

Assembly Instruction for Impact Vibrators with Electromagnetic Drive

(Translation of the original assembly instruction)

Series SR...

This assembly instruction refers to AViTEQ impact vibrators of the series SR... that are operated with an AViTEQ magnetic vibrator.

Impact vibrators shall improve the emptying of hoppers that are filled with bulk materials and avoid plugging, caking, or bridging. This is achieved by directional shock pulses that stimulate the hopper wall, generated by the impact vibrator.

Please also observe the effective operating manual for the AViTEQ magnetic vibrators!

For your Safety

You will find three different types of symbols in this assembly instruction which are intended to point out important information:



DANGER!

The danger warning describes procedures or conditions which could lead to dangerous and even life-threatening consequences for the person installing or using the equipment.



ATTENTION!

You will find this information with procedures in which a danger of damage to equipment exists. This damage could also result in injury to personnel (e.g., from a fire or an explosion).



NOTE

Notes provide information regarding individual tasks. Notes explain circumstances, clarify terminology or provide tips for simplifying processes or procedures.

Beside all safety information that are shown in this assembly instruction it is mandatory to observe all safety information in the appropriate operating manual for the magnetic vibrator!



DANGER!

When the unit is connected to the mains, a lethal voltage is present inside the controller and the terminal box of the magnetic vibrator. Touching electrically live components can be lethal! Before switching on mains power, ensure that no live parts can be touched, the cover of the terminal box is closed and that all cable glands and insulations are undamaged!



DANGER!

*Inadequate installation may cause the impact vibrator or the magnetic vibrator to fall down possibly causing perilous injuries! Ensure that the impact vibrator and the magnetic vibrator are bolted on tight to the supporting construction and take appropriate steps to ensure that the units cannot fall down! Remaining under the impact vibrator is **not** allowed!*



DANGER!

*Explosions can lead to perilous injuries and cause great damage to property! AViTEQ-impact vibrators of the series SR... **must not** be operated in areas with potentially explosive atmospheres consisting of a gas-, a vapour-, a mist- or a dust-air-mixture.*



NOTE

Impact vibrators should only be operated periodically to avoid compacting the bulk material inside the hopper. Further, only operate the impact vibrator while the outlet of the hopper is opened and material can be discharged. The maximum shaking effect arises directly after switching on the drive. Due to this, even a short operation time of some seconds will help the material to flow out of the hopper. The necessary operation time (e.g. 8 seconds ON and 12 seconds OFF) ought to be found out by carrying out tests.

Basically the impact vibrator should only be operated with the impact force (working stroke) that is just effective enough to achieve the desired effect.

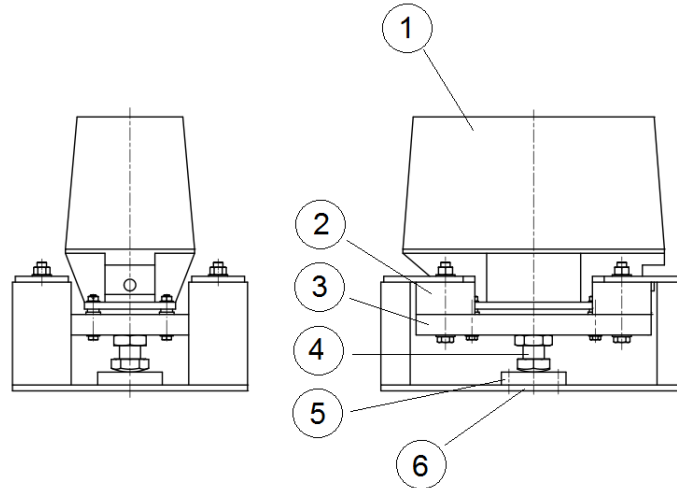


NOTE

Depending on the construction of the hopper and the acoustic properties of the material inside the hopper as well as the degree of strength of the impact, the sound pressure level of the operational impact vibrator may lie in the range of 95 up to 100 dB(A). It is in the operator's responsibility to assure that appropriate measures are met at the operating location. For example the use of "personal protective equipment" (ear protection)!

Device Specification

The construction concept of the impact vibrator with electromagnetic drive is shown in the figure below. The magnetic vibrator is normally operated together with a controller.



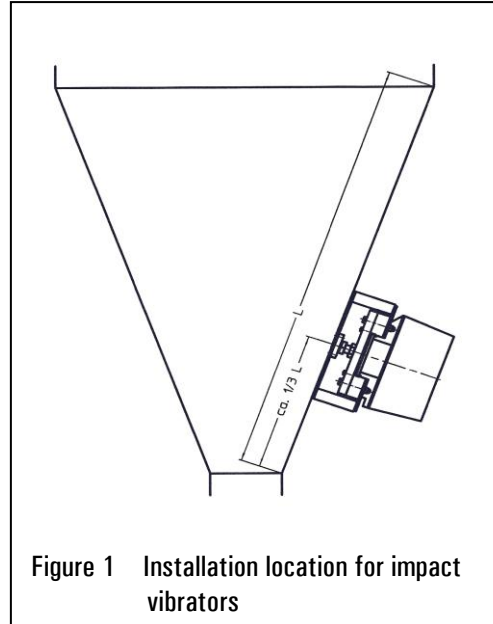
Together with the vibrator plate (3) the magnetic vibrator (1) forms a two-mass oscillation system. The vibrator plate is linked to the base support (6) by rubber pads (2). The operating magnetic vibrator generates a linear movement of the impact bolt (4). During operation the impact bolt hits against the impact plate (5) and generates a shock pulse that is transmitted into the hopper wall the impact vibrator is tightened to.

