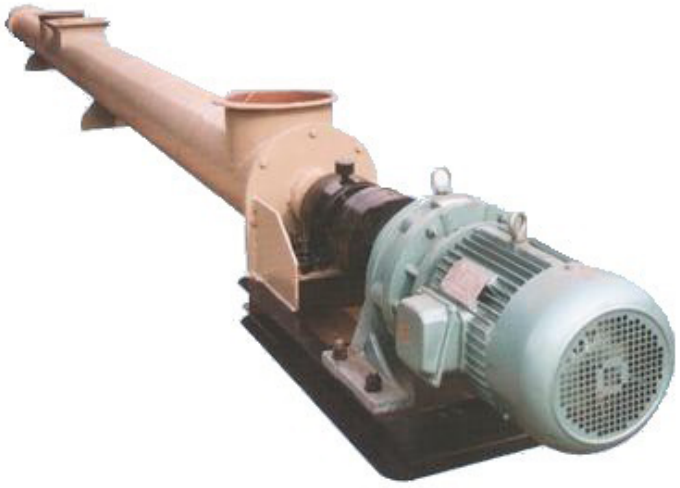
Nederman

Instruction manual

Equipment for dust collectors

Screw conveyor

PSR



Original instruction manual

EN INSTRUCTION MANUAL

Translation of original instruction manual

DA BETJENINGSVEJLEDNING
DE BEDIENUNGSANLEITUNG
ES MANUAL DE INSTRUCCIONES
FR MANUEL D'INSTRUCTION
PL INSTRUKCJA UŻYTKOWANIA
SV ANVÄNDARMANUA

2016-05-04

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Figures

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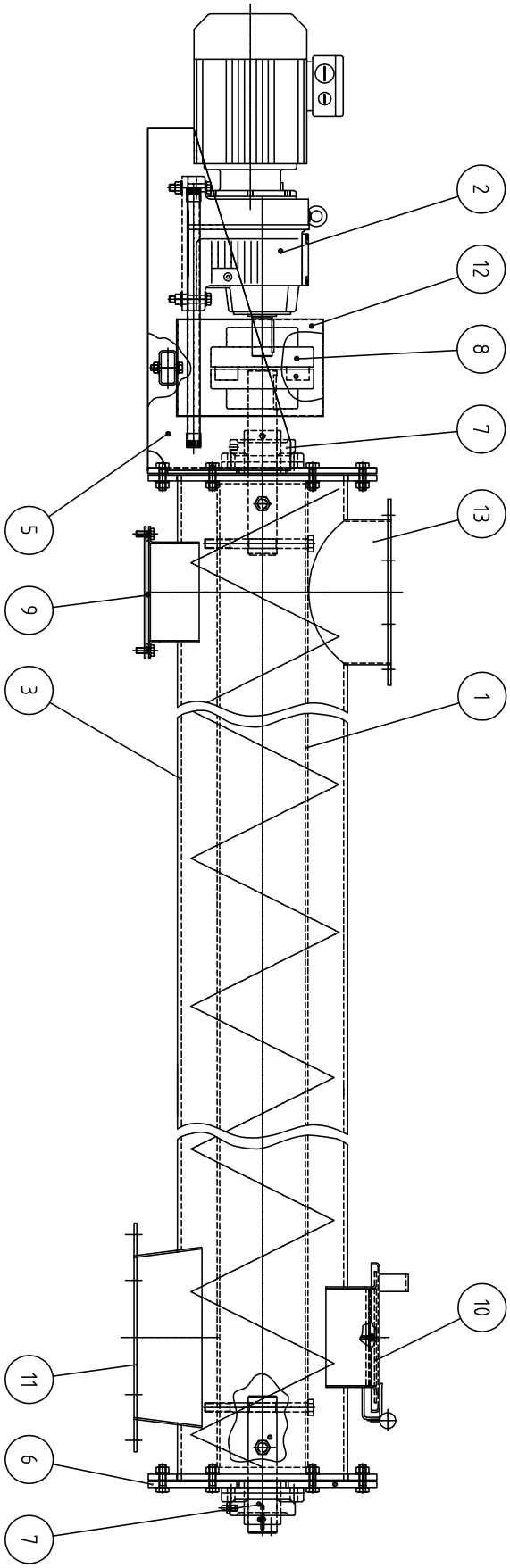

