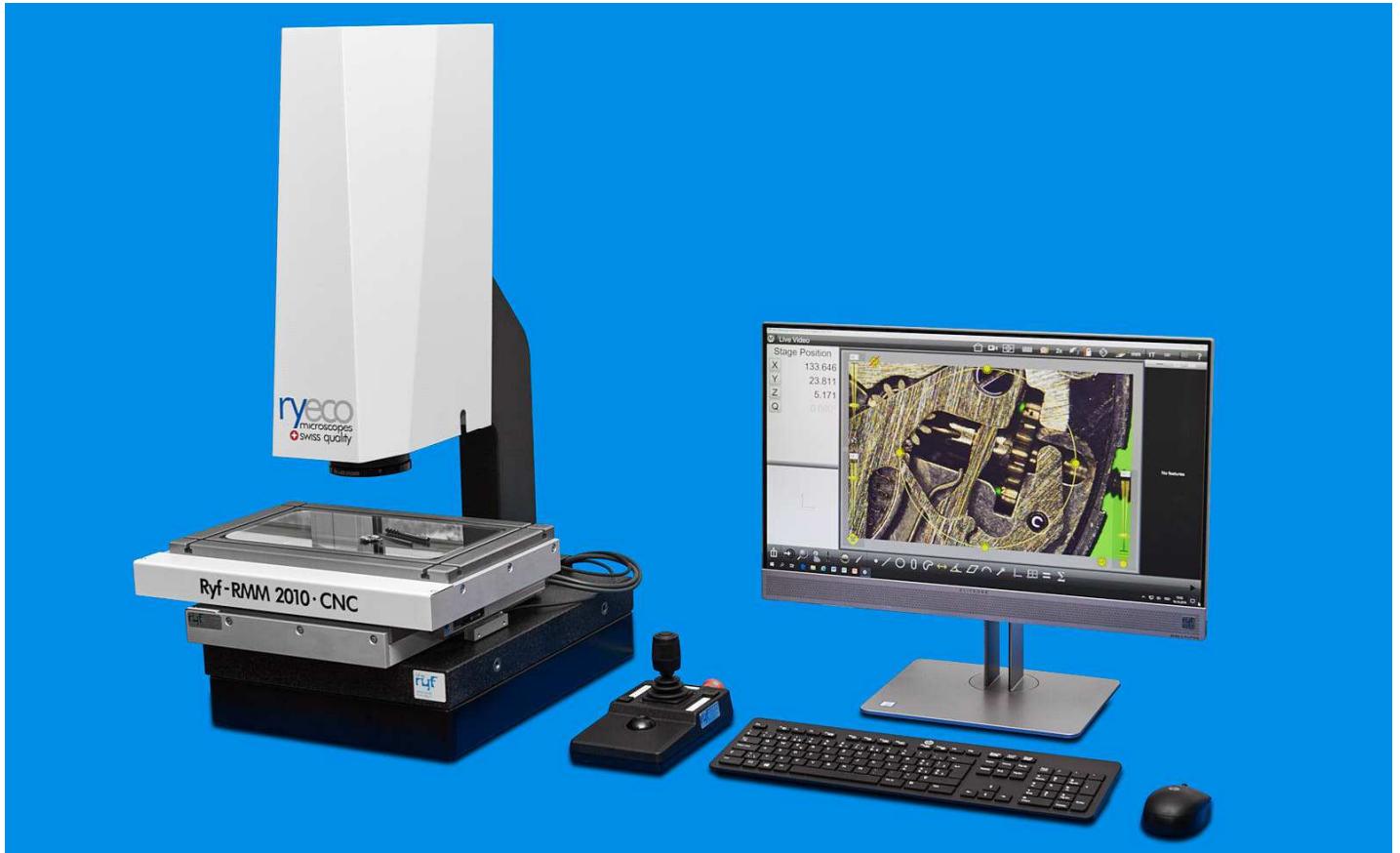


## *Operating Instructions Ryeco RMM2010 - CNC*



# **Operation Instructions** **CNC Toolmaker Microscope** **Ryf RMM2010-CNC**

## Operating Instructions Ryeco RMM2010 - CNC

### 1 General information

#### 1.1 Introduction

These operating instructions contain important information regarding the safe and intended use of a measurement device used for the optical or optical-tactile multi-sensor coordinate measurement of workpieces that are suitable based on their characteristics, such as size, weight and material.

The instructions are intended to help avoid hazardous situations, to prevent accidents and to protect the system from damage due to improper conduct of personnel. The operating instructions are aimed at all persons who operate the system or complete any maintenance or servicing work on the system.

#### 1.2 Target group

These operating instructions are only aimed at trained personnel and specialized staff with relevant training by Ryf Ltd. in the respective area of activity. For more information see

#### 1.3 Limitation of liability

All of the information and instructions in these operating instructions have been compiled taking into account the applicable standards and regulations, the state-of-the-art, as well as our long-standing knowledge and experience.

Ryf Ltd. reserve the right to implement technical changes within the scope of the ongoing development of the product described in these operating instructions without prior notice. The details, figures and descriptions in these operating instructions therefore only serve as indicative information. The illustrations provided in these operating instructions also do not necessarily correspond to the scope of delivery or any spare parts supplies. The drawings and figures are not drawn to scale.

Ryf Ltd. shall not assume liability for damages and malfunctions caused by the following circumstances:

- Operating errors
- Non-compliance with the documentation
- Non-intended use of the measurement device
- Deployment of personnel who are not trained for the corresponding task
- Repairs that have not been completed professionally
- Failure to complete or incorrect maintenance work
- Unauthorized technical changes
- Use of spare parts and accessories that have not been approved by Ryf Ltd. Switzerland
- Use of unsuitable or unauthorized operating materials
- Operation using faulty, non-functional or bypassed safety and monitoring equipment
- Incorrect connection or preceding work that is not included in the contractually agreed
- Retrofitting and/or other structural changes to the measurement device, if and to the extent that they have not been expressly approved by Ryf Ltd. Switzerland in writing.

A warranty is not expressly granted.

## Operating Instructions Ryeco RMM2010 - CNC

### 1.4 Warranty, product liability

The measurement device left our factory in a perfect condition. At the time it showed no signs of defects in accordance with the Civil Code and no faults in accordance with the Product Liability Act.

