

# Ridder – Drive Systems

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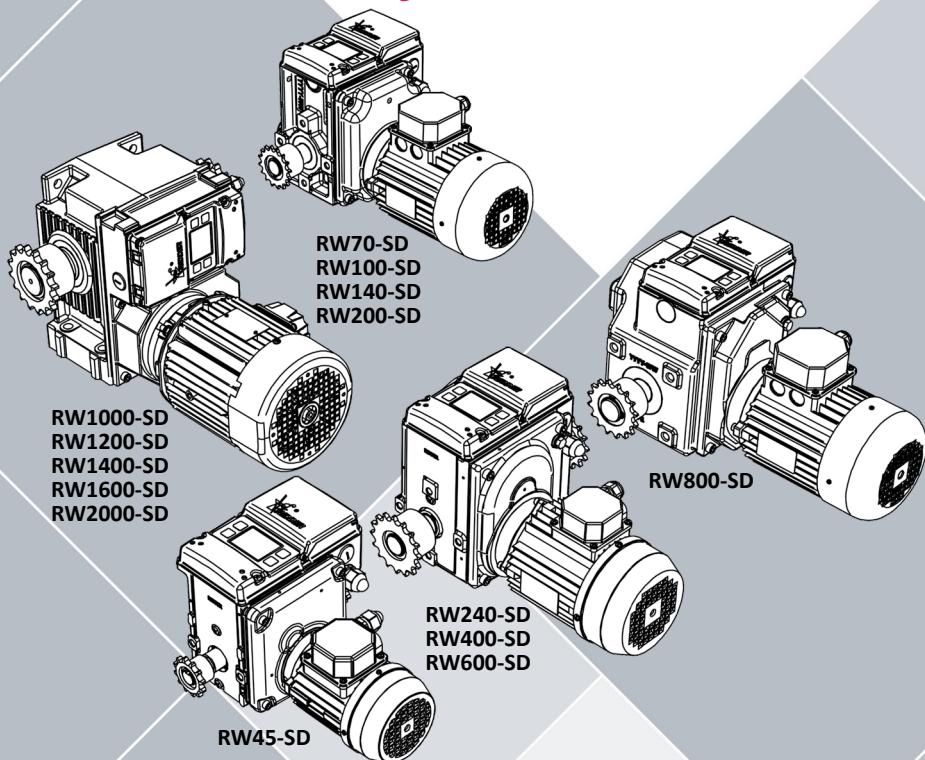


## Product Manual

### Ridder SmartDrive RW-SD Motor Gearboxes 3-phase

Original product-manual  
265004EN - 2023.07 - V00

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Helping you grow  
your way



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## 1. GUIDELINES, STANDARDS AND CONDITIONS

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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 2014/35/EU | 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

### Compliance statement (part 15.19)

This device complies with part 15 of the FCC Rules and to RSS of Industry Canada.

Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

### Warning (part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Information to the User (Part 15.105 (b))

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.



If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**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 Ridder SmartDrive RW-SD 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 safely and responsibly.

TARGET GROUP FOR EACH CHAPTER		CHAPTER (refer to Table of Contents)														
TARGET GROUP		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
User (operator)		•	•	•			•	(•)	•	(•)	(•)	(•)	(•)	(•)	(•)	
Installer / Approved personnel		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

(\*) = Not fully applicable (for users/operators). Read the chapters/sections.

Keep this product manual with the product during the lifespan. Make sure 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 SmartDrive RW-SD Motor-Gearbox.
- It is not permitted to weld to the RW-SD motor gearbox or its parts.
- It is not permitted to use the RW-SD motor gearbox to lift or move people.
- Do not let the torque of the RW-SD motor gearbox be more than its maximum.
- Do not let the duty cycle of the RW-SD motor gearbox be more than its maximum.
- It is not permitted to use the RW-SD motor gearbox in operating conditions, systems or configurations which do not comply with the technical specifications (in this manual). Also refer to §3.5.

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



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## 1.4 Special tools and equipment

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### Bluetooth

To use Bluetooth the special tools and equipment that follow are necessary:

- ① A **mobile device** with SmartPhone functionality
- ② The Ridder **SD app**. Go to Google Play Store or Apple App Store for download and setup.

Use the app (after commissioning) to:

- Copy range-of-travel configuratoins to other SD units
- Read out data/statistics
- Do motor control after commissioning.

