Oscillating Mounts

Based in Milan, Italy, as an affiliate of **WAMGROUP®**, **OWC** develops and manufactures **oscillating mounts for vibrating devices** like vibrating screens, feeders, dryers, compaction tables and vibrating machines in general.

As a result from studies **conducted by our research and development department**, our products aim for leadership on the market based on long-term expertise of our engineers and on the support of our **worldwide distribution network**.

OWC offers full technical support always **ready to satisfy customers' expectations** day after day.

Let the good vibes roll!

WAMGROUP® is the leader on the global market of screw conveyors and one of the main companies in the field of bulk solids handling and processing equipment. The company founded in Modena, Italy, in 1968, hires approximately 2,100 employees in over 60 subsidiaries in 40 countries.

WAMGROUP®'s range of products includes equipment for bulk solids handling and processing, dust filtration, industrial mixers, wastewater treatment and renewable energy generation.

In order to expand its product range and cover new market segments, in 2017 WAMGROUP decided to establish OWC.

OSCILLATING MOUNTS

OWC’s OWSNE (standard range) and OWSHD (heavy-duty range) oscillating mounts are designed for:

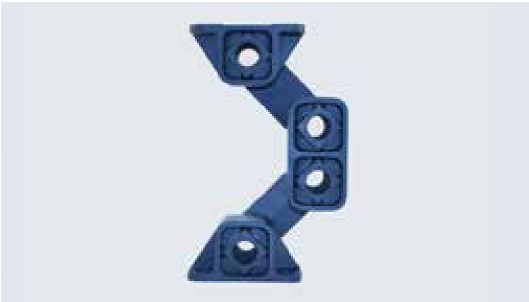
- vibrating screens
- vibrating feeders
- vibrating driers
- vibrating compaction tables
- other vibrating machines

This catalogue illustrates the operating principle of OWC oscillating mounts providing the basic tools for selection of the correct type and size for a machine, simplifying the common concepts of any type of vibrating machine.

OWSNE

OWSHD

OWS oscillating mounts assure a high shock-absorbing level due to their special shape featuring the interaction of four elastic torsional elements. Each insert is implemented by constraining two square profiles with four rubber inserts.



OWSNE5000 side view

Central torsional elastic insert

The four torsional elements are combined in a different manner to allow the implementation of two types of suspensions: OWSNE and OWSHD. The two similar models differ from one another in regards to length and opening angle of the arms. This difference entails a different kinematic mechanism ensuring a higher level of stiffness to the OWSHD models. Having the same overall dimensions they allow for a greater vertical maximum load by slightly decreasing the elasticity.

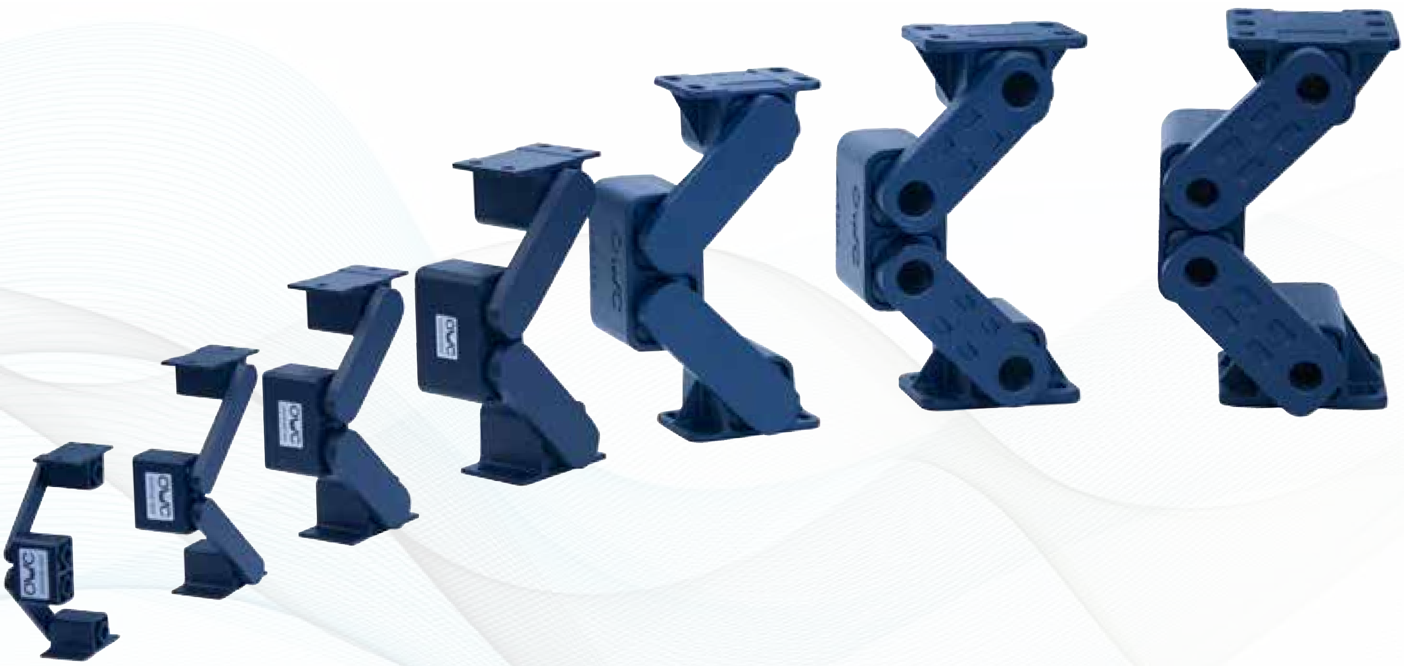
Both types guarantee very low natural frequency values of close to 2 Hz, thus succeeding to achieve insulation levels from the supporting structure of the vibrating machine higher than 98%, even at minimum excitation frequencies.

