



Operating Manual Magnetic Vibrator

(Translation of the original operating manual)

Series MV ...

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The *General Conditions of Delivery Domestic and Abroad* of AViTEQ Vibrationstechnik GmbH apply in their current version.

Do you have questions? Or do you have problems with the installation and/or commissioning?
Give us a call! We'll be glad to help you!

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Hattersheim, 6th September 2018

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1 Intended Use

AViTEQ magnetic vibrators of the series: MV... in standard version are designed and intended as drives for vibration devices for removing, conveying, distributing, condensing, mixing up, dosing and/or screening of bulk materials **outside** of areas with explosive atmospheres.

INFORMATION

AViTEQ magnetic vibrators of the series MV... in standard version are designed and approved for the European market (EU) and are in compliance with the safety requirements referring to the valid European Directives.

Please observe: These safety requirements are not always in compliance with the safety requirements that are valid for non-European markets such as, in particular, the North-American market.

The magnetic vibrators must only be operated with an appropriate controller, preferably with an AViTEQ-controller.

For areas with explosive atmospheres a special series of AViTEQ magnetic vibrators exists that are described in a separate operating manual.

The vibration device (unit of magnetic vibrator and working unit) must be able to oscillate freely, without effecting neighbouring components.

Please also observe the additional remarks about the intended use that are specified in chapter 3.3!

According to Article 2 Point g) of the Machines Directive 2006/42/EC, the drives are partly completed machinery. Installation instructions according to Appendix VI must be produced for and supplied with this partly completed machinery. Due to the requirements arising from other also applicable EC/EU Directives, a complete operating manual has been produced. This is an integral part of the product. A separate installation manual therefore does not exist. Instead, the description of the installation is part of the operating manual and must be observed accordingly.

2 Important safety instructions

You will find five different types of safety instructions in this operating manual, which are intended to draw your attention to the respective level of the hazard.

DANGER

This combination of symbol and signal word denotes a potential hazard, which – if disregarded – is very likely to result in an accident leading to death or serious injury.

WARNING

This combination of symbol and signal word denotes a potential hazard, which – if disregarded – could possibly result in an accident leading to death or serious injury.

CAUTION

This combination of symbol and signal word denotes a potential hazard, which – if disregarded – could possibly result in minor (slight) injury.

NOTICE

This signal words refers to a potential hazard, which – if disregarded – could lead to material and/or environmental damage. There is no risk of harm to human health.

INORMATION

This signal word refers to information on individual topics. Information explain circumstances, clarify terminology or provide tips for simplifying processes or procedures.

Read this operation manual before you start installing and/or commissioning the magnetic vibrator. Carry out all work in accordance with the applicable regulations that are valid. All electrical installation work is only allowed to be carried out by personnel with the appropriate qualifications in accordance with the applicable regulations.

In the interest of your safety and that of your colleagues, observe the following safety instructions.

⚠ DANGER

Risk of electric shock! Touching electrically live components can be lethal! When the unit is connected to the mains, a lethal voltage is present inside the terminal box of the magnetic vibrator. Ensure that there is no possibility of coming into contact with live parts before switching on the mains! Close the terminal box cover. Check that all cable glands and insulations are undamaged!

Risk of electric shock due to frayed connection cables! Connection cables must **never** come in contact with vibrating parts – otherwise, the insulation may be damaged. Run the cables in a way that excludes this danger and protect the drive with a motor circuit breaker or similar!

Risk of injury due to falling parts! Inadequate installation may cause the magnetic vibrator to fall down possibly causing perilous injuries. Ensure that the magnetic vibrator is bolted on tight to the working unit and take appropriate steps to ensure that the vibration device cannot fall down! Remaining under the magnetic vibrator and the working unit is **not** allowed!

Do not add any additional loads to the magnetic vibrator when transporting with lifting equipment or cranes as the lifting rings are only designed to support the weight of the drive and may tear! To provide a specific example, never lift the vibration device using the lifting rings for the magnetic vibrator! Also take note of the weight specifications for the drive(s) when selecting the load attachment device!

⚠ DANGER

Explosions can lead to fatal injuries and cause significant material damage!

AViTEQ magnetic vibrators of the series: MV... in standard version without an ATEX-type examination certification are **not** allowed to be operated in areas with explosive atmospheres consisting of a gas-, a vapour-, a mist- and/or a dust-air-mixture (presence of combustible dust).

⚠ WARNING

Risk for the wearers of pacemakers! The magnetic system of the magnetic vibrator generates a magnetic field during operation. This magnetic field may affect pacemakers. Persons how are wearing a pacemaker must always carry a warning device, if they remain in the area of the operating magnetic vibrator!

⚠ CAUTION

Risk of hearing damage! Depending on the construction of the working unit and the acoustic properties of the material transported, the sound pressure level of the operational vibration device may exceed 70 dB(A). It is the operator's responsibility to ensure adherence to the sound pressure level permitted by means of suitable noise protection measures.

Risk of skin burns or irritations! The surface of the magnetic vibrator heats up during operation. Expect surface temperatures of up to 120 °C.

Before carrying out any work, check that the surface temperature of the magnetic vibrator is below +50 °C.

Risk of damage to health due to possible paint particles! In the case of applications in the food industry a special lacquering may be required that is permitted for the food industry. Please observe this to avoid health risks of others!

NOTICE

Risk of damage to the drive due to excessive current draw! 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 leads to unacceptable high temperatures of the coil. This may result in a possible damage to the drive.

If the magnetic vibrator is equipped with a temperature switch that is connected and detected, the magnetic vibrator will be protected against an unallowed excessive temperature.

Always operate the magnetic vibrator with an appropriate overload protection (motor-protective circuit breaker or similar). The overload protection has to be set to the value of the rated current (nominal current) of the magnetic vibrator, as it is shown on the type label of the magnetic vibrator.

Risk of damage to the drive due to an improper electrical installation! Unsuitable controllers, operation without a controller and/or operation with the incorrect mains voltage/frequency could result in damage to the magnetic vibrator and is not allowed. Ensure that the connected loads are correct and compare them with the device type labels!

Risk of damage to the drive due to an improper modification of construction parts! Do **not** changes of the air gap, the spring rate, the tightening torque of the spring mounting screws, and/or the setting of the internal oscillation sensor PAL (...if present).

Risk of damage to the drive due to an improper natural frequency! **Only** operate the magnetic vibrator with its allowed natural frequency (observe the appropriate characteristics curve data sheet). Operation with an improper natural frequency may lead to excessive heating of the drive, to short circuits between electromagnet windings, and finally to damaging the drive.

Further, **never** operate the magnetic vibrator without a counterweight (working weight), because this may lead to damaging the drive. The natural frequency can only be adjusted, if the magnetic vibrator has been fixed to a counterweight (working weight). Please observe this!

Risk of damage to the drive when welding! All wiring connected to the magnetic vibrator (particularly the protective ground conductor) must be disconnected from the mains before carrying out welding work in the vicinity of the drive, as otherwise its coil may be damaged.

Risk of damage to the drive due to lubricants! Make sure that no oil and/or grease gets inside the magnetic vibrator. In particular, no oil and/or grease must get in contact with the fixation of the springs, because this may lead to damaging the drive. Please observe this!

 INFORMATION

This operating manual only refers to magnetic vibrators of the type: MV... for standard areas. For magnetic vibrators in special version for areas with potentially explosive atmospheres (type: eMV... (Ex)) there is a separate operating manual.

 INFORMATION

The item „nominal current“ that is used in this manual corresponds with the rated current and the limit current, as defined in the German standard VDE 0580.

3 Introduction

3.1 Notes on this operating manual

For whom?

This operating manual is intended for ...

- installation technicians installing and/or commissioning the magnetic vibrator and/or the vibration device, and
- engineers installing the controller, the electrical connexion to the a.c. mains network and the connexion to the magnetic vibrator.

All work on the electrical installation must be carried out by qualified personnel (electricians or persons trained in electrical engineering according to EN 60204-1).

Additional publications

Supplements to this operating manual

- Connexion diagram and operating manual for the controller
- Dimension sheet (drawing) of the magnetic vibrator
- Dimension sheet (drawing) of the working unit (...if delivered by AVITEQ)
- Characteristics curve data sheet for the magnetic vibrator
- List of spare parts for the magnetic vibrator

Definitions

- Magnetic vibrator: Electromagnetic-mechanical unit (vibration system) as it is shown on the front page.
- Working unit: The conveyor unit (trough, tube or screen etc.) in multiple variations.
- Vibration device: Magnetic vibrator with the assembled working unit.
- Controller: The separately shipped controller unit assigned to the magnetic vibrator for connecting to the a.c. mains network.



This operating manual only refers to magnetic vibrators of the type: MV... for standard areas. For magnetic vibrators in special version for areas with potentially explosive atmospheres (type: eMV... (Ex)) there is a separate operating manual.

Revision date

On the bottom on the right hand side page of this operating manual, the version number tells you the date when this document was last updated.

The "General Conditions of Delivery Domestic and Abroad" of AViTEQ Vibrationstechnik GmbH apply in their current version.

Special symbols in this operating manual

Earlier in this manual, you should have learned how we indicate safety notices. If you have any questions about safe work practices regarding magnetic vibrators for standard areas, you should give us a call.

For your convenience and orientation, we use the following special indicators in this operating manual:

- A round bullet indicates a listing of characteristics and conditions.
-  The pointing finger indicates steps that you have to carry out.

3.2 Product liability and warranty

The drives correspond to the current State of Engineering and have been tested for each of its guaranteed functions prior to delivery. AViTEQ Vibrationstechnik GmbH carries out product and market research to aid further development and continuous improvement. Should malfunctions or failures occur despite these preventative measures, please contact our service department! We guarantee that appropriate measures for the repair of the defect will be taken immediately.

Conditions of Warranty

We guarantee that the product is free of defects within the scope of the technical product specifications published by AViTEQ Vibrationstechnik GmbH as well as technical specifications provided in this operating manual. No declarations of other product features or claims regarding additional characteristics are provided. AViTEQ Vibrationstechnik GmbH is not liable for the economic efficiency of the product or proper functionality when used for applications other than the purpose defined for the product as specified in chapter 1 (Intended use) in this operating manual.

