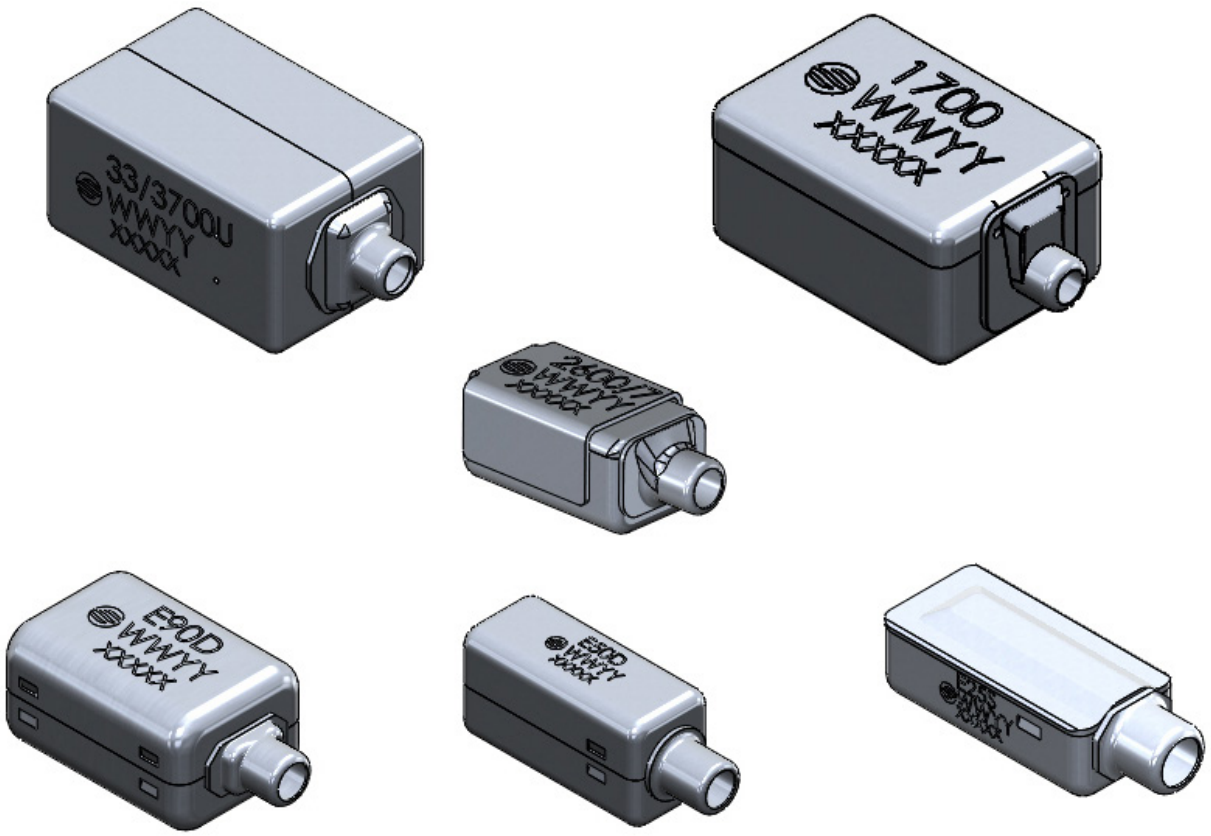


Handling of Transducers
Balanced Armatures

DK: +45 4630 6666
USA: +1 952 543 8300
PRC: +86 512 6832 3401
NL: +31 20 6068 100

Introduction

Transducers, although robust, have limits to chemical exposure and excessive handling.

Some examples of improper handling may be:

- Physical Dropping (excessive mechanical shock)
- Rough Handling
- Using harmful cleaning solvents

These mishandling processes may cause dents, loss of sensitivity or output, distortion, external leaks and damaged screens. All this can be prevented if the correct tools, fixtures and ESD protection are used and handling instructions are followed. Handling these micro-mechanical transducers should be performed in a clean environment.

This Application Note provides insights and guidelines for the handling of Balanced armature receivers.