Furthermore, they achieve a particularly low noise level. If needed, they can be operated as close as possible in resonance state with the vibrating machine.

OWC oscillating mounts withstand pulse feed. They are maintenance-free and can work in any type of ambient temperature between -40 °C and 80 °C.

The special kinematic mechanism and the features of the rubber insert allow to achieve a cross stiffness equal to about 10 times the longitudinal stiffness (feeding direction of the conveyed product). This results in an improved efficiency of the process, greater safety and the possibility to avoid side guides or additional devices to control the movement of the machine during turn-off transient state.

OWC oscillating mounts do not require regular cleaning.
Nevertheless, if there are particular plant requirements, the user must choose suitable products to clean the vibrating machine that do not damage the oscillating mounts (e.g. chemical products that are not compatible with rubber inserts).



MODEL IDENTIFICATION

For correct identification of the various models, reference must be made to the codes written on the oscillating mount, as indicated below.


Indication valid for sizes up to 3800 both NE and HD.
See the full code, e.g. OWSNE2700.

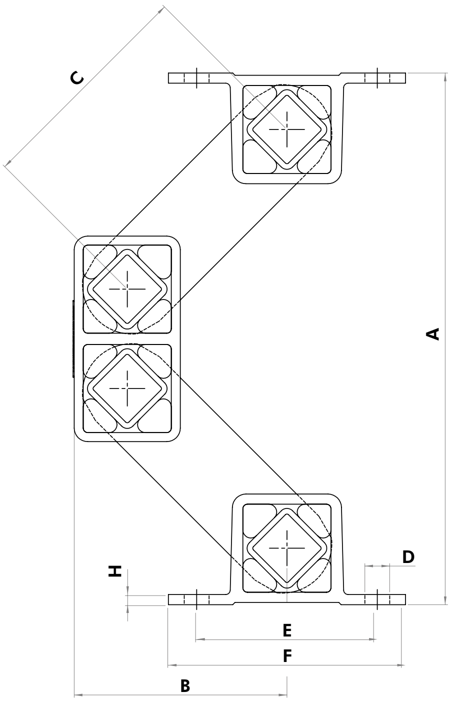

Indication valid for large sizes up to 5020.
See the partial code on the central panel, for example: OWS5000.
See the partial code on the arms, e.g. HD.
Full code, e.g. OWSHD5000.

