



Type / Serial number:

eMV _____



II 2 G, D
BVS .. ATEX ...

Operating Manual Magnetic Vibrator

Special version for areas with potentially explosive atmospheres

Series eMV ... (Ex)

Intended Use

AViTEQ magnetic vibrators in special version for areas with potentially explosive atmospheres with the authorisation:



BVS 05 ATEX ...
II 2 G Ex e IIB T4
II 2 D Ex tD A21 IP65 T 105°C

are designed and intended as units of the equipment group II, category 2 and 3 according to EN 60079-0 and EN 61241-0 as drives for vibration conveyor devices for removing, conveying, distributing, condensing, mixing up, dosing and/or screening of bulk materials in areas with the risk of explosion by a gas-, a vapour-, a mist- or a dust-air-mixture.

Operation is only allowed with the associated AViTEQ-controller, which must be installed outside the area with potentially explosive atmosphere. The controller must correspond to the defaults of the associated ATEX-type examination certification. For each magnetic vibrator a separate varistor protection unit and a certified (ATEX) motor-protective circuit breaker must be installed.

When installing the magnetic vibrator to a working unit (trough, tube or rail) it is to be made certain that no ignition sources result from colliding components. The vibration conveyor device (unit of magnetic vibrator and working unit) must be able to oscillate freely, without effecting neighboring components.

For your Safety

You will find three different types of symbols in this operating manual 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!).



NOTE!

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

Even though the AViTEQ magnetic vibrators were developed with all safety measures for your protection, handling errors may occur. In the interest of your safety and that of your colleagues, observe the following information:



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 and the cover of the terminal box is closed!



DANGER!

The magnetic vibrators in special version for areas with potentially explosive atmospheres are normally delivered without a connection cable and without a cable gland. Select, depending upon your case of application, a connection cable with a suitable cable cross section, permissible in accordance with the standards. The temperature of the connection cable must not exceed a value of +70°C with gas (zone 1 and 2) or dust (zone 21 and 22) at the cable gland and a value of +80°C inside the terminal box at the terminals. Select a connection cable that is suitable for a maximum temperature of +80°C and ask us in the case of doubt.

Only use cable glands with a metric thread that are permitted for the use in areas with potentially explosive atmospheres for your particular case. The degree of protection of the cable gland must be at least IP65. Further the cable gland must possess a strain relief.

*Normally the size of the thread for the cable gland provided by the customer for the magnetic vibrator sizes eMVC... (Ex), eMVD... (Ex) and eMVE... (Ex) is M20x1,5. As a special version also the thread size M25x1,5 is possible. Subsequent changing of the thread size or using extensions, reductions and/or intermediate connecting pieces is **not** allowed and results in the invalidity of the type examination certification!*



DANGER!

Never open the cover of the terminal box, as long as voltage is present at the terminals inside the terminal box, because this can be an ignition source and as a result lead to an ignition of a potentially explosive atmosphere consisting of a gas-, a vapour-, a mist- or a dust-air-mixture.



DANGER!

Inadequate installation may cause the magnetic vibrator to fall down possibly causing injuries or lead to an ignition spark. Ensure that the magnetic vibrator is bolted on tight to the working unit and take appropriate steps to ensure that the vibration conveyor device cannot fall down!



DANGER!

*Magnetic vibrators in special version for areas with potentially explosive atmospheres must only be operated with the appropriate AViTEQ-controller that is certificated for this case. The controller itself **must not** be installed in areas with potentially explosive atmospheres, and, according to the type examination certification, has to be completed with a motor-protective circuit breaker with a ATEX-Certification and a varistor protection unit for every magnetic vibrator. In the case of neglect AViTEQ is not liable for the consequences!*

In particular it is prohibited to operate the magnetic vibrator with a frequency converter.

*Magnetic vibrators in normal version without an ATEX-type examination certification **must not** be operated in areas with potentially explosive atmospheres consisting of a gas-, a vapour-, a mist- or a dust-air-mixture!*



DANGER!

Parts that collide with other parts can lead to ignition sources. Before first commissioning, make sure that the vibration conveyor device can oscillate without colliding with other parts and that all screws are tightened correctly.

*The magnet system is coated with a special dark impact-protection lacquer that anticipates the formation of ignition sparks. However, a so-called collision mode is **not** permitted! In the case of visible damage of the impact-protection lacquer in the area of the electromagnet, the magnetic vibrator in special version for areas with potentially explosive atmospheres is not allowed to be operated and has to be sent to AViTEQ for being repaired!*



DANGER!

*A subsequent varnishing of the magnetic vibrator and/or the protective hood is **prohibited**, because this may lead, caused by the coating, to an unacceptable electrostatic charging and as a result to ignition sources.*

A subsequent varnishing of the magnetic vibrator and/or the protective hood will lead to an expiring of the associated type examination certification! In the case of neglect AViTEQ is not liable for the consequences!



ATTENTION!

Every magnetic vibrator must be operated with a separate motor-protective circuit breaker! It is not allowed to add up the currents of several magnetic vibrators and then operate them with a common motor-protective circuit breaker!

In particular observe the following data on the type label: I_A/I_N – ratio between the pull-in current I_A and the rated current (nominal current) I_N and the time t_E – time period in which the coil of the electromagnet, as a result of the pull-in current, warms up from the end-temperature during rating mode with an ambient temperature of $+40^\circ\text{C}$ to the limit temperature.



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 leads to temperatures that exceed the respective temperature class. In this case the associated type examination certification becomes invalid and further this may lead to the destruction of the magnetic vibrator.



ATTENTION!

Unsuitable controller, operation without 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!

The motor-protective circuit breaker 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 adjust the setting, if it isn't correct.



ATTENTION!

Changes of the air gap, the spring rate, the tightening torque of the spring mounting screws and/or operating the magnetic vibrator with an incorrect natural frequency (...observe characteristics curve data sheet) are not allowed and result in the invalidity of the type examination certification, because this may lead to excessive heating of the drive, to short circuits between electromagnet windings, and eventually to the destruction of the drive.



ATTENTION!

In the case of applications in the food industry a special lacquering is required that is permitted for the food industry. Please observe this to avoid health risks of others.



ATTENTION!

*For making the working unit (trough, tube, screen, etc.) all materials are allowed **except** aluminium alloys with a magnesium part by weight greater than 7.5 % and plastic with a surface resistivity greater than 10^9 Ohm.*



NOTE!

This operating manual refers only to the magnetic vibrators of the type: eMVC... (Ex), eMVD... (Ex) and eMVE... (Ex) in accordance with the type examination certification. For magnetic vibrators in standard design there is a separate operating manual.



NOTE!

It is absolutely forbidden to carry out maintenance work. The magnetic vibrators in special version for areas with potentially explosive atmospheres are only allowed to be repaired by AViTEQ Vibrationstechnik GmbH. In the case of non-observance the associated type examination certification expires. AViTEQ Vibrationstechnik GmbH is not liable for damage to property and/or persons in the case of neglect!

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



NOTE!

