Operating Manual
for Vibrating Conveyor
and Vibrating Screen
with Magnetic Drive
I Safety

This machine was built in accordance with the following EC directives and standards:
- EC Directive on Machines (89/392/EEC) and (91/368/EEC)
- EN 60204-1 (VDE 0113)
- EN 292 Parts 1 and 2: 1991 Machine Safety (Principles)
- VDE 0580 Regulations for Electromagnetic Devices
- EN 60529 Systems of Protection, see the technical specifications of the respective units

For special designs, in accordance with the information in the assembly drawing.
- VDE 0171/1.69 Protection (Ex) s G4 Regulations for Devices in Mines where there is a Danger of Explosions
- VDE 0171/1.69 Protection (Sch) s (Ex) s 04 Regulations for Devices in Mines where there is a Danger of Explosions and Pit Gas
- IEC 38 Standard Voltage

Warning
The vibrating machine may only be installed, commissioned and serviced by trained technicians.
- Standard of training: the requirements compulsory in Germany for the qualification of electricians and technicians trained in electrotechnology as defined in IEC 364 and DIN VDE 0105 Part 1.

The vibrating machine including magnetic vibrator does not constitute an independent machine and is only intended for use in a system via a connector set. The machine may not be put into operation until it has been established that it complies with the regulations of the EC directive. The vibrating machine was built in conformity with this directive (see Certificate of Conformity).

I.II Built-in safety systems

- The vibrating machine is controlled via a VIBTRONIC® connector set operated via an On/Off switch (or contactor) - (The On/Off-switch may not be used as a main switch).
- With the exception of the MVB, the magnetic vibrator is covered by a protective hood.
- The vibrating machine is connected by way of a power supply system that must have a separate earth line PE - (with YELLOW-GREEN insulation).
I.II Safety measures (to be carried out by the owner)

This operating manual is an integral part of the vibrating machine.
- It must be readily at hand for the technicians at all times.
- It must be read before the machine is installed.
- The notes on hazards and other information contained in it are to be heeded accordingly.

The noise level is < 70 dB (A).
The level of airborne noise in terms of the EC directive "Machines" can only be determined on site and depends on the overall system, the material being conveyed and the surroundings. Appropriate protective measures to dampen the noise are to be implemented.

The work described in this manual is explained in such a way that it can be understood by persons with technical training in accordance with IEC 364 and the VOE regulations 0105.

This personnel must be equipped with the proper tools and testing sets. The personnel must be trained in safe working methods.

The owner must obtain any local operating permits required and comply with their provisions with respect to, for example:
- personnel safety
- disposal of products
- environmental protection regulations.

Notes

The provisions laid down in the PTB and BVS certificates must be complied with when the vibrating machines are used in locations where there is a danger of explosions or mines where there is a danger of pit gas.

The VDE regulations are to be complied with, in particular EN 60 204-1 (VDE 0113) and VDE0100.

Should you have any questions or be uncertain about anything, please contact AVITEQ.
II General notes on hazards

II.I Danger zone

- Only trained technicians may connect tie vibration machine's control system.
- The magnetic vibrator may only be operated with the protective hood on. This hood is to be remounted after repair or maintenance work.
- The machine is to be set up so that there is a free space of 30 to 50 mm extending around it on all sides. Working stroke + safety distance must be kept free.
- No loads other than the bulk material for which the machine was designed may act on the machine.
- No-one may stand under the vibrating machine.
- Passage ways are to be protected against falling material.
- Remove any unattached or loose parts from the danger zone.
- Access to the machine must be possible at all times for maintenance and repair work.

Warning
It is strictly forbidden to render any of the safety devices inoperative.

II.II Operating and maintenance personnel

1. The shutdown procedures specified in the operating manual are to be followed whenever any work (operation, maintenance, repair etc.) is carried out.
2. The operator may not apply any working methods that impair the safety of the machine.
3. The operator is to ensure that only authorized persons work on the machine.
4. The operator is obliged to immediately report to the owner any changes in the machine that impair its safety.
5. The owner may only operate the machine when it is in perfect working order.

II.III Spare and expendable parts

The spare parts lists for the different vibrators and connector sets are specified in the tables in the appendix. The relevant spare parts lists are delivered with every machine. DIN parts can be procured through the specialist trade. In cases of repair or maintenance, faulty vibrating machines or magnetic vibrators are:
- to be returned to the supplier or AViTEQ's agents, or
- repaired by a qualified technician if appropriate equipment and measuring tools are available.

Instructions on the assembly of magnetic vibrators can be obtained from AVITEQ on request.

Warning
(Ex) and (Sch) versions of the machine may only be repaired by workshops certified to carry out this work or by the supplier.
### III Table of contents and figures