### General



**ATTENTION**

Make sure that the correct equipment and tools are used.

## 1.5 Warranty provisions

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For the warranty period and conditions refer to the 'Conditions' section on our website at [ridder.com](http://ridder.com), or in the Ridder catalog.

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#### BASIC SETTINGS - Safety processor [MIT]

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## **2. SAFETY, PRECAUTIONS AND SYMBOLS**

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### **2.1 Signal words, instructions and warnings**

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#### **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.

 <b>TIP</b>	Suggestion to perform an operation more effectively.
 <b>ATTENTION</b>	May result in damage or problems if an action is performed incorrectly.
 <b>CAUTION</b>	May result in minor injury if the hazard is not avoided.
 <b>WARNING</b>	Significant injury, possible death, if the hazard is not avoided.
 <b>DANGER</b>	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

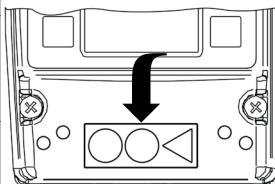


**After installation interchange the plug in the highest position with the vent plug! Refer to the permitted mounting positions in the product manual.\***

\* Not applicable to motor gearboxes filled with grease!

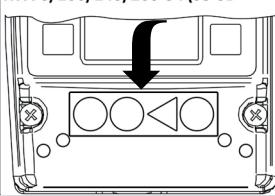
#### Grease lubrication

RW45-SD  
RW240SD



#### Oil lubrication

RW240/400/600SD  
RW800SD  
RW1000/1200/1400/1600/2000-SD  
RW70/100/140/200-34\68-SD



## 2.2 Precautions and safety instructions

### 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. This is also applicable if the drive unit is not in operation or the motor does not turn. Work without professional competence or not obeyed warning instructions could cause injury and/or material damage.
- Make sure that no foreign particles, loose parts, moisture or dust go into the components (EM, gearbox, SD unit) during all work. There is a risk of short circuit, fire and corrosion.
- Take sufficient precautions to prevent ElectroStatic Discharge (ESD).
- 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.



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- 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.
- Do not remove the product from the (sealed) packaging before it is sent to the installation site. 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 metal 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. Refer to the applicable standards and guidelines.
- The safety distance to the danger zone (if applicable) must agree with applicable standards and guidelines (for example ISO 13857:2008).
- Do not operate systems when the motor gearbox (internally and/or externally) is frozen in cold and moist conditions (for example because of snow or ice). NVT SMART DRIVE
- 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.



### 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.



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

### Forces

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

## 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	SDU cover	PE	Protective earth
A2	SDU circuit board	PH	Cross head "Phillips"
A3	SDU closing cover	PLC	PLC Control
A4	Locking system	PU	Panel unit
A5	PU circuit board	PZ	Cross head "Pozidriv"
ACS	Automatic control-system	P21/1	Auxiliary contact K21
BOS	Basic Output Shafts (RW-SD)	P22/1	Auxiliary contact K22
CM	Common connection	P71, P72	Automatic-control contacts (ACS)
CS	Control screen	rpm	revolutions per minute
D	Model with continuous worm-shaft	RPT	Ridder PolyTelescope
DIP	DIP-switch	RRD	Ridder RackDrive
EM, M	Electric motor, Motor	RSD	Ridder ScreenDrive
EMC	Electromagnetic compatibility	RW	Motor gearbox
ESD	ElectroStatic Discharge	SBI	Standard Bolt-Installation
FTL	Free Thread-Length	SD	SmartDrive
F1	Fuse	SDU	SD unit
HEX	Hexagonal width-across-flats	SID	Screw-in depth
I	Current in Amperes (A)	SS (S21)	System switch (S21)
IP	International Protection Rating	SU	Sensor unit
K	Designation sprocket (assembled configuration)	SW	Width-across-flats
		S1-S4	SDU operating buttons
kb	Maximum running time in minutes (kb = KurzBetrieb/ Short operation)	S11	Manual switch (bridged safety circuit)
		S21 (SS)	System switch (SS)
K11	Auxiliary relays (safety contact)	S111	Manual switch (MC)

