These operating instructions apply to: **GSA 1702**
GSA 2502
GSA 3502

Important note:
Before use of the Netter vibration drives of the series GSA read these operating instructions carefully and keep them stored afterwards.

Netter GmbH does not assume liability for damage to property and persons if the product has been technically modified or if the notes and regulations of these operating instructions have not been observed.

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Contents

Scope of supply

Check the packing for possible shipping damage.
If the packing is damaged, check the contents for completeness and possible damage. In case of damage inform the transport agent. Compare the scope of supply with the delivery note.
.

1 General Notes

Netter vibration drives of the series GSA comply with the EC Machinery Directive 2006/42/EC, the Directive 2004/108/EC relating to electromagnetic compatibility and the Low Voltage Directive 2006/95/EC.
In particular the standards DIN EN ISO 12100, DIN EN 60529 and EN 60034-1 have been observed.

Vibration drives generate circular vibrations.

These vibration drives are used in Netter ***Gyro****Shake* shaking stations and shaking tables.

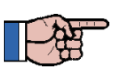
Shaking stations of the series ***Gyro****Shake* are used for concrete compaction in pre-cast part manufacturing plants. Shaking tables loose, separate and distribute bulk material and mix liquids into emulsions and suspensions.

They can also be used in the food and chemical industry if the respective operating regulations of the user are complied with.

Special features:

- 100% duty cycle
- Protection type IP 65
- Insulation class F
- High efficiency due to silicon electric sheets
- Minimal installation dimensions
- Noise level ≤ 70 dB(A)
- Fitted with thermistor as a standard
- Earthing screw in the terminal box

In these operating instructions the following information and danger symbols are used:

	**DANGER**	points out a possible danger which might result in death or serious injury if not avoided.
	**CAUTION**	points out a possible danger which might lead to personal injury or equipment damage if not avoided.
	**HOT SURFACE**	points out a possible danger which might lead to personal injury or equipment damage if not avoided.
	**IMPORTANT**	Note containing especially useful information and tips.
	**ENVIRONMENTALLY FRIENDLY WASTE DISPOSAL**	points out the obligation to dispose of waste in an environmentally friendly way.

2 Technical Data

Nominal voltage, nominal frequency:

The use of a frequency converter is mandatory for the operation of the vibration drives!

Voltage and frequency as specified on the type plate.
Power supply with frequency converter:
At constant torque (linear Volt-Hertz curve) the frequency converter may regulate the frequency between

0 Hz and 50 Hz	Type GSA 1702
0 Hz and 38 Hz	Type GSA 2502
0 Hz and 34 Hz	Type GSA 3502

(Observe maximum frequency on the type plate).

It must be ensured that the EMC Directive is complied with.
The operation of vibration drives of the series GSA with frequency converters permits variable speeds.

IMPORTANT

Rotary speed ranges:

Type GSA 1702	maximal 750 rpm
Type GSA 2502	maximal 580 rpm
Type GSA 3502	maximal 510 rpm

The maximum speeds indicated on the type plate must not be exceeded.

Ambient temperature:

0°C to +40°C
The ambient temperatures must not be exceeded or fallen below. These values apply to operation with a duty time of 100%.

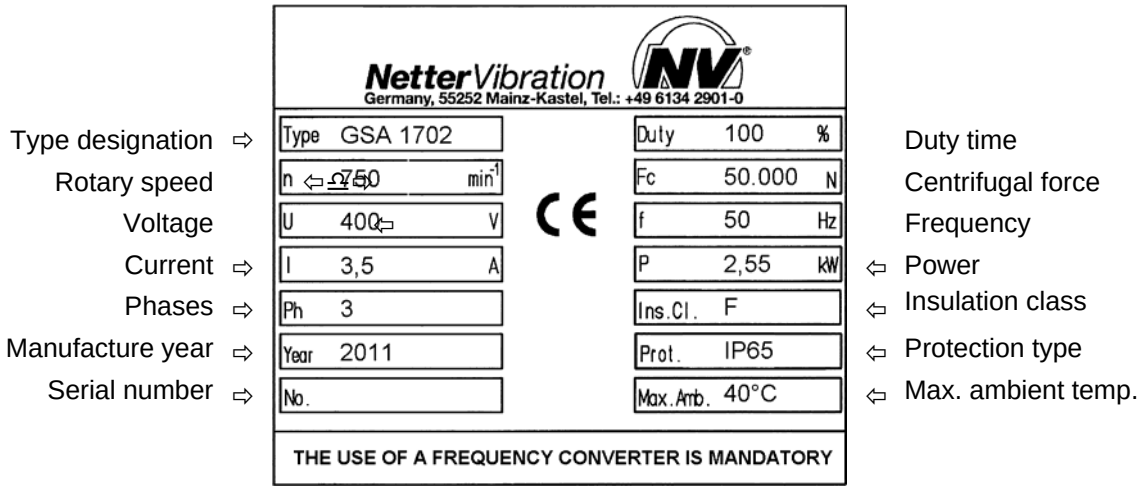
Vibration drives must not be used in hazardous areas.

Thermal overload protection:

GSA vibration drives are fitted with a PTC thermistor 130°C as a standard.

Type	**Nominal frequency** [Hz]	**Max. speed** [min^{-1}]	**Unbalance** [cmkg]	**Centrifugal force** [N]
GSA 1702	50	750	1.622	50.000
GSA 2502	38	580	2.698	50.000
GSA 3502	34	510	3.500	50.000

The technical data of your vibration drive can be seen on the type plate.



For detailed technical data on the vibration drives see the Technical Data Sheets in the middle section of this operating manual.

3 Design and Functioning

- **The vibration drive** of the series GSA is an asynchronous motor.

