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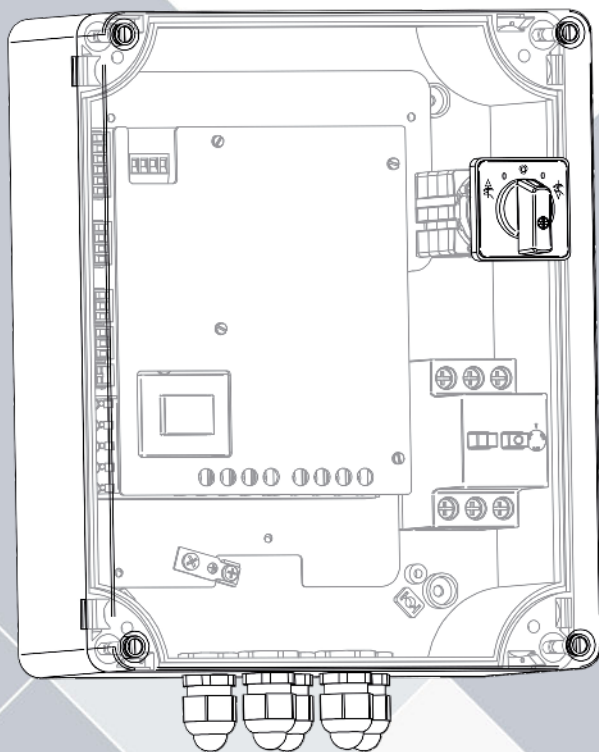
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Product Manual

Ridder MotorControl RMC400

Original product-manual
265047EN - 2021.12 - V05



Helping you grow
your way



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1. GUIDELINES, STANDARDS AND CONDITIONS

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

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 Ridder MotorControl RMC400 control-unit. 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
User (operator)	•	•	•			•			(•)	
Installer / Approved personnel	•	•	•	•	•	•	•	•	•	•

(•) = Not fully applicable (for users/operators)

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 MotorControl RMC400 control-unit.
- It is not permitted to use the RMC400 control-unit to lift or move people.
- It is not permitted to use the RMC400 control-unit 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.

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.



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2. SAFETY, PRECAUTIONS AND SYMBOLS


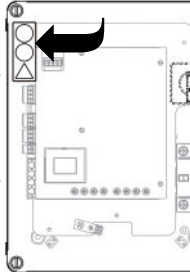


2.1 Signal words, instructions and warnings

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 effectively.
 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	

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. 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.
- 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 surfaces that are not painted.
- After installation discard the packaging and obey the applicable national and/or local regulations.

Safety instructions



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

- **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 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.



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2.3 Residual risks

Automatic Controls

The Ridder control-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

Because of the forces in the systems (in which the control 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
1L1	Power IN (A2)	PE	Protective earth
3L2	Power IN (A2)	PTC	PTC thermistor
5L3	Power IN (A2)	RCB	Ridder control-board
2T1	Power OUT (EM)	REU	Ridder EncoderUnit
4T2	Power OUT (EM)	RLS	Limit-switch system
6T3	Power OUT (EM)	RMC	Ridder MotorControl
ACS	Automatic control-system	RPD	Ridder PolyDrive
AL	Alarm (circuit)	RPR	Ridder PowerRoller
A1	RMC400 housing	RPU	Digital positioning-meter
A2	Control board	RSU	Limit-switch system
D1	Status LED - Green	RW	Motor gearbox
D2	Status LED - Red	SW	Width-across-flats
D3	Status LED - Red	T1, T2, T3	Load connection
D4	Status LED - Red	U1,V1,W1 U2, W2	Motor connection
EM, M	Electric motor, Motor	X1	Power input (RCB)
EMC	Electromagnetic compatibility	X2	Power output (EM)
ES11,ES12	Duty switch RSU/RLS	X3	Transformer
ES21,ES22	Safety switch RSU/RLS	X4	PTC input
GND	Ground	X5	Fault-contact output
I	Current in Amperes (A)	X6	Automatic-control input
L1, L2, L3	Voltage source	X7	RPU reference-input
MC	Manual Control	X8	Manual-control input
MPCB	Motor-Protection Circuit-Breaker	X9	Limit-switch input
N	Neutral wire		



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3. PRODUCT DETAILS

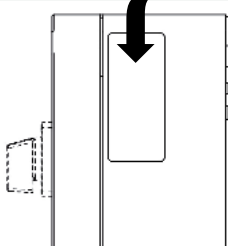
3.1 Identification

EXAMPLE



This product manual is only applicable to:

- Ridder MotorControl RMC400 control-unit
- Serial numbers from 200.900.000
- Item numbers from 500000.



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.

RMC400\115-400\1-3\0.4-0.6

0.4-0.6: Current (I) in Ampère (A).

Alternatives

0.6-1.0 A, 1.0-1.6 A, 1.6-2.5 A, 2.5-4.0 A, 4.0-6.3 A or 6.3-10 A.

1-3: 1~ - 3~ mains voltage.

Alternatives

3: 3~ mains voltage.

115-400: Mains voltage 115 V/230 V (1~) or 208 V/400 V (3~).

Alternatives

400: Mains voltage 400 V (3~).

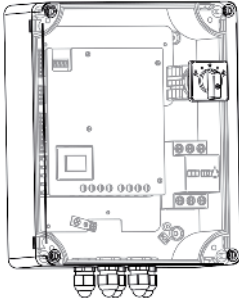
440-600: Mains voltage 440 V, 480 V or 600 V (3~).

RMC400: General designation Ridder RMC400 control units.

1~ - 3~ = 1-phase and 3-phase

3~ = 3-phase

3.2 Description



The RMC400 is a control unit to control Ridder motor-gearboxes. All the electrical components of the RMC400 control-unit are built-in to a plastic housing. Supply is with or without a motor-protection circuit-breaker (MPCB) and manual control (MC).

The control unit is applicable to:

- Different supply voltages
- Different mains frequencies
- 3-phase and 1-phase voltages.

The control unit has a control board with a microprocessor and a semiconductor relay.

The control board has connections for:

- The supply voltage
- The power supply for the electric motor (EM)
- An automatic control signal (24 V AC/DC) from an automatic control-system (ACS)
- A manual control (MC) (units without a built-in MC)
- A fault contact (NC) that can be part of an alarm circuit
- A PTC thermistor in the electric motor (EM) for thermal protection
- A digital positioning-meter (RPU).

The limit-switch system is also connected to the control board of the control unit.

The RMC400 control-unit transmits control signals from the automatic control-system (ACS) or manual control (MC) and monitors if these are processed without malfunctions. The control unit has rotational-field detection and phase detection of the supply voltage.

The 24 V AC/DC control input is protected from:

- Control in two directions at the same time
- Sudden changes of direction.

The control unit has status LEDs to show error messages of the system.

The RMC400 control-unit has plug connectors and terminal strips to connect the cables. To pull the cables through, out of the housing, the control unit also has cable glands. The protection rating of the RMC400 housing is IP54.

3.3 Application



Make sure that (with RW 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.