All of the technical information, specifications and notes relating to the operation of the measurement device, provided in these operating instructions, have been compiled and reviewed carefully. They meet the latest technical standards for the measurement device at the time of printing and are based on our experiences and technical expertise gained to date.

In the event of any defects or faults arising on the delivered measurement device or the supplied documentation and in the event of any culpable mistakes on our part, the content of the warranty and liability framework shall be exclusively governed by the regulations set out in the main contract relating to the acquisition. In this context, we also refer you to our general terms and conditions of business, which form an integral part of all of our business agreements. With the exception of liability according to statutory law as per the Swiss Product Liability Law, any further claims, especially claims for compensation, are excluded.

Any warranty claims must be submitted to Ryf Ltd. within the warranty period immediately after the defect or fault has been detected. The warranty period is specified in our final order confirmation. The warranty shall not cover normal wear, especially function-related wear of all wear parts installed in the measurement device.

## 2 Intended uses

### 2.1 General information about the intended use

Workshop microscopes from the RMM2010 series are optical or optical coordinate measurement devices and may be used for the following purposes (= intended use):

- **All models:** Optical coordinate measurement of two-dimensional geometries (e.g. points, lines, distances, circles, radii, angles) using the integrated transmitted and/or incident light illumination.
- Details on the measurement range and maximum workpiece weight is provided in the measurement range is dependent on the model. The maximum work piece size that can be measured is determined from the measurement range of the measurement device. The following must also be observed:
  - The workpiece must be designed in such a way that it can be positioned securely or fixed on the measurement table, ensuring that it cannot fall down and that the workpiece and measurement device (sensor or housing) do not collide when the measurement table is moved.
  - Specifications regarding the measurement range apply to the primary sensor (camera). If other sensors are used, the effective measurement range is reduced because of the following conditions:
    - Offset between camera center point and probe tip center point.
    - Characteristics and offsets of other sensors.
    - It must be ensured that the measurement table is loaded evenly as this could otherwise influence the measurement result.
    - The measurement device is designed for stationary applications

Any use of a RMM2010 that is not in accordance with the specified provisions and/or parameters is deemed to be contrary to the intended use for which Ryf Ltd. shall not assume any liability for damage or malfunctions.

## Operating Instructions Ryeco RMM2010 - CNC

### 2.2 Use contrary to intended use

A RMM2010 must **not** be used as follows:

- Depending on the model, the measurement table that can be moved in the X- and Y-direction must not be operated or moved in any other way than in manual mode (RMM 2010 manual) or with the help of the integrated CNC control (RMM2010-CNC).
- The load placed on the measurement table must not exceed the specified total maximum weight (do not use for material storage or as a support!).
- The measurement table must not come into contact with other objects (e.g. walls, cabinets) even when the maximum traverse path in the X- or Y-direction is used. A distance of one (1) meter must be maintained on all sides.
- The positioning laser (if available) must not be removed from its fastening, rotated in another direction or modified or manipulated in any other way.
- The positioning laser must not be used for any other purpose than to position measurement objects.

### 3 General safeties

#### 3.1 Operator's area of responsibility

The operator of the measurement machine is responsible for implementing the relevant legal provisions regarding occupational health and safety. The operator must ensure that the measurement device is only used as intended and is operated in a fault-free, fully functional condition.

The operator must:

- Know and implement the applicable occupational health and safety regulations.
- Ensure that the relevant task is only carried out by personnel who have the necessary training, qualifications and authorization and who have been instructed about the specific conditions at the location of the measurement device.
- Clearly specify and regulate personnel responsibilities regarding installation, operation, maintenance and cleaning.
- Bear responsibility for the operation of the measurement device.
- Ensure that all employees have read and understood the parts of this documentation that are relevant to their work. Provide personnel by Ryf with safety training at regular intervals; at least once per year (1x / year).
- Ensure that the documentation is always in a legible condition and that it is fully accessible in the immediate vicinity of the measurement device.
- Ensure that all of the safety and warning notices attached to the measurement device are present, clean and legible.
- Ensure and regularly check that locally and nationally applicable safety, accident prevention and environmental regulations are observed in addition to the occupational health and safety regulations in these instructions.
- Provide personnel with the necessary personal protective equipment.
- Secure hazardous areas between the measurement device and operating equipment.
- Ensure that the measurement device is always in a perfect condition.
- Ensure that the functionality and completeness of the safety equipment is checked on a regular basis.

#### 3.2 Personnel requirements

The measurement device must only be operated by correctly trained personnel by Ryf AG. Maintenance work must only be completed by specialized staff.

Work on electric components must only be carried out by an electrician from Ryf AG.

## Operating Instructions Ryeco RMM2010 - CNC

### 3.2.1 Trained personnel

Within the context of this documentation, trained personnel have attended training provided by the operator relating to the assigned work and have been instructed about possible dangers resulting from improper behavior.

### 3.2.2 Specialized staff

Within the context of this documentation, specialized staff is individuals who, based on their technical training, knowledge and experience and their awareness of the relevant regulations, are able to:

- Safely carry out the work assigned to them and correctly assess the scope of the work
- Independently recognize possible hazards and implement the necessary measures to eliminate them
- Have adequate language skills to understand these instructions in English.

### 3.2.3 Electrician

Electricians are individuals, who based on their technical training, knowledge and experience and their awareness of the relevant standards and regulations are able to complete work on electrical systems and independently recognize and prevent possible hazards.

### 3.3 Qualifications required based on the life cycle of the measurement device

Transporting the measurement device: Specialized staff for handling the hoisting and transport equipment. Experience of transporting heavy and bulky goods.

Assembling the measurement device: Specialized staff with relevant vocational training. Experience of assembling similar measurement devices.

Initial commissioning: Initial commissioning must be carried out by specialized staff at Ryf.

Operating the measurement device: Trained person with relevant specialist knowledge. Instructions on operating the measurement device.

Maintaining the measurement device: Trained personnel

- Must have received training for the relevant task
- Must have specialist knowledge about measurement devices to complete maintenance
- Must be aware of the dangers of handling measurement devices

Servicing the measurement device: Specialized staff with relevant vocational training. Experience of servicing similar measurement devices.

Decommissioning the measurement device: Specialized staff for handling the hoisting and transport equipment. Experience of transporting heavy and bulky goods. Knowledge of the applicable regulations relating to environmental protection and the disposal of operating materials at the site.