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Safety</td>
<td>I</td>
</tr>
<tr>
<td>I.I Built-in safety systems</td>
<td>I</td>
</tr>
<tr>
<td>I.II Safety measures</td>
<td>II</td>
</tr>
<tr>
<td>II General notes on hazards</td>
<td>III</td>
</tr>
<tr>
<td>II.I Danger zone</td>
<td>III</td>
</tr>
<tr>
<td>II.II Operating and maintenance personnel</td>
<td>III</td>
</tr>
<tr>
<td>II.III Spare and expendable parts</td>
<td>III</td>
</tr>
<tr>
<td>III Table of contents and figures</td>
<td>IV</td>
</tr>
<tr>
<td>III.I Contents</td>
<td>IV</td>
</tr>
<tr>
<td>III.II Figures and tables</td>
<td>IV</td>
</tr>
<tr>
<td>IV Notes on the operating manual</td>
<td>V</td>
</tr>
<tr>
<td>1 Short description (of the machine's intended purpose)</td>
<td>1</td>
</tr>
<tr>
<td>2 Technical specifications (see Appendix A or B)</td>
<td>1</td>
</tr>
<tr>
<td>3 Scope of delivery</td>
<td>2</td>
</tr>
<tr>
<td>4 Transport and packing</td>
<td>2</td>
</tr>
<tr>
<td>5 Functional description</td>
<td>4</td>
</tr>
<tr>
<td>6 Commissioning</td>
<td>6</td>
</tr>
<tr>
<td>6.1 Installation of the vibrating machine</td>
<td>6</td>
</tr>
<tr>
<td>6.2 Mounting the magnetic vibrator drive</td>
<td>9</td>
</tr>
<tr>
<td>6.3 Mounting and connecting the connector set (power supply)</td>
<td>11</td>
</tr>
<tr>
<td>6.3.1 Wire cross-sections</td>
<td>13</td>
</tr>
<tr>
<td>6.3.2 Ambient temperatures</td>
<td>16</td>
</tr>
<tr>
<td>6.4 Commissioning</td>
<td>17</td>
</tr>
<tr>
<td>7 Modifications, repairs and replacements</td>
<td>18</td>
</tr>
<tr>
<td>7.1 Subsequent modification of vibrating machines (tuning)</td>
<td>18</td>
</tr>
<tr>
<td>7.2 Repair and replacement of magnetic vibrators</td>
<td>18</td>
</tr>
<tr>
<td>8 Maintenance</td>
<td>20</td>
</tr>
<tr>
<td>8.1 Cleaning</td>
<td>20</td>
</tr>
<tr>
<td>8.2 Checks</td>
<td>20</td>
</tr>
<tr>
<td>9 Emergencies</td>
<td>20</td>
</tr>
<tr>
<td>10 Index</td>
<td>21</td>
</tr>
</tbody>
</table>

### III.II Figures and tables

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-1</td>
<td>Vibrating machine with magnetic drive</td>
<td>4</td>
</tr>
<tr>
<td>6-1</td>
<td>Vibration-isolated suspension of troughs and pipes</td>
<td>8</td>
</tr>
<tr>
<td>6-2</td>
<td>Mounting the run-out side vibrator, size H and up</td>
<td>9</td>
</tr>
<tr>
<td>6-3</td>
<td>Mounting of vibrators vertically</td>
<td>10</td>
</tr>
<tr>
<td>6-4</td>
<td>Minimum cross-sections of the supply line</td>
<td>13</td>
</tr>
<tr>
<td>6-5</td>
<td>Classification of characteristic curves for wire cross-sections (50 Hz mains)</td>
<td>14</td>
</tr>
<tr>
<td>6-6</td>
<td>Classification of characteristic curves for wire cross-sections (50 Hz mains; sMV...)</td>
<td>15</td>
</tr>
</tbody>
</table>

### III.III Appendix A or B
IV  Notes on the operating manual

Warnings
or very important remarks are framed and marked by a warning triangle.

Notes
are marked by a hand and framed.

Model
The information in this operating manual only applies to the vibrating machine specified on the tide page. Every machine is fitted with a plate with its specifications.

Whenever consulting us, it is essential that the following details are correctly stated:
- type
- serial number of the machine
- serial number of the vibrator
- sheet number of the assembly drawing.

The following information is required when ordering spare parts:
- type (title and sheet number of the assembly drawing)
- number of parts required
- description of spare part number.

We can only process your query/order property and quickly, if this information is correct.

IV.I  Definitions

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BVS</td>
<td>Bergbau-Versuchsstrecke (Test association for mining technology)</td>
</tr>
<tr>
<td>DMT</td>
<td>Deutsche MontanTechnologie (German association for mining technology)</td>
</tr>
<tr>
<td>EN</td>
<td>European norm</td>
</tr>
<tr>
<td>EVU</td>
<td>Electricity supply company</td>
</tr>
<tr>
<td>MV</td>
<td>Magnetic vibrator drive with electromagnets</td>
</tr>
<tr>
<td>PTB</td>
<td>Physikalisch-TechnischeBundesanstalt (Federal office for physics and technology)</td>
</tr>
</tbody>
</table>
1 Short description  
(of the machine’s intended purpose)

AViTEQ’s vibrating machine was designed and built to carry, charge, discharge, meter, mix and screen bulk materials. It allows the systematic utilization of mechanical oscillations in vibrators generated by an electromagnetic drive.

The vibrating machine consists of:
- a conveyor, screen or combination (for material transport)
- an oscillation generator (magnetic vibrator) a control unit (connector set).

2 Technical specifications

See Appendix A or B

Assembly drawing

An assembly drawing is drawn up for each particular customer and, together with the rating plates of the vibrating machine and vibrator, forms the basis for the order and technical specifications. The assembly drawing is an integral part of the operating manual and contains the specifications for •
1. vibrating machine
2. Magnetic vibrator
3. Support elements
   and optional extras (if any) or notes specific to a particular order

Optional extras:
1. Measuring card
2. Oscillation meter
3. Vibration pickup with oscillation width meter and signal unit
4. External ventilation

Model-dependent
5. Test unit
6. Trough no-load protection
7. Vibration collision protection
8. Digital oscillation width meter

Disposal of the machine:

The vibrating machine is made of steel, high-grade steel and/or aluminium. The support elements are made of rubber or spring steel.

