Operating instructions for Netter pneumatic external vibrators of the series NTV

July 2020
No. 1926E

These operating instructions apply to:

NTV 8-1
NTV 8-F
NTV 12-1
NTV 12-F
NTV 20-4
NTV 33-4
NTV 34-4
NTV 53-4
NTV 30-4Q
NTV 35-4Q

Contents

Scope of delivery

Please refer to the delivery note for the scope of delivery.

Check the packaging for possible transport damage. In the event of damage to the packaging, check the contents for completeness and possible damage. Inform the carrier in the case of damage.

Designation

The pneumatic external vibrators of the series NTV are hereafter referred to as "NTV".

Version of document

Document no.	1926E
Version no.	1
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1 General information

Use and storage

Before installing the NTV read these instructions carefully. It is the basis for any action when dealing with the NTV, and may be used for training purposes. The instructions should be subsequently stored at the operation site.

Target group

The target group for these instructions is technical staff, who have basic knowledge in pneumatics and mechanics.

Only complying technical staff may work on the NTV.

The NTV may only be installed, put into operation, maintained, troubleshot and disassembled by persons authorised by the operator.

Copyright

Limitation of liability

All technical information, data and instructions for installation, operation and maintenance in these instructions are based on the latest information available at the time of printing and take our past experience to the best of our knowledge into account.

No claims can be derived from the information, illustrations and descriptions in these operating instructions.

The manufacturer does not assume liability for damages resulting from:

- failure to observe the instructions,
- improper use,
- unauthorised repairs,
- technical modifications,
- use of non-permissible spare parts.

Translations are made to the best of our knowledge.

Netter*Vibration* does not assume liability for translation errors, even if the translation was made by us or on our behalf. Only the original German text remains binding.

Directives / standards observed

The pneumatic external vibrators of the series NTV comply with the EC Machinery Directive 2006/42/EC.

In particular, the standard EN ISO 12100 has been observed.

Instruction and warning symbols

The following instruction and warning symbols are used in these instructions:

Personal injuries

⚠ DANGER	
	signifies an immediate danger. Disregard of this notice will result in death or severe bodily injuries.

⚠ WARNING	
	signifies a potential danger. Disregard of this notice can result in death or severe bodily injuries.

⚠ CAUTION	
	signifies a potentially dangerous situation. Disregard of this notice can result in minor or moderate bodily injuries.

Material damages

NOTICE
signifies potential material damage. Disregard of this notice can result in material damage.

Notes

IMPORTANT
indicates actions, methods or notes that are not relative to safety, e.g. useful information and tips.

	**Environmentally safe disposal** indicates the obligation of environmentally safe disposal.

2 Safety

Intended use

The NTV are intended for generating circular vibrations.

General applications are loosening, conveying, compacting, separating bulk materials and reducing friction. NTV are used for compacting concrete, emptying bunkers and as drives for vibrating crosses.

The NTV are designed for installation in machines and may only be put into operation, if it has been assured that the complete machine complies with the regulations of the machinery directive.

The NTV may also be used outdoors as well as in dusty and humid environment. The NTV may not be submerged in bulk materials or in liquids.

Any other use is considered improper.

Qualification of qualified personnel

Installation, commissioning, maintenance and troubleshooting of the NTV may only be performed by authorised qualified personnel.

All handling of the NTV is the responsibility of the operator.

Falling parts

⚠ WARNING

Falling parts

The NTV, construction parts as well as fastening and housing screws can come loose due to vibration. Falling parts lead to severe personal injuries.

- ➢ Check the fastening and housing screws after one hour of operation and thereafter at regular intervals (generally monthly).
- ➢ Retighten the fastening and housing screws, if necessary.
- ➢ A safety device with a safety cable is mandatory for critical mounting situations.

Compressed air

⚠ WARNING

Compressed air

A loosened hose which is under pressure can lead to personal injuries.

- ➢ Screw the hose lines on carefully.
- ➢ Check the hose lines and connections after one hour of operation and thereafter regularly (generally monthly).
- ➢ Retighten the hose lines, if necessary.
- ➢ Ensure that the compressed air is disconnected from the supply lines during all work on the NTV.
- ➢ Prevent the NTV from being switched back on during all work.