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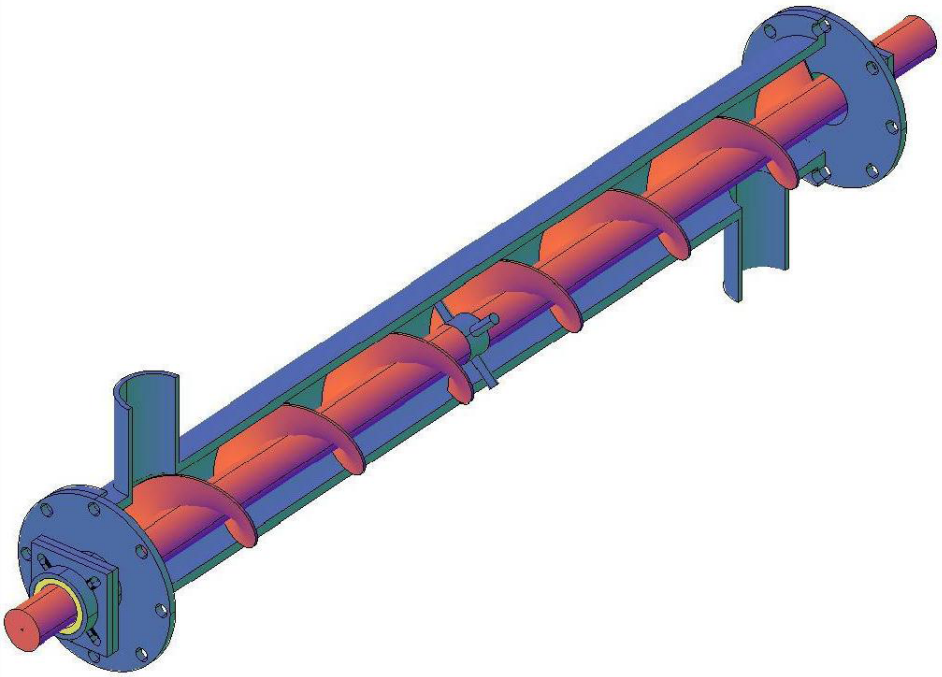

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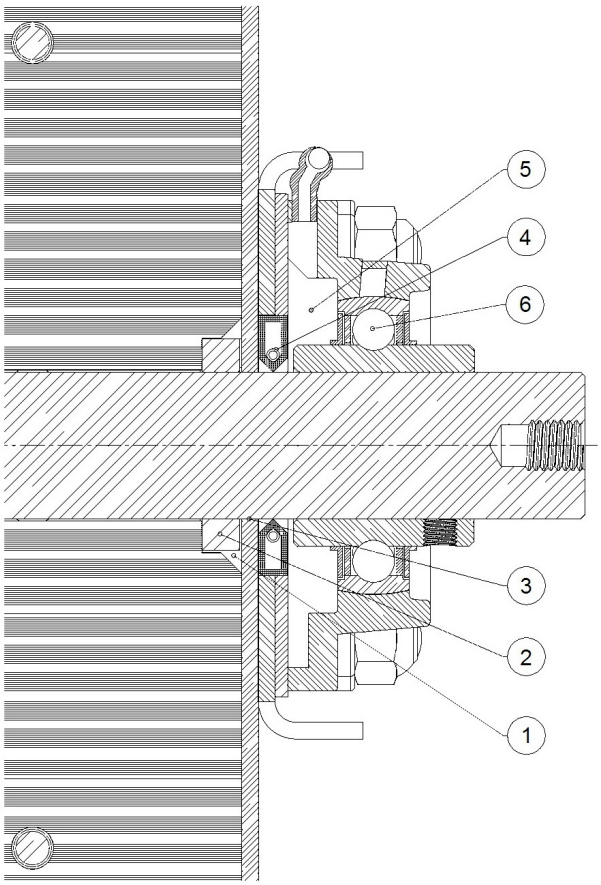