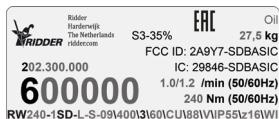


K21, K22	Reversing relay (sufficiently specified) for direction-of-rotation	TRA	Model for built-on rack unit
L	Model with winch shaft	TRN	Rack drives TRN
L1, L2, L3	Voltage source	TX	Screw head "Torx"
MC	Manual Control	T1	Safety transformer (EN 61558)
MPCB/ Q41	Motor-Protection Circuit-Breaker	U1	Motor connection
		V1	Motor connection
N	Neutral wire	W1	Motor connection
NC	"normally closed"	X1	Terminal strip (1–10)
NO	"normally open"	X2	Terminal strip (11–16)

### 3. PRODUCT DETAILS

#### 3.1 Identification

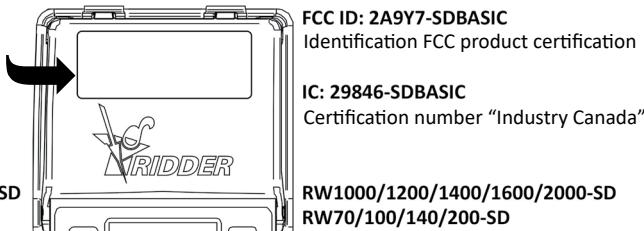
##### EXAMPLE



This product manual is only applicable to:

- Ridder SmartDrive **RW-SD** Motor Gearboxes 3-phase
- Serial numbers from 202.300.000
- Item numbers from 600000.

##### Closing cover (A3)



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 catalog or website at [ridder.com](http://ridder.com).

RW240-1SD-L-S-09\400\3\60\CU\88\V\IP55\z16\W\	- W: White color finish
	- z16: Optional sprockets Alternatives: z12/z316 (3x for D model)
	- IP55: Protection rating
	- No symbol in identification = IP54
	- V: Grease lubrication
	- No symbol in identification = Oil lubrication
	- 88: Switching range motor-gearbox Alternatives: 55/100/110/155/1100
	- CU: CSA/UL certification mark Alternatives: 3C (CCC)/C (CSA)/U (UL)
	- 60: Mains frequency [Hz] No symbol in identification = 50 Hz
	- 3: 3-phase mains voltage 400: Mains voltage [V] Alternatives: 208-480/380/600
	- 09: Motor power at 50\60 Hz [daW] Alternatives: 11/12/14/25/29/30/37/42/44/55/63/66/75/85/ 90/110/125/132/150/180/200/216/240/300/360
	- S = Wire-screen system
	- L: Model with winch shaft
	- TRA: Model for built-on rack unit
	- D: Model with continuous worm-shaft No symbol in identification = Sprockets (K)*
	- 1: Rotational speed of drive shaft at 50(60) Hz [rpm] Alternatives: 2/3/5/34(41)/68(82)
	- 240: Torque [Nm] Alternatives: 70/100/140/200/400/600/ 800/1000/1200/1400/1600/2000
	- 45 = Torque 120, 90 or 60 Nm
	- RW-SD: General designation RW SmartDrive motorgearboxes

----- = If not applicable: No symbol in identification.

**NOTE:** Possibly the sequence of symbols is different and/or other symbols are included in the identification. Not all symbols and assembled configurations (such as LK, LD, ...) are included in the explanation.

\* K = Sprocket in an assembled configuration.



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## 3.2 Description

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RW-SD motor gearboxes are drive units to operate systems in greenhouses, livestock houses, crop-storage buildings and such. The RW-SD motor gearboxes are applicable at ambient temperatures between 0 and 60 °C. RW-SD motor gearboxes have a self-braking worm-gear transmission which stops the drive unit (worm shaft) when not operated and then locks the output shaft. To operate manually (externally) is possible with (electric) tools and a hexagon socket in the shaft of the electric motor.

RW-SD motor gearboxes use the end position system of the SD unit. The built-in sensor unit gives position feedback to sense the digitally set end positions. These digital end positions are used to enable contacts. The circuitboard of the SD unit has duty contacts (end positions) and a safety contact (safety stop). If an SD panel unit is connected, the control contacts (motor control) and a safety contact of the panel unit are used. Then the contacts of the SDU circuitboard become disabled.

RW-SD motor gearboxes are applicable to use intermittently (duty class s3-35%) with a maximum duty cycle of 25 minutes.

