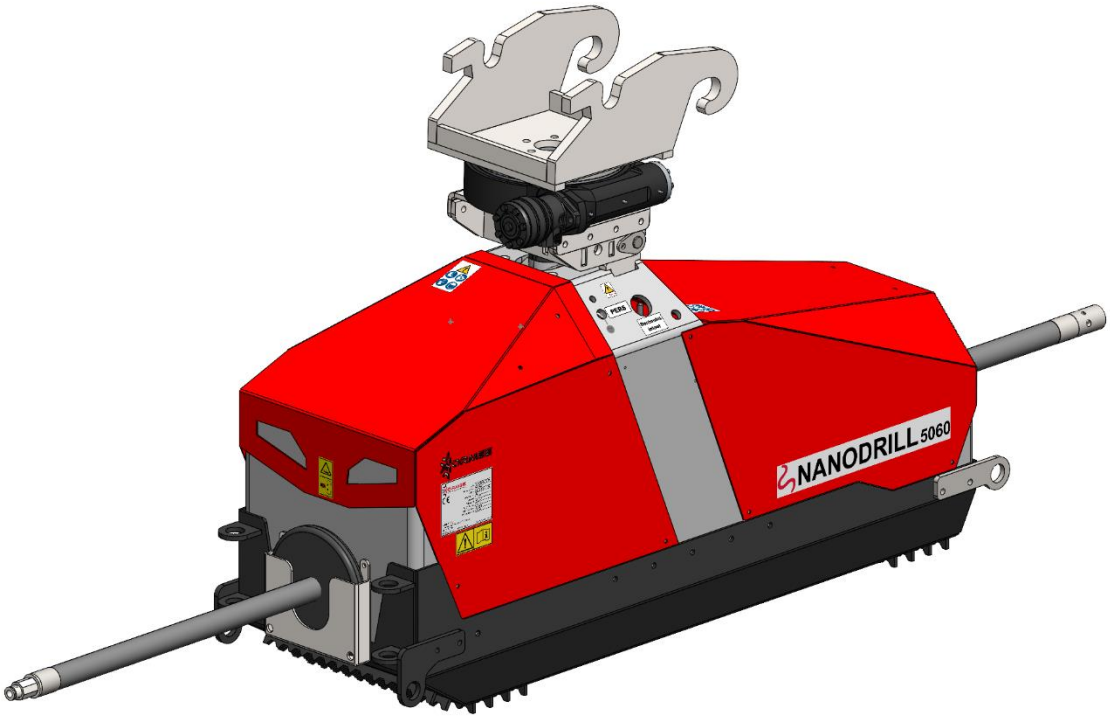
User manual

NANODRILL 5060



Version 20241610

Translation of original manual

KORMEE reserves the right to change parts at any time without prior or direct notification to the customer. The content of this user manual is also subject to change without prior notice. For information regarding setup, maintenance operations or repairs not provided for in this user manual, please contact your supplier's technical service department.

Information in this document is believed to be accurate and reliable. However, the manufacturer does not give any representations or warranties for its completeness, accuracy, usefulness or timeliness. KORMEE cannot be held liable for direct or indirect damage as a result of errors in this User Manual.

If you have any doubts, questions or other issues about operating the Nanodrill 5060 after reading this manual, please contact your dealer or KORMEE BV before first use.

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EG declaration

KORMEE mechanical engineering

EG declaration of conformity

Concerning Machinery, according to Directive 2006/42/EC, Annex II, Part 1-A.

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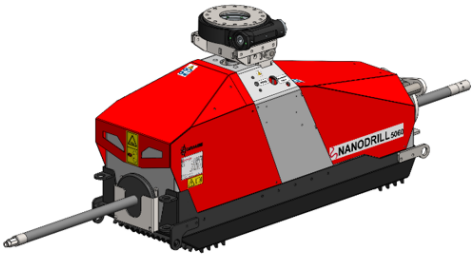

Hereby declares that the interchangeable attachment:

Name: NANODRILL
Function: Performing Horizontally Controlled Drilling
Model: 5060
Serial number:
Year of construction:

Under applicable restrictions:

- **Coupling only to mini excavators that meet the specified requirements:**
  - Correct permissible lifting load and load distance: 320kg at min 1.75m from pivot point,
  - 0.25m-0.75m from the ground;
  - Hydraulics: max 35L/min, max 230 Bar;
  - Correct hose connections: 1/2" Male and Female connections;
  - And other requirements mentioned in the manual.

Complies with all the applicable provisions of the following directive(s):

- DIRECTIVE 2006/42/EC (Machinery Directive)

Where applicable, the following harmonised and other standards were used:

- NEN-EN-ISO 12100 (Safety of Machinery)

Place: Rhenen
Date: 18-03-2024

Name: P. Korpershoek
Function: Director

Signature:

Growing by innovation

FIGURE 1 - EG- DECLARATION (EXAMPLE)

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Overview

Details of the NANODRILL 5060.

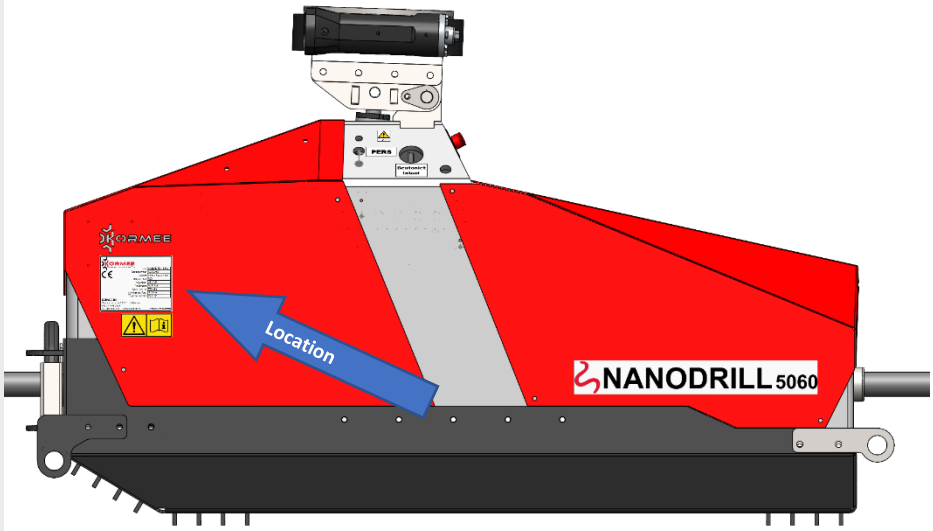

FIGURE 2 - NANODRILL 5060 WITH LOCATION OF IDENTIFICATION PLATE

Type designations:

1. NANODRILL 5060

Overview of main components:

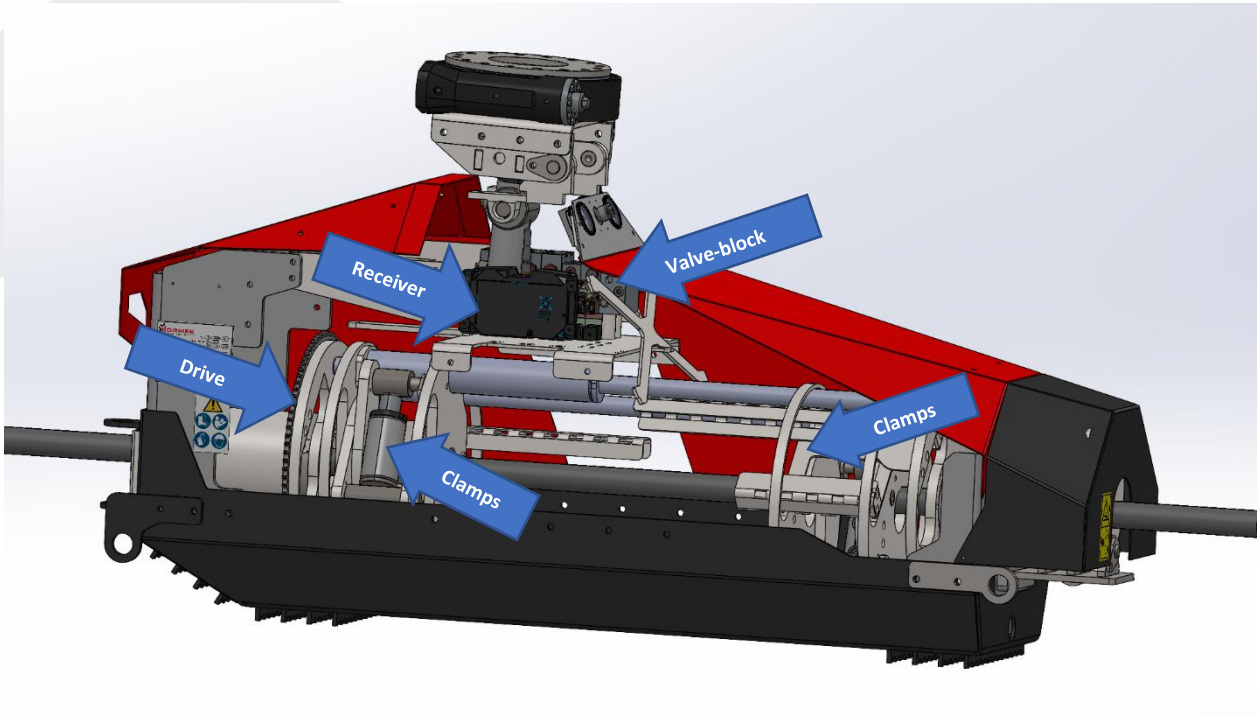

FIGURE 2 - NANODRILL 5060 KEY COMPONENTS

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Foreword

We thank you for purchasing and using KORMEE equipment.

This manual is an integral part of your equipment and provides safety information and operating instructions for the use and maintenance of your KORMEE machine.
Please read this manual before operating the machine. Always keep the manual with the machine for reference. If you sell the machine, always include this manual.
If you need a new manual, visit our website at www.KORMEE.nl or write to the following address:

KORMEE BV
Attn: Sales
Remmerden 13-A
3911 TZ Rhenen
Netherlands

We hope you enjoy working with our equipment and please do not hesitate to contact us with feedback and suggestions.

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Content

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Introduction

Make sure that all persons operating and maintaining the machine are familiar with the contents of this manual and are trained on the correct operational and handling procedures of the NANODRILL 5060.

For information regarding malfunctions, maintenance work or repairs not covered by this manual, please contact KORMEE BV.

Explanation of symbols on the machine or in the manual

The following warning categories, together with the symbols described in chapter 1.1, alert you to potentially dangerous situations for you, bystanders on the work site and the equipment. If you see these words and pictograms in the manual or on the machine, read and follow the corresponding instructions carefully. YOUR SAFETY IS AT STAKE.

Pay attention to three levels of warning: **DANGER**, **WARNING** and **CAUTION**. Learn the meaning of each level.

DANGER indicates a hazardous situation that, if not avoided, will result in serious injury or death. This signal word is restricted to the most extreme situations.

WARNING indicates a hazardous situation which, if not avoided, could result in serious injury or death.

CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

In addition, pay attention to two other words: **ATTENTION** and **IMPORTANT**.
ATTENTION indicates information that is important but not related to danger (such as messages related to material damage).

IMPORTANT can help you do your job better or easier.

	Manual Please consult this User Manual before use and when in doubt. **READ SERVICE PAPERS DURING SERVICE WORK!**
	Focus on reading the manual and using Personal Protective Equipment (PPE) **READ THE MANUAL FOR REQUIRED PPE**

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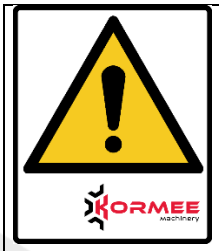
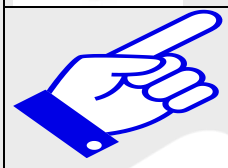
	CAUTION: general hazard
	CAUTION: Be aware of moving and rotating parts such as sprockets, gears and V-belts **KEEP A DISTANCE FROM THE ROTATING DRILL ROD**
	Do not clean with high-pressure sprayer. **DO NOT HOSE DOWN THE MACHINE**
	Indication lubrication point/ grease nipple
	Indication of a point of interest in the manual. **IMPORTANT TO READ**
Where necessary, the above symbols are also displayed on the NANODRILL 5060 and in this manual.	

TABLE 1 – SYMBOLS ON THE MACHINE

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1. General description of the machine

The NANODRILL 5060 is an attachment for horizontal directional drilling, designed to install underground cables and pipes over distances of up to 80 meters. The NANODRILL 5060 is equipped with CW05 quick-change plates and operates using the mini excavator's hydraulics. It is operated by remote control.
The requirements for the coupled situation and specifically for the mini excavator are listed below. Any non-compliant machines or procedures other than those described herein may not be used without explicit prior consent of KORMEE BV, otherwise KORMEE BV's responsibility, warranties and liabilities as manufacturer lapse.

1.1. Requirements for coupled situation

NANODRILL 5060 is coupled to a mini-excavator that must meet the minimum requirements described below.

KORMEE BV retains the role of manufacturer of the Nanodrill 5060 when used in combination with a mini excavator, provided the following conditions are met:

- The NANODRILL 5060 is coupled to the Mini Excavator, in accordance with the instructions in this manual.
- The Mini-Excavator complies with the stated minimum requirements mentioned in this chapter.
- The Mini Excavator is maintained in accordance with the operating instructions of the Mini Excavator manufacturer.
- The Operator is aware of the contents of this operating manual as well as the operating manual of the mini excavator, with emphasis on the risks and hazards stated therein, as well as the inspection and maintenance aspects.