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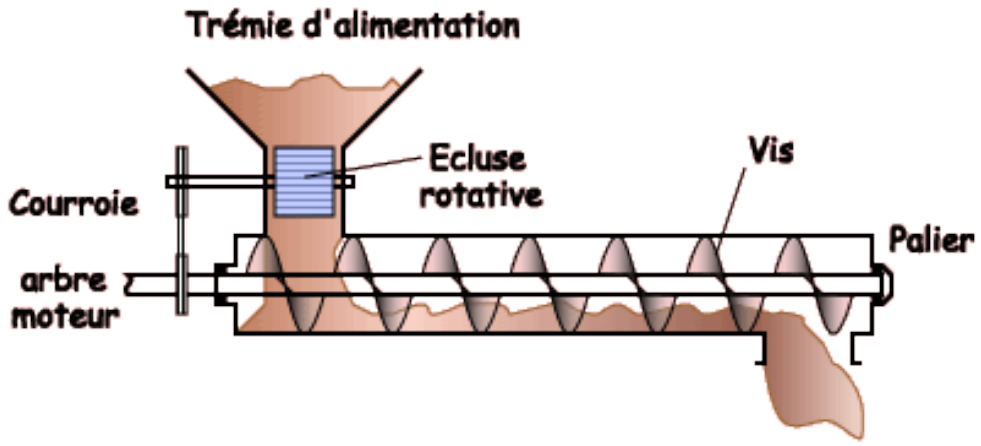
Trémie d'alimentation
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arbre moteur

English
Instruction manual

Equipment for dust collectors

Screw conveyor

PSR

Table of contents

1 Declaration of conformity

Below is presented a document setting out the contents of the EC declaration of conformity, not including the serial number and the signature of an authorized person. The formal Declaration is attached to your screw conveyor.

manufacturer's logo

DECLARATION OF INCORPORATION OF PARTLY COMPLETED MACHINERY

We,

NEDERMAN Manufacturing Poland Sp. z o. o.
ul. Okólna 45 A
05-270 Marki, Poland

herewith declare that

the machine:	**Screw conveyor**
type:	**PSR..**
serial number:	
year of manufact.:	

is in conformity with the provisions of the Directive **2006/42/EC** with exclusion of point **1.3.7 Annex I** until correctly installed according to the manual.

Proper engineering documentation for the above-named machine has been prepared according to Annex VII part B. Technical Dpt. Manager at Nederman Manufacturing Poland Sp. z o. o. is responsible for this documentation.

The product is also in conformity with other following directives:

- Low Voltage Directive **2006/95/EC**,
- Electromagnetic Compatibility Directive **2004/108/EC**,

and complies with harmonized standards relating to EC Directives:
EN 60204-1

NEDERMAN Manufacturing Poland Sp. z o. o. furthermore declares that the partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive 2006/42/EC.

The identity and signature of the person empowered to draw up the declaration

Marki, *date*

2 Preface

Your PSR screw conveyor has been produced 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.pl

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! Also 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.

3 Notices

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

NOTE! Disregarding NEDERMAN safety regulations entails a heavy safety risk.

These safety regulations cover safety in connection with the installation, operation, inspection and maintenance of any dedusting system in which the screw conveyor is to be installed.

Different precautions are included in the filter system. By using these according to their purpose and by following the safe practice during daily operation, the risk by using the filter system is minimized to the residual risk.

4.1 General safety precautions

Locking at main switch

The main switch (start switch) can be locked. This way unintended start of the system is ensured for example during inspection and maintenance.

Stop switch in inspection doors

The inspection doors in the filter may only be opened, when the filter is stopped.

The micro switches in the inspection doors must stop the system, if the inspections doors are opened during operation.

Locking of gangway

The gangway in front of the explosion relief doors must not be used during operation.

The gangway must be locked during operation.

Residual risk

Different safety precautions are included in the filter system. By using these according to their purpose and by following the safe practice during daily operation, the risk by using the filter system is minimized to the residual risk.

Residual risk are outlined the section: Operating Instructions.

Maintenance

NOTE! Maintenance must be performed to Nederman maintenance instructions.

Maintenance work may not be started until the total system has been stopped in a correct manner, and until the power supply has been cut in a safe manner, for instance by locking the main switch.

Inspection of the filter hopper section by opening the inspection doors may not be performed until the filter cleaning system has been activated thoroughly, and the hopper section emptied of material. In this connection, it must be checked whether the cleaning has been adequate by examining the residual dust settlement on the filter bags.

Inspection by opening inspection doors and similar may only be performed when personal safety equipment, adapted to the conditions, is used.

If a movable ladder is used for the work, it must be secured correctly for stability before commencing the work.

To prevent generation of static electricity in the filter system, it must be ensured that the filter and the connected ducts etc. are duly earthed.

