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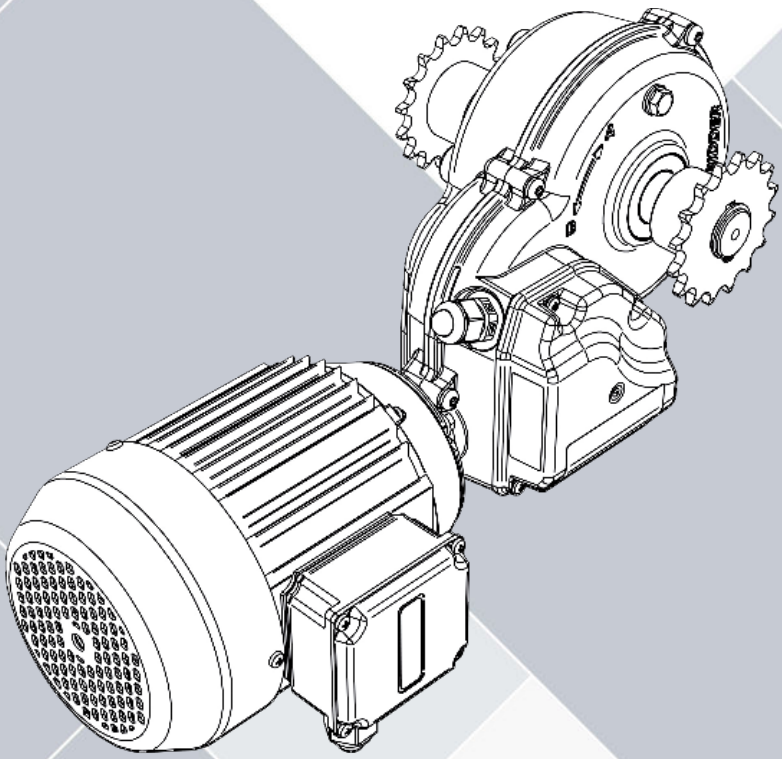
Product Manual

Ridder PolyDrive RPD

Original product-manual
265704EN - 2022.07 - V01



Helping you grow
your way

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1.1 Applicable guidelines and standards

This product complies with the provisions of the European guidelines that follow:

Machinery Directive 2006/42/EC | Low Voltage Directive 2006/95/EC | EMC Directive 2004/108/EC

The harmonized standards (or parts of these standards) that follow are applicable:

NEN-EN-ISO 12100:2010 | NEN-EN-IEC 60204-1 |
NEN 82079-1 (62079: 2001) | NEN5509 | ISO 3864-2

Make sure that this product is only put into operation if the system (in which it will be installed) complies with the provisions of the applicable standards and guidelines.

Regulatory Conformity

1.2 Approved personnel

This product manual contains important information for installers about the installation and commissioning of a PolyDrive RPD motor gearbox. Read this product manual and instructions first before the work starts. Approved mechanical and/or electrical installers, with professional competence, must do all work safe and responsible.

TARGET GROUP FOR EACH CHAPTER	CHAPTER (refer to Table of Contents)										
TARGET GROUP	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	
User (operator)	•	•	•			•			(•)		
Installer / Approved personnel	•	•	•	•	•	•	•	•	•	•	
(•) = Not fully applicable											

Keep this product manual with the product during the lifespan. Make sure that it is available for users (operators), installers and approved personnel.

1.3 Warning about discouraged use

The conditions that follow are applicable:

- Do not change (the construction of) the RPD motor gearbox.
- It is not permitted to weld to the drive-unit or its parts.
- It is not permitted to use the RPD motor gearbox to lift or move people.
- It is not permitted to use the RPD motor gearbox for hoist functions.
- Do not let the torque of the RPD motor gearbox be more than its maximum.
- Do not let the duty cycle of the RPD motor gearbox be more than its maximum.
- It is not recommended to use the RPD motor-gearbox in (almost) frictionless systems, that move easy and are not physically stopped at the end position. Refer to §2.3.

Refer to §3.3 for a description of the intended use.

1.4 Warranty provisions

For the warranty period and conditions refer to the 'Conditions' section on our website at **ridder.com**, or in the Ridder catalogue.

2. SAFETY, PRECAUTIONS AND SYMBOLS

2.1 Signal words, instructions and warnings

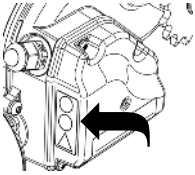
Signal words (ISO 3864-2)
This product manual contains safety instructions with different signal words. The list that follows gives the risk levels and possible effects of each signal word.

TIP	Suggestion to perform an operation more effective.
ATTENTION	**May result in damage or problems if an action is performed incorrectly.**
CAUTION	**May result in minor injury if the hazard is not avoided.**
WARNING	**Significant injury, possible death, if the hazard is not avoided.**
DANGER	**Severe injury and possible death if the hazard is not avoided.**

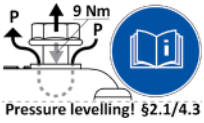
Instructions and warnings on the product

Read the product manual to fully know all product properties, before it is used or work starts!

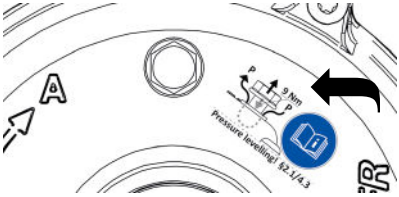
It is not permitted to use high-pressure cleaners (and related cleaning agents)! Use a soft brush with a small quantity of water without cleaning agents.



Warning - Electrical voltage



Read the product manual. Refer to §4.3 Installation / Pressure levelling.



Precautions

GENERAL

A system can be dangerous. Safety precautions and instructions are important.

- If these precautions cannot be obeyed, then use warnings.
- The responsibility for precautions and warnings lies with the installer of the system. Refer to the, local or national, laws and regulations of the country if a certification (mark) is necessary.
- Parts of the electrical or electronic installations are connected to dangerous electrical voltages. Work without professional competence or not obeyed warning instructions could cause injury and/or material damage.
- Ridder is not responsible for injury, material damage or consequential damage if accessories are used that Ridder did not make.

TRANSPORT, STORAGE AND PACKAGING

The conditions and instructions that follow are applicable.

- Ambient temperature: -15 to +60 °C (+5 to +140 °F).
- Ambient: A not-condensed relative humidity is necessary.
- Do a check for transport damage and missing parts immediately on incoming goods.
- Tell damages and missing parts immediately to the transport company and to your local After Sales contact person.
- Do not use damaged products and if necessary do not start the work.
- Send the product to the installation site before it is removed from the (sealed) packaging. This prevents damage (from mechanical shocks) to the product.
- Use applicable means-of-transport with dimensions which are sufficient. Use (if necessary) the correct work equipment and accessories. Refer to “Dimensions” and “Technical specifications”. Make sure that the working conditions comply with the, local or national, laws and regulations.
- Make sure that storage areas and the areas in the means-of-transport are dry and the airflow is sufficient.
- Make sure that the products do not touch the (moist) bottom surface of storage areas and of the means-of-transport (use pallets or such). The bottom surfaces must be smooth.
- Make sure that the products are protected from dust, dirt and direct sunlight.
- Apply an applicable corrosion-preventive agent to surfaces that are not painted.
- After installation discard the packaging and obey the applicable national and/or local regulations.

Safety instructions

⚠ DANGER	**If you do not obey the safety instructions that follow it can be dangerous and cause injury.**

- **IF NECESSARY: For a fail-safe function install redundant safety systems to prevent that loads or system parts fall uncontrolled. Install (if necessary) protection from system parts that move. Obey the applicable national and/or local standards and guidelines of the related type of operated system.**
- Use (if applicable) personal protective-equipment for protection which agrees with the different types of work.
- Do not let persons and not approved personnel be near controls and systems in operation.
- Damaged systems must be stopped immediately until they are repaired.
- Use safety barriers, for system parts that move, to a height of 2.5 m from the ground.

- The safety distance to the danger zone (if applicable) must agree with ISO 13857:2008.
- Do not operate systems when persons are in the danger zone and can touch the system.
- Monitor the danger zone when you work with or near the system.
- Stop and de-energize systems during maintenance and cleaning work on or near the system.
- Make sure that there is sufficient space between parts that move and adjacent objects.
- Stay away from or safety areas where there is a risk to become caught in a system that moves.
- The torque and the duty cycle of the system must be in the range of the motor gearbox parameters. Refer to the product manual of the used Ridder motor-gearbox at **ridder.com**.

2.3 Residual risks

Frictionless systems (load and friction)

⚠ WARNING	**Accidental operation of a safety switch can occur when the load moves in the direction-of-gravity. This is a risk in almost frictionless systems, that move easy and are not physically stopped at the end position.**

Automatic controls

The Ridder drive-units are usually used in automatic controlled systems. Persons who do work or stay near the system must know about that. If persons or their clothes touch the system during operation, it can be dangerous.

⚠ DANGER	**Persons can be in danger of life if they touch a system that is in operation.**

Forces

Because of the forces in the systems (in which the drive unit is installed), Ridder cannot be sure that there will be no injury to persons or damage to the system.