KORMEE BV remains at all times manufacturer of the NANODRILL 5060 as interchangeable equipment, subject to the provisions of Chapter 7. In principle, KORMEE BV assumes the role of manufacturer in the event that the mini-excavator complies with the stated requirements mentioned in this chapter.

1.2. Requirements for the mini-excavator

This section covers the requirements for the mini-excavator to which the NANODRILL 5060 interchangeable attachment is coupled.

1.2.1. Technical requirements mini excavator

Quick-change connection	CW05
Lifting load and load distance	See Figure 4 - Lifting load and load distance (next page)
Hydraulic flow	90L/min max
Hydraulic pressure	220 Bar max
Hydraulic hose connections	1/2” Male (1x) en 1/2” Female (1x)

TABEL 2 – TECHNICAL REQUIREMENTS MINI-EXCAVATOR

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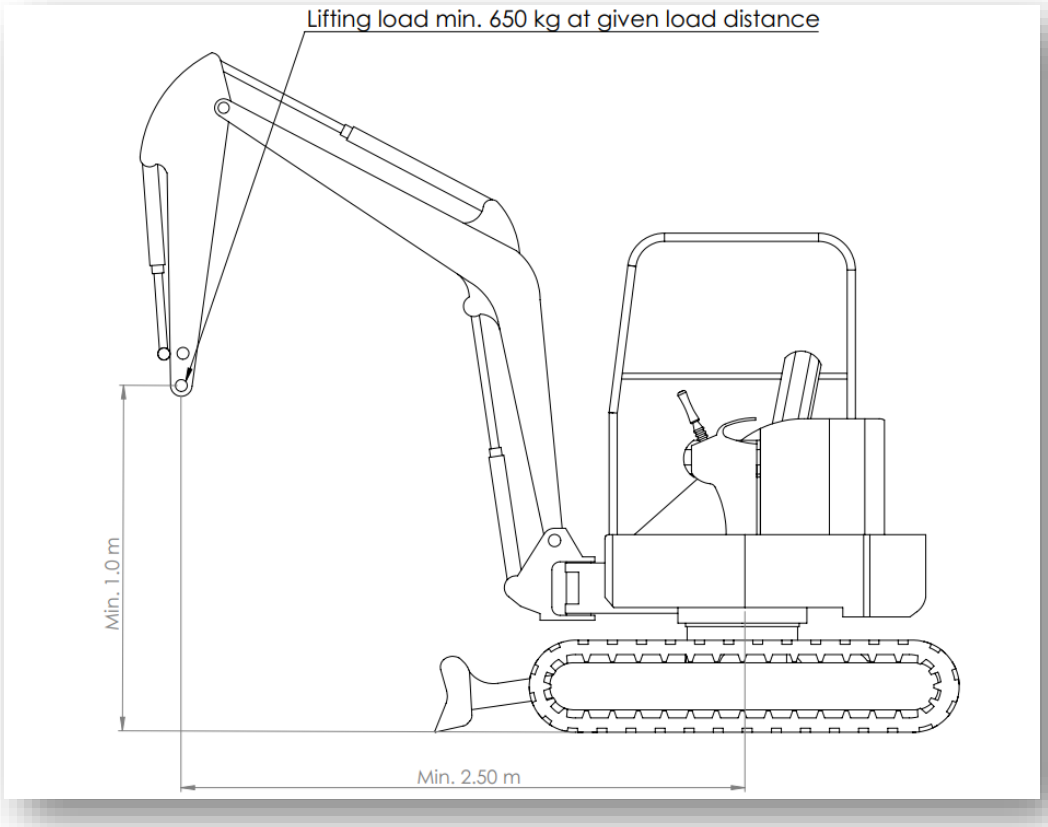

FIGURE 3 - LIFTING LOAD AND LOAD DISTANCE

1.2.2. Requirements for the Quick Coupler

A mini excavator with quick coupler and attachment can cause serious damage or personal injury if improperly used or inadequately maintained.

Therefore, before putting the quick coupler into operation - but at least daily - check the following points:

1. The quick coupler must not be damaged, bent or cracked.
2. Do not use the quick coupler if the suspension pins, key, adapter plates or other parts are bent, cracked or show noticeable play.
3. All lubrication points must be well greased.
4. Lift the excavator arm off the ground and move the bucket cylinder completely out and in. The quick coupler should not scrape or jam anywhere against the machine structure or pressure piece.
5. For a hydraulic quick coupler: check the hydraulic cylinder and connections for leaks.
6. Before using the excavator, check that the attachment is correctly attached to the quick coupler. The pins of the quick coupler must fit free of play in the adapter plates.

As long as the quick coupler is not mounted and secured in the prescribed manner, it is forbidden to work with the machine.

1.2.3. Safety requirements on the mini excavator

The mini-excavator should be equipped with an option to control the hydraulic power function externally while the safety lever is raised. This ensures that the other functions of the mini-excavator cannot be operated.

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2. Safety

KORMEE has made every effort to manufacture equipment that meets the highest safety standards and to inform you as correctly and completely as possible about possible dangers when handling the NANODRILL 5060. This information can be found in this user manual. You are responsible for observing these rules of conduct.

Nevertheless, Kormee wishes to emphasize the importance of correct handling of the NANODRILL 5060. KORMEE products are equipped with safety and protection devices, but always be aware that potential risks when working with or in the vicinity of a MIPO 1005 are high.

Store the manual always near the machine

2.1 Intended and unintended use

The NANODRILL 5060 is an attachment for horizontal directional drilling, designed to install underground cables and pipes over distances of up to 80Mtr, depending on soil conditions, and intended for operation in ambient temperatures from 0 to 46°C. Any other use is considered contrary to the intended use.
The NANODRILL can be used with the MIPO2015/2018 (or otherwise sold) drilling fluid pump system and various positioning equipment. It must only be operated, maintained and repaired by qualified persons familiar with its special characteristics and are familiar with the relevant safety procedures.

Different use is only possible after consultation with KORMEE BV and can only be done if the described user manual has been adapted to the new requirements.

DANGER - be aware of forces, cables and pipes underground

Equipment modifications: This equipment has been designed and manufactured in accordance with applicable standards and regulations. Making unauthorized modifications to the equipment may result in the NANODRILL 5060 no longer complying with the regulations and possibly not functioning properly or at all according to the operating instructions. Changes to the equipment may only be made by competent employees who are familiar with the relevant standards, regulations, functionality/requirements of the design and any special tests required, and after consultation with KORMEE BV.

2.2 Safety equipment

Safety devices fitted by the supplier of the NANODRILL 5060 must not be removed or blocked during operation. This machine is equipped with the following safety devices:

- Shields at the location of dangerous machine parts
- Labels warning users of potential hazards
- Sealed enclosure
- Emergency stop device

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2.3 Safety measures

To operate the NANODRILL 5060 safely, the following general safety precautions should be followed:

- As owner of the NANODRILL 5060, it is your responsibility that persons operating or maintaining the NANODRILL 5060 are adequately qualified to do so.
- During operations, unauthorised persons are prohibited from being in the vicinity of the NANODRILL 5060.
- Identify the risks of the working environment and take the measures necessary to maintain safety.
- Provide a safely cordoned off work area.
- Ensure that unauthorised persons, especially children or animals, cannot gain access to the NANODRILL 5060.
- Wear close-fitting clothing. Avoid with loose clothing (such as scarves), neck and arm jewellery, rings and long hair.
- Always wear your PPE (personal protective equipment).
- Safety devices should never be removed or rendered inoperative.
- Keep the workplace clean.
- Ensure adequate ambient lighting.
- Convince yourself of the correct operation of the NANODRILL. Replace or repair parts if necessary.
- Contact KORMEE BV or your dealer if you have any questions about the operation, maintenance or use of the NANODRILL 5060.

2.4 Procedures in case of emergency

Before working with the machine, go through the emergency procedures and check that all safety measures have been taken.

When working near power lines, keep the following in mind:

- Electricity follows any path to earth, not just the path of least resistance.
- Pipes, hoses and cables conduct electricity back to all equipment.
- Low-voltage current can cause serious or fatal injuries. Many electrocutions at work result from contact with voltages of less than 440 volts.

Usually, an electrical strike on the work site is not noticeable, but the following may indicate a strike:

- power failure
- smoke
- explosions
- an arc of light

If any of these situations occur, assume that an electrical strike has occurred. Work site hazards can cause serious injury or death. Use proper equipment and apply proper working methods. Use and maintain proper safety equipment. Contact with power lines results in serious injury or death. Be familiar with the location of cables and stay away from them.

STOP IN CASE OF EMERGENCY - Press the EMERGENCY STOP-button, on the remote controller and switch off the mini-excavator.

If you suspect that an electrical line has been damaged and you are on the drill or earthing equipment, STAY IN PLACE.

The order and extent of operations depend on the situation.

- Warn everyone in the area that a strike has occurred.
- Have someone contact the utility company.
- Reverse the direction of drilling and try to break the contact. Do not touch the drill pipe with your hands or with tools you are holding. Wait for the utility company to cut the power.
- Do not continue drilling and do not allow anyone onto the site until the utility company gives permission to do so.

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If you suspect that an electrical line is damaged and you are not on the drill or grounding equipment, DO NOT TOUCH ANY MATERIAL connected to the drill. Act as follows.

The order and extent of actions depend on the situation.

- Stay where you are unless you are wearing electrically insulated shoes.
- If you leave, do not return to the site and do not allow anyone onto it until authorised by the utility company.

If you suspect that a gas pipe has been damaged, act as follows.

The order and extent of operations depend on the situation.

- Turn off the engine(s) immediately if this can be done safely and quickly.
- Remove any ignition sources if this can be done safely and quickly.
- Warn others that a gas pipe has been hit and that they should leave the site.
- Leave the work area as soon as possible.
- Call the local emergency telephone number and utility company immediately.
- If the work site is on a street, make sure that no traffic comes near the work site.
- Do not return to the work site until permission has been granted by the emergency service and utility company.

If you suspect that an fibre-optic cable has been damaged, DO NOT LOOK IN THE CUT-OFF ENDS. This can cause serious damage to the eyesight. Contact the utility company.

If the machine catches fire, perform the emergency stop procedure and then act as follows.

The order and extent of the actions depend on the situation.

- Immediately turn the battery switch (if present and accessible) to the off position.
- If the fire is small and an extinguisher is available, try to extinguish the fire.
- If the fire cannot be extinguished, leave the site as soon as possible and alert the emergency service.

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2.5 Emergency stop device

An emergency stop device is fitted on the NANODRILL remote controller, which stops the actuation of the NANODRILL.

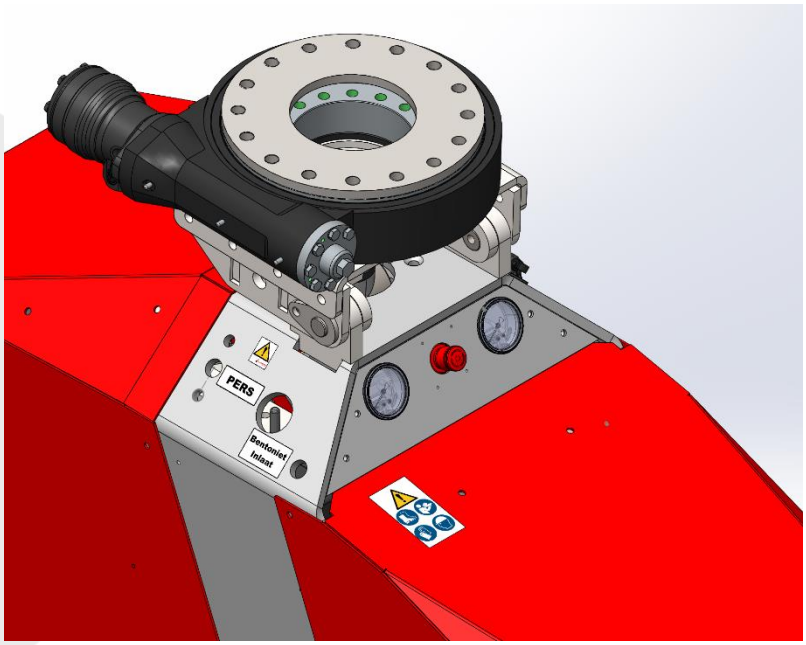

FIGURE 4 – EMERGENCY STOP DEVICE ON REMOTE CONTROLLER

An emergency stop device is also fitted on the NANODRILL itself.