For anticipating the formation of ignition sparks by collision of parts of the magnetic system the armature is coated with a special dark impact-protection lacquer. Further the electromagnet is coated with a conductible lacquer. In the case of visible damage of the impact-protection lacquer or the conductible lacquer in the area of the electromagnet, the magnetic vibrator in special version for areas with potentially explosive atmospheres is not allowed to be operated and has to be sent to AViTEQ for being repaired!



NOTE!

*Magnetic vibrators in special version for areas with potentially explosive atmospheres are, according to the associated type examination certification, designed and permitted for areas with potentially explosive atmospheres consisting of a gas-, a vapour-, a mist- or a dust-air-mixture. A so-called „hybrid operation“, an operation with coexisting potentially explosive atmospheres consisting of a gas-, a vapour-, a mist- and a dust-air-mixture is **not** allowed.*



NOTE!

Depending on the construction of the working unit and the acoustic properties of the material transported, the sound pressure level of the operational magnetic vibrator 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!



NOTE!

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

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This operating manual supports the intended use and appropriate deployment of AViTEQ magnetic vibrators. For this purpose, the operating manual describes details that are significant for the product's operation.

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Unless otherwise stated, the relevant state of engineering is that at the time of the combined delivery of the product and the operating manual from AViTEQ Vibrationstechnik GmbH. The product is subject to technical changes without prior notice. Previous operating manuals no longer apply.

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

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

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Hattersheim-Eddersheim, 20th of July 2009

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1 We are Partners

1.1 About this Operating Manual

For whom?

This operating manual is intended for

- Installation technicians installing and/or commissioning the magnetic vibrator and/or the vibration conveyor device.
- Engineers installing the controller, the electrical connection to the a.c. mains network and the connection 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

- Connection diagram for the controller
- Operating manual for the controller
- ATEX-Type Examination Certificate including supplement
- 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

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 conveyor device:* magnetic vibrator with the assembled working unit
- *Controller:* the separately shipped controller unit assigned to the magnetic vibrator including motor-protective circuit breaker (ATEX) and a varistor protection unit for connecting to the a.c. mains network



NOTE!

This operating manual refers only to the magnetic vibrators of the type: eMVC... (Ex), eMVD... (Ex) and eMVE... (Ex) in accordance with the type examination certification. For magnetic vibrators in standard design 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 the page was last updated.

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 areas with potentially explosive atmospheres and their environment, you should give us a call! We do not want you to endanger yourself or others just because the possible dangers were not clear to you!

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 upward showing thumb tells you to check something, or read a summary.
-  The pointing finger indicates steps that you have to carry out.

1.2 Product Liability and Warranty

The magnetic vibrators in special version for areas with potentially explosive atmospheres 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 on the first, left-hand inner page (page 2 / 40) in the front of 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. Further the ATEX-authorisation will expire. 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.

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

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 in special version for areas with potentially explosive atmospheres 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.

The magnetic vibrators in special version for areas with potentially explosive atmospheres described in this operating manual must not be operated without consultation and corresponding release by AViTEQ Vibrationstechnik GmbH in the United States of America and other countries where US American laws are applicable.

1.3 Operative Range

AViTEQ magnetic vibrators in special version for areas with potentially explosive atmospheres are designed and intended as units of the equipment group II, category 2 and 3 according to EN 60079-0 and EN 61241-0 as drives for vibration conveyor devices for removing, conveying, distributing, condensing, mixing up, dosing and/or screening of bulk materials in areas with the risk of explosion by a gas-, a vapour-, a mist- or a dust-air-mixture.

Magnetic vibrators are used as components of conveyor and automation plants. Sample applications are...

- general industry use for the transport and screening of, e.g. shavings, plastic- or paint-powder, chemicals etc.
- food industry for the transport and screening of, e.g. baking ingredients (flour, sugar, etc.), spices etc.



NOTE!

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 liquids, powder with particle diameters of less than 50 μm , sticky items, items that may jam, bulky items, soft items and fragile items (thin glass)!
- *Do not use* if product temperatures exceed +100°C, or in environmental temperatures below - 20°C and above + 40°C, or in tropical climate! The units are designed for operation in moderate climate environments.
- *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.
- *Do not use* if co-existing potentially explosive atmospheres are consisting of a gas-, a vapour-, a mist- and a dust-air-mixture (so-called hybrid-mixtures).

Connection with the controller

The magnetic vibrators in special version for areas with potentially explosive atmospheres must only be operated with the appropriate AViTEQ-controller with a varistor protection unit and a certified (ATEX) motor-protective circuit breaker. A suitable controller exists for every magnetic vibrator.

Other control and connection options are not included.



DANGER!

The magnetic vibrators in special version for areas with potentially explosive atmospheres are normally delivered without a connection cable and without a cable gland. Select, depending upon your case of application, a connection cable with a suitable cable cross section, permissible in accordance with the standards. The temperature of the connection cable must not exceed a value of +70°C with gas (zone 1 and 2) or dust (zone 21 and 22) at the cable gland and a value of +80°C inside the terminal box at the terminals. Select a connection cable that is suitable for a maximum temperature of +80°C and ask us in the case of doubt.



DANGER!

Only use cable glands with a metric thread that are permitted for the use in areas with potentially explosive atmospheres for your particular case. The degree of protection of the cable gland must be at least IP65. Further the cable gland must possess a strain relief.

*Normally the size of the thread for the cable gland provided by the customer for the magnetic vibrator sizes eMVC... (Ex), eMVD... (Ex) and eMVE... (Ex) is M20x1,5. As a special version also the thread size M25x1,5 is possible. Subsequent changing of the thread size or using extensions, reductions and/or intermediate connecting pieces is **not** allowed and results in the invalidity of the type examination certification!*

***Never** open the cover of the terminal box, as long as voltage is present at the terminals inside the terminal box, because this can be an ignition sources and as a result lead to an ignition of a potentially explosive atmosphere consisting of a gas-, a vapour-, a mist- or a dust-air-mixture.*



ATTENTION!

Operate the magnetic vibrator in special version for areas with potentially explosive atmospheres only with the appropriate controller according to the type examination certification. In the case of neglect the type examination certification becomes invalid! Further AViTEQ is exempt from any kind of liability in this case.

1.4 Installation and Operating Personnel

Prior to installation and/or commissioning, you must be familiar with all details and connection 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 notes. 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).



NOTE!

The magnetic vibrators in special version for areas with potentially explosive atmospheres are only allowed to be repaired by AViTEQ Vibrationstechnik GmbH. In the case of non-observance the associated type examination certification expires. AViTEQ Vibrationstechnik GmbH is not liable for damage to property and/or person in the case of neglect!

1.5 Safety Instruction Regarding the Operation Location

- Supports and buildings must be designed to withstand the static load and dynamic stresses of the magnetic vibrator(s), the vibration (conveyor) device and the bulk material.
 - The magnetic vibrator with the vibration (conveyor) device has to be located in such a way that an adequate safety distance of 120 mm is present on all sides. Working stroke and safety distance must be kept free.
 - For adjustment, inspection, and maintenance purposes, the magnetic vibrator must be accessible at all times.
-

1.6 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 notes.
- The operator must obtain a local operating permit and observe any conditions relating to it. All requirements for the use of the magnetic vibrator in areas with potentially explosive atmospheres must be fulfilled.
- EC regulations in their current version are to be observed. This applies in particular to EN 60 204-1 regarding machine safety and electrical equipment of machines.
- 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 notes 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.