### 3.4 Safety and monitoring equipment

The safety and monitoring equipment is designed to protect against personnel injuries and material damage.

Measurement devices may only be operated when all of the safety and monitoring equipment is present and fully functional.

Once part of the safety or monitoring equipment has been triggered, the measurement device may only be placed back into operation once the cause of the fault has been eliminated.

Safety or monitoring equipment may only be removed, changed, disabled or bypassed by qualified specialized staff as part of temporary interventions during testing, investigations, troubleshooting, the elimination of damage or faults, and when replacing components. In addition, these interventions must be safety-related or adequate safety-related contingency measures must have been implemented.



# Operating Instructions Ryeco RMM2010 - CNC

## 3.5 Noise

If used as intended, a noise level of 70 dB(A) will not be exceeded in the operational environment of the measurement device.

## 3.6 Vibrations

No health-related vibrations are emitted by the measurement device.

## 3.8 General safety notices for the WM1 series

### 3.8.1 Laser-specific hazards

The following explanations are provided in accordance with the applicable DIN standards DIN EN 60 825-1 (VDE 0837-1):2015-07 "Safety of laser products" and Accident Insurance (DGUV) specification 11 "Durchführungsanweisungen Laserstrahlung" ("Operational instructions for laser radiation").

**The positioning laser emits class 2M laser radiation.** The available laser radiation is in the visible spectral range of 400 nm to 700 nm. For short exposure times (up to 0.25 s), it is harmless to the human eye as long as the cross section of the beam is not decreased with optical instruments, e.g. magnifying glasses, lenses, telescopes. As long as no optical instruments, that decrease the cross section of the beam, are used, **the risk of class 2M laser devices is comparable to that of class 2 laser devices.**

If the eye is accidentally exposed to the laser radiation of a class 2 laser device for a short period, i.e. exposure time of up to 0.25 s, it will not be at risk. Class 2 laser devices may therefore be used without any other safety measures if it can be ensured that the application requires neither deliberate eye contact of more than 0.25 s nor repeated eye contact with the laser radiation or the laser radiation reflected by the mirror. Generally, the presence of the eyelid closing reflex and other aversion responses to protect the eye cannot be assumed. Therefore if class 2 laser radiation strikes the eye, you should consciously close your eyes and turn your head away immediately.



### **Warning: The laser emits class 2M laser radiation**

Direct contact with the laser beam for a period of more than 0.25 s can damage the eyes.

- Never look into the direct or reflected laser beam.
- If the laser radiation strikes the eye, consciously close your eyes and turn your head away from the beam immediately.
- No optical instruments, that decrease the cross section of the beam, may be used.
- The positioning laser must not be removed from its fastening, rotated in another direction or modified or manipulated in any other way.
- The positioning laser must not be used for any other purpose than to position measurement objects.
- The positioning laser should only be switched on when actually required.
- Any work, that requires the protective housing of the laser system to be removed, must only be completed by qualified specialized staff from Ryf Ltd.

# Operating Instructions Ryeco RMM2010 - CNC



## Damaged or ineffective safety equipment and damaged components

Risk of death or serious injuries caused by ineffective safety equipment or damaged components.

- Never operate the measurement device with damaged, ineffective or bypassed safety equipment.
- Check the functionality of the safety equipment before starting work.
- Check measurement device components, the power cable and connector for any visible damage before starting work. Do not use the measurement device if measurement device components, the power cable or connector are damaged.
- In the event of any damage, deactivate the measurement device immediately, secure it against accidental reactivation and inform the responsible department.



## Dangerous electrical voltage

Risk of a fatal electric shock or serious injuries upon contact with any live parts.

- Never open the power supply.
- Any defects that are detected on electrical components must be corrected immediately.
- Operating rooms and/or control cabinets must only be opened by an electrician.
- Work on electric components must only be carried out by an electrician. Locally applicable regulations and guidelines for the installation and operation of electrical systems must be observed.
- Before completing any work on live components, remove the mains plug to disconnect the power supply and secure against accidental re-start.
- Parts of the measurement device on which inspection, maintenance and repair work is carried out, must be disconnected from the power supply, if specified. First of all, check that no voltage is present in disconnected parts, then ground and short circuit them. Isolate any neighbouring live parts.
- Check the system's electrical equipment on a regular basis. Defects, such as loose connections or damaged cables must be eliminated immediately by an electrician.
- Lock away the power cable for the duration of the maintenance work.
- Attach a warning sign to the housing indicating that the measurement device is being maintained.

Risk of a fatal electric shock or serious injuries caused by water in the measurement device.

- The measurement device must only be cleaned with a dry or, at most, a slightly moistened cleansing tissue or microfibre cloth.
- It must be ensured that water or any other liquid never penetrates the measurement device.

## Operating Instructions Ryeco RMM2010 - CNC



### **Hazard caused by the measurement device falling down or tilting during transport and assembly:**

Risk of squashing, shearing or collision.

- Only use the specified attachment points for transport purposes.
- Heavy vibration and shock loads and point loads on the housing of the measurement device must be avoided.
- Secure the measurement table of the measurement device so that it cannot spontaneously shift or move during transport. The measurement table must be fixed/secured **with the supplied transport securing device** during transport, also see
- The measurement device must only be installed on a level, sufficiently load-bearing and sufficiently wide surface.
- Bolt the RMM2010 and base frame together using the supplied transport securing device.





# Operating Instructions Ryeco RMM2010 - CNC

## Emergency Stop button (CNC model)

In the event of a hazardous situation, press the Emergency Stop button on the joystick immediately to stop the axis motion of the measurement device.