The SDU cover has a display which shows the control screen and has four pushbuttons. The control screen tells you the steps of the setting procedures (or commissioning) in a selected language. You can download all settings (end positions and more) of the first set SD unit, and upload these to other units with Bluetooth and the SD app (on a Smartphone). The sensor unit monitors the positions of the drive unit and transmits the data to the automatic control-system (ACS). The SD app can read out and monitor information of the SD system such as statistics, load and more. This information is available for predictive maintenance of the operated system.

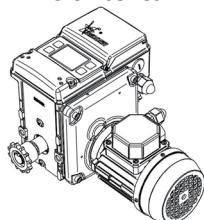
Operation is possible, usually in automated systems, with:

- An external manual control (only when **no** SD panel unit is connected)
- The control screen on the SDU cover
- The SD panel unit:
  - INTERNAL - Manual control (knob S8)
  - EXTERNAL - Automatic control (ACS) **or** Modbus control (PLC).
- The SD app on a Smartphone (only enabled with connected SD panel unit).

The RW-SD motor gearboxes have connections (terminal block/terminal strips) to connect the cables and are supplied with cable glands for the power cables and control cables. The gearbox housing of the RW-SD motor gearbox has a powder-coating. RW-SD motor gearboxes are supplied with fixing bolts and spring washers\*.

\* For RW1000–RW2000-SD motor gearboxes bolts (M12), spring washers and nuts are accessories.

### RW45-SD series

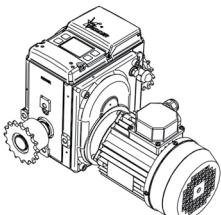


- RW45-SD: 12-tooth 1/2" x 5/16" zinc-plated sprockets for chain couplings are installed. **Optionally** 16-tooth 1/2" x 5/16" sprockets are installed to compensate for larger angle differences (to a maximum of 6°).

- RW45-SD-L: Has a one-sided output shaft to install a belt drum or cable drum.
- RW45-SD-TRA: Has a one-sided output shaft to install a TRA520 rack-drive.
- RW45-SD-D: An RW45-SD with a continuous worm-shaft. **Optionally** a 16-tooth 1/2" x 5/16" zinc-plated sprocket for chain couplings is installed.

The switching range of the end position system is 55 or 100 revolutions of the drive shaft. The range is related to different models.

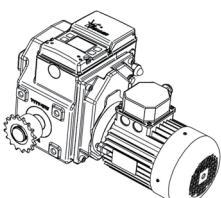
#### RW240-600-SD series



- RW240/400/600-SD: 16-tooth 5/8" x 3/8" zinc-plated sprockets for chain couplings are installed.
- RW240/400/600-SD-L: Has a one-sided output shaft to install a belt drum or cable drum.
- RW240/400/600-SD-TRA: Has a one-sided output shaft to install a TRA520 rack-drive.
- RW240/400/600-SD-D: An RW240/400/600-SD equipped with a continuous worm-shaft. **Optionally** a 16-tooth 1/2" x 5/16" zinc-plated sprocket for chain couplings is installed.

The switching range of the end position system is 88 revolutions of the drive shaft.

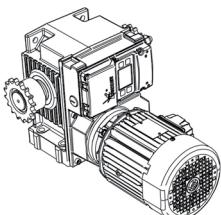
#### RW800-SD series



- RW800-SD: 16-tooth 5/8" x 3/8" zinc-plated sprockets for chain couplings are installed.

The switching range of the end position system is 155 revolutions of the drive shaft.

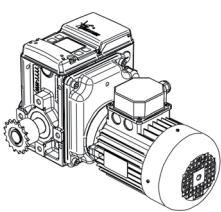
#### RW1000-2000-SD series



- RW1000/1200/1400/1600/2000-SD: 16-tooth 3/4" x 7/16" zinc-plated sprockets for chain couplings are installed.

The switching range of the end position system is 110 revolutions of the drive shaft.

#### RW70-200-SD series



- RW70/100/140/200-SD: 16-tooth 1/2" x 5/16" zinc-plated sprockets for chain couplings are installed.

The switching range of the end position system is 1100 revolutions of the drive shaft.