Sound level

⚠ WARNING

Sound level

Near the NTV or in the vicinity of the constructions connected with the NTV, the sound pressure level may exceed 80 dB(A). The human ear can be permanently damaged by the high sound level.

- ➢ When working in the noise area, use ear protection if 80 dB(A) is exceeded.

Heavy parts

⚠ WARNING

Risk of injury while handling heavy parts

Risk of serious injury due to weight during transport and installation of the NTV.

- ➢ Observe the weight information in Chapter Technical data, from page 7 on.
- ➢ Only qualified personnel may transport and install the NTV.
- ➢ Use suitable load handling devices and slinging equipment.
- ➢ Wear suitable personal protective equipment.

3 Technical data

Permissible operating conditions

Drive medium	NTV must be operated with filtered (filter ≤ 40 µm), lubricated compressed air or lubricated nitrogen according to the following specification: ISO 8573-1 [x : 6 : 4] Filter > 10 µm Humidity, pressure dew point ≤ +10 °C Total oil content ≤ 5 mg/m³
Lubrication	ISO viscosity class according to DIN ISO 3448, VG 15 or SAE viscosity class 5 Fill the mist lubricator with acid- and resin-free compressed air oil.
Ambient temperature*	-10 °C to 60 °C
Operating pressure	2.0 to 6.0 bar

** Higher temperatures are only permitted after consultation with and the written consent of application engineers from* **Netter***Vibration.*

Parameters

Type	Nominal frequency [min^{-1}]	Centrifugal force [N]	Unbalance [cmkg]	Air consumption [l/min]	Weight [kg]
NTV 8-1	14,000	7,630	0.71	1,600	6.6
NTV 8-F	14,000	7,630	0.71	1,600	7.1
NTV 12-1	14,000	11,800	0.96	1,750	7.0
NTV 12-F	14,000	11,800	0.96	1,750	7.5
NTV 20-4	8,500	20,440	5.16	1,700	14.9
NTV 33-4	8,500	33,980	8.58	1,700	16.2
NTV 34-4	13,500	34,400	3.00	1,800	14.9
NTV 53-4	13,000	53,100	4.60	1,800	16.0
NTV 30-4Q	10,500	29,700	4.90	1,600	19.0
NTV 35-4Q	10,000	35,400	6.45	1,800	21.0

Data obtained on 6 bar.

Type designation

The type designations of the NTV differ as follows:

NTV xx**-1** have to be used with the bracket NVH 1.

NTV xx**-4** have to be used with the bracket NVH 4.

NTV xx**-F** have a flange for screw connection.

xx (8 to 53) is the centrifugal force of the **NTV**, specified in kN.

NTV with the suffix Q in the type designation are equipped with a silencer.

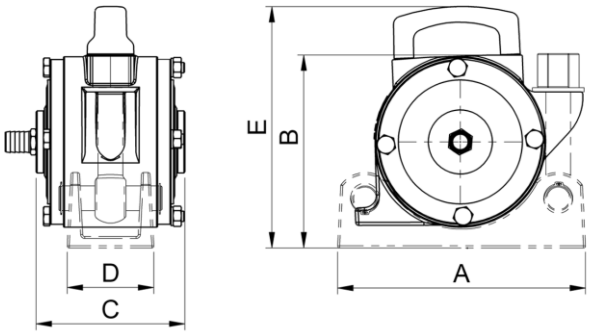
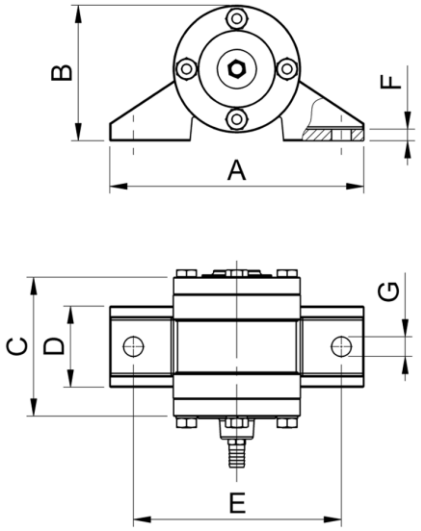
Service life

The technical performance data changes over the service life (wear and contamination).

