NetterVibration

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Electric External Vibrators

- Circular vibration
- Nominal frequency from 750 min^{-1} to 6,000 min^{-1}
- Centrifugal force from 40 N to 217,749 N
- Smooth housing surface
- Stainless steel unbalance covers
- Available for ambient temperatures up to 55 °C
- Ex tb IIIC Db (dust ignition proof) available
- Ex e IIC available
- Degree of protection IP 66-7, insulation class F
- Stainless steel versions available

Serving industry with vibration

NetterVibration

Electric External Vibrators

Contents

Notes on Vibrator Design

Formulary

working moment	M = s x m	centrifugal force	$F = a_{(g)} x\ m \times 9.81$
acceleration	$a_{(g)} = s \times (\frac{n}{1000})^2 \times 5.59$	centrifugal force	$F = M \times (\frac{n}{1000})^2 \times 54.84$

Symbols and units

s	vibration width	cm	n	frequency	min^{-1}
m	weight with vibrator	kg	M	working moment	cmkg
F	centrifugal force	N	$a_{(g)}$	acceleration	g

Which kind of vibration for which task?

Task	Frequency	Acceleration $[a_{(g)}]$ Many times the gravitational acceleration	Vibration width	Vibration circular ↻ directed ↔
Conveying, dosing	750 – 3,000	2 – 5	large	↔
Sieving	1,000 – 1,500	3 – 4	large	↔
Draining	1,500 – 3,000	3 – 5	medium	↔
Cleaning, shaking off filter	1,500 – 3,000	2 – 3	medium	↻
Loosening, releasing Emptying bulk materials	1,500 – 3,000	0,15 – 0,2 of the material weight in the conical part of the silo	medium	↻
Compacting bulk materials	1,500 – 6,000	2 – 4	medium	↻ ↔
Compacting cement	3,000 – 9,000	0.8 – 1.5	small	↻ ↔
Testing components	300 – 6,600	0.5 – 5	adjustable	↻ ↔

CE All external vibrators manufactured by ***Netter****Vibration* comply with the applicable EU directives and bear the CE mark.

c SP us Many external vibrators made by ***Netter****Vibration* meet the standard C22.2 no. LR100-95, file no. LR100948 Part B. Class 421101 Motors and Generators (North America).

NetterVibration

Electric External Vibrators

Designs and ambient conditions

Stainless steel vibrators are resistant to very harsh environmental conditions. Especially the chemical, pharmaceutical and food industries use this resistance in production areas with aggressive, liquid and gaseous media.

ATEX vibrators allow operation in explosive atmospheres (ATEX Zones 1, 2, 21 and 22) using special design measures in which gases, vapours, mists and dusts are used. These vibrators, which meet very high safety standards, find a use especially in the chemical and petroleum industry.

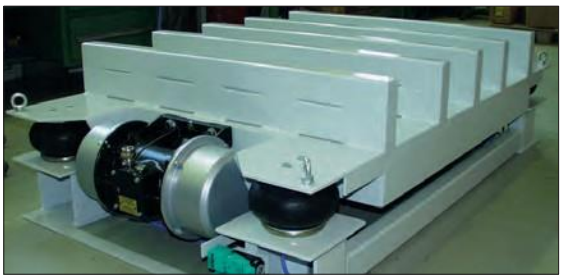
Plastic vibrators have the advantages of stainless steel devices, but are much lighter. The useful properties of these vibrators are used in the manufacture of dairy products (e.g. cheese), throughout the food industry and in extreme industrial applications.

Series	Stainless	Plastics	ATEX zone 21/22	ATEX zone 22	ATEX zone 1/2
NEG			●		
NEA	●			up to GG 60	
NED		●			
NEG E			●	●	●
NEG S	●				
NES	●		●	●	

Information on the NEG, NEA and NED series

Conveying

Sieving



Compacting

Applications
The electric external vibrators of the series NEG, NEA or NED are always used when, for example, conveyor troughs or sieves have to be driven. In addition, these vibrators can loosen product jams and deposit build-ups in silos. When used on concrete formwork, a high surface quality and compaction of the concrete is achieved by a particularly uniform vibration.
One special feature of the NEG is the maintenance-free operation even under harsh environmental conditions.