Installation

Installation location and clamping area

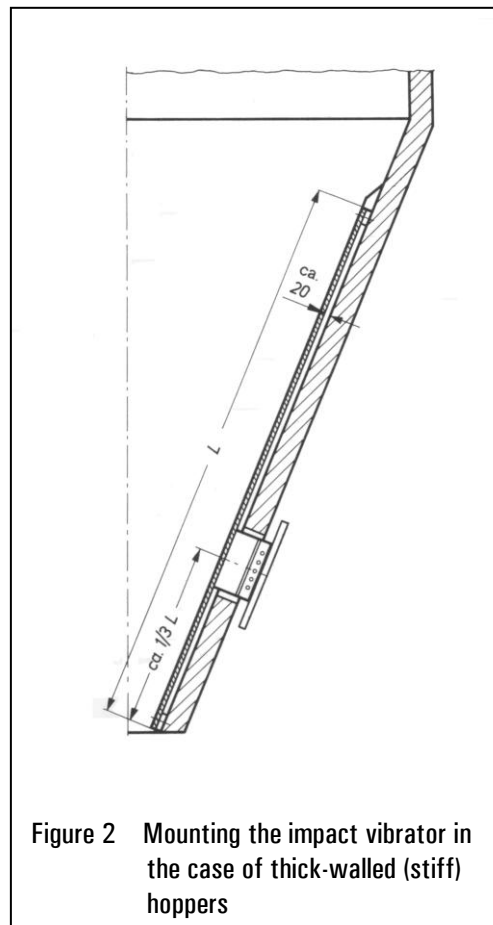
To assure an effective operation of the impact vibrator, please select the ideal installation location. Hoppers that tend to plugging or bridging normally show a good emptying, if the impact vibrator is mounted at about $\frac{1}{3}$ of the height of the conical hopper (...see Figure 1).

We recommend using a rigid plate or steel profile with corresponding holes for the fixing screws in the case of hoppers made out of sheet steel.



In the case of thick-walled and stiff hoppers made out of steel or concrete, a steel plate is required that rests on steel or rubber strips at its edges (...see Figure 2).

The installation of the impact vibrator is described on the following page. The electrical connexion to the a.c. mains is described in the appropriate operating manual for the magnetic vibrator.



Assembly preparations

Choose the correct screws for fixing the impact vibrator. The particular screw size is indicated in the following table. The recommended length of engagement is valid for threaded holes and a support structure made of steel. Only choose screws with a bolt quality of at least 8.8 and clean the screw thread from oil deposits.

Impact vibrator	Number of screws	Screw size	Length of engagement (recommended)
SR C...	4	M16	20 mm
SR D... SR E...	4	M20	25 mm

Table 1 Fixing screws

In the case of threaded holes we recommend to use Loctite 245 for securing the screws.

Installation



DANGER!

Danger of crushing! Use appropriate hoisting devices for transporting the impact vibrator and avoid unintended swinging of the unit on the hoist during the transport. Further prevent the impact vibrator from falling down by securing it appropriately.

Screw the impact vibrator onto the hopper. Tighten the fixing screws with the torque indicated in the following table.

Screw size	Screw tightening torques (Bolt quality 8.8)
M16	210 Nm
M20	400 Nm

Table 2 Screw tightening torques



NOTE

In the case of through holes, each nut must be secured by a locknut. If it is not possible to use such a locknut, the nut must be secured using Loctite, just as in the case of threaded holes.



ATTENTION!

Tighten the fixing screws crosswise to avoid faulty gripping. In the case of neglect damage to the impact vibrator is possible and further, the unit could fall down. Damage to property and/or person can be the result!

Loctite is a trademark of the company Henkel KGaA.

Commissioning

Prior to the first commissioning all installation works have to be carried out, as they are described in the previous chapter.



NOTE

AVITEQ delivers magnetic vibrators including the appropriate controllers. Before commissioning, please check that the magnetic vibrator is only operated with a matching controller!



ATTENTION!

It is totally prohibited that the current consumption of the magnetic vibrator exceeds the value of the nominal current specified on the type label, because this may lead to destroying the magnetic vibrator.

We recommend to fill the hopper prior to commissioning and to keep the outlet opened.

Loosen the locknut at the impact bolt and screw the impact bolt into the vibrator plate until an air gap of some 5 mm exists between the impact bolt and the impact plate.



DANGER!