Warranty Exclusions

Customers and third parties must not undertake work inside or otherwise interfere with the product, except the works that are described in this operating manual. Otherwise, liability for devices, persons and other consequential damages of any type to the product specified in the contract and other legal assets is precluded, provided AViTEQ Vibrationstechnik GmbH is not co-responsible. Entering into or interfering with the equipment also renders any warranty null and void.

AViTEQ Vibrationstechnik GmbH does not accept liability beyond the warranty entitlements stated in our terms of business on which the contract is based. This applies in particular to claims arising from loss of profit or other damage to purchaser/customer assets. This liability limitation does not apply unless the damage was intentional or caused through gross negligence and unless liability for loss of life or limb or loss of health is mandatory. This also does not apply when the purchaser/customer makes a claim for damages based on an incorrect claim of a characteristic or an agreed-upon characteristic. In the event of culpable violation of principle contractual obligations, AViTEQ Vibrationstechnik GmbH is also liable for criminal intent and gross negligence on the part of non-managing employees and for mild

negligence. In the latter case, this is limited to the contract-typical, judicious, predictable damages.

Warranty is excluded in particular when the units are used in environments, for purposes, or connected to power supplies or to control systems that are not suitable for the magnetic vibrators or that do not represent the common state of technology. In particular, no warranty is provided for damages caused by unsuitable or incorrect use, incorrect mounting or commissioning by the purchaser/customer or third parties, natural wear, faulty or careless handling or unsuitable operating materials. The same applies for replacement parts, chemical, electrochemical or electrical influences provided they cannot be attributed to AViTEQ Vibrationstechnik GmbH and its employees. Claims made for damages to objects other than that which is specified in the contract, so-called deficiency losses, are limited. In this case, AViTEQ Vibrationstechnik GmbH is liable, regardless of the legal basis, only in the cases of intent, gross negligence on the part of the owner/of its management or managing employee in the event of culpable loss of life or limb or health, in the event of deficiencies which are fraudulently concealed or the absence of which AViTEQ guaranteed, in the event of deficiencies of the delivered object, provided liability is provided in accordance with the product liability law for injury to persons and damages to materials or other special legal requirements.

Likewise, no warranty is provided for damages to conveyance and automation systems, which are the result of a malfunction of the product or a textual error in the operating manual. The warranty excludes damages, which are the result of accessories not supplied or certified by AViTEQ Vibrationstechnik GmbH. AViTEQ Vibrationstechnik GmbH is not responsible for the violation of patent rights and other titles of third parties outside of the Federal Republic of Germany.

We would like to point out that we are not liable for damage to the product subject to the contract, or for consequential damage to other property, if the damage is caused by non-observation of safety regulations and/or warning notices.

When entering the contract, the purchaser/customer is obliged to point out explicitly if the product is intended for private use and will be used by the purchaser/customer predominantly for this purpose.

3.3 Operative range

AViTEQ magnetic vibrators of the series: MV... in standard version are designed and intended as drives for vibration devices for removing, conveying, distributing, condensing, mixing up, dosing and/or screening of bulk materials **outside** of areas with explosive atmospheres.

Vibration devices are used as components of conveyor and automation plants. Sample applications are...

- General industry for transporting and/or screening of, e.g. shavings, plastic- or paint-powder, chemicals, etc.
- Food industry for transporting and/or screening of, e.g. baking ingredients (flour, sugar, etc.), spices, biscuits, cereals, etc.

INFORMATION

We carry out experiments for products whose transportation properties are unknown. Give us a call.

Never use in the following cases:

- Do not use with mains voltages and mains frequencies that, according to the information on the type label, are not adapted for the magnetic vibrator.
- Do not use in areas with ambient temperatures below **-20 °C** and above **+40 °C**, or in tropical climate! The units are designed for operation in moderate climate environments. Special versions for non-moderate climate environments or for lower or higher ambient temperatures might be possible on request.
- Do not use at elevations above 1,000 m above sea level without first consulting AViTEQ Vibrationstechnik GmbH.
- Do not use in the food industry with standard lacquering, if a special lacquering is required that is permitted for the food industry. The drives can be carried out with a special lacquering that is suitable for the food industry on request.
- Do not use, if potentially explosive atmospheres are consisting of a gas-, a vapour-, a mist- and/or a dust-air-mixture.
- Do not use for handling explosives, chemically unstable substances (pyrophorous substances), or self-decomposing substances.

Connexion with the controller

The magnetic vibrators in standard version must only be operated with an appropriate controller, preferably with an AViTEQ-controller. A suitable controller exists for every magnetic vibrator.

INFORMATION

Some types of the sizes MV 1/... and MV 6/... can be operated without a controller by connecting them directly to the mains. Therefore, please study the characteristics curve data sheet of the respective drive.

Other control and connexion options are not included.

3.4 Installation, operating, and maintenance personnel

Prior to installation and/or commissioning, you must be familiar with all details and connexion configurations of the magnetic vibrator.

Persons involved with installation, commissioning, assembly, disassembly, adjustment or maintenance must have read and understood this operating manual in its entirety; in particular the safety instructions. If you have any questions, we would be glad to help you!

All work on the electrical installation must be carried out by qualified personnel (electricians or persons trained in electrical engineering according to EN 60204-1).



The magnetic vibrators for standard areas are only allowed to be repaired by AViTEQ Vibrationstechnik GmbH or by special staff that has been trained and authorised by AViTEQ. AViTEQ Vibrationstechnik GmbH is not liable for damage to property and/or person in the case of neglect!

3.5 Safety information for the point of operation

- Supports and buildings must be designed to withstand the static load and dynamic stresses of the magnetic vibrator(s), the working unit and the bulk material.
- We recommend installing the working unit with the magnetic vibrator in such a way that an all-side free space of at least 120 mm exists. Working stroke and safety distance must be kept free. Please also observe EN 349!
- For adjustment, inspection, and maintenance purposes, the magnetic vibrator must be accessible at all times.

3.6 Safety precautions and responsibilities of the operator

This operating manual is part of the magnetic vibrator and must be available to qualified personnel at any time. The following has to be observed:

- Qualified personnel must have appropriate tools and test equipment at their disposal.
- Qualified personnel must be trained in safe work practices and must be familiar with the safety instructions.
- The operator must obtain a local operating permit and observe any conditions relating to it.
- The applicable conditions in their respective latest version must be complied with. Particularly observe EN 60204-1 which applies for the electrical equipment of machines and which must be applied mandatorily in its area of applicability.
- The operator may only use the magnetic vibrator if it is in perfect condition and in a proper state.

Please observe the following:

- All works on the magnetic vibrator require that you observe the safety instructions as they are shown in this operating manual.
- Avoid any work practice that compromises safety in relation to the magnetic vibrator. **You must not disable any safety mechanisms!**
- Any changes relating to the magnetic vibrator that could compromise safety must be reported to the operator immediately.

3.7 EC-/EU-Directives

According to the EC Directive 2006/42/EC for Machines, Article 2 Point g), the drive is a partly completed machine. It is not permitted to start using this unit until it has been established that the completely functional machine in which the drive is installed complies with the provisions of the Machinery Directive. The drive has been built in accordance with this Directive. An associated Declaration of Incorporation is included on page 59.

Further, the drive complies with the regulations of the EU Directive 2014/35/EU relating to electrical equipment designed for use within certain voltage limits. The associated Declaration of Conformity can be found on page 58.

4

Transport, packaging, and storage

AVITEQ delivers the magnetic vibrators and possible equipment in appropriate packaging to ensure that they reach their destination undamaged.

INFORMATION

If the packing is visibly damaged in a way that indicates damage to the contents, contact the forwarding agent! In further proceedings, take notice of the General Conditions of Business of the forwarding agent in order not to risk your claim for damages by improperly filled out forms!

Storage

- ☞ Storage: Unless special agreements concerning packing and storage have been made, the units, either packed or unpacked, must be stored and transported under „normal“ conditions. This means in enclosed rooms with temperatures between -25 °C and +50 °C, relative humidity not exceed 80% (no condensation).

Transport

DANGER

Risk of injury due to falling parts! Inadequate installation may cause the magnetic vibrator to fall down possibly causing perilous injuries!

Do not add any additional loads to the magnetic vibrator when transporting with lifting equipment or cranes as the lifting rings are only designed to support the weight of the drive and may tear! To provide a specific example, never lift the vibration device using the lifting rings for the magnetic vibrator! Also take note of the weight specifications for the drive(s) when selecting the load attachment device!

Remaining under the suspended load is **not** allowed!

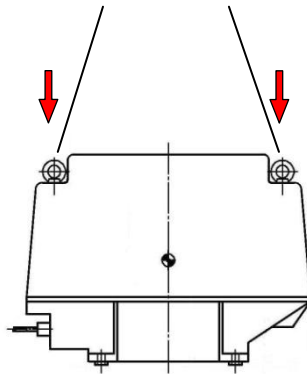
WARNING

Danger of crushing! Avoid unintended swinging of the magnetic vibrator on the hoist during the transport. Further, prevent the magnetic vibrator from falling down by securing it appropriately!

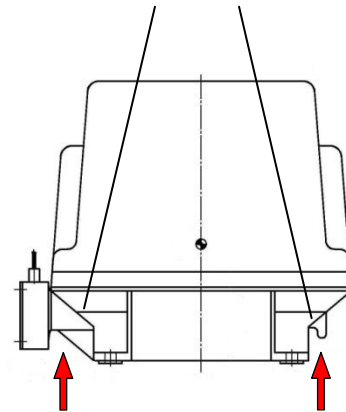
When transporting the unpacked magnetic vibrator, it is easy to avoid damage by observing the following points:

- ☞ Starting from the size MVC..., please use appropriate hoisting devices and lift the unit by the suspension points for transporting the magnetic vibrator.

The dimensions, the weight and the position of the centre of gravity can be found on the appropriate drawing that exists for every magnetic vibrator.