OWS NE
Oscillating Mounts - Standard Range

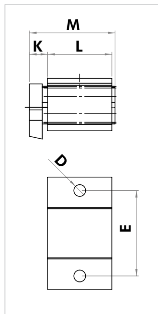
from NE 1500 to NE 3800

NE 4500

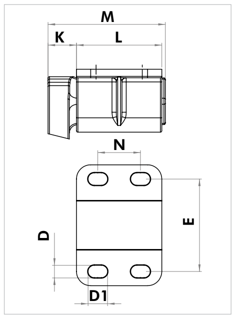
from NE 5000 to NE 5020



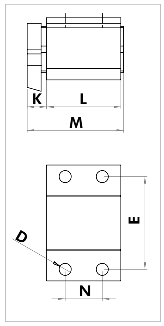
from NE 1500 to NE 2700



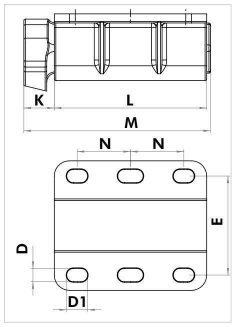
from NE 4500 to NE 5000



NE 3800



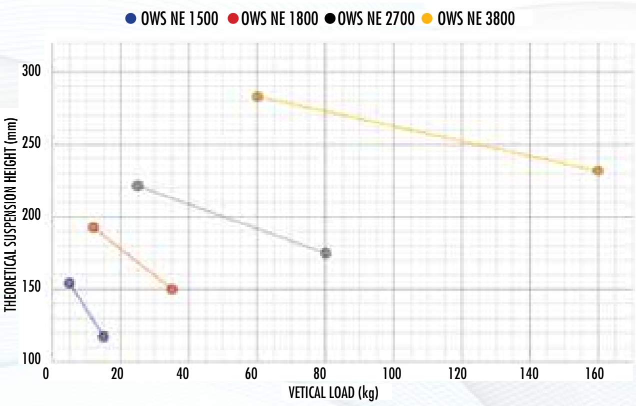
NE 5020



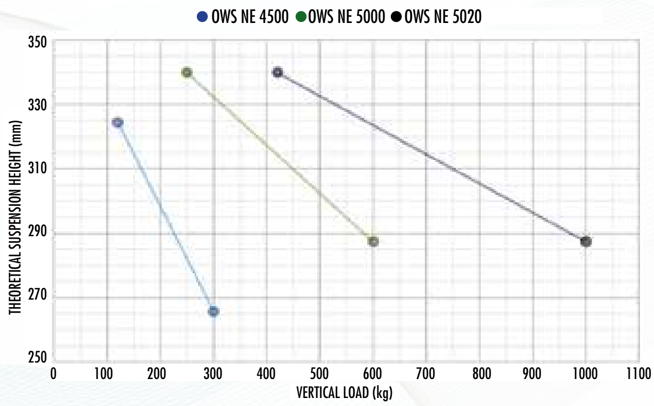
model	load capacity (kg)		A (mm)		B (mm)		dynamic limits						proper frequency (Hz)	
							8 poles		6 poles		4 poles			
	unload	max. load	unload	max. load	unload	max. load	max. stroke (mm)	a max (g)	max. stroke (mm)	a max (g)	max. stroke (mm)	a max (g)	unload	max. load
OWS NE 1500	5	15	168	117	70	87	14	4.1	12	6.2	8	9.3	4.0	2.8
OWS NE 1800	12	35	208	150	88	108	17	4.9	15	7.7	8	9.3	3.7	2.6
OWS NE 2700	25	80	235	175	94	113	17	4.9	14	7.2	8	9.3	3.7	2.7
OWS NE 3800	60	160	305	232	120	146	20	5.8	17	8.8	8	9.3	3.0	2.4
OWS NE 4500	120	300	354	266	139	168	21	6.1	18	9.3	8	9.3	2.8	2.3
OWS NE 5000	250	600	382	287	150	181	22	6.4	18	9.3	8	9.3	2.4	2.1
OWS NE 5020	420	1000	382	287	150	181	22	6.4	18	9.3	8	9.3	2.4	2.1

model	C	D / D1	E	F	H	K	L	M	N	weight	material		colour
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg)	arms	external frame	
OWS NE 1500	80	7	50	65	3	10	40	52	-	0.5	fabricated steel	aluminium frame	blue
OWS NE 1800	100	9	60	80	3.5	14	50	67	-	1.1	fabricated steel	aluminium frame	
OWS NE 2700	100	11	80	105	4.5	17	60	80	-	2.3	fabricated steel	aluminium frame	
OWS NE 3800	125	13	100	125	6	21	80	104	40	5.1	fabricated steel	aluminium frame	
OWS NE 4500	140	13x26	115	145	8	28	100	132	58	13.5	fabricated steel	nodular cast iron	
OWS NE 5000	150	17x27	130	170	12	40	120	165	60	22.5	nodular cast iron	nodular cast iron	
OWS NE 5020	150	17x27	130	170	12	40	200	245	70	33.2	nodular cast iron	nodular cast iron	

OWS NE Load vs Deflection



OWS NE Load vs Deflection



The height values shown in the graphs refer to suspensions already tested (use of 300 hours). The actual suspension height may vary depending on the operating temperature, type of material load, frequency and oscillation amplitude.