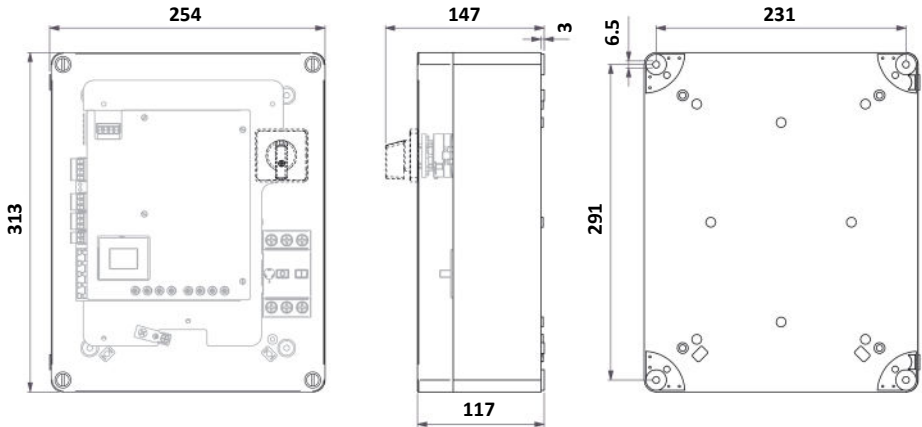
The control unit is used to control Ridder motor gearboxes in two directions-of-rotation.

The RMC400 control-unit is applicable to:

- RW motor gearboxes
- RPR PowerRollers
- RPD PolyDrives.

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

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

Dimensions (WxHxD)	254 mm x 313 mm x 147 mm (with MC)
	254 mm x 313 mm x 117 mm (without MC)
Weight	2.4 - 3.2 kg



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Ambient

Protection rating	IP54
Ambient temperature	0 to +60 °C (+32 to +140 °F)
Maximum relative humidity	95%

The three types of control boards (RCB) that follow are available for the RMC400 control-unit.

RCB-A (Type A):

50/60 Hz AC

1~ 115V-230 V, 12FLA, 72 LRA

3~ 208-400 V, 12 FLA, 72 LRA

RCB-B (Type B):

50/60 Hz AC

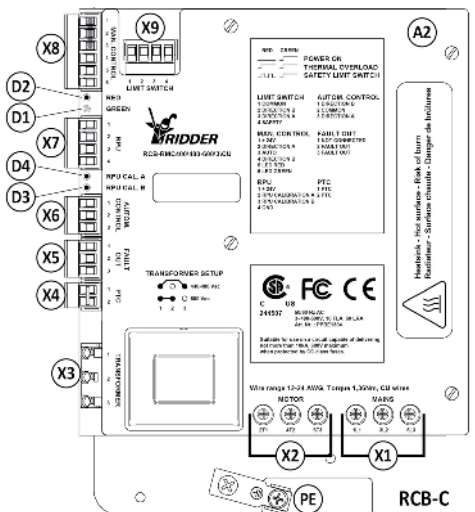
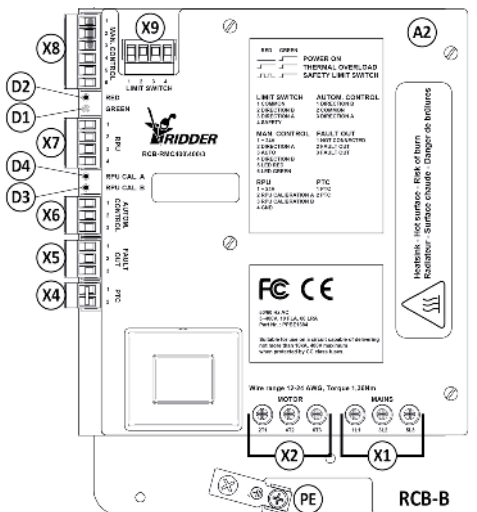
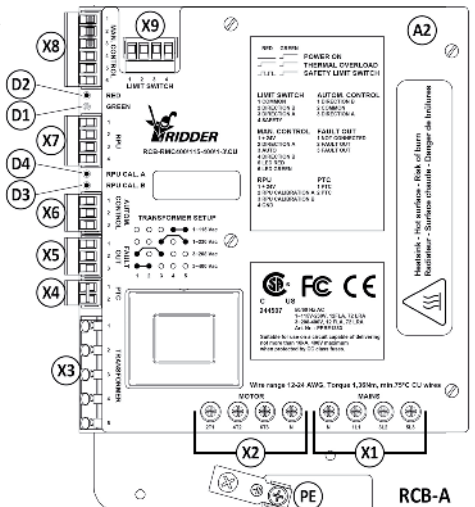
3~ 400 V, 10 FLA, 60 LRA

RCB-C (Type C):

50/60 Hz AC

3~ 440-600 V, 10 FLA, 60 LRA

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



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Electrical					
			Supply voltage		
X1	Power supply	Type	1-phase (1~)	3-phase (3~)	Current
1L1	RCB (A2)	Input	RCB-A 1x 115 VAC 1x 230 VAC	RCB-A - - 3x 208 VAC 3x 400 VAC RCB-B 3x 400 VAC RCB-C 3x 440-480 VAC 3x 600 VAC	Max 12 A
3L2	RCB (A2)	Input			
5L3	RCB (A2)	Input			
N*	RCB (A2)	Input			
X2	Power supply	Type			
2T1	Electric motor (EM)	Output			
4T2	Electric motor (EM)	Output			
6T3	Electric motor (EM)	Output			
N*	Electric motor (EM)	Output			
*N is only there on RCB-A.					
X3	Transformer		Supply voltage		
RCB-A	1 2 3 4 5	Type	1-phase (1~)	3-phase (3~)	Current
1~		Loop connection	1x 115 VAC	N.A.	~16 mA
1~		Loop connection	1x 230 VAC	N.A.	~10 mA
3~		Loop connection	N.A.	3x 208 VAC	~10 mA
3~		Loop connection	N.A.	3x 400 VAC	~ 4 mA
(X3)	Transformer		Supply voltage		
RCB-B	1 2 3 4 5	Type		3-phase (3~)	Current
3~	N.A.	N.A.	N.A.	3x 400 VAC	
X3	Transformer		Supply voltage		
RCB-C	1 2 3	Type		3-phase (3~)	Current
3~		Loop connection	N.A.	3x 440-480 VAC	
3~		Loop connection	N.A.	3x 600 VAC	
X4	PTC IN	Type	Supply voltage		Current
1	PTC	Input	0.25 V DC		1 mA
2	PTC'	Power supply	0.25 V DC		1 mA
X5	Fault-contact OUT	Type	Supply voltage		Current
1	Not connected	Loop-connection pin	Max 350 V		Max 50 mA
2	Fault OUT	Switching contact	Max 350 V		Max 50 mA
3	Fault OUT'	Switching contact	Max 350 V		Max 50 mA
X6	ACS	Type	Supply voltage		Current
1	Direction B	Input	24 V AC/DC		10.5/10 mA
2	Common	Ground	Ground		10.5/10 mA
3	Direction A	Input	24 V AC/DC		10.5/10 mA
X7	RPU	Type	Supply voltage		Current
1	+24V	Power supply	24 V DC		50 mA
2	RPU CALIBRATION A	Output	24 V DC		0.5/1 mA
3	RPU CALIBRATION B	Output	24 V DC		0.5/1 mA
4	Neutral wire	Power supply			



Electrical				
X8	MC	Type	Supply voltage	Current
1	+24V	Power supply	24 V DC	Max 15.7 mA
2	Direction A	Input	24 V DC	2.1 mA
3	Auto	Input	24 V DC	2.1 mA
4	Direction B	Input	24 V DC	2.1 mA
5	LED	Output	24 V DC	4.7 mA
6	LED	Output	24 V DC	4.7 mA
X9	Limit-switch IN	Type	Supply voltage	Current
1	Common	Power supply	7 V DC	3.3 mA
2	Direction B	Input	7 V DC	1.1 mA
3	Direction A	Input	7 V DC	1.1 mA
4	Safety	Input	7 V DC	1.1 mA
D1-D4	LED			
D1	Green			
D2	Red			
D3	Red (RPU)			
D4	Red (RPU)			

4. INSTALL INSTRUCTIONS

Installation is only permitted to approved personnel.