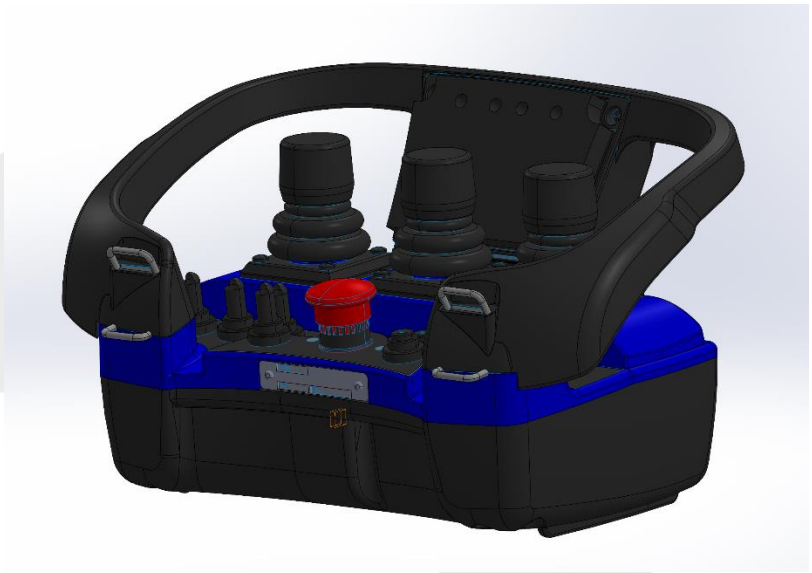

FIGURE 5 – EMERGENCY STOP DEVICE NANODRILL 5060

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2.6 Warnings and instructions for the machine

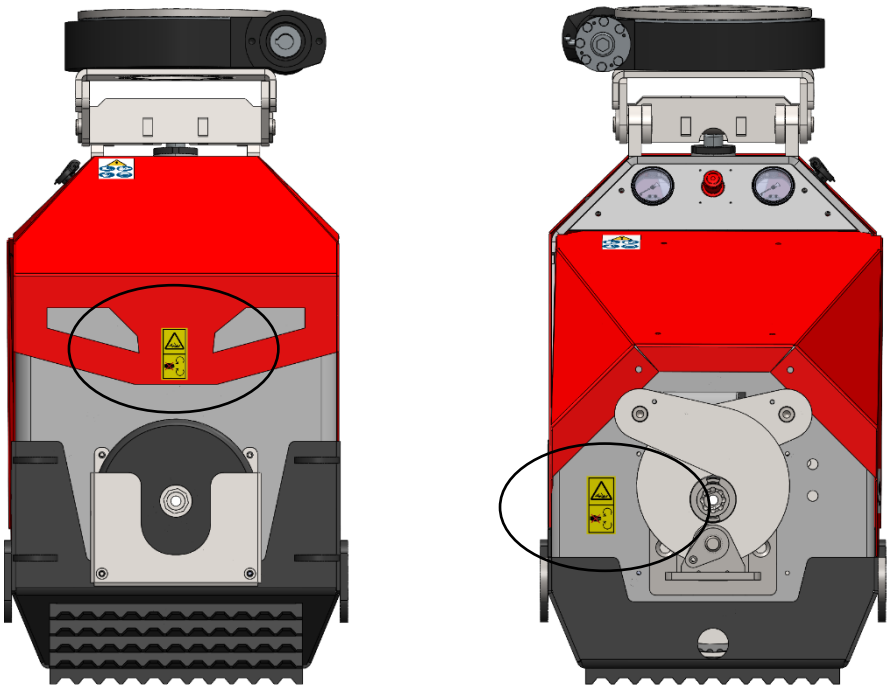

FIGURE 6 - LOCATION WARNING ROTATING PARTS

WARNING - At the front and rear, the drill rod emerges from the machine. During drilling, there is a risk that the pushing and/or rotating movement may cause injury, entrapment or grabbing of hair, loose clothing, etc..

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3. Technical specifications

3.1. Technical details

Type	NANODRILL 5060
Dimensions l x w x h	1895 x 544 x 1085
Operating weight	600KG
Rotation speed (max)	200RPM
Traction force	6000 kg
Max. hydraulic flow	90L/min
Max. hydraulic pressure	220 Bar
Max. power	30 kW

TABLE 3 – TECHNICAL DETAILS NANODRILL 5060

The above specifications are general and subject to change without notice. If precise values are required, the NANODRILL 5060 should be weighed and measured. Options may cause deviations. These specifications are also visible on the identification plate on the NANODRILL 5060, see 3.2.

3.2. Identification plate

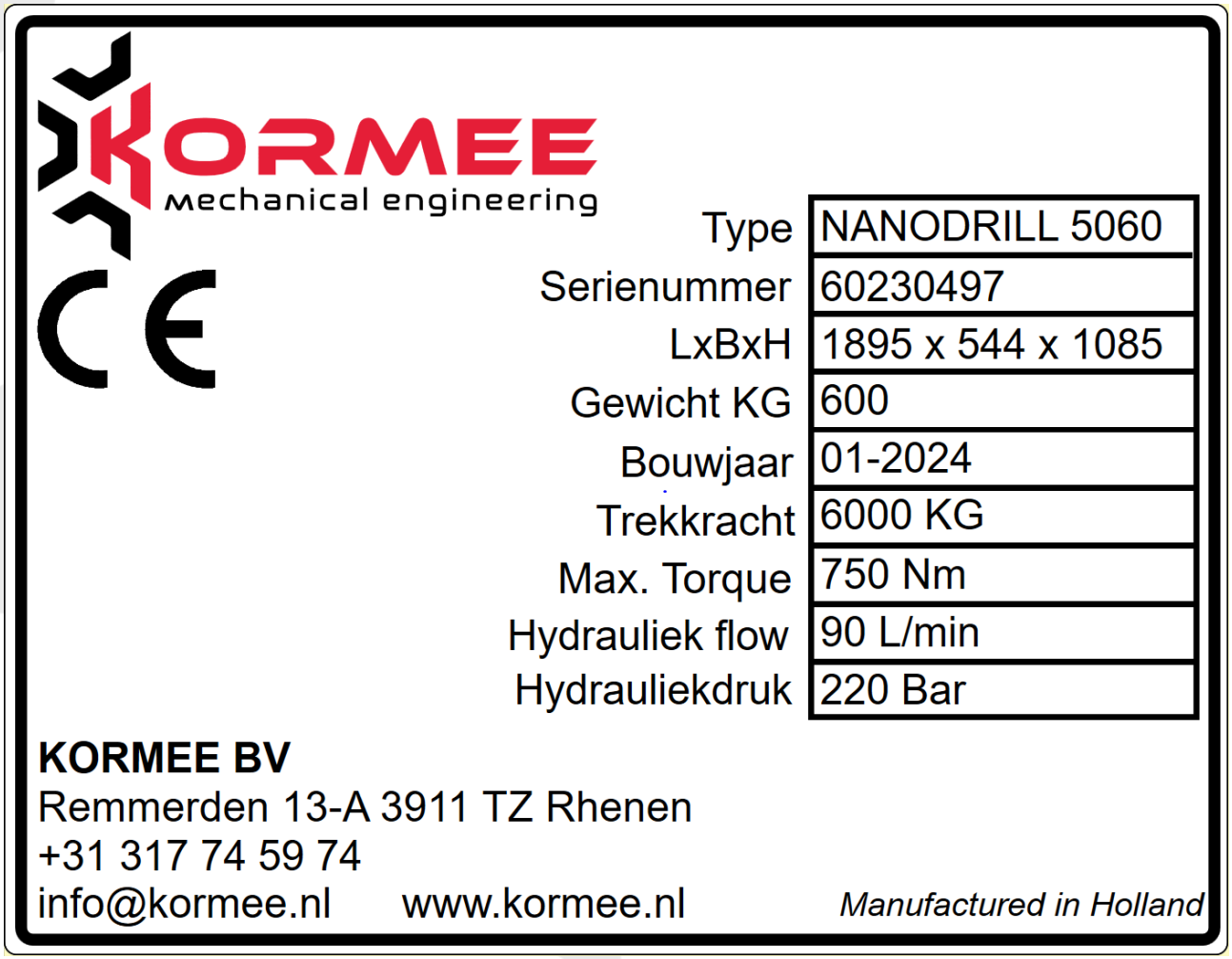

FIGURE 7 – IDENTIFICATION PLATE (EXAMPLE)

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4. Operation

4.1. Connecting the NANODRILL to a mini excavator

The coupling of the interchangeable equipment must meet important conditions before it can be considered a safe, approved coupling to the mini excavator.
Check the following conditions EVERY time the coupling of the NANODRILL 5060 to the mini-excavator is made:

- The mini-excavator meets the requirements in section 1.1
- Ensure that no one in the working area is within reach of potential machine movements.
- Place the mini excavator on a firm and level surface
- Position the crane directly in front of the NANODRILL 5060
- Ensure that no obstacles or hoses can get between the quick coupler and the quick coupler hooks.
- Couple the NANODRILL 5060 to the mini excavator.
- During operation, ensure that the coupling of the NANODRILL 5060 remains horizontal.
- Stop the mini excavator and depressurize the auxiliary function (the hydraulic function that will be used to operate the NANODRILL 5060).
- Connect the hydraulic hoses to the mini excavator.
- Check that the hoses are fully connected.
- Switch on the hydraulic function. The pressure gauges should rise slightly as the oil flows through the machine.

4.2. Remote controller operation

To use the machine correctly, it is important that the user understands the functions of the remote controller.
In this chapter, we explain the operation of the functions and the work sequence for correct use.

Lay-out remote controller.

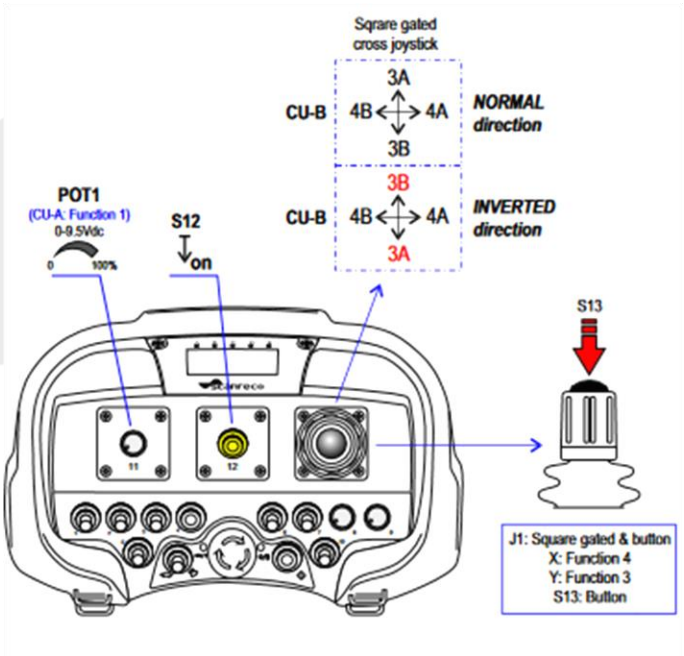

FIGURE 8 - LAY-OUT REMOTE CONTROLLER

Feature	Joystick direction
Steering	3A
Forward drilling	3A/4A
Backward drilling	3B
Reaming	3B/4A

TABLE 4 - FEATURES JOYSTICK

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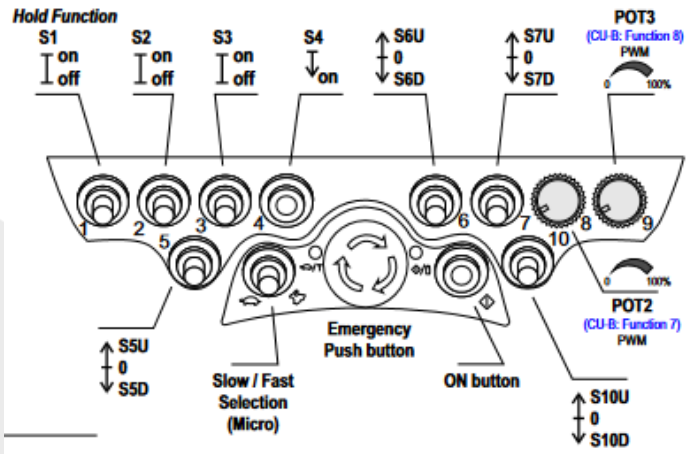

FIGURE 9 - LAY-OUT SWITCHES REMOTE CONTROLLER

Feature	Switch
Cruise control	S1
Hydraulic feature	S2
	S3
-	S4
-	S5U
Reset Sensors	S6U
-	S7U
-	S10U
Bentonite supply	S12
Slow feature	S13
Quantity of bentonite	POT1
Rotation speed	POT2
Movement speed	POT3

TABLE 5 – FEATURES SWITCHES REMOTE CONTROLLER

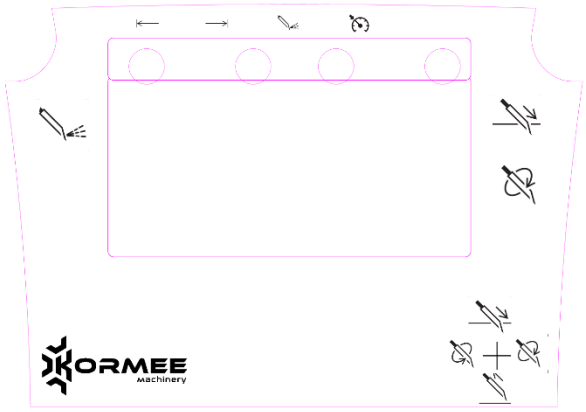

FIGURE 10 - LAY-OUT LEDS AND SCREEN REMOTE CONTROLLER

Feature	LED
Front clamp	1
Rear clamp	2
High-pressure pump	3
Cruise control	4

TABLE 6 – FEATURES LEDS REMOTE CONTROLLER

Figures 9,10 and 11 show the layout of the remote controller, below an in-depth explanation of some items therein:

S1 This switch is used to turn the cruise control on or off. The cruise control is switched on as follows:

a. Determine the desired speed with the joystick.
b. Hold the joystick at this position.
c. Turn on switch S1.
d. The machine will now continue to operate at the desired speed without holding the joystick.
e. The cruise control is switched off as soon as the joystick or emergency stop is operated.
f. The operator should keep the remote control within easy reach.
g. So that immediate action can be taken in case of dangers or undesirable situations.
h. Stay alert for dangerous situations.