– The stators of the asynchronous motors are made of electrical sheet with a low dissipation factor in order to achieve a high efficiency at a low operating temperature of the motor.

– Motor protection by incorporated thermistor.

- **The motor shaft** is made of heat treated alloy steel.
- **The special bearings** are overdimensioned for excessive loads
- **Rotary speed regulation** with frequency converters is mandatory for all units.
- The housings are made of high strength lamellar graphite cast.
- **The paint finish** is highly weather-resistant as well as resistant to abrasion, impacts and a wide variety of chemicals. Colour: traffic black.
- **The unbalance masses** can be separated from the drive.

4 Safety

DANGER

Voltage-carrying or rotating parts can cause severe or fatal injuries.

DANGER

The vibration drives are manufactured in accordance with the current EC directives.
Assembly, installation, commissioning and maintenance must only be performed by authorized qualified personnel.
During installation and operation of the vibration drives the directives and regulations of the local associations for electrical engineering (e.g. VDE) and the known accident prevention rules have to be complied with.

CAUTION

Changes to the device may affect the characteristics or even damage the unit and cause the rejection of any warranty claims.

DANGER

When working on the vibration drive it has to be safely disconnected from the power supply. To do this, proceed as follows:

1. Switch off vibration drive
2. Secure against being switched on again
3. Check for the absence of voltage

DANGER

Use a suitable supply cable for the installation. Connect cables and protective conductors correctly.

Circuit diagrams can be found in the terminal box (see chapter 6.2 Electrical connection).

IMPORT-ANT

The ends of the leads must be fitted with insulated cable clips to prevent the strands from splaying.
The maximum size of the cable clips is AWG 16 for set screw M5.

DANGER

The electric cables have to be installed carefully and it has to be ensured that the cables are not worn through by vibrating parts.

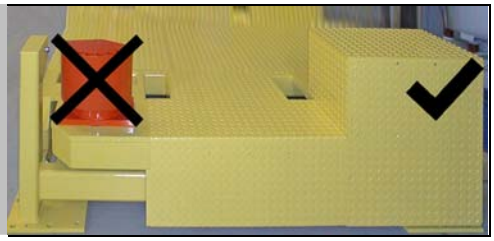
The proper condition of the electric cables and the cable clips has to be checked at regular intervals (as a rule every six months). Discovered faults have to be immediately eliminated.
Protect the cable against high temperatures, lubricants and sharp edges.

DANGER

GSA vibration drives and other parts of the structure may come loose due to vibration. Falling parts can cause injuries or damage to material. Screw locks and/or Loctite or the like have to be used. Screw connections have to be checked and possibly retightened after 1 hour of operation and then at regular intervals (as a rule once a month).

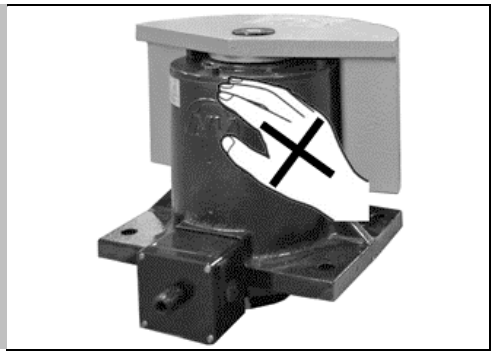
DANGER

The vibration drive must not be operated without unbalance cover! The rotating unbalances can cause severe injuries!



HOT SURFACE

The surface of the vibration drive can reach such high temperatures that there is a risk of burns.



5 Transport and Storage

IMPORTANT

Check the packaging for possible signs of transport damages.

In the event of damage to the packaging, check that the contents are complete and undamaged. If there is any damage, inform the shipping agent.

The units are packed ready-to-install. The type plate is fixed on the vibration drive.
When transporting the vibration drive, it should be ensured that it is not subjected to severe impacts or vibrations which might damage the bearings.

The device should be stored in a dry and clean environment.

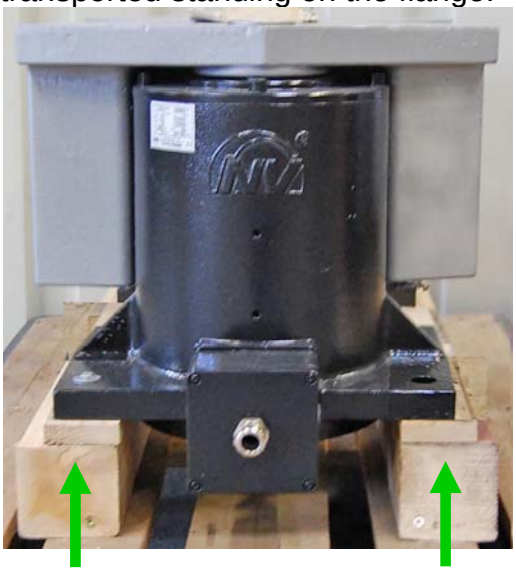
If it is necessary to store the vibration drive for a longer period (up to a maximum of 2 years), the temperature in the storage room must not fall below +5°C or exceed +40°C and the relative air humidity must not exceed 60%.

After a storage time of more than 1 year the grease in the bearing of the vibration drive must be exchanged before installation and the vibration drive must be tested electrically.

DANGER

Use the transport lug in the motor shaft only for lifting the vibration drive.

The vibration drives must never be placed directly on the encoder and the terminal box, because the encoder and terminal box would be damaged by it.
Vibration drives must always be transported standing on the flange.