Open fire, sparking or some other form of heat generation such as: Welding, grinding, drilling / boring or smoking, etc. may not take place closer than 3 meters to filters etc. working with an explosive atmosphere, such as dust laden air.

It must be ensured that cleaning is performed on and around filters etc. to prevent fire and explosive dust waste from igniting and causing heavy damage.

Service and Repair

WARNING! Electrocution hazard.
Before any servicing, mechanical or electric activities are commenced, one must always remember to disconnect the power supply. The switch is to be set at OFF and locked in this position (protected against switching on by unauthorized personnel).

WARNING! Injury hazard.
Appropriate lifting and protective equipment are to be used at all times.

NOTE! Service and repair may be performed by specially trained staff only.

Before starting any work, the energy supply must be switched off at the main switch, and it must be ensured that any unintended restarting cannot occur, for instance by locking the main switch. Accumulated energy, such as in compressed air system, must also be switched off, possibly discharged altogether, before commencing the work.

For service and repair work making it necessary to be in dust laden air, for instance in the filter hopper section, the following safety equipment must be used:

- Respiratory protective device, possibly with fresh air supply.
- Goggles, possibly a screen mask in connection with fresh air supply.
- Fire-retardant suit.
- Fire-retardant working gloves.
- Safety footwear.
- Safety helmet.
- Non-sparking tools wherever possible.

Inspection of the filter bags when staying at the filter top after opening of the explosion relief doors may be performed only when the filter system has stopped.

For this purpose, the personal safety equipment referred to above must also be used.

If the filter unit or similar device is cleaned by a vacuum cleaner, protection must be established against static electric charging in the suction arrangement.

Boring of holes in filter housing or adjoining pipe ducts may be made only when the system has stopped and been cleaned, while taking great care and without heat generation.

If any fault(s) should occur in the electric system, stopping the system, and restart is disconnected, the faulty component may not be by-passed to allow for further operation. Proper troubleshooting and repair must be performed before restarting.

Disposal of replaced components, dust/waste from cleaning, as well as other waste, must be performed to the guidelines for the particular materials. These guidelines have normally been established by the local authorities. In case of doubt, the person responsible for company safety must be consulted.

5 Description

5.1 Function

The PSR type screw conveyors are used to transfer a powdery material between two separate systems. In typical NEDERMAN dust conveying systems discharge is usually required from the dust collector to the silo or container, at atmospheric pressure.

This is an ideal application for that type screw conveyor.

Conveyor operation principle consists in rotation of screw surface jointly with shaft in relation to the tubular cross-section that makes the conveyor encasing. Such rotation brings permanent and uniform movement of the transported material along the trough. A rotating screw shaft makes the main conveyor section. It is situated in screwed or inter-welded troughs or in a steel that make the conveyor encasing.

Screw conveyor type PSR is designed to be incorporated as a part element of a complete material transport system.

5.2 Technical data

Due to their simple construction and easy operation, screw conveyors belong to the most often used group of equipment for transportation of loose material. Their design provides high durability and reliability.

Conveyors type PSR are designed to relocate of loose materials in horizontal direction or at slight slope (up to **20** degrees).

They are applied for transport of dusts and other fine-grained or fine pieces of loose, powdered and non-gluey materials properties.

Noise level: < 70 dB(A)[1].

NOTE! Transportation of other type materials, for instance of large size, strongly abrasive and easy crumbling pieces occur, can be of negative impact on conveyor durability and efficiency or can cause its damage.

Table 5-1: Approximate capacities of screw conveyors type PSR [m^3/h]

	Rotary speed* [RPM]	Capacity [m^3/h]	
		PSR 200	PSR 250
1	21.5	2.4	4.7
2	25.5	2.9	5.6
3	27.0	3.1	6.0
4	43.5	5.0	9.6
5	59.0	6.7	13.0
6	78.0	8.9	17.2
7	118.0	13.4	26.0
8	164.5	18.6	36.2

** Rotary speed values (RPM) of typical gear motors offered (see Table 5-2 for details)*

Capacities shown above refer to the standard conditions showing in table 5-1.

1. Measurement based on ISO: 3744.

Table 5-2: Load conditions of PSR Screw conveyor.

Filling level	Conveying resistance coefficient
0.3	3.75

Table 5-3: Typical drives (gear motors) used in conveyors type PSR.