S2 This switch is used to control an external mud pump. You enable this function as follows (Note this is an option!):

a. Place the electrically powered mud pump in the specially mounted socket marked “remote controller”.
b. Connect the remote controller to the mix unit.
c. Turn on switch S2.
d. The mud pump will now start pumping.
e. The mud pump will switch off when you turn switch S2 off or when the emergency stop is pressed.

S12 This switch is used to control the high-pressure bentonite pump. This function is switched on as follows.

a. Connect the remote controller to the mix unit.
b. Turn switch S3 on. Note that an LED lights up.
c. Slowly turn the potentiometer to the right.

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d. Check that the high-pressure pump starts running.
e. Make sure the hose cannot make any strange movement.
f. The hose should be connected to the NANDRILL 5060 or hung back in the tank.
g. The high-pressure pump is switched off when you turn the switch S3 off or when the emergency stop is pressed.

S6U This switch is used to reset the sensors. If the drill rod will not move forward, it is often due to a sensor error. This is visible by the LED jumping from red to green. This function is used as follows:

a. Switch S6U on once.
b. The LED jumps from red to green.
c. The drill rod will now continue to move forward.
d. The S6U is a monostable switch and will automatically return to the off position.

POT1 This potentiometer is used to control the speed of the high-pressure bentonite pump. This pump is stepless adjustable. You use this function as follows:

a. Set POT1 to 0%
b. Turn switch S3 on.
c. Slowly turn the POT1 to the desired percentage.
d. Check that the pump can draw enough bentonite.
e. Turn switch S3 off.
f. The pump now stops running.
g. When you switch it on again, the pump accelerates to the desired speed again.
h. You can switch the pump off with switch S3 or the emergency stop.

Step-by-step procedure to use the remote control.

- Insert a charged battery into the remote control.
- Turn the potentiometer to 0.
- Check that switches S1, S2, S12 are set to “off”.
- Unlock the emergency stop (turn it right, it will pop up).
- Press the ON button until the LEDS turn on.
- Move the joystick gently to check the operation of the machine.
- Check that the nozzle of the drill head is open by turning on the high-pressure pump. (see sections described above)
- You can now use the machine.

The joystick is used to control the NANODRILL 5060. Ensure smooth movements, this reduces wear and tear on the moving parts of the machine. If the machine sensitivity is too high, it can be adjusted with the SLOW/FAST switch. The LED with the turtle next to it shows which mode the remote control is in. To return the machine to normal speed (100%), all switches should be off and the potentiometer set to 0%.

Green LED	Indication
Off	0 to 100% (normal speed)
1 flash every 3 seconds	0 to 60%
2 flashes every 3 seconds	0 to 50%
3 flashes every 3 seconds	0 to 40%
4 flashes per 3 seconds	0 to 30%
5 flashes per 3 seconds	0 to 20 %

TABLE 7 – SPEED INDICATION LEDS

ALWAYS ACTIVATE THE EMERGENCY STOP WHEN WORKING ON THE DRILL RODS!
ENSURE THAT THE REMOTE CONTROL CANNOT BE ACTIVATED UNINTENTIONALLY!

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4.3. Moving the coupled NANODRILL

Moving the mini excavator with coupled NANODRILL 5060 requires care and attention and should be carried out in accordance with to the following instructions.

1. Transport speed may not exceed 3km/h
2. Do not drive on and off a vehicle
3. Keep the NANODRILL 5060 on the side of the sliding board during movements.
4. Keep the NANODRILL 5060 as close as possible to the crane and in the direction of travel during movements.

4.4. Instructions and guidelines during use

4.4.1. Work area inspection

- Follow local regulations on digging and trenching.
    - Contact local utility companies to locate underground cables and pipes before starting excavation work.
    - Inspect the work site and surrounding area for signs of underground hazards, such as:
        - signs indicating underground cables or pipes
        - buildings where no overhead cables run
        - gas or water meters
        - junction boxes
        - branch boxes
        - light poles
        - manhole covers
        - subsided soil
    - Have a worker qualified in operating positioning equipment check a 20 ft (6 m) strip on either side of the planned borepath. Verify the locations of pipes and cables previously marked.
    - Mark all underground pipes, cables and obstacles.

4.4.2. Precautions for work areas

Contact authorities familiar with the hazards present at each site to determine whether drilling can be carried out and, if so, what precautions should be taken.

4.4.3. Cut-out length drill rod at the back of the NANODRILL

Due to various safety considerations, the explicit instruction is to allow drill rods to protrude a maximum of 4 metres behind the NANODRILL. Consider objects and/or persons at risk of being hit in the expanded work area.

4.5. Start drilling

DANGER - Work site hazards can cause serious injury or death. Use the right equipment and apply proper working methods. To prevent injuries:

- If there is doubt about the type of work site or if unmarked power lines may be present, the work site should be considered electrical.
- Piercing high-voltage cables may cause electrocution. Expose cables by hand before digging.
- All vegetation around the control station should be removed. Touching trees, bushes or weeds during an electrical strike may cause electrocution.

4.5.1 Planning drill path

The drilling path should be established from start to finish before drilling operations are started. Make the drilling path visible on the work site using a paint spray or flags, or ensure that the drilling path is recorded on paper for the benefit of the operator.

A handy tool to calculate the drilling profile is the SMARTDRILLER app, available in the Play Store.

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Consult an expert for complex drillings. Have the working area geo-surveyed and the drilling path calculated. Make sure the expert knows the minimum insertion angle, the bending limits of the drill pipe, the bending and stress limits of the utility pipe material, the lengths of the pipes and the location of any underground cables and pipes.

Recommendations for non-complex drillings:
Make the path of the bore based on four measurements:

1. recommended bending limit
2. insertion angle
3. minimum set-back
4. minimum depth

Recommended bending limits

KORMEE drill pipes are designed to bend during operation. The bending makes it possible to steer and correct the drilling direction. When exceeding the recommended bending limits, invisible damage can occur. This damage becomes increasingly severe and may lead to eventual sudden fractures.

NANODRILL plastic drill rods can bend to a maximum radius of 3 metres.

Insertion angle

The insertion angle is the slope of the drill head relative to the slope of the ground at the start of drilling.

The insertion angle depends on the depth required when drilling away.

CAUTION - for insertion angles greater than 70% (70 cm drop per 1 horizontal metre): The measuring points are projected in front of the drill head, which means that the predicted depth on the measuring systems is then no longer reliable. Ensure that SETBACK is achieved as soon as possible and perform recording of measurements from the moment the drill head has an angle less than 50%.

Minimum set-back

Set-back is the distance from the insertion point to the point at which the drill pipe starts running horizontally.

Minimum depth

Because the drill pipe has to be bent gradually, the depth at which the bore path starts running horizontally depends on the insertion angle and the bending limits. This is called the minimum depth.

- To reduce the minimum depth, the insertion angle must be reduced. This also reduces the set-back.
- To increase the minimum depth, the insertion angle must be increased. This also increases the set-back.

4.5.2 Prepare working area

Mark the planned bore path and all localized underground cables and pipes with flags or paint.

Prepare insertion point

For successful drilling, the first drill pipe must be straight when it goes into the ground. Dig a small initial hole so that the first pipe is drilled into a vertical surface to prevent the first pipe from bending. To avoid bending or overloading the pipe, set up the drill so that the drill pipe goes straight into the ground, see Figure 12 on page 26.

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Checking accessories

Check the following accessories are present and functional before starting drilling:

- Receiver and Probe
- Probe(s) with new and spare batteries
- Walkie-talkies with new and spare batteries
- Remote control and battery pack
- Anchoring attachments and accessories
- Various control plates
- Adapters, drill pipes, drill heads
- Marker flags or paint and jalopy sticks if necessary
- Water hoses and other hoses
- Fuel for the generator
- Drilling fluid additives
- Wrenches for assembling and disassembling drill rods
- Reamers, turning heads, retractors
- Hose for rinsing and spray gun
- Grease and wire brushes
- Electrically insulated shoes and gloves
- Personal safety equipment, such as helmet and goggles
- Notebook and pencil

4.5.3 Prepare equipment

Check the equipment for the following points:

- Fluid levels
- Fuel
- hydraulic fluid
- engine coolant
- battery charge
- engine oil

Check condition and function

- filters (air, oil, hydraulics)
- fluid pump
- fittings
- Tires and tracks
- Pumps and motors
- drilling fluid mixer
- hoses and valves
- water tanks

4.5.4 Start NANODRILL 5060

Complete the following steps to get the NANODRILL 5060 ready for use:

- Connect hydraulic hoses to the connection points on the mini excavator (if not already done)
- Connect power cable. Pay attention to the positive and negative connection
- Insert a freshly charged battery into the remote control
- Starting up the generator
- Connect communication cable to and from the MIPO
- In the case of a wireless system, check that a connection has been established
- Connect the bentonite hose to the NANODRILL 5060
- Startup mini crane and switch on hydraulic flow, following the instructions of the mini crane
- Turn the remote control potentiometer to zero.
- Deactivate the emergency stop on the remote control
- Press the start button on the remote control
- Test the operation of the bentonite pump

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Shutting the NANODRILL 5060 off:

- Press the Emergency Stop on the remote controller
- Turn off the mini crane's hydraulic power supply
- Turn off the generator

4.5.5 Set-up of NANODRILL 5060

Drill head preparation:

1. Make sure the drill head is clean to avoid dirt, grease and water from entering the probe housing
2. Open the probe housing
3. Choose the optimal frequency of the drill probe
4. Make sure the drill probe indicates '6 o'clock' when mounting the probe in the drill head
5. Choose the right drilling plate
    a. KM Steering plate 5“ - 125mm 5x 3/8”-16
    b. KM Steering Plate 4“ - 100mm 5x 3/8”-16 VM 5-Bolt
    c. VM Steering plate RUBBLE 2.5“ 5-bolt 3/8”-16
    d. VM Rubble Blade 5-Bolt 3-1/2 3/4'' Thick 3/8-16
6. Make sure the socket head bolts are undamaged during assembly (replace with new bolts in a timely manner)
7. Calibrate the drill head 3 meters away from the receiver
8. Check that the clock position of the drill head as displayed on the receiver is 12 o'clock when the drill head is too.

Set-up NANODRILL 5060:

1. Determine the exact location of the entry point.
2. See if existing cables and pipes are indicated.
3. Locate any pipelines.
4. Determine drill profile based on desired parameters such as required depth.
5. Determine entry angle.
6. Dig an entry hole according to underlying drawing. This drawing is a sample setup.
7. Try to make a starting wall as smooth as possible. This will ensure better power transfer between the ground and the machine.
8. Dig a deeper hole under the machine. This will be used to discharge the bentonite. The deepening allows you to keep a good view of your drill rods.
9. Make sure the distance between the extension piece and the ground is no more than 10cm. This ensures that the rods do not buckle so easily.

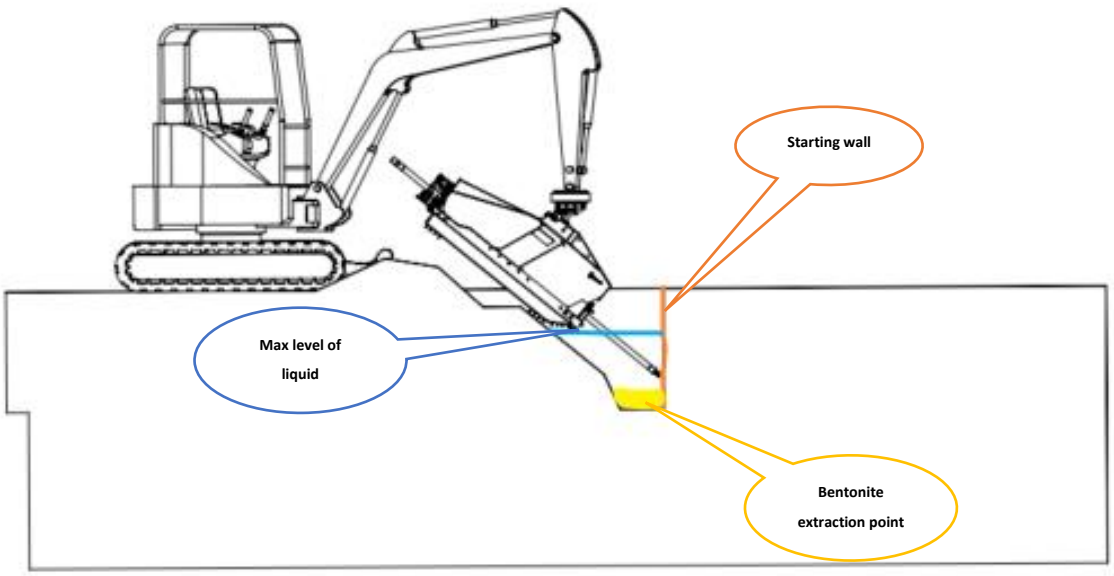

FIGURE 11 – STARTING SITUATION OF A DRILL

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4.5.6 First drill rod and continuation

Drill the first rod as follows:

1. Connect the bentonite swivel to the drill rod.
2. Turn on the drilling fluid.
3. Check that the drilling fluid is flowing.
4. Turn the steering plate to the 12 o'clock start position.
5. Bring the drill rod forward. Be sure to steer so that drilling is done straight out from the NANODRILL. Drill the drill head and 1/3 of the first rod into the ground before steering.
6. Keep an eye on the pressure gauges

Continue by connecting new drill rods in accordance with the following instructions:

- Make sure the drill cannot be operated
- Make sure the drilling fluid is switched off
- Disconnect the bentonite swivel from the drill rod
- Check the coupling for dirt and clean if necessary
- Couple the new drill rod in line with the previous drill rod
- Slide the locking pin into one of the corresponding holes
- Tighten the locking pin firmly with the thread using an Allen key. One side is sufficient
- Mount the bentonite swivel to the new drill rod
- Repeat these steps each time a new drill rod needs to be attached

ATTENTION - Allow drill rods to extend a maximum of 4 meters behind the NANODRILL.