2.4 Symbols and abbreviations

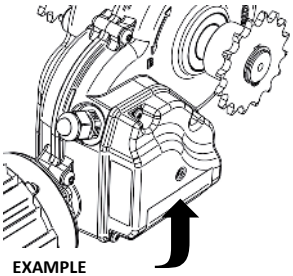
This section tells about used symbols and abbreviations in this manual. The table that follows gives the descriptions.

Symbol	Description	Symbol	Description
A1, B1	Duty switch RLS	PTC	PTC Thermistor
A2, B2	Safety switch RLS	PTO	**P**rotective **T**hermal-**O**verload Switch
A, B	Limit switch A, B	PZ	Cross head “Pozidriv”
ACS	Automatic control system	P21/1	Auxiliary contact K21
Dir A, B	Direction-of-rotation A, B	P22/1	Auxiliary contact K22
EM, M	Electric motor, Motor	P71, P72	Automated control contacts (ACS)
F1	Fuse	Q41	MPCB
K11	Auxiliary relays (safety switches)	Q41/1	Auxiliary contact Q41
K11/1	Auxiliary contact K11	RLS	Ridder Limit Switch
K11/2	Auxiliary contact K11	RPD	Ridder PolyDrive
K21, K22	Reversing relay for direction-of-rotation (3-phase)	SID	Screw-in depth
		SW	Width-across-flats

L1, L2, L3	Voltage source	S11	Manual switch (bridged safety circuit)
MBRN	Membrane		
MC	Manual control	S111	Manual switch (MC)
MPCB	Motor-Protection Circuit-Breaker	S21 (SS)	System switch (SS)
N	Neutral wire	T1, T2	PTC connection (1, 2)
P	Air pressure	U1	Safety transformer (EN 61558)
PE	Protective earth	U1, U2, V1, W1, W2	Motor connection
PH	Cross head “Phillips”		

3. PRODUCT DETAILS

3.1 Identification



EXAMPLE

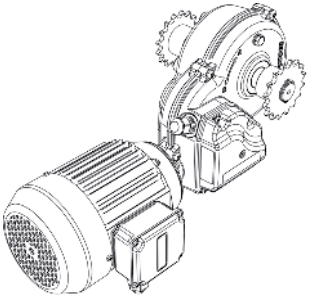
This product manual is only applicable to:

- Ridder PolyDrive-RPD Motor-Gearboxes
- Serial numbers from 200.900.000
- Item numbers from 506000.

Identification is possible from the sticker on the location shown. Refer to the explanation that follows on how to read the information. For more information on item numbers and models refer to the Ridder catalogue or website at **ridder.com**.

RPD150-3-18\115\60\36\3C\5/8-16

- 5/8-16: Sprockets 5/8” x 3/8”, 16 tooth
- 3C: CCC certification mark
  Alternatives: U (UL), C (CSA), CU (CSA/UL)
  Alternatives: No symbol in identification
- 37: Limit-switch range motor-gearbox
  Alternatives: 57
- 60: Mains frequency 60 Hz
  Alternatives: 50 Hz = No symbol in identification
- 115: Mains voltage 115 V
  Alternatives: 208-480, 230, 380, 400 or 600
- 18: Motor power in daW
  Alternatives: 25, 30, 37 or 44
- 3: Number of revolutions drive shaft at 50\60 Hz in rpm
  Alternatives: 5, 3.6 or 6
- 150: Torque RPD motor gearbox in Nm
  Alternatives: 300 or 450
- RPD: General designation Ridder PolyDrive-RPD motor-gearboxes



RPD drive units feature an enclosed housing and sealed limit-switch system. The drive units are applicable at ambient temperatures of 0-60°C. An expansion chamber with membrane maintains a low oil pressure in the drive unit, even at high temperatures. A venting plug is not necessary. This expansion chamber keeps the oil inside the gearbox in optimum condition. The gearbox is both rain and wind resistant, and can be installed in any position.

All RPD drive units are equipped with a double-sided output shaft and a self-braking worm-gear transmission. This two-stage transmission makes sure that the drive shaft is locked when the drive unit does not move. The RPD is available in 115, 208-480, 230, 380, 400 and 600 VAC models with a torque of 150, 300 or 450 Nm (refer to §3.1). An RPD can be hand-driven by means of the hexagon bolt in the electric motor shaft.

The RPD drive units are equipped with a linear limit-switch system with duty switches and safety switches. The maximum switching range (minimum-maximum) of the limit-switch system is 1–37 revolutions of the drive shaft at 3 rpm (revolutions per minute) or 3–57 revolutions at 5 rpm. Models with 150 Nm and 3 rpm (150-3, 1-phase 3-wire) are thermally protected with a PTO switch.

RPD drive units have a lightweight aluminium housing and are supplied with sprockets, the necessary keys and fasteners.

DANGER

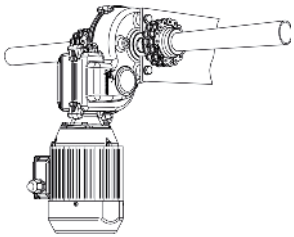
Make sure that (with RPD motor gearboxes) operated systems comply with the provisions of the applicable safety standards and safety guidelines.

This prevents (for example) the risk:

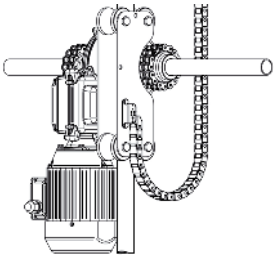
- **To become caught in a system that moves**
- **That loads or system parts that fall can hit persons.**

The RPD drive units are used in poly greenhouses for driving ventilation systems and roller screen systems. For other (different) applications approval from **Ridder Drive Systems** is necessary.

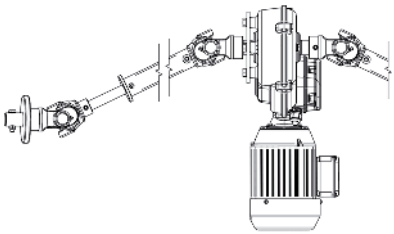
1 Continuous ventilation
2 Push-pull screening.
NOTE: REFER TO "ATTENTION"!



Sidewall ventilation with carriage.



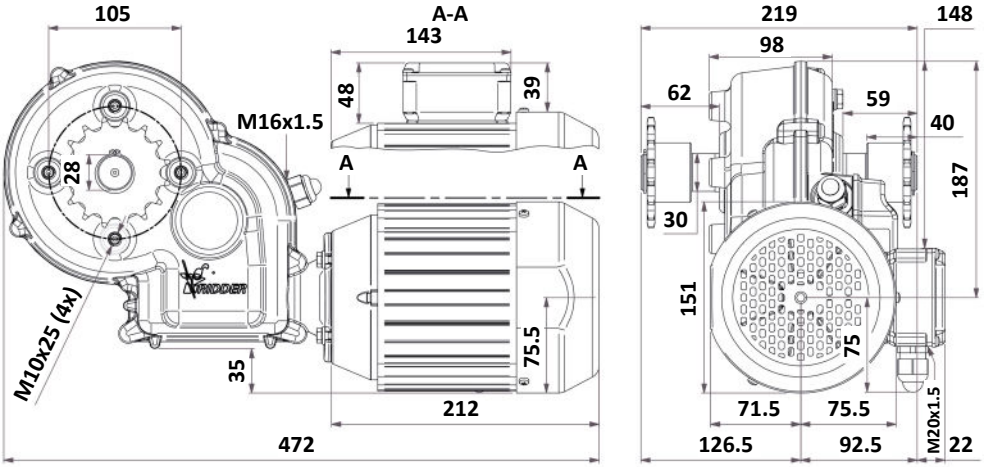
Sidewall ventilation with sliding cardan-shaft.



ATTENTION

Push-pull systems with a section size of 4.40 m or MORE: only TU21-40 rack drive permitted!
Push-pull systems with a section size of 4.39 m or LESS: use RSD250 rack drive.

3.4 Dimensions



Note: The dimensions and illustrations are approximate. In this product manual shown illustrations can be different than the components and/or systems.

3.5 Technical specifications

Mechanical	
Torque	150, 300 or 450 Nm
Speed	3 or 5 (3.6 or 6) rpm\50 (60) Hz
Transmission ratio	i = 1:443 (3 rpm), i = 1:286 (5 rpm)
Switching range between end positions	3 rpm: 1–37 rev (minimum-maximum)
	5 rpm: 3–57 rev (minimum-maximum)
Drive unit	Self-braking
Dimensions (WxHxD)	472 mm x 262.5 mm x 241 mm (approximately)
Weight	14.4-18.8 kg

Electrical	
Supply voltage	115, 230 V AC (1~) or 208-480, 380, 400, 600 V AC (3~)
Power	0.18 kW, 0.25 kW, 0.30 kW, 0.37 kW or 0.44 kW
Duty Cycle	Applicable for intermittent duty, duty class s3-35%, up to 25 minutes
Cable gland (gearbox)	M16x1.5 mm, Ø5.0 to 10.0 mm, tightening torque 2.5 Nm
Cable gland (EM)	M20x1.5 mm Ø 6.0-12.0 mm, tightening torque 5 Nm

Ambient	
Protection rating	IP55
Ambient temperature	0 to +60 °C (+32 to +140 °F)

Installation is only permitted to approved personnel.