Suspension points MVC... to MVE(S)...



Suspension points MVF... to MVH(S)...

- ☞ Avoid contact with pointed or sharp (metallic) objects that could damage the protective lacquer coating!
- ☞ Always place the unit onto a secure support base and position, such that the unit cannot tip or fall down!

NOTICE

Risk of damage to the magnetic vibrator due to inappropriate storage or transport! Transporting and storing the units under inappropriate conditions may cause permanent damage. Such damage may not be detectable from the outside. AViTEQ does not cover this case in its warranty and is not liable for any consequential damage.

4.1 Extent of delivery

After unpacking, please check the delivery note and accompanying documentation to ensure that all the parts have been supplied and are undamaged.

Compare the information on the type label of the magnetic vibrator, the working unit and the controller with the delivery note and order documentation.

NOTICE

Destruction of magnetic vibrator and controller possible if the units do not match! Only operate units that belong together!

In the case of applications in the food industry, please check, if the magnetic vibrator has been delivered with a special lacquering, if required.

4.2 Disposal of the packing material

AViTEQ uses the following materials for delivering the magnetic vibrators, depending on the type of transport:

- Polyethylene foil (PE) for device protection
- Corrugated cardboard for outer and inner packing
- Wooden cases for outer packing
- Paper shavings as filler material
- Styrofoam (Flo-Pack) as filler and cushioning material

All packing materials should be disposed of in accordance with local regulations of the delivery destination.

Cardboard containers and paper packing tapes can be recycled in accordance with the valid disposal and re-utilisation rules. Where used, packaging foil, packing tapes, and foam foils are made from polyethylene (PE), the CFC-free cushions are usually made from polystyrene foam (PS). These packing materials consist of pure hydrocarbons and can thus be recycled.

In special cases, we use steel packing bands and wooden cases free of chemical treatment.

5 Description of the unit

5.1 Construction and principle of the magnetic vibrator

AVITEQ magnetic vibrators are used as drives for vibration devices. A vibration device consists of at least the following components:

- Magnetic vibrator
- Working unit (trough, tube, screen etc.) with support elements (e.g. rubber pads)
- Controller

Further supply devices may be part of the unit.

The construction concept of the magnetic vibrator is shown in the figure below.

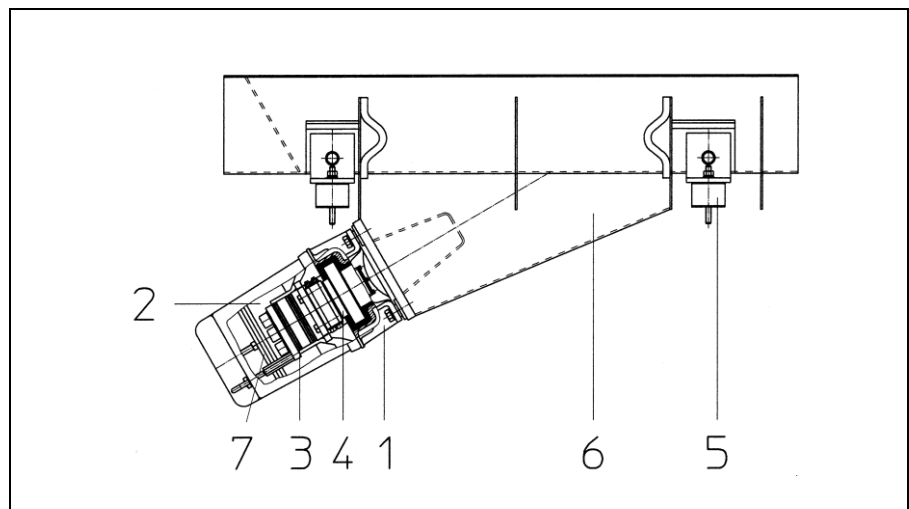


Figure 5-1 Construction of the magnetic vibrator

Together with the working unit the magnetic vibrator forms a two-mass oscillation system and is, among other things, made up of the main components: working side (1), inoperative side (2) with the auxiliary weights (7), leaf springs (3) and electro-magnet (4).

The electromagnet (4) generates a straight-path upwardly oscillation motion. The working unit (6) that is mounted to the working side (1) transmits the oscillation motion to the transported material. Together the working side with the electromagnet (4) and the working unit form one mass unit within the oscillation system. The inoperative side (2) represents the counter-mass. Both masses are connected by leaf springs (3). Support elements (e.g. rubber pads) (5) support the oscillation system to its environment.

Each voltage cycle exerts a pulling force on the electromagnet (4). Depending on the type of the magnetic vibrator, the unit oscillates with 1,500; 2,000; 3,000 or 6,000 oscillations per minute at a 50 Hz-mains or 1,800; 2,400 or 3,600 oscillations per minute at a 60 Hz-mains. By varying the output voltage of the controller, the working stroke and hence the throughput may be adjusted during operation from close to 0 up to 100 %.

5.2 Tuning of the oscillation system

5.2.1 Principles

Vibration drives are spring-mass oscillation systems that exploit the resonance of the oscillation system. If the system is stimulated, it continues to oscillate with its natural frequency, with a decaying amplitude depending on its attenuation properties.

If a sinusoidal force acts on this system with a frequency different from the natural frequency (vibration frequency or drive frequency), the entire system will no longer oscillate at its natural frequency (resonance frequency), but will follow the rhythm of the force exerted on it (forced oscillation).

The closer the natural and the vibration frequency are, the larger the working stroke. However, for electromagnetic vibration drives, operation in the immediate vicinity of the natural frequency is critical, because retroactivities of the transported material like attenuation and coupling effects may have negative effects. For a stable operation of the oscillation system, a well-defined distance from the natural frequency is required. In this case, the natural frequency may be lower or higher than the vibration frequency.

AViTEQ magnetic vibrators, as described in this manual, always work in sub-critical operation. The natural frequency of the oscillation system is greater than the vibration frequency.

5.2.2 Tuning data

For every magnetic vibrator there is a related characteristics curve data sheet that contains all relevant information for tuning the magnetic vibrator. Figure 5-2 on the following page shows the characteristics curve data sheet for the MVE 25-4 as an example

NOTICE

Risk of damage to the drive due to an improper natural frequency! **Only** operate the magnetic vibrator with its allowed natural frequency (observe the appropriate characteristics curve data sheet). Operation with an improper natural frequency may lead to excessive heating of the drive, to short circuits between electromagnet windings, and finally to damaging the drive.

INFORMATION

For measuring the natural frequency you do need an adequate measuring device. This can be either a frequency meter or an electronic measuring device with an oscillation sensor that is able to analyse the natural frequency. Measuring the natural frequency is always carried out without load (without bulk material), because the damping and coupling of the bulk material does not allow an exact measuring result. The natural frequency that is shown on the characteristics curve data sheet is valid only for vibration devices **without** load!

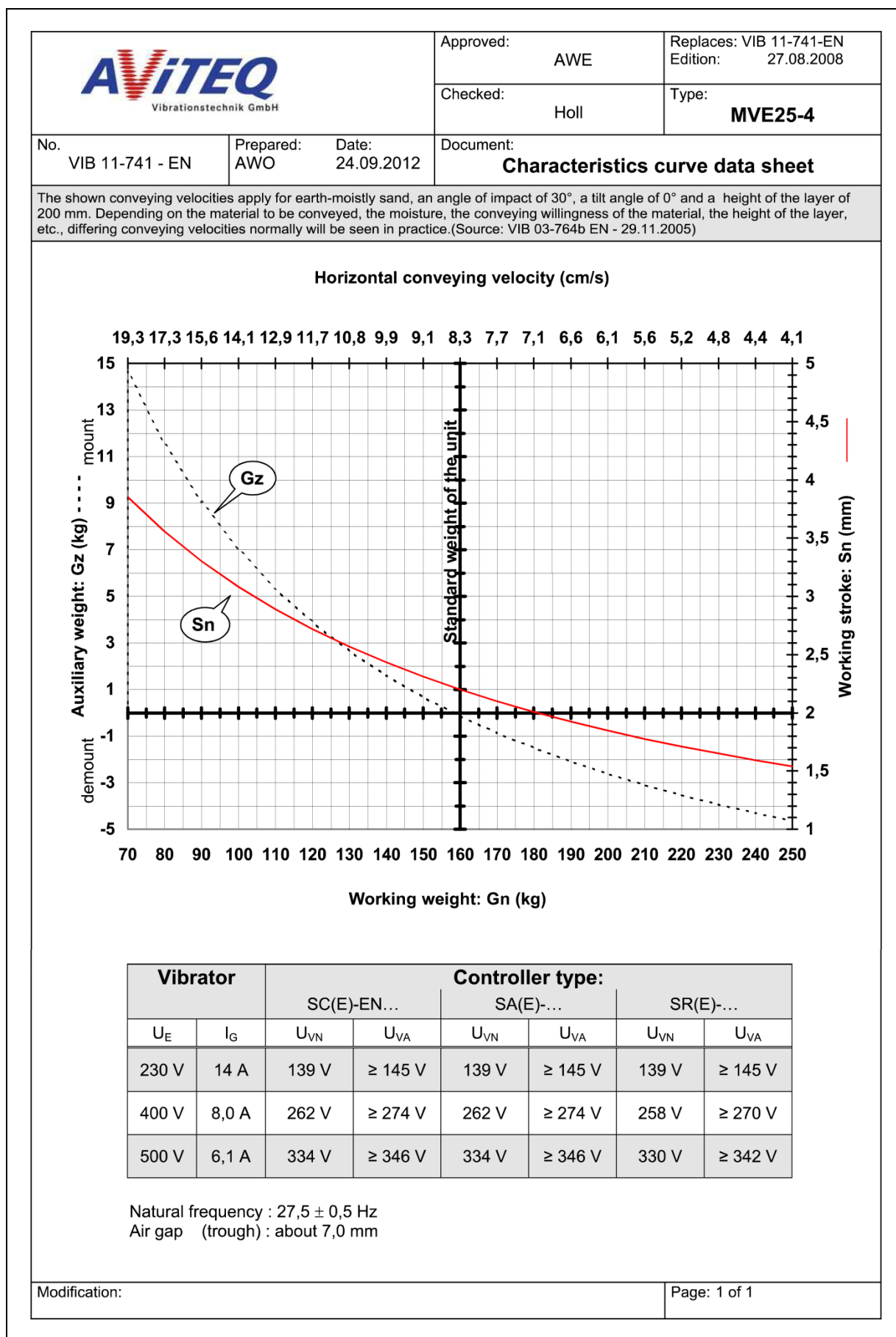


Figure 5-2 Characteristics curve data sheet

The allowed working weight range, the associated working stroke and the necessary auxiliary weight „Gz“ - depending on the working weight „Gn“ - are shown on the characteristics curve data sheet.