Tip

Lubricate joints each time before use. Lubricate the interfaces and collars of exterior joints with copper-based grease. This prevents rust and reduces wear of interfaces and collars.
When necessary, clean the joint with water (pressure washer) and detergent.
Be careful not to get grease on the plastic, this affects the strength of the machine.

Aligning drill rod connections:
Carefully align the coupling pieces of both drill rods before securing them. The notches on both coupling pieces must line up, otherwise the locking pin cannot be inserted and tightened.

4.5.7 Steering the drill head

Correcting drilling direction is a skill that the operator acquires through experience, knowledge of the equipment, and soil conditions. **These instructions cover only the basic operations**. To monitor progress and make corrections, one of the staff members provides drill head positioning and relays instructions to the operator. Corrections are made by locating the drill head, comparing it with the drill profile and adjusting the drill head roll position as necessary.

Basic principles:

- The ability to make adjustments depends on soil conditions, the steering plate, drill head and nozzle used, the position of the drill head and the distance over which the drill head can be pushed without rotation.
- All corrections should be made as gradually as possible.
- If too much correction is made, the rod will “coil”. This can damage the rod, making drilling and retraction difficult. After each correction, start drilling **straight** again as soon as possible.
- Do **not** push a piece of drill rod whole into the ground without rotation. This may exceed the bending radius and break the rod.

Steering procedure:

1. Determine the location of the drill head when drilling has stopped/paused. Use available data from the transmitter and positioning equipment such as:
    a. depth
    b. slope
    c. left/right data
    d. temperature
    e. roll position of transmitter

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2. Compare the location of the drill head with the drill profile. Determine in which direction to drill.
3. Orient the drill head.
4. Push the drill rod into the ground as far as necessary to change the direction.
5. Rotate Using the remote controller, rotate the drill pipe into the ground for the remaining length. the drill rod with the remote controller.

Position of the drill head:
The position of the drill head is determined by the reading of the roll position of the transmitter (probe). This is referred to as a clockwise position.

1. Read the roll position of the transmitter.
2. Slowly rotate the drill rod until the locating equipment indicates the desired clock position/roll position.

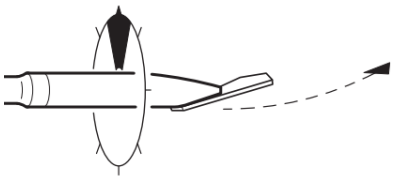

FIGURE 12 – CLOCK POSITION DRILL HEAD AND STEERING PLATE

Change direction:

1. Rotate the drill rod (clockwise or counterclockwise) to the clock position in which you want to steer it.
2. Push the rod into the ground without rotation, using more spool pressure if necessary for optimal results.

Defining the drilling path:
At each pipe length, determine the location of the drill head. As work progresses, record the data for each drill pipe by marking it on the ground. With the receiver cabinet, the drill head can be positively logged, this allows the creation of a depth profile.

Finishing the drill path:
Guide the drill head to an exit trench or to the surface

ATTENTION - exit angles greater than 70%: The measuring points are projected behind the drill head so the predicted depth on the measuring systems is then no longer reliable. Manually calculate the exit position. Example: Exit angle 70% means: 70cm rise on 1 meter length.

1. Make sure all bends are gradual.
2. Clear the area around the exit point.
3. Turn the fluid flow control to the Off position as soon as the drill head rises above the ground.
4. Wait for the operator to turn the drill off.
5. Clean the drill head, especially around the threads.

Mounting reamer:
Sometimes the drilled hole must be enlarged to fit a product pipe. As a rule of thumb, the final hole should be 1.5 times larger than the diameter of the product pipe (or bundle) to be installed. The number of reamings required depends on the soil conditions.

ATTENTION: Do not over-enlarge the hole in one go. When reaming several times with increasingly larger reamers, the machine wears out less quickly.
During reaming, rotate at full speed and the rotation pressure should not exceed 125 bar. During the reaming operation, sufficient rinsing should be done to remove the loosened soil.

Required amount of drilling fluid for reaming:
To ream properly, sufficient fluid must reach the drilled hole. The amount depends on the size of the drilled hole and the soil conditions. Measure the fill percentage (proportion of contamination in the bentonite fluid) in the return flush using the scale to perform the bentonite test, article 100730, available on request from KORMEE BV.

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4.5.8 Bentonite

Bentonite is a dry powder. When properly mixed with water, it adheres to the drill wall in a thin layer, lubricating and keeping the drill hole open and also retaining the fluid in the drill hole.

Pay attention to the following points when mixing bentonite:

- Use clean water that does not contain salt, calcium or an excessive amount of chlorine.
- Use water with a pH level between 9 and 10.
- Use water with a hardness of less than 120 PPM.
- Do not use bentonite that contains sand.
- Mix the bentonite thoroughly otherwise it will settle in the tank.

When mixing bentonite, ensure that the funnel viscosity is not exceeded. See 'Marsh funnel viscosity' for information on measuring viscosity using a Marsh funnel.

4.5.9 Marsh-funnel-viscosity

See the manual of the corresponding MIPO for more information about the viscosity of the bentonite. This also contains more information about the different products needed to test the viscosity.

4.6. When in operation

When the NANODRILL 5060 is in operation, there are certain rules and recommendations to make the working area and the task safer:

- As the owner/tenant of the NANODRILL 5060, it is your responsibility that persons operating or maintaining the NANODRILL 5060 are adequately qualified to do so;
- Bear responsibility and control for the entire drilling and work area and ensure that you carry out the work at all times with authorized and qualified persons.
- Ensure, for example, walkie-talkie contact with the operator before any actions are carried out in, for example, the trench through which the pulling is done. Over the entire length, entrapment hazards can occur between the cable and its surroundings.

- During the work it is forbidden for unauthorized persons to be in the vicinity of the NANODRILL 5060!

In case of regular or other failures, please contact KORMEE BV.

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5. Inspection and maintenance

The following inspection points should be checked according to specified interval:

No.	Inspection points	Interval
1	Lubricating grease nipples 6 pcs.	After each use
2	Cleaning the machine	After each use
3	Replace rod wiper (art. 200196)	Every 3 weeks
4	Rotating parts (bearings, etc.)	Half year
5	Check hoses for damage	Half year
6	Check cable(s) for damage (in case of damage, replace cable)	During each use
7	Drive	Half Year
8	Check stickers and identification plate for presence/readability	Every week
9	Hydraulic lever seals	Half Year
10	Presence of instruction manuals	Half Year
11	Construction Frame cracking and damage	Half Year
12	Attachment of parts	Half Year
13	Operation of safety devices	Half Year
14	Chain tensioning/inspection	Half Year
15	Sprockets check	Half Year
16	Check rod clamps for grip	Every week
17	Check rod clamps for clamping force	Half Year

TABLE 8 – INSPECTION POINTS NANODRILL 5060

5.1. Maintenance

- Maintenance work may only be carried out when the NANODRILL 5060 is stationary, clean and disconnected from the hydraulics **and** the hydraulic lines are depressurized.
- Assembly work may only be carried out by authorized personnel.
- The markings attached to the NANODRILL 5060 such as nameplate, warning symbols, etc. must remain clean, free of paint and clearly legible. Missing or illegible markings must be replaced in immediately.

5.2. Storage of the machine

- Always store NANODRILL 5060 with the starting rod in the machine.
- Always clean the NANODRILL 5060 after use, including the inside: access by removing the bottom plate
- After use, spray the non-painted parts with a preservative spray
- Store the machine in a stable way.
- Protect NANODRILL against frost damage.

5.3. Storage of the machine during frost

The drilling rig can be left outside overnight in freezing weather if a polypropylene-based antifreeze is circulated through the machine before shutting down. This applies to the Bentonite channel as well. For protection of the MIPO mix pump system against frost damage, see MIPO system manual.

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5.4. Overview inspection and maintenance points

Table 8 above contains a table showing the maintenance points and their intervals. To elaborate on this, the locations of these maintenance points are shown below. The numbers correspond to the table.

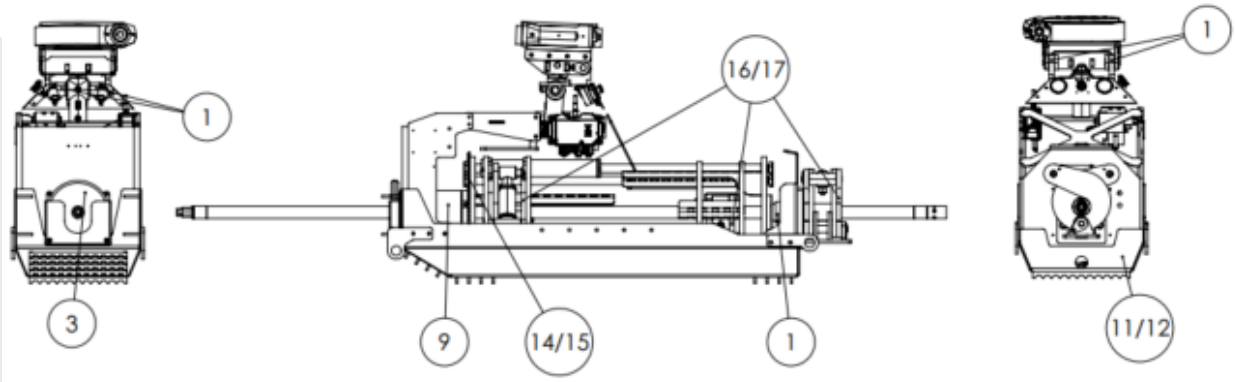

FIGURE 13 – LOCATION AND MAINTENANCE POINTS

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6. Frequently occurring problems

6.1. Loss in pulling force

If the machine loses pulling force it may be caused by one of the following points.

- The clamping jaws and drill rods have become greasy due to a hydraulic leak.
  - Clean the machine with a strong degreaser! Make sure that the clamping jaws in particular are grease free.
  - Clean the drill rods with a powerful degreaser! Note: the rod wiper must be replaced if it continues to deposit oil on the drill rods.
- The clamping jaws are saturated with mud. This is caused by a worn rod wiper.
  - Clean the machine with a pressure washer. Make sure the jaws are thoroughly clean inside again.
  - Spray the drill rods clean so that no more mud enters the machine.
  - Replace the rod wiper.

6.2. Machine runs but does not pull/push

Sometimes the remote controller is set to the slowest setting. Because the machine is protected against shocks, the machine speed cannot go lower than 40%. This problem can be signaled by a LED flashing on the left side of the emergency stop.

To solve this problem follow these steps:

- Turn the potentiometer anti-clockwise to 0%
- Turn all switches OFF (towards you).
- Press the emergency stop.
- Unlock the emergency stop (turn it right, it will pop back up).
- Press the Connect button on the right side of the emergency stop until the remote controller is paired. The LEDS on the remote controller light up.
- Push the switch on the left side of the emergency stop to the right until the light stops flashing.
- The machine will work properly again.

6.3. Pairing remote controller with machine

To pair a remote controller with another machine, the following procedure should be followed:

- Unscrew the plastic window from the NANODRILL 5060.
- Switch off the Scanreco receiver using the small switch on the right-hand side.
- The switch should be set in the middle.
- Press the emergency stop on the remote controller.
- Remove the battery from the remote controller.
- Connect the connection cable to the remote controller.
- Connect the connection cable to the receiver.
- Raise the switch on the receiver.
- Unlock the emergency switch (turn it right, it pop up).
- Press the Connect button on the right side of the emergency stop until the remote controller makes a sound. The remote controller is paired with the receiver again.
- Press the emergency stop button again.
- Remove the connection cable from the remote controller and the receiver.
- Replace the waterproof seals on the connection points.
- Insert the battery back into the remote controller.
- Press the Connect button on the right side of the emergency stop until the remote controller is paired. You can see this because LEDS on the remote controller light up.
- If the remote controller is not paired properly, repeat the entire procedure.

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7. CE certification

This NANODRILL 5060 bears the CE mark. This means that the NANODRILL 5060 complies with the application of the European Directives on Safety and Health. The included 'CE Declaration' indicates which directives these are.