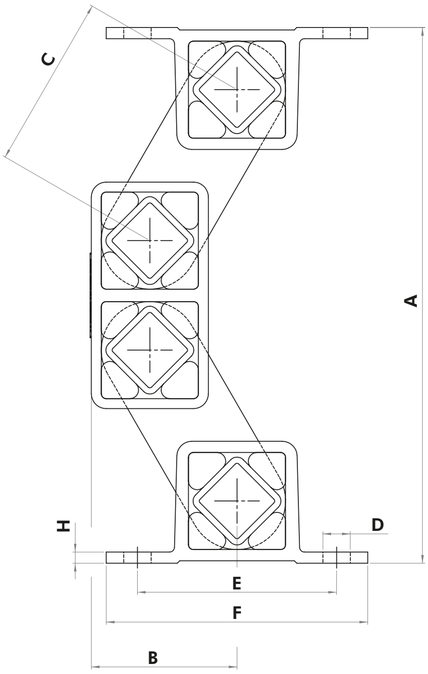
OWS HD

Oscillating Mounts - Heavy-duty Range

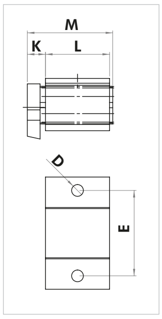
from HD 2700
to HD 3800

HD 4500

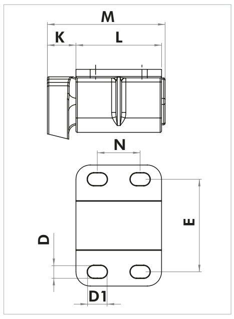
from HD 5000
to HD 5020



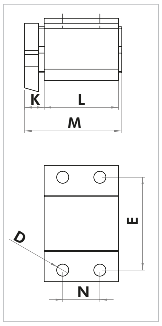
HD 2700



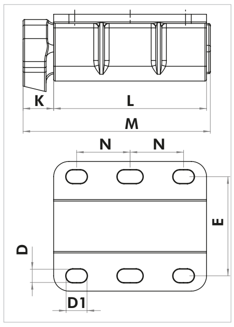
from HD 4500 to HD 5016



HD 3800



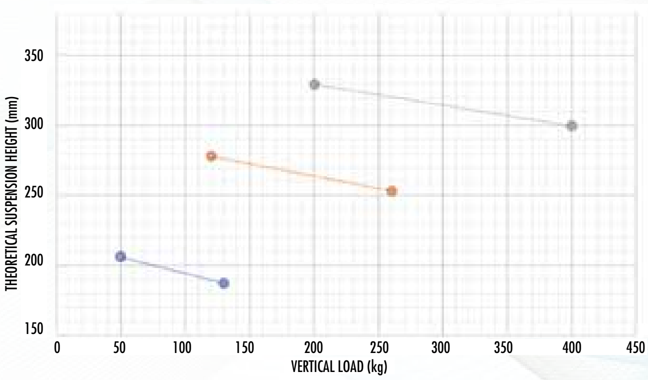
HD 5020



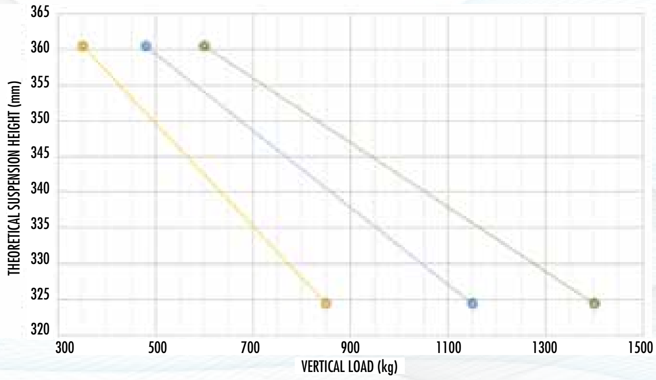
model	load capacity (kg)		A (mm)		B (mm)		dynamic limits						proper frequency (Hz)	
							8 poles		6 poles		4 poles			
	unload	max. load	unload	max. load	unload	max. load	max. stroke (mm)	a max (g)	max. stroke (mm)	a max (g)	max. stroke (mm)	a max (g)	unload	max. load
OWS HD 2700	50	130	215	187	59	74	12	3.5	10	5.2	8	9.3	4.8	3.1
OWS HD 3800	120	260	293	253	79	105	15	4.3	13	6.7	8	9.3	3.6	2.7
OWS HD 4500	200	400	347	300	96	125	17	4.9	14	7.2	8	9.3	3.3	2.5
OWS HD 5000	350	850	378	324	105	138	18	5.2	15	7.7	8	9.3	3.2	2.4
OWS HD 5016	480	1150	378	324	105	138	18	5.2	15	7.7	8	9.3	3.2	2.4
OWS HD 5020	600	1400	378	324	105	138	18	5.2	15	7.7	8	9.3	3.2	2.4

model	C	D / D1	E	F	H	K	L	M	N	weight	material		colour
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg)	arms	external frame	
OWS HD 2700	70	11	80	105	4.5	17	60	80	-	2.1	fabricated steel	aluminium frame	blue
OWS HD 3800	95	13	100	125	6	21	80	104	40	4.8	fabricated steel	aluminium frame	
OWS HD 4500	110	13x26	115	145	8	28	100	132	58	13.4	fabricated steel	nodular cast iron	
OWS HD 5000	120	17x27	130	170	12	40	120	165	60	21.9	nodular cast iron	nodular cast iron	
OWS HD 5016	120	17x27	130	170	12	40	160	208	70	27.3	nodular cast iron	nodular cast iron	
OWS HD 5020	120	17x27	130	170	12	45	200	250	70	33.4	nodular cast iron	nodular cast iron	