IMPORTANT

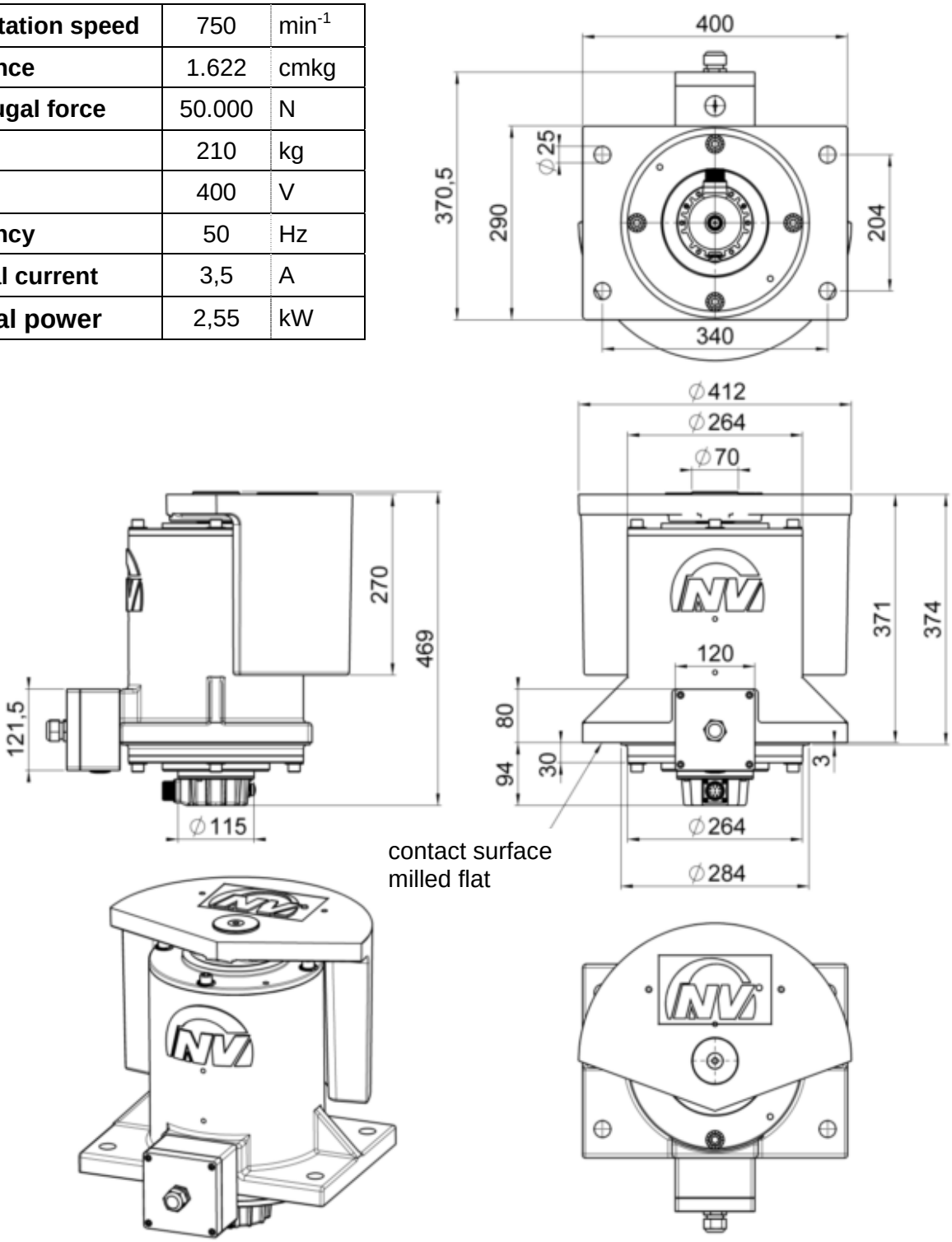
Always place sufficiently high square timber blocks underneath the flanges when setting the vibration drive on the ground or transporting it.

NetterVibration

Technical Data Sheet
Type GSA 1702

Dec. 2011
No. 4506E

Max. rotation speed	750	min^{-1}
Unbalance	1.622	cmkg
Centrifugal force	50.000	N
Mass	210	kg
Voltage	400	V
Frequency	50	Hz
Nominal current	3,5	A
Nominal power	2,55	kW



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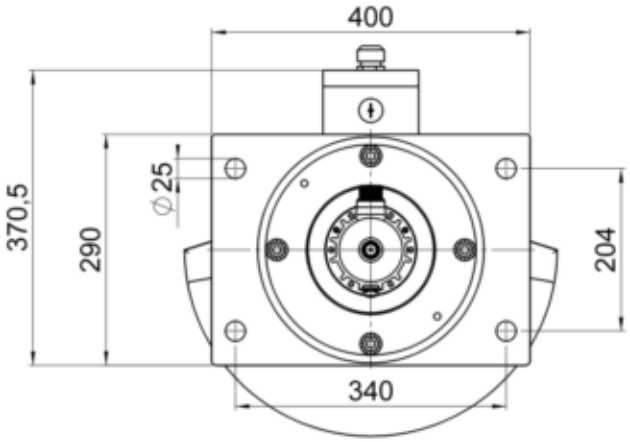
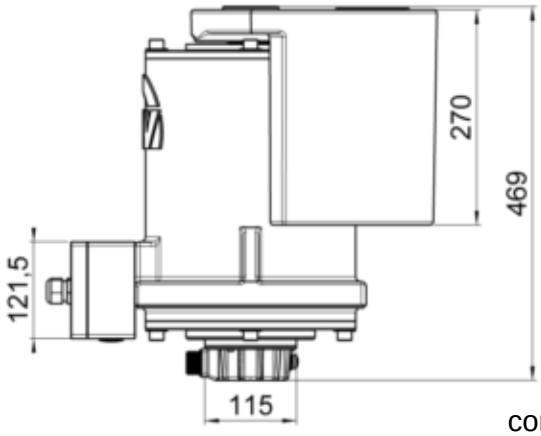
NetterVibration