Design and function
External electric vibrators are unbalance motors based on the short circuit rotor principle and, apart from a few decisive differences, are very similar to commercially available electric motors. The NEG three-phase vibrators run on 230/400 V, 50 Hz, depending on the number of poles, at 750, 1.000, 1,500 or 3,000 min^{-1}.
The NEA AC units run on 230 V, 50 Hz at 3,000 min^{-1}. Further voltages are available.
The NED DC vibrators run on 12 or 24 V at 3,000 min^{-1} (NED 601110 only on 24 V, 3,600 min^{-1}).

There are unbalances on both shaft ends, which generate an omnidirectional, sinusoidal vibration with the frequency of the corresponding speed.
All NEG/NEA are also designed for use at 60 Hz, the speed is then correspondingly 20 % higher than the values at 50 Hz. The unbalance is adjusted, if necessary.
Generously dimensioned roller bearings guarantee a high degree of operational safety. All NEG are fully suitable for operation with frequency converters.

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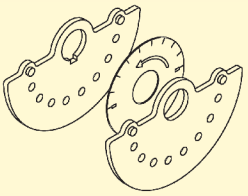
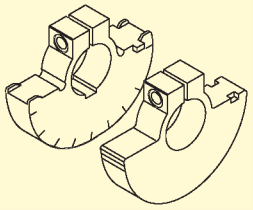
Electric External Vibrators