Storage and operational conditions

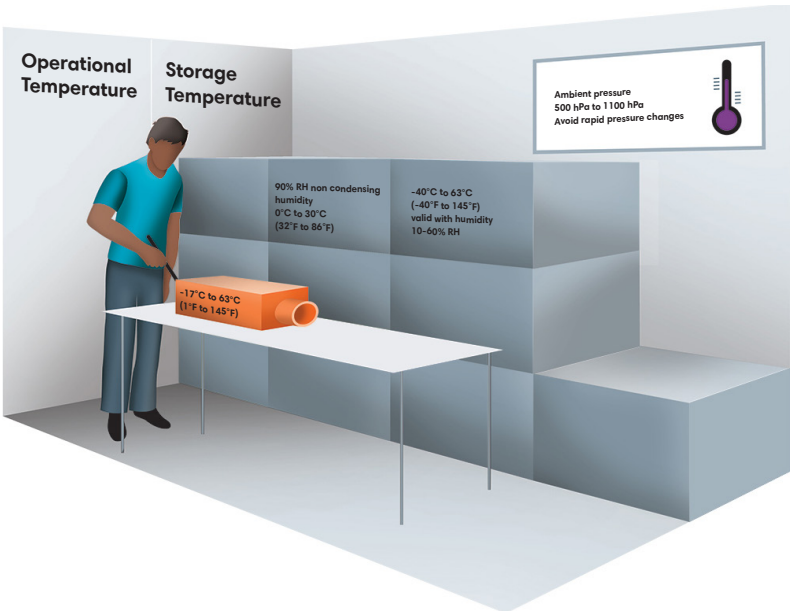
Absolute Maximum Ratings

Exposure to stress beyond the below absolute Maximum Ratings can induce permanent damage to the device. Stresses beyond these limits are not guaranteed and/or have not been tested.

In operation	Min	Typ	Max	Unit	Comments
Supply voltage (V_{DD})			49.9	V	
Temperature range (biased)	-10 [14]	38 [100]	65 [149]	°C [°F]	@ rubbing-free drive
Temperature range (non-biased)	-40 [-40]	25 [77]	70 [158]	°C [°F]	
Humidity	10	60	93	RH	

In storage conditions	Min	Typ	Max	Unit	Comments
Temperature range	-29 [-20]	25 [77]	60 [140]	°C [°F]	in packaging
Humidity	10	60	93	%RH	in packaging
Ambient barometric range	500	1000	1100	hPa	static pressure

Our products are designed to withstand normal atmospheric differences by barometric pressure relief between its front and rear volume. Rapid pressure changes, for example from mechanical shock or air pressure device, may still damage the device and must be avoided.



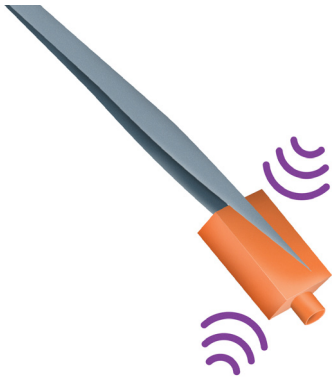
Handling guidelines

Soldering

Soldering can be harmfull for receivers if not done correctly. See section about soldering instructions for more details.

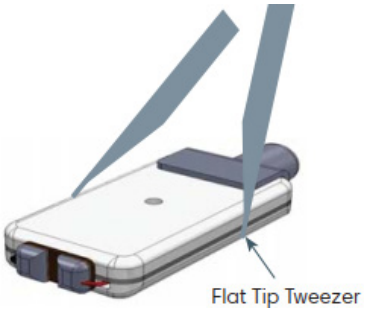
Forceful squeezing

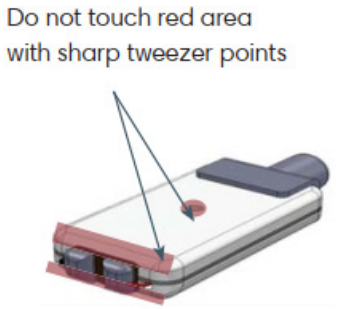
This will cause dents on the side of a transducer, which may cause distortion and external leaks. It is recommended to use flat plastic tweezers to pick the receiver. Never grab a receiver in the sound outlet.