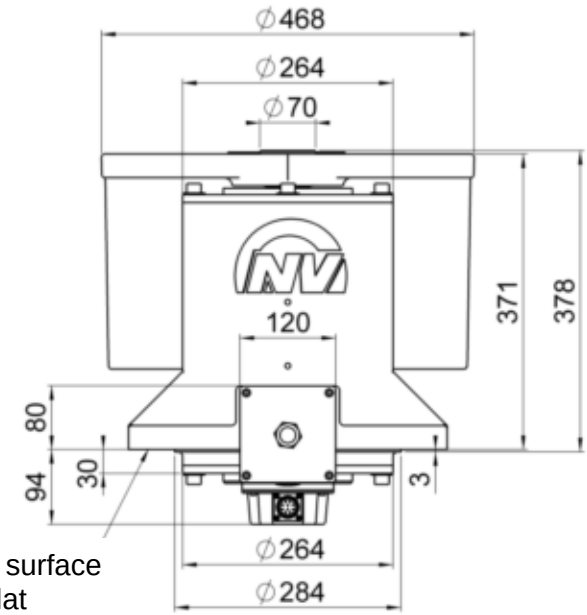
Technical Data Sheet
Type GSA 2502

May 2011
No. 4392E

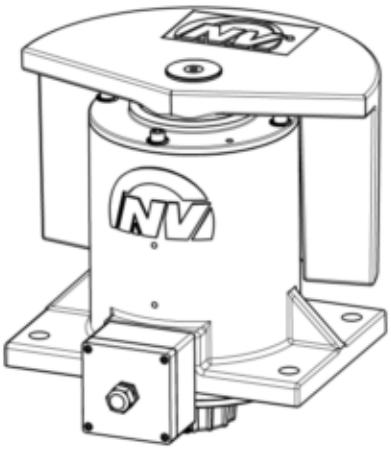
Max. rotation speed	580	min^{-1}
Unbalance	2.698	cmkg
Centrifugal force	50.000	N
Mass	245	kg
Voltage	400	V
Frequency	38	Hz
Nominal current	3,5	A
Nominal power	2,55	kW

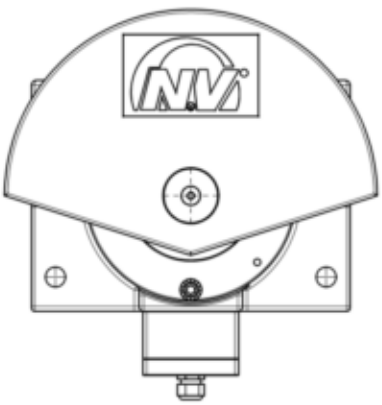






contact surface
milled flat





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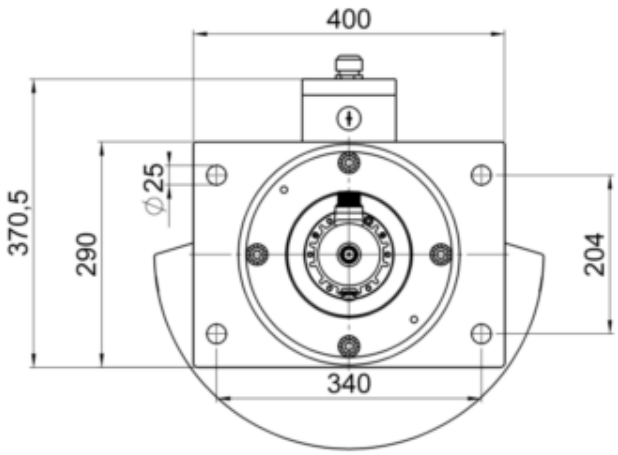
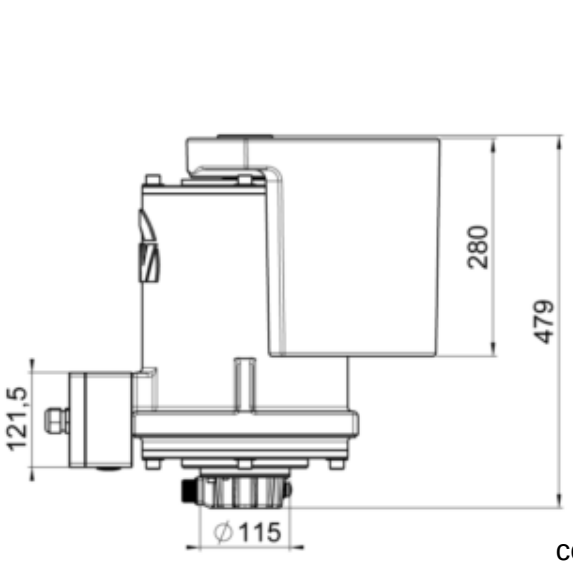
NetterVibration