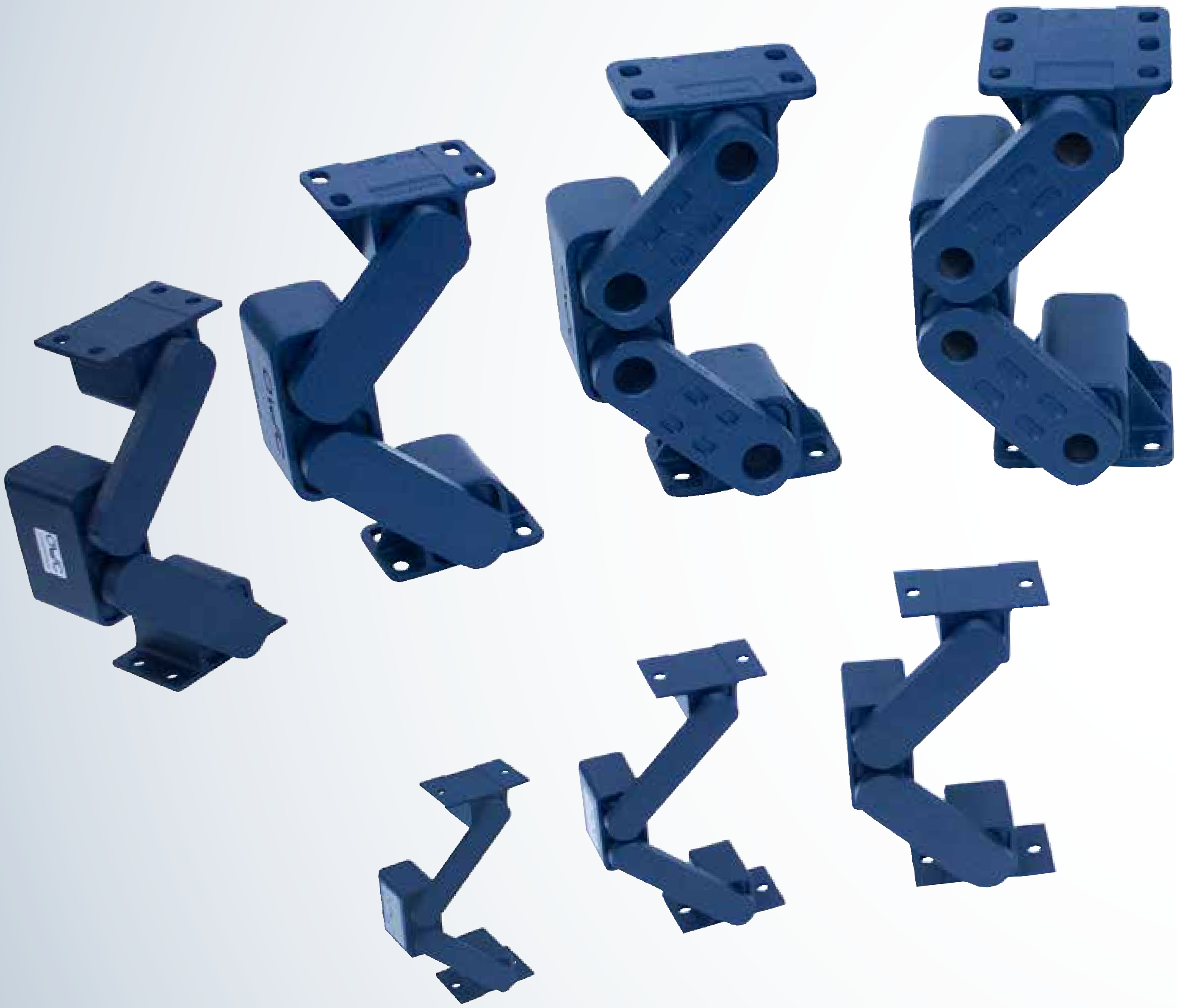
OWS HD Load vs Deflection



OWS HD Load vs Deflection



The height values shown in the graphs refer to suspensions already tested (use of 300 hours). The actual suspension height may vary depending on the operating temperature, type of material load, frequency and oscillation amplitude.



OWS NE
Standard Range

w w w . o w c - e q

OWC

OWS HD

Heavy-duty Range

uipment.com

OSCILLATING MOUNTS SIZING

For selection of the type and correct assembly position of the suspensions, it is recommended to follow the procedure mentioned below.
This procedure is applicable for any type of machine intended for transportation or screening of any type of material. It also applies to compaction tables.

Data required:

- Mass of the vibrating feeder $M_{machine}$
- Mass of the material passing through the feeder instantly (assuming machine shut-down: quantity of material lying in the tank) $M_{material}$
- Type of motovibrators used (RPM, mass, operation cycle) $MVE\ldots$
- Position of the centre of gravity of the machine without material:

  G_{load} % weight loaded on the material feed end
  G_{unload} % weight loaded on the material unload end

- Type of load (from belt conveyor, grab,...)
- Any tilt of vibrating feeder

Firstly, it is necessary to calculate the total mass to which the suspensions are subject:

$$M_{tot} = M_{machine} + M_{motor} \cdot n_{motors} + M_{material}$$

Then, considering the position of the centre of gravity, it is necessary to calculate the mass share, loaded on the feed end and on the unload end of the processed material.

$$G_{load} = a\%$$
$$G_{unload} = b\% = 100\% - a\%$$

$$M_{load} = M_{tot} \cdot a\%$$
$$M_{unload} = M_{tot} \cdot b\%$$

Considering the minimum setup requirements, that is one suspension for each support point, it is necessary to select the smallest suspension size possible, which meets the minimum requirements as to acceptably load both the load and unload side.
It is not possible to combine different sizes of suspensions inside the same machine.
It is important that the load percentage of the individual suspensions is consistent, except in case of tolerance.