	Item ID	Motor power [kW]	RPM	Case type	Type	Producer
1	114536	1.1	21.5	B3	BG 50-11/D09 SA4	Bauer
2	114535	1.5	27.0	B3	BG 50-11/D09 LA4	Bauer
3	114534	2.2	25.5	B3	BG 60-11/D09 XA4	Bauer
4	114532	2.2	43.0	B3	BG 50-11/D09 XA4	Bauer
5	114531	3.0	43.5	B3	BG 50-11/D11 SA4	Bauer
6	114530	3.0	59.0	B3	BG 50-11/D11 SA4	Bauer
7	114533	4.0	78.0	B3	BG 50-11/D11 MA4	Bauer
8	114542	5.5	118.0	B3	BG 50-11/D11 LA4	Bauer
9	115510	7.5	164.5	B3	BG 50-11/D13 MA4	Bauer

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.

In the case of all conveyor types of up to 8 m length the shaft is provided with bearings at the both ends. In the case of all longer conveyors, so called combined trough conveyors, the shaft is additionally furnished, besides bearings at its ends, with so called supporting bearings at one or two points along its length.

Shaft is driven with motorized speed reducer through flexible coupling. Casing of the first screw shaft bearing as well as the motorised speed reducer base and the second bearing case are screwed to terminal flanges of the conveyor encasing. Bearings are furnished with a set of seals to protect against dust penetration

The structure of type PSR screw conveyor and its main components are shown on Fig. 1. The units and named in Tab. 6-1. Some components are specified more detailed in Chapter 10.1 as spare parts.

Table 6-1: Main parts of the screw conveyor type PSR.

Pos. Fig.1	Name	Notes
1	Screw	Two types: outer dia **200** mm or dia **250** mm
2	Gear motor	For details see Table 6-2
3	Tubular casing	
4	-	(pos. intentionally blank)
5	Base plate	
6	End plate	
7	Bearing set, contains the seal plate	2 Pcs per standard conveyor
8	Shaft coupling	With two Taper Lock bushes for fixing the clutch to the shafts
9	Inspection opening with cover	
10	Flanged inlet	
11	Flanged outlet	
12	Clutch housing	Consists of two segments: upper and lower
13	Inlet spigot with flange	

Table 6-2: Data of gear motors used in screw conveyors type PSR.

	Item ID	Motor power [kW]	RPM	Case type	Type	Producer
1	114536	1.1	21.5	B3	BG 50-11/D09 SA4	Bauer
2	114535	1.5	27.0	B3	BG 50-11/D09 LA4	Bauer
3	114534	2.2	25.5	B3	BG 50-11/D09 SA4	Bauer
4	114532	2.2	43.0	B3	BG 50-11/D09 XA4	Bauer
5	114531	3.0	43.5	B3	BG 50-11/D11 SA4	Bauer
6	114530	3.0	59.0	B3	BG 50-11/D11 SA4	Bauer
7	114533	4.0	78.0	B3	BG 50-11/D11 MA4	Bauer
8	114541	5.5	37.0	B3	BG 60-11/D11 LA4	Bauer
9	114542	5.5	118.0	B3	BG 50-11/D11 LA4	Bauer
10	115510	7.5	164.5	B3	BG 50-11/D13 MA4	Bauer

7 Before installation

7.1 Delivery checks

Ensure that the machine has been delivered undamaged. In case damage or missing parts are found, inform the carrier and a local representative of NEDERMAN company.

7.2 Transport and packaging

WARNING! Injury hazard.
Risk of being crushed/pinned down by falling objects. Care must be taken when lifting, moving and assembling the machine. Appropriate lifting tools and protective measures must be applied.

WARNING! Risk of dropping.
Pay attention to the position of centre of gravity and fastening in transport.

Transport can be carried out using normal pallet handling equipment. When using a crane lift, the lifting slings must be fastened to two lugs located inside the trough (near the centre of gravity).

Despatch may be effected by all means of transport normally used. For sea carriage, supplementary protection should be considered.

Screw conveyor type PSR is typically mounted to the outlet of the dust collector hopper but might be packed and transported separately on a wooden pallet.

8 Installation

8.1 Installing screw conveyor

The screw conveyor is mounted by fastening to material inlet and material outlet to the round flanges of the screw conveyor. If inlet / outlet do not have sufficient stability for the normally occurring loads from the rotary motion of the screw conveyor, including start-up, additional stiffening should be made. These stiffening elements must be fastened to the flanges.