NEG E Series
Ex e IIC Gb
Ex tb IIIC Db

Unbalance type XLs



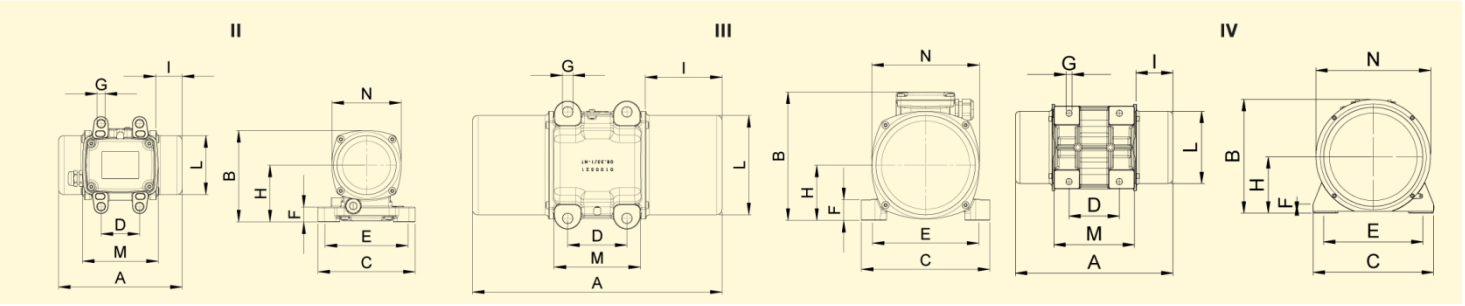
Unbalance type XS



min^{-1}	Type	Housing size	Max. surface temperature* (dust) [°C]	Temperature class (gas)	Power consumption [1] [kW] T3	Power consumption [1] [kW] T4	Nominal current [2] [A] T3	Nominal current [2] [A] T4	t_E [s] T3	t_E [s] T4	I_A / I_N T3	I_A / I_N T4
3000 3600	NEG 50300 E	110	120	T3, T4	0.26	0.23	0.57	0.48	18	12	3.50	4.20
	NEG 50550 E	120	120	T3, T4	0.50	0.35	0.76	0.57	12	8	4.20	5.60
	NEG 50770 E	130	120	T3, T4	0.55	0,39	0,95	0,72	12	8	4,20	5,52
	NEG 501140 E	133	120	T3, T4	0.55	0.46	0.86	0.76	15	11	3.88	4.37
	NEG 501540 E	140	135, 115	T3, T4	1.01	0.83	1.62	1.43	6	6	9.29	7.30
	NEG 501800 E	140	135	T3	1.01	–	1.62	–	6	–	9.29	–
	NEG 502020 E	150	170	T3	1.11	–	1.90	–	7	–	5.90	–
	NEG 502270 E	150	170	T3	1.11	–	1.90	–	7	–	5.90	–
1500 1800	NEG 25210 E	110	120	T3, T4	0.20	0,17	0,45	0,39	35	28	2,04	2,34
	NEG 25420 E	120	120	T3, T4	0,30	0.28	0.57	0.52	18	16	3.33	3.63
	NEG 25540 E	120	120	T3, T4	0.30	0.28	0.57	0.52	18	16	3.33	3.63
	NEG 25700 E	130	120	T3, T4	0.46	0.36	0.86	0.72	17	12	3.50	4.20
	NEG 25930 E	133	120	T4	–	0.37	–	0.81	–	13	–	4.00
	NEG 251410 E	140	120	T3, T4	0.90	0.63	1.38	1.05	13	8	4.00	5.36
	NEG 251800 E	140	150, 120	T3, T4	1.10	0.63	1.90	1.33	9	5,5	4.95	7.00
	NEG 252370 E	160	150, 135	T3, T4	1.60	1.15	3.04	2.47	7	5.5	6.00	7.50
	NEG 253720 E	170	135	T3, T4	2.20	1.85	3.71	3.14	6	6	7.17	8.42
	NEG 254900 E	180	135	T3	3.20	–	5.70	–	6	–	7.00	–
1000 1200	NEG 16190 E	120	120	T4	–	0.18	–	0.48	–	25	–	2.72
	NEG 16310 E	130	120	T4	–	0.32	–	0,.7	–	25	–	2,.1
	NEG 16410 E	133	120	T4	–	0.35	–	0.71	–	26	–	2.40
	NEG 16810 E	140	135	T3, T4	0.68	0.50	1.33	1.05	25	17	2.78	3.54
	NEG 161130 E	140	135	T3, T4	0.75	0.48	1.57	1.24	19	13	3.33	4.23
	NEG 161610 E	160	135	T3, T4	1.10	0.85	2.09	1.81	15	10	3.63	4.73
	NEG 162550 E	170	135	T3	1.96	–	3.90	–	8	–	5.31	–
	NEG 163820 E	180	135	T3, T4	2.20	2.00	4.85	4.28	7	6	5.88	6.66
	NEG 165190 E	190	135	T3	3.50	–	6.65	–	10	–	4.64	–
750 900	NEG 12100 E	120	130	T3	0.23	–	0.67	–	25	–	2.00	–
	NEG 12180 E	130	130	T3	0.35	–	0.86	–	25	–	2.47	–
	NEG 12230 E	133	120	T4	–	0.28	–	0.57	–	30	–	1.66
	NEG 12460 E	140	120	T3	0.50	–	1.14	–	30	–	2.15	–
	NEG 12640 E	140	120	T3, T4	0.60	0.45	1.33	1.14	30	25	2.14	2.50
	NEG 12900 E	160	150	T3	0.95	–	2.09	–	30	–	2.63	–
	NEG 121430 E	170	135	T3	1.50	–	3.61	–	15	–	4.18	–
	NEG 122150 E	180	135	T3	2.00	–	5.13	–	13	–	3.96	–
	NEG 122920 E	190	135	T3	2.63	–	6.18	–	14	–	3.84	–
	NEG 123530 E	190	135	T3	3.52	–	7.79	–	14	–	3.80	–

[1] at 50 Hz, [2] at 400 V, 50 Hz, [1][2] vibrators at 60 Hz on request
T3 = 200 °C, T4 = 135 °C

* at an ambient temperature of 40 °C max.
PTC thermistors are standard from housing size 170 up