**"CLICK"**

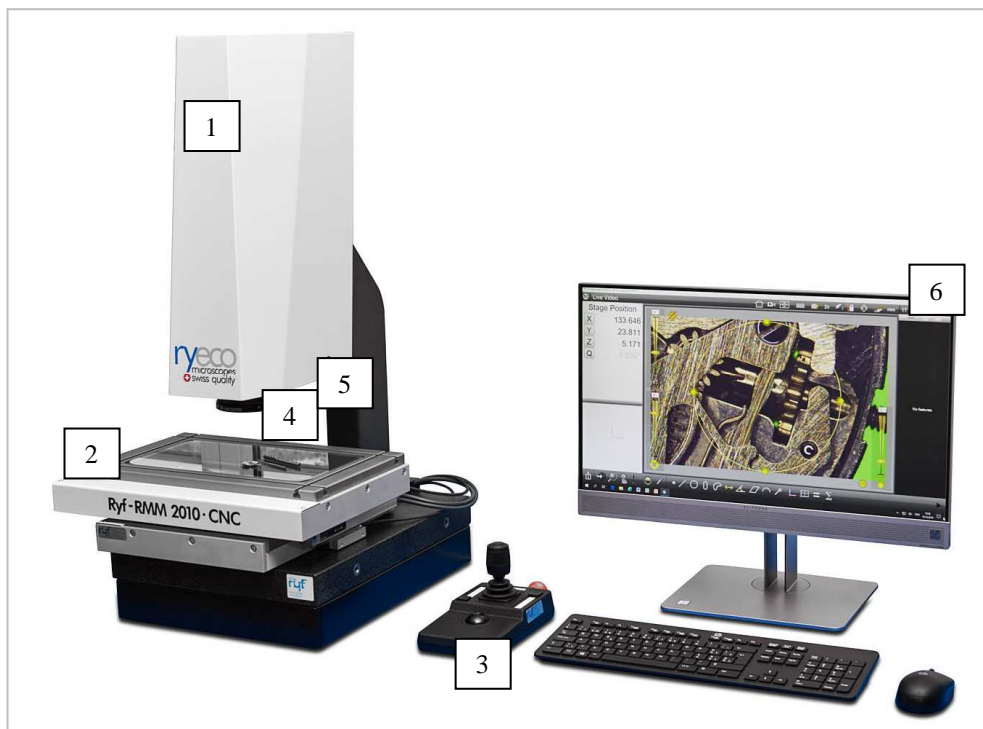


## 4.2 Structure of measurement device RMM2010-CNC (CNC model)

Measurement device RMM2010-CNC is designed according to the latest technology and currently applicable rules and regulations.

The following figure illustrates an example of a RMM2010- CNC with M3 measurement and analysis software:

- 1 Housing
- 2 Measurement table with glass plate
- 3 Joystick
- 4 Camera lens and LED incident light illumination
- 5 Positioning laser (diode laser)
- 6 Measurement computer (in this case: all in one HP PC i9)



# Operating Instructions Ryeco RMM2010 - CNC

## 4.3.1 Joystick (CNC model)

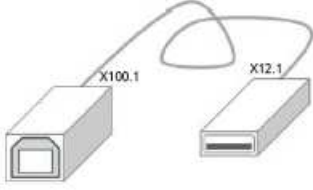
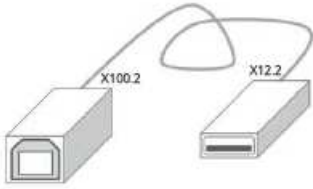
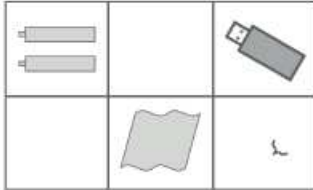

The joystick is used to control the axes.  
 The following figure illustrates an example of the standard scope of supply:

- 1 Connection socket
- 2 Button to switch between "creep speed – normal speed"
- 3 Axis interlock button
- 4 Emergency Stop button
- 5 "GoTo position" button (optional)
- 6 Z-direction rotating



IMAGE	DESIGNATION
	Joystick (only on CNC models)
	Joystick cable with 2 x D-SUB socket (only on CNC models)
	Glass plate with tension spring
	Plug-in power supply unit with stereo connector, 5-pole
	Plug-in power supply unit with barrel connector
	Multiple socket extension lead (only on CNC models)

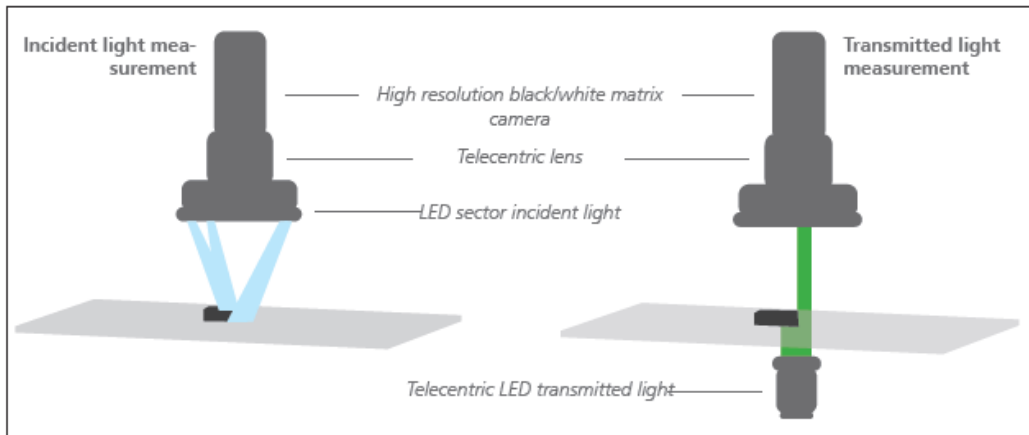
# Operating Instructions Ryeco RMM2010 - CNC

IMAGE	DESIGNATION
	USB cable A to B (X12.1 to X100.1) for the camera
	USB cable A to B (X12.2 to X100.2) for the controller
	Box including microfibre cloth, batteries, tension spring and USB receiver for mouse and keyboard
	Software licence key/dongle

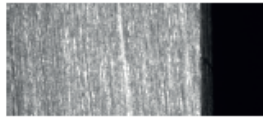
## Operating Instructions Ryeco RMM2010 - CNC

### 4.6.1 Measurements using transmitted light and incident light

All models of the WM1 series can be used for transmitted light and/or incident light measurements. The following figure provides a schematic overview of both measurement options:



- Measurements with incident light help to identify contours and characteristics on the surface of the workpiece, while contrasts (and thus the principle measurement accuracy) are dependent on the material, contour, texture and colour of the workpiece surface. An example is provided in the following image:



- Measurements with transmitted light provide high contrasts and sharp edges, while contours and characteristics on the workpiece surface are not recognisable using transmitted light. An example is provided in the following image:



- Transmitted light and incident light measurements can be combined and activated simultaneously, if required.