The machine is to be disposed of in accordance with your local environmental protection regulations for electric appliances. (Please contact AVITEQ should you have any questions in this regard).
3 Scope of delivery

The scope of delivery contains (in conformity with the assembly drawing):
1. Vibrating machine
2. Magnetic vibrator
3. Connector set
4. Support elements .(rubber buffers, coil springs, suspension elements)
5. Optional extras
6. Operating manual
   Enclosures
   - Assembly drawing
   - List of spare parts
   - Characteristics curve data sheet
   - Appendix A or B

4 Transport and packing

The vibrating machine with separately packed magnetic vibrator is packed in accordance with the destination of the shipment, e.g. in a frame, crate or case and, if necessary, sealed in polyethylene foil (0.02 mm thick).
All the screws, bolts and accessories required are included in the shipment. The master packing is taken back by the supplier.
AViTEQ’s vibrating machines are carefully tested and packed before being shipped.

Receiving inspection:
- Check the shipment against the delivery note to ensure that it is complete!

If the packing is damaged,
- then check the machine itself for damage (visual inspection)!

Complaints
If the machine was damaged during transit:
- immediately contact the carrier!
- keep the packing material (in case the carrier wants to inspect it or the machine has to be shipped back to us)!

Packing for return shipment
- Pack the machine so that it is shockproof.

Intermediate storage
- Machines packed for domestic shipment can be stored for up to three months.
- Machines in seaworthy or air freight packing can be stored for up to 12 months.

Note
Make sure that the foil has no leaks, check weekly!
Intermediate storage in an unpacked state

If a delay in installation is unavoidable:
- cover the unfacquered bearing surfaces for the mounting of the divev® antirust grease. The grease must be removed before installation.
- check the machine monthly for corrosion if stored in a roofed storage area.

If a delay in commissioning after installation is unavoidable:
- protect the machine against precipitation if set up in the open.
- no measures are necessary if set up under a roof or in a dosed room.

if a long standstill after commissioning is necessary:
- dean the machine of bulk material and dirt
- run the machine in no-load mode for about two hours at intervals of three months.

**Note**
Covering the machine with a tarpaulin to provide protection against precipitation is not useful because condensation water can form as a result of temperature fluctuations.

Transport to the point of installation
The vibrating machine is to be hitched to a suitable means of transport (crane, fork-lift truck, hoist) at the eyebolts provided (see assembly drawing and, for the magnetic vibrator, page 9, Fig. 6-2 & 3, item 5) and transported by trained personnel. Do not add any loads to the vibrating machine because the eyebolts are only designed to bear the weight of the machine.

**Note**
Take the weights specified in the assembly drawing into account when deciding on which means of transport to use.

Special precautions for the transport of vibrating machines of the size MV H and up

When transporting the through conveyor, ensure that
- you do not damage the mounting eyes for the magnetic vibrator or the bearing surfaces of the eyes on the vibrating machine.
- The bearing surfaces of the magnetic vibrator’s feet may not be damaged. If the magnetic vibrator is to be dragged, attach runners under the feet because otherwise the protective hood will be damaged.

**Note**
The transport positions that are possible are shown on the plate on the protective hood.

**Note**
Only undamaged and dean bearing surfaces guarantee maintenance-free and fatigue-proof connection of the machines.
5 Functional description

Vibrating machine

The function of the vibrating machine is to transport bulk materials. This is done by mechanical oscillations in the magnetic vibrator that are transmitted to the conveyor (for material transport). The vibrating machine can be designed as a trough, tube, screen, pot with inside or outside spiral or similar (in accordance with the assembly drawing enclosed).

Fig. 5-1 Vibrating machine with magnetic drive

A vibrating machine consists of three subassemblies:

1 Machine with conveyor, screen or combination
2 Magnetic vibrator
3 VIBTRONIC® connector set (not illustrated)
Magnetic vibrator (drive)
The magnetic vibrator is a spring-mass system that utilises the resonance of the oscillation system.
The oscillations of the magnetic vibrator are generated by the electromagnets excited by a.c. voltage.
The magnetic vibrator, mounted at an angle to the conveying surface, causes the conveyor to oscillate linearly at an upwards slant. Together with the conveyor it forms the two-mass oscillation system.
The housing of the magnetic vibrator, which is screwed tight to the vibrating machine, represents the one side of the mass, the "working mass".
The second mass is the counter oscillation mass in the magnetic vibrator, the "free mass".
Both sides are connected by coil or leaf springs.

Note
A detailed description can be found in the brochures
- Basic Principles of Vibratory Conveying Technology,
- Planning Aids for Tube Conveyors for Product Streams.

Connector set
The magnetic drive is connected to an a.c. net via a VIBTRONIC® connector set. The connector set is necessary to run the vibrating machine with the planned oscillation frequency and for the steady and non-volatile control or regulation of the flow rate.

The VIBTRONIC connector set allows:
- the infinitely variable adjustment of the flow rate during operation within broad limits manually or by a command variable.
- the magnetic vibrator to work at full power immediately after it has been switched on and to come to a standstill in a fraction of a second when switched off (according to the oscillating characteristic of the mechanics).
6 Commissioning

6.1 Installation of the vibrating machine

The vibrating machine is to be installed by a specialist.

**Warning**

Only carry out work on the vibrating machine when it is off and measures have been taken to ensure that it cannot be switched on again.

1. When assembling the support elements, comply with the specifications in the assembly drawing that accompanies every machine. Suspension or support frames are generally not included in AViTEQ’s scope of delivery and are mounted by the customer. Only remove any transport protection devices (marked red) when the machine is ready for commissioning.

   The support structures for freely-swinging machines must be dimensioned for the weights of the
   - vibrating machine
   - magnetic vibrator
   - bulk material filling
   - pressure of the bulk material pillar in the bunker

   Check the statics of the support structure and the building before installing the machine.