Do a check of the supplied parts in the table that follows. Use these parts with the mounting plate (selection) or guiding unit (selection) which is applicable. Refer to §4.3.

Parts list 506000*			
506000 RPD motor gearbox**	1x	**291390** Bolt M10x25 mm	3x
		295159 Spring washer M10	3x
* Minimum parts list: Drive unit **without** optional parts and accessories.			
** Sprockets and keys are installed on the drive unit.			

4.1 Special tools and equipment

No **special** tools or equipment are necessary to install, to connect or for commissioning.

Make sure that the correct equipment and tools are used.

4.2 Mounting positions

Installation of RPD motor-gearboxes is permitted in all necessary mounting positions.

The conditions and starting points that follow are applicable for installation. Make sure that the working conditions comply with the, local or national, laws and regulations.

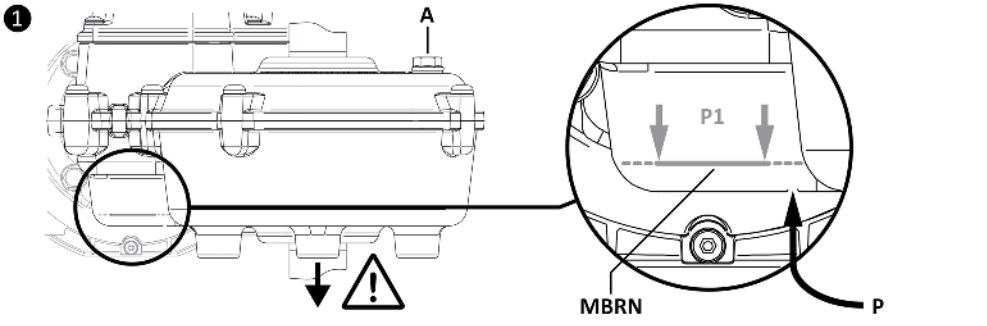
- Do not remove the product from the packaging until a short time before the installation.
- Use the correct work equipment and accessories (belts, chains, pallets or such) if it is not permitted or possible to put the product manually in position.
- The mounting plates are available in different dimensions for different configurations. Refer to the Ridder catalogue or website **ridder.com** for more information.
- Attach the RPD drive-unit to a mounting plate or guiding unit with the supplied spring washers and bolts M10x25 (3x). Refer to "**Minimum screw-in depth fixing-bolts (SID)**" which also shows the standard bolt-installation.

Pressure levelling

Difference in air pressure (P) of low-altitude areas and high-altitude areas has an effect on the initial position of the membrane (MBRN) in the expansion chamber. This makes pressure levelling at the installation site necessary. Do this before the installation.

Obey the procedure that follows.

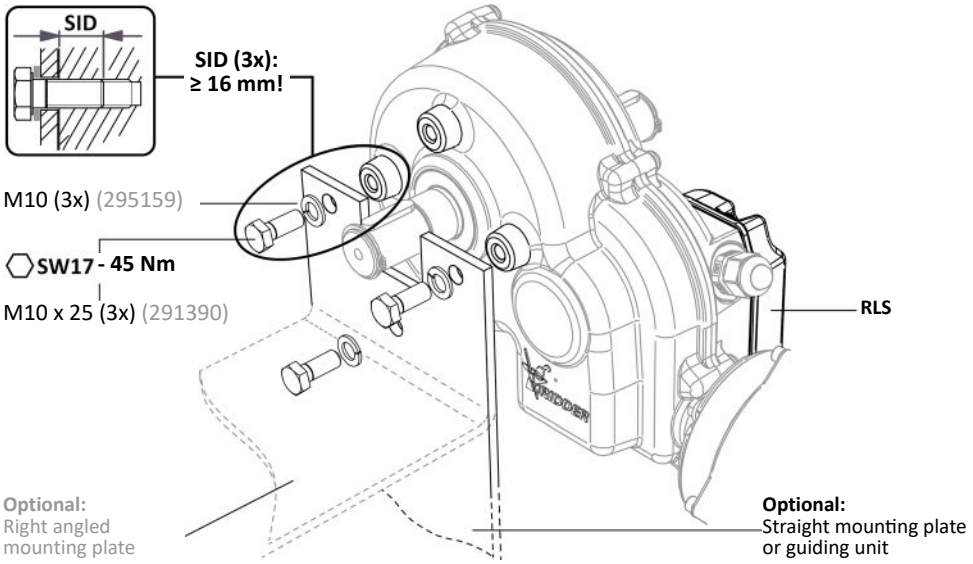
1. Put the RPD drive-unit in horizontal position and make sure that the sealing plug (A) points up. This prevents that oil flows out of the RPD drive-unit.
2. Loosen the sealing plug (A) and make sure that the internal pressure (P1) and the external pressure (P) are the same.
3. Tighten the sealing plug (A) with the correct tightening torque (**9 Nm**).



Minimum screw-in depth fixing-bolts (SID)

- For the tightening torque of the used fixing bolts a **minimum** screw-in depth **(SID)** is necessary. Refer to the illustration that follows.
- Possibly fixing bolts with more length are necessary if a larger sheet thickness is used!
- Tighten the bolts crosswise and gradually with the correct tightening torque (**45 Nm**).

Standard Bolt-installation

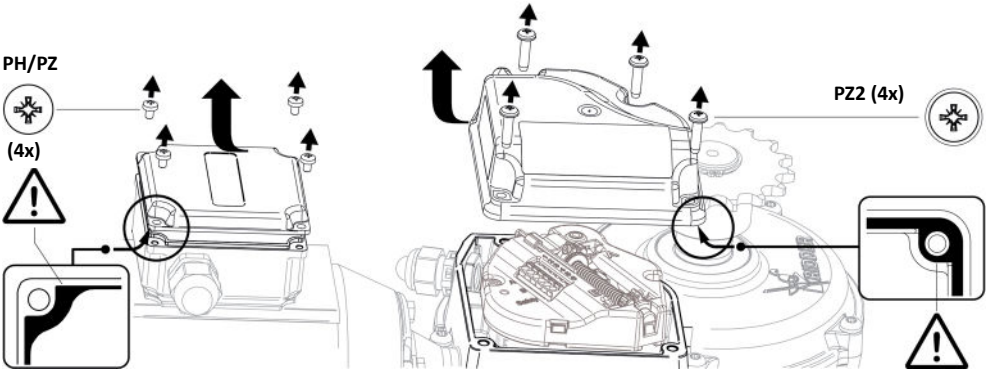


⚠ CAUTION	**Do the check of the minimum screw-in depth (SID) of the configuration that follows: SHEET THICKNESS and fixing-bolt LENGTH. This prevents damage or injury (breakage risk).**
⚠ CAUTION	**Make sure that the drive unit is installed in a stable condition. The structure must have sufficient strength for the applied forces.**
⚠ ATTENTION	**Make sure that easy access to the covers of the drive-unit is possible for all work.**

Only to approved personnel it is permitted to do the connect instructions.

Removal covers

- Remove the bolts (2x4) and the covers (2x) temporarily to do all necessary work. The gaskets (2x) usually stay in their position.
- Make sure that no damage is caused to the gaskets and that they do not become dirty.
- Install the covers (2x) again after the work! Refer to the end of chapter 7



In this product manual shown illustrations can be different than the components and/or systems.

5.1 Electrical material

- A conductor cross-section of **1.5 mm²** is applicable to the cables in the general wiring diagrams in §5.4, §5.5, §5.6 and §5.7. For the used components, electrical material and cable lengths the necessary conductor cross-section can be different. Always refer to the related information and manuals.
- Motor-current connection through the RLS is not permitted! The limit-switch system is applicable for the currents that follow: **< 1 A at 24 V AC or < 100 mA at 230 V.**
- The electric motor (EM) has a cable gland M20x1.5mm to put through the motor connections and PTC cables (if applicable).
- The gearbox has a cable gland M16x1.5 mm to put through the RLS cables.
- To comply with IP classification(s), refer to the specifications (Ø/Nm) in §3.5!

⚠ ATTENTION	**Use only applicable components and electrical material. Refer to the information of the components and electrical material.**
⚠ ATTENTION	**The RLS is NOT applicable for motor-current connection through the limit-switch unit.**

5.2 Protection - Conditions and starting points

The conditions that follow are applicable to the wiring diagrams.

- The installer makes sure that a motor-protection circuit-breaker (MPCB) is used and included in the wiring diagrams.
- The installer makes sure that necessary and not shown protections are used and included in the wiring diagrams.
- Make sure that you can see the operated system from all control units and control systems. Put control units and control systems at a height of more than 1.5 m.
- Protect the electric connections from moist conditions.