Sound level reduction

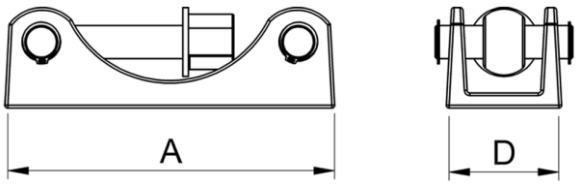
An acoustic insulation of the NTV is only effective if the sheet metal and moulds are also insulated.

Dimensions

NTV 8-1 / 12-1, NTV 20-4 / 33-4 / 34-4 / 53-4 NTV 30-4Q / 35-4Q	NTV 8-F / 12-F
	

Type	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	Ø G [mm]
NTV 8-1 / 12-1	180	130	145	94	-	-	-
NTV 8-F / 12-F	180	115	145	72	150	10	17
NTV 20-4 / 33-4 / 34-4 / 53-4	240	190	165	90	235	-	-
NTV 30-4Q / 35-4Q	240	190	165	90	235	-	-

Brackets for NTV-1 / -4



Type	A [mm]	D [mm]	Weight [kg]
NVH 1	180	94	3.5
NVH 4	240	90	4.5

Valves / hoses

***Netter**Vibration* recommends the following cross-sections:

NTV	Connection thread [inch]	Valve/grommet*	Hose size*
All types	G 3/8	DN 12	DN 16

* DN = diameter nominal (inner diameter)

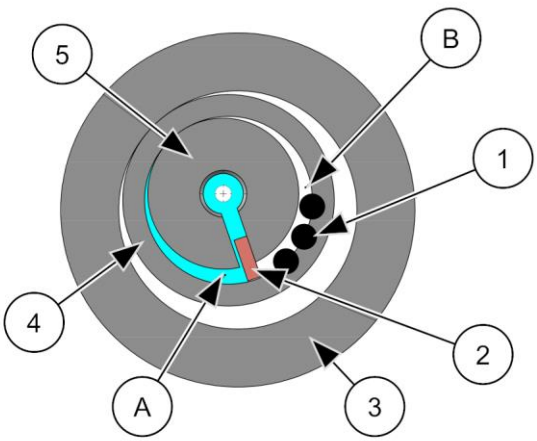
Tightening torques

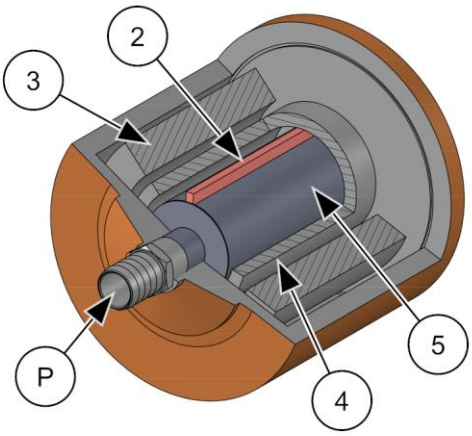
***Netter**Vibration* recommends the following tightening torques:

	Thread	Tightening torque [Nm]
Fastening screws for NTV-F	M16	210
Nut of the bracket NVH 1 for NTV-1	M18	200
Nut of the bracket NVH 4 for NTV-4	M24	300
Handle screws for NTV-1 / -4	M8	25
Housing screws (for all types of NTV)	M10	50
Grommet (for all types of NTV)	G 3/8	45

4 Design and function

Design





1	Exhaust bores	5	Shaft
2	Vane	A	Air chamber A
3	Outer rotor	B	Air chamber B
4	Inner rotor	P	Air inlet / grommet

Function

The NTV generate circular vibrations, i.e. the vibrations act in all directions of a plane.

The frequency and therefore also the centrifugal force are infinitely variable via the operating pressure.

The vibration is produced by the inner rotor (4) that is eccentrically driven around the shaft (5), and (for larger NTV) by the outer rotor (3).

The compressed air enters into the shaft at P and pushes the movable vane (2) against the inner rotor. Through the air channels of the vane the compressed air is led to air chamber A. The constant air supply increases the volume of air chamber A and shifts the position of the inner rotor. The rotation of the inner rotor changes the shape of chamber A to finally connect it with air chamber B so that the compressed air escapes through the exhaust bores (1).