Type	Housing type	Dimensions [mm]													Unbalance [number of unbalance discs]	
		A	B	C	D	E	n_2* mounting dimensions**	F	G	H	I	L	M	N	Type	50/60 Hz
NEG 50300 E	II	255	175.5	164	**65** 90	**140** 125	4	25	**13**	105	54	124	128	141	XLs	8/6
NEG 50550 E	II	284	195	217	**100** 105	**180** 140	4	30	**17** 13	115	63	143	144	160	XLs	10/6
NEG 50770 E	III	308	211	215	100	180	4	35	17	93.5	63	168	144	182	XLs	8/6
NEG 501140 E	III	314	217	217	100	180	4	35	17	93.5	76	168	146	182	XLs	12/8
NEG 501540 E	IV	438	257	230	140	190	4	25	17	124.5	103	201	224	241	XLs	12/8 14/10
NEG 502020 E	IV	463	235	230	140	190	4	22	17	104	104	188	248	224	XLs	16/10
NEG 502270 E																18/12
NEG 25210 E	II	295	175.5	164	**65** 90	**140** 125	4	25	**13**	105	74	124	128	141	XS	4
NEG 25420 E	II	340	195	217	**100**	**180**	4	30	**17**	115	91	143	144	160	XS	4
NEG 25540 E		380			105	140			13		111					
NEG 25700 E	III	378	211	215	100	180	4	35	17	93.5	98	168	144	182	XS	4
NEG 25930 E	III	422	217	217							130	168	146			
NEG 251410 E	IV	438	257	230	140	190	4	25	17	124.5	103	201	224	241	XS	4
NEG 251800 E		490									129					
NEG 252370 E	IV	523	283	275	155	225	4	28	22	140	130	231	255	271	XS	4
NEG 253720 E	IV	588	335	310	155	255	4	30	23.5	160	139	274	302	310	XS	4
NEG 254900 E	IV	640	369	340	180	280	4	30	26	173	155	301	322	336	XS	4
NEG 16190 E	II	340	195	217	**100** 105	**180** 140	4	30	**17** 13	115	91	143	144	160	XS	4
NEG 16310 E	III	378	211	215	100	180	4	35	17	93.5	98	168	144	182	XS	4
NEG 16410 E	III	422	217	217							130	168	146			
NEG 16810 E	IV	490	257	230	140	190	4	25	17	124.5	129	201	224	241	XS	4
NEG 161130 E		560									164					
NEG 161610 E	IV	600	283	275	155	225	4	28	22	140	168.5	231	255	271	XS	4
NEG 162550 E	IV	670	335	310	155	255	4	30	23,5	160	180	274	302	310	XS	4
NEG 163820 E	IV	742	369	340	180	280	4	30	26	173	206	301	322	336	XS	4
NEG 165190 E	IV	772	380	390	200	320	4	32	28	189	206	340	360	384	XS	4
NEG 12100 E	II	340	195	217	**100** 105	**180** 140	4	30	**17** 13	115	91	143	144	160	XS	4
NEG 12180 E	III	378	211	215	100	180	4	35	17	93.5	98	168	184	182	XS	4
NEG 12230 E	III	422	217	217							130	168	145			
NEG 12460 E	IV	490	257	230	140	190	4	25	17	124.5	129	201	224	241	XS	4
NEG 12640 E		560									164					
NEG 12900 E	IV	600	283	275	155	225	4	28	22	140	168.5	231	255	271	XS	4
NEG 121430 E	IV	670	335	310	155	255	4	30	23,5	160	180	274	302	310	XS	4
NEG 122150 E	IV	742	369	340	180	280	4	30	26	173	206	301	322	336	XS	4
NEG 122920 E	IV	772	380	390	200	320	4	32	28	189	206	340	360	384	XS	4
NEG 123530 E		850									245					

* number of bores
** recommended mounting dimensions printed in bold

Electric External Vibrators
Special versions

CC Unbalances

Applications
This special version with CC unbalances is used if two different unbalance settings are to be at a disposal during operation.

The CC unbalances are manufactured on customer request and allow a second unbalance setting of 25-100% of the main value.

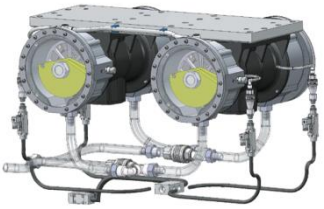
Design and function
To use the CC unbalances, the NEG must be operable by a corresponding electrical circuit in both directions of rotation. If the NEG turns in one direction, it works e.g. with a maximum unbalance.

When the direction of rotation changes, the outer unbalance disc automatically rotates at a specified angle against the inner unbalance disc and thus provides a reduced unbalance setting.

Shaft Coupling

Applications
This special version with shaft coupling is used when large centrifugal forces are necessary, but little space is available for installation.

