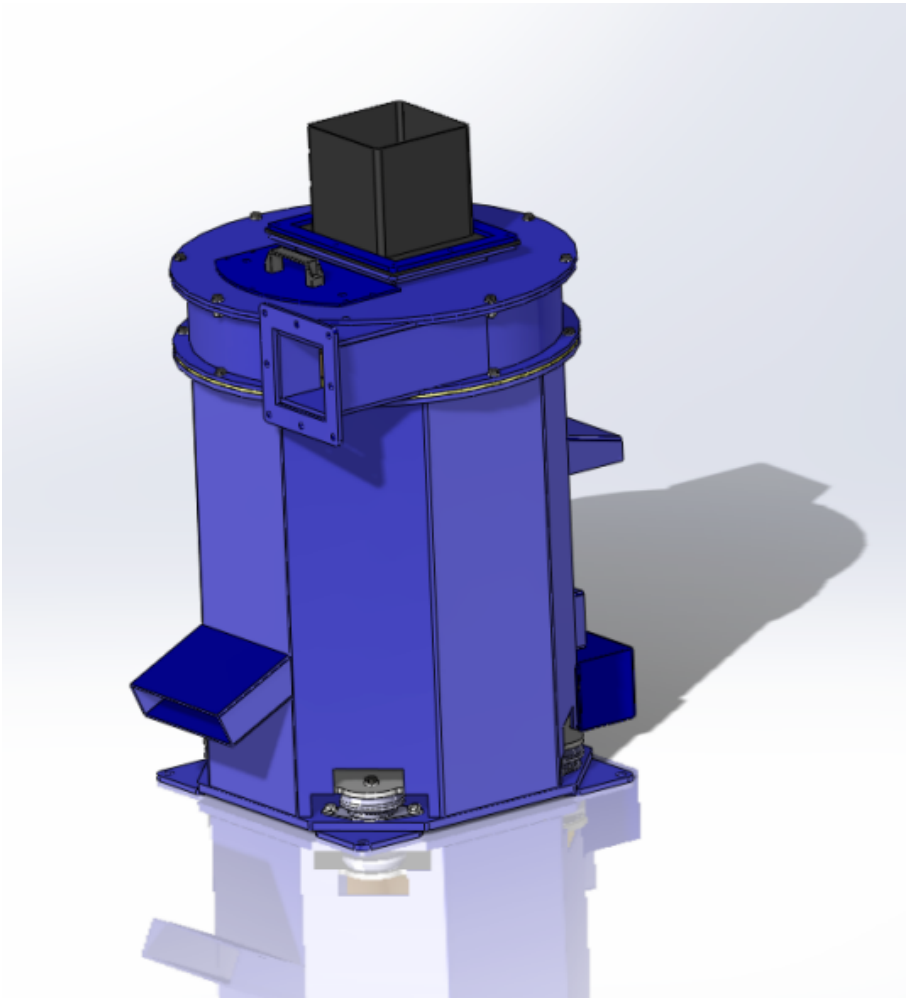
Nederman

Instruction manual

Chip & swarf management system

Swarf centrifuge

VD40



Original instruction manual
EN INSTRUCTION MANUAL

Translation of original instruction manual
DA BETJENINGSVEJLEDNING
DE BEDIENUNGSANLEITUNG
ES MANUAL DE INSTRUCCIONES
PL INSTRUKCJA UŻYTKOWANIA
PT MANUAL DE INSTRUÇÕES
SV ANVÄNDARMANUAL

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Figures

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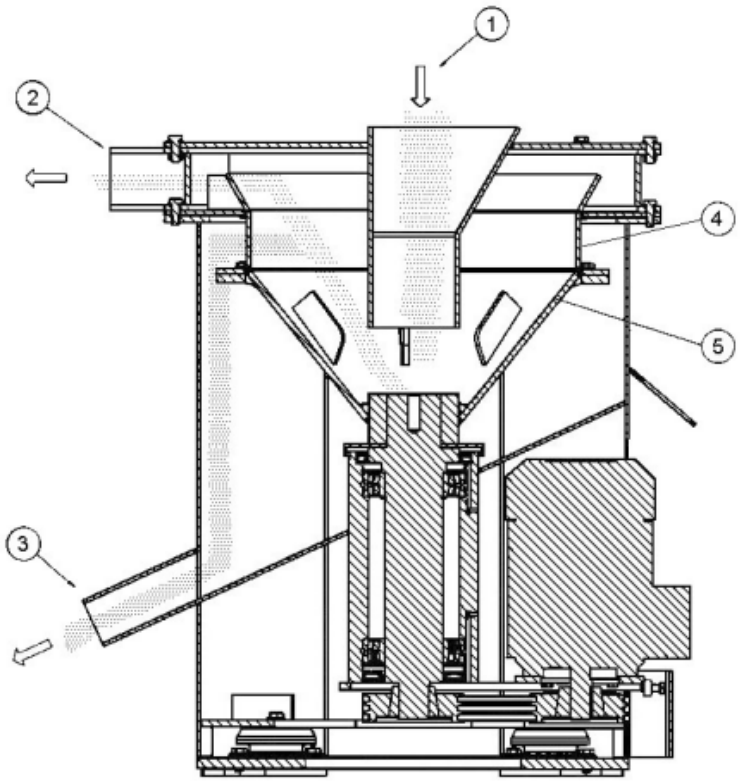