The RMC400 control-unit is available:

- **With** a built-in motor-protection circuit-breaker (**MPCB**) and manual control (**MC**)
- **Without** a built-in motor-protection circuit-breaker (**MPCB**) and manual control (**MC**).

Do a check of the supplied parts in the table that follows.

Parts list			
580000 RMC400 control-unit	1x	272031 Cable gland M20\IP68\PA\LC	5x
		272033 Nut M20 PA	5x
NOTE: The installer must install the supplied cable glands and nuts as necessary.			



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4.1 Special tools and equipment

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

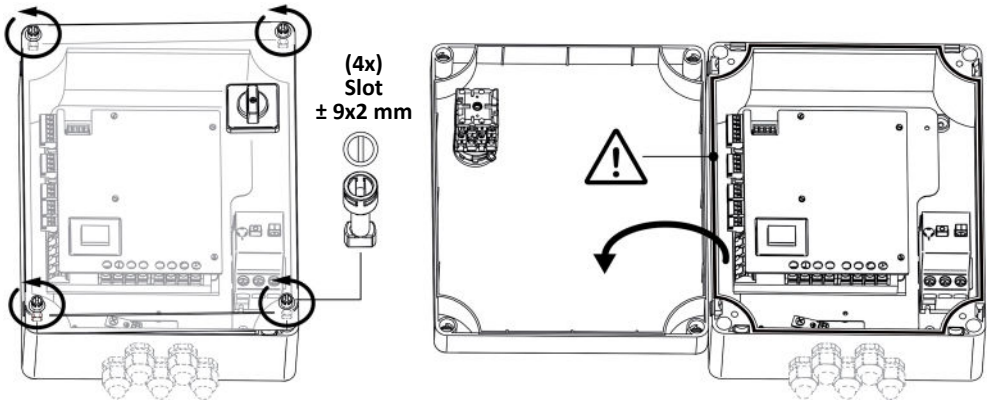


ATTENTION

Make sure that the correct equipment and tools are used.

4.2 Removal cover

- Loosen the cover screws (4x, slot $\pm 9 \times 2$ mm) and the cover temporarily to do all necessary work. The gasket usually stays in its position.
- Make sure that no damage is caused to the gasket and that it does not become dirty.
- Install the cover again after the work! Refer to the end of chapter 7.



4.3 Installation

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 RMC400 is applicable for wall mounting.
- 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.
- The RMC400 gives information about the system with LEDs on the control board. Thus, easy access and a satisfactory view is recommended for the location of the RMC400.

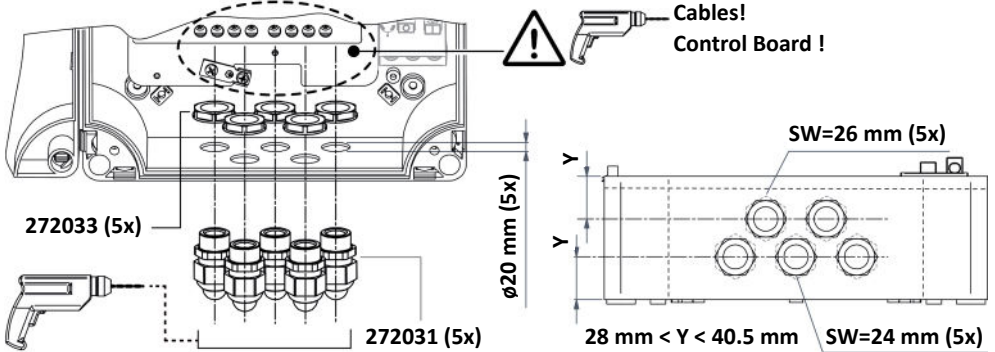


ATTENTION

Make sure that easy access to the cover of the RMC400 control-unit is possible for all work.

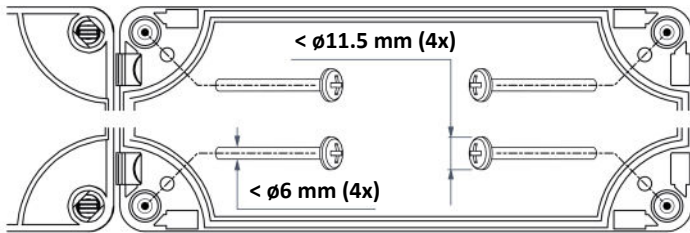
Cable glands

- Select the necessary number, and location in the bottom of the housing, for the cable glands M20. Refer to the applicable connections in chapter 5.
 - Drill the holes of $\varnothing 20$ mm and install the cable glands (SW24) with the nuts (SW26).
- Note:** Make sure that no damage is caused to the cables and the control board!



Installation

- Install the RMC400 unit with four screws or such (maximum $\varnothing 6$ mm/ $\varnothing 11.5$ mm) in the mounting holes. The locations of the mounting holes (recommended for the IP protection-rating) are in the corners of the housing!



5. CONNECT INSTRUCTIONS

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

NOTE: It is recommended to do a **check** of all of the **system**, in which this product is included, for Electromagnetic Compatibility (EMC). If necessary take precautions for **interference suppression**.

5.1 Electrical material

A minimum conductor diameter of 1.5 mm^2 is applicable to the cables in the wiring diagrams. For the used components, electrical material and cable lengths the necessary conductor diameter can be different.



Use only applicable components and electrical material. Always refer to the related information and manuals.



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5.2 Protection - Conditions and starting points

The conditions that follow are applicable to 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 that agrees with applicable standards and guidelines.
- If applicable, it is possible to connect a PTC thermistor. Refer to diagrams §5.5, §5.6 and §5.7.
- Protect the electric connections from moist conditions.
- Obey the applicable standards, guidelines and/or wiring guidelines for electrical connections.



Electrical connections are only permitted to an electrotechnical installer or an electrician.



For installation and maintenance work the system must be de-energized.



Always make sure that the protections comply with the, local or national, laws and regulations of the country.



The installer sets the Motor-Protection Circuit-Breaker (MPCB) to the value of the nominal current of the electric motor.



The RMC400 does not have a short-circuit protection and overload protection. To get the necessary safety, refer to 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.



Separation of cables is necessary. This prevents problems with induction.

EMC Interference

Problems with electromagnetic interference must be prevented. For a correct functional operation possibly precautions, such as an EMC mains-filter, are necessary.