7.1. Product liability

KORMEE BV is not liable for accidents, unsafe situations and direct and indirect damages resulting from:

- Ignoring warnings or instructions as shown on the NANODRILL 5060 or in this documentation.
- Use for applications or under conditions other than those specified in this documentation.
- Unauthorized modifications to the NANODRILL 5060. This includes the use of any non-original replacement parts.
- Altering weldments and/or mechanical operations on the NANODRILL 5060.
- Inadequate maintenance.
- Damage caused by poor supervision.

KORMEE BV is not liable for:

- The resulting damage in case of product failures, business interruption, etc.
- Ignoring warnings or instructions as shown in this documentation.
- Use for applications or under conditions other than those indicated in this documentation.
- Unauthorized modifications to the NANODRILL 5060. This includes applying non-original replacement parts.
- Altering weldments and/or mechanical operations on the NANODRILL 5060 without consent of KORMEE BV.
- Inadequate maintenance.

7.2. Warranty

Unless otherwise agreed in writing, the warranty provisions below apply:

KORMEE BV provides warranty to the first user up to 12 months after delivery, provided that the NANODRILL 5060 is checked and a maintenance inspection is carried out by KORMEE BV every 6 months.

Defects must be reported to KORMEE BV before the expiry of the warranty period.
The warranty applies to defects that:

- Occur during normal use of the NANODRILL 5060;
- Occur due to faulty construction or materials.

The warranty is void in the event of defects resulting from:

- Normal wear and tear;
- Normal consumption of consumables;
- Misuse.

If defects occur, KORMEE BV will:

- Replacing the parts. KORMEE BV becomes the owner of the replaced parts;
- Repair the defects;
- Opt for another replacement solution, if repair is not reasonably possible.

Other comments:

- The customer must give KORMEE BV the opportunity to remedy any defects.
- For built-in third-party components, the warranty conditions of the respective supplier apply.
- The warranty period may differ from what is stated above.
- Restoration and/or repair shall take place in KORMEE BV's workshop.
- KORMEE BV reserves the right to change its machines without prior warning.
- Machines must be delivered thoroughly clean.

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7.3. Liability

KORMEE BV is not liable:

- If the customer has not fulfilled all its obligations to KORMEE BV (financial or otherwise).
- For consequential damages due to malfunctions or defects of the NANODRILL 5060 (e.g. damage to the products to be processed, business interruption, delay, etc.).
- For damage resulting from incompetence of the operators.
- For damage caused to the infrastructure and environment

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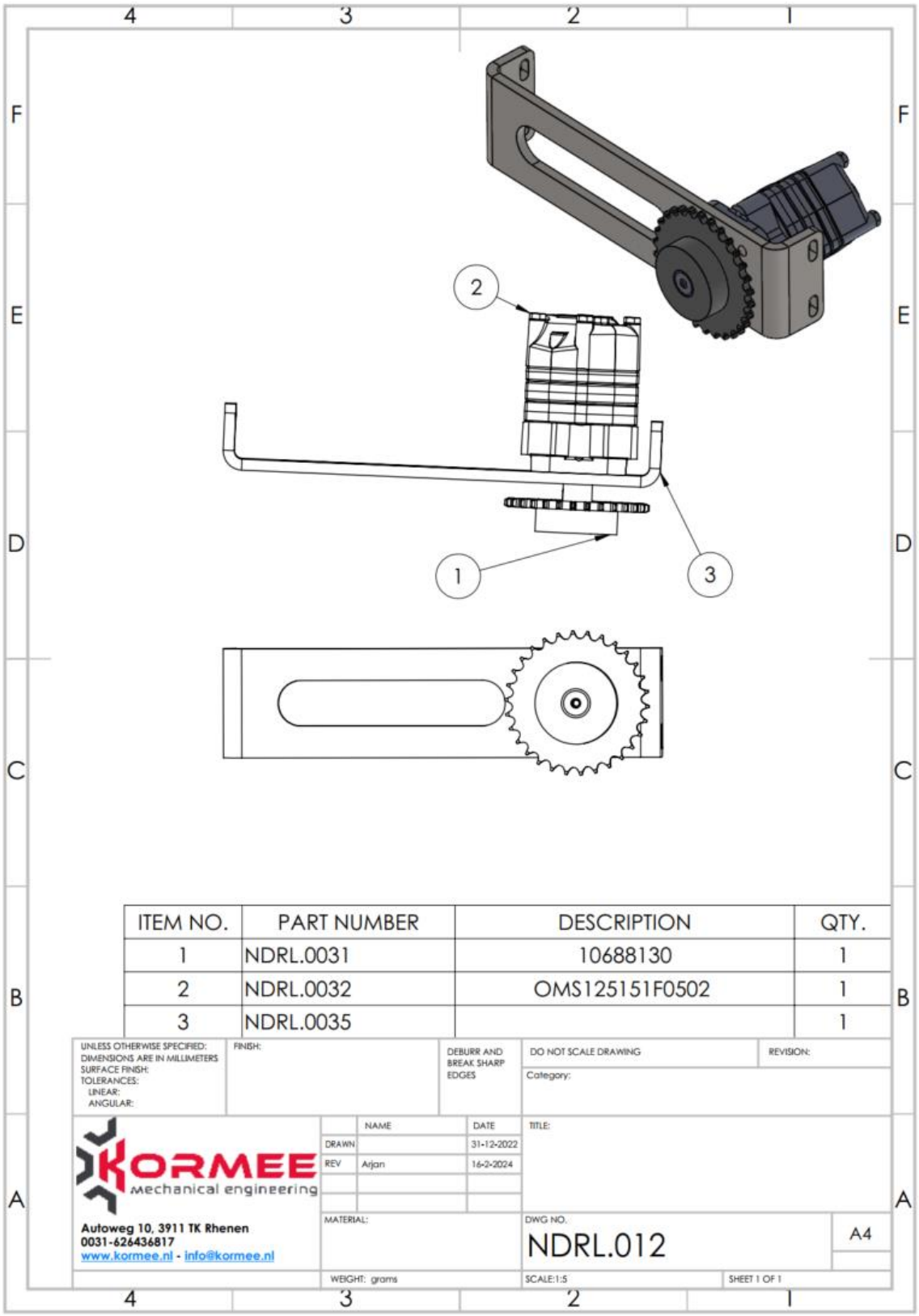
8. Appendix

8.1. Parts drawings NANODRILL 5060

The following information is provided for the sole purpose of assisting in the maintenance of the machine. These drawings may not be used to reproduce parts without explicit consent of Kormee BV. If parts are damaged during use, they can be reordered with an original part number.



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	NDRL.0031	10688130	1
2	NDRL.0032	OMS125151F0502	1
3	NDRL.0035		1

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBURR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION:

Category:

KORMEE mechanical engineering

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0031-626436817
www.kormee.nl - info@kormee.nl

	NAME	DATE
DRAWN		31-12-2022
REV	Arjan	16-2-2024

TITLE:

MATERIAL:

DWG NO. NDRL.012

A4

WEIGHT: grams

SCALE:1:5

SHEET 1 OF 1

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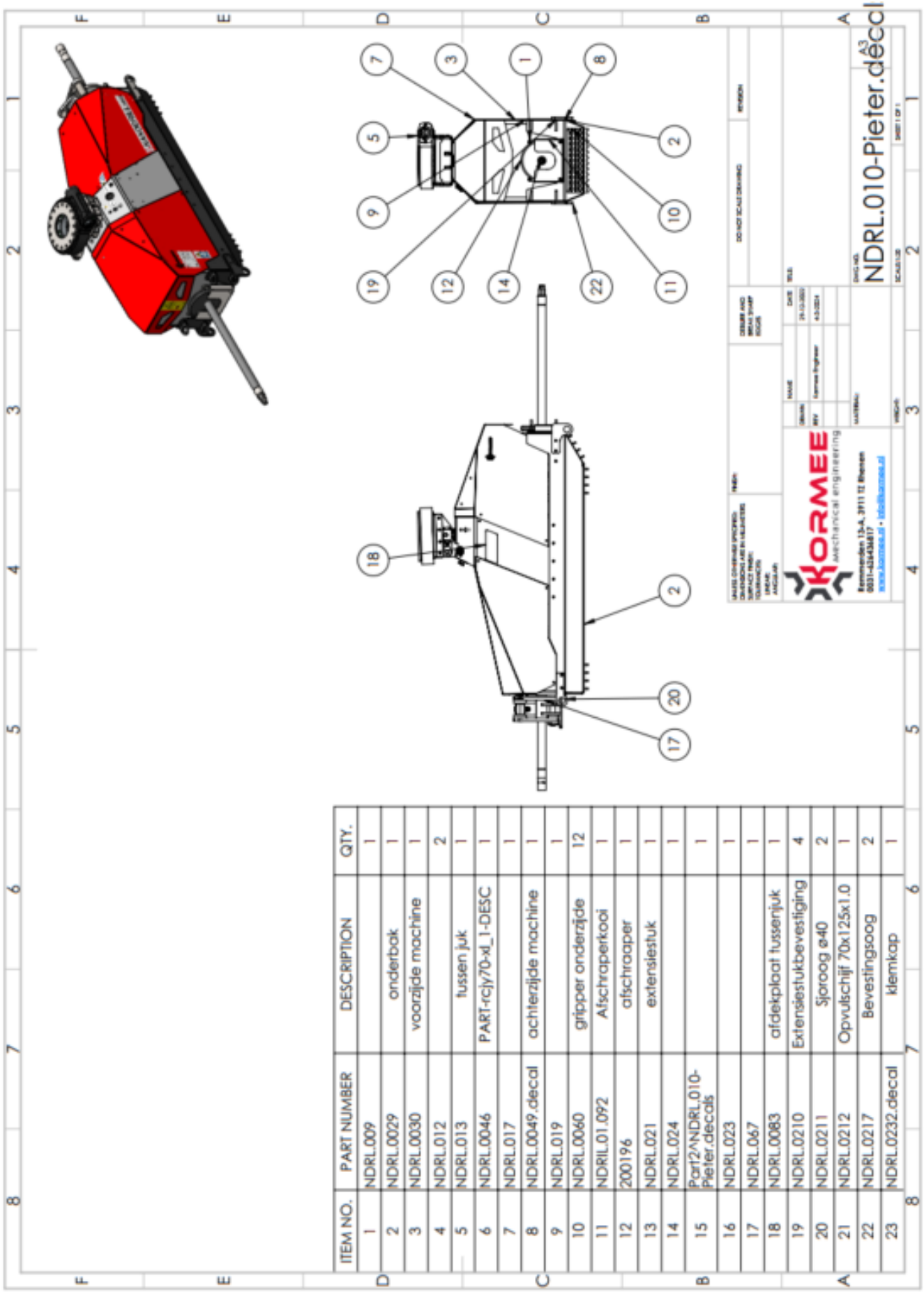

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	NDRL.009		1
2	NDRL.0029	onderbak	1
3	NDRL.0030	voorzijde machine	1
4	NDRL.012		2
5	NDRL.013	tussen juk	1
6	NDRL.0046	PART-rcjy70-xl_1-DESC	1
7	NDRL.017		1
8	NDRL.0049.decal	achterzijde machine	1
9	NDRL.019		1
10	NDRL.0060	gripper onderzijde	12
11	NDRIL.01.092	Afschraperkooi	1
12	200196	afschraaper	1
13	NDRL.021	extensiestuk	1
14	NDRL.024		1
15	Part2^NDRL.010-Pieter.decals		1
16	NDRL.023		1
17	NDRL.067		1
18	NDRL.0083	afdekplaat tussenjuk	1
19	NDRL.0210	Extensiestukbevestiging	4
20	NDRL.0211	Sjoroog ø40	2
21	NDRL.0212	Opvulschijf 70x125x1.0	1
22	NDRL.0217	Bevestingsoog	2
23	NDRL.0232.decal	klemkap	1