**Warning**

Ensure that the support structures are vibration-proof because otherwise the alternating forces transmitted via the elastic support elements can cause impermissibly large sympathetic vibrations.

2. Mount the vibrating machine and support or suspension elements in accordance with the assembly drawing accompanying the machine.

   Ensure that
   - the support points of the supports for rubber pads or compression springs on the run-in and run-out sides lie in one plane to ensure uniform loading,
   - the bearing surfaces of the supports are horizontal when the vibrating machine is installed at an upwards or downwards slant The deviation from the horizontal may not exceed ±3°,
   - the vibrating machine is not in contact with any fixed structures; the distance between it and other parts must amount to the working stroke + safety distance (see assembly drawing),
   - you only use flexible gaskets for the dust-tight connections at the run-in and run-out nozzle.

**Note**

In the case of through conveyors with divided troughs, model OAT, first screw the individual parts together and then mount them on the support or suspension carrier.
3. in the case of vibrating machines suspended from coil springs (see page 8, Fig. 6-1, item C), screw the bottom eyebolt of the coil spring to the suspension eye (item 3).

Ensure that
- the spring axle points in the direction of pull so that the spring is not stressed on flexion,
- the direction of pull is inclined 5-10° to the sides in order to avoid offset oscillating of the machine (see page 8, Fig. 6-1, item C),
- the cables in the conveying direction are vertical. Fit the spring elements at the top end of the cable (see page 8, Fig. 6-1, item D), straining or hook bolts are used to simplify vertical alignment of the machine,
- you adhere to the free cable length L min. (see page 8, Fig. 6-1, item D) required. The distance between the last bottom and top cable clamps must be at least 25 times larger than the cable diameter.

3.1 In case of vibrating machines with compression springs the included spring-connection must be used from the spring size $d = \phi 5.2$ to $d = \phi 26$.

**Note**
In the case of cable suspensions on the run-in and run-out sides, the machine can swerve counter to the direction of oscillation. In this case mount rubber pads at a distance of 10-15 mm to the stationary part.

**Warning**
If spring connection is not used, danger of squeeze exists (see EG-Guidelines)

**Warning**
Fit a safety mechanism to catch the vibrating machine in the event that the cable or a spring might break.
Fig. 6-1 Oscillation-isolated suspension of troughs and tubes

Suspension type A with rubber pads and strips ("vibration dampers") only for oscillation frequencies of 50 Hz.

Suspension type B to D for all oscillation frequencies.

A  Supported on rubber pads
B  Supported on hollow rubber pads
   1 Pressed in threaded bolt
   2 Loosely inserted bush with female thread
C  Supported on compression springs with spring connection
D  Examples of suspension from traction cable
   4 Compression-stressed rubber pads
   5 Tension springs
   6 Compression-stressed rubber strips
   7 Compression-stressed hollow rubber pads
   8 Compression springs (not illustrated) Type of mounting like 4, 6 or 7
6.2 Mounting the magnetic vibrator drive by trained technicians

**Note**
See the appendix Technical specifications" to establish the suitable magnetic vibrator when mounting or modifying the vibrating machine.

On account of the large weights, suitable transport aids are needed to mount the magnetic vibrator drive to the vibrating machine. The most favourable mounting depends on
- the spatial conditions at the installation site,
- the hoists available (fork-lift trucks, cable blocks etc.),
- the mounting position of the magnetic vibrator at the vibrating machine.

1. Clean the mounting surfaces of the magnetic vibrator and vibrating machine of dirt, oil and lacquer residues. The mounting surface on the vibrating machine must be flat, unbarred and stiff.

2. Check the rating plate of the vibrating machine for the serial number of the corresponding magnetic vibrator. The serial number of the vibrating machine is also marked on the vibrating machine and the magnetic vibrator in red.

**Note**
If several vibrating machines are being installed, the magnetic vibrators must be connected to their corresponding vibrating machines, in the case of vibrating machines with several magnetic vibrators, mount each magnetic

3. In the case of a single drive, transport the magnetic drive to its final position at the conveyor trough using a fork-lift truck or cable blocks. The same applies for the vibrator at the run-in side when twin drives are being installed. In the case of twin drives, mount the magnetic drive at the run-in side first.

4. Remove the protective hood from the vibrator and screw the eyebolts (Fig. 6-2 & 3, item 5) into the tap holes provided.

5. Use two flexible steel cables about 10 mm in diameter to lift the magnetic vibrator via cable pulleys or bolts (see Fig. 6-2).

6. Anchor the cable ends and lift the magnetic drive until the bolting holes and the mounting holes of the vibrating machine (trough conveyor) are in alignment.

![Fig. 6-2 Mounting the run-out side vibrator, size H and up](image)
Note
The holes must be aligned exactly. Screws inserted at an angle can become loose, resulting in damage to the magnetic drive and the vibrating machine.

Note
I If the magnetic vibrators are set up vertically (see Fig. 6-3), they are to be mounted in exactly the same way as if set up horizontally (see Fig. 6-2).

If three magnetic vibrators are set up next to each other, mount the middle one first.

7. Screw the magnetic vibrator to the vibrating machine.

Note
| The mounting screws delivered with the machine are grade 8.8. Replacements must be of at least the same grade and match the diameter of the base holes.

Tighten the screws with the normal tightening moments.