1.7 EC-Directives

The magnetic vibrator is not a standalone machine in the sense of the EC Machinery Directive 98/37/EC, and only intended for use together with another machine. Operation is prohibited until it has been established that the machine that is handed to the operator complies with the regulations of the EC directive. The magnetic vibrator was built in accordance with these regulations. The associated Manufacturer's Declaration can be found on page 41.

Further the magnetic vibrator complies with the regulations of the EC directive 94/9/EC relating to equipment and protective systems for use in areas with potentially explosive atmospheres. The associated Declaration of Conformity can be found on page 40.

2 Transport, Storage

Magnetic vibrators for areas with potentially explosive atmospheres are delivered in appropriate packaging to ensure that they reach their destination undamaged.



NOTE!

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:** 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 $+50^{\circ}\text{C}$, relative humidity not exceed 80%.

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

- ☞ For transporting the magnetic vibrator use appropriate hoisting devices and lift the unit by the suspension points.
- ☞ 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!

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



ATTENTION!

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.

2.1 Extent of Delivery

After unpacking, 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!



ATTENTION!

Destruction of magnetic vibrator and controller possible if the units don't match! Only operate units that belong together and observe the information in the associated type examination certification.

The motor-protective circuit breaker 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, if necessary, the setting, if it isn't correct.

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

2.2 Disposal

2.2.1 Packing Materials

The following materials are used by AViTEQ 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 within the RECY Disposal and Re-utilisation System. 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.

2.2.2 Returning the Device

AViTEQ Vibrationstechnik GmbH will accept without charge magnetic vibrators, type: eMV... (Ex) that have been delivered in 2009 or later when delivered shipping paid to AViTEQ Vibrationstechnik GmbH, 65795 Hattersheim-Eddersheim, 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.

2.2.3 Materials Used in the Units

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.



NOTE!

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!

3 Equipment Configuration

3.1 Construction and Principle of the Magnetic Vibrator

AViTEQ magnetic vibrators are used as drives for vibration conveyor devices. A vibration conveyor 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 vibration conveyor device is shown in the figure below.

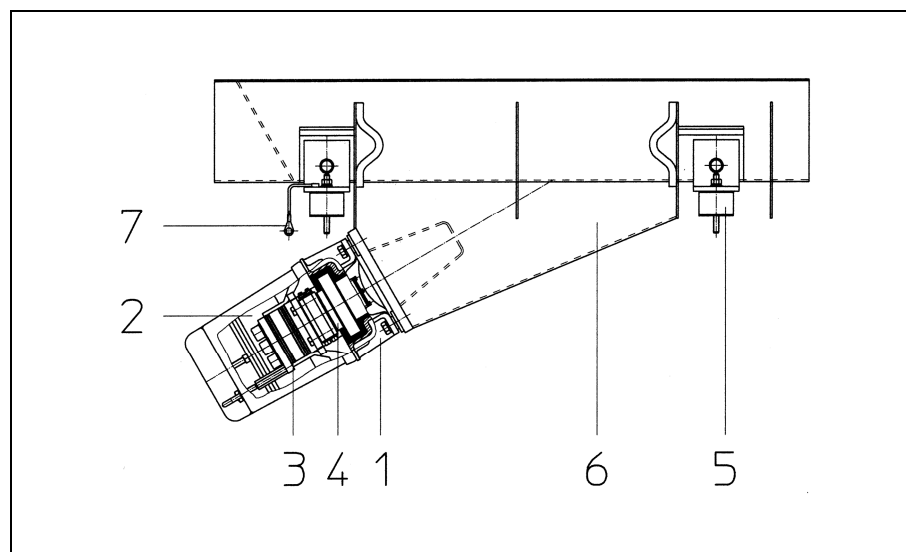


Figure 3-1 Construction of the magnetic vibrator and the vibration conveyor device

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), leaf springs (3) and electromagnet (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. Grounding strips (7) assure an earthing and are connected with the support construction.

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 or 3,000 oscillations per minute at a 50 Hz-mains. By changing the voltage from the controller, the working stroke and hence the throughput may be adjusted during operation from close to 0 to 100 %.

3.2 Tuning of the Oscillation System

3.2.1 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 for areas with potentially explosive atmospheres, as described in this manual, always work in sub-critical operation. The natural frequency of the oscillation system is greater than the vibration frequency

3.2.2 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 3-2 on the following page shows the characteristics curve data sheet for the eMVE 25-4.. (Ex) as an example.



ATTENTION!

Changes of the air gap, the spring rate, the tightening torque of the spring mounting screws and/or operating the magnetic vibrator with a incorrect natural frequency (...observe characteristics curve data sheet) are not allowed and result in the invalidity of the type examination certification, because this may lead to excessive heating of the drive, to short circuits between electromagnet windings, and eventually to the destruction of the drive.



NOTE!

*For measuring the natural frequency you do need an adequate measuring device. 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 doesn't allow an exact measuring result. The natural frequency that is shown in the characteristics curve data sheet is valid only for vibration conveyor devices **without load!***