⚠ WARNING	**Electrical connections are only permitted to an electrical installer or an electrician.**
⚠ WARNING	**A fully and correctly connected wiring diagram is necessary. It is mandatory to connect all connections (6x) of all safety switches and duty switches.**
⚠ CAUTION	**For connection work the system must be de-energized.**
⚠ ATTENTION	**The installer sets the Motor-Protection Circuit-Breaker (Q41) to the value of the nominal current of the electric motor.**
⚠ ATTENTION	**Always make sure that the protections comply with the, local or national, laws and regulations of the country.**

Induction

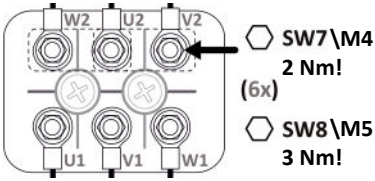
Problems with induction must be prevented. Induction can cause an interference with the electronics.

Induction can have many causes such as:

- Cable lengths
- External sources
- Too many cables together.

⚠ ATTENTION	**Separation of cables is necessary. This prevents problems with induction.**

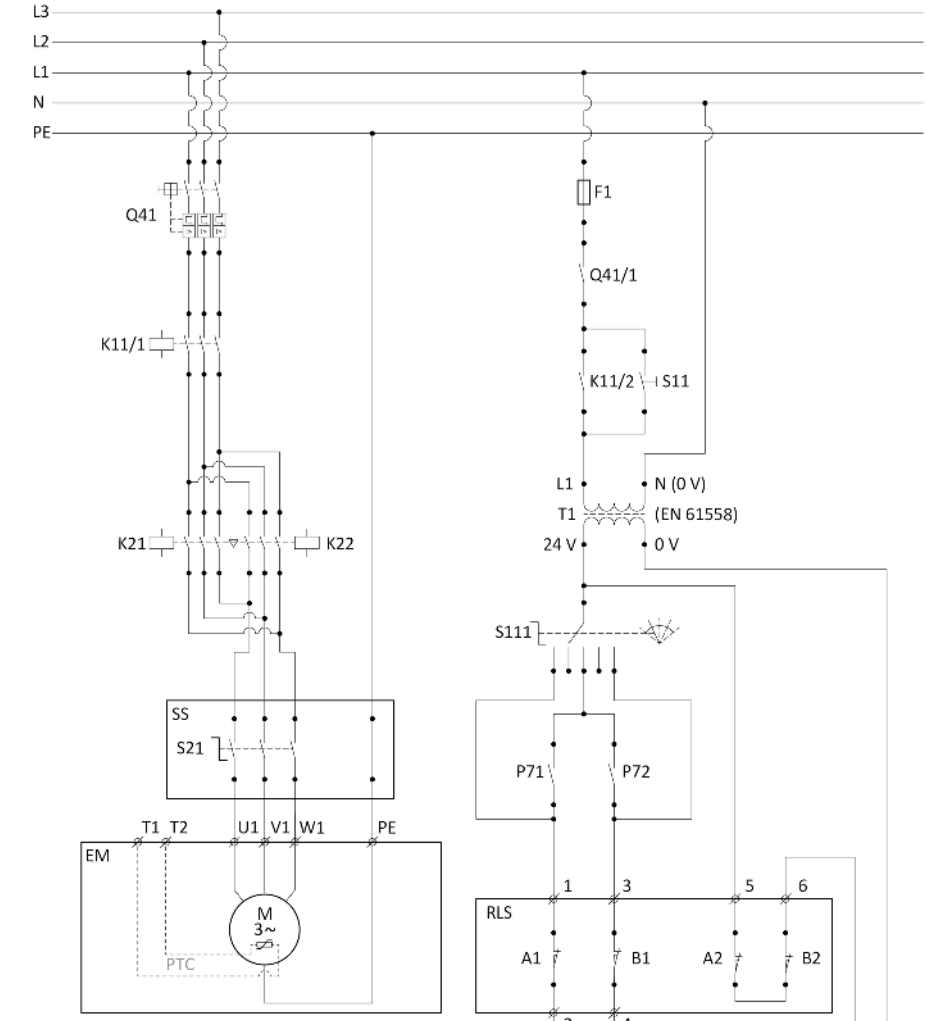
5.3 Tightening-torque motor-connections



Tighten the motor connections with the correct tightening torque!

- **M4** connections: **2 Nm**
- **M5** connections: **3 Nm**.

5.4 Wiring diagram: 3-phase motor



WARNING

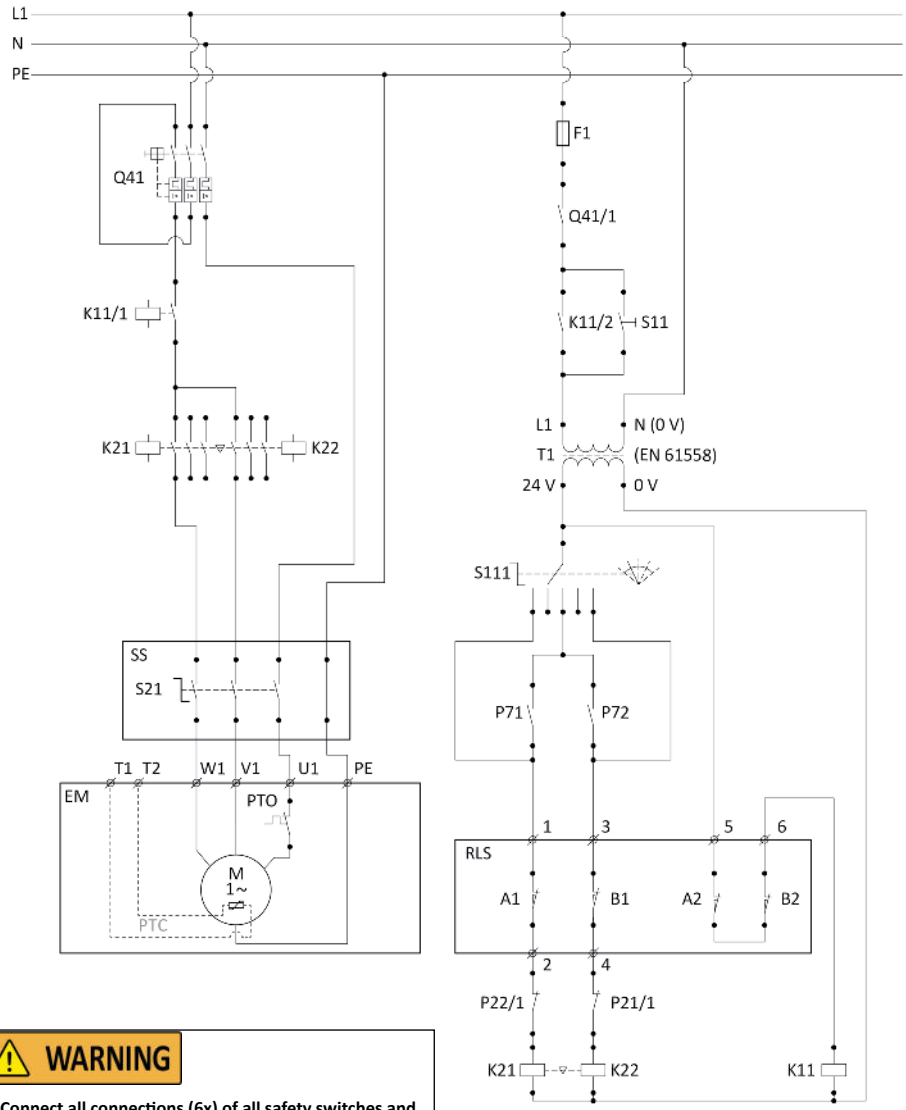
Connect all connections (6x) of all safety switches and duty switches.

A1 Duty Switch: 1-2 (RLS)
B1 Duty Switch: 3-4 (RLS)
A2/B2 Safety Switch: 5-6 (RLS)

TIP

Change direction-of-rotation:
Interchange U1 and V1 on the terminal block (EM).
Change switching sense: Interchange 1 and 3, plus 2 and 4 of the RLS.