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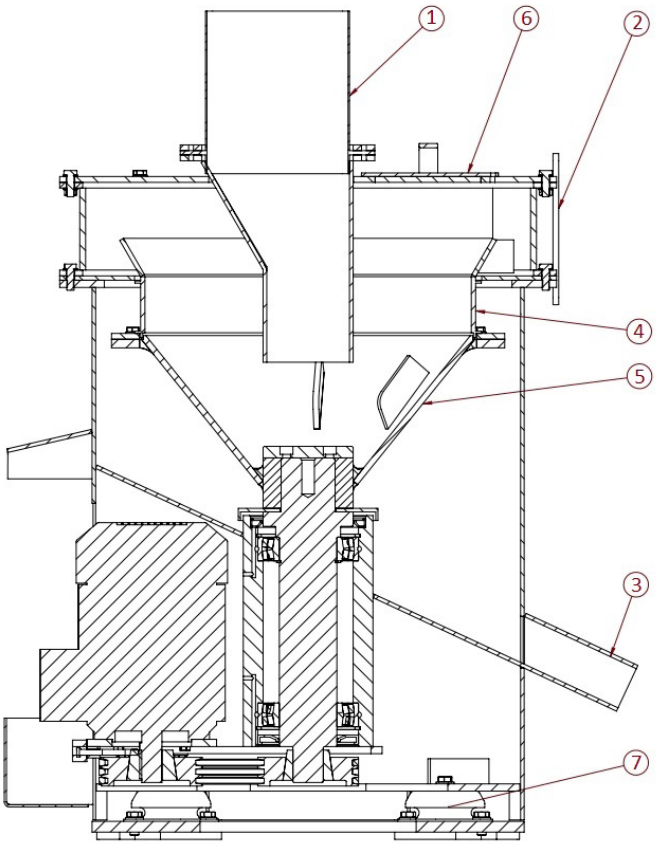

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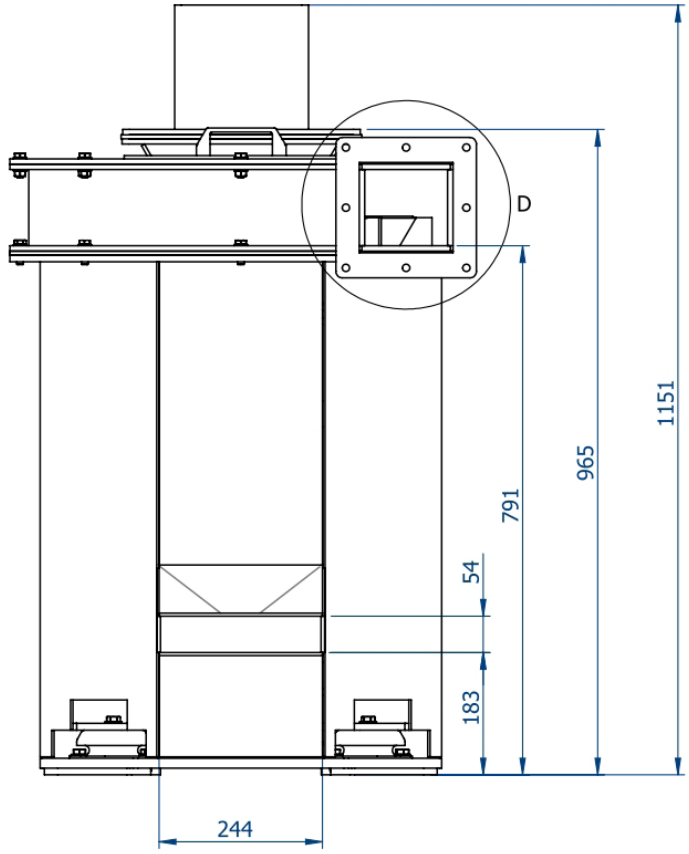

