REOVIB
For Vibratory Feeder Systems
SWM 4000
Handheld measuring instrument for vibratory feeder
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Technical Information for the User

This description contains the necessary information for the correct application of the product described below. It is intended for use by technically qualified personnel. Qualified personnel are persons who, because of their training, experience and position as well as their knowledge of appropriate standards, regulations, health and safety requirements and working conditions, are authorised to be responsible for the safety of the equipment, at all times, whilst carrying out their normal duties and are therefore aware of, and can report, possible hazards (Definition of specialist according to IEC 364).

Safety Instructions
The following instructions are provided for the personal safety of operators and also for the protection of the described product and connected equipment.

Warning!
Hazardous Voltage
Failure to observe can kill, cause serious injury or damage

- Isolate from mains before installation or dismantling work, as well as for fuse changes or post installation modifications.
- Observe the prescribed accident prevention and safety rules for the specific application.
- Before putting into operation check if the rated voltage for the unit conforms with the local supply voltage.
- Emergency stop devices must be provided for all applications. Operation of the emergency stop must inhibit any further uncontrolled operation.
- Electrical connections must be covered
- Earth bonding must be tested prior to operation

Prescribed Use
The units described herein are electrically powered for use in industrial applications and are not suitable for domestic use

Do not open, modify or repair the device.
Changes or modifications to the device will invalidate the warranty.
For example, when the battery should be replaced, contact the manufacturer or supplier.

Warning!
Use only the delivered charger, battery and cable.
Different chargers or cables can cause the battery to explode or damage the device.

Declaration of Conformity:
We declare that these products conform with the following standards and directives:

<table>
<thead>
<tr>
<th>Directives:</th>
<th>Standard:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014/30/EU</td>
<td>EMC EN 61000-6-1:2007 +A1:2011; EN 61000-6-2:2005</td>
</tr>
<tr>
<td>2014/35/EU</td>
<td>LVD EN 50178:1997</td>
</tr>
<tr>
<td>2011/65/EU</td>
<td>RoHS</td>
</tr>
</tbody>
</table>

REO AG, D-42657 Solingen
### 1.0 General

Reliable and accurate instrument for the installation, testing and servicing of vibratory conveyor equipment. This unit supersedes REO's popular SWM3000 unit and incorporates many new features. When combined with an appropriate accelerometer, the unit displays, acceleration, speed, vibration amplitude and frequency. It can store up to 125 instantaneous values and transfer these as an .XLS file to a PC via USB connection. The stroboscope function generates light flashes with the built-in LED to make the movements of the feeder visible and to analyse them. The language may be set to allow worldwide use and the screen is backlit to allow easy viewing in all ambient conditions. The unit is housed within a robust rubber casing and the integrated lithium-ion battery, can be charged easily via a USB interface to allow versatile operation. Optimization of the design, display and internal battery, means that the unit is faster, more reliable and yet is smaller and more convenient to use. The REOVIB SWM4000 instrument is supplied with a comprehensive list of accessories, consisting of USB cable and charger (traveler), protective cover, 100mV/g accelerometer, sensor mounting bracket and sturdy carry case.

### 2.0 Technical Data

<table>
<thead>
<tr>
<th>Unit type</th>
<th>REOVIB SWM 4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>USB Travel Charger / Power Supply, 115/230V , 50/60 Hz , +/-10% min. 0,9A / 5V</td>
</tr>
<tr>
<td>Charging time</td>
<td>about 6 hours</td>
</tr>
<tr>
<td>Effective value input</td>
<td>Sensor 10 / 100 / 500 mV/g  +/-20% difference adjustment (8 – 600mV/g)</td>
</tr>
<tr>
<td>Sensor supply</td>
<td>Constant current 14mA</td>
</tr>
<tr>
<td>Frequency</td>
<td>6...600Hz</td>
</tr>
<tr>
<td>Amplitude</td>
<td>0...30mm</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0,2...150g</td>
</tr>
<tr>
<td>Measuring error</td>
<td>1,5%</td>
</tr>
<tr>
<td>Enclosure protection</td>
<td>IP 40</td>
</tr>
<tr>
<td>Dimensions- (HxWxD)</td>
<td>81 x 159,5 x 35 mm</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0...45 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20...+45 °C</td>
</tr>
<tr>
<td>Rel. Humidity</td>
<td>93 % without dew or condensation</td>
</tr>
<tr>
<td>Environment protection</td>
<td>Class 1 (IEC 664)</td>
</tr>
<tr>
<td>Power rating</td>
<td>0,8 VA</td>
</tr>
</tbody>
</table>
3.0 Connections / Control Elements / Display Messages