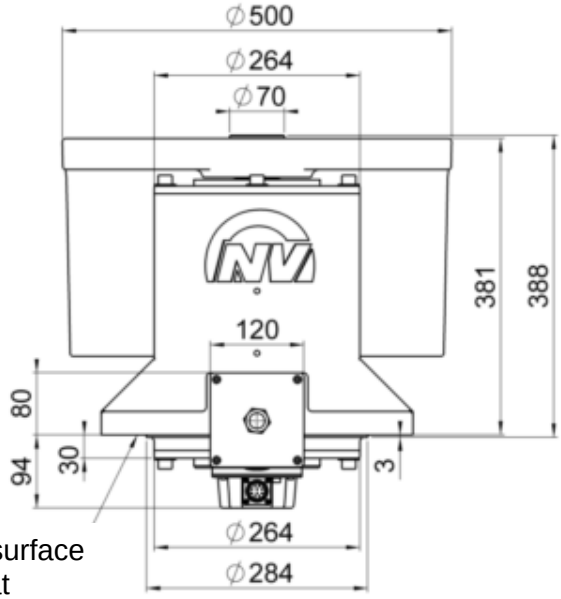
Technical Data Sheet
Type GSA 3502

May 2011
No. 4393E

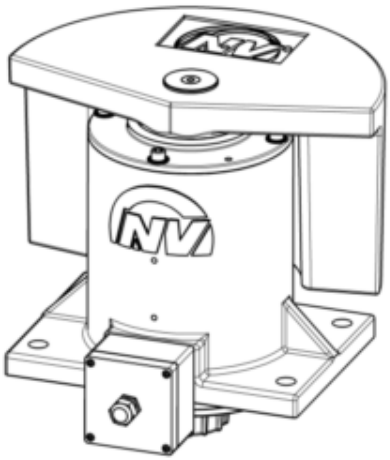
Max. rotation speed	510	min^{-1}
Unbalance	3.500	cmkg
Centrifugal force	50.000	N
Mass	273	kg
Voltage	400	V
Frequency	34	Hz
Nominal current	4	A
Nominal power	2,8	kW

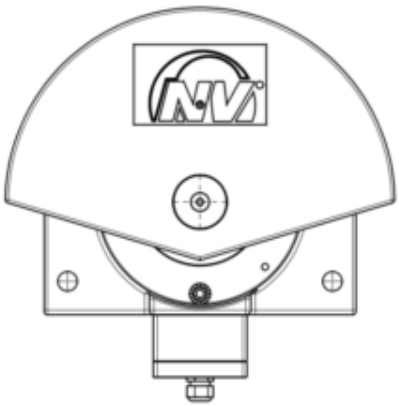






contact surface
milled flat





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6 Installation

DANGER

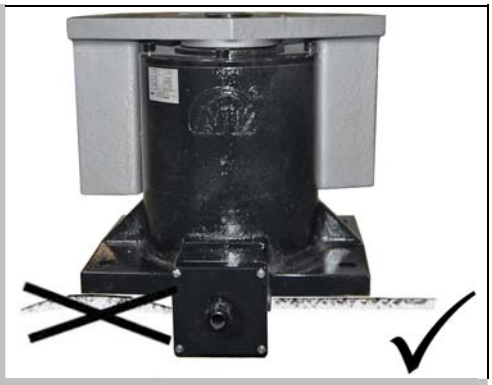
During installation the safety instructions of chapter 4 and the accident prevention rules have to be complied with!
The installation of the system must be carried out in compliance with the local known regulations (e.g. VDE regulations).

6.1 Mounting of the vibration drive

Netter vibration drives can only be operated in horizontal position.
The following instructions have to be strictly observed during installation:

DANGER

The mounting surfaces must be absolutely even (± 0,1mm evenness) so that the feet of the vibration drives are fully in contact with the surface and no tensions occur in the housing when tightening the fastening screws. There should also be no paint residues or weld penetrations on the surfaces. Tensions in the housing can lead to mechanical and/or electrical damage.



It is mandatory to use fastening screws of the quality 8.8 (DIN 931 or 933) and secure them with counter nuts (DIN 934) and a suitable glue. The screws have to be checked and possibly retightened at regular intervals (generally once a month).

DANGER

The tightening torques can be taken from the following table. Higher tightening torques may cause fracture of screws or tearing of threads.
Inadequate screw connections may cause loosening of units by vibration. This can cause injuries and damage to material!

Recommended tightening torques for screws of the quality 8.8
(Screws as supplied, with no extra grease or lubrication):

Screw type	**M 24**
Torque	740 Nm

Use a torque wrench and tighten the screws in a crosswise pattern.

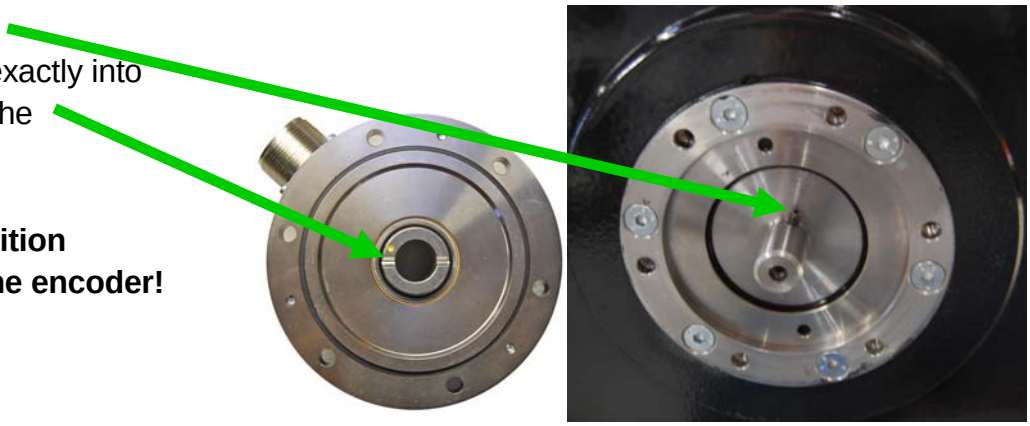
DANGER

Retightening:
Screw connections should be retightened after 1 h of operation (after the first commissioning) and then checked at regular intervals (generally once a month) and retightened, if necessary.