When mounting inlet and outlet, avoid jutting edges, flats, and similar which may inhibit the free material flow. Apply the sealing material delivered by supplier between the mating flanges.

The placing of the screw conveyor appears from a plant view plan, allowing for servicing to be performed, including dismantling of motor and rotor, and allowing for power connection to be made.

When placing in places at the risk of inadequate cooling of the electric motor, another placing should be considered, external cooling established, or special thermal protection considered.

8.1.1 Electrical connections

Connection of power supply to the conveyor drive should be made by qualified electricians and in accordance with adequate local regulations as well as with the motors manufacturer's instructions.

Power supply connection should be made in a way not providing stretched conductors. Align the motorso as to avoid water penetration along the conductor to the motor connection box interior.

Connect the electric motor of the conveyor according to the power current regulations in force and make earthing.

NOTE: Connect the power supply with regard to correct direction of rotation. To obtain that, use of phase sequence indicator is highly recommended.

9 Using the screw conveyor

9.1 Before start-up

During operation, it must be necessary for the screw to rotate in a fixed direction (shown on the gear motor housing with an arrow).

Before putting into normal operation, check ampere consumption during an idle running (without transporting the material) and then re-check the consumption while material loading.

After completing mounting, check that there is an electric connection between material inlet and material outlet so that no static electricity can arise.

9.2 Operation

Screw conveyor type PSR has been designed to be incorporated as a part element of a complete material transport system and / or complete dust collecting installation.

Operation, such as start stop of the screw conveyor, does not occur in normal working situations. The screw conveyor will normally be controlled by a central control system for the material transport or dust collecting installation of which the screw conveyor forms part.

10 Maintenance

NOTE! Before any kind of activity, the ‘Chapter 4 - SAFETY’ must be read carefully, and the safety regulations must be strictly adhered to.

10.1 Planned 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.

If any deviations are made from the safety regulations, this may cause serious personal injury. Before restarting, guards, hatches/doors etc. must be closed / reestablished. The following elements are to be maintained regularly at the intervals stated. The briefest interval shall apply. If any wear or similar is found, the faulty parts must be replaced.

Table 10-1: PSR type screw conveyor maintenance intervals.

Pos.	Maintenance description	Months	Operating hours
1	Clean gear motor of any dust depositions and similar	1	500
2	Check trough, coupling, shaft seals outside for wear, tramp material, and similar	6	1000
3	Check trough inside for wear, tramp material, and similar	6	1000
4	Check and grease the bearings of the screw conveyor (T < 70°C)	6	1000
5	Check and grease the bearings of the screw conveyor (T > 70°C)	1	150
6	Check gear motor for oil waste	6	1000
7	Check connected transport ducts for wear and similar	6	1000

* See the further information in this chapter for more detailed instructions

Filling up the grease chamber:

See Figure 3, pos. 5.

Between the bearing and the end plate of the screw conveyor there is a chamber which when filled up with grease prevents the material from getting into the surroundings. The chamber is filled via the lubricator nipple near the end plate of the screw conveyor. The grease mentioned in Table 10-2 shall be used.

Greasing the bearings of the screw conveyor

The screw conveyor are supplied with bearings filled up with grease lubricant as shown in Table 10-2. Regrease with the same or a similar grease type.

Table 10-2: Lubricants for screw conveyor PSR

Bearing operation temperature [deg C]	Trade name	Producer	Classification
< 120°C	LitWay™ 43	Statoil®	WT-30/99/Statoil
	Greasen ŁT-4S3	Orlen Oil	ISO6743/9: BDEA-3
> 120°C	Bentomos 23	Orlen Oil	ISO6743/9: BDEB-2
	LOCTITE® 8102™	Loctite®	NLGI class 2

Gear Motor:

The gear motor is lubricated for life and demand no further maintenance. In case of oil waste the gear motor must be changed. For details see the separate manual for gear motor.

Dismantling

Dismantling may be performed after an external lift (for instance a crane) has been established, and the screw conveyor has been cleaned inside of toxic, explosive or otherwise dangerous material.

After cleaning the rotor (screw) the conveyor consists of steel, rubber, copper, lubricant, plastic, and paint.

10.2 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:

- Conveyor type and serial number (see the product identification plate).
- Part (item) number and name of the spare part.
- Quantity of the parts required.