- **Mini-USB-Port:** for charging and data transfer
- **LED:** Charging status / Stroboscope
- **BNC-Port:** Sensor input
**Displays**

- Acceleration in g
- Speed in cm/sec
- Deflection in mm
- Frequency in Hz

**Indicators**

- **ON**
  - Indicates that there is no measurement signal and the sensor is connected.
- **OFF**
  - Indicates that the Sensor is not connected or Sensor fault.
  - Blinking indicates a sensor fault.

**Example: Parameterisation**

- **Black background**: Selected menu / parameters
- **Operation mode**
  - Acceleration: 5.00 g
  - Speed: 7.5 cm/s
  - Deflection: 0.23 mm
  - Frequency: 105 Hz

- **Selections**
  - 1: Storage
  - 2: Storage
  - 3: Storage
  - 4: Storage
  - 5: Storage
  - 6: Storage
  - 7: Storage

- **Options**
  - Enables parameterisation
  - Changes parameters / sets value
  - Finishes parameterisation
  - Goes backwards each level or returns to Operation mode
### 4.0 Menu Structure

<table>
<thead>
<tr>
<th>No.</th>
<th>Symbol</th>
<th>Menu option</th>
<th>Meaning</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td></td>
<td>Record</td>
<td>Save record</td>
<td>0-124</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Records</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td></td>
<td>Record</td>
<td>Load record</td>
<td>0-124</td>
</tr>
<tr>
<td>2.2</td>
<td></td>
<td>Acceleration</td>
<td>Acceleration</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td></td>
<td>Speed</td>
<td>Speed</td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td></td>
<td>Deflection</td>
<td>Deflection</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td>Frequency</td>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>2.6</td>
<td></td>
<td>Clear Record</td>
<td>Delete selected record</td>
<td>Execute</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Info</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td></td>
<td>No</td>
<td>(Only for service purposes)</td>
<td>View only</td>
</tr>
<tr>
<td>3.2</td>
<td></td>
<td>20151201-130154</td>
<td>Software version</td>
<td>View only</td>
</tr>
<tr>
<td>3.3</td>
<td></td>
<td>Battery</td>
<td>Battery status in percent</td>
<td>View only</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Stroboscope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1</td>
<td></td>
<td>Dead Centre</td>
<td>Amplitude will be visible (Min. and Max. of Oscillation)</td>
<td>1 / 0</td>
</tr>
<tr>
<td>4.2</td>
<td></td>
<td>Slow Motion</td>
<td>Vibration is in slow motion (motion blur will be removed)</td>
<td>1 / 0</td>
</tr>
<tr>
<td>4.3</td>
<td></td>
<td>Tempo</td>
<td>&quot;Slow Motion&quot; rate</td>
<td>0,01 Hz…2,00 Hz</td>
</tr>
<tr>
<td>4.4</td>
<td></td>
<td>Phase Locked</td>
<td>Phase shift on / off</td>
<td>1 / 0</td>
</tr>
<tr>
<td>4.5</td>
<td></td>
<td>Phase</td>
<td>Phase shift</td>
<td>-180°…0°…+180°</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1</td>
<td></td>
<td>Clear All Records</td>
<td>Clear All Records</td>
<td>Execute</td>
</tr>
<tr>
<td>5.2</td>
<td></td>
<td>Cal</td>
<td>Acceleration sensor calibration</td>
<td>8-600 mV/g</td>
</tr>
<tr>
<td>5.3</td>
<td></td>
<td>Language</td>
<td>Select the menu language</td>
<td>Select</td>
</tr>
<tr>
<td>5.4</td>
<td></td>
<td>Back Light</td>
<td>Backlight off / on</td>
<td>1 / 0</td>
</tr>
<tr>
<td>5.5</td>
<td></td>
<td>Factory Settings</td>
<td>Restoring factory settings</td>
<td>Execute</td>
</tr>
<tr>
<td>5.6</td>
<td></td>
<td>Code</td>
<td>Menus enabling or disabling (see section 9.0 and 10.0)</td>
<td></td>
</tr>
<tr>
<td>5.7</td>
<td></td>
<td>User Params</td>
<td>Load customers parameter settings</td>
<td>Execute</td>
</tr>
<tr>
<td>5.8</td>
<td></td>
<td>Auto Off</td>
<td>Auto Off: 1 = Energy saving mode On (the backlight turns off after 30 seconds and SWM4000 turns after 2 minutes off) Auto Off: 0 = Energy saving mode off (the backlight (if Backlight: 1) and SWM4000 remain permanently switched on)</td>
<td>1 / 0</td>
</tr>
<tr>
<td>5.9</td>
<td></td>
<td>Hold</td>
<td>The last measured value is displayed (after switching off the feeder)</td>
<td>1 / 0</td>
</tr>
<tr>
<td>5.10</td>
<td></td>
<td>Effective Value</td>
<td>Acceleration is displayed in RMS</td>
<td>1 / 0</td>
</tr>
</tbody>
</table>
5.0 Mounting the accelerometer