Depending on the value of the working weight „Gn“ additional weight has to be added or taken away for adjusting the correct natural frequency.

NOTICE

Collision mode and/or damage to the drive are possible, if the natural frequency is too low or too high! Therefore deviations from the allowed natural frequency are **not** allowed, because this may lead to excessive heating of the drive, to short circuits between electromagnet windings, and eventually to damaging the drive.

INFORMATION

Depending on the type of controller and the particular mains voltage (U_E), the vibrator nominal voltage (U_{VN}) and the vibrator collision voltage (U_{VA}) are shown on the characteristics curve data sheet. The values for the vibrator nominal voltage and the vibrator collision voltage apply only to the associated mains voltage (e.g. 400 V) that is shown in the table.

Instead of a constant value for the mains voltage you will find a mains voltage range on the type label of the AViTEQ-controllers and also on the type label of certain AViTEQ magnetic vibrators. If the mains voltage that you do measure in practice differs from the mains voltage that is shown on the characteristics curve data sheet, you have to check the difference between the vibrator nominal voltage and the vibrator collision voltage and, if necessary correct the setting at the controller.

NOTICE

Risk of damage to the drive due to an improper mains voltage! Only operating the magnetic vibrator with a mains voltage that corresponds to the mains voltage or the mains voltage range that is shown on the type label of the drive including an allowed tolerance of $\pm 10\%$. AViTEQ is not liable for the consequences in the case of neglect!

INFORMATION

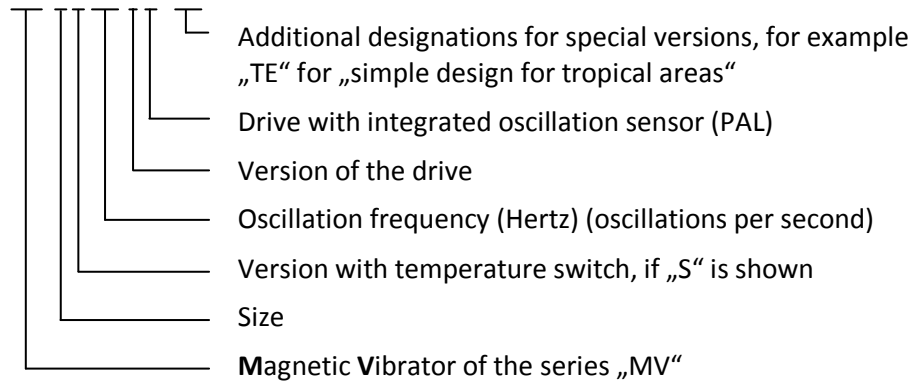
For every magnetic vibrator there is an appropriate characteristics curve data sheet that is needed for a correct tuning of the magnetic vibrator. Before mounting the magnetic vibrator, please check if the appropriate characteristics curve data sheet is present and observe the shown data.

5.3 Sizes

5.3.1 Type designation

AViTEQ-magnetic vibrators are available in different sizes and executions. The type designation contains the following information:

MVES50-1P-TE



INFORMATION

All magnetic vibrators with an integrated oscillation sensor (PAL) and/or a temperature switch are completed with a 5-core connexion cable by AViTEQ. There are some exceptions from the type designation that is shown above. The MVF 30-4, the MVG 33-1P, and the MVH 33-1P do have an integrated temperature switch without showing the code letter "S" in their type designation.

5.3.2 Mounting hole dimensions

INFORMATION

The dimensions are contained in the product specifications for AViTEQ magnetic vibrators (separate drawing) or in the brochure, which are available separately.

On the following page you can find the dimensions of the hole pattern for every magnetic vibrator. Depending on the size, the drive is fixed with 2 or 4 screws.

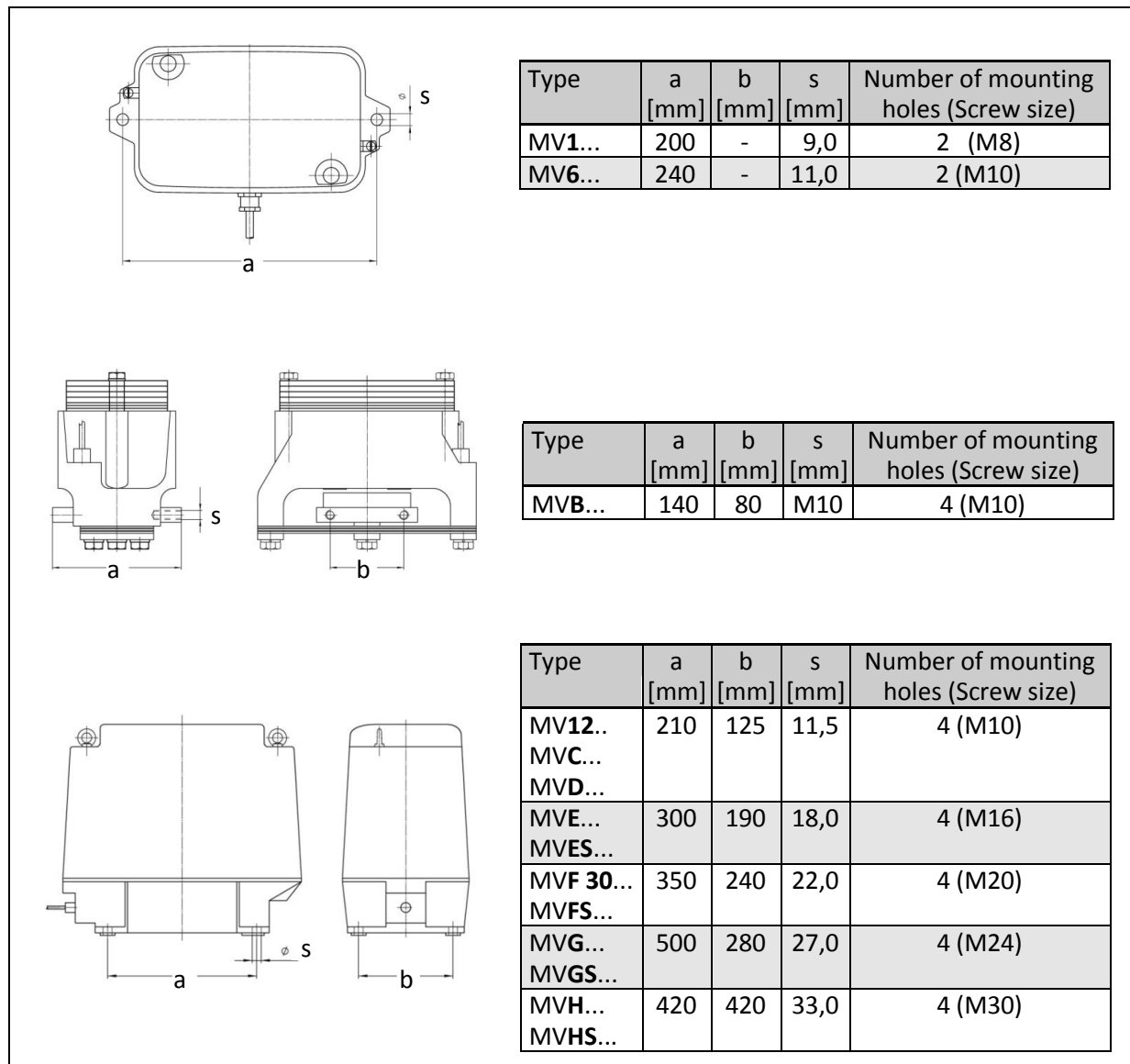


Figure 5-3 Mounting hole dimensions

5.4 Fall protection

From year of manufacture 2018, the magnetic vibrators of the type: MVC...; MVD... and MVE... (later on also MVES... and MVFS...) can usually be fixed to the working unit by a fall protection. The position and the connection dimensions of the attachment points can be found in the corresponding drawing of the magnetic vibrator.

INFORMATION

Whether a fall protection is required depends on the installation situation and the risk situation in the event of a falling-down of the magnetic vibrator. As part of the risk assessment for the vibration device (usually an incomplete machine in the sense of the Machinery Directive 2006/42/EC) or the plant (entire machine), it must be determined whether a fall protection for the magnetic vibrator is required.

The maximum height of fall has to be limited to **200 mm**.

AVITEQ offers corresponding wire ropes as fall protection on request.

5.5 Separate ventilation

Cooling with fresh air is required, if magnetic vibrators are operated in areas with an ambient temperature that exceeds +40 °C. For this AVITEQ delivers modified magnetic vibrators in a special version with separate ventilation.

NOTICE

Risk of damage to the drive due to operating the magnetic vibrator at ambient temperatures exceeding +40 °C without a separate ventilation! Do not operate magnetic vibrators at ambient temperatures exceeding +40 °C without a separate ventilation. AVITEQ is not liable for the consequences in the case of neglect!

Magnetic vibrators in special version with separate ventilation are marked with the code letters "FB" in the type designation. These drives have an inlet-nozzle for the air supply. The allowed maximum overpressure is 15 up to 20 hPA (mbar), the inlet-temperature of the fresh air must not exceed +40 °C.