## Operating Instructions Ryeco RMM2010 - CNC

### 5 Installation location, ambient conditions, transport

#### 5.1 Installation location

The measurement device must be installed on a level, sufficiently load-bearing and sufficiently wide surface.

The installation location for the measurement device must be selected so that no direct light from windows or lights can penetrate the measurement table of the measurement device. Additionally, when selecting an installation location it must be ensured that no inductive loads from fluorescent tubes, welding sets, wire or vertical arc-erosion machines, etc. are connected as these cause spikes in the power supply system. We therefore recommend using a separate power supply for the measurement device. If disturbances should arise despite these measures, an alternating voltage stabilizer or mains filter may be used depending on the type of disturbance (both are available as accessories; if required, contact the Customer Services team).

#### 5.2 General ambient conditions

The location of the measurement device must be selected to ensure that it is not exposed to any interferences, such as

- Dust
- Dirt
- Humidity

Vibrations of the measurement device and heat sources in its surrounding area should also be excluded as these can cause measurement inaccuracies. Certain temperature conditions are required to meet the specified length measurement uncertainty

#### 5.3 Ambient conditions for transport and storage

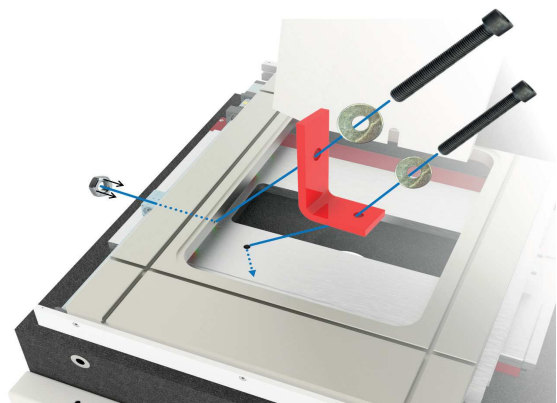
Minimum conditions:

- Permissible ambient temperature: 5 °C – 40 °C
- No dust
- No direct sunlight
- No rain and no humidity

#### 5.4 General notes on transport and storage

The following points must be observed to prevent any damage and fatal injuries:

- The glass plate must not be inserted in the measurement device or measurement table during transport.
- Only use transportation means that are in accordance with the applicable laws, regulations and provisions of the respective country.
- The measurement device may only be transported by specialized staff who are trained and qualified for this task.
- The transport vehicle, hoisting equipment and lifting accessories must be designed for the weight and dimensions of the system components. They must also adhere to the requirements for safe transport of the measurement device.
- The operating instructions for the hoisting equipment and lifting accessories must be observed.
- The transport units (measurement device, computer, accessories, etc.) must be transported to the installation location on transport pallets by the customer.

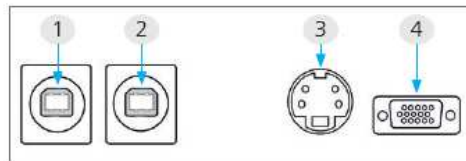


## Operating Instructions Ryeco RMM2010 - CNC

### 6.0 Connections on the rear of the device (CNC model)

All USB devices should always be connected to the same connection to prevent any driver conflicts.

The following figure shows an example of the connections on the rear of a CNC-controlled RMM2010; similar presentation, not to scale:

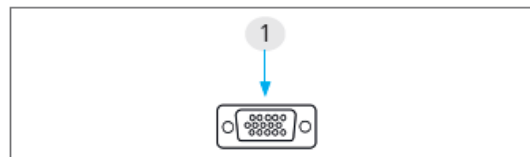


POSITION	DESIGNATION	FUNCTION
1*	X100.1	USB-B connection*: camera connection
2	X100.2	USB-B connection: control connection
3	X100.3	Mains plug: power supply
4	X100.4	D-SUB socket: joystick connection

\* On models with an industrial PC instead of a panel PC a FireWire connection may be used for the camera instead of a USB connection. Designation X100.1 is retained.

#### 6.0.1 Connections on the joystick (CNC model)

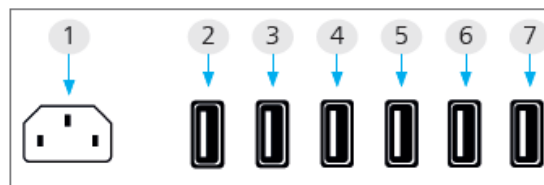
The following figure shows an example of the connections on the joystick of a CNC-controlled WM1; similar presentation, not to scale:



POSITION	DESIGNATION	FUNCTION
1	X102	Measurement device connection

### 6.1 Connections on the measurement computer

The following figure shows an example of the connections on a **Panel PC**; similar presentation, not to scale:



POSITION	DESIGNATION	FUNCTION
1	X12.3	Mains plug: power supply
2*	X12.1*	USB-A connection*: camera connection
3	X12.2	USB-A connection: control connection
4	X12.5	USB-A connection: Software licence key/dongle connection
5	X12.6	USB-A connection: wireless keyboard/mouse connection
6	-	Free
7	-	Free

\* On models with an industrial PC instead of a panel PC a old FireWire connection may be used for the camera instead of a USB2 or USB3 connection. The **designation changes from X12.1 to X12.39**).



# Operating Instructions Ryeco RMM2010 - CNC

## 7.0 Activation and startup

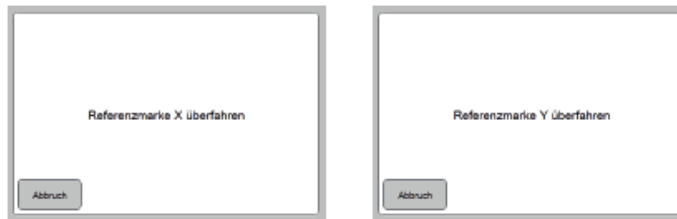
1. Connect the multiple socket extension lead
2. Switch on the measurement computer
  - ▶▶ The measurement computer and Windows operating system start up
3. Log in to Windows using the "User" account
4. **Models with M3 measurement software:** Click on the "M3" icon on the desktop to start M3
  - ▶▶ The M3 measurement software opens
6. Log in as the "Super User" (password: superuser) or "User" (no password required) and click on "Complete"
  - ▶▶ A reference run must be completed (see below)

## 7.1 Completing a reference run (models with M3)

Every time the computer is restarted and every time the power supply is interrupted, the M3 measurement software automatically indicates that a reference run must be completed. This reference run is mandatory and cannot be skipped.