5.5 Wiring diagram: 1-phase 3-wire motor



WARNING

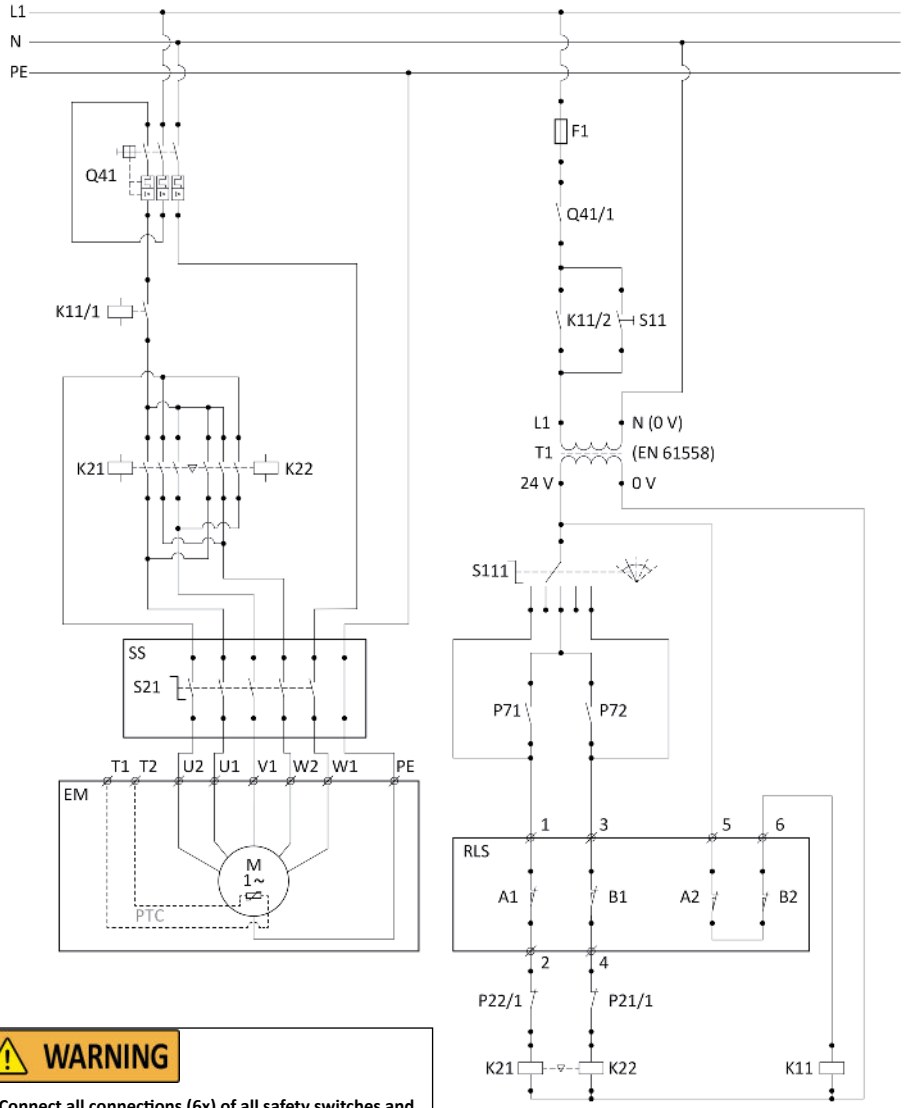
Connect all connections (6x) of all safety switches and duty switches.

A1 Duty Switch: 1-2 (RLS)
B1 Duty Switch: 3-4 (RLS)
A2/B2 Safety Switch: 5-6 (RLS)

TIP

Change direction-of-rotation:
Interchange V1 and W1 on the terminal block (EM).
Change switching sense: Interchange 1 and 3, plus 2 and 4 of the RLS.

5.6 Wiring diagram: 1-phase 5-wire motor



WARNING

Connect all connections (6x) of all safety switches and duty switches.

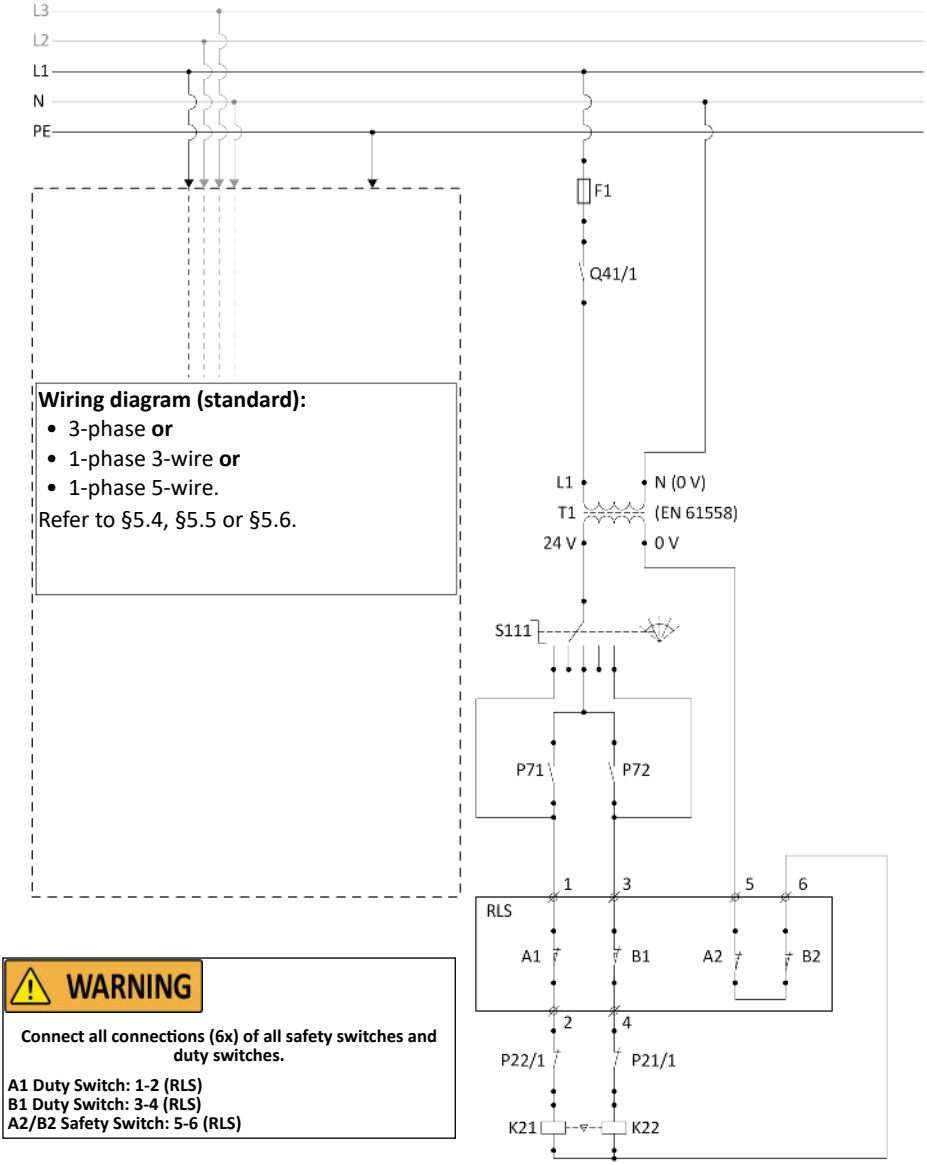
A1 Duty Switch: 1-2 (RLS)
B1 Duty Switch: 3-4 (RLS)
A2/B2 Safety Switch: 5-6 (RLS)

TIP

Change direction-of-rotation:
Interchange V1 and W2 on the terminal block (EM).
Change switching sense: Interchange 1 and 3, plus 2 and 4 of the RLS.

5.7 Alternative control-circuit (without safety relay K11)

Alternative connection of the control-circuit with common connection through the safety switches. The safety relay (K11) is not part of the wiring diagram. This alternative connection makes sure that operated safety switches are sensed. If applicable, include the control circuit that follows in a standard diagram (§5.4, §5.5, §5.6).



Wiring diagram (standard):

- 3-phase **or**
- 1-phase 3-wire **or**
- 1-phase 5-wire.

Refer to §5.4, §5.5 or §5.6.

WARNING

Connect all connections (6x) of all safety switches and duty switches.

A1 Duty Switch: 1-2 (RLS)
B1 Duty Switch: 3-4 (RLS)
A2/B2 Safety Switch: 5-6 (RLS)

6.1 Usage - Conditions and starting points

The conditions and starting points that follow are applicable when you use the RPD motor-gearbox.

Automatic Control

DANGER	**The motor can start and stop automatically without a warning. Persons can be in danger of life if they touch a system that is in operation.**

Temperature

DANGER	**The motor can start and stop automatically without a warning but will stay energized. De-energize the system during work on the drive unit or the system. Persons can be in danger of life if they touch a system that is in operation.**
CAUTION	**A drive unit can get high temperatures. If necessary take protective precautions to prevent injuries.**

Waiting time

CAUTION	**The waiting time must be approximately 2 seconds when you change the direction-of-rotation. The electric motor must stop. This prevents that it continues in the initial direction.**

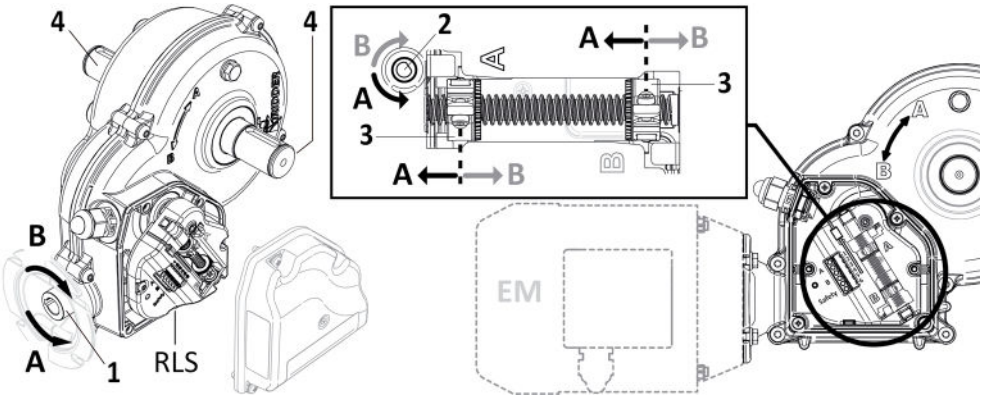
SAFETY STOP

CAUTION	**When a "safety stop" (safety switch) occurs:** **• Do a check of the condition of the operated system. Make sure that the system can be safely operated.** **• Do a check of the condition of the limit-switch system (switching cam --> switching spring).** **If necessary: Put switching cam below lifting element (§7.5).** **Make sure that the system can be safely operated.** **• If necessary: Adjust the end positions again.** **This prevents damage or injury.**

6.2 Direction-of-rotation of RPD motor gearbox

The illustration that follows shows the direction-of-rotation A and B of:

1. The input shaft (direction-of-rotation of the motor)
2. The worm-gear transmission
3. The RLS limit-switch system. The connection nuts move in the same direction (A or B)
4. The output shafts. Refer to A and B on the gearbox housing.