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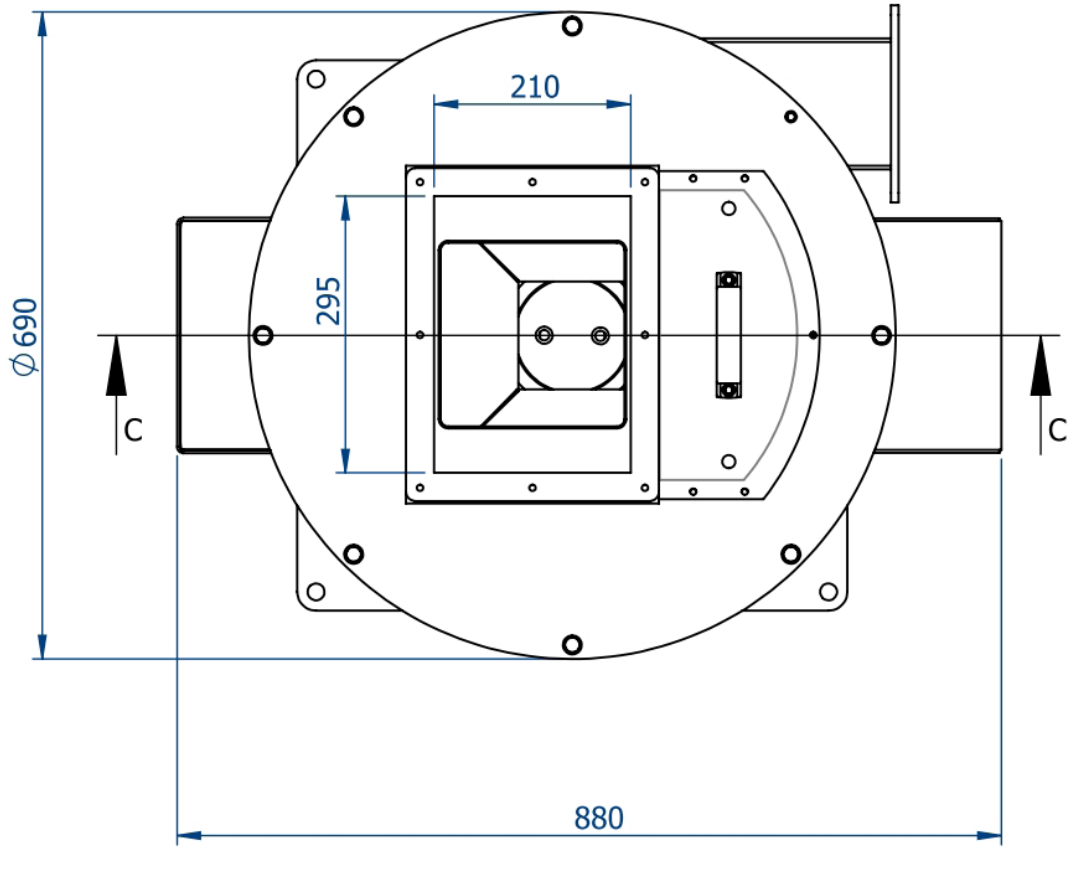

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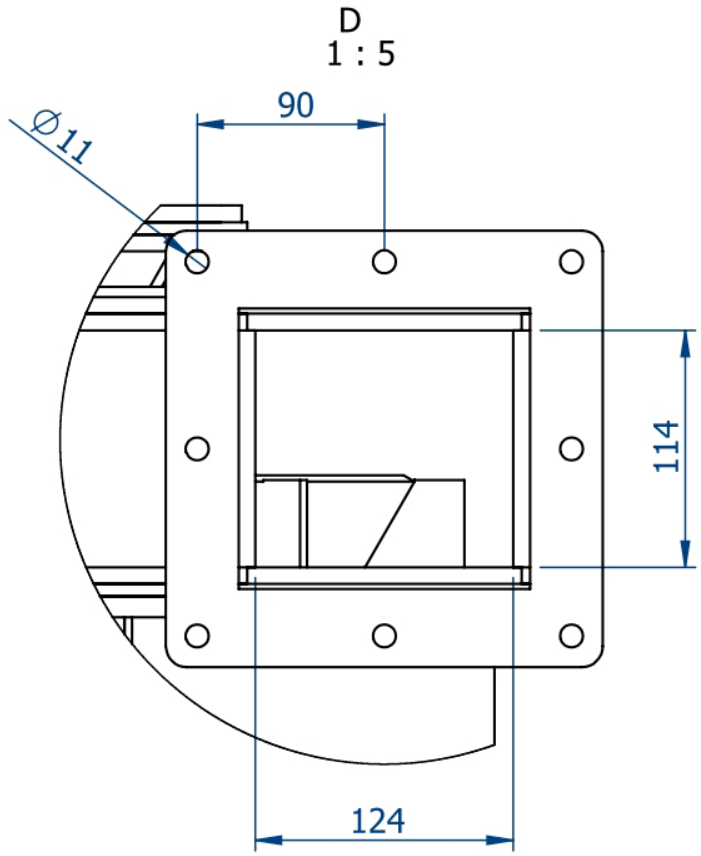

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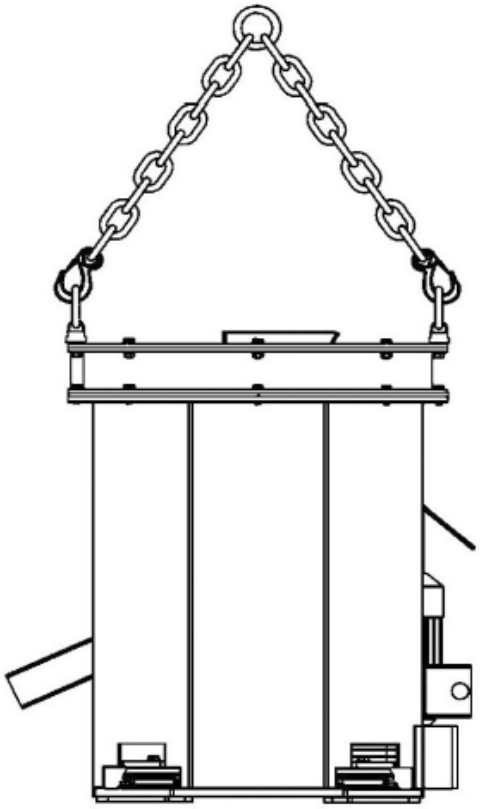