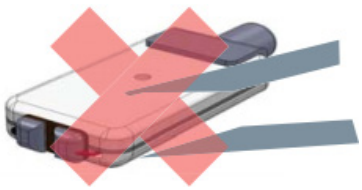
Extra care should be taken when using the 4100 and 4400 receivers. Due to the small size and internal construction these receivers are less robust to mechanical stress than other receivers.

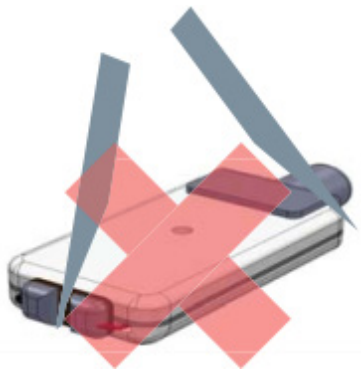
Correct handling





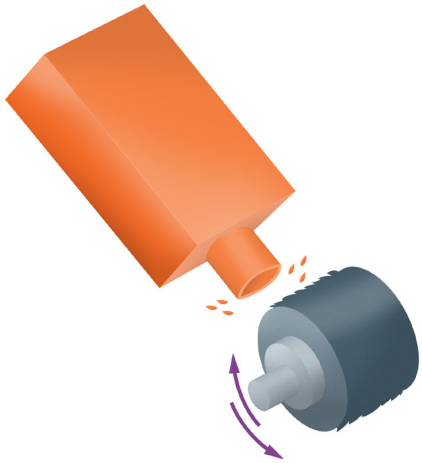
Incorrect handling





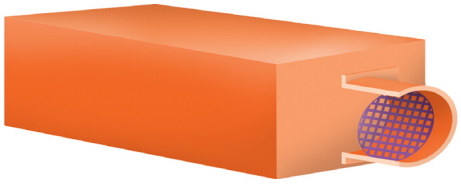
Use of liquid chemicals
Please also use caution when cleaning the receiver to prevent any liquid chemicals or their vapours from entering inside the receiver. For example, chemicals like Isopropanol can be destructive to the internal operation of a receiver. It could for example cause a stiffening of the receiver membrane, resulting in a lower output or dead receiver. See the list at the end of this document for more details on chemicals.

Buffing
This will cause dents on the side of a transducer, which may cause distortion and external leaks. It is recommended to use flat plastic tweezers to pick the receiver. Never grab a receiver in the sound outlet.

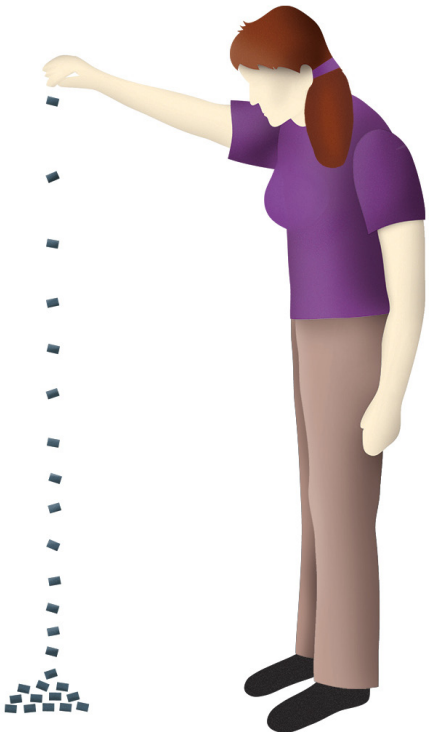


Electrostatic discharge
Balanced Armature receivers are not subject to electrostatic discharge.

Removing residue from screens (when applicable)
Screens are fragile. Dented screens or plugged up screens will cause decreased output. Use care when removing residue from screens.



Dropping
This may cause internal damage to a receiver and dents causing distortion or external leaks.