The inner rotor turns now with the help of the kinetic energy until it reaches the starting position and the two air chambers, A and B, are back into place.

For larger NTV an additional outer rotor is driven by the inner rotor.

5 Transport and storage

Observe the safety instructions in Ch. Safety, from page 5 on.

Transport conditions

Special conditions of transport are not required.

Packaging

The NTV are packed and ready for assembly. Accessories and add-on parts are delivered unmounted, unless otherwise agreed upon.

The packaging protects the NTV from transport damage. The packaging material has been selected from an environmentally safe and technically disposable point of view and is therefore recyclable.

The return of packaging to the material cycle conserves raw materials and reduces the amount of waste.

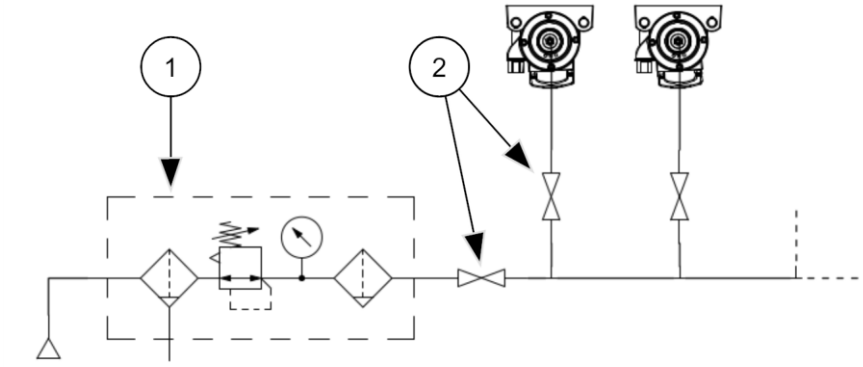
Storage conditions

- Store the NTV in a dry and clean environment.
- Protect the NTV from UV-exposures, weather and ozone.
- The storage temperature is between -20 °C and +60 °C.
- Close all openings when re-storing.

6 Installation

Observe the safety instructions in Ch. Safety, from page 5 on.

Standard installation



1 Maintenance unit

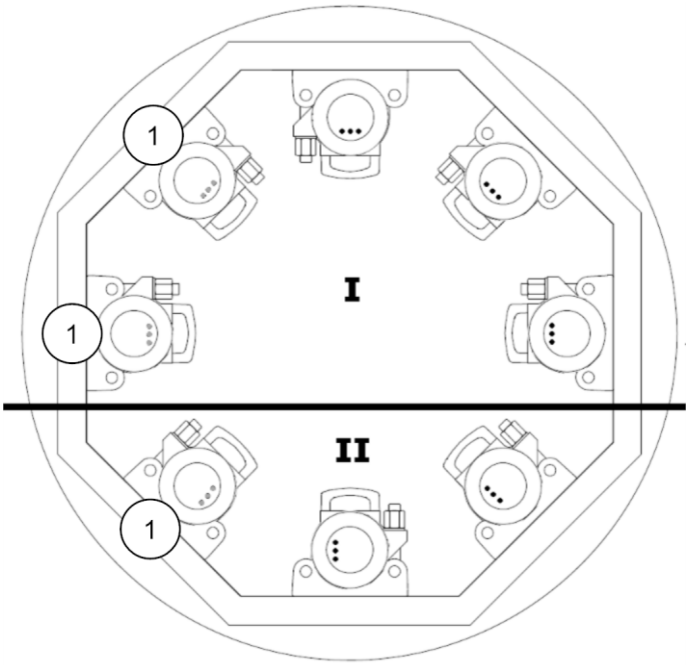
2 Ball valve

Use manually operated ball valves or 3/2-way solenoid valves for actuation of the NTV. Suitable distributor blocks for operating several NTV and special circuit diagrams are available on request.

Positioning of the vane

The positioning of the vane is relevant for the functioning of the NTV and can be derived from the position of the exhaust bores. Make sure that the exhaust bores of the NTV are in a suitable position for the position of installation (see illustration). The position as per delivery is suitable for operation in zone "I". For operation in zone "II" the covers of the NTV have to be turned before assembly according to the description given in chapter Maintenance, page 15 (Repositioning the exhaust bores).