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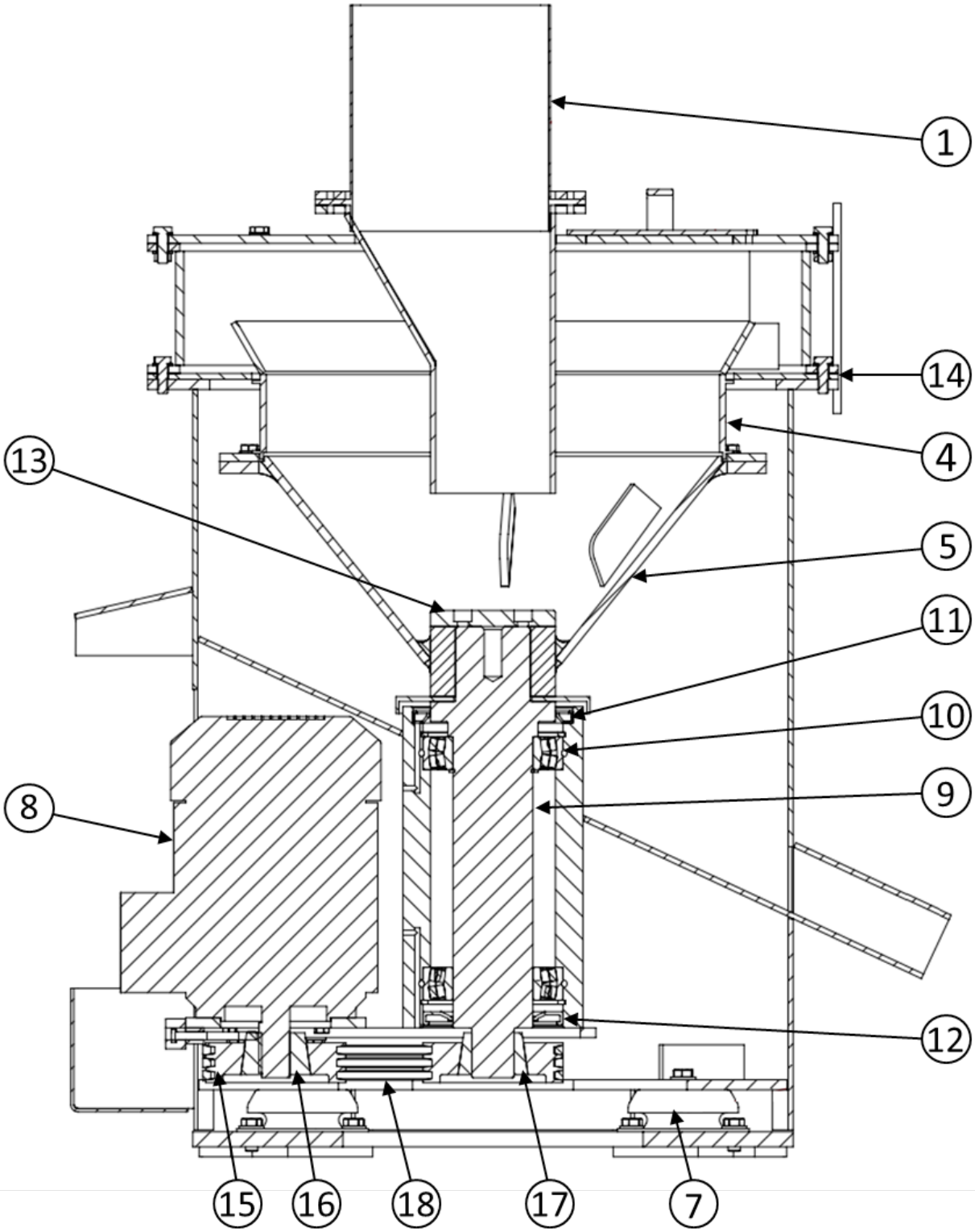