If the position of the centre of gravity is considerably displaced towards one of the two ends (material load side or unload side), for example G_{load} = 70% G_{unload} = 30%, one must take into account

2 suspension blocks per supporting point corresponding to the greater load end.

Additionally, it is advisable to take into account a minimum safety factor for the maximum allowable load (see above).

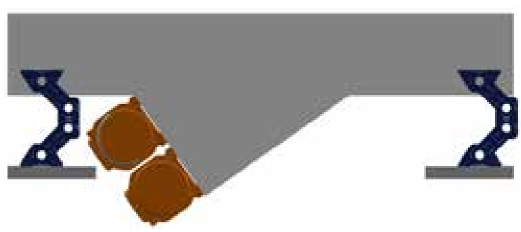
The greater the uncertainty of the amount of conveyed material, the higher this factor. Normally, the value ranges from 15% to 20%.
However, if the dynamics of the vibrating machine is very important, for example, for a peak-to-peak oscillation (stroke) that is higher than 8mm, it is advisable to take into account a higher safety margin.

Here below are some typical cases, as an example of a correct selection of oscillating mounts:

$$G_{load} = 50\% \quad G_{unload} = 50\%$$

4 oscillating mounts

$$G_{load} = 60\% \quad G_{unload} = 40\%$$



4 or 6 oscillating mounts (4 + 2)

$$G_{load} = 70\% \quad G_{unload} = 30\%$$

6 oscillating mounts (4 + 2)

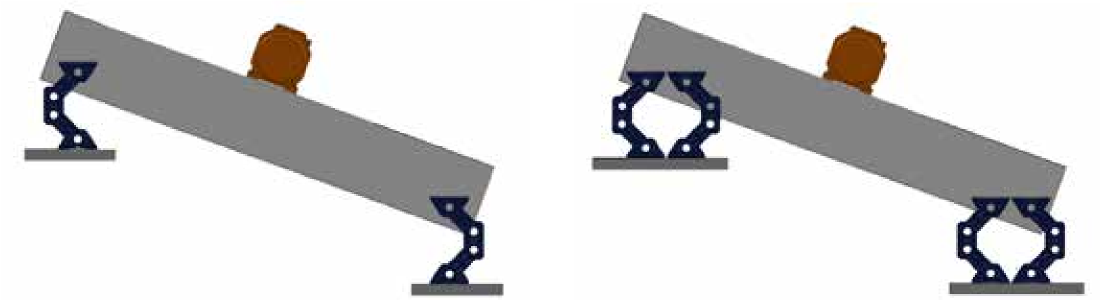
Once the size and the number of oscillating mounts required has been selected, the following must be considered:

- Type of material feeding onto the vibrating machine;
- Possible angle of the vibrating machine.

Should the load of the material occur gradually, for instance by means of a belt conveyor or of another vibrating feeder, the aforementioned notes shall apply.

Should the load be of the impulse-type and, therefore, generate an impact (e.g. by means of a grab), it is necessary to consider as a compulsory option the use of 4 oscillating mounts instead of 2 on the load side of the product .

If the vibrating machine is inclined at an angle steeper than 10°, in order to maintain the functionality of the oscillating mounts in time, it is recommended to install them in a pantograph configuration as in the diagram here below.



The same configuration is mandatory for the design of a compaction table.

Once the static measuring of the suspensions has been completed, it is necessary to perform a dynamic check so as to avoid any damage of any type during an extended use of the vibrating machine. These values are useful in order to achieve a rather realistic estimate of the machine operation performance.

Consequently, it is necessary to calculate the peak/peak oscillation width (stroke) and the total acceleration (α max.) of the vibrating machine (considering also the weight of the material, which instantly weighs down on the suspensions).

$$stroke = \frac{Wm[\mathrm{cm}] \cdot 10 \cdot n_{motors}}{M_{tot}} \quad [\mathrm{mm}]$$

$$a_{max} = \frac{\left(\frac{2\pi}{60} \cdot RPM_{motor}\right) \cdot stroke[\mathrm{mm}]}{2 \cdot g \cdot 1000}$$

If the two calculated values are lower than the limit values shown in the chart (see pct. 8 and 9) and referred to the suspension size selected, the sizing has been verified.

If one or both values are higher, it is necessary to review the size of the suspension selected previously.