It is necessary to obey EMC-conformity. This prevents problems with electromagnetic interference.

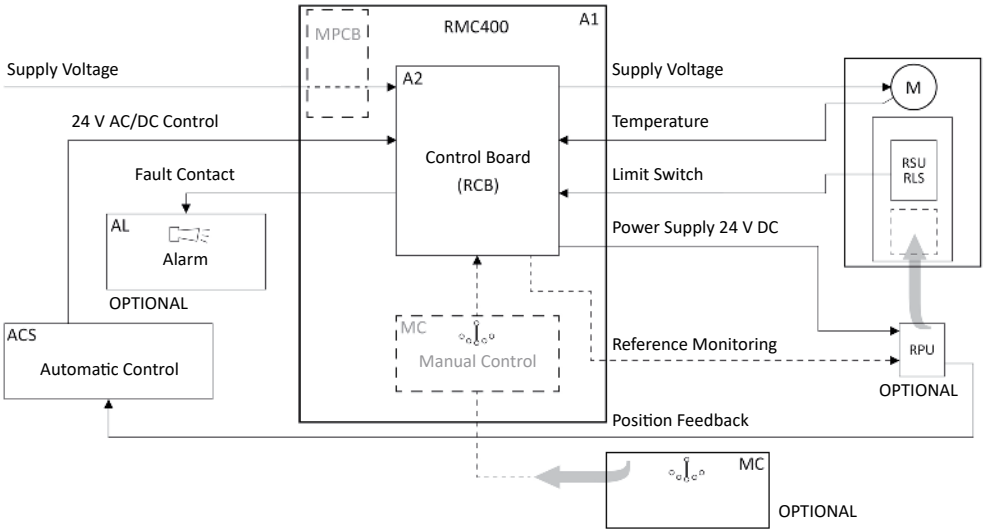


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5.3 Overview and function diagram

The diagram that follows shows the RMC400 control-unit in a system. **Ridder Drive Systems** connects the components (if applicable) in the framework A1.



5.4 Wiring diagram: Control board (RCB)

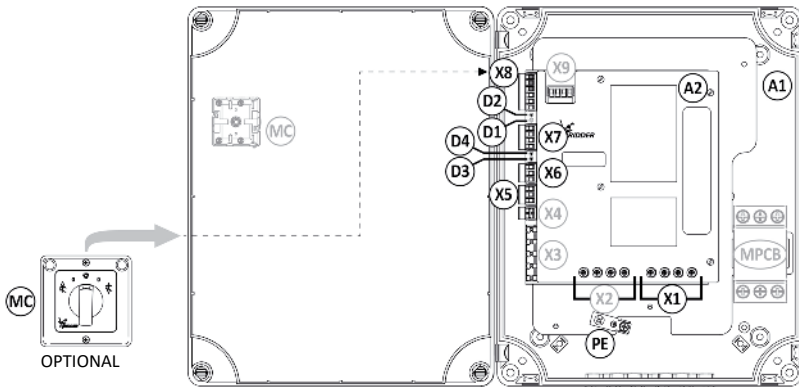
The diagrams that follow show:

- The RMC400 housing (A1) and the RCB control-board (A2)
- The standard connections and optional connections with related connectors
- The related sections with the wiring diagrams and information.

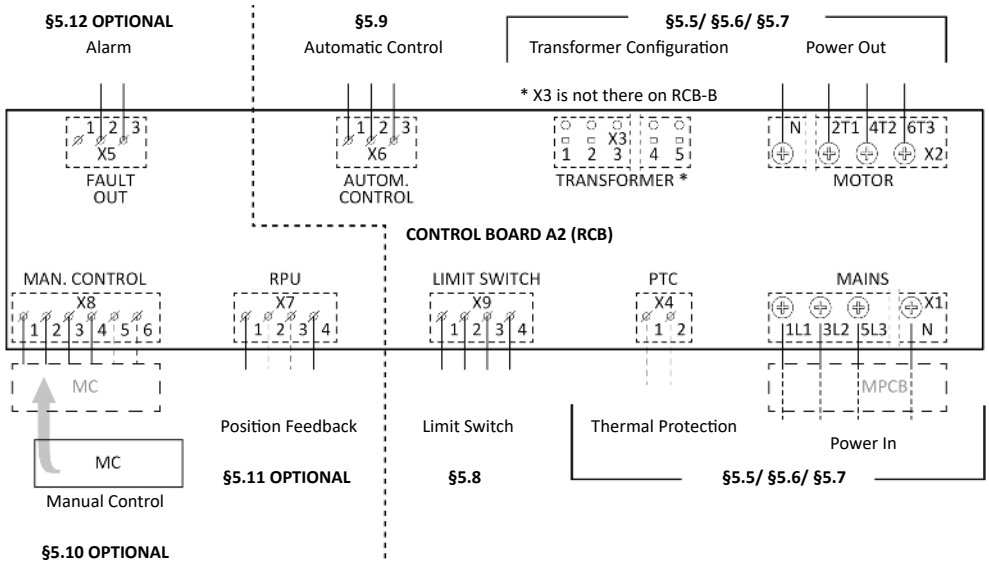
If units have a built-in MPCB and MC, then Ridder connected:

- X1 to the motor-protection circuit-breaker (MPCB) with **standard 3-phase** connections. If applicable, refer to the related sections (§5.6/§5.7) to change to **1-phase** connections!
- X8 to the manual control (MC).

RMC400 housing:



RMC400 control-board (RCB):