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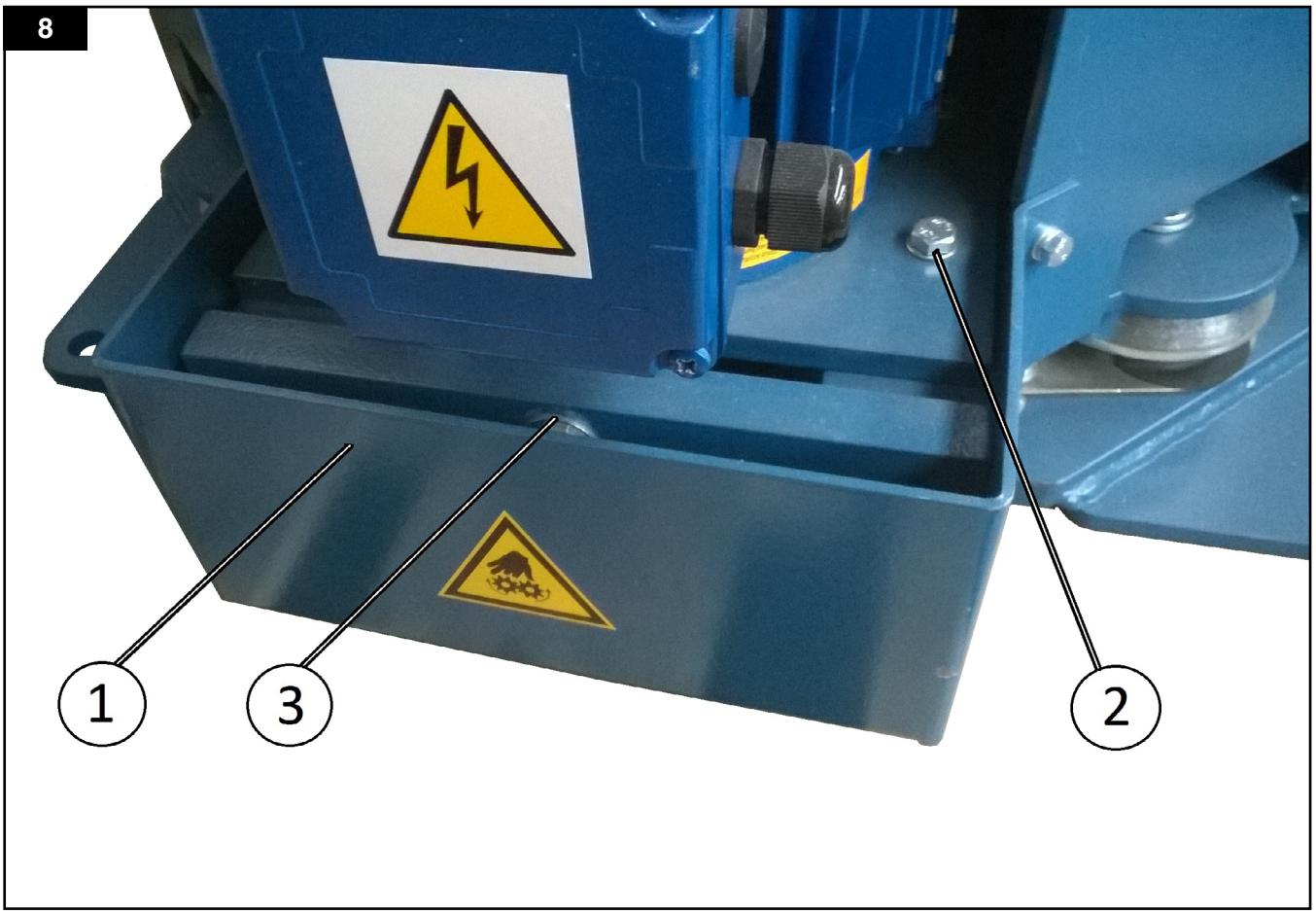

English

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Table of contents

1 Declaration of conformity

The formal Declaration is attached to your product.

2 Preface

This manual is for the correct installation, use and maintenance of this product. Read it carefully before using this product or carrying out maintenance. Replace the manual immediately if lost.

This product has been designed to meet the requirements of relevant EC directives. To maintain this status, all installation, repair and maintenance work for this product is to be carried out by qualified personnel using only original spare parts. Contact the nearest authorized distributor or Nederman for advice on technical service and obtaining spare parts.

NOTE! Read Chapter '4 Safety' thoroughly.

Nederman continuously improves its products design and efficiency through modifications, and reserves the right to do so without introducing these improvements to previously supplied products. Nederman also reserve the right to, without previous notice, modify data and equipment as well as operating and maintenance instructions.

2.1 Foreword

Your VD40 Swarf centrifuge has been manufactured by:

NEDERMAN Manufacturing Poland Sp. z o.o.

ul. Okólna 45 A

05-270 Marki, Poland

Tel: +48 22 7616000

Fax: +48 22 7616099

www.nederman.com

NEDERMAN Swarf centrifuge guarantee good design, quality components and skilled labour plus years of experience in filters for oil mist and coolants. All these abilities have been used to design a product with high reliability and long service life. We are convinced that your experiences will confirm your choice of NEDERMAN Swarf centrifuge.

Length of life and reliability can, as with any machine tool, be prolonged with correct installation and correct maintenance. It pays off to follow our advice for maintenance.

This maintenance manual consists of instructions and spare parts list for your new NEDERMAN Swarf centrifuge. It also contains simple schedule for trouble-shooting.

All Swarf centrifuges which leave our works are checked and do not need any additional maintenance other than stated in this manual.

3 Notices on hazards

This document contains important information that is presented either as a warning, caution or note. See the following examples:

WARNING! Type of injury
Warnings indicate a potential hazard to the health and safety of personnel, and how that hazard may be avoided.

CAUTION! Type of risk
Cautions indicate a potential hazard to the product but not to personnel, and how that hazard may be avoided.

NOTE! Notes contain other information that is important for personnel.

4 Safety

This chapter contains important information that refer to a potential hazard to the health and safety of personnel, and how that hazard may be avoided.

NOTE! The user of the product is obliged to check periodically the validity of the following documents, referred to in the present manual: directives, acts, regulations, standards. The supplier of the product bears no responsibility for losses and damages suffered by the user due to application of expired legal acts and standards.