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



## DANGER

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 RW45-SD motor gearboxes are drive units to operate ventilation systems and screen systems in greenhouses and livestock houses or crop-storage buildings.
- The RW45-SD-L\RW240/400-SD-L motor gearboxes with drums (belt or cable) are drive units to hoist feeding lines and drinking lines and to open air inlets in livestock houses or crop-storage buildings.
- The RW45-SD-TRA\RW240-SD-TRA motor gearboxes with a TRA520 rack drive are drive units to operate ventilation systems and hoisting systems in greenhouses and livestock houses or crop-storage buildings.
- The RW45-SD-D\RW400/600-SD-D motor gearboxes are drive units to operate ventilation systems and hoisting systems in greenhouses and livestock houses or crop-storage buildings.
- The RW240-600-SD\RW800-SD motor gearboxes are drive units to operate ventilation systems, screen systems and hoisting systems in greenhouses and livestock houses or crop-storage buildings.
- The RW1000/1400-SD motor gearboxes are drive units to operate ventilation systems, screen systems and hoisting systems in greenhouses.
- The RW1200/1600/2000-SD-S motor gearboxes are drive units to operate wire screen systems in greenhouses.
- The RW70-200-34/68SD motor gearboxes are drive units to operate indirectly-operated ventilation-systems in greenhouses and livestock houses or crop-storage buildings.

This section tells about usual configurations of motor gearboxes and operated systems. Possibly other configurations (or applications) are applicable.

For other (different) applications, approval from **Ridder** is necessary.



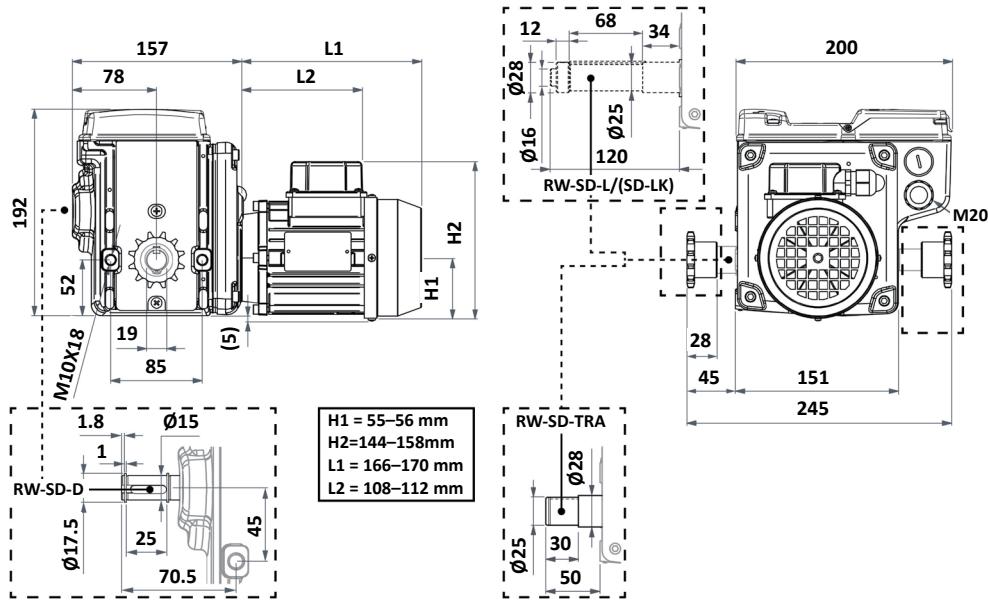
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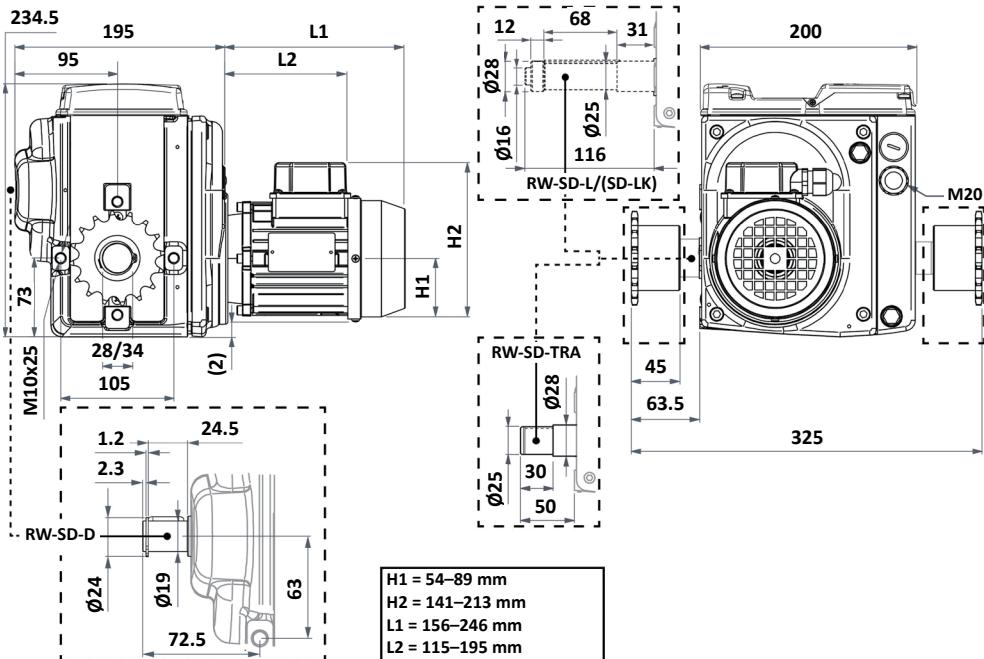
### 3.4 Dimensions