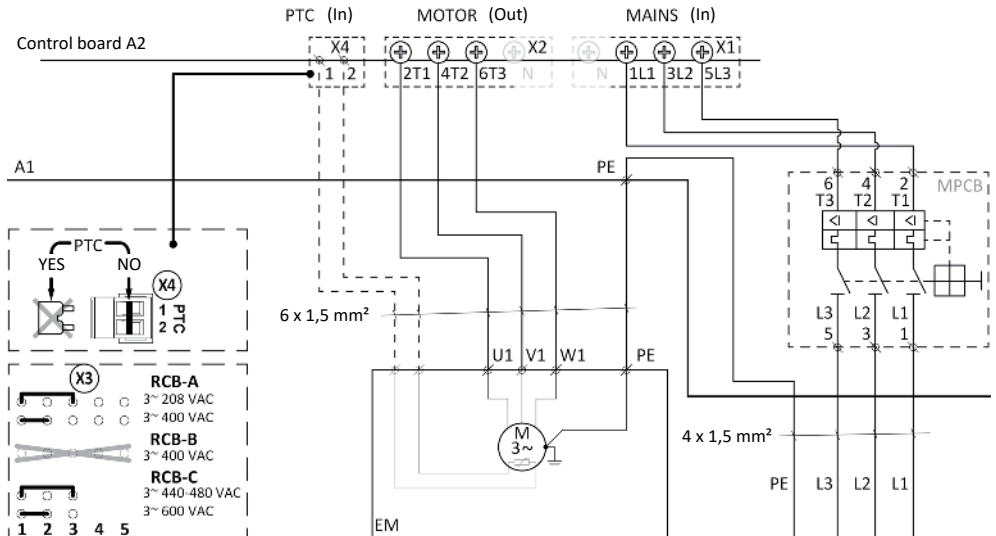


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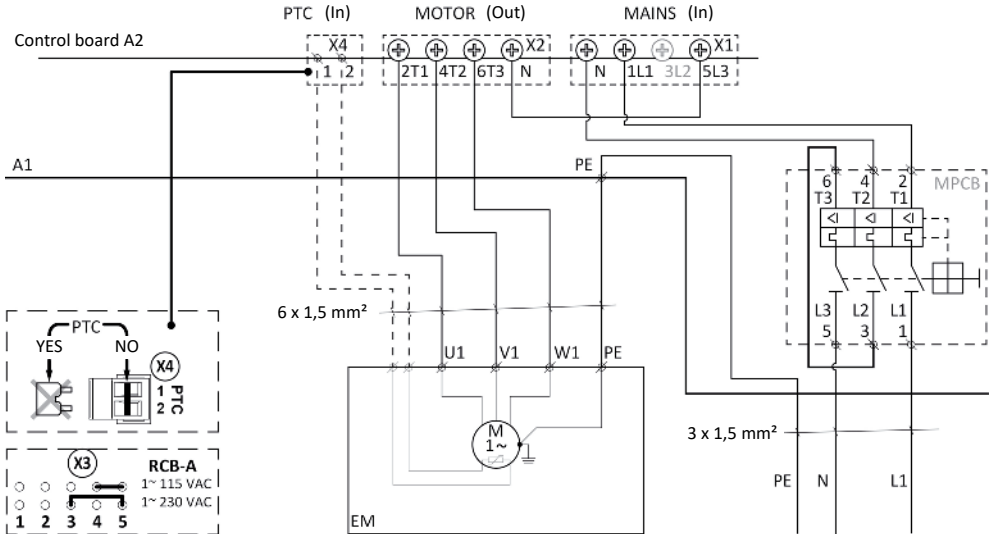
5.5 3-phase electric motor (208-600 VAC)

- Make sure that the configuration (RCB-A or C) on X3 (TRANSFORMER) agrees with the supply voltage!
- Connect the electric motor (EM) to X2 (MOTOR).
- If applicable, remove the jumper from X4 and connect EM to X4 (PTC)
- Connect the supply voltage to the MPCB (if applicable) or X1 (MAINS), and PE (protective earth).



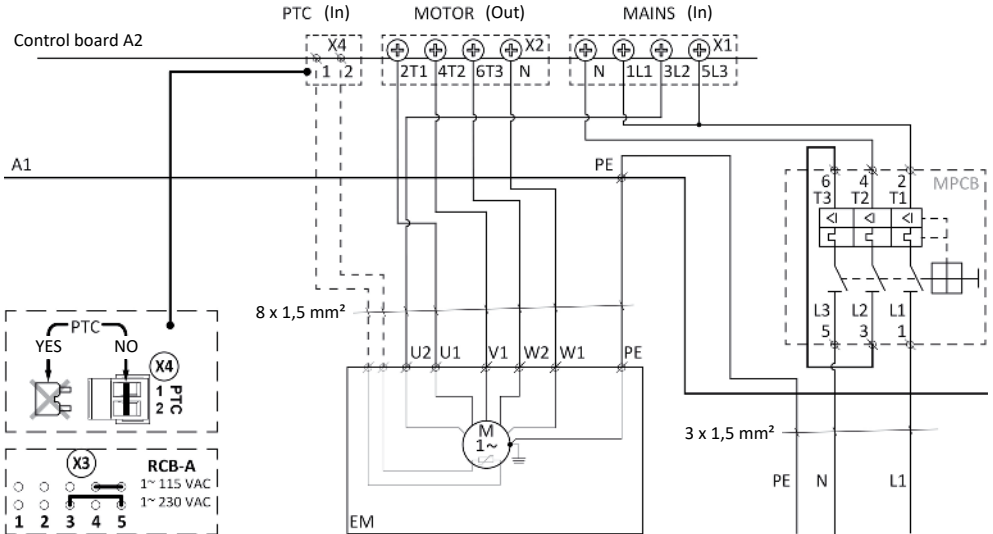
5.6 1-phase 3-wire electric motor (115-230 VAC)

- Make sure that the configuration (RCB-A) on X3 (TRANSFORMER) agrees with the supply voltage!
- Connect the electric motor (EM) to X2 (MOTOR).
- If applicable, remove the jumper from X4 and connect EM to X4 (PTC)
- If the unit has a built-in MPCB, make sure to **change** the standard 3-phase connections to **1-phase** connections! The diagram of §5.5 (X1) must change to the diagram of §5.6 (X1, X2, MPCB).
- Connect the supply voltage to the MPCB (if applicable) or X1 (MAINS), and PE (protective earth).



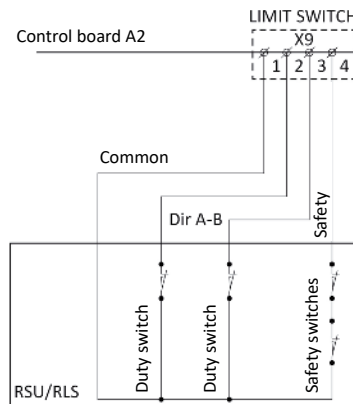
5.7 1-phase 5-wire electric motor (115-230 VAC)

- Make sure that the configuration (RCB-A) on X3 (TRANSFORMER) agrees with the supply voltage!
- Connect the electric motor (EM) to X2 (MOTOR).
- If applicable, remove the jumper from X4 and connect EM to X4 (PTC)
- If the unit has a built-in MPCB, make sure to **change** the standard 3-phase connections to **1-phase** connections! The diagram of §5.5 (X1) must change to the diagram of §5.7 (X1, X2, MPCB).
- Connect the supply voltage to the MPCB (if applicable) **or** X1 (MAINS), and PE (protective earth).



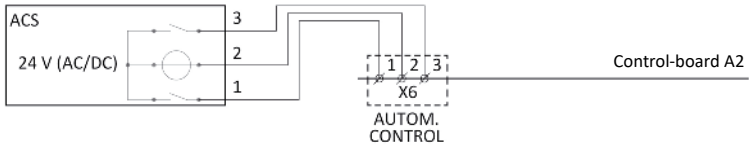
5.8 Limit switch (RSU/RLS)

Connect a limit switch (RSU/RLS) to X9 of the control board (A2). Refer to the diagram that follows. Also refer to the product manual of the used Ridder motor-gearbox at ridder.com.



5.9 Automatic Control (ACS) (24 V AC/DC)

You can connect the RMC400 control-unit to an automatic control-system (ACS). Refer to the diagram that follows and connect the ACS. Also refer to the product manual of the ACS that is used.



Notes:

- When the two inputs of the digital control (pin 1 and 3) receive a control signal at the same time, the control unit will not process them. The electric motor does not move.
- The external power supply can be 24 V AC/DC.
- Refer to §3.5 for the technical specifications of the external power supply of connector X6.