**Important!**

Sensor mounting:
The accelerometer should generate signals for the movement and acceleration of the feeder, which are fed back to the regulator circuit of the control unit. Therefore it is very important that no other extraneous vibration signals are picked up by the sensor.

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**Example:**

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6.0 Calibrating the sensor input

**Important!**

The sensor constants deviating from the indicated sensor voltage (mV/g) must be set once on the measuring unit!

A calibration certificate is provided with each sensor supplied. This certificate shows the exact value of the sensor output voltage, for example 95 mV/g. This value must be entered in the **Menu: Service with Parameter “Cal”**.

The sensor input is factory-set to 100 mV/g. It is possible to set deviations up to +/- 20 %.
7.0 Saving the measured values
All four values (acceleration, speed, deflection / amplitude, frequency) are saved. Press the arrow key to select the no. of the set to start the storage with.

In Menu: Storage, Parameter: Record

8.0 Read measurements
This menu serves to control the data sets stored. The individual data sets may be viewed and cleared (if necessary) by pressing the arrow keys.

In Menu: Records, Parameter: Record

9.0 Saving your own parameter
You can save your own settings of the unit.

Save:
In Menu: Service, Parameter: Code: 143 → Set User Params

Load:
In Menu: Service, Parameter: User Params

10.0 Function „only measure“ or enable and disable Parameter/Menus
With this parameter you can protect the saved data sets and unit settings against unauthorised modifying.

In Menu: Service, Parameter: Code: 117 → Lock Menues: 1

Enabling parameter / Menus:
In Menu: Service, Parameter: Code: 117 → Lock Menues: 0

11.0 Factory setting
With this parameter you can restore the factory settings.

In Menu: Service, Parameter: Factory Settings

12.0 Readout the saved data sets into a PC
At this unit it is possible to load the saved data sets via the USB interface into a PC. For the coupling you need Microsoft EXCEL

Approaching:
1. Connect measurement device with the data cable to the PC.
2. Switch on the SWM 4000
3. Load data file „SWM4000_usb32.xls“
4. Use button „receive“. After the sweep the data sets must be displayed.
13.0 Delivery contents

The measuring instrument "SWM 4000 Set" consists of:

<table>
<thead>
<tr>
<th>Designation</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring instrument SWM 4000</td>
<td></td>
</tr>
<tr>
<td>USB-charger/power Supply (traveler) incl. USB data/charging cable</td>
<td>677401</td>
</tr>
<tr>
<td>Silicone protective cover for SWM 4000</td>
<td></td>
</tr>
<tr>
<td>Sturdy carry case</td>
<td></td>
</tr>
<tr>
<td>Sensor mounting bracket</td>
<td></td>
</tr>
<tr>
<td>Accelerometer (100mv/g) incl. mounting magnet</td>
<td></td>
</tr>
</tbody>
</table>