6.3 Operation

An RPD motor gearbox can be operated by an intelligent control unit (Ridder MotorControl RMC). Operation is also possible together with one or two of the control components that follow:

- Automatic control system (ACS)
- Manual control (MC).

Refer to the Ridder catalogue or website **ridder.com** for more information. Always refer to the manuals of the control components used.

6.4 Safety functions and stop functions

The RPD motor-gearbox has the safety functions and stop functions that follow:

1. Stop at an adjusted end position when a duty switch is operated
2. Stop when a safety switch is operated if a duty switch not disconnects
3. Lock the position of the drive shaft, when the drive unit is stopped, because of a self-braking worm-gear transmission
4. Thermal-overload protection of the electric motor with a built-in PTO switch. (The model with 150 Nm and 3 rpm (150-3, 1-phase 3-wire).)

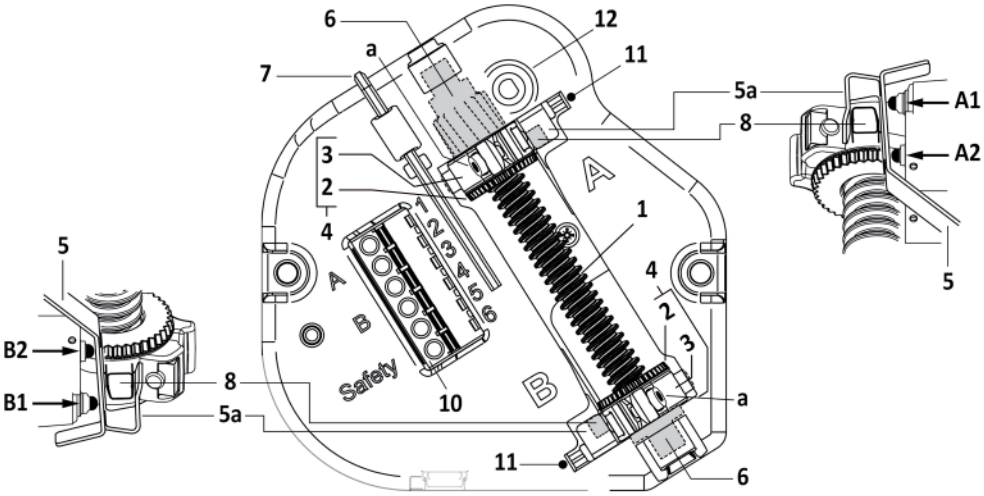
The commissioning is only permitted to approved personnel.

7.1 Commissioning - Conditions and starting points

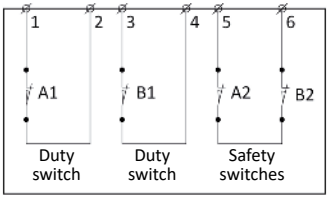
It is important to fully know the functional operation of the RLS limit-switch system in §7.2. After that obey the procedures in §7.3, §7.4 and if necessary §7.5.

CAUTION	**Do not go across the limits of the system. This prevents damage or injury.**
ATTENTION	**Before the system is put into operation, the installer must always make sure that the limit switch is correctly adjusted.**
WARNING	**Make sure that there is no blockage of the system before the limit-switch system is adjusted. This prevents damage or injury.**

7.2 RLS Limit-switch system



1. Threaded shaft
2. Knurled nut
3. Adjusting ring
4. Connection nut
5. Switching spring
5a. Lifting element
6. Stopper
7. Hex wrench 2 mm
8. Switching cam
9. -
10. Connection Terminals (0.8-1.5 mm²)
11. Housing/pivoting point)
12. Worm-gear transmission
a. Adjusting screw
A1. Duty switch
B1. Duty switch
A2. Safety switch
B2. Safety switch



7.2.1 Voltage range and current

The contacts in the switches, in the limit-switch system, are applicable for the currents that follow:

- 24 V AC to 1 A
- 230 V to 100 mA.

7.2.2 Limit-switch system

The limit-switch system is a linear switch system, designed for use in the RPD motor gearboxes. The limit-switch system is, with a transmission, driven by the intermediate shaft of the motor gearbox. A number of revolutions of the output shaft can be set between the end positions. The maximum switching range (minimum-maximum) of the limit-switch system equates to 1–37 (3 rpm) or 3–57 (5 rpm) revolutions of the drive shaft.

7.2.3 Delivery

An RPD motor gearbox has a limit-switch system with connection nuts (4). Ridder does **not lock** the adjusting rings (3). The drive unit can turn freely in the two directions.

⚠ CAUTION

Do not go across the limits of the system when the motor is operated manually or is operated with electric tools (with the hexagon socket in the electric-motor shaft). This prevents damage or injury.

7.2.4 Connections and functional operation

The limit-switch system has a terminal strip with six connection terminals (0.8-1.5 mm²).

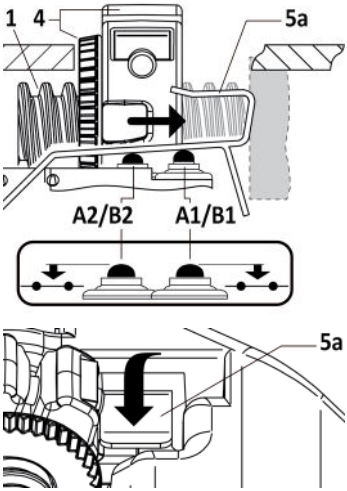
- Starting point for a correct connection and functional operation is the wiring diagram in §5.4, §5.5, §5.6 or §5.7.
- Connection of all safety switches and duty switches is **mandatory**.

7.2.5 Working principle

In operation (between the end positions)

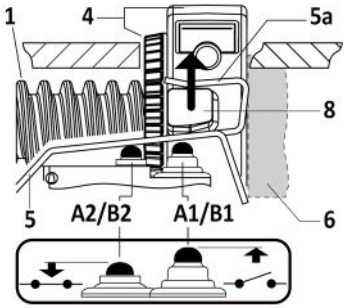
- The gearbox drives the threaded shaft (1) of the limit-switch system through a worm-gear transmission (12).
- The connection nuts (4) move linearly along the threaded shaft (1).

Note: The starting point is with the connection nuts (4) in locking position. Refer to §7.2.6 for more information about the locking system of the connection nuts (4).



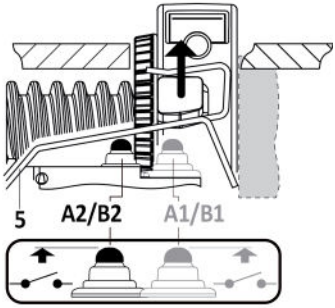
Duty switch

- When a connection nut (4) is at the end position, it touches the stopper (6). Subsequently the connection nut (4) will turn with the threaded shaft (1).
- The switching cam (8) moves the lifting element (5a). The switching spring (5) operates the duty switch (A1 or B1). The motor gearbox stops.

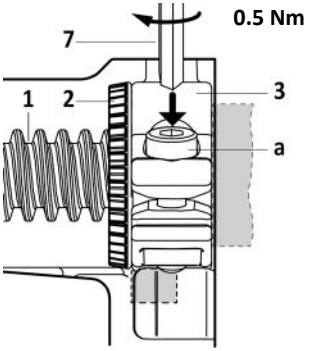


Safety switch

- If a failure of the duty switch occurs, the switching spring (5) operates the safety switch (A2 or B2).
- This makes sure the motor gearbox stops. It prevents consequential damage to the system.



7.2.6 Connection nuts - Locking system



Read the information and instructions and obey them! They are always applicable (in commissioning procedures) to the locking position of the connection nuts.

The connection nuts, on the threaded shaft (1), have two parts. A knurled nut (2) and an adjusting ring (3). The adjusting ring (3) must, if in operation, be locked to the knurled nut (2).

Instructions - Locking position

- Put the hex wrench (7) into the adjusting screw (a).
- Tighten the adjusting screw (a) with the correct tightening torque (**0.5 Nm**).