WARNING! Risk of injury
Before starting any work (inspection, service or maintenance) requiring direct access to moving parts, such as drum / drums centrifuge or the belt transmission, should turn off the power supply of drive and make sure, that there is no risk unintended start-up, by blocking the switch in position O "OFF".

WARNING! Risk of injury
Any work involving with handling of the centrifuge, can be performed only by persons trained and equipped with personal protective equipment (helmet, safety shoes, safety gloves and glasses). Wearing loose clothing and accessories (ties, loose sleeves, etc.) is prohibited.

WARNING! Risk of injury
Do not open the doors and inspection openings during the centrifuge operation, and before completely stopping the drum/drums.

WARNING! Falling hazards
The floor around the device might get slippery from coolant getting outside the machine.

NOTE! Any the centrifuge design changes without acceptance by Nederman will void the warranty.

Safety regulations:

- Electrical installations have to be done by qualified personnel only.
- At connection of voltage feed as well as at service and maintenance work on the unit the circuit breaker must be off.
- Test the emergency stop at installation and always when maintenance and service have been done.
- The centrifuge must not be operated with the covers removed.
- Materials able to centrifuge are different qualities of steel swarf as well as brass and cast iron swarf, if any other material please ask Nederman.
- Information included in the data sheet from the supplier of the coolant and oil/grease to lubricate bearings must be know, because coolant/oil/grease can cause allergic reactions.

5 Description

The NEDERMAN vertical Swarf centrifuge is designed to operate at high rpm and is almost completely vibrationless. Each component in the rotation system is individually balanced so that all parts are fully replaceable without disturbing overall balance.

Despite of fact that the parts are individually balanced a certain imbalance may arise when material is fed in. To avoid vibrations being transferred to mountings the centrifuge is installed on vibration absorbers.

5.1 Function

The NEDERMAN vertical Swarf centrifuge is a drum centrifuge, which via rotation movement exposes the supplied material to high G-force. The solid particles are separated on the inner periphery of a drum lining, whilst the liquid passes through this.

Fig. **1** shows the materials flow through the centrifuge.

Table 5-1: Description of Fig. **1** - the materials flow through the centrifuge.

Number on Fig. 1	Description
1	Inlet hopper
2	Outlet - swarf / chips
3	Outlet - liquid
4	Screen
5	Drum

The material fed in through the top inlet hopper [1] glides down to the bottom of the drum [5]. On contact with the drum the material is accelerated to the speed of the drum at the periphery and moves upwards along the drum until it comes into contact with the screen [4]. During the time the material is exposed to the centrifugal force the liquid is separated from the solid particles. When the materials passes over the screen the liquid goes through this and out from the centrifuge via the outlet for liquids [3]. The dry swarf passes over the screen and out via the swarf outlet [2].

Please noticed that the Swarf centrifuge is available with two options for the swarf. Alternatively the swarf can go straight out at the outlet [2] or an adapter can be fitted, which will cause the swarf to be blown away to a bin.

5.2 Technical data

Features:

The centrifuge is automatically emptied after each working cycle. Chips and coolant must not stay in the centrifuge.

Separation of chips from coolant by a high-speed rotating drum with wire wedge screen. The residual humidity 2-5 % depends on the chip quality and the coolant.

The drum is made of stainless steel. The wire wedge screen is made of stainless steel and has an opening of about 0,7 mm (standard). The stand is made of steel and the sealing ring for housing is made of Hardox.

Table 5-2: VD40 Swarf centrifuge characteristics

Model	Motor [kW]	Height [mm]	Weight [kg]	Noise level* dB(A)
VD40	4,0	940	450	79,2

*Measurement based on EN ISO 11201.

NOTE: Capacity rate depends on nature of swarf (size and shape) and contaminate volume / weight.

Main dimensions of **VD40** Swarf centrifuge are presented on Fig. **3**, **4** and **5**.

6 Main components

We continuously improve our products and their efficiency through the introduction of design modifications. We reserve the right to do this without introducing these improvements on previously supplied products. We also reserve the right, without previous notice, to modify data and equipment, as well as operating and maintenance instructions.

Centrifuge **VD40** consists of the following main components (see Fig. **2**).

Table 6-1: Main components of VD40 Swarf centrifuge (see Fig. **2**)

Number on Fig. 2	Component name
1	Inlet - wet chips
2	Outlet - dry swarf / chips
3	Outlet - liquid
4	Screen
5	Drum
6	Inspection door
7	Vibration absorber (4 pcs.)

6.1 Accessories

The screen opening is delivered as a standard 0,7 mm if not otherwise specified in the order. Other screen openings may be fitted.

On request the device may be equipped with swarf and coolant outlet chutes.

7 Before installation

7.1 Delivery checks

Check the package and the unit for any transport damage. In case of damage or parts missing, notify the carrier and your local Nederman representative immediately.

7.2 Installation requirements

Consideration must be taken to the positioning of the centrifuge in relation to other equipment. The centrifuge requires very little space. However, space for maintenance must be available and adequate space must be ensured for access

to all the hatches. Screen, drum and the interior components are removable from the top.