<table>
<thead>
<tr>
<th>Screw size</th>
<th>Tightening moment 48</th>
<th>Screw size</th>
<th>Tightening moment</th>
</tr>
</thead>
<tbody>
<tr>
<td>M10</td>
<td>Nm 83 Nm 200</td>
<td>M20</td>
<td>400 Nm 675 Nm</td>
</tr>
<tr>
<td>M12</td>
<td>Nm</td>
<td>M24</td>
<td>1350 Nm</td>
</tr>
<tr>
<td>M16</td>
<td></td>
<td>M30</td>
<td></td>
</tr>
</tbody>
</table>

8. Lock the vibrator's mounting screws.

For machines of up to drive size G
- with spring washers (DIN 128 form A) for machines with tap holes
- with lock nuts for machines with smooth holes

For machines from drive size H up
- with the liquid plastic Loctite 245 delivered with the machine.

Clean the screw threads of dirt and oil and then wet them with Loctite.

Note
- Loctite remains liquid as long as atmospheric oxygen has access to it.
- Loctite only begins to harden after screwing.
- It attains its final strength after three to six hours.
- The machine can be put into operation two hours after screwing if the room temperature is at least 20°C.
- The connection can be loosened at any time.
For smooth holes
- fasten the bolts with lock nuts.

Use a ratchet with a twelve-point socket SW 46 to screw in the M30 hexagon screws or, if conditions are cramped, a striking-face wrench with SW 46 mm. Tighten the screws as far as possible (see torques, page 10).

**Warning**
Should your skin come into contact with Loctite:
- wipe splashes off with a paper towel
- wash the Loctite off with soap and water Do not use solvents to clean your skin!

9. After mounting, remove the cable pulleys or clamp them tight with washers so that they do not clatter when the machine is in operation.

6.3 Mounting and connecting the connector set (power supply)

**Note**
See the appendix Technical specifications" to establish the suitable connector set when mounting or modifying the vibrating machine.

**Warning**
Only work on the electrical equipment if it is off and measures have been taken to ensure that it cannot be switched on again.

Only technicians trained in accordance with IEC 364 (VDE 0105 Part 1) may connect the control unit.

1. Check whether the voltage and frequency of the power supply concur with the specifications on the connector set's rating plate.

2. Mount the connector set in a vertical position at a suitable point

**Warning**
When mounting the set, ensure that
- it cannot be heated by external sources of heat sunshine, radiators etc.,
- the ambient temperature range of -25°C to +40°C is kept to.
Special measures are necessary should temperatures drop below or exceed this range.

3. Equip the unit with the prescribed fuses as specified in the circuit diagram for the connector set model (see appendix, basic circuit diagram for standard connector set). The VDE regulations and the guidelines of your local electricity supply company must be followed for earthing, grounding and protective circuits.
**Note**
Only cam controllers and air break contactors may be used to connect connector j sets in the power circuit. You must use switches or relays with gold contacts (10 um gold layer on hard silver) in the reference adjuster’s circuit.
If the magnetic vibrator and connector set are to be connected, you must fit a protection unit VSE (available as an optional extra) between the output terminals and the magnetic vibrator.

4. Use a multi-wire flexible rubber cable (H07RN-F_G) to connect the connector set. See Chapter 6.3.1 to determine the wire cross-section.

**Warning**
When connecting the 331/3 Hz vibrator, use the vibrator cable’s black wires for the vibration pickup’s signal or instrument lines. Do not connect them to the mains supply. Connect the black wires with terminals 13 and 14 of the connector set SA (see Appendix B, Fig. 14-1, basic circuit diagram).

To prevent chafing, fix the power cable up to about 1 m in front of the magnetic drive. The rest of the power cable must sag freely so that the oscillation movements do not cause any tensile stresses.

5. Secure
- the power supply cable at the magnetic vibrator’s lead-in socket
- the cable at the connector set or
- the cable at an intermediate box against traction and twisting with cable dips.

**Note**
Normal cable material can be used to lay a permanent extension from an intermediate 5 box should this be necessary. In the case of 33 1/3 Hz vibrators, the extension
- can be established from the intermediate box with two cables, a three-wire vibrator line and a two-wire signal cable (2 x 1.5 not shielded) or
- can be established with a common five-wire cable for distances of up to 50 m.

**Note**
The operating regulations of PTB and your local authorities for the connection and operation of magnetic drives in locations where there is a danger of explosions are to be followed.

6. When connecting an external oscillation amplitude adjuster R2, ensure that
- you lay a separate three-wire control cable with stranded wires for every potentiometer,
- there are no other control circuits in the same cable,
- in the case of shielded cables, you leave the shield open and do not connect to the earth conductor (shielding not necessary).
- Cables may be a maximum of 300 m long; in SRK machines a maximum of 20 m long.
6.3.1 Wire cross-sections

The wire cross-sections specified in Fig. 6-4 are to be used for all magnetic vibrators, the wire length is the distance between the magnetic vibrator and the main distributor. The supply line cross-sections specified are adequate provided that the mains voltage does not drop to below 95% of the nominal voltage.

The diagram is based on
- an ambient temperature of 35°C and
- individual laying of the supply lines.

<table>
<thead>
<tr>
<th>L (m)</th>
<th>A (mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>150</td>
<td>4</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
</tr>
<tr>
<td>250</td>
<td>6</td>
</tr>
<tr>
<td>300</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

**Fig. 6-4 Minimum cross-sections of the supply line**

- L Length of the power supply cable between the main distributor and the magnetic vibrator
- A Wire cross-section
- 1-15 Magnetic vibrator/characteristic curve

If smaller wire cross-sections are used,
- the nominal oscillation width is not attained and
- the effects of undervoltage cannot be compensated.

**Note**

Use the next larger wire cross-section in higher ambient temperatures and/or if the lines are laid in cable troughs. Changes in the connector set are necessary for lines that are longer than 300 m between the connector set and magnetic drive (in SRK machines, longer than 20 m).
Classical classification of characteristic curves for wire cross-sections according to Fig. 6-4, page 13, in dependence on the mains voltage and the length of the supply line between the main distributor and the magnetic vibrator.