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

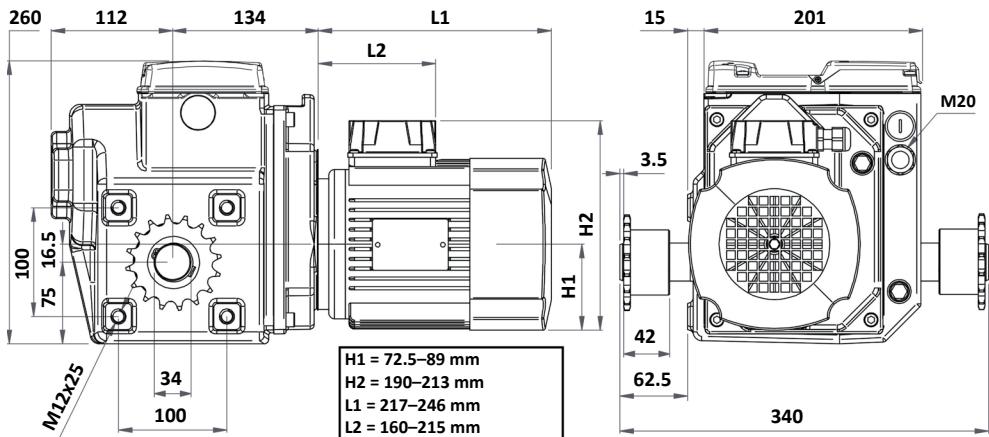
#### RW45-SD:



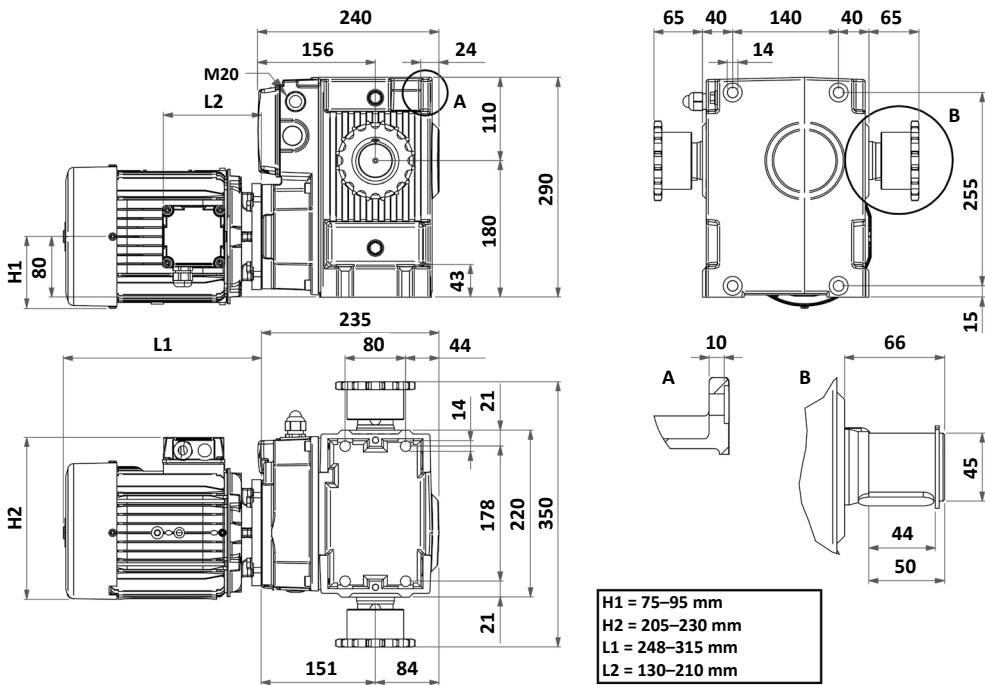
## RW240/400/600-SD:



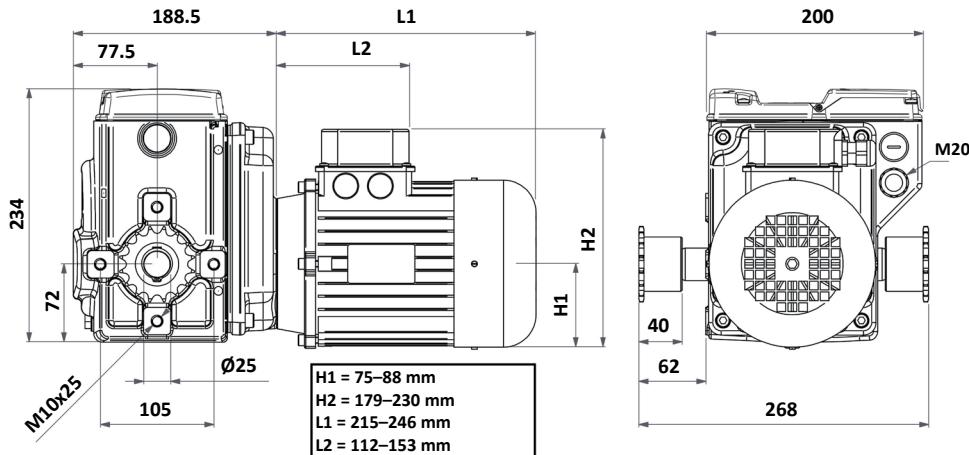
## RW800-SD:



**RW1000/1200/1400/1600/2000-SD:**



RW70/100/140/200-34\68SD:



Ridder - Drive Systems

### 3.5 Technical specifications

#### Mechanical

	RW-SD series	RW45	RW240–600	RW800	RW1000–2000	RW70–200
Torque [Nm]		60 90 120	240 400 600	800	1000 1200 1400 1600 2000	70 100 140 200
<b>Mains frequency [Hz]</b>		50/60		50/60	50/60	
Rotational speed [revolutions per minute]			1/1.2* 2/2.4* 3/3.6 5/6.0		3/3.6 5/6.0	34/41 68/82
* Not applicable:		-	RW600	-	-	-
Switching range [revolutions of drive shaft]		55 100	88	155	110	1100
Drive unit		Self-braking				
Operate manually (externally):		With (electric) tools and a hexagon socket in the shaft of the electric motor.				
Dimensions [mm] WxHxD		Refer to §3.4 (minimum–maximum).				
Weight [kg]	15.5–17	27.5–42	40.5–44	54.5–68	30–40	

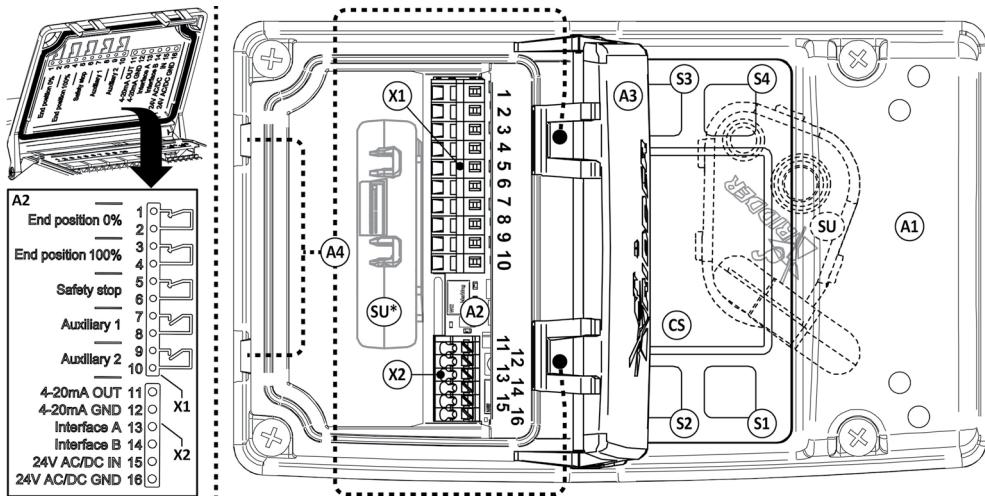
#### Ambient

	RW-SD series	RW45	RW240–600	RW800	RW1000–2000	RW70–200
Protection rating		IP54*				
Ambient temperature [°C (°F)]		0–60 °C (32–140 °F)				
Maximum relative humidity		A not-condensed relative humidity is necessary.				

