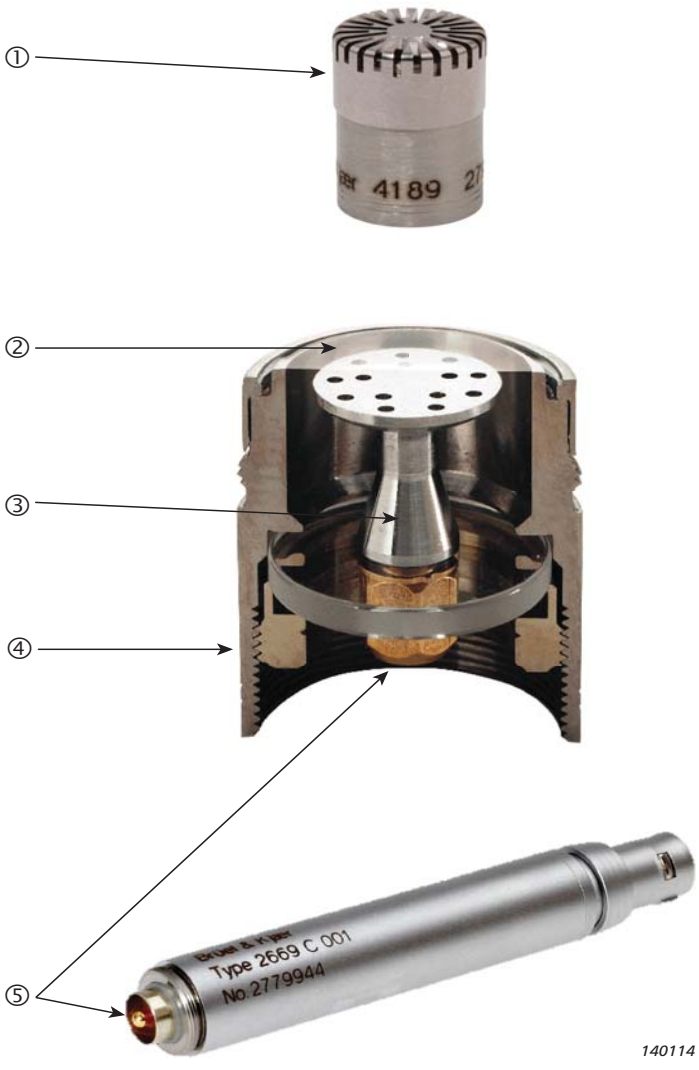
Handling and Cleaning Condenser Microphones

Parts of a Microphone

Fig. 1
***Top**: Typical microphone*
***Centre**: Cross-section of microphone*
***Bottom**: Typical preamplifier*



A Brüel & Kjær microphone is made up of five main parts:

① **Protection Grid**
A threaded cap that attaches to the housing and protects the microphone diaphragm

② **Diaphragm**
A very thin steel or titanium membrane that converts the physical pressure waves into electrical signals

③ **Backplate/Terminal**
Transmits electrical signals from the diaphragm to the preamplifier

④ **Housing**
Made of rolled steel or titanium

⑤ **Centre Contacts**
Isolated, high-impedence areas that are very sensitive to contamination

Microphone Accessories

Fig. 2
Typical preamplifier

140152

Preamplifier
Conditions the electrical signal for cable transmission

Fig. 3
Typical windscreen

140136

Windscreen
Polyurethane foam cover that fits over protection grid, microphone and preamplifier

Handling

Brüel & Kjær microphones are sensitive instruments and must be treated as such.

The diaphragm is extremely thin and very easy to damage, thereby ruining your microphone. Since it is very easy to dent the diaphragm when you remove or attach the protective grid, do so only when absolutely necessary; for example, in order to clean.

Never remove the protection grid while in the field.

Keep dust and foreign objects away from the diaphragm and the centre contacts. Keeping the protection grid and preamplifier attached to the microphone at all times will protect these sensitive areas.

Use hand-strength to attach the protection grid to the microphone cartridge or the microphone cartridge to the preamplifier. Follow the same rule for removal of the protection grid and preamplifier.

Before use, it is a good idea to attach the microphone to the preamplifier in a relatively clean environment, such as your office, instead of in the field.

Storage

Always keep your microphone in its box when not in use.

It is recommended that you store the assembled preamplifier and microphone together but if they are to be stored separately, attach the protective cap to the preamplifier to protect the centre contact.

Cleaning Microphones

Protection Grid
Carefully remove the protection grid from the cartridge, taking care not to touch or damage the diaphragm.

Use a soft dry brush such as an artist's paintbrush or a can of inert, solvent-free air, also known as a gas duster, to dislodge particles from the grid. Remember to use suitable eye protection when using gas dusters.

Diaphragm
The diaphragm is resistant to corrosion, and the influence of slight contamination on the frequency response is normally negligible*.