Depending on the ambient temperature and the magnetic vibrator type, some 2 up to 75 m³/h fresh air are needed for the ventilation. If the vibration device has been delivered by AVITEQ, normally information about the amount of fresh air that is needed are given in the appropriate dimension sheet (drawing). The fresh air cools down the electromagnet and escapes through holes that are located in the protective hood or the working side.

5.6 Sound pressure level

The magnetic vibrator generates a sound pressure level of less than 70 dB(A) without considering the working unit or the transported material. Depending on the construction of the working unit and the acoustic properties of the material transported, the sound pressure level of the operational vibration device may exceed 70 dB(A). It is the operator's responsibility to ensure adherence to the sound pressure level permitted by means of suitable noise protection measures!

6 Installation

6.1 Notes on the working unit

Essential part of the vibration device is the working unit. The working unit can be part of the AViTEQ delivery but also been made by the customer himself.

6.1.1 Working unit



If the working unit has been designed and manufactured by AViTEQ, the associated working weight „Gn“ is shown on the type label of the working unit. To protect the magnetic vibrator from damage during transport, AViTEQ might possibly delivers the magnetic vibrator and the working unit unmounted. While mounting the magnetic vibrator and the associated working unit in this case, make sure that the correct combination of magnetic vibrator and working unit has been chosen. Therefore, check the information that are given in the dimension sheet (drawing) and on the type label of the working unit.

6.1.2 Instructions for working units not supplied by AViTEQ

If you want to build your own working unit (trough, tube, screen, etc.) please observe the following advices:

- ☞ The working unit has to be stiff to avoid bending. The sheet metal fields have to be designed in a way that no sheet metal field resonances perform.
- ☞ The following applies for the admissible flatness tolerance: All four support surfaces for attaching the magnetic vibrator to the device must be between two parallel planes with a maximum distance of 0.2 mm. The permissible average roughness value Ra is 6.3 µm. Breaking of the feet and therewith the destruction of the drive are possible in the case of neglect. A falling down of the drive can be caused by this.
- ☞ Operating noise: the magnetic vibrator generates a sound pressure level of less than 70 dB(A) without considering the working unit or the transported material.



Risk of hearing damage! Depending on the construction of the working unit and the acoustic properties of the material transported, the sound pressure level of the operational vibration device may exceed 70 dB(A). It is the operator's responsibility to ensure adherence to the sound pressure level permitted by means of suitable noise protection measures.

- ☞ On customers request AViTEQ carries out a so-called pre-tuning of the magnetic vibrator, if the value of the working weight (without the weight of the load) is known when ordering the magnetic vibrator!

6.2 Mechanical installation of the magnetic vibrator and the vibration device

Normally first the magnetic vibrator is fixed to the working unit before the vibration device (unit of magnetic vibrator and working unit) is built into the installation.

The following description characterises the normal sequence for completing the vibration device by fixing the magnetic vibrator to the working unit before the vibration device (unit of magnetic vibrator and working unit) is built into the installation and tuned.

6.2.1 Safety information on the installation

DANGER

Risk of injury due to falling parts! Inadequate installation may cause the magnetic vibrator to fall down possibly causing perilous injuries. Ensure that the magnetic vibrator is bolted on tight to the working unit and take appropriate steps to ensure that the vibration device cannot fall down! Remaining under the magnetic vibrator and the working unit is **not** allowed!

Do not add any additional loads to the magnetic vibrator when transporting with lifting equipment or cranes as the lifting rings are only designed to support the weight of the drive and may tear! To provide a specific example, never lift the vibration device using the lifting rings for the magnetic vibrator! Also take note of the weight specifications for the drive(s) when selecting the load attachment device!

Risk of electric shock! Touching electrically live components can be lethal! When the unit is connected to the mains, a lethal voltage is present inside the terminal box of the magnetic vibrator. Ensure that there is no possibility of coming into contact with live parts during the installation!

6.2.2 Assembly preparations

- ☞ Check the supporting surfaces for fixing the magnetic vibrator at the magnetic vibrator and the working unit. The supporting surfaces must be even and free of burrs, of grease and of lacquer.

⚠ DANGER

Risk of injuries due to falling parts! Observe the following requirements that have to be fulfilled:

1. The following applies for the admissible flatness tolerance: All four support surfaces for attaching the magnetic vibrator to the device must be between two parallel planes with a maximum distance of 0.2 mm. The permissible average roughness value Ra is 6.3 µm.
2. The screws for fixing the magnetic vibrator must have a strength class of 8.8.
3. Welding work on the working unit can result in deformation of the mounting surface for the magnetic vibrator. Therefore welding work on the working unit is not allowed after the mounting surface has been machined.
4. The thickness of the mounting plate (connection strips) on the working unit in the area of the feet of the magnetic vibrator must at least correspond to the diameter of the appropriate fixing screws.

Breaking of the feet and therewith the falling off of the drive is possible in the case of neglect. Observe this to avoid a falling down of the magnetic vibrator!

Mounting options

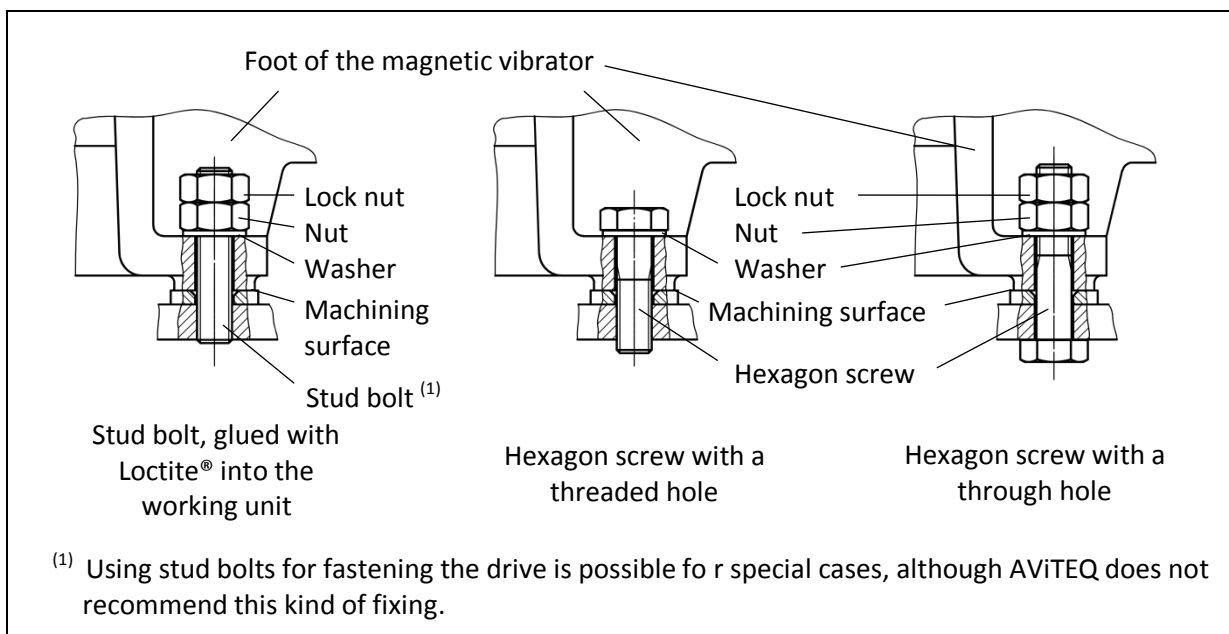


Figure 6-1 Fastening the drive

Figure 6-1 shows three possible mounting options. The most commonly used mounting option is the one using hexagon screws with threaded holes as described below.

- ☞ Choose the correct screws for fixing the magnetic vibrator. The particular screw length for threaded holes and the associated screw size are indicated in the following table 6-2. Further, you do need a plain washer (type: washer ISO 7092 - _ - 200 HV – steel, zinc-plated or stainless steel – A2) for every screw, if this is specified in table 6-2.

Magnetic vibrator	Number of screws	Screw size	Washer ISO 7092- _-200 HV out of steel is required	Minimum screw length	Screw length (maximum)
MV 1 ...	2	M 8	Yes	45 mm	-
MV 6...	2	M10	Yes	40 mm	-
MV 12...	4	M10	Yes	30 mm	30 mm
MVB...	4	M10	Yes	_ ¹⁾	_ ¹⁾
MVC...	4	M10	Yes	35 mm	45 mm
MVD...	4	M10	Yes	35 mm	45 mm
MVE... MVEs...	4	M16	Yes	45 mm	50 mm
MVF 30-4 MVFS...	4	M20	Yes	50 mm	70 mm
MVG 33-1P MVG 50-11	4	M24	-	60 mm	130 mm
MVG 50-2 MVG 60-2	4	M24	-	60 mm	90 mm
MVGS...	4	M24	-	60 mm	130 mm
MVH 33-1P MVH(S)...	4	M30	-	_ ²⁾	

Table 6-2 Fixing screws for threaded holes

- ¹⁾ The screw length depends on the thickness of the adjacent construction. Observe the recommended screw-in depth of 10 mm.
- ²⁾ Stud bolts are **not** allowed with the MVH 33-1P / MVH(S)...!
- ☞ Do magnetic vibrator and working unit match? Therefore, check the data on the type labels of the magnetic vibrator and the working unit.

NOTICE

Risk of damage to the drive and/or the vibration device due to an improper combination of magnetic vibrator and working unit! If the working unit and the magnetic vibrator were delivered by AViTEQ, the adjustment of the natural frequency has already been carried out by AViTEQ. The magnetic vibrator and the working unit even though might be delivered unmounted. On the type label of the working unit you will find amongst others the value of the working weight and the serial number and type of the associated magnetic vibrator. While mounting the magnetic vibrator with the working unit make sure that both match according to the information on the type labels and check the natural frequency before commissioning!

In the case of neglect damage to the magnetic vibrator and an unallowable heating of the drive are possible. AViTEQ Vibrationstechnik GmbH is not liable for damage to property or person in the case of neglect!

- ☞ The controller has to be disconnected from the mains, if the controller and the magnetic vibrator already have been connected.

6.2.3 Installation

WARNING

Danger of crushing! Avoid unintended swinging of the magnetic vibrator on the hoist during the transport. Further, prevent the magnetic vibrator from falling down by securing it appropriately!