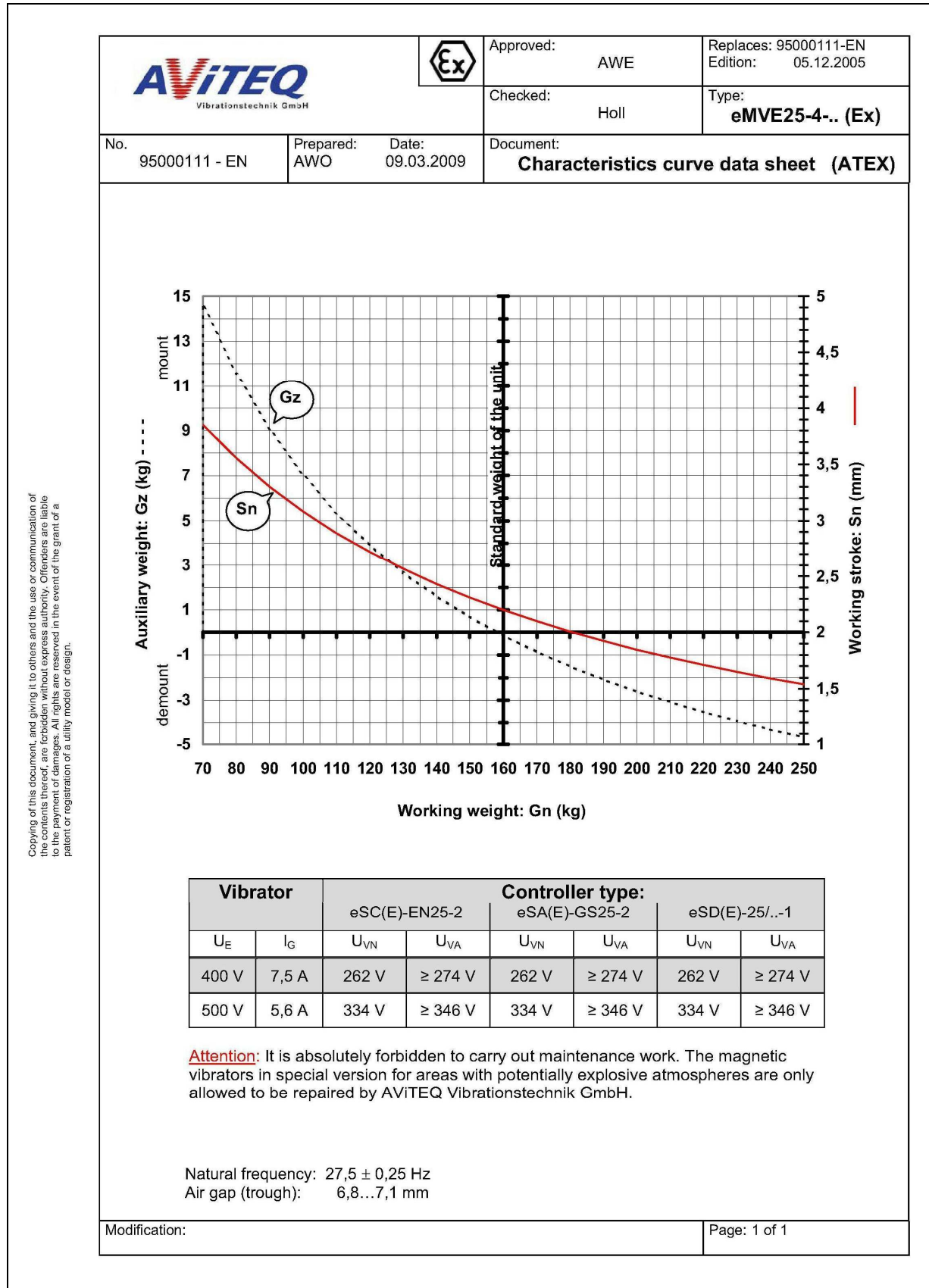


Figure 3-2 Characteristics curve data sheet

The allowed working weight range, the associated working stroke and the necessary additional 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.



ATTENTION!

*The natural frequency that is shown on the related characteristics curve data sheet **must** be compellingly kept. Check this before commissioning.*

If the natural frequency lies above the allowed value, the active power consumption of the magnetic vibrator will increase which leads to an unallowable heating of the drive. In this case the associated type examination certification expires and further, damage to the magnetic vibrator is possible! AViTEQ Vibrationstechnik GmbH is not liable for damage to property or person in the case of neglect!

If the natural frequency lies below the allowed value, the risk of operating the magnetic vibrator in collision mode increases. Further the active power consumption of the magnetic vibrator might increase which leads to an unallowable heating of the drive. In this case the associated type examination certification expires and further, damage to the magnetic vibrator is possible! AViTEQ Vibrationstechnik GmbH is not liable for damage to property and/or person in the case of neglect!



NOTE!

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.

Operating the magnetic vibrator with a mains voltage that differs from the mains voltage value or that is outside the mains voltage range that is shown on the type label of the magnetic vibrator including an allowed tolerance of $\pm 10\%$ is forbidden. In the case of neglect AViTEQ is not liable for the consequences!



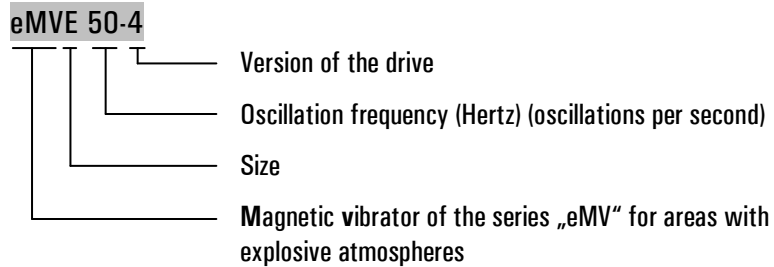
NOTE!

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 keep with the shown data!

3.3 Sizes

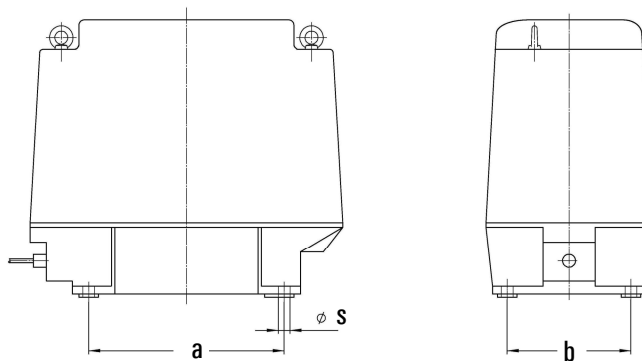
3.3.1 Type Designation

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



3.3.2 Housing Sizes and Mounting Hole Dimensions

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



Size	a [mm]	b [mm]	s [mm]	Number of mounting holes (Screw size)
eMVC... eMVD...	210	125	11,5	4 (M10)
eMVE...	300	190	18,0	4 (M16)

3.4 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 magnetic vibrator 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!

4 Installation

4.1 Installation of the Working Unit

4.1.1 Working Unit

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



ATTENTION!

*For making the working unit (trough, tube, screen, etc.) all materials are allowed **except** aluminium alloys with a magnesium part by weight greater than 7.5 % and plastic with a surface resistivity greater than 10^9 Ohm.*



NOTE!

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 delivers the magnetic vibrator and the working unit unmounted. While mounting the magnetic vibrator and the associated working unit make sure that the correct combination of magnetic vibrator and working unit have been chosen. Therefore check the information that are given in the shipping documents (dimension sheet) and on the type label of the working unit.

4.1.2 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 maximum allowable tolerance for the evenness for the bearing surface for the fixing of the magnetic vibrator at the saddle (working unit) is $\pm 0,2$ mm. 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 form ignition sparks.
- ☞ 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.



NOTE!

Depending on the construction of the working unit and the acoustic properties of the material transported, the sound pressure level of the operational magnetic vibrator 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 pretuning of the magnetic vibrator, if the value of the working weight (without the weight of the load) is known when ordering the magnetic vibrator!

4.2 Completing the Vibration Conveyor Device

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



Parts that collide with other parts can lead to ignition sources. Before first commissioning, make sure that the vibration conveyor device can oscillate without colliding with other parts and that all screws are tightened correctly.

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

4.2.1 Assembly Preparations

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



The maximum allowable tolerance for the evenness for the bearing surface for the fixing of the magnetic vibrator at the saddle (working unit) is $\pm 0,2$ mm. 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 form ignition sparks and also result in injury to personnel.

- ☞ Choose the correct screws for fixing the magnetic vibrator. The particular screw length for tap holes and the screw size are indicated in the following table. Choose screws with a bolt quality of at least 8.8!