RECOMMENDATIONS FOR DESIGNING A VIBRATING MACHINE

This paragraph lists some suggestions, which must be taken into account during the designing stage of the vibrating machine to ensure correct operation.

Strain of oscillating mounts under load:

It is important to take into account the height of the suspensions under load and the consequent height of the machine in order to place the feeder and the unload of the material requiring processing at the correct height.

Previously, the graphs showing the load/strain relation for each size of oscillating mount have been reported. The curves described therein report average values, which may vary for a few millimetres compared to the actual values, as the actual height is affected by environmental factors; e.g. operating temperature, material feed mode, oscillation frequency and width.

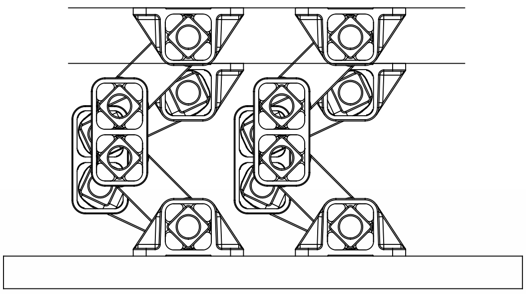
Furthermore, it must be taken into account that these values were obtained with the suspensions already set up.

The adjustment phase for oscillating mounts is completed within the first days of use. It involves a reduction in their height under load of 10/25 mm according to the model.

Complete adjustment requires more time but in terms of height, it is almost unnoticeable.

Such a phenomenon is normal as it is connected to the natural features of the elastic rubber insert.

In case of two suspensions for each support point, it is necessary to take into account the strain/adjustment even as regards overall length. Therefore, it is necessary to space out the two suspensions in order to avoid contact between them during operation of the vibrating machine (see typical diagram below).



Therefore:

- Read the estimated actual value of the oscillating mount height under load from the chart (increased estimate by a few mm for cold environments and moderate loads and, vice versa, decrease estimate for very hot environments and very large loads);

- Take into account, during the sizing of material load/unload, that the height value of the vibrating machine during assembly will undergo a reduction of 10/25 mm during adjustment;

- In case of assembly of 2 oscillating mounts for each support point, consider that during static or dynamic compression, longitudinal dimensions increase; consequently, if not suitably spaced out they may collide.

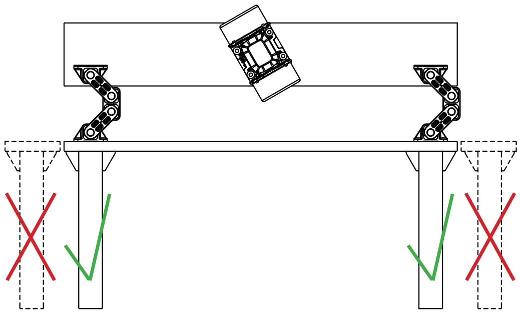
Accumulation of material / mechanical stops:

In order to avoid damage to the oscillating mounts due to an overload of the vibrating machine (e.g. the material load continues to operate once the vibrating feeder has stopped), it is necessary to consider the introduction of mechanical stops, which may avoid excessive compression.

Underlying structure / machine frame:

For correct and efficient operation of the vibrating machine it is very important to provide a stiff support on which the suspensions are assembled.

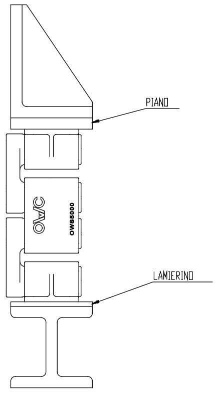
The optimal condition requires the assembly of the suspensions on a frame featuring vertical beams at the positioning point of the same (see typical diagram on the right).



If, due to system reasons, this is not possible, it is however essential that the underlying structure is sufficiently stiff so not to undergo strains or displacements caused by the vibrating mass. Every movement of the part underlying the oscillating mounts limits until deleting the performance of the process, by transmitting unwanted vibrations, which spread inside the system, resulting in noise and structural failure.

Supporting brackets for installation of oscillating mounts:

To calculate the height position of the support brackets needed to mount the oscillating mounts, please refer to the paragraph **"Deformation of oscillating mounts under load".** It is recommended to take the height of the oscillating mounts under load into account so as to define the actual height of the vibrating feeder.



Connection points of the supporting brackets used to mount oscillating mounts on a vibrating feeder are one of the most strained areas of the machine.

Therefore, it is recommended to measure both brackets and walls of the vibrating feeder and the constraints (bolts or welding) with a high safety factor.

To achieve optimal oscillation of the vibrating machine, it is recommended to assemble the suspensions in perfectly horizontal position (reference surface: bracket surface) and at the maximum distance possible from the centre of gravity of the vibrating feeder.

Where possible, in order for the vibrating machine to be perfectly balanced, respect the equal distance of the suspensions on the feed and discharge side from the centre of gravity.

Vertically, the upper bracket must be on the same surface as the centre of gravity of the vibrating feeder (this condition cannot be applied in case of tilted surface).