-  Screw the magnetic vibrator onto the working unit (see figure 6-1). Tighten the fixing screws with the torque indicated in the following table.

Screw size	Tightening torque (strength class 8.8)
M8	25 Nm
M10	49 Nm
M16	210 Nm
M20	400 Nm
M24	730 Nm
M30	1.450 Nm

Table 6-3 Tightening torque

DANGER

Risk of injuries due to falling parts! Observe the following requirements that have to be fulfilled!

1. Depending on the construction of the working unit, it is also possible to mount the drive by using hexagon screws with through holes or stud bolts. Use plain washers (type: washer ISO 7092 - _ - 200 HV – steel, zinc-plated or stainless steel – A2) as shown in figure 6-1 and secure each nut with a lock nut.

Glue every stud bolt with Loctite®.

2. Tighten the fixing screws or nuts crosswise to avoid faulty gripping.

-  Now integrate the vibration device into the installation. Use suitable support elements. AViTEQ Vibrationstechnik GmbH normally uses rubber pads for an oscillation frequency of 50 and 60 Hz and rubber hollow pads for an oscillation frequency of 25, 30, 33, and 40 Hz.

DANGER

Risk of injuries due to an improper installation! Caused by a relative movement between the support elements and the base frame and/or the vibration device due to unfixed support elements destruction of the support elements and a falling down of the vibration device are possible. Make sure that this cannot happen!

Loctite® is a trademark of the company Henkel KGaA.

- ☞ After the magnetic vibrator has been fixed to the working unit and the vibration device has been integrated into the installation and can oscillate freely, the natural frequency must be checked and if necessary set to the correct value. The value of the associated natural frequency with the allowed tolerance is shown on the characteristics curve data sheet. For tuning the magnetic vibrator first remove the protective hood, if necessary.

 INFORMATION

To assure a faultless measuring result, please observe that the vibration device must oscillate freely, without effecting neighbouring components.

 CAUTION

Danger of crushing! While the magnetic vibrator is in use without a mounted protective hood, danger of crushing the fingers is present in the area of the air gap and the inoperative side.

NOTICE

Risk of damage to the drive due to an improper natural frequency! **Only** operate the magnetic vibrator with its allowed natural frequency (observe the appropriate characteristics curve data sheet). Operation with an improper natural frequency may lead to excessive heating of the drive, to short circuits between electromagnet windings, and finally to damaging the drive.

- ☞ Detect the value of the additional weight that has to be added or taken away on the basis of the characteristics curve data sheet.

 INFORMATION

From mid-2010 on you can find the weight specification „Gz0=...kg“ on the type label of the magnetic vibrator. This information says, how much auxiliary weight has been added during production to tune the magnetic vibrator at its standard weight according to the characteristics curve data sheet. Normally the auxiliary weights are unpainted.

 INFORMATION

If you replace the magnetic vibrator, maybe because the old drive is damaged, you can proceed as follows for presetting the natural frequency:

1. Remove all auxiliary weights of the old magnetic vibrator and identify the total weight by weighing the weights.
2. Compare the total weight of the auxiliary weights of the old magnetic vibrator with the weight specification „Gz0“ on the type label of this old magnetic vibrator. If the total weight is less than the weight specification “Gz0” remove the difference in weight at the new magnetic vibrator. If the total weight is greater than the weight specification “Gz0” add the difference in weight at the new magnetic vibrator.

If the weight specification „Gz0=...kg“ is missing on the type label, you can contact AVITEQ to find out about the value of the weight. Therefore, you have to inform us about the magnetic vibrator type and the serial number of the drive.

-
- ☞ Loosen the fixing nuts of the additional weight and alter the weight. Then tighten the fixing nuts again.
 - ☞ Then detect the natural frequency by observing the following safety instructions.

 INFORMATION

You do need an adequate measuring device for measuring the natural frequency. This can be either a frequency meter or an electronical measuring device with an oscillation sensor that is able to analyse the natural frequency. Measuring the natural frequency is always carried out without load (without bulk material), because the damping and coupling of the bulk material does not allow an exact measuring result. The natural frequency that is shown on the characteristics curve data sheet is valid only for vibration devices **without** load!

 INFORMATION

The protective hood of the magnetic vibrator has to be demounted for adjusting the natural frequency by altering the additional weight „Gz“. Please observe that the weight of the protective hood has an influence on the natural frequency too. Therefore the protective hood has to be mounted again for a correct measurement of the natural frequency after altering the additional weight. Alternatively a compensation weight that complies with the weight of the protective hood can be added to the working weight so that you do not need to mount the protective hood for every measurement. This compensation weight has to be removed again, after the natural frequency has been adjusted.

INFORMATION

The additional weight that is shown on the characteristics curve data sheet and that depends on the working weight has tolerances. Therefore, it is important and **compellingly** required to check the natural frequency. AViTEQ Vibrationstechnik GmbH is not liable for damage to property or person in the case of neglect!

☞ After the tuning of the magnetic vibrator has been carried out with success, do mount the protective hood.

CAUTION

Danger of crushing! After the tuning has been carried out it is mandatory to mount the protective hood. Operating the magnetic vibrator except for the MVB... and the MVG 50-11 without protective hood is **not** allowed! Please observe this.

INFORMATION

From size MVC... until size MVES... lifting eye nuts are used for fixing the protective hood. These lifting eye nuts have to be tightened correctly. From the size MVFS... hexagon nuts or hexagon screws are used for fixing the protective hood. Therefore please observe the following screw tightening torques:

- a) **MVFS...** _____ 12 Nm
(Hexagon nut M8-8)
- b) **MVG 50...; MVG 60... and MVH 50...** _____ 120 Nm
(Hexagon screw M16x...-8.8)
- c) **MVG 33...; MVGS...; MVH 33... and MVHS...** _____ 150 Nm
(Hexagon nut M20x1,5-10)

Always locate a washer between every lifting eye nut, hexagon nut or hexagon screw and the protective hood to avoid damaging the protective hood!

6.3 Electrical installation

6.3.1 Safety information on the electrical installation

DANGER

Risk of electric shock! Touching electrically live components can be lethal! When the unit is connected to the mains, a lethal voltage is present inside the terminal box of the magnetic vibrator.

All work on the electrical installation must be carried out by qualified personnel (electricians or persons trained in electrical engineering according to EN 60204-1).

Switch off the mains supply, check that no voltage is present and protect against unintentional re-connexion!

Risk of electric shock due to frayed connection cables! Connection cables must never come into contact with moving parts as this can damage the insulation. Route the cable in a way that eliminates this hazard!

NOTICE

Risk of damage to the drive due to excessive current draw! Always operate the magnetic vibrator with an appropriate overload protection (motor-protective circuit breaker or similar). The overload protection has to be set to the value of the rated current (nominal current) of the magnetic vibrator, as it is shown on the type label of the drive.

6.3.2 Controllers

The following AVITEQ controllers with different characteristics are applicable and can be designated:

- **SRA(E)...**, series with voltage regulation for nominal currents up to 6,0 A with soft start. Mains voltage fluctuations are compensated and are almost without an effect on the conveyor capability. Optional the controller can be delivered with a level scanning system / part overflow controller. Controllers with a level scanning system / part overflow controller are specially designed for linking several vibration devices.

INFORMATION

For using the level scanning system or the part overflow controller an appropriate sensor is needed. Unless the sensor is not part of the AVITEQ supply, AVITEQ is not responsible for the sensor selected and therefore further is not liable for damages that result out of incorrect selection and an incorrect case of operation of a sensor that is not permitted for the case of operation.

- **SC(E) ...**, series with voltage regulation for nominal currents up to 15,0 A with soft start. Mains voltage fluctuations are compensated and are almost without an effect on the conveyor capability.
- **SA(E) ...**, series with voltage regulation for nominal currents up to 43 A with soft start. Mains voltage fluctuations are compensated and are almost without an effect on the conveyor capability.

- **SD(E) ...**, series with voltage regulation for nominal currents up to 50 A with soft start and digital controller unit. Mains voltage fluctuations are compensated and are almost without an effect on the conveyor capability.

The controllers can optionally be delivered in the following versions:

- **Cabinet unit** (IP54), controller in a closed housing. Depending on the type of the controller, the terminals are designed pluggable and a potentiometer and a switch (On/Off) are integrated on the front plate. Delivered with an appropriate operating manual and possible accessories (e.g. plug etc.).
- **Panel mounting unit** (IP00 or IP20), controller for installation in switching cabinets or control cases. Depending on the type, the fixing of the controller results from mounting onto a top hat rail or bolting together with a subplate. Delivered with an appropriate potentiometer (delivered loose) and operating manual.



Some types of the sizes MV 1/... and MV 6/... can be operated without a controller by connecting them directly to the mains. Therefore, please study the characteristics curve data sheet of the respective drive.



6.3.3 Connexion cable and line lengths

AVITEQ Vibrationstechnik GmbH www.aviteq.de					
Type	Serial no.			Year	
○	V	A	Hz	/ min	○
Operate only with appropriate connector set					
Gz0=		kg			
Magnetic Vibrator		Magnetvibrator		Vibrateur magnetique	
VDE 0580		Made in Germany		CE	

Choose the connexion cable according to the nominal current (observe information on the type label) and the cable length. The voltage drop should not exceed 5%.

When you install the cable between the magnetic vibrator and the controller, please observe the following:

- ☞ The cable length (between the main distribution and the drive) must not exceed **300 m**.
- ☞ The connexion cable for the magnetic vibrator (...first 3 to 4 meter) must be flexible.
- ☞ Only use a cable whose insulation suits the special environmental conditions. For pharmaceutical and food processing applications, you might have to choose sterilisable insulations, if required.
- ☞ In the proximity of the magnetic vibrator, run the cable in such a way that contact with vibrating parts is impossible.

▲ DANGER

Short circuits and electric shock may result if insulation is damaged by rubbing! Connection cables must **never** come in contact with vibrating parts – otherwise, the insulation may be damaged. Run the cables in a way that excludes this danger!