<table>
<thead>
<tr>
<th>Type</th>
<th>Mains voltage</th>
<th>For connection to a mains frequency of 50 Hz via a VIBTRONIC®-connector set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>230V-</td>
<td>400V-</td>
</tr>
<tr>
<td>MV12/50-3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>MV50-4</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>MVC25-4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>MVC50-4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>MVC 100-4</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>MVD25-4</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>MVD50-4</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>MVE25-4</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>MVE33-1</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>MVE33-1(P)</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>MVE50-4</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>MVE50-1(P)</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>MVF25-3</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>MVF33-2</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>MVFS 33-1(P)</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>MVF50-3</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>MVF 50-3.1</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>MVF50-4</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>MVFS 50-1(P)</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>MVFS 50-2(P)</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>MV6 25-2</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>MVG 25-3.1</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>MV633-1</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>MVGS33-1P</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>MVGS50-2</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>MVG 50-11</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>MVH 25-2</td>
<td>-</td>
<td>15/11</td>
</tr>
<tr>
<td>MVH 33-1</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>MVHS33-1P</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>MVH 50-1</td>
<td>-</td>
<td>15</td>
</tr>
</tbody>
</table>

1) Before the slash: two-wire supply fine + PE; behind the slash: four-wire vibrator fine + PE

Table 6-5 Classification of characteristic curves for wire cross-sections
Classification of characteristic curves for wire cross-sections according to Fig. 6-4, page 13, in dependence on the mains voltage and the length of the supply line between the main distributor and the magnetic vibrator.

<table>
<thead>
<tr>
<th>Type</th>
<th>Mains voltage</th>
<th>Mains voltage</th>
<th>Mains voltage</th>
<th>Mains voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-230V-</td>
<td>-400V-</td>
<td>-500V-</td>
<td>-690V-</td>
</tr>
</tbody>
</table>

For connection to a mains frequency of 50 Hz via a VIBTRONIC*-connector set

<table>
<thead>
<tr>
<th>Type</th>
<th>6MV12/50-2</th>
<th>2</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>eMVC25-2</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>eMVC50-2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>eMVC100-4</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>eMVD25-2</td>
<td>7</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>eMVD50-2</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6MVE25-2</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>eMVE50-2</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>eMVE 50-12</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>eMVF25-1</td>
<td>12</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>eMVFSO-3</td>
<td>13</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>eMVG25-2</td>
<td>-</td>
<td>11</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>eMVG50-2</td>
<td>-</td>
<td>11</td>
<td>8</td>
<td>5</td>
</tr>
</tbody>
</table>

* Before the slash: two-wire supply line + PE; behind the stash: four-wire vibrator line + PE

Table 6-5a Classification of characteristic curves for wire cross-sections

Classification of characteristic curves for wire cross-sections according to Fig. 6-4, page 13, in dependence on the mains voltage and the length of the supply line between the main distributor and the magnetic vibrator.

<table>
<thead>
<tr>
<th>Type</th>
<th>SMVG25-2</th>
<th>8</th>
<th>4</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>sMVH25-2</td>
<td>15/8&quot;</td>
<td>12/8&quot;</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>sMVH33-1</td>
<td>-</td>
<td>12/8&quot;</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>sMVH 50-1</td>
<td>-</td>
<td>12</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

* Before the slash: two-wire supply line + PE; behind the stash: four-wire vibrator line + PE or seven-wire + PE for sMVH 33

Table 6-6 Classification of characteristic curves for wire cross-sections
Classification of characteristic curves for wire cross-sections according to fig. 6-4, page 13, in dependence on the mains voltage and the length of the supply line between the main distributor and the magnetic vibrator.

<table>
<thead>
<tr>
<th>Type</th>
<th>Mains voltage -230V-</th>
<th>Mains voltage -400V-</th>
<th>Mains voltage -500V-</th>
<th>Mains voltage -690V-</th>
</tr>
</thead>
<tbody>
<tr>
<td>MV12/60-3 MVB60-4 2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MVC30-3 5</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>MVC60-4 4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>MVC 60-4.1 4</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MVD30-3 MVD60-4 7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MVE30-3 MVE60-4 11</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>MVF30-3 13</td>
<td>-</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MVF30-4 MVF30-1 MVF60-3 12</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>MVF60-3.1 12</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>MVG60-2 -</td>
<td>-</td>
<td>-</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>MVH60-2 -</td>
<td>-</td>
<td>-</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>eMVC60-2 4</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>eMVD60-2 6</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>eMVE60-2 10</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>eMVG60-2 -</td>
<td>-</td>
<td>-</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

For connection to a mains frequency of 50 Hz via a VIBTRONIC*-connector set

Before the slash: two-wire supply fine + PE; behind the slash: four-wire vibrator fine +

Table 6-7 Classification of characteristic curves for wire cross-sections
6.3.2 Ambient temperatures

Magnetic drives subjected to ambient temperatures higher than those specified in the technical specifications must be cooled with fresh air.

On request, a ventilation connection with double nipple will be fitted to the working side. Connect a supply of fresh air to this ventilation connection. It may not exceed
- a pressure of 15 to 20 mbar or
- an inlet temperature of 40°C.

Depending on the ambient temperature and magnetic drive, 2 to 75 m³/h fresh air are required for ventilation (see details in the assembly drawing).

The fresh air flushes around the magnets and exits from holes in the hood or in the working side.

Note

Special measures are required for magnetic vibrators subjected to temperatures of less than
- 25°C.
6.4 Commissioning

1. Switch the machine on with the working stroke on the smallest setting.
   To attain a constant working stroke, the respective mains voltage is assigned a particular vibrator voltage (see characteristics curve data sheet in the appendix).