Magnetic vibrator	Screw size	Screw length (recommended)
eMVC... (Ex), eMVD... (Ex)	M10	35 mm
eMVE... (Ex)	M16	45 mm

Table 4-1 Fixing screws

- ☞ Do magnetic vibrator and working unit match? Therefore check the data on the type labels of the magnetic vibrator and the 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. Normally the magnetic vibrator and the working unit are 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. The associated type examination certification expires in this case! AVITEQ Vibrationstechnik GmbH is not liable for damage to property and/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.

4.2.2 Installation

- ☞ Screw the magnetic vibrator onto the working unit. Tighten the fixing screws with the torque indicated in the following table.

Screw size	Tightening torque (bolt quality 8.8)
M10	48 Nm
M16	200 Nm

Table 4-2
Tightening torques

- ☞ Now integrate the vibration conveyor device into the installation. Use suitable support elements. AViTEQ Vibrationstechnik GmbH normally uses rubber pads for an oscillation frequency of 50 Hz and rubber hollow pads for an oscillation frequency of 25 Hz. Further do provide a grounding strip at at least one of the support elements between the working unit and the base frame.



DANGER!

Parts that collide with other parts can lead to ignition sources. Before first commissioning, make sure that the vibration conveyor device can oscillate without colliding with other parts and that all screws including the screws of the support elements are tightened correctly.

Caused by a relative movement between the support elements and the base frame and/or the working unit due to unfixed support elements destruction of the support elements is possible that might lead to the creation of ignition sources caused by colliding parts. Make sure that this can't happen!

- ☞ After the magnetic vibrator has been fixed to the working unit and the vibration conveyor 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.



ATTENTION!

***Collision mode due to a too low natural frequency!** Therefore deviations from the allowed natural frequency are **not allowed** and result in the invalidity of the type examination certification, because this may lead to excessive heating of the drive, to short circuits between electromagnet windings, and eventually to the destruction of the drive.*



ATTENTION!

***Destruction of the magnetic vibrator caused by an improperly high natural frequency possible!** Therefore deviations from the allowed natural frequency are **not allowed** and result in the invalidity of the type examination certification, because this may lead to excessive heating of the drive, to short circuits between electromagnet windings, and eventually to the destruction of 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.
- ☞ 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 notes:



NOTE!

*For measuring the natural frequency you do need an adequate measuring device. 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 doesn't allow an exact measuring result. The natural frequency that is shown in the characteristics curve data sheet is valid only for vibration conveyor devices **without load!***



NOTE!

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



NOTE!

*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 Vibrations-technik 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.
- ☞ Care for a potential equalisation between the magnetic vibrator and the base frame or the working unit. Therefore use the present earthing terminal at the magnetic vibrator.



Figure 4-3 Earthing terminal

4.3 Mains Connection

4.3.1 Controllers



*Magnetic vibrators in special version for areas with potentially explosive atmospheres must only be operated with the appropriate AViTEQ-controller that is certificated for this case. The controller itself **must not** be installed in areas with potentially explosive atmospheres, and, according to the type examination certification, has to be completed with a motor-protective circuit breaker with a ATEX-Certification and a varistor protection unit for every magnetic vibrator. In the case of neglect AViTEQ is not liable for the consequences!*

In particular it is prohibited to operate the magnetic vibrator with a frequency converter.

*Magnetic vibrators in normal version without an ATEX-type examination certification **must not** be operated in areas with potentially explosive atmospheres consisting of a gas-, a vapour-, a mist- or a dust-air-mixture!*

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

- **eSRA(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 conveyor devices.



ATTENTION!

For using the level scanning system or the part overflow controller a appropriate sensor is needed that is permitted to be used in areas with potentially explosive atmospheres and therefore must have an appropriate ATEX-authorisation for the present area of application.

Unless the sensor isn't part of the AViTEQ supply, AViTEQ isn't responsible for the sensor selected and therefore further isn't liable for damages that result out of incorrect selection and an incorrect case of operation of a sensor that isn't permitted for the case of operation.

- **eSC(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.
- **eSA(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.
- **eSD(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.



NOTE!

*As a standard, a AViTEQ varistor protection unit (VSE...) and a adequate motor-protective circuit breaker with a ATEX-Certification is part of every controller, type **eS...**! Further controllers for multiple drives have an electric rectifier unit (NGE...).*

The controllers can optionally be delivered in the following versions:

- **Cabinet unit (IP54)**, controller in a closed housing. Depending on the type of 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.

4.3.2 Connection Cable and Line Lengths

AVITEQ Vibrationstechnik GmbH D-65795 Hattersheim-Eddersheim www.aviteq.de		Year 2009	CE 0158
Ex	BVS 05 ATEX ... II 2 G Ex e IIB T4 II 2 D Ex ID A21 IP65	T105°C	
Type	eMV ... (Ex)	... min	f _k /N ...
Serial no. kW _{out}	f _z > ... min
	V ... A	G _n ... kg	
	DIN VDE 0580 ... Hz	Made in Germany	



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 must not exceed **300 m**.
- ☞ Only use cable whose insulation suits the special environmental conditions and that are suitable for areas with potentially explosive atmospheres. For pharmaceutical and food processing applications, you must further choose sterilizable insulations.
- ☞ In the proximity of the magnetic vibrator, run the cable in such a way that contact with vibrating parts is impossible.



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

- ☞ Avoid cable loops! Shorten cables if required.

4.3.3 Connection Diagrams

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



Unless the sensor isn't part of the AViTEQ supply, AViTEQ isn't responsible for the sensor selected and therefore further isn't liable for damages that result out of incorrect selection and an incorrect case of operation of a sensor that isn't permitted for the case of operation.

For single drives the wiring has to be carried out as shown in figure 4-4 below.