Lifting instructions

Lift the centrifuge by crane. Use a chain of approved quality and strength and in adapted length. Place the chain in the eye bolt on the upper side of the centrifuge (see Fig. **6**).

Weight **450** kg.

CAUTION! Damage of unit.
Consider the centre of gravity of the device and attachments during transport.

8 Installation

WARNING! Crushing hazard
Take special care when lifting, lowering, moving and assembling the device or its parts. Always use special lifting equipment and elements (lifting slings) with certificates.

WARNING! Crushing hazard
Any work related with lifting the centrifuge must be made by trained persons, supplied with persons safety equipment (safety shoes, safety helmet, protection gloves).

WARNING! Crushing hazard
Should note, that the weight of the centrifuge may not exceed the allowable lifting capacity of the applied lifting jack.

WARNING! Falling hazard
Any work at height (higher than 1 m) can be made only by qualified personnel to work at heights, provided with appropriate equipment securing them against fall. Prior to commencement of works check the technical conditions, stability and strength of the structure or the equipment on which the works are to be performed.

WARNING! Drawing-in hazard
Assembly of the centrifuge can be performed only by persons trained and equipped with personal protective equipment (helmet, safety shoes, safety gloves and glasses). Wearing loose clothing and accessories (ties, loose sleeves, etc.) is prohibited.

WARNING! Electrocution hazard
Electrical connection and earthing of the centrifuge can be performed only by an assembler possessing documented electrical permissions, in accordance with current and valid local regulations.

WARNING! Risk of injury
If the customer wants to make his own inlet and /or outlet installation, Nederman has to accept this project.

8.1 Installing the Swarf centrifuge

NEDERMAN Swarf centrifuge is delivered fully fitted. Observe care during installation and always use the lifting hooks which it is equipped with. The mountings should be level and sufficiently secure to support a load of about 500 kg and also be available to sustain dynamic loads via the centrifuge´s vibration absorber. The dynamic loading is normally very low.

The centrifuge should be installed in the space provided according to the installation documentation, taking into account the place for work related to servicing and maintenance of equipment, or execution the power supply connection. The relevant data is available in **EN 547-1**: *Safety of machinery - Human body measurements - Principles for determining the dimensions required for openings for whole body access to the machine.*

The centrifuge fasten to the flat ground using standard fasteners. For this purpose in the basic of the devices are mounting holes Ø 18.

The direction of rotation of the centrifuge drum must to clockwise.

Centrifuges VD must be connected to:

- the delivery system of chips,
- the system of reception chips and coolant.

There should be no rigid connections to the centrifuge. When the centrifuge is correctly installed it should be able to vibrate on the vibration absorbers without striking or causing any abrasion against any connection. Liquid and solid particles should be fed to a tank or conveyor. A fixed pipe connection should be avoided. The liquid outlet, however, must be shielded to prevent splash.

The motor is dimensioned as 4 kW, 400 V AC, 50 Hz and 3-phase. The electric cables to the motor must accommodate a certain flexibility.

NOTE! In case of power the centrifuge from three phase network, during connecting of wires should use the phase sequence indicator to get the proper direction of drum rotation (indicated by an arrow on the centrifuge housing). To change the rotations direction to the opposite, should change places any two the phase conductors.

NOTE! Before connecting the centrifuge to power supply, check the drum it should rotate freely.

NOTE! Data about electrical power supply (voltage, power) are given on the centrifuge nameplate.

NOTE! If You have any doubts about how to connect the centrifuge to devices providing and receiving the centrifuged material You should contact with Nederman.

During commissioning the unit should be performed:

- Measurement of the phase currents of the motor winding during no-load operation.
- Measurement of vibration level device, which should not exceed 4,5 mm^2/s.
- Testing bearing lubrication system.
- Test the electromagnetic lock of door/cover of the centrifuge.

The corresponding data saved in the receiving protocol of the device.

9 Using the Swarf centrifuge

WARNING! Noise hazards
The purpose of the VD40 centrifuge is centrifugation of chips received from the other device, so employees working near the system should use hearing protection.

CAUTION! Poorly centrifuged swarf
Because the centrifuge is working in continuous mode, is very important, that the material was fed uniformly, in order to ensure a possible low the residual moisture level of chips centrifuged.

CAUTION! Centrifuge failure
Do not feed the material, if the centrifuge has not reached full rotations, because this may cause its destruction

CAUTION! Damage of the centrifuge drum
If the unit generates an atypical noise and/or vibrations, should turn off the unit, secured against accidental start-up and check the condition of the drum. Damage of the centrifuge drum caused vibration, power reduction and increasing the consumption of the drive shaft and bearings. See also chapter 12 *"Troubleshooting"*.

9.1 Before start-up

WARNING! Crushing hazard
Before starting the centrifuge, the door/cover and all guards must be thoroughly mounted, closed and secured.

WARNING! Crushing hazard
Before any kind of activity, the SAFETY REGULATIONS (Chapter 4) must be read carefully, and the safety regulations must be strictly adhered to.

9.2 Operating

Study Fig. **1** - *Material flow in centrifuge* - where a general description is provided.