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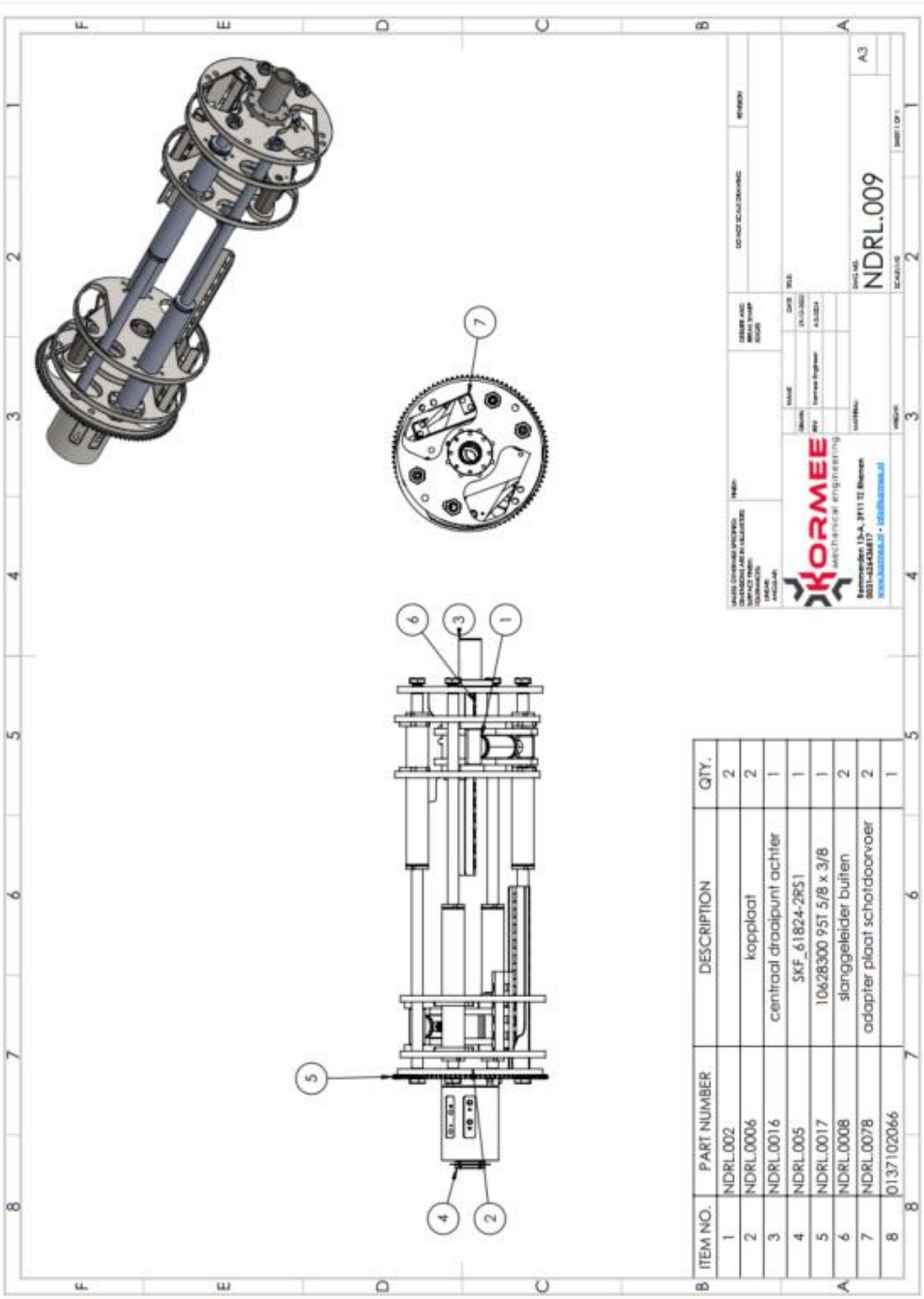

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	NDRL.002		2
2	NDRL.0006	koppiaat	2
3	NDRL.0016	centraal draaipunt achter	1
4	NDRL.005	SKF_61824-2RS1	1
5	NDRL.0017	10628300 95T 5/8 x 3/8	1
6	NDRL.0008	slanggeleider buiten	2
7	NDRL.0078	adapter plaat schotdoorvoer	2
8	0137102066		1

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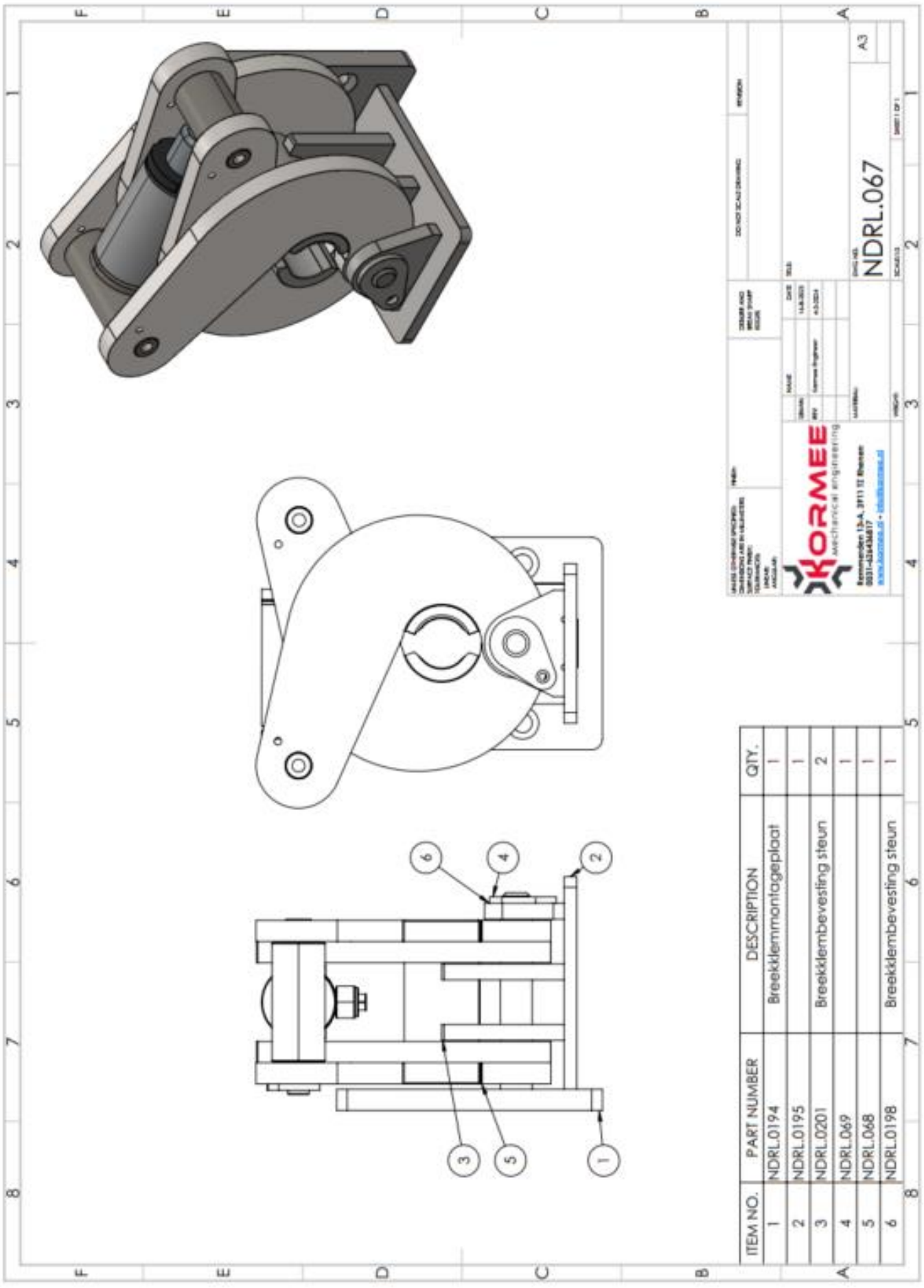

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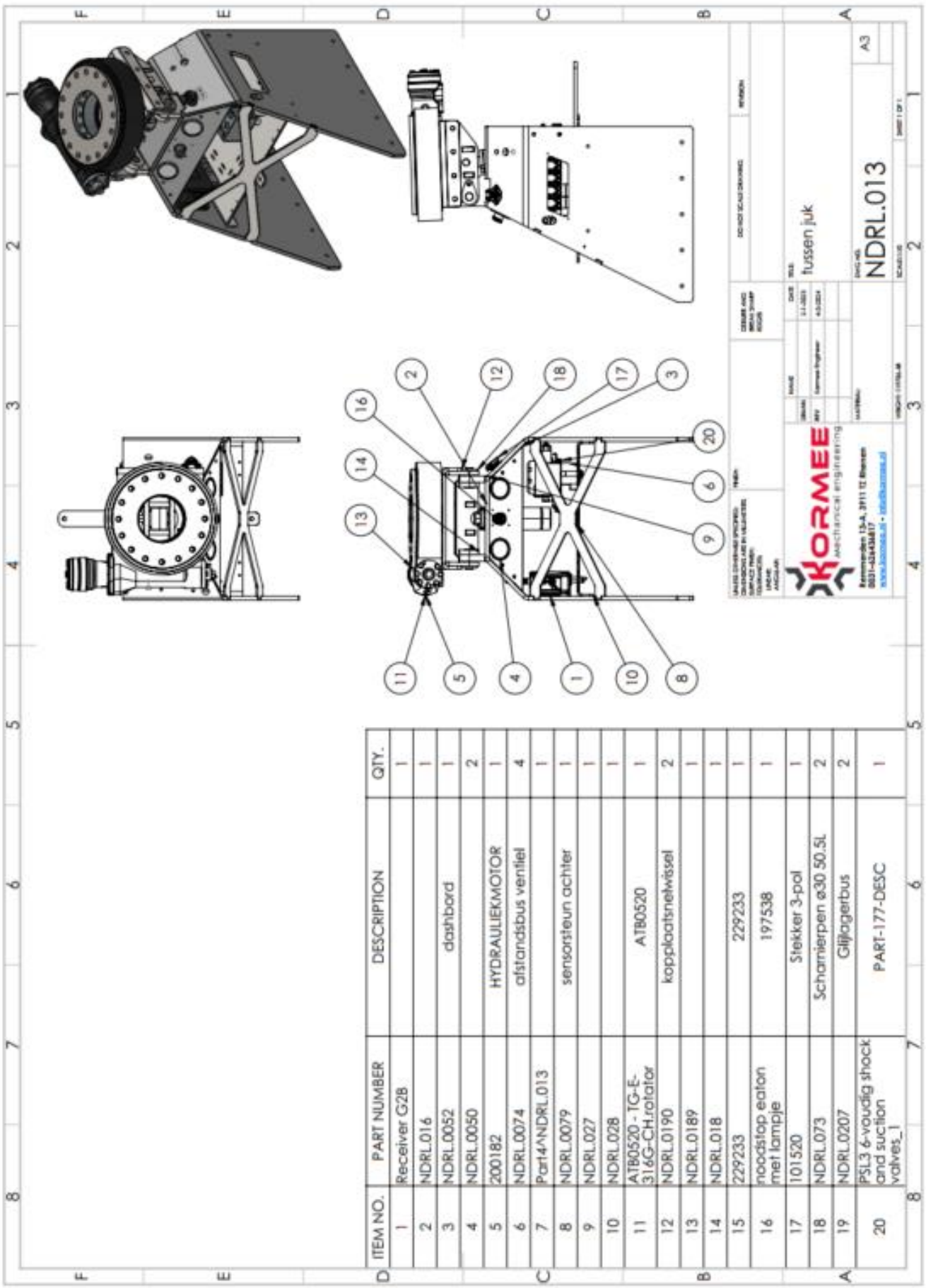

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Receiver G2B		1
2	NDRL.016		1
3	NDRL.0052	dashbord	1
4	NDRL.0050		2
5	200182	HYDRAULIEKMOTOR	1
6	NDRL.0074	afstandsbus ventiel	4
7	Part4^NDRL.013		1
8	NDRL.0079	sensorsteun achter	1
9	NDRL.027		1
10	NDRL.028		1
11	ATB0520 - TG-E-316G-CH.rotator	ATB0520	1
12	NDRL.0190	koppelaarsnelwissel	2
13	NDRL.0189		1
14	NDRL.018		1
15	229233	229233	1
16	noodstop eaton met lampje	197538	1
17	101520	Stekker 3-pol	1
18	NDRL.073	Schamierpen ø30 50.5L	2
19	NDRL.0207	Glijlagerbus	2
20	PSL3 6-voudig shock and suction valves_1	PART-177-DESC	1

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tussen juk

NDRL.013

A3

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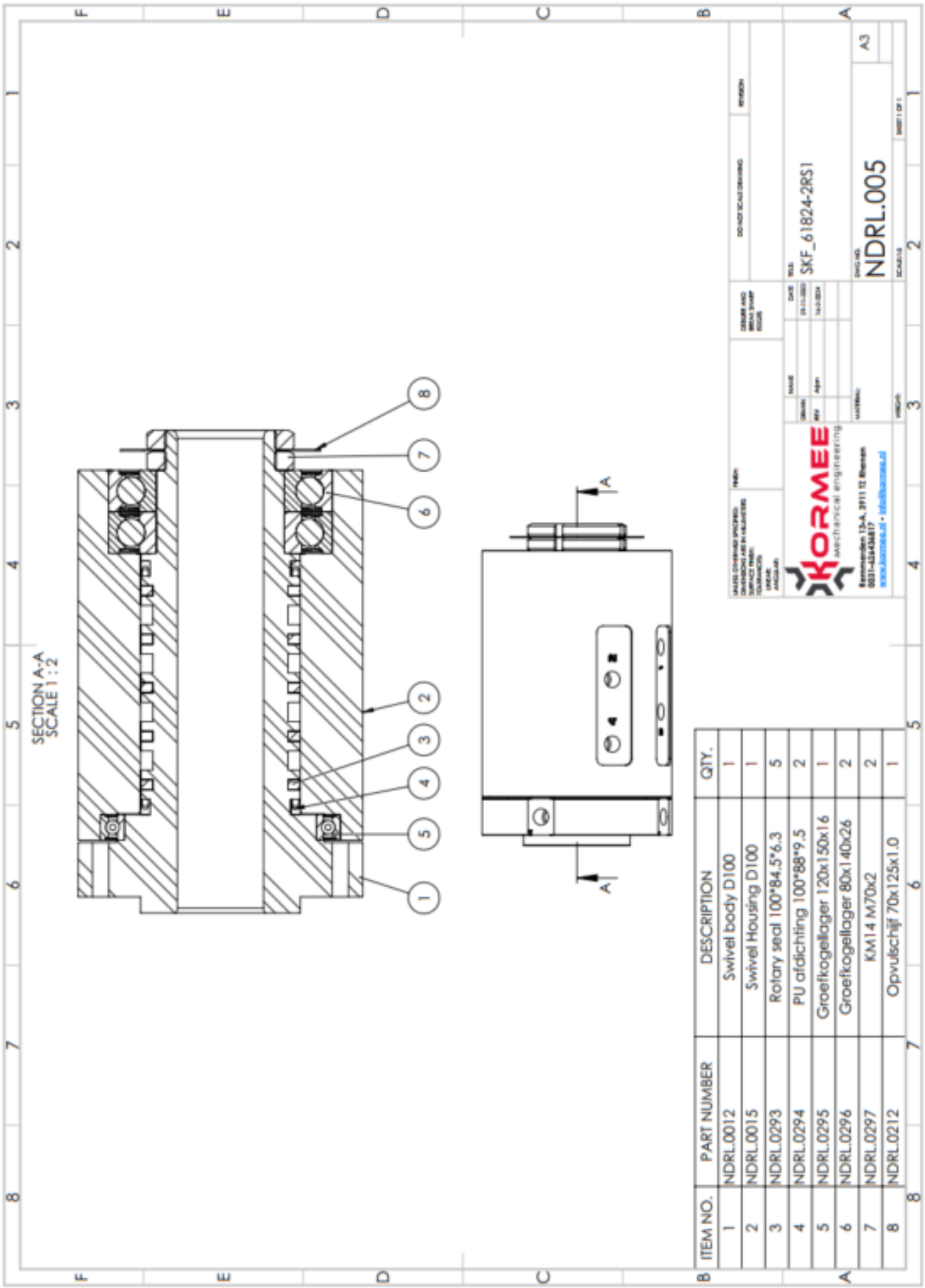