Position of the exhaust bores suitable for the position of installation



I Position as per delivery

II Position after the necessary modification (see page 15)

1 The exhaust bores are on the side averted from the NTV.

Technical data Information regarding tightening torques for screws as well as cross sections for valves and hoses can be found in Ch. Technical data, page 7.

Air supply The loss of pressure increases with the hose length. The nominal diameters in Chap. Technical data, from page 7 on, apply to hose lengths up to 5 m up to the next bigger hose cross section. Longer supply lines require larger cross-sections.

Procedure When installing the NTV, carry out the following steps in succession:

1. **Attention:** The NTV must lie completely on the surface so that there is no tension in the housing when tightening the fastening screw(s), which could cause mechanical damage. The mounting surface has to be flat (±0,1 mm flatness for NTV-F) and clean with no paint residues or burn-ins.
   For NTV-1 / -4, the bracket NVH 1 / NVH 4 has to be welded to the construction to be vibrated.
2. Assemble the NTV-F directly on the mounting surface with self-locking fastening screws M16, the NTV-1 / -4 on the bracket NVH 1 / NVH 4 with the supplied nut. Observe the recommended values for screw sizes and tightening torques.
3. If necessary, additionally use a medium-strength liquid safety agent to secure the screw connections.
4. Observe the recommended cross-sections for valves and hoses. For the air supply, preferably use screw connections with integrated flat seal or liquid sealant. Avoid using sealing tape.
   Do not use longer screw threads than intended for the air supply (e.g. no pipes with external thread). Otherwise, the thread can be damaged.
5. Fasten the compressed air supply securely.

Checklist installation

Check that the following steps have been carried out:

- Compliance with permissible ambient temperatures ensured? ☐
- NTV assembled on a flat surface (for NTV-F: ±0,1 mm flatness)? ☐
- For NTV-1 / -4: Bracket NVH 1 / NVH 4 properly welded-on? ☐
- Position of the exhaust bores of the NTV checked? ☐
- Securing of fastening screws checked? ☐
- Screw size and tightening torques observed? ☐
- Maintenance unit (filter, regulator, mist lubricator), valve and supply line mounted? ☐
- Compressed air supply line securely fastened? ☐
- Specifications on hose length and nominal width observed? ☐
- NTV secured against falling by means of a safety cable in critical assembly situations? ☐

7 Start-up and operation

Observe the safety instructions in Ch. Safety, from page 5 on.

Permissible operating conditions

Please refer to Ch. Technical data, page 7 for permissible operating conditions.

Setting the frequency

Use the pressure control valve of the maintenance unit to set the operating frequency of the NTV.

By reducing the operating pressure, the centrifugal force is also reduced. At the same time the amplitude remains almost constant.

Setting mist lubricator

Set the mist lubricator to the smallest safely adjustable number of drops while the NTV is running. **Notice:** The NTV is ready for operation only after adjustment and correct functioning of the mist lubricator.

Recommended number of drops

Netter*Vibration* recommends setting the following number of drops on the mist lubricator depending on the hose length of the NTV:

NTV	Number of drops
All types	4-6 drops/min

Checklist start-up

Check that the following steps have been carried out:

Screw connections checked before start-up? ☐

Use of ear protection ensured? ☐

Desired frequency set on pressure control valve? ☐

Mist lubricator set? ☐

After one hour of operation:
Hose supply connections as well as fastening and housing screws and, for NTV-1 / -4, nut of the bracket NVH 1 / NVH 4 checked, retightened, if necessary? ☐
Then follow the maintenance plan.

8 Maintenance and servicing

Observe the safety instructions in Ch. Safety, from page 5 on.

Cleaning

To clean the NTV, proceed as follows:

1. Close the supply air opening and the exhaust bores.
2. Clean the NTV externally with a jet of water.
3. Activate the NTV briefly.