   **Note**
   In the event of deviations from the nominal working stroke:
   - first measure the current and voltage with an instrument that displays effective values
   - and then compare the measured values with the assembly drawing enclosed
   - correct the values (see appendix, Chapter 12, Mains and vibrator voltage)

Use a direct-display moving iron instrument for the measurements because other instruments show varying, unusable readings as a result of the non-sine current.

You raise the working stroke to the required value by turning the oscillation amplitude adjuster on the connector set clockwise.
At maximum the nominal working stroke specified on the rating plate of the vibrating machine must be attained.

Check the nominal working stroke with AViTEQ's oscillation meter or AViTEQ's (oscillation wedge) measuring card (optional extras).

   **Warning**
   Switch the machine off immediately should a hammering sound occur (collision mode) caused by the magnet and the armature colliding with each other. Eliminate the source of the fault (see Troubleshooting).
   Our guarantee does not apply for faults caused by such collisions

4. Ensure that
   - the bunker discharge trough attains the required volumetric flow rate at nominal working stroke,
   - the bulk material can flow out of the bunker without interruption,
   - an adequately high layer is available.

   **Note**
   If the volumetric flow rate is not attained, increase the height of the opening at the bunker run-out. It must be possible for the bulk material to flow out of the bunker without interruption. However, it must be ensured that the bulk material does not continue flowing after the conveyor has been switched off.
7 Modifications, repairs and replacements

7.1 Subsequent modification of vibrating machines (retuning)

Warning
Structural modifications, e.g. lengthening or shortening a conveyor, influence the oscillating characteristic and rigidity of the machine and are therefore not allowed.

The retrofitting of wearing plates, which is possible within limits,
- reduces the volumetric flow rate on account of the increase in weight,
- raises the danger of collisions,
- necessitates a retuning of the magnetic drive.

Please contact our works for details and fitting instructions.

Retuning
In order to restore the machine to its original state on delivery with the required collision safety, retuning is necessary.
Balance out the weight differences vis-a-vis the delivery state by changing the number of red auxiliary weights.
For increases in weight
- by removing an appropriate number of auxiliary weights
For decreases in weight
- by adding an appropriate number of auxiliary weights

Note
See the characteristics curve data sheet with balancing instructions for the relationship between the weights of the vibrating machine without magnetic vibrator (effective weight) and the auxiliary weight.

7.2 Repair and replacement of magnetic vibrators

Warning
Before carrying out any repair or replacement work, switch the machine off and take measures to ensure that it cannot be switched on again.

In the case of faulty vibrators or connector sets:
- return the faulty machine to the supplier or AVITEQ's agents, or
- have the faulty magnetic vibrator repaired by a qualified technician if appropriate equipment and measuring tools are available,
- or replace it with a new vibrator.

Warning
(Ex) and (Sch) versions of the machines may only be repaired by workshops certified to carry out this work or by the supplier.
Repairing the magnetic vibrator

We will gladly send you the necessary instructions for the assembly of the magnetic vibrator.

- Order the spare parts required in accordance with the accompanying spare parts list
- Compare the air gap specifications on the vibrating machine’s rating plate with those in the instructions. If they differ, reset the air gap according to the rating plate. Here
  - an air gap that is too small causes a danger of collision
  - an air gap that is too large raises current consumption to an impermissibly high level and causes a danger of a spring fracture.

Replacement of magnetic vibrators

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement magnetic vibrators are delivered without auxiliary weights and are not balanced to any particular effective weight</td>
</tr>
</tbody>
</table>

Proceed as follows to replace a magnetic vibrator
- remove the protective hood
- remove the red auxiliary weights from the faulty magnetic vibrator
- replace the vibrator with a new one
- place the auxiliary weights on the replacement vibrator
- tighten the screw connections between magnetic vibrator and vibrating machine (see page 10, Chapter 62, point 7).

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlacquered plates are tolerance compensation plates and may not be replaced.</td>
</tr>
</tbody>
</table>
8 Maintenance

**Warning**
Only carry out maintenance work on the machine if the machine is off and measures have been taken to ensure that it cannot be switched back on again.

When welding, connect the earth cable of the welding set or transformer directly to the vibrating machine so that there is a good current flow because otherwise the high welding current will flow along the earth cable and destroy it.

8.1 Cleaning

The conveyor is to be cleaned in dependence on how dirty it is because caking of bulk material can influence the flow rate.

8.2 Checks

The following parts of the machine are subject to wear and are to be monitored according to company regulations and replaced accordingly:

- support/suspension elements
- rubber pads
- compression/tension springs
- gaskets/compensators used for packing

The magnetic vibrators have no other wearing parts and are thus maintenance free if operated as intended.

Check the drive mounting screw connections one to two operating hours after installation to ensure that they are tight. Tighten if necessary.