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	NDRL.0012	Swivel body D100	1
2	NDRL.0015	Swivel Housing D100	1
3	NDRL.0293	Rotary seal 100*84.5*6.3	5
4	NDRL.0294	PU afdichting 100*88*9.5	2
5	NDRL.0295	Groefkogellager 120x150x16	1
6	NDRL.0296	Groefkogellager 80x140x26	2
7	NDRL.0297	KM14 M70x2	2
8	NDRL.0212	Opvulschijf 70x125x1.0	1

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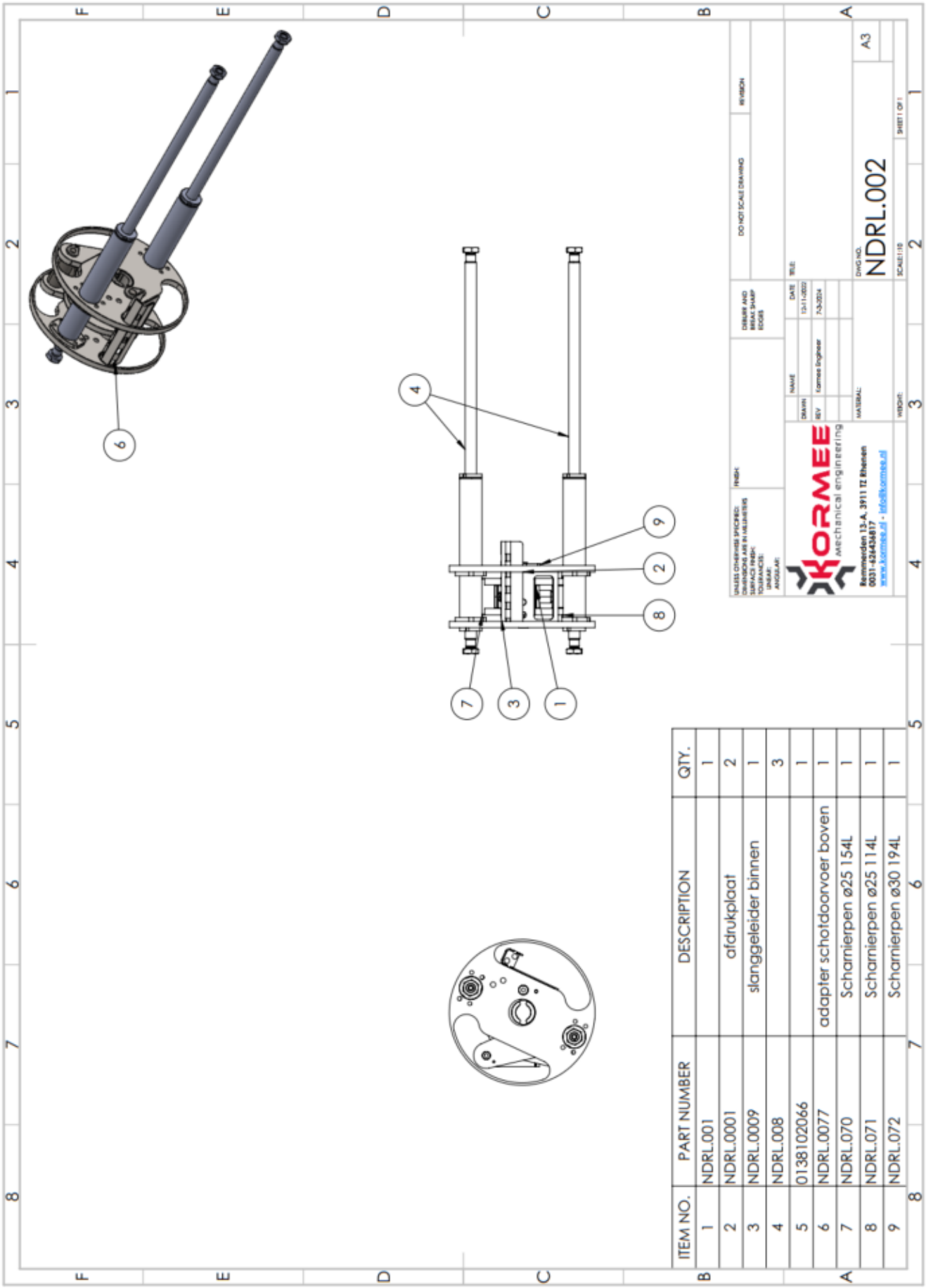

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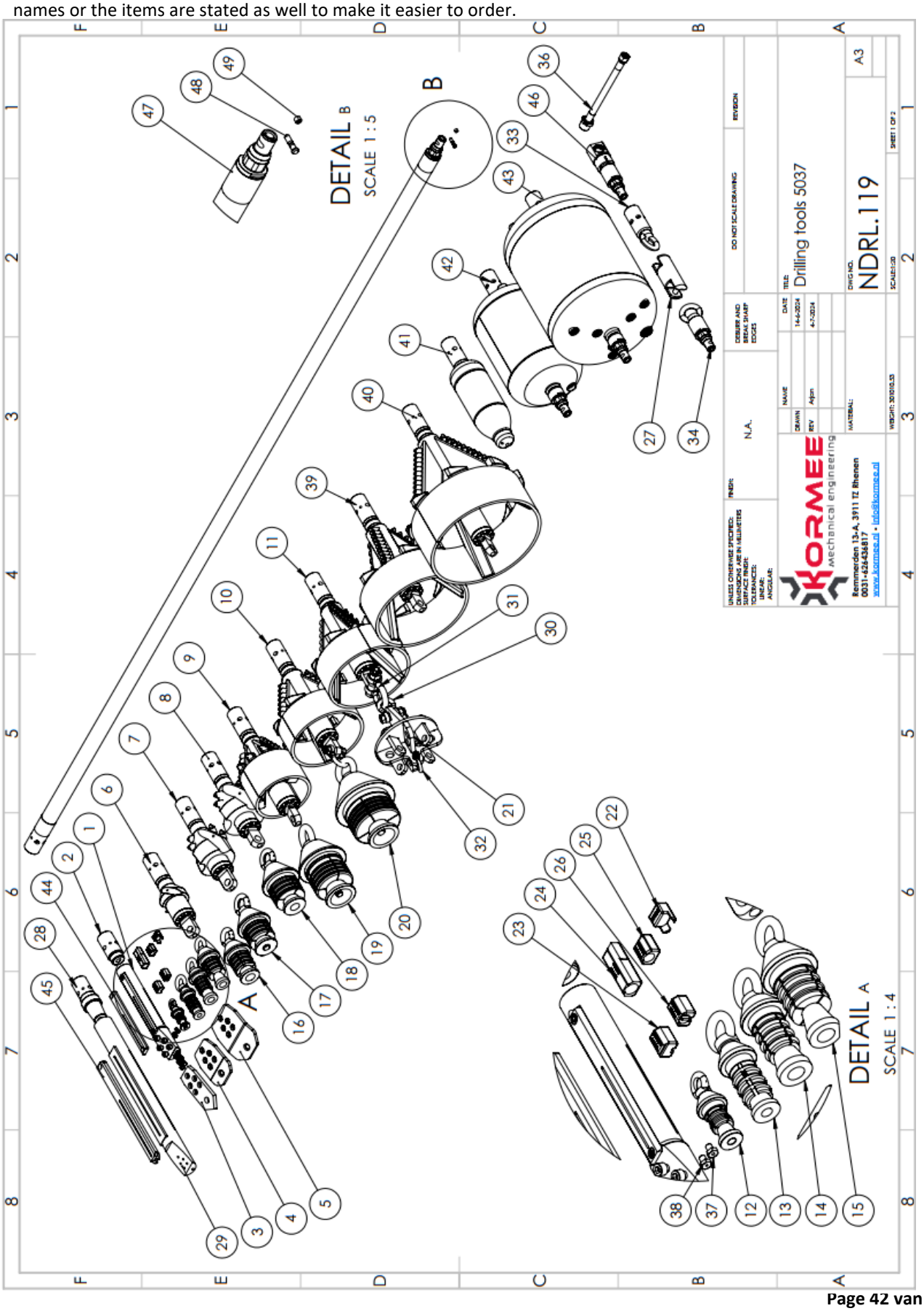
8.2. Drill heads, reamers and drill rods

Below is a list of all the drill heads, reamers, drill rods and other equipment necessary for drillings. Make sure to state the correct item number when ordering a part from KORMEE BV or the dealer. In the table below, all the correct names or the items are stated as well to make it easier to order.



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ITEM NO.	PART NUMBER	DESCRIPTION		QTY.
1	107168	KM Drill head ø50 Nano VM 5-bolt 42(B)		1
2	107169	Adapter 5037B x 42(P)		1
3	100588	VM Stuurplaat RUBBLE 2.5" 5-bolt 3/8"-16		1
4	106949	Bit 4"- 100mm VM 5-Bolt 3/8"-16		1
5	100151	Bit 5"- 125mm VM 5-Bolt 3/8"-16		1
6	107075	Backreamer ø90-5037B +swivel		1
7	107074	Backreamer ø120-5037B +swivel		1
8	107076	Backreamer ø150-5037B 4t Swivel		1
9	107077	Flycutter ø190/210-5037B+ swivel		1
10	107078	FlyCutter 240/260-5037B + Swivel		1
11	107079	FlyCutter 280/300-5037B + Swivel 4t		1
12	100022	Pullers 40mm SDR 11-17.6		1
13	100027	Pullers 50mm SDR 11-17.6		1
14	100013	Pullers 63mm SDR 11-17.6		1
15	100028	Pullers 75mm SDR 11-17.6		1
16	100029	Pullers 90 SDR11/17.6/21		1
17	100030	Pullers 110 SDR11/17.6/21		1
18	100031	Pullers 125 SDR11/17.6/21		1
19	100032	Pullers 160 SDR11/17.6/21		1
20	100720	Pullers 200 SDR11/17.6/21		1
21	100355	Pulling plate ø212 Multi with loose towing eyes		1
22	101349	Fitting block DCI FT2s ø25.4-203		1
23	107194	Fitting block DCI 18mm Front		1
24	107195	Fitting block DCI 18mm Back		1
25	101350	Fitting block SNS Mkt1 back		1
26	101351	Fitting block SNS Mkt1 Front		1
27	106727	2" 4.5T HDD swivel		1
28	107002	Adapter 5037B - 2" IF(P)		1
29	100435	"2.25" Drill head 2"IF Box VM 5-Bolt DCI 15" Probe		1
30	103482	D-Washer 1/2 2000KG		1
31	103486	D-Washer 3/4 4750KG		1
32	101186	D-Washer 1/2" redpin WLL2000		1
33	107290	Adapter 5037B x M20 Oogbout		1
34	107291	Rod adapter 5037 Pin - M20(B)		1
36	107266	Mud hose for nanodrill 5060		1
37	107177	Nozzle M8 ø4mm		1
38	107176	Nozzle M8 ø3mm		1
39	107294	FlyCutter 320 5037B+ Swivel 4t		1
40	107301	FlyCutter 380/400 5037B+ Swivel 4T		1
41	107318	Barrel ø114,3 5037B		1
42	107304	Barrel ø250 5037 B+P		1
43	107306	Barrel ø350 5037 B+P		1
44	107187	Lid DCI FT2s ø25.4-203		1
45	106954	Dirt Housing door 2.25"		1
46	107161	Swivel 5037P G1"'		1
47	107071	Drill rod ø50 5037P+B L3000		1
48	106947	Securing pin rod adapter 5037		1
49	107096	Allen key M8x8 45H black		1

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