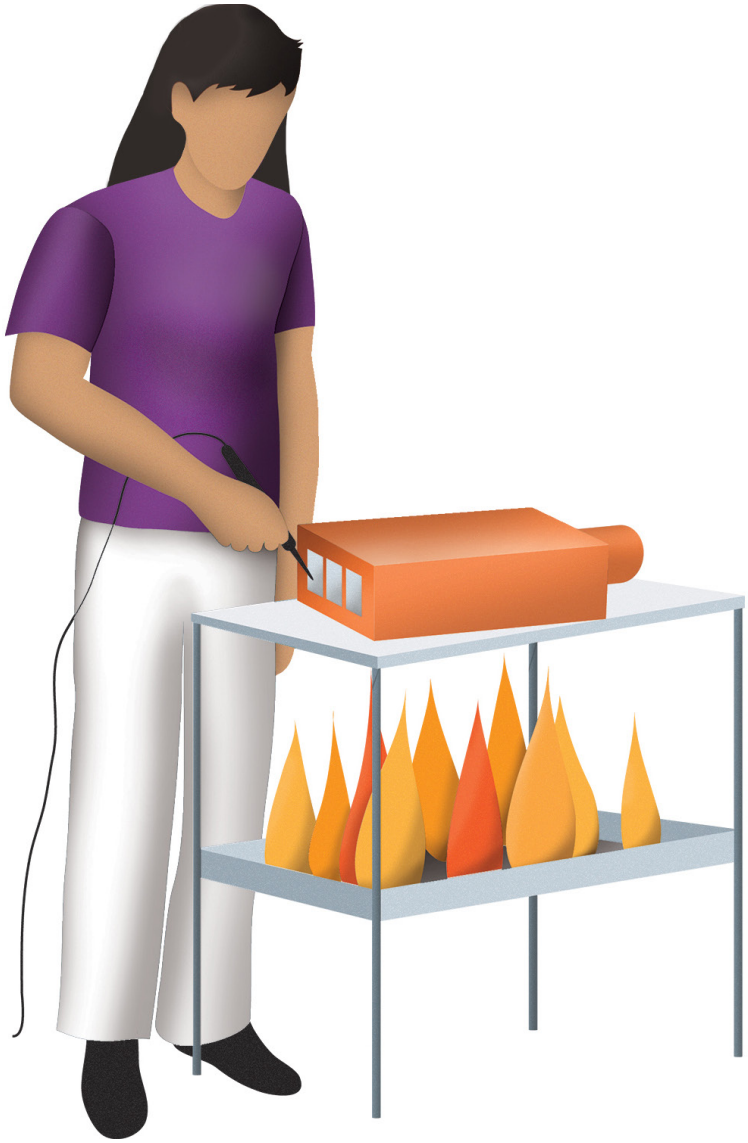


External magnets
Strong magnetic fields in the vicinity of a Balanced Armature receiver may cause permanent or temporary performance degradation.

Back-vented receivers
Do not cover the hole. Special attention should be paid with tuned-vent receiver, which rely on a thin tube which may protrude from the case. Be extra careful with the use of adhesive and soldering when venting via the pads.

Soldering instructions

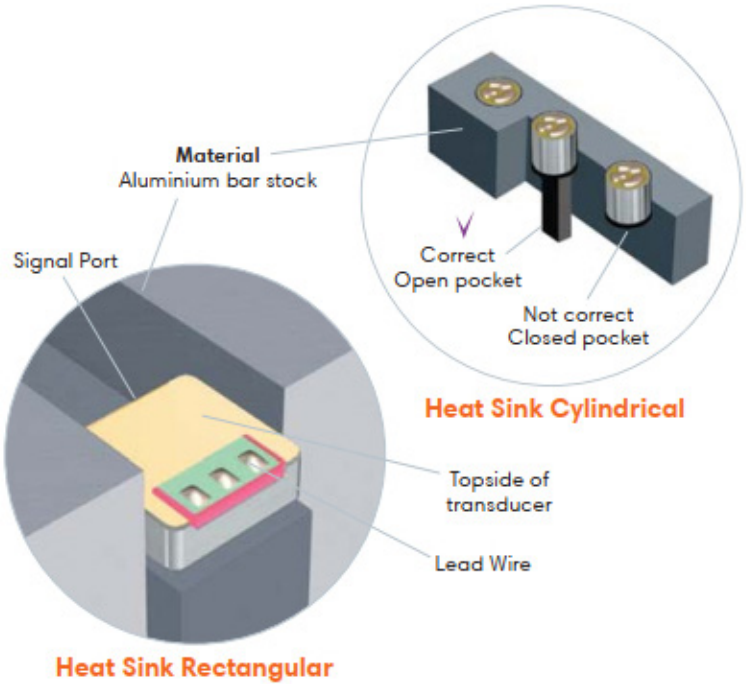
Warning: When soldering on the transducer the spout must not be blocked. This is to prevent pressure increase due to expanding air.