9 Emergencies

The vibrating machine with connector set is an integral part of the conveyor system. In the event of an emergency, switch off the conveyor system's main switch or activate its emergency stop system.
# 10 Index

## A

- **Airgap** 19
- **Ambient temperature** 11, 16
- **Assembling** 6
- **Assembly drawing** V
- **Auxiliary weights** 19

## B

- **Built-in safety systems** I

## C

- **Cable length** 7
- **Caking** 20
- **Characteristic curves** 14, 15
- **Characteristics data** 17
- **Characteristics curve data sheet** 18
- **Checks** 20
- **Clatter** 11
- **Cleaning** 20
- **Compensators** 20
- **Commissioning** 6, 17
- **Complaints** 2
- **Compression springs** 6, 8
- **Compression/tension springs** 20
- **Connector set** 5
- **Contents** IV

## D

- **Danger zone** III
- **Decreases in weight** 18
- **Definitions** V
- **DIN parts** III
- **Disposal of products** II
- **Disposal of the machine** 1

## E

- **Earth conductor** 12
- **EC directives** I
- **Emergencies** 20
- **Emergency stop system** 20
- **Environmental protection regulations** II

## F

- **Figures and tables** IV
- **Functional description** 4
- **G**
- **General notes on hazards** III

## H

- **Holes** 10
- **Hollow rubber pads** 8

## I

- **Increases in weight** 18
- **Index** 21
- **Installation of the vibrating machine** 6
- **Intermediate storage** 2, 3

## L

- **Liquid plastic** 10
- **Lock nuts** 10, 11

## M

- **Machine’s intended purpose** 1
- **Magnetic vibrator (drive)** 5
- **Main switch** 20
- **Maintenance** 20
- **Modifications** 18
- **Mounting and connecting the connector set** 11
- **Mounting screws** 10
- **Mounting surfaces** 9
- **Mounting the magnetic vibrator drive** 9

## N

- **Noise level** II
- **Notes** II, V, 2, 3, 5, 9, 10
- **Notes on the operating manual** V

## O

- **On/Off switch** I
- **Operating and maintenance personnel** III
- **Operating permits** II
- **Operating regulations** 12
- **Optional extras** 1
- **Ordering spare parts** V
- **Oscillation amplitude adjuster** 12

## P

- **Packing for return shipment** 2
- **Packing is damaged** 2
- **Personnel safety** II
- **Potentiometer** 2
- **Power supply system** I
- **Protective hood** 1, 11, 9, 19

---

Page 21
<table>
<thead>
<tr>
<th>Q</th>
<th>Qualification</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Rating plate</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Receiving inspection</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Repaired</td>
<td>III</td>
</tr>
<tr>
<td></td>
<td>Repairing</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Repairs</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Replacement</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Replacement of magnetic vibrators</td>
<td>18, 19</td>
</tr>
<tr>
<td></td>
<td>Rubber pads</td>
<td>6, 7, 8, 20</td>
</tr>
<tr>
<td></td>
<td>Rubber strips</td>
<td>8</td>
</tr>
<tr>
<td>S</td>
<td>Safety</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>Safety distance</td>
<td>III</td>
</tr>
<tr>
<td></td>
<td>Safety measures</td>
<td>II</td>
</tr>
<tr>
<td></td>
<td>Safety mechanism</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Scope of delivery</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Screw connections</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Screw size</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Serial number</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>Serial number of vibrator</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>Short description</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Single drive</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Smooth holes</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Spare expendable parts</td>
<td>III</td>
</tr>
<tr>
<td></td>
<td>Spare parts</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Special designs</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Spring axle</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Standstill</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Subsequent modification of oscillating machines</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Supply fine</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Support elements</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Support structures</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Support/suspension elements</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Suspension or support frames</td>
<td>6</td>
</tr>
<tr>
<td>T</td>
<td>Table of contents and figures</td>
<td>IV</td>
</tr>
<tr>
<td></td>
<td>Technical specifications</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Tension springs</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Tightening moments</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Tolerance compensation plates</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Torques</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Trained technicians</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>Transport and packing</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Transport protection devices</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Transport to the point of installation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Twin drives</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Two-mass oscillation system</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Type</td>
<td>V</td>
</tr>
<tr>
<td>V</td>
<td>VDE regulations</td>
<td>II</td>
</tr>
<tr>
<td></td>
<td>Vibrating machine</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Vibration pickup's</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Volumetric flow rate</td>
<td>17</td>
</tr>
<tr>
<td>W</td>
<td>Warnings</td>
<td>HI, VI, 6, 7, 11, 12, 17, 18, 20</td>
</tr>
<tr>
<td></td>
<td>Wearing plates</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Welding</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Wire cross-sections</td>
<td>13, 14, 15</td>
</tr>
<tr>
<td></td>
<td>Working stroke</td>
<td>III, 17</td>
</tr>
<tr>
<td></td>
<td>Working stroke + safety distance</td>
<td>6</td>
</tr>
</tbody>
</table>
Manufacturer's Declaration

according to Appendix IIB of the EC Directive 89/392/EEC relating to

machinery Manufacturer
AViTEQ Vibrationstechnik GmbH
Im Gotthelf 16
65795 Hattersheim-Eddersheim

Product description:
Magnetic Drive

Device Types:
MV...

The products of the specified type series are in conformance with the following European directives:
89/392/EEC  Directive relating to machinery under consideration of additions and amendments according to directives 91/368/EEC, 93/44/EEC and 93/68/EEC
73/23/EEC  Directive relating to electrical equipment designed for use within certain voltage limits under consideration of the amendments according to directive 93/68/EEC

The conformance of the products with European Directives is demonstrated through full observation of the following harmonized standards and national standards and directives:
EN 292-1, EN 292-2
EN 563
EN 50081-2, EN 50082-2
EN 60034
EN 50014/50018  EN 60204-1  IEC 34-5
EN 60529  IEC 38

Full technical documentation is available. The Operating Manual for the devices is in hand. The CE symbol has been included. Commissioning of the unbalanced motor is prohibited until it is established that the machine with which the unbalanced motor will be installed complies with the regulations of the machinery directive 89/392/EEC and its current amendments and additions.
The safety notes in the operating manual supplied must be observed!
This declaration certifies conformance with the specified standards and directives. It does not, however, include a guarantee of characteristics.

Hattersheim-Eddersheim, April 2002 Legally binding signature:

Nickmann,AViTEQ/PI