\* IP55 only applicable if in identification.

## Electrical - SD unit (SDU)

Refer to the illustration and table that follows for abbreviations, technical specifications and descriptions of all components and connections.



	No.	Designation	Description
X1	1–2	End position 0%	End position 0%: <b>duty contact</b>
	3–4	End position 100%	End position 100%: <b>duty contact</b>
	5–6	Safety stop	Safety stop: <b>safety contact</b>
	7–8	Auxiliary 1	Auxiliary contact 1
	9–10	Auxiliary 2	Auxiliary contact 2
X2	11	4–20 mA OUT	Output: feedback signal
	12	4–20 mA GND	Ground: feedback signal
	13	Interface A	Communication channel A
	14	Interface B	Communication channel B
	15	24 V AC/DC IN	Input: power supply
	16	24 V AC/DC GND	Ground: power supply
A1	-	-	SDU cover (of motor gearbox)
A2	-	-	SDU circuit board
A3	-	-	SDU closing cover
A4	-	-	Locking system of SDU closing cover
CS	-	-	Control screen
S1–S4	-	-	SDU operating buttons
SU/SU*	-	-	Sensor unit (position feedback)

\* The illustration shows two sensor units (SU), but SD motor gearboxes have **only one** sensor unit. Only the **RW45-SD** and **RW240-600-SD** series have the mounting location **SU\***.



## Electrical - RW-SD motor gearbox

RW-SD series	RW45	RW240–600	RW800	RW1000–2000	RW70–200
Duty cycle [kb]	Applicable for intermittent duty, duty class s3-35%, with a maximum running time of 25 minutes.				
Maximum current	Refer to the nameplate of the electric motor.				
Power					
Cable glands	M16x1.5 mm/M20x1.5 mm. Also refer to §5.2.				
<b>Mains voltage</b>					
400 V - 50 Hz	•	•	•	•	•
480 V - 60 Hz					
200–415 V - 50 Hz	•	•	•	•	•*
200–480 V - 60 Hz					
380 V - 60 Hz	-	•*	-	-	-
600 V - 60 Hz	-	•	•	•	•**
* Not applicable:	-	RW600	-	-	RW100
** Not applicable:	-	-	-	-	RW70–140

### Flash memory

The Flash Memory has a maximum number of times to erase or write without faults. You can erase or write (without faults) approximately 10,000 times. The lifespan of the flash memory extends when the erase/write cycles are kept to a minimum.

## 4. INSTALL INSTRUCTIONS

Installation is only permitted to approved personnel.

**This chapter tells about the install instructions without installed SD panel unit (PU). Refer to the PU product manual if an SD panel unit is installed.**

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

Parts list *	
600000 RW-SD Motor Gearbox 3-phase **	1x

\* Minimum parts list: Motor gearbox **without** optional parts and accessories.

\*\* Motor gearboxes have spring washers and bolts M10x20 (2x), M10x25 (3x) **or** M12x25 (4x). Item numbers from 600000.

**NOTE:** Bolts (M12), spring washers and nuts are **accessories** for RW1000-SD thru RW2000-SD motor gearboxes.

### Installation (general)

- This product manual gives **only** information about the installation of RW-SD motor gearboxes and related connections to output-shafts (installation options).
- Information about the different operated systems is **not** (or not fully) given or gives only general information.

### Installation options for output shafts

Refer to (if applicable):

- §4.4.1 for the (most) used connections of **basic output shafts** to operated systems (installation options A–F)
- §4.4.2 for the installation options (A–F) of **special output shafts**
- §4.4.3 for the installation of **chains** onto sprockets (for installation options A–D)
- §4.5 for **TRA** models with TRA drive-unit (installation options G, H, I)
- §4.6 for **L** models with belt drum (installation option J)
- §4.7 for **L** models with cable drum (installation option K).