Danger of crushing! Danger of crushing the fingers in the area of the air gap between the impact bolt and the impact plate during operation.

The commissioning procedure must be carried out using the lowest working stroke: Turn the vibration-width adjuster (potentiometer) on the controller counter clockwise till you reach the end stop (scale value of 0) or, if you use an external command value, set the lowest command value. Now switch on the controller.

Listen for any hammering noises that indicate the collision mode.



ATTENTION!

It is not allowed to operate the magnetic vibrator if hammering noises exist! Collision mode will lead to destroying the magnetic vibrator. Please ask us in the case of doubt.

Slowly increase the working stroke by gradually turning the vibration-width adjuster (potentiometer) or by increasing the external command value, until the maximum value has been reached.

If hammering noises occur, switch off the unit and check the cause. By measuring the current on the terminals of the appropriate controller, you can check the related value.



DANGER!

Short circuit or danger of electrocution during the following measurements! Observe the safety regulations when measuring voltage-carrying components! Take appropriate measures to prevent contact with voltage-carrying components.

The current that is shown on the type label must not be exceeded! Additionally you can measure the vibrator voltage and compare it with the value that is shown on the appropriate characteristics curve data sheet.



NOTE

Only use meters which display the root mean square value for measuring the voltage and the current (moving iron instrument or „true RMS“). Other measuring devices would not produce relevant measurements when measuring the non-sinusoidal voltage or current curve. For digital measuring devices, select a measuring range of $\geq 750\text{ V}$!

If no problems appeared while commissioning, please adjust the impact bolt as follows. Make sure that the impact vibrator is switched off before carrying out any adjustment work. Unscrew the impact bolt until it just starts touching the impact plate. Then secure the impact bolt with the appropriate locknut.

Finally, please check the function of the impact vibrator while discharging the hopper: Is the material discharged uniformly?



NOTE

The impact force can be modified by varying the working stroke with the appropriate controller. Basically the impact vibrator should only be operated with the impact force (working stroke) that is just effective enough to achieve the desired effect.

Did problems appear while commissioning or do you have any questions, give us a call. We'll be glad to help you.

Maintenance

We recommend the following checks in regular intervals as shown below:

Test intervals	Checks
2 operating hours after the first commissioning	<ul style="list-style-type: none">- Check screw connections (impact vibrator/drive)- Check the condition of the impact bolt and the impact plate- Check the discharge of material out of the hopper
24 operating hours after the first commissioning	<ul style="list-style-type: none">- Check screw connections (impact vibrator/drive)- Check the condition of the impact bolt and the impact plate- Check the discharge of material out of the hopper- Check the condition of the impact vibrator (incl. rubber pads)
weekly	<ul style="list-style-type: none">- Check the discharge of material out of the hopper
monthly	<ul style="list-style-type: none">- Check screw connections (impact vibrator/drive)- Check the condition of the impact bolt and the impact plate
half-yearly	<ul style="list-style-type: none">- Check the condition of the impact vibrator (incl. rubber pads)

Declaration of Incorporation

(Translation of the original Declaration of Incorporation)

according to Appendix II, Part 1, Section B of the EC Directive 2006/42/EC for Machines

The manufacturer...

AViTEQ Vibrationstechnik GmbH
Im Gotthelf 16
65795 Hattersheim
Germany

declares that the impact vibrators of the series...

SR...

comply with the requirements of the following European Directive:

2006/42/EC Directive for Machines

and according to Article 2 Point g), these are partly completed machinery which are exclusively intended for the installation in or for the assembly with another machine or equipment.

The special technical documents according to Appendix VII Part B have been produced. Mr. **Adrian Beilfuss** is authorised to compile these special technical documents according to Appendix VII Part B and to transmit these on request in electronic form to the responsible national authorities. The associated address is: **AViTEQ Vibrationstechnik GmbH, Mr. Adrian Beilfuss, Im Gotthelf 16, 65795 Hattersheim, Germany.**

The following general health and safety requirements according to Appendix I of this Directive are applicable and have been complied with:

1.1.1; 1.1.2; 1.1.3; 1.1.5;
1.3.1; 1.3.2; 1.3.3; 1.3.4;
1.4.1;
1.5.1; 1.5.6;
1.7.3; 1.7.4; 1.7.4.1 and 1.7.4.2

The conformity of the products with the European Directive is also proven by compliance with the following harmonised and (inter)national standards and requirements:

DIN EN ISO 12100 (03-2011)

Due to Appendix IV of the Machines Directive 2006/42/EC an assembly instruction is needed for the impact vibrator (partly completed machinery according to the Machines Directive 2006/42/EC). This document is on hand.

It is not permitted to start using the impact vibrator until it has been ensured that the machine in which the unit is installed complies with the provisions of the Machines Directive 2006/42/EC!

Strictly observe the safety instructions and the information about proper use in the supplied assembly instruction!

Hattersheim, the 10th of September 2012

Legally binding signature:




i.V. Beilfuss (Product Manager for Impact Vibrators)

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