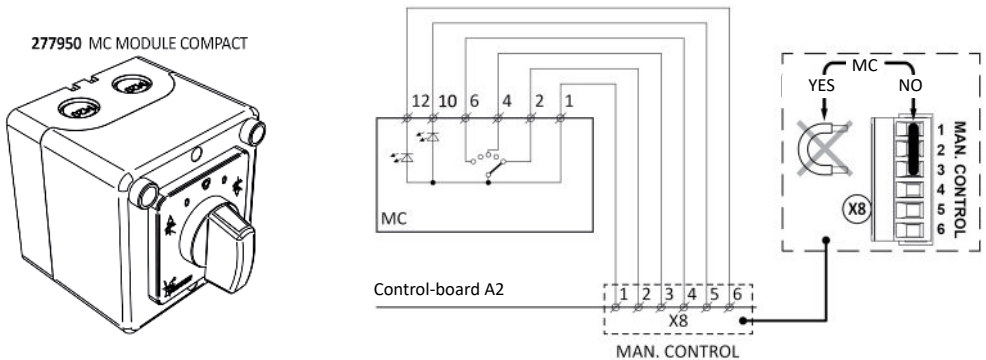
ATTENTION

Connector X6 of the control-board (A2) can be connected to automatic control-systems (ACS) that have a “switched ground” or a “switched positive”.

5.10 OPTIONAL - Manual Control (MC)

You can connect the RMC400 control-unit (without built-in MC) to a manual control (MC) such as the Ridder MC Module Compact (277950).

- Remove the jumper from connection 1 and 3 of X8.
- Connect the manual control (MC). Refer to the diagram that follows.
Refer to the related manual when you connect a different manual control (MC).



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5.11 OPTIONAL - Position Feedback (RPU)

You can connect a digital positioning-meter (RPU) and an automatic control system (ACS) to the RMC400 control-unit.

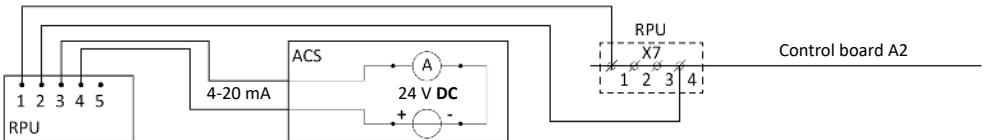
Refer to the diagram ① and procedure ② that follow and connect the RPU. Also refer to the product manual of the ACS that is used.

① Connecting - Power supply and feedback

- Connect the 24 V power supply (connection 1 and 2) to connector X7 of the control board (A2) (connection 1 and 4).
- Connect the position feedback (connection 3 and 4) to the automatic control-system (ACS).
- Make sure that the power supply is 24 V DC from an external source.

② Check - Reference-input RPU

- Connect the reference input (connection 5) to use reference monitoring and to set the reference again. Obey the procedure to connect the RPU connector X7 correctly.



► Description

- 1 Select which duty switch (ES11 or ES12) you want to use as switch for the RPU reference-monitoring. Let the motor turn in the direction of this duty switch until it disconnects.



To prevent damage or injury, do not go across the limit positions of the operated system!

- 2 LED D3 or D4 will come on on control-board (A2). Obey the instructions in 3-A or 3-B.

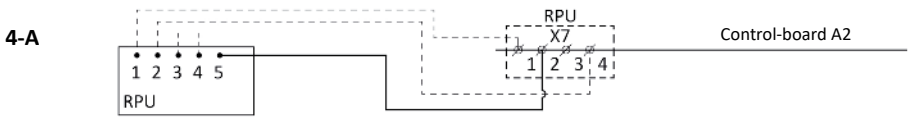
Blink code is 2.1. The LED D4 (RPU CAL. A) comes on. **Refer to §6.2 and §9.2.**
Go to step 4-A.

3-A	2.1	<input checked="" type="radio"/> D3	<input type="checkbox"/>
		<input checked="" type="radio"/> D4	<input type="checkbox"/>

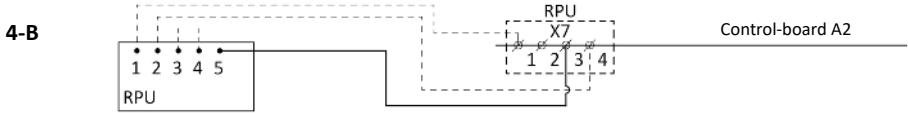
Blink code is 2.2. The LED D3 (RPU CAL. B) comes on. **Refer to §6.2 and §9.2.**
Go to step 4-B.

3-B	2.2	<input checked="" type="radio"/> D3	<input type="checkbox"/>
		<input checked="" type="radio"/> D4	<input type="checkbox"/>


Connect the reference monitoring to connection 2 of X7. Go to step 5.



Connect the reference monitoring to connection 3 of X7. Go to step 5.



- 5 The RPU is prepared to set the end positions.
Refer to the RPU product manual at ridder.com.



ATTENTION It is only permitted to connect the RPU reference-input to X7 of the control board (A2). Do NOT connect it to the RSU/RLS. Refer to §3.5 (Technical specifications) of X7 and X9.

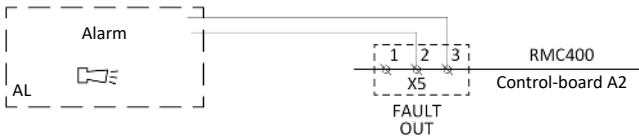
5.12 OPTIONAL - Alarm (AL)

The RMC400 control-board (A2) has an output for a fault contact (X5) that opens when a random fault occurs. You can include this fault contact in an alarm circuit.

You can connect one or more control units to an alarm circuit.

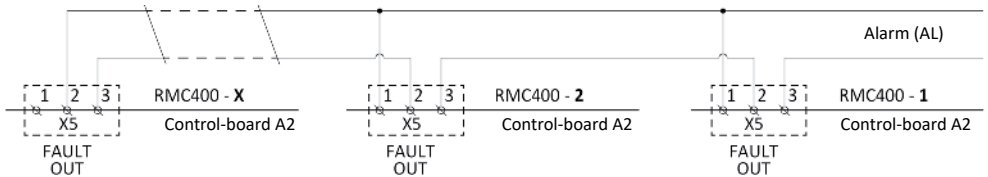
Connecting - One RMC400 control-unit

Obey the diagram that follows to connect one control unit.



Connecting - Two or more RMC400 control-units

Obey the diagram that follows to connect the fault contacts (X5) to two or more control units.



6. USER INSTRUCTIONS

6.1 Usage - Conditions and starting points

The conditions and starting points that follow are applicable when you use the RMC400 control-unit.

Automatic Control



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



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.



A drive unit can get high temperatures. If necessary take protective precautions to prevent injuries.

Waiting time



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



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/adjusting screw --> switching spring).

If applicable/If necessary:

Unlock the "Fail Safe" position. Make sure that the system can be safely operated.

- If necessary:

Adjust the end positions again.