ASSEMBLY
OF THE VIBRATING MACHINE

During installation, it is essential to comply with the correct assembly position (direction).

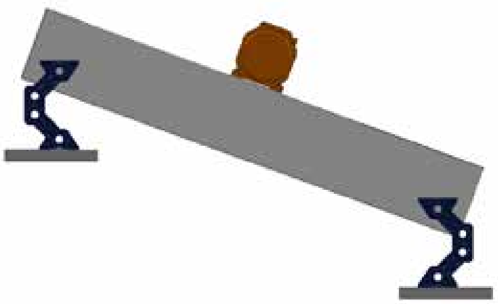
For most vibrating machines, for correct operation, all the suspensions must be assembled with the "knee" turned towards the material feed direction.

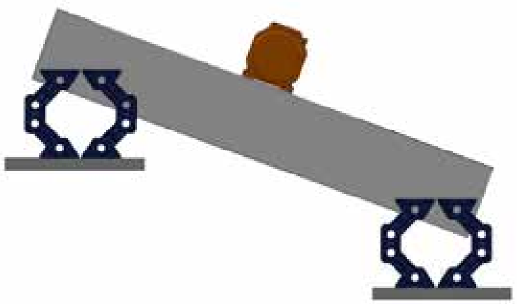
Installation of oscillating mounts with arms pointing towards the outer side or towards the inner side of the vibrating machine does not involve any difference in terms of their operation.

Nonetheless, it is recommended to install oscillating mounts with their arms pointing towards the outer side of the vibrating machine, in order to facilitate mounting and possible replacement operations.

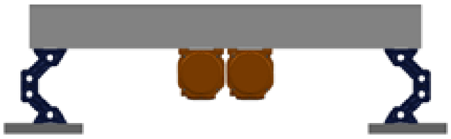
Should the oscillating mounts be assembled in a "hanging" configuration (hanging screen, vibrating hanging feeder,...), the oscillating mounts must be assembled with the "knee" turned backwards compared to the material feeding direction.

If the vibrating machine is tilted, with an angle steeper than 10°, it is necessary to select the "pantograph"-type assembly, where the "knee" of the oscillating mounts on both axes is turned towards the external part of the machine. Specularity shall be achieved compared to the centreline of the machine. This setup aims at preserving the duration of the suspensions.





The same assembly configuration ("pantograph" type) is also adopted for machines where vibration is merely vertical such as, for example, for compaction tables.



To achieve an optimal performance of the suspensions and of the vibrating machine, it is recommended to proceed during assembly as follows:

- Lift the vibrating feeder with a crane/overhead crane (if not feasible, use four jacks so to lift the feeder, parallel to the floor);
- Place the oscillating mounts on the machine support frame;
- Tighten the bolts temporarily in the lower position compared to the vibrating machine frame;
- Place the vibrating feeder without pressing down/loading the oscillating mounts;
- Tighten the bolts temporarily in the upper position compared to the vibrating feeder;
- Slowly lower the vibrating feeder taking care of aligning the suspensions: it is important that they are parallel to the material feed direction (tolerance ±1° - keep the arms as reference);
- Tighten both upper and the lower bolts.

During measuring of the oscillating mounts, the theoretical centre of gravity of the vibrating feeder has been taken into account to define a setup where the load is distributed equally on each support.

Nevertheless, in most cases during assembly, it can be noted that it is not possible to obtain a perfect distribution of the loads, thus resulting in a different compression of the suspensions on the feed side and on the discharge side of the vibrating machine.

If it is important to keep a certain tilt or flatness of the vibrating feeder, it is possible to insert some metal sheet spacers between the oscillating mounts and the frame of the vibrating machine until reaching the desired level.

CHECKS AFTER ASSEMBLY

After the first days of operation, the oscillating mounts undergo a natural adjustment, which entails lowering of its own height under load. This phenomenon is related to the feature of the rubber and does not at all jeopardise operation of the vibrating machine.

As it is affected by different factors, a different adjustment may occur between the feed end and the discharge end of the processed material. Therefore, it is recommended to check the height of the suspensions on both axes and, if required, intervene with metal sheet spacers to correct the tilt of the vibrating feeder.

It is recommended to visually check the movement of the feeder. If it is not perfectly in line, measure the oscillation width at the support points.

If the values found are not equivalent, it is recommended to check:

- Position of the motovibrators/linear motion exciters/drive unit; the forces produced must be incident to the centre of gravity of the machine and the direction must be parallel to the longitudinal axis of the vibrating feeder;
- In case of a belt-driven vibrator, check that the stroke is not excessive and does not tend to overbalance the feeder sideways;
- The processed material in both normal and special environmental conditions (very wet material) may affect the centre of gravity of the vibrating feeder thus reducing feeding performance.

For whatever further technical information, recommendation or in-depth analysis, please feel free to contact our technical staff at OWC Equipment.

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