### 7.1.1 Manual models

1. The following notification windows are displayed successively indicating that a reference run is necessary and providing the relevant instructions:



2. Complete the reference run by moving the measurement table along the X- and Y-axis using the handwheel and the camera lens along the Z-axis using the handwheel.
  - ▶▶ The M3 measurement software is available following the reference run.

### 7.1.2 CNC models

1. An input window indicating that a reference run is required appears:



2. Check that the Emergency Stop button on the joystick is unlocked.
3. Acknowledge the input window by pressing the "Start" button.
  - ▶▶ The reference run is completed automatically.
  - ▶▶ The M3 measurement software is available following the reference run.

## 7.2 Completing a measurement

The measurement object must be free of any impurities and must not wobble or move when the measurement table is moved, as the measurement result will otherwise be distorted.

1. Position measurement object or sample workpiece on the glass plate.
2. Secure measurement object, if necessary.
3. Ensure that the edge of the workpiece is in focus on the screen; move the Z-axis for this purpose. Generally, the upper edge of the workpiece should be in focus.
4. The measurement can now be started.

## Operating Instructions Ryeco RMM2010 - CNC

Information on operating and handling the **M3 measurement software** is provided in the supplied "M3" operating instructions.

### 7.2.1 Correct positioning of measurement objects

Depending on their shape and condition, measurement objects or workpieces should be aligned at a right angle to the measurement table, as the measurement result may otherwise be distorted. For this purpose, it may be sensible to mount or install holding devices or clamping tools (e.g. stop bracket, prism, center supports) on the measurement table. The T-slots on the measurement table or edges of the measurement table itself can be used as alignment aids.

## 8 Maintenance of the RMM2010 CNC

Only specialised staff is authorised to complete maintenance work on the measurement device. Maintenance work must be completed in the presence of a person who is trained at Ryf Ltd. to operate the measurement device. All of the work must be completed in accordance with applicable provisions and protective regulations to safeguard any warranty claims.

The **functional parts inside the device are cleaned** as part of the maintenance/ inspection work completed by the Customer Services team at Ryf AG in Switzerland.

We recommend that the measurement device is checked, maintained and adjusted, if required, on an annual basis (1 x / year). Please contact Customer Services to arrange this ([tel +41 032 654 21 04.](tel:+410326542104))

The optical components (lens, condenser of LED transmitted light) should always be free from oil, dust and finger prints. Therefore do not touch optical components directly with your hands. Only use a soft cleansing tissue (e.g. "Kleenex® Original" or ask at Ryf Ltd.) to clean optical components.

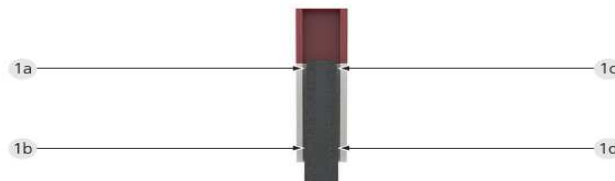
The checks and maintenance work detailed in the following must be performed, **without exception, at the required intervals by specialised staff**

### 8.1.1 Lubrication of guiding units

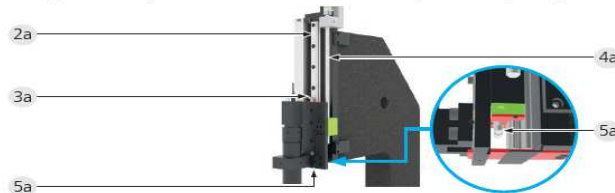
All of the guide units on the measurement table unit have highly accurate, pre-tensioned bearings. They are sensitive to dirt, dust and humidity. Absolute cleanliness must therefore be ensured in the vicinity of the guides. Check guide units once a year and lubricate slightly, if required. A grease gun is required for certain work steps (a suitable adapter may be required for the lubricating nipple).

#### Lubricating the Z-axis

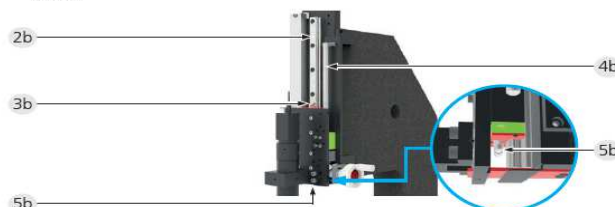
1. Remove the housing; for this purpose, release hexagon socket screws 1a-1d on the rear of the housing.



- **CNC models:** The Z-axis guide rail (2a), Z-axis spindle (4a) and upper lubricating nipple on the guide carriage (3a) are accessible, see following figure. The lower lubricating nipple (5a, not pictured) becomes accessible when you move up along the Z-axis.



- **Manual models:** The Z-axis guide rail (2b), Z-axis spindle (4b) and upper lubricating nipple on the guide carriage (3b) are accessible, see following figure. The lower lubricating nipple (5a, not pictured) becomes accessible when you move up along the Z-axis.



# Operating Instructions Ryeco RMM2010 - CNC

2. Clean the Z-axis guide rail (2a/2b) with a lint-free cloth: move up and down the Z-axis several times so that any remaining grease residue is easier to remove.
3. Grease the Z-axis guide rail **via the upper lubricating nipple on the guide carriage (3a/3b) and via the lower lubricating nipple of the guide carriage (5a/5b)**; use a suitable grease gun for this purpose (use suitable adapter, if necessary). **Never grease the Z-axis guide rail directly!**
4. Move the Z-axis fully up and down several times to distribute the grease evenly.



## CAUTION

### Destruction of the belt drive (on manual models)

Destruction of the belt drive. The belt drive would need to be replaced as a result and other repairs may be necessary.

- Lubricating grease must never get in/on the belt drive (see red circle in following image). This must always be ensured.