Design and function
Two or more vibrators in series are operated with angular synchronous unbalances by connecting the shafts of the vibrators via a shaft coupling.



Oil Circulating Lubrication

Applications
This special version with external oil circulating lubrication is recommended when operating high frequency vibrators continuously, which would lead to major heating and a reduced bearing life.

Design and function
A hydraulic pump continuously supplies the bearings with oil during operation, which flows back into the oil tank via a cooler.

Rotary Encoders

Applications
These special versions with rotary encoders are always used when the frequency and/or position of the unbalance is to be detected electronically. This enables the building of complex vibration systems.

Design and function
The external electric vibrators are equipped with a special mounting system for rotary encoders. Robust rotary encoders with integrated, highly elastic and a torsionally stiff hollow shaft coupling measure the frequency of the vibrator even under the toughest operating conditions.

Electric External Vibrators
Accessories

SRF

ATV

NFU

Static adjustable frequency converters
ATV 320 / NFU Series
Static adjustable frequency controls
SRF Series

Applications
The frequency control of the SRF series and the frequency inverters of the series ATV and NFU are used to control the frequency of electric vibrators.
Special applications require frequencies that cannot be achieved with normal multipole vibrators at mains frequency. The special feature of this frequency converter is its robust and uncomplicated design.

Design and function
SRF frequency controllers are mounted in a control cabinet with a degree of protection of IP 65. ATV units are frequency converters in the IP 2x housing and are intended for switch cabinet installation at the customer. The performance data correspond to the SRF series.
NFU units are frequency converters with a motor circuit in an IP 65 housing for wall mounting and are equipped with a main switch, a rotational direction switch and a setpoint potentiometer.

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Electric External Vibrators
Accessories

On-Off Switch

Applications
With the on-off switches, one or two electric external vibrators of the NEG or NEA series can be connected directly to the system or decentralized, e.g. be switched on or off from a control room.

Design and function
Depending on the material, the switches are integrated in a housing with a degree of protection of IP 55 or IP 65. Large con trol buttons allow easy operation. The main emergency stop switch is lockable. Versions with motor protection switch are available.

Brake Units
BZ Series

Applications
Brake units of the BZ series are used to bring the NEG as quickly as possible to a standstill during operation.

In order to avoid resonance phenomena of vibration tables and of conveyors, it is often necessary to be able to switch off drives without their running down uncon-trollably.

A special feature of these units is the very high braking effect with a compact size.

Design and function
The load-resistant power electronics changes the direction of the electric rotat-ting field when the brake is actuated, bringing the NEG immediately to a stand still. The short-term high braking currents can be easily handled by the NEG. The permissible temperature range is between 0 °C and +40 °C, degree of protection is IP 23. The braking devices are only suita-ble for stable mains frequencies of 50 Hz or 60 Hz. Operation together with a fre-quency converter is not permitted.

Vibration Monitoring Systems
Series ***Vibro****Monitor*

Applications
The vibration monitoring system of the series ***Vibro****Monitor* is used for the con-stant monitoring of impactors, vibrators and vibration systems.

The ***Vibro****Monitor* system reliably moni-tors the functioning of vibrators and im-pactors, even in hard-to-reach places.

Design and function
The monitoring system consists of a sensor, a connection cable and a con-troller. The controller ensures safe data transmission of the sensor signal up to a max. distance of 250 m. Depending on the version, one controller can steer up to 4 sensors. The controller can be mounted on a standard M36 DIN rail.

Safety Cable
Series NSE

Applications
The safety cables of the NSE series pre-vent the external electric vibrators from falling down if they accidentally come loose.

The use of safety cables is recommend-ed, especially in critical installation situa-tions, e.g. at high altitudes.

Fastening Kits
Series NBS

Applications
The NBS series fastening kits are for the safe and permanent attachment of the electric external vibrators and are sized to exactly match the foot height of the housings.

They are available in different designs, among others in stainless steel in the appropriate strength category.

Netter*Vibration* has a worldwide net-work of experienced dealers and applica-tion technicians who are happy to solve problems, also on-site, together with you or your customers with the help of vibra-tion technology.

Netter provides solutions.
Consult our experienced application technicians.

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