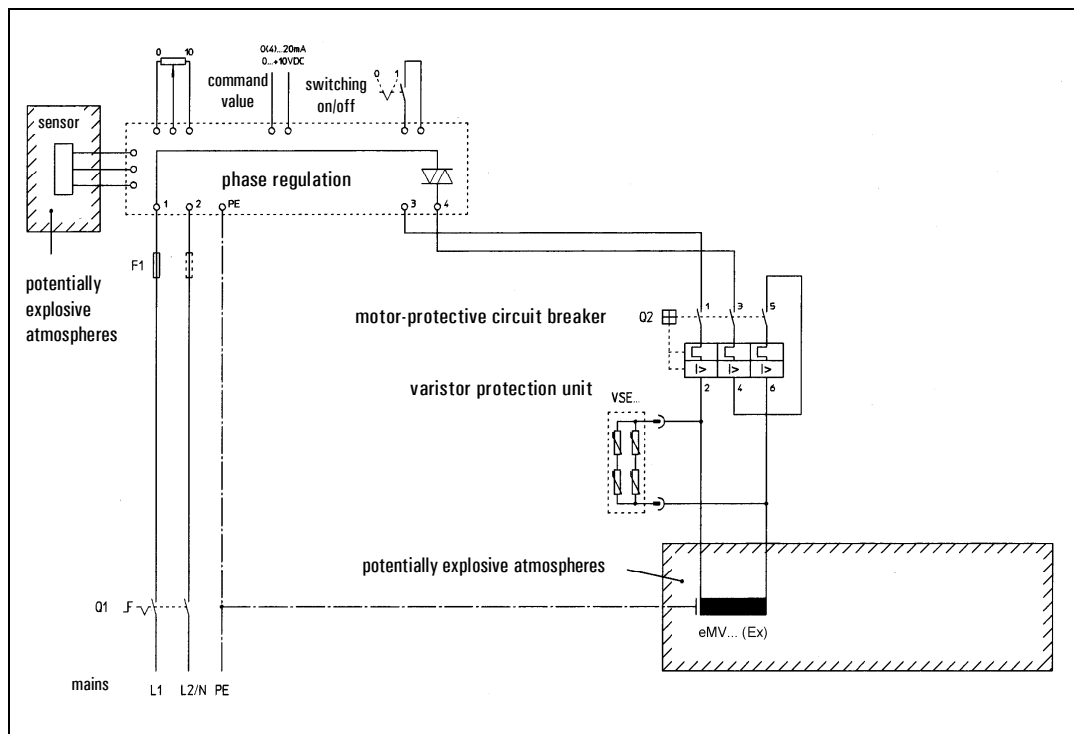


Figure 4-4 Connection diagram, single drive



ATTENTION!

Unsuitable controller, operation without 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!

The motor-protective circuit breaker 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 adjust the setting, if it isn't correct.



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 leads to temperatures that exceed the respective temperature class. In this case the associated type examination certification becomes invalid and further this may lead to the destruction of the magnetic vibrator.

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

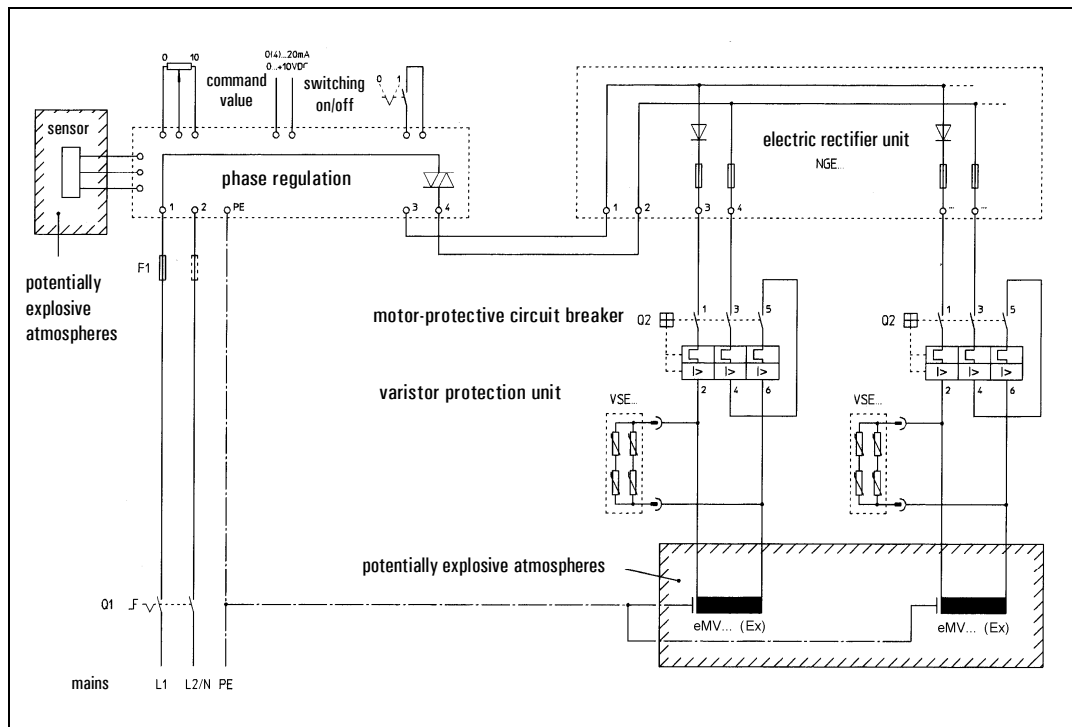


Figure 4-5 Connection diagram, multiple drives



ATTENTION!

Every magnetic vibrator must be operated with a separate motor-protective circuit breaker (Q2)! It is not allowed to add up the currents of several magnetic vibrators and then operate them with a common motor-protective circuit breaker!

In particular observe the following data on the type label: I_A/I_N – ratio between the pull-in current I_A and the rated current (nominal current) I_N and the time t_E – time period in which the coil of the electromagnet, as a result of the pull-in current, warms up from the end-temperature during rating mode with an ambient temperature of $+40^\circ\text{C}$ to the limit temperature.

For every magnetic vibrator a AViTEQ varistor protection unit (VSE...) is required! With multiple drives (s. figure 4-5) further an AViTEQ electric rectifier unit (NGE...) is required!

4.3.4 Mains Connection



The magnetic vibrators in special version for areas with potentially explosive atmospheres are normally delivered without a connection cable and without a cable gland. Select, depending upon your case of application, a connection cable with a suitable cable cross section, permissible in accordance with the standards. The temperature of the connection cable must not exceed a value of +70°C with gas (zone 1 and 2) or dust (zone 21 and 22) at the cable gland and a value of +80°C inside the terminal box at the terminals. Select a connection cable that is suitable for a maximum temperature of +80°C and ask us in the case of doubt.

Only use cable glands with a metric thread that are permitted for the use in areas with potentially explosive atmospheres for your particular case. The degree of protection of the cable gland must be at least IP65. Further the cable gland must possess a strain relief.

Normally the size of the thread for the cable gland provided by the customer for the magnetic vibrator sizes eMVC... (Ex), eMVD... (Ex) and eMVE... (Ex) is M20x1,5. As a special version also the thread size M25x1,5 is possible. Subsequent changing of the thread size or using extensions, reductions and/or intermediate connecting pieces is **not** allowed and results in the invalidity of the type examination certification!

Never open the cover of the terminal box, as long as voltage is present at the terminals inside the terminal box, because this can be an ignition sources and as a result lead to an ignition of a potentially explosive atmosphere consisting of a gas-, a vapour-, a mist- or a dust-air-mixture.



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 and the cover of the terminal box is closed!



Depending on the number of magnetic vibrators, type: eMV... (Ex) for areas with potentially explosive atmospheres that are operated with an AViTEQ-controller, there is a connection diagram that is part of this operating manual and is shown in chapter 4.3.3 (connection diagrams). This connection diagram **must** be observed compellent. The wiring has to be carried out according to the connection diagram. Especially this has to be observed, if the controller is delivered as a cabinet mounting unit that is built-in into a cabinet by the customer.

In the case of non-observance the associated type examination certification expires. AViTEQ Vibrationstechnik GmbH is not liable for damage to property and/or person in the case of neglect!

At first choose an adequate connection cable and a appropriate cable gland. While choosing the cable, please observe that there is a relative movement between the terminal box at the magnetic vibrator and the support structure during operation.