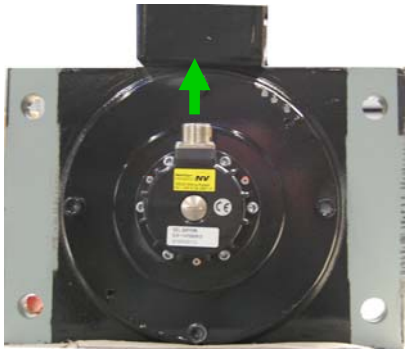
6.2 Assembly of the encoder

1. The roll pin must be fitted exactly into the keyway of the hollow shaft.

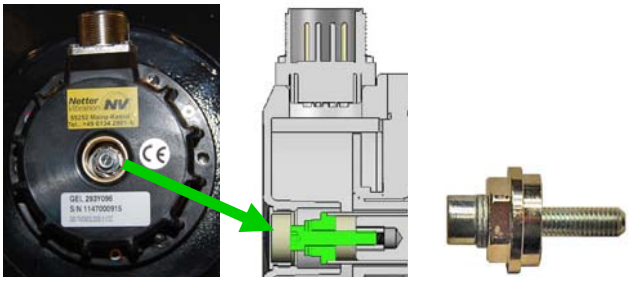
   Any other position will damage the encoder!



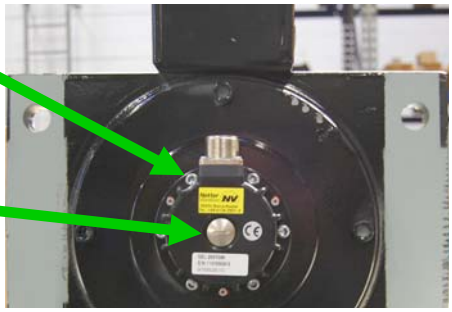
2. The cable output of the encoder housing must show in the direction of the terminal box of the vibration drive.



3. Connect the hollow shaft with the tappet by means of the hexagonal screw M5, the Nordlock lock washer and the thrust washer (external hex profile).



4. Attach encoder by means of hexagonal screws and Nordlock lock washers.
   Fix screw cap to the encoder.



6.3 Electrical connection

DANGER

ATTENTION:

The terminal box must not be opened when voltage is applied!

The electrical installation of the vibration drives must only be carried out by authorized qualified personnel.

The qualified personnel have to use only insulated tools that are suitable for this area of application.

Electrical connection

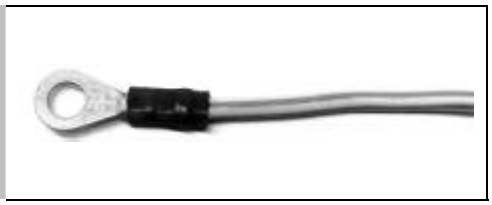
DANGER

Each vibration drive has to be provided with a suitable motor protection switch. For dual operation, the motor protection switches must be mutually interlocked to ensure that upon failure of one motor the power supply of both is interrupted simultaneously. Otherwise uncontrolled vibrations might occur and damage the system.

IM-PORTANT

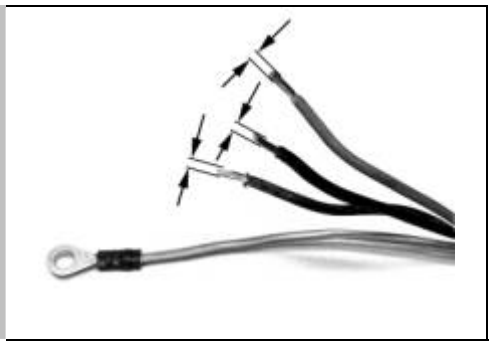
Use only flexible cables for the connection of the vibration drive.

The ends of the leads must be fitted with insulated cable clips to prevent the strands from splaying.



DANGER

The conductors in the supply cable for connection of the vibration drive to the mains supply must have a sufficient cross section suited to the length of the cable used.
The green-yellow conductor is the earthing conductor and must be used exclusively for connection to the earth terminal.



IM-PORTANT

When selecting the connecting cables, please consider the mechanical demands on the cables due to vibration.

The recommended cable types for power supply operation with 400 V in non-explosive atmosphere: rubber hose line H07 RN-F or oilflex cable 110 CY.

In case of other voltages or other environmental conditions the cables have to be adapted accordingly.

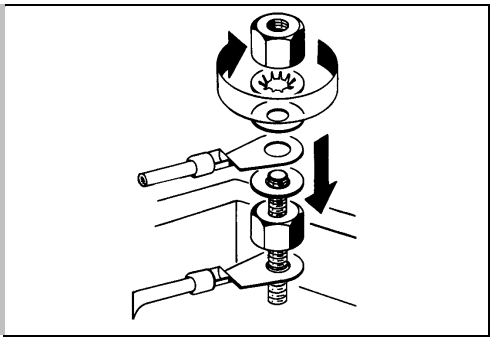
DANGER

The electric lines have to be laid with care. It has to be ensured that the cables are not worn through by vibrating parts.
The proper condition of the electric lines and their plugs has to be checked at regular intervals (generally every six months). Defects which are discovered are to be eliminated immediately.