7.3 Check - Connections and functional operation

For the check, of a correct connection and functional operation, the conditions and starting points that follow are applicable:

- Check sequence: The check of the limit switches can be from A to B **or** from B to A. In this manual first the check of limit switch A is done and then limit switch B
- §7.3 and §7.4 (check and adjustment) are recommended to do **immediately after each other**
- Starting point is a fully and correctly connected wiring diagram (§5.4, §5.5, §5.6 or §5.7). Connection of all safety switches and duty switches is **mandatory**.

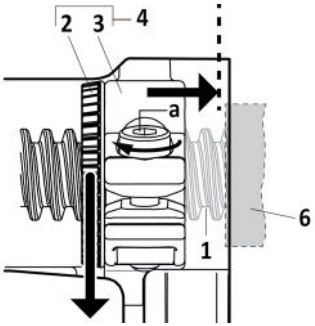
CAUTION **Put the system in a position where the motor cannot cause damage to the system when it is operated.**

▶ **Description**

1

Do as follows for A.

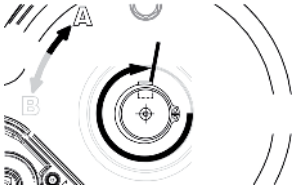
- Turn the knurled nut (2), on the threaded shaft (1), in the direction of the stopper (6).
- Put the connection nut (4) at a **small distance** from the stopper (6).
- Lock the adjusting ring (3) with the adjusting screw (a) (**0.5 Nm**).
  Refer to **§7.2.6!**

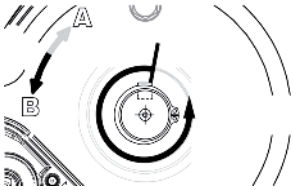
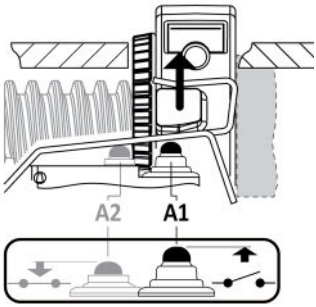
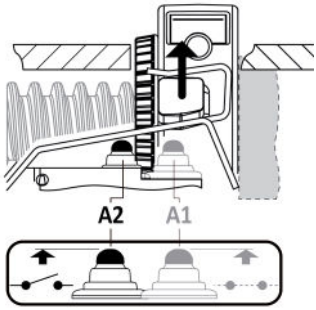
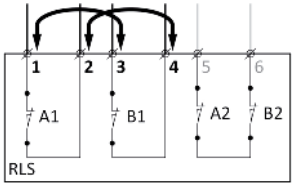


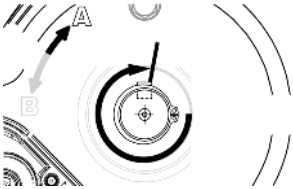
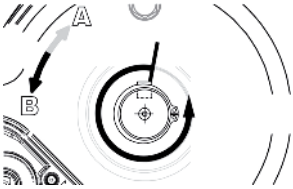
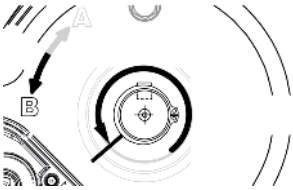
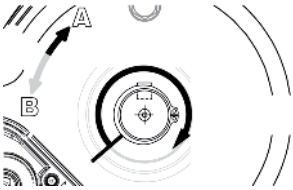
2

Let the motor turn to the direction A.

- **MOTOR STOPS** - Go to step **4**.
- **MOTOR DOES NOT STOP** - Go to step **3**.



3	Do a **check** for a **fully** and **correctly** connected diagram (§5.4, §5.5 , §5.6 or §5.7). **Note:** Examine A1, B1, A2 and B2. **CORRECT** - Contact your supplier. **NOT CORRECT** - Connect diagram fully and correctly. Go to step **1**.	
4	Try to let the motor turn to the (opposite) direction B. • MOTOR **TURNS** - Go to step **4-A**. • MOTOR DOES **NOT TURN** - Go to step **4-B**.	
4-A	If the motor turns in direction B, then duty switch A1 is operated. The connection of duty switch A1 (Direction A) and functional operation is **correct**. • Go to step **10**.	
4-B	If the motor does not turn, then safety switch A2 is operated. A1 and B1 are connected **incorrectly** (interchanged). • Go to step **5**.	
5	Interchange at the connection terminals of the RLS: • Connections 1 and 3 • Connections 2 and 4.	
6	• Unlock the connection nut A. Do step 1 again for connection nut A.	

7	Let the motor turn to the direction A. • **MOTOR STOPS** - Go to step **8**. • **MOTOR DOES NOT STOP** - Contact your supplier.	
8	Try to let the motor turn to the (opposite) direction B. • MOTOR **TURNS** - The connection of duty switch A1 (Direction A) and functional operation is **correct**. Go to step **10**. • MOTOR DOES **NOT TURN**. Go to step **9.**	
9	Do a **check** of the **condition** of the wiring. **GOOD** - Contact your supplier. **NOT GOOD** - Replace or repair the wiring. Do step **8** again.	
10	• Do step 1 again for connection nut B.	
11	Let the motor turn to the direction B. • **MOTOR STOPS** - Go to step **12**. • **MOTOR DOES NOT STOP** - Contact your supplier.	
12	Try to let the motor turn to the (opposite) direction A. • MOTOR **TURNS** - The functional operation (and connection) of duty switch B1 (Direction B) is **correct**. Go to step **14**. • MOTOR DOES **NOT TURN**. Go to step **13**.	
13	Do a **check** of the **condition** of the wiring. **GOOD**- Contact your supplier. **NOT GOOD** - Replace or repair the wiring. Do step **12** again.	
14	The check of the connections and functional operation of the RLS is completed.	

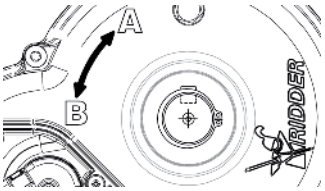
7.4 Adjustment RLS limit-switch system

The conditions and starting points that follow are applicable.

- The check of direction-of-rotation of the motor gearbox is completed in §5.4 thru §6.3.
- The check of the connections and functional operation of the RLS in §7.3 is completed.
- Do the adjusting procedure (§7.4) immediately after the check procedure (§7.3).
- The adjusting sequence can be from end position A to B or from B to A.

1

- Let the system turn to an end position (A or B).

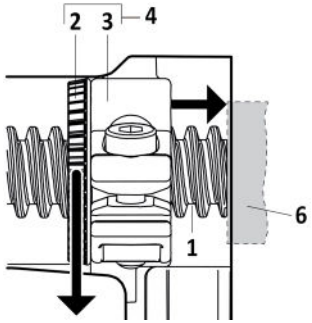


CAUTION **Do not go farther than the extreme positions of the system when the motor is operated. This prevents damage or injury!**

2

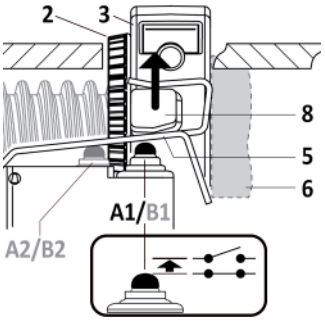
Of the related limit switch (A or B):

- Turn the knurled nut (2), on the threaded shaft (1), in the direction of the stopper (6).
- Tighten the knurled nut (2) with your hand against the stopper (6).



3

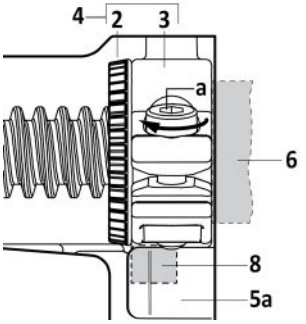
- Turn the adjusting ring (3) in the opposite direction of the knurled nut (2). The duty switch (A1 or B1) is operated by the switching cam (8) and switching spring (5).
- Hold the adjusting ring (3) at this position and go to step 4.



4

- Lock the adjusting ring (3) with the adjusting screw (a) (**0.5 Nm**).
  Refer to **§7.2.6!**

Go to step 5 to adjust the opposite end position (A or B).
Go to step 7 if the two end positions are adjusted.



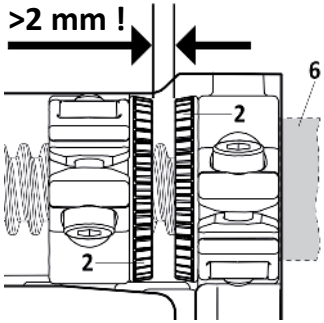
- Do step 1 again for the opposite end position (A or B).

CAUTION

Make sure the knurled nuts (2) do not touch each other. This prevents damage to the limit-switch system!

5

- Always make sure there is a distance of more than **2 mm** between the knurled nuts (2).
  Note: At the 2 mm point the switching range is at its maximum. It is not permitted to set more than the maximum switching range (distance smaller than 2 mm). This also makes the RPD not applicable for the system!



6

- Do the steps 2 thru 4 again to adjust the opposite end position (A or B).