DK: +45 4630 6666
USA: +1 952 543 8300
PRC: +86 512 6832 3401
NL: +31 20 6068 100

Step by step instructions

1. Place the transducer in a heat sink with terminal pads facing up. Sonion highly recommends using heat sinks to dissipate the heat from the transducers (see pictures). When placing a transducer in a heat sink fixture it is important not to apply excessive force to the sides. This may cause damage.



An alternative way to dissipate the heat from the transducers is to use a metal double sided tape on a metal block, provided that the sound outlet is not closed during the soldering. We recommend using this only if there are no alternative options and it should be done by experienced operators.

2. Dip the pretinned part of the wire in liquid rosin flux. Avoid excessive flux residue. Use of flux is recommended, but not required.

3. Lay tinned tip of wire on terminal pad.

4. Clean soldering iron tip on wet cellulose sponge.

5. Apply soldering iron tip to the wire and terminal pad simultaneously.

6. Keep soldering iron in contact with wire and terminal pad until solder flows and make a good connection. The total time that the soldering iron tip is in contact with the wire and terminal should not exceed one second, and the temperature of the receiver should not exceed 80°C (176°F). Remove solder iron tip and hold wire in place until solder solidifies.

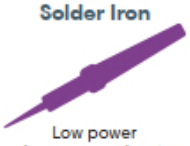
7. Inspect connection to see that:

a. Solder has flowed smoothly over wire and terminal pas

b. Solder has not bridged between adjacent terminal pads or between the terminal pad and the case.

Recommended equipment

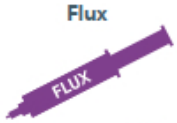
Solder Iron



Low power (25-60 Watts) with temperature control

Smallest tip possible

Flux



Lead Free compatible, no-clean flux

Only add flux when needed

Can be added to the solder pad or the connection wire

Solder material

SAC305 with 1 - 2.2% flux (Sn 97.5%/Ag 3.0%/Cu 0.5%)

Diameter 0.25 - 0.50 mm

Soldering Time

Solder pads: 1 sec. (Max: 2 sec.)

Dwell time: 10 sec. between solder operations

Wires: 3 sec. (Can increase when wires are held with tweezers)

Soldering specifications

The below tables indicates good practice temperatures such as measured on the tip of the soldering iron.

	Soldering temperature		Soldering iron tip size	
	Celsius	Fahrenheit	mm	inches
Receiver	350-380°C	662-716°F	0.2-0.6	0.008-0.024

Environmental standard

Sonion transducers are designed towards the following standards:
REACH: All materials comply with **REACH** regulation (EC) no. 1907/2006, although some articles may contain SVHC's >0.1%.
RoHS: All materials comply with **RoHS** Directive 2011/65/EU (including amendment 2015/863), although some exemptions may apply.

Chemicals

	Description	REC
Adhesive type	Alkoxyethyl Cyanoacrylate	Safe to use
	Ethyl Cyanoacrylate	Use with care
	Epoxy & Epoxy Derivatives	Safe to use / Use with care
	Silicone Elastomer	Safe to use
	Methacrylate	Use with care
	Isobornyl acrylate	Safe to use
Solvent / Cleaning material	Aqueous Rosin Cleaner	Use with care
	Ethanol	Use with care
	2-propanol (Isopropanol)	Use with care
	Acetone	Do not use
	Aliphatic Hydrocarbon Solvents (Naphtha / mineral spirits)	Do not use