Maintenance plan

Maintenance of the NTV must be carried out as follows:

Interval	Action
After one hour of operation after initial commissioning	Check fastening and housing screws and (for NTV-1 / -4) nut of the bracket NVH 1 / NVH 4, retighten if necessary.*
	Check hose screw connections and hose fittings, retighten if necessary.
Before each commissioning	Check hose supply connections for damage, permeability and kinks. If necessary, clean and remove kinks or replace.
Weekly	For NTV-1 / -4: Check nut of the bracket NVH 1 / NVH 4, retighten if necessary.*
Monthly	Check fastening and housing screws, retighten if necessary.*
	Check hose screw connections and hose fittings, retighten if necessary.
	Check the function of the NTV.
	Ensure that mist lubricator operates according to regulations (see chap. Start-up, page 14 for specification). Refill oil if necessary.
	Clean the filter of the maintenance unit and replace, if necessary.

* Observe the recommended tightening torques (see Ch. Technical data, from page 7 on).

Maintenance intervals

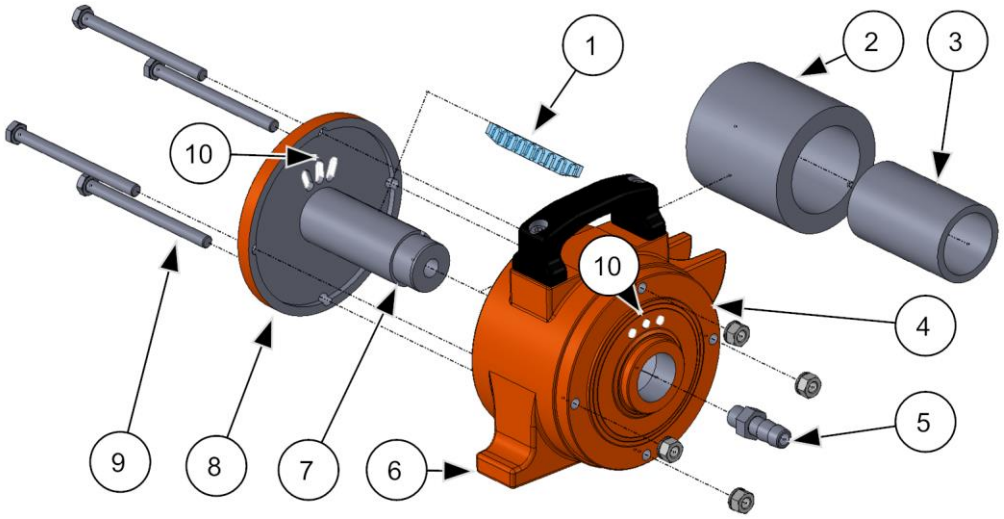
The maintenance intervals depend essentially on the service life and how clean the drive medium is.

Unfiltered compressed air leads to high wear, silencer clogging or complete failure of the NTV.

Repositioning of the exhaust bores

If an NTV does not start, the position of the exhaust bores has to be checked and, if necessary, changed. Proceed as for the exchange of the vane (see next page), leaving out the third step.

Exchange of the vane



1	Vane	6	Retaining cam
2	Outer rotor	7	Shaft
3	Inner rotor	8	Rear cover
4	Front cover	9	Housing screw
5	Grommet	10	Exhaust bores

The exchange of the vane has to be carried out as follows:

1. Unscrew the grommet (5) and loosen the housing screws (9).
2. Press the shaft (7) out from the side of the front cover (4). This may be accomplished either hydraulically (place the rim of the housing on an auxiliary ring for this purpose) or by clamping the retaining cam (6) of the housing in a vice and knocking the shaft with a hammer and a copper mandrel.
   Result: The shaft will drop out of the housing together with the rear cover (8) whereby these parts remain together. The rotor(s) (2 and 3) will also fall out.
3. Exchange the vane (1). Ensure that the vane is easy to move, or otherwise it must be ground in so that it fits tightly. The open channels of the vane must point away from the exhaust bores (10) to the right.
4. If the two covers are in a position that is not suitable for starting the vibrator (see chap. Installation, page 11): Remove the front cover from the housing and turn the two covers until the exhaust bores are in a position suitable for the position of installation.
5. For assembly, place vane and rear cover on a solid surface, put the rotor(s) into the shaft and lay the housing on the shaft with the open side facing the surface. Ensure that the covers are in a correct position to each other: The exhaust bores have to precisely stand on top of each other.
6. The housing has to be pressed on the shaft with an auxiliary ring or knocked in with a copper hammer from the side of the front cover.
7. Tighten the housing screws and retighten them after a short test operation.