The threaded hole at the terminal box for the cable gland is closed with a blind plug by AViTEQ. Remove this blind plug before assembling the cable gland. Do **not** use this blind plug in areas with potentially explosive atmospheres, because the blind plug isn't suitable for such areas.

Connect the connection cable as shown below.

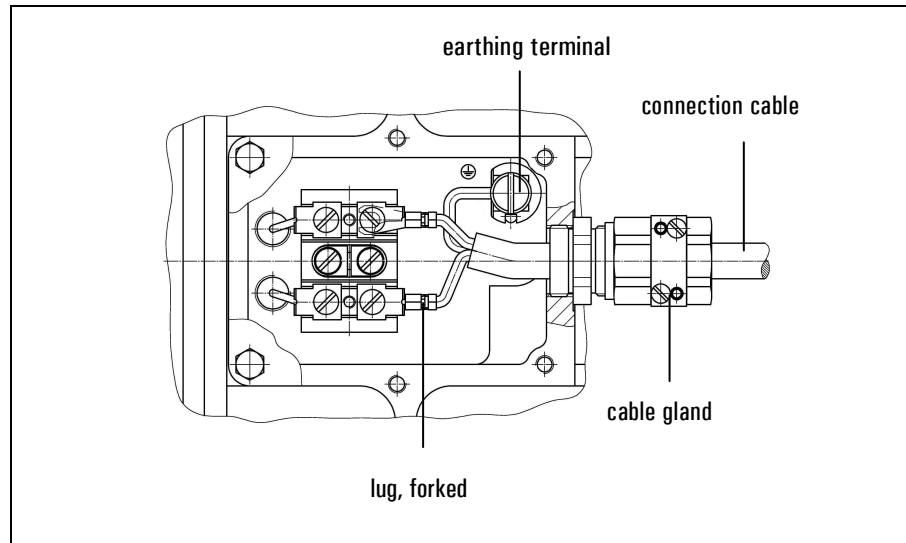


Figure 4-6 Electrical connection eMV... (Ex)

Connect the conductors L1 and L2 or N to the terminal board by using (non-)isolated lugs (forked). The green-yellow wire has to be connected to the earthing terminal with a lug (closed), as shown in figure 4-6 above. Tighten all screws well, so that they cannot untighten during operation.



ATTENTION!

Observe while carrying out the connection that between the net-potential-prominent terminals and the associated lugs (forked) and the inner wall and the cable gland a minimum clearance of 8 mm must exist! This minimum clearance of 8 mm must not be fallen below. In the case of non-observance the associated type examination certification expires. AViTEQ Vibrationstechnik GmbH is not liable for damage to property and/or person in the case of neglect!



NOTE!

The sealing of the terminal box is stuck together with the cover. Before closing the cover of the terminal box, please make sure that the sealing is present and undamaged. If the sealing is missing or is damaged, dust might penetrate into the terminal box and form a potentially explosive atmosphere that can lead to an explosion. Please observe this! Only mount the cover of the terminal box, if the sealing is present and undamaged!

AViTEQ Vibrationstechnik GmbH is not liable for damage to property and/or person in the case of neglect!

5 Commissioning

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



Parts that collide with other parts can lead to ignition sources. Before first commissioning, make sure that the vibration conveyor device can oscillate without colliding with other parts and that all screws are tightened correctly.

*The magnet system is coated with a special dark impact-protection lacquer that anticipates the formation of ignition sparks. However, a so-called collision mode is **not permitted!** In the case of visible damage of the impact-protection lacquer in the area of the electromagnet, the magnetic vibrator in special version for areas with potentially explosive atmospheres is not allowed to be operated and has to be sent to AViTEQ for being repaired!*

AViTEQ delivers magnetic vibrators for areas with potentially explosive atmospheres including the appropriate controllers. Before commissioning, please check that the magnetic vibrator is only operated with a matching AViTEQ-controller!



*Magnetic vibrators in special version for areas with potentially explosive atmospheres must only be operated with the appropriate AViTEQ-controller that is certificated for this case. The controller itself **must not** be installed in areas with potentially explosive atmospheres, and, according to the type examination certification, has to be completed with a motor-protective circuit breaker with a ATEX-Certification and a varistor protection unit for every magnetic vibrator. In the case of neglect AViTEQ is not liable for the consequences!*

In particular it is prohibited to operate the magnetic vibrator with a frequency converter.

*Magnetic vibrators in normal version without an ATEX-type examination certification **must not** be operated in areas with potentially explosive atmospheres consisting of a gas-, a vapour-, a mist- or a dust-air-mixture!*



ATTENTION!

Unsuitable controller, operation without 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!

The motor-protective circuit breaker 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 adjust the setting, if it isn't correct.



NOTE!

For anticipating the formation of ignition sparks by collision of parts of the magnetic system the armature is coated with a special dark impact-protection lacquer. Further the electromagnet is coated with a conductible lacquer. In the case of visible damage of the impact-protection lacquer or the conductible lacquer in the area of the electromagnet, the magnetic vibrator in special version for areas with potentially explosive atmospheres is not allowed to be operated and has to be sent to AViTEQ for being repaired!

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.



NOTE!

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 behavior of the entire vibration conveyor device which is undetected at this point. Example: The working unit collides with neighboring conveyor components or works in collision mode.

Listen for any *hammering* 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.



NOTE!

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 conveyor device operates cleanly at its limits.

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 safety regulations when measuring voltage-carrying components! Take appropriate measures to prevent contact with voltage-carrying components.



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 $\geq 750\text{ V}$ to avoid incorrect measurements due to the crest factor!

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

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.

6 Maintenance



DANGER!

Before carrying out any inspection works, the magnetic vibrator must be disconnected from mains and protected against reconnecting. Check that no voltage is present! Further check, if the surface temperature is less than +50°C, otherwise the surface temperature may lead to burns of the skin!



ATTENTION!

Changes of the air gap, the spring rate, the tightening torque of the spring mounting screws and/or operating the magnetic vibrator with a incorrect natural frequency (...observe characteristics curve data sheet) are not allowed and result in the invalidity of the type examination certification, because this may lead to excessive heating of the drive, to short circuits between electromagnet windings, and eventually to the destruction of the drive.

6.1 Regular Checks

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 (working unit/drive) - Check, if connection cable doesn't swing - Check, if connection cable shows visible damages - Check noise development - Check that no deposits are existing (working unit)
24 operating hours after the first commissioning	<ul style="list-style-type: none"> - Check screw connections (working unit/drive) - Check, if connection cable doesn't swing - Check, if connection cable shows visible damages - Check noise development - Check that no deposits are existing (working unit) - Check the condition of the support elements (rubber (hollow) pads) - Check the condition of the working unit - Check the natural frequency
weekly	<ul style="list-style-type: none"> - Check, if connection cable doesn't swing - Check, if connection cable shows visible damages - Check noise development - Check that no deposits are existing (working unit)
monthly	<ul style="list-style-type: none"> - Check screw connections (working unit/drive)
half-yearly	<ul style="list-style-type: none"> - Check the condition of the support elements (rubber (hollow) pads) - Check the condition of the working unit - Check the natural frequency

Table 6-1 Regular checks

6.2 Cleaning

Depending on the environmental condition and the properties of the material transported, the components of the conveyor, 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, or there is a layer of dirt on the magnetic vibrator or the working unit that is thicker than 5 mm, it must be cleaned. As cleaning methods, alongside mechanical methods (hand brush e.g.), pressurized 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 pressurized air, water and cleaning solvents that apply to the installation site! Also observe the degree of protection (IP65) 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!