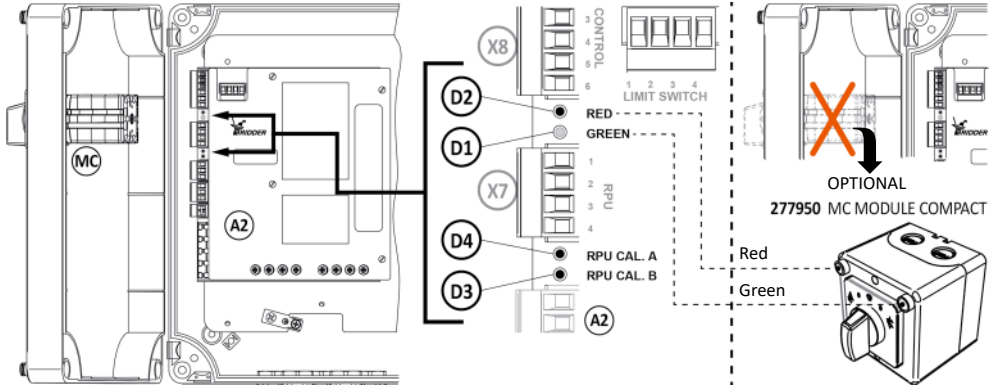
This prevents damage or injury.

6.2 Status LEDs

The four LEDs D1 (green), D2 (red), D3 (red) and D4 (red) on the control board (A2) give status indication of the system. This information is important for troubleshooting.

Refer to §9.1 and §9.2. These sections tell about the malfunctions and blink codes that can occur.

If a manual control (MC) (277950) is connected, the two LEDs (green and red) agree with the LEDs D1 and D2 on the control board (A2). The control board (A2) and the manual control (MC) show the blink codes (D1 and D2) at the same time.

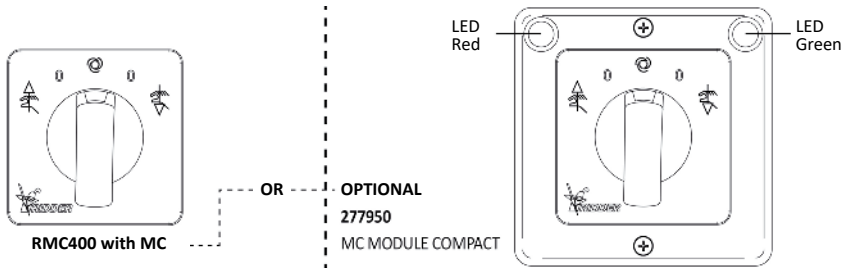


6.3 Operation

This section tells about the operating functions of the RMC400 control-unit:

- With a built-in manual control (MC) and connected to an automatic control-system (ACS)
- Without a built-in manual control (MC) and connected to a Ridder manual control (MC) (277950) and an automatic control-system (ACS).

Always refer to the related information and manuals (ACS and MC).



Before you use the manual control, make sure that the green LED (D1) on control board A2 is on. If connected, the green LED on the Ridder manual-control must be on at the same time.

Blink code 1.1 gives the indication: No malfunctions, the control unit operates correctly. Refer to §9.2.

The switch with five positions has the four functions that follow:

1. The system is manually controlled in direction A or B. The system is controlled independently also if there is an automatic 24 V AC/DC control signal (ACS).
2. The system is put in automatic mode.
The system is controlled if there is an automatic 24 V AC/DC control signal (ACS).
3. The system is manually stopped if the switch is set to position “0”.
4. The error messages are erased if the switch is set to position “0”.

Function	Description	
1	Direction A	
3	The manual control does not control the electric motor.	0
4	Position to erase error messages after a malfunction.	0
2	Automatic mode , the control unit operates when it receives external control from an ACS.	
3	The manual control does not control the electric motor.	0
4	Position to erase error messages after a malfunction.	0
1	Direction B	



Control signals from an automatic control-system (ACS) are only processed if the manual control (MC) is in automatic mode.



Automatic mode is only in operation if there is an automatic control signal (ACS).

6.4 Alarm

The RMC400 control-units have a fault contact for feedback. The maximum current for the fault contact is 0.5 A at 24 V AC/DC.

The fault contact is in operation:

- When the electric motor is thermally stopped
- When phase failure occurs
- When the safety switch is operated
- When there is no power supply.



Connect the fault contact to an alarm unit or an alarm input of a control system.

6.5 Safety functions and stop functions

The RMC400 control-unit has the safety functions and stop functions that follow:

1. Phase detection to protect from a change of phases in the power supply. This makes sure that the direction-of-rotation of the motor gearbox is correct.
2. Delay time when the direction-of-rotation is suddenly changed. This prevents that it continues in the initial direction.
3. Protection from thermal overload with a Motor-Protection Circuit-Breaker (MPCB, if applicable).
4. Stops automatically when the safety switch is operated. Manual or automatic control in the opposite direction-of-rotation stays possible.
5. Error-message indication with four LEDs on the control board (A2).
6. Feedback of error messages with a fault contact.

7. COMMISSIONING INSTRUCTIONS

The commissioning is only permitted to approved personnel.

7.1 Commissioning - Conditions and starting points

Make sure that the necessary moving direction of the operated system agrees with:

- The switching sense of the Limit Switch (RSU/RLS)
- The control direction of the Automatic Control (ACS)
- The control direction of the Manual Control (MC).

Obey the procedures that follow:

- §7.2 Check: Switching sense of the Limit Switch (RSU/RLS)
- §7.3 Check: Control direction of the Automatic Control (ACS)
- §7.4 Check: Control direction of the Manual Control (MC).

Refer to the product manual of the used Ridder motor-gearbox at ridder.com to **adjust the end positions!**



Do not go across the limits of the system. This prevents damage or injury.



Before the system is put into operation, the installer must always make sure that the limit switch is correctly adjusted.



Make sure that there is no blockage of the system before the limit-switch system is adjusted. This prevents damage or injury.

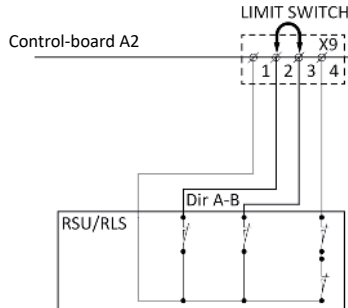
7.2 Check: Switching sense of the Limit Switch (RSU/RLS)

1. Use the manual control (MC) (if connected) **or** the automatic control-system (ACS). Let the motor gearbox turn in a direction that can cause no damage to the operated system.
2. Make sure that the motor gearbox turns in the correct direction for the duty switch to disconnect the motor.

CORRECT - Go to step 5.

NOT CORRECT - De-energize the system. Go to step 3.

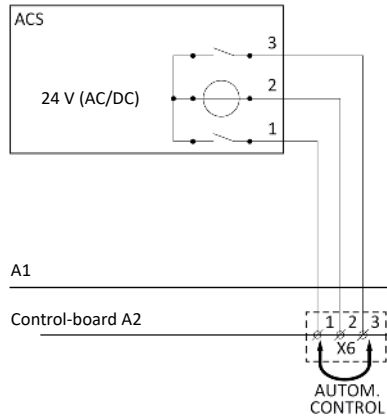
3. Interchange the connections 2 and 3 of connector X9.



4. Energize the system. Go to step 1.
5. The check procedure of the switching sense is completed.

7.3 Check: Control direction of the Automatic Control (ACS)

1. Set the switch of the manual control (MC) (if connected) to “Automatic mode”.
2. Use the automatic control-system (ACS). Let the motor gearbox turn in a direction that can cause no damage to the operated system.
3. Make sure that the direction of the automatic control (ACS) agrees with the necessary moving direction (of the operated system).
CORRECT - Go to step 6.
NOT CORRECT - De-energize the system. Go to step 4.
4. Interchange the connections 1 and 3 of connector X6.