- ☞ Avoid cable loops! Shorten cables if required.

6.3.4 Connexion diagrams

Depending on the application a single magnetic vibrator (see figure 6-4) or up to 4 magnetic vibrators (see figure 6-5) can be operated with a single controller. Also the connexion of a sensor with an AViTEQ controller of the type SRA... in special version with level scanning system or part overflow controller is possible.

i INFORMATION

For using the level scanning system or the part overflow controller an appropriate sensor is needed. Unless the sensor is not part of the AViTEQ supply, AViTEQ is not responsible for the sensor selected and therefore further is not liable for damages that result out of incorrect selection and an incorrect case of operation of a sensor that is not permitted for the case of operation.

INFORMATION

The following connexion diagrams (image 6-4 and 6-5) apply to a combination of an AViTEQ magnetic vibrator with an AViTEQ controller. Further details referring to the connexion of the controller and the magnetic vibrator are given in the operating manual for the respective AViTEQ-controller. If the magnetic vibrator is equipped with an oscillation sensor (PAL) and/or a temperature switch, the connexion has to be carried out according to the information that are given in the operating manual for the respective AViTEQ-controller.

Using a controller from a third-party manufacturer, AViTEQ cannot give any information about the operating behaviour of the magnetic vibrator. No warranty is given for damages that occur out of an improper combination of a controller from a third-party manufacturer with an AViTEQ magnetic vibrator.

For single drives the wiring has to be carried out as shown in the following figure 6-4. If several magnetic vibrators (multiple drives) are operated with a common controller the wiring has to be carried out as shown in the following figure 6-5.

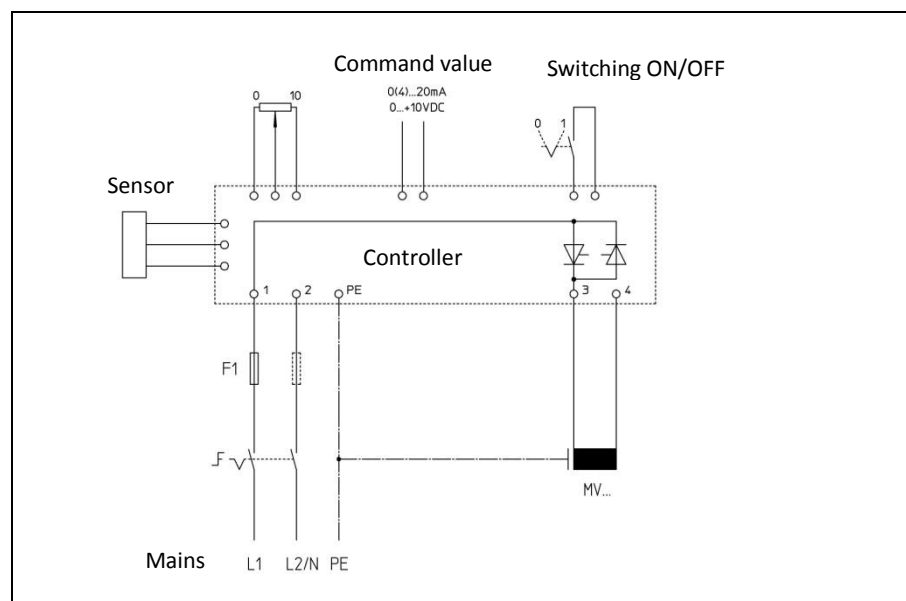


Figure 6-4 Connexion diagram, single drive

6.3.5 Mains connexion

DANGER

Risk of electric shock! Avoid accidents, observe regulations! Regulations and guidelines of your power company apply to the connexion of earth, neutral line, and protective circuitry.

The connexion must be carried out only by qualified personnel (electricians or persons trained in electrical engineering according to EN 60204-1).

Switch off the mains supply, check that no voltage is present and protect against unintentional re-connexion!

Normally the magnetic vibrators are delivered with about a 3.5 m long connection cable that is factory mounted.

Please observe that there is a relative movement between the terminal box at the magnetic vibrator and the support structure during operation.

NOTICE

Risk of damage to the drive due to an improper electrical installation! Magnetic vibrators of the series MV... must only be operated with an appropriate controller. Basic connexion diagrams are part of this operating manual and are shown in chapter 6.3.4. . Please also observe the details referring to the connexion of the controller that are given in the operating manual for the respective AViTEQ-controller.

INFORMATION

Some types of the sizes MV 1/... and MV 6/... can be operated without a controller by connecting them directly to the mains. Therefore, please study the characteristics curve data sheet of the respective drive.

7 Commissioning

7.1 Safety information for the commissioning

DANGER

Risk of electric shock! Touching electrically live components can be lethal! When the unit is connected to the mains, a lethal voltage is present inside the terminal box of the magnetic vibrator. The cover of the terminal box must be closed. Further, check that all cable glands and insulations are undamaged!

Ensure that there is no possibility of coming into contact with live parts before switching on the mains!

Risk of electric shock due to frayed connection cables! Connection cables must **never** come in contact with vibrating parts – otherwise, the insulation may be damaged. Run the cables in a way that excludes this danger!

DANGER

Explosions can lead to fatal injuries and cause significant material damage!

AVITEQ magnetic vibrators of the series: MV... in standard version without an ATEX-type examination certification are **not** allowed to be operated in areas with explosive atmospheres consisting of a gas-, a vapour-, a mist- and/or a dust-air-mixture (presence of combustible dust).

CAUTION

Danger of crushing! Magnetic vibrators of the type MVB... and MVG 50-11 don't possess a protective hood. With these drives there is the risk of crushing the fingers when the magnetic vibrators of the type MVB... and MVG 50-11 are operated.

Further, with the magnetic vibrator of the type MVG 50-11 there is the risk of crushing the fingers in the area of the compression springs when the drive is operated.

NOTICE

Risk of damage to the drive due to excessive current draw! Please observe: 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 leads to unacceptable high temperatures of the coil. This may result in a possible damage to the drive.

If the magnetic vibrator is equipped with a temperature switch that is connected and detected, the magnetic vibrator will be protected against an unallowed excessive temperature.

Always operate the magnetic vibrator with an appropriate overload protection (motor-protective circuit breaker or similar). The overload protection has to be set to the value of the rated current (nominal current) of the magnetic vibrator, as it is shown on the type label of the magnetic vibrator! Check this prior to first commissioning and correct the setting, if it is not correct.

7.2 Initial commissioning

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

Before first commissioning, make sure that the vibration device can oscillate without colliding with neighbouring parts and that all fixing screws (incl. for the support elements) are tightened correctly.

NOTICE

Risk of damage to the drive due to an improper electrical installation! Unsuitable controllers, operation without a controller and/or operation with the incorrect mains voltage/frequency could result in damage to the magnetic vibrator and is not allowed. Ensure that the connected loads are correct and compare them with the device type labels!

Is the protective hood mounted? If not, do mount the protective hood before you start with the commissioning.

CAUTION

Danger of crushing! There is the risk of crushing the fingers in the area of the air gap and the inoperative side when the magnetic vibrator is operated without protective hood. Install the protective hood prior to the initial commissioning as far as this has not been done yet. Operating the magnetic vibrator except for the MVB... and the MVG 50-11 without protective hood is **not** allowed! Please observe this.

The commissioning procedure must be carried out using the lowest working stroke: Turn the vibration-width adjuster (potentiometer) on the controller counter clockwise until 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.

INFORMATION

The commissioning process is carried out at a low working stroke in order to be able to detect any damage caused by assembly errors or the vibration behaviour of the entire vibration device, which is undetected at this point. Example: The working unit collides with neighbouring conveyor components or works in collision mode.

Listen for any hammering (collision) noises that indicate the collision mode.

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.

INFORMATION

Even if the maximum command value (control input) is not used later in actual operation, you should test this position as well during commissioning to ensure that the vibration device operates cleanly at its limit.

If hammering noises or resonances of the working unit or the support structure occur, switch off the unit and check the cause. By measuring the current and the voltage on the terminals of the controller, you can check the appropriate values. The maximum allowed vibrator voltage that is shown on the related characteristics curve data sheet for the respective mains voltage **must** not be exceeded!

DANGER

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

INFORMATION

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 ≥ 750 V!

The current that is shown on the type label must **not** be exceeded!

NOTICE

Risk of damage to the drive due to excessive current draw! Please observe: It is totally prohibited that the current consumption of the magnetic vibrator exceeds the value of the nominal current specified on the type label.

If no problems appeared, please check the function of the magnetic vibrator with the appropriate transported material for completing the commissioning: Is the material transported uniformly? Measure whether the required throughput is achieved.

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

8 Maintenance

8.1 Safety information for maintenance

DANGER

Risk of electric shock! Touching electrically live components can be lethal! Switch off the mains supply before you carry out any maintenance works! Check that no voltage is present and protect against unintentional re-connexion!

CAUTION

Risk of skin burns or irritations! The surface of the magnetic vibrator heats up during operation. Expect surface temperatures of up to 120 °C.

Before carrying out any work, check that the surface temperature of the magnetic vibrator is below +50 °C.

NOTICE

Risk of damage to the drive due to an improper modification of construction parts! Do **not** changes of the air gap, the spring rate, the tightening torque of the spring mounting screws, and/or the setting of the internal oscillation sensor PAL (...if present).

8.2 Regular checks

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

Test intervals	Checks
2 operating hours after the first commissioning	- Check screw connexions (working unit/drive) - Check, if connexion cable does not swing - Check, if connexion cable shows visible damages - Check noise development - Check that no deposits are existing (working unit)
24 operating hours after the first commissioning	- Check screw connexions (working unit/drive) - Check, if connexion cable does not swing - Check, if connexion cable shows visible damages - Check noise development - Check that no deposits are existing (working unit) - Check the condition of the support elements (e.g. rubber (hollow) pads) - Check the condition of the working unit and the drive - Check the natural frequency
weekly	- Check, if connexion cable does not swing - Check, if connexion cable shows visible damages - Check noise development - Check that no deposits are existing (working unit)
monthly	- Check screw connexions (working unit/drive)
half-yearly	- Check the condition of the support elements (e.g. rubber (hollow) pads) - Check the condition of the working unit and the drive - Check the natural frequency

Table 8-1 Regular checks

8.3 Cleaning

Depending on the environmental condition and the properties of the material transported, the magnetic vibrator and in particular the working unit will be subject to varying degrees of contamination. Check the contamination level on regular basis. Initially, check on a weekly basis, thereafter check in intervals that you determine based on the requirements.