If the diaphragm becomes contaminated with liquid, dust or oil, it can be carefully cleaned using a cotton swab or, preferably, a soft artist's brush. Loose particles and dust can also be removed with a gas duster. When using a gas duster, direct the gas so that it flows over the diaphragm, not directly at it.

Note:
Do not use the microphone for 30 minutes after using a gas duster to clean. The gas from a gas duster is different from the gas in the Earth's atmosphere. This means that there will be a pressure difference on either side of the diaphragm after cleaning. Waiting allows the pressure to equalize.

Special consideration should be given to the type of diaphragm you are cleaning. Threads from a cotton swab can snag on the welding of laser-welded diaphragms, such as Type 4956 and Type 4961. The arrow in Fig. 4 points to the innermost black ring, which is the welding.

Fig. 4
Magnification of laser-welded diaphragm

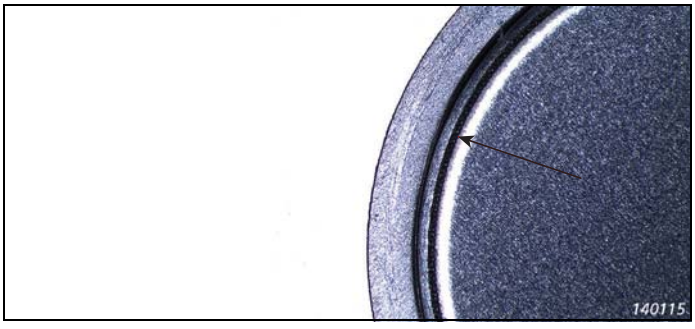


Fig. 5
Magnification of press-fitted diaphragm

A typical press-fitted diaphragm, found in microphone Types 4189 and 4942, is shown in Fig. 5. Note the differences between the two types of diaphragm.

Centre Contacts
The microphone and preamplifier contacts should be cleaned with a cotton-tipped swab that is moistened, not saturated, with isopropyl alcohol.

Cleaning Microphone Accessories

Windscreens
Windscreens can be washed in clean, warm water with a small amount of detergent. After washing, gently rinse in clean, warm water and allow to dry thoroughly before inserting the microphone. If the foam material shows signs of crumbling, it is necessary to replace the windscreen.

* The microphone sensitivity is controlled by the diaphragm tension and not by its mass, except at frequencies near the resonance frequency. As a result, dust particles or contamination do not influence the sensitivity in any serious way.

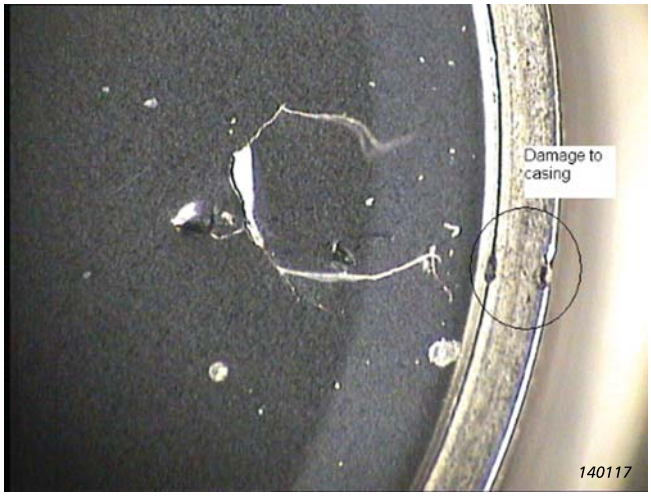
Preamplifiers

Disconnect the preamplifier from the signal conditioning and remove the microphone cartridge. Wipe the body of the preamplifier with a lint free cloth. Use isopropyl alcohol to remove any oil-based residue.

Microphones in Use

Brüel & Kjær microphones are specifically designed and built to ensure stability under a variety of conditions. For example, they can withstand both temperature fatigue and polluted industrial environments. Here are a few tips to help you get the most out of your microphone.

Fig. 6
Damaged microphone



Protect Against Damage

In normal use, the most common damage to a condenser microphone occurs when the edge of the protection grid hits a hard object. This can deform the grid as well as damage the housing and diaphragm (see Fig. 6).

If conditions allow, the use of a windscreen is an excellent way to protect your microphone against impacts and, as an added bonus, dust particles.

Microphone Holders and Tripods

When using a microphone holder, the angle between the microphone and the arm of the holder should be 120 to 150 degrees to prevent sound reflection. Also, secure the cable to the holder for this same reason.

Tripods can fall. When mounting your microphone on a tripod, align the microphone with one of the legs. That way, if the tripod falls, your microphone has a better chance of survival.

Periodic Calibration

Regular calibration is necessary to ensure the accuracy of your measurements. The frequency of use, environmental conditions, and industry standards are factors that determine how often you should have your microphone calibrated.

Calibration preformed by a Brüel & Kjær calibration centre is documented and traceable, and it meets all relevant standards. As a part of the service, we always inspect your microphone and perform any necessary cleaning.

BR 8037 – 11 2014-06

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