14.0 Spare Parts / Single components

<table>
<thead>
<tr>
<th>Designation</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring instrument SWM 4000 with USB-charger/power Supply (traveler) incl. USB data/charging cable</td>
<td>677411</td>
</tr>
<tr>
<td>USB-charger/power Supply (traveler) incl. USB data/charging cable</td>
<td>090611</td>
</tr>
<tr>
<td>Silicone protective cover for SWM 4000</td>
<td>090612</td>
</tr>
<tr>
<td>Sturdy carry case</td>
<td>090613</td>
</tr>
<tr>
<td>Sensor mounting bracket</td>
<td>090614</td>
</tr>
<tr>
<td>Accelerometer (100mv/g) incl. mounting magnet</td>
<td>084430</td>
</tr>
</tbody>
</table>
15.0 Battery pack

**Warning!**
Use only the delivered charger, battery and cable. Different chargers or cables can cause the battery to explode or damage the device.

- Upon delivery, the battery is not fully charged. Recharge the battery before using.
- The battery may only be changed by the manufacturer.

**Disposal**
The battery and the device should not be disposed of with household or industry waste. They should be handed over to a designated collection point, e.g., on an authorized one-for-one basis when you buy a new similar product or to an authorized collection site for recycling waste electrical and electronic equipment and batteries and accumulators.
16.0 Declaration of Conformity

EG-Konformitätserklärung
EC-Declaration of Conformity
Certificat de conformité CE

Der Hersteller: REO AG
The Manufacturer: Brüither Straße 100
Le Fabricant: D-42657 Sollingen

erklärt hiermit, dass die folgenden Produkte
certifies that the following products
par la présente certifie que les produits suivants

Produktbezeichnung Messegät für Schwingförderer
Product designation: Measuring instrument for vibratory feeder
Désignation du produit: Mètre pour alimentateurs

Typenreihe: REOVIB SWM 4000
Type code: REOVIB SWM 4000
Série de modèles:

den Bestimmungen der folgenden Richtlinien entsprechen:
are in conformity with the following requirements:
correspondent aux exigences de la Directive:

EG-Niederspannungsrichtlinie 2014/35/EU.
EC Low Voltage Directive 2014/35/EU
Directive Basse Tension 2014/35/EU

EG-Richtlinie Elektromagnetische Verträglichkeit 2014/30/EU
EC "Electromagnetic compatibility" 2014/30/EU.
Directive européenne sur "Compatibilité électromagnétique" 2014/30/EU.

EG-Richtlinie RoHS 2011/65/EU zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in
Elektro- und Elektronikgeräten (RoHS).
Directive RoHS 2011/65/EU on the Restriction of the Use of certain Hazardous Substances in Electrical and
Electronic Equipment (RoHS).

Direktive européenne RoHS 2011/65/EU relative à la limitation de l'utilisation de certaines substances
dangereuses (RoHS) dans les équipements électriques et électroniques

Folgende Normen sind angewandt:
The following standards are in use:
Les normes suivantes sont appliquées:

EN 50178
1997
Ausrüstung von Starkstromanlagen mit elektronischen Betriebsmitteln
Electronic equipment used in power installations
Utilisation d'équipements électroniques dans les installations de puissance.

EN 61000-6-2
2005
Fachgrundnorm Störfestigkeit Indusbriebereich
Technical Basic Standard – Resistance to Interference. Industrial field
Norme générique-Immunité pour les environnements industriels

EN 61000-6-4
Fachgrundnorm Störausssendung Industriebereich
Technical Basic Standard – Noise Emission Industrial field
Norme générique-sur l’émission pour les environnements industriels

Solingen, 18.11.2015
(Ort, Datum der Ausstellung)
(Lieu et date d’établissement)

Rechtsverbindliche Unterschrift
Signature of authorized person
Signature de la personne autorisée
17.0 Dimensions

Dimensions in [mm]
**PRODUCTION+SALES:**

**China**
REO Shanghai Inductive Components Co., Ltd
No. 536 ShangFeng Road · #2, Pudong, 201201 Shanghai · China
Tel.: +86 (0)21 5858 0686 · Fax: +86 (0)21 5858 0289
E-Mail: info@reo.cn · Internet: www.reo.cn

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E-Mail: croma@croma.com.pl · Internet: www.croma.com.pl

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E-Mail: info@reo-turkey.com · Internet: www.reo-turkey.com