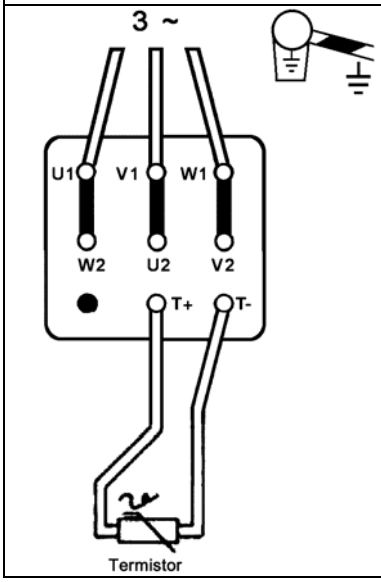
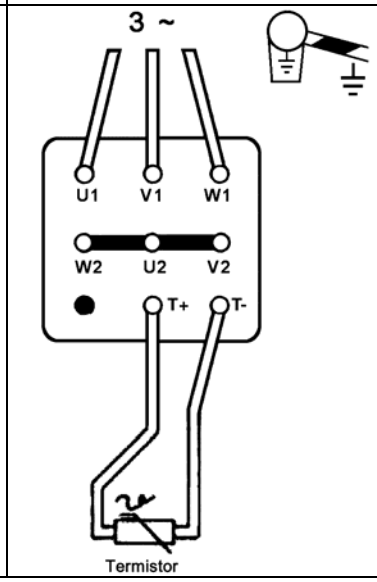
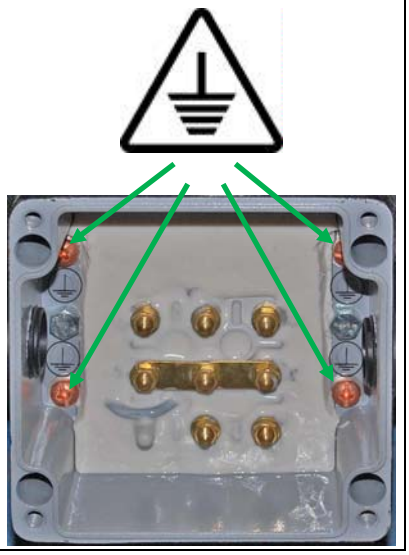
DANGER

Tighten junction plate nuts using the prescribed torque. Do not forget the lock washer between the ring and the nut and reinsert the vibration-damping element.

M 4 ⇒ 3,1 Nm
M 5 ⇒ 6,1 Nm
M 6 ⇒ 10,4 Nm



Depending on the supply voltage the wiring has to be made as follows:

Terminal plan		
Series GSA with thermistor Alternating current 3-phase Lower voltage △	Series GSA with thermistor Alternating current 3-phase Higher voltage Y	The green-yellow conductor is the protective conductor and must exclusively be connected to the earth terminal.
		

More terminal plans (e.g. for special voltages) on request.

IMPORTANT

Vibration drives must only be operated with a frequency converter and it has to be ensured that the EMC directive is complied with.

7 Start-up

CAUTION

Please comply with the safety instructions of chapter 4 during commissioning.

IMPORTANT

During commissioning of the vibration drives the directives and regulations of the local associations for electrical engineering (e.g. VDE) and the known accident prevention rules have to be complied with.

During initial commissioning the power consumption must be measured individually in all 3 phases and should correspond to the data on the type plate.

Check list for commissioning:

CAUTION

1. Check that all cable connections are tightly fastened before switching on the vibration drive.
2. Adjust the required frequency (if necessary).
3. Adjust the required amplitude (if necessary).
4. Tighten the fastening screws after 1 hour of operation.

8 Maintenance / Repair

CAUTION

Please comply strictly with the safety regulations in chapter 4 when performing any service work on the unit.

DANGER

Retightening:
Screw connections should be retightened after 1 h of operation (after the first commissioning) and then checked at regular intervals (generally once a month) and retightened, if necessary. The specified torque must be observed (see chapter 6.1)

The cylindrical roller bearings are lubricated with OPTIMOL LONGTIME PD2.

An exchange of the grease is required after 1000 operating hours (grease quantity per bearing: 80g).

Recommended tightening torques for screws

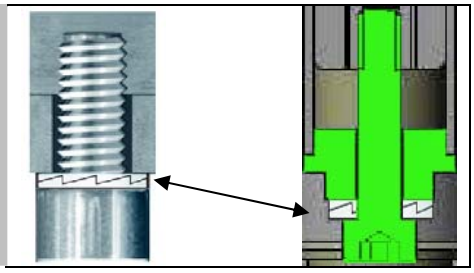
Screw type	M6	M8	M10	M12	M14	M16	M18	M20
8.8 Tightening torque [Nm]	10,4	25	51	87	140	215	300	430
12.9 Tightening torque [Nm]	18	43	87	150	240	370	510	720