If the contamination is significant enough to impair the throughput, the magnetic vibrator or the working unit must be cleaned. As cleaning methods, alongside mechanical methods (hand brush e.g.), pressurised air and water with and without chemical cleansing agents are allowed.

Proceed thereby as follows:

- ☞ Switch off the power to the drive before any cleaning operation!
- ☞ Select the appropriate method! If applicable, follow the guidelines for the use of pressurised air, water and cleaning solvents that apply to the installation site! Also observe the degree of protection according to the type label and take appropriate steps to avoid water intrusion into the terminal box.
- ☞ Only use cleaning solvents with a pH value of 7 or greater!
- ☞ Do not use cleaning solvents containing chlorine!
- ☞ When cleaning with compressed air, observe any in-house regulations regarding dust.

NOTICE

Risk of damage to the drive due to aggressive cleaning agent! Detachment of paintwork and contamination of the transported material! Do not use aggressive agents that could damage the paintwork! In the food processing industry, only permitted cleaning agents and solvents may be used. Do not use cleaning agents that may attack the plastic insulation of cables and cable glands!

- ☞ Remove all residues of transported material and cleaning agent after cleaning!

8.4 Repairs

NOTICE

Risk of damage to the drive due to improper repairs! Please observe:
The magnetic vibrators for standard areas are only allowed to be repaired by AViTEQ Vibrationstechnik GmbH or by special staff that has been trained and authorised by AViTEQ.

The only work that is allowed is the electrical connexion with opening the cover of the terminal box, the mounting of the magnetic vibrator and the tuning to the natural frequency.

In the event of damage, it is best to send the magnetic vibrator back to AViTEQ Vibrationstechnik GmbH, 65795 Hattersheim, Germany for being repaired. We do not recommend self-repairs.

9 Troubleshooting

In the following table you will find information regarding possible faults, which could occur during installation or during operation.

	Fault	Cause(s)	Remedy
①	Drive does not function	No mains voltage present	Check fuse(s) and the supply line(s) (wiring).
		Units (controller, magnetic vibrator) defect	Please send the units to AVITEQ Vibrationstechnik GmbH, we will check and if possible repair the units.
②	Release of the motor-protective circuit breaker or open fuse	Motor-protective circuit breaker has the wrong adjustment	Observe the current shown on the type label on the drive; alter the adjustment on the motor-protective circuit breaker
		Power input of the magnetic vibrator inadmissibly high	Observe point ③.
③	Power input of the magnetic vibrator inadmissibly high	Defect coil (electromagnet)	Please send the unit to AVITEQ Vibrationstechnik GmbH, we will check and if possible repair the magnetic vibrator.
		Air gap is set too wide	Only AVITEQ Vibrationstechnik GmbH is allowed to alter the air gap, please send in the unit or ask for our service.
		Working weight too low causes natural frequency too high	Observe the characteristics curve data sheet and tune to the correct natural frequency by adding weight to the inoperative side
④	Drive is running in collision mode (hammering noise)	Operating the magnetic vibrator without a controller	Only operate the magnetic vibrator with the appropriate controller according to AVITEQ's specifications.
		Screws are loose	Tighten screws immediately with the appropriate torque to avoid damage to the drive and/or the vibration device.
		Working weight too high causes natural frequency too low	Observe the characteristics curve data sheet and tune to the correct natural frequency by reducing the weight of the inoperative side.
		Deposits of the transported material result in a too low natural frequency	Eliminate deposits and take further steps to avoid deposits.
		Air gap is set too narrow	Only AVITEQ Vibrationstechnik GmbH is allowed to alter the air gap, please send in the unit or ask for our service.
		Wrong controller chosen	Please check, if the controller and the magnetic vibrator match, therefore check the AVITEQ delivery information.
		Leaf spring(s) or spring mountings screw(s) broken	Please send the unit to AVITEQ Vibrationstechnik GmbH, we will check and if possible repair the drive, check cause.
		Loose parts collide with the magnetic vibrator or unit	Remove or tighten loose parts immediately.
⑤	Output (capacity) too low	Wrong controller chosen	Please check, if the controller and the magnetic vibrator match, therefore check the AVITEQ delivery information.
		Working weight too low causes natural frequency too high	Observe the characteristics curve data sheet and tune to the correct natural frequency by adding weight to the inoperative side
		Working unit cannot vibrate freely	The working unit must oscillate freely without touching any components, take appropriate steps to assure this.
		Resonances at the working unit or the support construction	Eliminate resonances.
		Deposits of the transported material, also ④ possible	Eliminate deposits and take further steps to avoid deposits.
		Temperatures below 0°C, transported material freezes or sticks	Warm up the transported material if possible or take other steps to avoid that the material freezes or sticks.

Table 9-1 Fault, Causes and Remedies



INFORMATION

Consult us, however, prior to performing error rectification measures to avoid possible damages or accidents.

The faults listed in the table 9-1 mainly refer to the magnetic vibrator. Further faults, caused by the controller, can be found in the appropriate operating manual!

10 Emergency situation

In an emergency situation disconnect the magnetic vibrator from the mains.

11 Dismounting and disposal

11.1 Safety information for the dismounting

DANGER

Risk of electric shock! Touching electrically live components can be lethal! When the unit is connected to the mains, a lethal voltage is present inside the terminal box of the magnetic vibrator.

Switch off the mains supply before you carry out any dismounting works! Check that no voltage is present and protect against unintentional re-connexion.

Risk of injury due to falling parts! Remaining under the magnetic vibrator and the working unit is **not** allowed!

Do not add any additional loads to the magnetic vibrator when transporting with lifting equipment or cranes as the lifting rings are only designed to support the weight of the drive and may tear! To provide a specific example, never lift the vibration device using the lifting rings for the magnetic vibrator! Also take note of the weight specifications for the drive when selecting the load attachment device!

INFORMATION

The centre of gravity is about in the middle of the drive. Detailed information on the location of the centre of gravity can be found in the appropriate dimension sheet (drawing) of the magnetic vibrator (additional document).

11.2 Dismounting

Remove the cover of the terminal box and disconnect the connection cable inside the terminal box. Then untighten the fixing screws of the magnetic vibrator and remove the drive by using appropriate lifting equipment.

WARNING

Danger of crushing! Avoid unintended swinging of the magnetic vibrator on the hoist during the transport. Further, prevent the magnetic vibrator from falling down by securing it appropriately!

11.3 Disposal

11.3.1 Returning the device

AVITEQ Vibrationstechnik GmbH will accept without charge magnetic vibrators, type: MV... that have been delivered in 1990 or later when delivered shipping paid to AVITEQ Vibrationstechnik GmbH, 65795 Hattersheim, Germany.

AVITEQ guarantees for a professional disposal. Therefore, the magnetic vibrators have to be free of product arrears and pollutants. Otherwise AVITEQ is justified to refuse the acceptance of the drive.

11.3.2 Disposal

In case of disposal by the customer, and when exchanging components, the current local waste and disposal regulations apply and should be observed. We accept no responsibility for improperly disposed of parts and components.

- The regulations for the disposal of electronic parts and components apply to the disposal of the controller.
- The power semiconductors used (triacs and diode modules) do not contain beryllium.



More detailed information on the materials used is available from us on request. In case of doubt, please do make use of our recycling service!

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EU-Declaration of Conformity

according to Appendix III, Module A of the EU Directive 2014/35/EU for electrical equipment designed for use within certain voltage limits

The manufacturer ...

AVITEQ Vibrationstechnik GmbH
Im Gotthelf 16
65795 Hattersheim
Germany

declares that the magnetic vibrators of the series ... **MV...**

comply with the requirements of the following European Directive ...

**2014/35/EU Directive for electrical equipment designed
for use within certain voltage limits**

The conformity of the products with the European Directives is proven by compliance with the following harmonized standards and national standard:

EN 60204-1 (2006/CENELEC-Cor. :2010)

EN 60038 (2011)

DIN VDE 0580 (2011-11)

Full technical documentation is available. The operating manual for the devices is in hand. The CE symbol has been included. Strictly observe the safety instructions and the information about proper use in the supplied operating manual!

Hattersheim, 20.04.2016

Legally binding signature:



i.V. Holl (Product Manager for Magnetic Vibrators)

Note: This declaration certifies conformance with the specified standards and directive. It does not, however, include a guarantee of characteristics.

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 drives (magnetic vibrators) of the series ...

MV...

comply with the requirements of the following European Directive:

2006/42/EC Directive for Machines

and according to Article 2 Point g), these are incomplete machines 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. **Thomas Holl** 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. Thomas Holl, Nürtinger Straße 80, 72644 Oberboihingen, Germany.**

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

1.1.2; 1.1.3; 1.1.5;
1.3.3; 1.3.4; 1.3.7; 1.3.8.1;
1.4.1; 1.4.2.1;
1.5.8;
1.6.1; 1.6.2; 1.6.5;
1.7.1; 1.7.3; 1.7.3; 1.7.4.1; 1.7.4.2 and 1.7.4.3.

According to Article 2 Point g) of the Machines Directive 2006/42/EC, the drives are incomplete machines. Installation instructions according to Appendix VI must be produced for and supplied with these incomplete machines. Due to the requirements arising from other also applicable EC/EU Directives, a complete operating manual has been produced. This is an integral part of the product. A separate installation manual therefore does not exist. Instead, the description of the installation is part of the operating manual and must be observed accordingly.

It is not permitted to start using the drive until it has been ensured that the machine in which the drive 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 operating manual!

Hattersheim, 20.02.2018

Legally binding signature:



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