WARNING

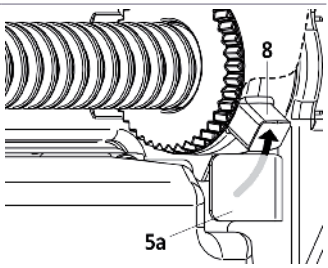
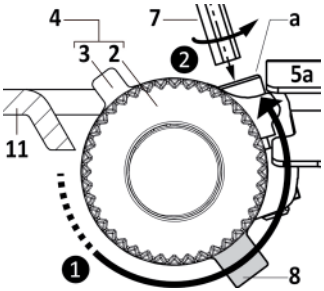
Always do a check of correct functional operation of the limit-switch system, after the two end positions are adjusted!

7

- The procedure to adjust the limit-switch system is completed.

7.5 REPAIR: Put switching cam below lifting element

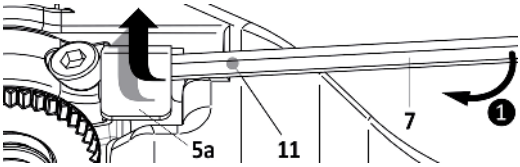
- Starting point: The switching cam (8) is **not** in the position **below** the lifting element (5a).

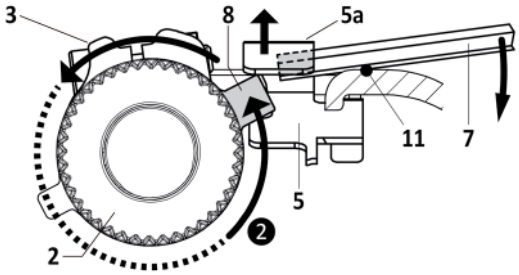
	▶ Description	
1	The system went (possibly) farther than the extreme positions. There is a **risk** for a system in a damaged or dangerous condition!	
	CAUTION **Do a check of the condition of the system. Make sure that the system can be safely operated. This prevents damage or injury!**	
2	❶ Manually turn the connection nut (4) and make adjusting screw (a) accessible for the hex wrench (7). ❷ Loosen the adjusting screw (a). Make sure the adjusting ring (3) can turn freely.	

3

❶ **Lift** the lifting element (5a) to the **maximum** with the hex wrench (7) and **hold** this position. Use the **edge** of the housing (**11**) as the **pivoting point**.
Note: Do not put the hex wrench (7) too far below the lifting element (5a).

❷ Turn only the adjusting ring (3) with your hand. Put the switching cam (8) below the lifting element (5a) and remove the hex wrench (7).





4

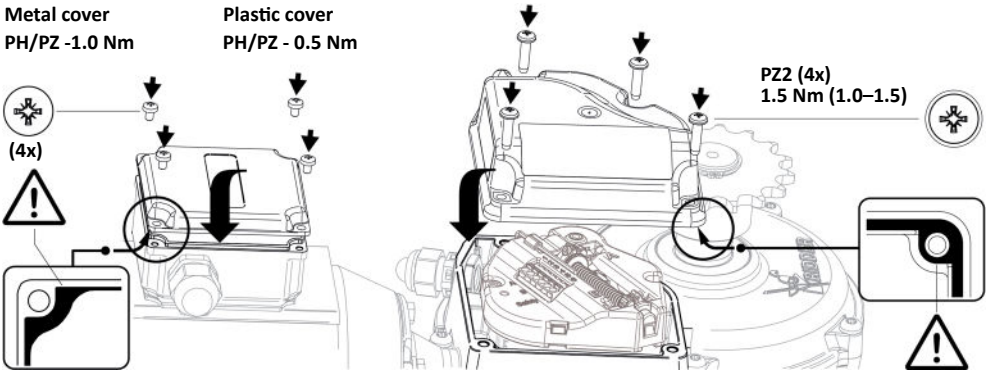
WARNING **Make sure to adjust the end positions again. This prevents significant injury or possible death.**

Go to §7.4. Obey the procedure to adjust the end positions!

Installation covers

Always put the covers (2x) and the bolts (2x4) back after the work. **Problems** with **moisture** and/or the **IP** protection rating (if applicable) must be **prevented!**

- Do a check of the gaskets (2x) for dirt and damages.
- Put gaskets (if removed) back carefully and make sure that no damage is caused.
- Tighten the bolts crosswise and gradually with the correct tightening torque (2x4).



In this product manual shown illustrations can be different than the components and/or systems.

8. MAINTENANCE INSTRUCTIONS

Inspection and maintenance work is only permitted to approved personnel. If necessary remove covers to do the work. Refer to chapter 5.
For safe and correct maintenance, read (if necessary) the (applicable) sections of:

- Chapter 2, chapter 6, chapter 7 (§7.1, §7.2, §7.3), chapter 9 and chapter 10 (§10.1).

Always **put** removed **covers back** after the work! Refer to the end of chapter 7.

8.1 Maintenance

Maintenance on the RPD motor gearbox is usually not necessary (“maintenance-free”). It is recommended to do the checks that follow every 6 months:

- Of the correct operation of the drive unit and the system
- For oil leakage. Tell your installer if there is a leakage
- Of the mechanical condition (wear and tear, fasteners, correctly attached and such)
- Of the adjusted end positions (are they still correct for the system?).

Contact your supplier if:
- Replacement of parts is necessary
- A problem is found with no solution. Refer to §9.1 first.

Refer to the Ridder catalogue or the website **ridder.com** for more information about spare parts (or accessories) that are available.

If necessary remove covers to do the work. Refer to chapter 5.
For safe and correct servicing, read the (applicable) sections of:

- Chapter 2, chapter 6, chapter 7 (§7.1, §7.2, §7.3) and chapter 10 (§10.1).

Always **put** removed **covers back** after the work! Refer to the end of chapter 7.

9.1 Troubleshooting

Troubleshooting is only permitted to approved personnel. This section tells about possible malfunctions and their solutions. If a malfunction is not in the list that follows, contact your supplier.

Malfunction 1	**The RPD does not operate when control signals are transmitted.**
Observation 1	The output shaft of the reductor does not turn.
Cause 1	There is a problem with the connections or cables.
Solution 1	Do a check of the connections and cables and repair these if necessary.
Cause 2	The safety switch A2 or B2 is operated. The switching sense is not correct.
Solution 2	Interchange at the connection terminals (10) of the RLS: • Connections 1 and 3 • Connections 2 and 4.
Cause 3	A duty switch (A1 or B1) is defective.
Solution 3	Replace the RLS. • If switching spring (5) operated A2, then A1 is defective • If switching spring (5) operated B2, then B1 is defective.
Malfunction 2	**The RPD does not turn while the electric motor (EM) is in operation.**
Observation 2	The electric motor (EM) turns, while the output shaft of the reductor does not turn.
Cause 1	The electric motor is defective.
Solution 1	Do a check of the electric motor (EM) and replace it if defective.
Cause 2	There is a mechanical defect.
Solution 2	Remove the electric motor (EM). Do a check of the key and replace it if defective. If the key is not defective, then replace the reductor.

9.2 Technical support

For technical support contact your local After Sales contact person. You can find your local After Sales contact person on our website at **ridder.com**.

10. ENVIRONMENT

10.1 Decommissioning and removal

Decommissioning and removal is only permitted to approved personnel.
The starting points that follow are possible:

❶ During the work it is necessary to de-energize.
❷ Storage is necessary because of temporary removal.
❸ The product is at the end of the lifespan.

❶ Temporary decommissioning: Work

1. Refer to §2.2 “Precautions” and “Safety instructions”.
2. De-energize the product.
3. Do the work (maintenance, service or such).
4. Energize the product.
5. The temporary decommissioning is completed.

❷ Temporary decommissioning: Product storage

1. Refer to §2.2 “Precautions” and “Safety instructions”.
2. Disconnect the product from the electric circuit.
3. Disconnect the product mechanically from the system and remove the product (usually in opposite sequence of the installation).

⚠ WARNING	**Make sure that the system is in a stable and mechanically tension-free condition and loosened parts (or the system) cannot hit persons! This prevents damage or injury.**

4. Refer to §2.2 “Transport, storage and packaging” and obey the (applicable) instructions and conditions.
5. The temporary decommissioning is completed.

Note: Obey the product manual for a subsequent installation!

❸ Permanent decommissioning: End of lifespan

1. Refer to §2.2 “Precautions” and “Safety instructions”.
2. Disconnect the product from the electric circuit.
3. Disconnect the product mechanically from the system and remove the product (usually in opposite sequence of the installation).

⚠ WARNING	**Make sure that the system is in a stable and mechanically tension-free condition and loosened parts (or the system) cannot hit persons! This prevents damage or injury.**

4. Make the product unserviceable and make a mark on the product. This prevents that the product is (accidentally) used again.
5. The permanent decommissioning is completed. Refer to **§10.2** “**Waste disposal**”.

Discard products of **Ridder Drive Systems** after their lifespan and obey the applicable national and/or local regulations.

Make sure that after disassembly there is a separation of:
- The collected operating materials (if applicable) such as oil, grease and such
- The different materials (if applicable) such as metals, non-ferrous metals, plastics and such.

It is recommended that approved personnel and/or a company that is specialized in “Waste disposal” do the work.

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