Table 10-1: Spare parts for screw conveyor type PSR.

Pos.	Name	Item No.	Notes
1	Screw, ext. dia 200 mm	depends on length	for type PSR 200
1	Screw, ext. dia 250 mm	depends on length	for type PSR 250
2	Gear motor	114XXX	see Table 6-2
7	Bearing UCF 210	107305	T < 120°C, with seal plate DP-50
8	Shaft coupling, type Poly-Norm® AR 85 KTR*	114979	without Taperlock bushes 8.1, 8.2
8.1	Taperlock bush 2517-40	18030.640	
8.2	Taperlock bush 2517-50	18030.650	
12.1	Shaft coupling housing - upper part	107935	
12.2	Shaft coupling housing - lower part	107941	
14	Seal for plates and flanges	100418	ceramic rope dia 6 mm, not shown
16	Remote rotation sensor 10-55VDC 3 wire	101722	drive stall detection - optionally, not shown

* For technical data and mounting instructions see producer's site KTR®: **www.ktr.com**

NOTE! Always use the original spare parts from NEDERMAN or components recommended and approved by NEDERMAN.

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.

After cleaning the rotor (screw) and the trough of the conveyor, worn and scrap equipment consists of steel, rubber, copper, lubricant, plastic, and paint. Those components should be disposed according to your local environmental regulations.

12 Troubleshooting

NOTE! All troubleshooting and fault remedying activities may by performed by skilled competent staff only, with knowledge of the plant function and build-up.

Safety regulations (see Chapter 4) should be read before commencing activities, and be observed during performance

NOTE! Before restarting, all guards, doors/hatches, etc. must be reestablished. The screw conveyor must be examined carefully after an evt. explosion / fire. If the screw conveyor is not completely without damages and without visible changes, the screw conveyor must be replaced in order to preserve the security level.

Troubleshooting Assistance

If the trouble shooting guide as shown in 'Table 12-1: Trouble shooting guide' does not solve the problem, contact your nearest authorized distributor or Nederman for technical assistance.

Table 12-1: Trouble shooting guide

Fault	Possible cause	Solution proposal
Screw shaft does not rotate	Motor of the screw conveyor disconnected by overload protection (thermally)	Identify and remove the cause the overload (see fault: Screw conveyor disconnected thermally) then switch on the protector
	One of the shaft keys cut off	Replace broken key
	Gear motor faulty	Replace gear motor
	Overload (thermal) protection switch faulty	Replace overload protection switch
	Faulty fuse (motor switch)	Replace the fuse
Screw conveyor disconnected thermally	Tramp material or some hard piece jammed between the screw and the trough	Remove tramp material or hard piece
	Material on the screw frozen	Thaw with hot air or water
	Actual material volume per time unit larger than conveyor capacity planned	Reduce material volume supplied
	Sized or damaged bearing	Replace faulty bearing, fill it up with lubricant acc. to instructions - see Chapter 10 - Maintenance. Lubricate bearings frequently.
	Excessive voltage drop in power supply	Replace cables to larger square
	Overload (thermal) protection preset wrongly	Adjust overload protection

Fault	Possible cause	Solution proposal
Screw conveyor produces an “screeching” sound	Jammed tramp material	Remove tramp material
	Screw shaft faulty (deformed)	Replace faulty parts
Material cannot pass the conveyor and makes excessive accumulations	Material volume per time unit larger than conveyor capacity planned	Reduce material volume supplied
		Replace the gear motor with higher rotation speed and adequate power
	Material not being removed quickly enough at screw conveyor outlet side	Check emptying system function

13 Acronyms and abbreviations

Appendix A: Installation protocol

Copy the installation protocol, fill it in and save it as a service record.

For values, note the value in the result column, otherwise a tick will suffice if the item has been performed or considered.

NOTE! If a value is outside the limit or a result is incorrect or missing, this must be rectified before the initial start-up and normal operation.

Unit No.	Date:	
	Performed by:	

Control items	Reference	Result	Notes

Appendix B: Service protocol

Copy the service protocol, fill it in and save it as a service record.

For values, note the value in the result column, otherwise a tick will suffice if the item has been performed or considered.

NOTE! If the results of the checks (for example, measured values) differ significantly from previous results, investigate more carefully.

Unit No.	Date:	
	Operating hours:	
	Performed by:	

Control items	Reference	Result	Notes

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