9 Troubleshooting

Malfunctions and causes

In the case of malfunctions of the NTV proceed as follows:

Malfunction	Possible cause	Corrective action
NTV does not start	Compressed air supply	Check if there is enough pressure at the NTV. Check valve.
	Wrong position of exhaust bores	Turn covers (see Ch. Maintenance, page 15 "Repositioning the exhaust bores").
	Vane jammed, missing or incorrectly inserted	Check vane (see Ch. Maintenance, page 16).
NTV has too little power	Line cross-sections	Observe recommended cross-sections (see Ch. Technical data, from page 7 on). Check air pressure and supply lines.
	Wear	Check vane (see Ch. Maintenance, page 16), cover and inner rotor for visible wear. In addition, check the function of the mist lubricator.
	Increase of pressure does not lead to an increase of frequency	Improve the reinforcement or use NTV with a smaller working moment (smaller outer rotor).
Power loss	Screws loose, frequency reduction	Retighten fastening and housing screws, for NTV-1 / -4 as well as the nut of the bracket NVH 1 / NVH 4.
	NTV polluted	Clean NTV (see Ch. Maintenance, page 15).
High sound level	Frequency range, rattling	Adjust the frequency to a lower sound level. Secure loose parts, retighten screws.

10 Spare parts and accessories

Ordering of spare parts

Please provide the following details when ordering spare parts:

- required amount
- description and position of spare part
- type of NTV

Possible accessories

The following accessories are available for the NTV:

Component	Description
Hose material and hose screw connections	For air supply or discharge, available in various qualities and dimensions
3/2-way valves	Electrically, pneumatically or manually activated
Throttle check valves	For amplitude regulation, manually adjustable or pneumatically controllable
Maintenance units	Filter, regulator and mist lubricator
Netter Electronic Timers	Electric or pneumatic, for interval operation
Brackets NVH 1 / NVH 4	For permanent fixing (NTV-1 / -4)
Clamps NKG	For temporary fixing (NTV-F)
Distributor blocks	For operating several NTV
Rotors	For other working moments
Safety cable	Protects NTV from falling down

11 Disposal

Prices

All parts of the NTV must be properly disposed of according to the material specifications. The valid disposal prices of the NTV are available on request.

Material specifications

All parts of the NTV can be recycled.

Material	Part
Cast iron or steel	Housing, rotors, shaft, covers, flange (for NTV-F), bracket NVH 1 / NVH 4 (for NTV -1 / -4), grommet
Plastics	Vane, exhaust air hose with silencer (for NTV Q), handle (for NTV -4)

12 Annex

NetterVibration

Declaration of Incorporation
Pneumatic Vibrators
High Frequency Impactors

June 2020
Nr. 4811E

Declaration of Incorporation

according to the

EC Machinery Directive 2006/42/EC (Annex II 1 B)

We hereby declare, that the

pneumatic impactors series PKL

pneumatic linear vibrators series NTK, NTP, NTS

pneumatic ball vibrators series NCB

pneumatic roller vibrators series NCR

pneumatic turbine vibrators series NCT

high frequency impactors series NHK

pneumatic external vibrators of the series NTV

are partly completed machinery. They cannot function alone. For this reason they do not comply with all sections of the relevant regulations in the Machinery Directive mentioned above.

The following basic safety and health requirements of annex I of the directive mentioned above are applied and respected:

1.1.1, 1.1.2, 1.1.3, 1.1.5, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.7, 1.5.3, 1.5.8, 1.6.1, 1.6.2, 1.7

When installing in a machine or on completion of a machine, which can function on its own, the requirements in the assembly instructions must be observed. Start-up is not permitted until it is determined that the machine to be assembled into the device is functioning and complies with the protection requirements of the Machinery Directive.

The technical documentation is compiled in accordance with part B of annex VII. The authorised person to establish the technical documents in accordance with annex II digit 1 part B. No. 2 is **Netter GmbH, Germany**.

In response to a founded request by individual state departments, we will send a hardcopy of the technical documentation by mail.

Mainz-Kastel, 26.06.2020

p.p. J. Gauß
(Technical manager)

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