ATTENTION!

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!

6.3 Repairs

In the event of damage, please send the magnetic vibrator back to AViTEQ Vibrationstechnik GmbH, 65795 Hattersheim-Eddersheim, Germany for being repaired. Self-repairs are **prohibited**.



NOTE!

It is absolutely forbidden to carry out repairs. The magnetic vibrators in special version for areas with potentially explosive atmospheres are only allowed to be repaired by AViTEQ Vibrationstechnik GmbH. In the case of non-observance the associated type examination certification expires. AViTEQ Vibrationstechnik GmbH is not liable for damage to property and/or persons in the case of neglect!

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

7 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	Check fuse(s) and the supply line(s)
		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	Motor-protective circuit breaker has the wrong adjustment	Observe the current shown on the type label on the magnetic vibrator and alter the adjustment on the motor-protective circuit breaker.
		Power input of the magnetic vibrator inadmissibly highly	Observe point ③.
③	Power input of the magnetic vibrator inadmissibly highly	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 to wide	Only AViTEQ Vibrationstechnik GmbH is allowed to alter the air gap, please send in the unit or ask for our service
		Natural frequency to 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, otherwise the ATEX-Type Examination Certification becomes invalid
		Screws are loose	Tighten screws immediately with the appropriate torque, because the collision of components is a possible ignition source
		Natural frequency to low	Observe the characteristics curve data sheet and tune to the correct natural frequency by taking away weight from the inoperative side
		Deposits of the transported material result in a to low natural frequency	Eliminate deposits and take further steps to avoid deposits
		Air gap is set to 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 drive to AViTEQ Vibrationstechnik GmbH, we will repair the magnetic vibrator
Loose parts collide with the magnetic vibrator or unit	Remove or tighten loose parts immediately, because the collision of components is a possible ignition source		
⑤	Output (capacity) to low	Wrong controller chosen	Please check, if the controller and the magnetic vibrator match, therefore check the AViTEQ delivery information
		Natural frequency to high	Observe the characteristics curve data sheet and tune to the correct natural frequency by adding weight to the inoperative side
		Working unit can not vibrate freely	The working unit must oscillate freely without touching any components
		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 7-1 Fault, Causes and Remedies



NOTE!

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

The faults listed in the table 7-1 mainly refer to the magnetic vibrator. Further faults, caused by the controller, can be found in the appropriate operating manual.

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Declaration of Conformity

according to Appendix X B of the EC Directive 94/9/EC relating to equipment and protective systems for use in explosive atmospheres

The Manufacturer...

AViTEQ Vibrationstechnik GmbH
Im Gotthelf 16
65795 Hattersheim-Eddersheim
Germany

declares that the magnetic vibrators of the series...
eMVC 25... (Ex) (220-240V / 50Hz); (380-420V / 50Hz)
eMVC 50... (Ex) (220-240V / 50Hz); (380-420V / 50Hz)
eMVD 25... (Ex) (220-240V / 50Hz); (380-420V / 50Hz)
eMVD 50... (Ex) (220-240V / 50Hz); (380-420V / 50Hz)
eMVE 25... (Ex) (380-420V / 50Hz); (480-520V / 50Hz)
eMVE 50... (Ex) (220-240V / 50Hz); (380-420V / 50Hz); (480-520V / 50Hz)

are in conformance with the following European directive:

94/ 9/EG

**Directive relating to equipment and protective systems
for use in explosive atmospheres**

and are classified as electrical apparatus of the equipment group II and therefore can be operated according to the following definition:

eMVC... (Ex)



BVS 05 ATEX E 155 1. Supplement
II 2 G Ex e IIB T4
II 2 D Ex tD A21 IP65 T 105°C

eMVD... (Ex)



BVS 05 ATEX E 156 1. Supplement
II 2 G Ex e IIB T4
II 2 D Ex tD A21 IP65 T 105°C

eMVE... (Ex)



BVS 05 ATEX E 120 1. Supplement
II 2 G Ex e IIB T4
II 2 D Ex tD A21 IP65 T 105°C

AViTEQ Vibrationstechnik GmbH possess a certificated quality system for manufacturing magnetic vibrators for areas with potentially explosive atmospheres that complies with the requirements of the directive 94/9/EC, Annex IV. This quality system is attested and verified by

DEKRA EXAM GmbH
Dinnendahlstraße 9
44809 Bochum
Germany

Notified Body number: 0158

The quality management of the production is observed by this Notified Body.

The conformance of the products with the European Directive is demonstrated through full observation of the following harmonized European Standards:

EN 60079-0

EN 60079-7

EN 61241-0

EN 61241-1

Full technical documentation is available. The operating manual for the devices is in hand. The CE symbol has been included. The safety notes in the operating manual must be observed!

Hattersheim-Eddersheim, 30th of March 2009

Legally binding signature:

i.V. Holl (Ex protection-representative (ExB))

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

Manufacturer's Declaration

according to Appendix II B of the EC Directive 98/37/EC relating to machinery

The Manufacturer...

AViTEQ Vibrationstechnik GmbH
Im Gotthelf 16
65795 Hattersheim-Eddersheim
Germany

declares that the magnetic vibrators of the series...	eMVC 25... (Ex)	(220-240V / 50Hz); (380-420V / 50Hz)
	eMVC 50... (Ex)	(220-240V / 50Hz); (380-420V / 50Hz)
	eMVD 25... (Ex)	(220-240V / 50Hz); (380-420V / 50Hz)
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	eMVE 25... (Ex)	(380-420V / 50Hz); (480-520V / 50Hz)
	eMVE 50... (Ex)	(220-240V / 50Hz); (380-420V / 50Hz); (480-520V / 50Hz)

are in conformance with the following European directive:

98/37/EC **Directive relating to machinery**

The conformance of the products with the European Directive is demonstrated through full observation of the following harmonized standards and national standards:

EN ISO 12100-1 / ...-2	DIN IEC 60038
EN 60204-1	DIN VDE 0580
EN 60529	

Full technical documentation is available. The operating manual for the devices is in hand. The CE symbol has been included.

Commissioning of the magnetic vibrator is prohibited until it is established that the machine with which the magnetic vibrator will be completed complies with the regulations of the machinery directive 98/37/EC.

The safety notes in the operating manual must be observed! This declaration certifies conformance with the specified standards and directive . It does not, however, include a guarantee of characteristics.

Hattersheim-Eddersheim, 30th of March 2009

Legally binding signature:




i.V. Holl (Ex protection-representative (ExB))

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