Westfälische Berggewerkschaftskasse gave the following ratings to the Sonitron part SP27:

**** IP20:*** means the casing of the SP27 is protected against the impact of objects larger than 12 mm and the touch of fingers.

**** EEx I:*** This is the rating for electronic materials in explosion hazard areas. Gas group I refers to the gas methane and means that the material can be used in mine shafts and mine gas explosion danger in accordance with the norms EN50 014 to EN 5020 and EN 5028. EEX is the relation between the minimum ignition current and the minimum ignition current of methane laboratory gas. This is 0.28 mJ.

The document number with detailed description is BVS 87.1087 U .
A BVS label is also available on special request.

NOTES

NOTES

BUZZERS & TRANSDUCERS

STANDARD SERIES >

SMA-SERIES >

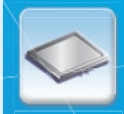
SMAT-SERIES >

SMAC-SERIES >

SMB-SERIES >

PIEZOCERAMIC SPEAKERS

SPS-SERIES >



SCS-SERIES >

FOR MORE INFORMATION !

See PIEZO SPEAKER Catalogue

ALARMS & SIRENS

SAS-SERIES >

FOR MORE INFORMATION !

See ALARMS & SIRENS Catalogue

sonitron®

Excellence in physical acoustics

Kasteelstraat 93
9100 Sint-Niklaas
BELGIUM

Tel.: 32 3 780 76 30 Fax: 32 3 777 58 96
sales@sonitron.be - http://www.sonitron.be
info@sonitron.be - http://www.sonitron.eu