Check the following points prior to putting into operation:

1. Free rotation.
   The drum should be able to be turned round by hand.
2. Motor loading.
   Check zero-load power and compare with power during loading and rating data of motor.
3. Observation of zero-load sound.
   Attention should be paid to the normal sound level of the equipment.
   NOTE! A screaming noise may be emitted by the V-belt when the drum is accelerating. This is normal.
4. Always start machine unloaded.
   If the machine is started when loaded then start load will exceed motor capacity. The centrifuge must not be fed until the correct speed of the drum is reached.
5. Feed the centrifuge evenly.

Since the centrifuge works continuously it is of great importance that it is fed evenly to ensure a level of residual moisture in the centrifuged swarf as low as possible.

The operator should always be aware of the normal power consumption of the motor, normal outflow of solid particles, the liquid content of the material and the level of vibration. By considering the above mentioned factors and observing modifications one can be quite sure that the centrifuge will function properly.

NOTE! The V-belt of the transmission may during accelerating of the centrifuge drum emit a noise, what is a normal state.

10 Maintenance

Read Chapter '**4** *Safety*' before carrying out maintenance.

Installation, repair and maintenance work is to be carried out by qualified personnel using only original Nederman spare parts. Contact your nearest authorized distributor or Nederman for advice on technical service.

NOTE! The service intervals in this chapter are based on the unit being professionally maintained.

10.1 Maintenance instruction

NEDERMAN Swarf centrifuge is very robust in design but should like every other production machine be regularly checked and maintained.

Daily checks should be made at the start of operations until a permanent maintenance schedule can be established. When this has been done only routine checks and general observations are necessary.

All parts coming into contact with the material which passes through the centrifuge are subject to wear. Negligent or delayed replacement of worn parts results in high repair costs and unsatisfactory separating of liquid.
A maintenance schedule should therefore be established which also indicates when it is time to replace worn parts. This schedule may only be drawn up by you since wear is highly dependent upon the ingoing swarf quality. A basic rule, however, is to check the screen, drum and housing once a month in the case of one-shift operations. Inspection takes place via the front hatch which is quickly removed.

10.2 Replacement and adjustment of drive belts tension

NOTE! Make sure that the main is switched OFF!

During replacement drive belts and adjustment of belt tension (see Fig. **8**):

1. Remove the belt protection [1] from the belt assembly.
2. Loosen the releasing bolt [2].
3. Tighten the drive belts by turning bolt clockwise [3] until the appropriate belt tension is achieved.
4. Tighten the releasing bolt [2].
5. Remount the belt protection [1].

10.3 Lubrication

The VD40 Swarf centrifuge has grease lubricated bearings and temperature is normally high, which is why high quality grease should be used.

CAUTION! Centrifuge failure
Lubrication intervals should be adjusted to current operating conditions, although should be at least every six months during one-shift operations.

NOTE! The used grease removed in accordance with local regulations.

10.4 Spare parts

Contact your nearest authorized distributor or Nederman for advice on technical service or if you require help with spare parts. See also **www.nederman.com**

Ordering spare parts

When ordering spare parts always state the following:

- Product serial number and Nederman reference number (see the product identification plate).
- Article designation - see Table **10-1**.
- Quantity of the parts required.

Table 10-1: Spare parts specification - see Fig. **7**

Pos.	Spare parts
1	Flexible (Rubber) Inlet (for wet chips)
4	Screen (with holes of diameter 0.7 mm as standard)
5	Drum
7	Vibration absorber (4 pcs)
8	Motor 4 kW (400 V AC, 50 Hz, 3-phase)
9	Shaft
10	Bearings (set)
9+10	Shaft (complete incl. bearings)
11	Sealing ring 125
12	Sealing ring 80
13	Shaft washer
14	Bulkhead plate (set)
15	V-Belt Pulley SPZ 132-3
16	Taper bushing type Taperlock 2012-28
17	Taper bushing type Taperlock 2012-42
18	V-Belt (3 pcs)

11 Recycling

The product has been designed for component materials to be recycled. Its different material types must be handled according to relevant local regulations. Contact the distributor or Nederman if uncertainties arise when scrapping the product at the end of its service life.

12 Troubleshooting

This trouble-shooting schedule only serves as a guide to probable reasons for faults. As mentioned earlier correct maintenance is the best insurance against the development of defects. To replacement and repairs should be used only original Nederman spare parts.

Table 12-1: Trouble shooting guide

Problem	Possible cause	Solution
Motor starts but drum stands still	Belts off	Replace belts
Motor protector fuses or motor sluggish (high power consumption)	Blown fuse	Check/replace fuse
	Motor fault	Replace motor
	Excess feed	Check that feed is not higher than indicated in order document
	Solid particles have piled up in centrifuge housing	Clean housing and check that free outlet is available for coolant and swarf
Too much swarf in coolant outlet	Worn or deformed screen	Replace screen
Too high level of residual moisture in centrifuged swarf	Screen blocked	Clean screen
	Screen damaged	Replace screen
	Excess feed	Check that feed is not higher than indicated in order document
To high level of vibration	Worn bearings	Replace bearing
	Screen damaged by component and swarf has collected at damage location	Replace screen
	Worn drum	Replace drum

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