Recommended tightening torques for nuts

Nuts	M5	M6	M10	M12	M14×1,5	M18×1,5	M24×2	M30x1,5
Nm	5	9	45	70	130	270	650	1100

IMPORTANT

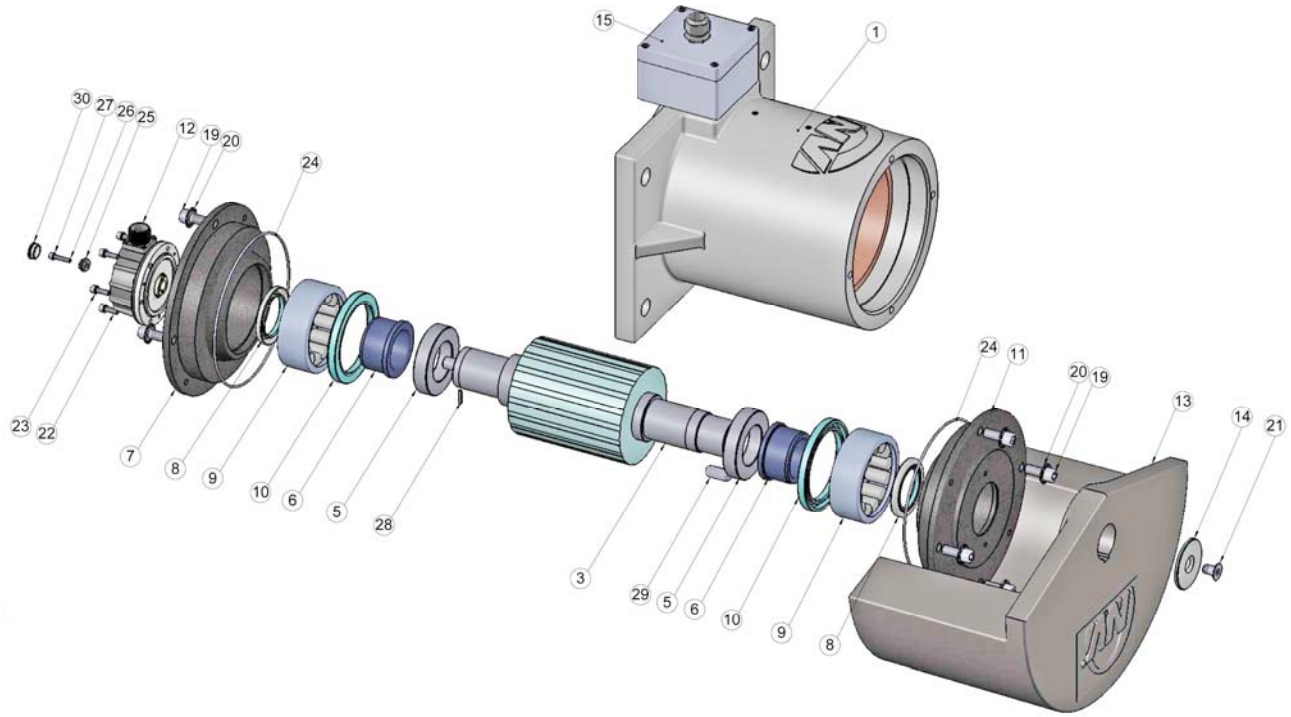
When installing Nordlock lock washers it has to be ensured that the wedge surfaces lie flat against each other.



Procedure for grease exchange in the bearings:

When working on the vibration drive it has to be safely disconnected from the power supply. To do this, proceed as follows:

1. Switch off vibration drive
2. Secure against being switched on again
3. Check for the absence of voltage



Item	Quantity	Description
1	1	Housing
3	1	Rotor
5	2	Spacer
6	2	Inner ring of cylindrical roller bearing
7	1	Flange Encoder
8	2	Rotary shaft seal
9	2	Cylindrical roller bearing
10	2	Rotary shaft seal
11	1	Flange unload
12	1	Incremental encoder
13	1	Unbalance
14	1	Lock washer
15	1	Terminal box

Item.	Quantity	Description
19	8	Socket head screw
20	8	Lock washer
21	1	Counter-sunk screw
22	6	Socket head screw
23	6	Lock washer
24	2	Seal ring
25	1	Druckscheibe
26	1	Socket head screw
27	1	Lock washer
28	1	Roll pin
29	1	Parallel key
30	1	Screw cap

9 Troubleshooting

ATTENTION:
Faults on vibration drives must only be repaired by authorized qualified personnel.

Fault	Possible Cause	Troubleshooting	Remedy
Vibration drive does not start or is running with low speed	Phase interruption	Check fuse and connecting cables	Replace fuse or connecting cable
	Mains voltage too low	Check mains voltage and cable cross section	Correct mains voltage, replace cable
Speed drop under load	Wiring fault	Check with terminal plan	
	Insufficient contact on a connecting terminal	Check connection in terminal box	Tighten terminal nuts
	Phase interruption	Check fuse and connecting cable	Replace fuse or connecting cable
	Incorrectly dimensioned connecting cable	Check cable cross-section	Replace cable
	Overload	Check setting of unbalances	Reduce unbalance
	Mains voltage too low	Check mains voltage and cable cross-section	Correct mains voltage, replace cable
One phase without current	Phase interruption	Check connecting cable	Replace cable
Excessive temperature rise in the stator winding	Wiring fault Overload	Check with terminal plan	
	Mains voltage too low	Check mains voltage and cable cross section	Correct mains voltage, replace cable
Humming vibration drive	Phase interruption	Check fuse, mains voltage and connecting cable	Correct mains voltage, replace fuse or cable
	Turn-to-turn fault in the stator winding	Replace vibration drive	
Circuit breaker fails when switched on	Phase interruption	Check fuse and connecting cables	Exchange fuse or cable
	Overload	Check setting of unbalances	Reduce unbalance
	Short circuit in the winding	Exchange vibration drive	
High power consumption	Natural resonance range of the vibration system	Check power consumption	Stiffen the device
	Impacts	Check power consumption	Reduce force of vibration drive
		Fastening loose	Retighten screws
Bearing too hot	Too much grease in the bearing	Apply correct quantity of grease Optimol Longtime PD2	
	No grease in the bearing	Apply correct quantity of grease Optimol Longtime PD2	
	Foreign matter in the bearing	Clean or replace bearing	

10 Spare Parts

When ordering spare parts, please give us the following details:

1. Type of unit
2. Description and position of the spare part
3. Required quantity

11 Appendix

11.1 Accessories

The following accessories are available for vibration drives of the series GSA:

Description	**Remark**
Frequency converter	for frequency-regulated operation
Braking devices	permit a rapid slow-down of the vibration drives
Encoder	zur Positionsbestimmung der Unwucht

Additional electrotechnical accessories on request.

11.2 Disposal

Depending on the material the parts must be disposed of in an expert way.

Material specifications:

	GSA
Steel	Rotor, case, unbalance, flange, bearing, screws, discs and nuts
Aluminium	Type plate
PTFE, PU, VITON	Seals, terminal box
Copper with resin	Winding

ENVIRONMENTALLY FRIENDLY DISPOSAL

All units can be disposed of through Netter GmbH.
The disposal prices are available on request.

11.3 Enclosures

Enclosure (s):

Declaration of Incorporation

Further information available on request
Leaflet No. 42 (Netter *Gyro*Shake), and others