5. Energize the system. Go to step 1.
6. The check procedure of the direction-of-rotation of the automatic control is completed.

7.4 Check: Control direction of the Manual Control (MC)

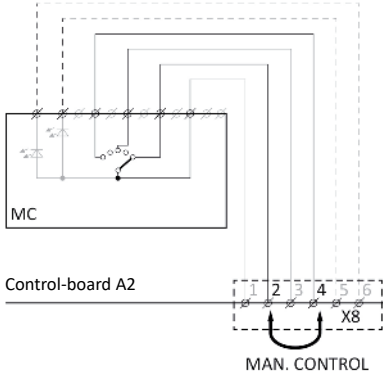
1. Use the manual control (MC). Let the motor gearbox turn in a direction that can cause no damage to the operated system.
2. Make sure that the symbols on the manual control (MC) agree with the necessary moving direction (of the operated system).



CORRECT - Go to step 5.

NOT CORRECT - De-energize the system. Go to step 3.

3. Interchange the connections 2 and 4 of connector X8.



X8	Manual Control (MC)
1	24 V DC
2	Direction A
3	Auto
4	Direction B
5	LED red (D2)
6	LED green (D1)

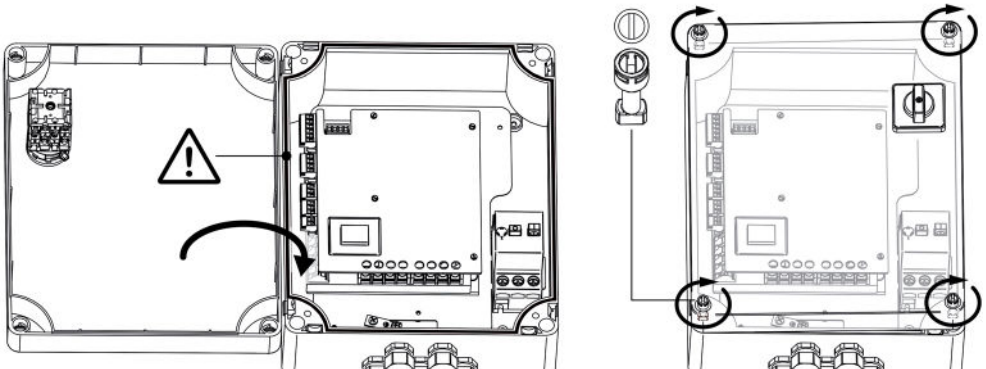
4. Energize the system. Go to step 1.
5. The check procedure of the direction-of-rotation of the manual control is completed.

7.5 Installation cover

Always put the cover and the cover screws (4x) back after the work. **Problems with moisture** and/or the IP protection rating (if applicable) must be **prevented!**

- Do a check of the gasket for dirt and damages.
- Tighten the cover screws crosswise and gradually with the correct tightening torque.

Slot $\pm 9 \times 2$ mm (4x) - 0.8 Nm



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8. MAINTENANCE INSTRUCTIONS

Inspection and maintenance work is only permitted to approved personnel. If necessary remove covers to do the work. Refer to §4.2.

For safe and correct maintenance, read (if necessary) the (applicable) sections of:

- Chapter 2, chapter 6, chapter 7 (§7.1), chapter 9 and chapter 10 (§10.1)
- The product manual of the used Ridder motor-gearbox at **ridder.com**.

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

8.1 Maintenance

Maintenance on the RMC400 control-unit is usually not necessary (“maintenance-free”). It is recommended to do the checks that follow every 6 months:

- Of the correct operation
- For a satisfactory view of possible malfunctions and easy access to all LEDs (on the control board [A2] and **optional** manual control [MC])
- For error-message indications of the blink codes
- Of the mechanical condition (connectors, connection terminals, fasteners and such).

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 at **ridder.com** for more information about spare parts (or accessories) that are available. Also refer to available documentation (maintenance instructions) at **ridder.com** of the Ridder products in the operated system.

9. SERVICE

If necessary remove covers to do the work. Refer to §4.2.

For safe and correct servicing, read the (applicable) sections of:

- Chapter 2, chapter 6, chapter 7 (§7.1) and chapter 10 (§10.1).
- The product manual of the used Ridder motor-gearbox at **ridder.com**.

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



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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 No supply voltage

Observation 1 The two LEDs D1 and D2 are off (blink code 1.2).

Cause 1 Power supply is externally disconnected.

Solution 1 Connect power supply.

Cause 2 No voltage on the control board.

Solution 2 Measure the supply voltage with a multimeter on the connections X1 of the control board (A2).

Malfunction 2 Electric motor thermally stopped

Observation 2 The two LEDs D1 and D2 are on, during and after a shutdown of the motor for a minimum of 2 minutes (blink code 1.3).

Cause 1 If the temperature in the electric motor becomes higher than 150 °C the system will be thermally stopped.

Solution 1 Set the manual-control switch to position "0" to erase the error message. When this occurs again and again or if the error message does not erase, contact your supplier.

Malfunction 3 A safety stop of the electric motor occurred

Observation 3 The red LED (D2) blinks while the green LED (D1) is on (blink code 1.4).

Cause 1 The duty switch is possibly not disconnected. The electric motor subsequently operated the safety switch.

Solution 1 Set the manual-control switch to position "0" to erase the error message. When this occurs again and again or if the error message does not erase, contact your supplier.

Malfunction 4 Phase failure

Observation 4 The red LED (D2) blinks while the green LED (D1) is off (blink code 1.5).

Cause 1 A phase failure is detected.


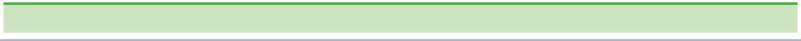







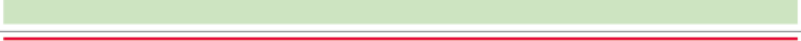


















Solution 1 Make sure that all phases are connected correctly. Make sure that the connection terminals have a good connection.



9.2 Blink codes

This section gives the indications and illustrations of the blink codes.

Blink codes

1.1	 D1	
	 D2	
Normal operation: The control unit operates correctly.		
1.2	 D1	
	 D2	
No supply voltage: The control unit does not receive a supply voltage.		
1.3	 D1	
	 D2	
Thermal stop: The control unit will stop the electric motor if the temperature becomes higher than 150 °C.		
1.4	 D1	
	 D2	
Safety stop: The duty switch is possibly not disconnected. The electric motor subsequently operated the safety switch.		
1.5	 D1	
	 D2	
Phase failure: A phase failure occurred in the system.		
2.1	 D3	
	 D4	
End position A: The limit switch A is operated. The duty switch is open and output 2 (X7) is enabled.		
2.2	 D3	
	 D4	
End position B: The limit switch B is operated. The duty switch is open and output 3 (X7) is enabled.		

9.3 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:

- ① During the work it is necessary to de-energize.
- ② Storage is necessary because of temporary removal.
- ③ The product is at the end of the lifespan.

① 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.

② Temporary decommissioning: Product storage

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

③ Permanent decommissioning: End of lifespan

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

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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