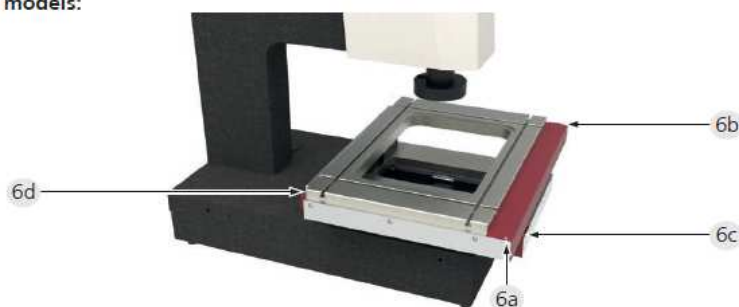


5. Clean the Z-axis spindle (4a/4b) with a lint-free cloth.
6. Slightly grease the Z-axis spindle (4a/4b) with a brush.
7. Move the Z-axis fully up and down several times to distribute the grease evenly. If applicable: Remove any excess grease that has collected at the ends of the spindle.
8. Carefully clean the oil collection plate. The oil collection plate is positioned underneath the Z-axis guide rail.
9. Attach the housing again; to do so screw the housing in place with the hexagon socket screws.

## Preparing to lubricate the X-axis and Y-axis

10. **Carefully** remove the glass plate from the measurement table; to do so carefully place one hand underneath the glass plate to push it up and out and use your other hand to remove it upwards. Make sure that the tension spring is not lost.
11. Remove the two red cover plates from the X-axis and Y-axis guide spindles; to do so release hexagon socket screws 6a-6d.

### CNC models:



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- **CNC models:** The following figure shows an example of the guide unit for the measurement table unit (X-axis and Y-axis):



POSITION	DESIGNATION
7 (a, b)	X-axis guide rails
7c	X-axis spindle
8 (a, b)	Y-axis guide rails
8c	Y-axis spindle

- **Manual models:** The following figure shows an example of the guide unit for the measurement table unit (X-axis and Y-axis):



POSITION	DESIGNATION
7 (a, b)	X-axis guide rails
7c	X-axis spindle
8 (a, b)	Y-axis guide rails
8c	Y-axis spindle


## Lubricating the X-axis and Y-axis spindles

12. Clean the X-axis spindle (7c) with a lint-free cloth: move up and down the X-axis several times so that any remaining grease residue is easier to remove.
13. Slightly grease the X-axis spindle (7c) with a brush.
14. Move the X-axis fully up and down several times to distribute the grease evenly. If applicable: Remove any excess grease that has collected at the ends of the spindle.
15. Clean the Y-axis spindle (8c) with a lint-free cloth: move up and down the Y-axis several times so that any remaining grease residue is easier to remove.
16. Slightly grease the Y-axis spindle (8c) with a brush.
17. Move the Y-axis fully up and down several times to distribute the grease evenly. If applicable: Remove any excess grease that has collected at the ends of the spindle.



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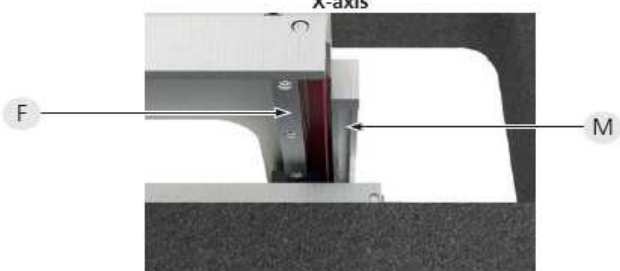
**CAUTION**




**Damage or destruction of the measuring units**  
Damage or destruction of the measuring units. The measuring units would need to be repaired or replaced as a result. The measurement device may also need to be re-aligned.

- Lubricating grease must never get in/on a measuring unit. This must always be ensured.
- Ensure that you do not confuse the measuring units (M) with the guide rails (F).

**X-axis**




**Y-axis**

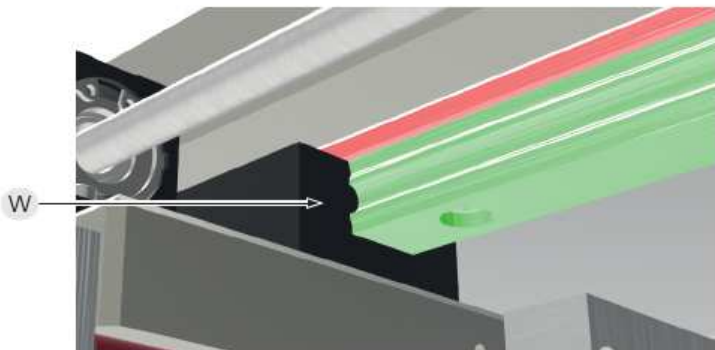


18. Clean both of the X-axis guide rails (7a, 7b) with a lint-free cloth: move up and down the X-axis several times so that any remaining grease residue is easier to remove.
19. Slightly grease both of the X-axis guide rails (7a, 7b) with a brush.

**NOTICE**



You only need to lubricate the part of the guide rail that actually moves along the guide carriage (W, see following figure).  
In this example, the green area must be lubricated, while the red area does not need lubricating.



20. Move the X-axis fully up and down several times to distribute the grease evenly. If applicable: Remove any excess grease that has collected at the ends of the rails.
21. Clean both of the Y-axis guide rails (8a, 8b) with a lint-free cloth: move up and down the Y-axis several times so that any remaining grease residue is easier to remove.
22. Slightly grease both of the Y-axis guide rails (8a, 8b) with a brush.
23. Move the Y-axis fully up and down several times to distribute the grease evenly. If applicable: Remove any excess grease that has collected at the ends of the rails.

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### 8.2 Troubleshooting and fault elimination

Any "**Service**" work must be completed by the Customer Services team at Ryf Ltd. as additional alignment or calibration work and special tools are required. The following faults can occur on manual and/or CNC models:

FAULT	POSSIBLE CAUSE(S)	REMEDIAL ACTION
General, unspecified fault (also applies to faults described in the following)	<ul style="list-style-type: none"> <li>Software/hardware communication error in measurement computer and/or measurement device or unspecified software error</li> </ul>	<ol style="list-style-type: none"> <li>Switch off the measurement computer</li> <li>Switch off the measurement device using the main switch</li> <li>Completely disconnect the measurement device from the power supply</li> <li>Reconnect the measurement device to the power supply</li> <li>Switch on the measurement computer and start the software</li> <li>If the problem has not been resolved, there is probably a defect. In this case, contact the <b>Service</b> team.</li> </ol>
No light and no laser point available or CNC model <b>cannot</b> be moved with the joystick or Error messages that indicate there is no connection to the controller (e.g. "Configuration of machine axis incomplete")	<ul style="list-style-type: none"> <li>Power supply is not plugged in</li> <li>Connector not inserted</li> <li>Power supply is faulty</li> </ul>	<ul style="list-style-type: none"> <li>Connect, or disconnect and connect the power supply</li> <li>Connect, or disconnect and connect the connector</li> <li>Have an electrician check the voltage</li> <li>or</li> <li>Procure new power supply (<b>Service</b>)</li> </ul>
Lubricating grease/oil is dripping from the upper housing	<ul style="list-style-type: none"> <li>Oil collection plate is overflowing because too much lubricating grease was applied, for example</li> </ul>	<ul style="list-style-type: none"> <li>Clean the oil collection plate</li> </ul>
No light and no laser point available but counter display is working	<ul style="list-style-type: none"> <li>Illumination circuit board</li> <li>Counter circuit board (or MIO circuit board on CNC machines) is faulty</li> </ul>	<ul style="list-style-type: none"> <li>Replace illumination circuit board (<b>Service</b>)</li> <li>Replace counter circuit board (or MIO circuit board on CNC machines) (<b>Service</b>)</li> </ul>
No camera image	<ul style="list-style-type: none"> <li>Camera cable between the measurement computer and is not connected correctly</li> <li>Camera cable between the measurement computer and is faulty</li> <li>Camera is faulty</li> </ul>	<ul style="list-style-type: none"> <li>Remove camera cable on both sides and reconnect</li> <li>Replace camera cable (<b>Service</b>)</li> <li>Replace camera (<b>Service</b>)</li> </ul>
No transmitted light illumination	<ul style="list-style-type: none"> <li>Transmitted light LED is faulty</li> </ul>	<ul style="list-style-type: none"> <li>Replace transmitted light LED (<b>Service</b>)</li> </ul>
No incident light illumination	<ul style="list-style-type: none"> <li>LED ring light is faulty</li> </ul>	<ul style="list-style-type: none"> <li>Replace LED ring light (<b>Service</b>)</li> </ul>
Counter does not count or displays incorrect (or impossible) coordinates but the light works	<ul style="list-style-type: none"> <li>Measurement system for the relevant axis is faulty</li> <li>Counter circuit board (or MNC circuit board on CNC models) is faulty</li> </ul>	<ul style="list-style-type: none"> <li>Replace measurement system (<b>Service</b>)</li> <li>Replace counter circuit board (or MNC circuit board on CNC models) (<b>Service</b>)</li> </ul>



## Operating Instructions Ryeco RMM2010 - CNC

FAULT	POSSIBLE CAUSE(S)	REMEDIAL ACTION
Zoom lens (optional) is deactivated or jammed	<ul style="list-style-type: none"> <li>Zoom lens is faulty</li> <li>Zoom lens is stuck at the stop (the movement cannot be started)</li> </ul>	<ul style="list-style-type: none"> <li>Replace zoom lens (<b>Service</b>)</li> <li>Follow the instructions printed below</li> </ul>

1. Press the Emergency Stop button.
2. Manually pull the zoom lens downwards until you can see the control gear wheel.



3. Manually turn the control gear wheel several times in both directions and ensure that it is not located at an attachment point following this process.
4. Release the Emergency Stop button and check whether the problem has been resolved. If the problem has not been resolved, there is probably a defect.

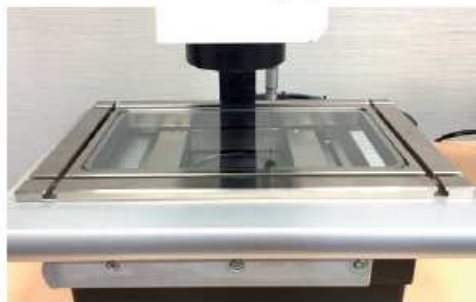
The following faults only occur on CNC models:

FAULT	POSSIBLE CAUSE(S)	REMEDIAL ACTION
None of the axes will move	<ul style="list-style-type: none"> <li>Emergency Stop button has been actuated</li> <li>MMA circuit board is faulty</li> </ul>	<ul style="list-style-type: none"> <li>Release Emergency Stop button</li> <li>Replace MMA circuit board (<b>Service</b>)</li> </ul>
One of the axes moves poorly or not at all	<ul style="list-style-type: none"> <li>Axis is mechanically stiff</li> <li>Motor is faulty</li> <li>Motor cable is faulty</li> </ul>	<ul style="list-style-type: none"> <li>Axis must be checked by specialised staff</li> <li>Replace motor (<b>Service</b>)</li> <li>Replace motor cable (<b>Service</b>)</li> </ul>

# Operating Instructions Ryeco RMM2010 - CNC

FAULT	POSSIBLE CAUSE(S)	REMEDIAL ACTION
Reference run will not work (measurement table does not move automatically) ("drag error")	<ul style="list-style-type: none"> <li>One of the axes indicates a starting position with an excessive starting torque</li> </ul>	<ul style="list-style-type: none"> <li>Follow the instructions printed below</li> </ul>

1. Completely disconnect the measurement device from the power supply.
2. Manually move the measurement table so that it is roughly in the centre of the X- and Y-axis (see following figure). Manually pull down the lens incident light unit so that it is also roughly in the centre (see following figure).



3. Reconnect the power supply to the measurement device and check whether the problem has been resolved. If the problem has not been resolved, there is probably a defect. In this case, contact the **Service** team.

## 9 Disassembly, storage, disposal

### 9.1 Disassembly

The disassembly must only be carried out by specialized staff who are trained and qualified for this task. Personal protective equipment must be worn.

- Laws, regulations and provisions, as well as the safety guidelines in these instructions must be observed.
- The measurement device must be shut down and secured against accidental start-up before disassembly.
- The measurement device must be disconnected from all supply lines.
- When handling operating and auxiliary materials, the product-specific safety guidelines and safety data sheets for the operating and auxiliary material must be observed.

### 9.2 Storage

The following regulations apply to the storage of measurement devices:

- Store in a dry location. Maximum relative air humidity: 50 – 70%.
- Do not store outdoors.
- Protect against direct sunlight.
- Store in a dust-free location.
- Protect stored components against mechanical vibrations and damage.

### 9.3 Disposal

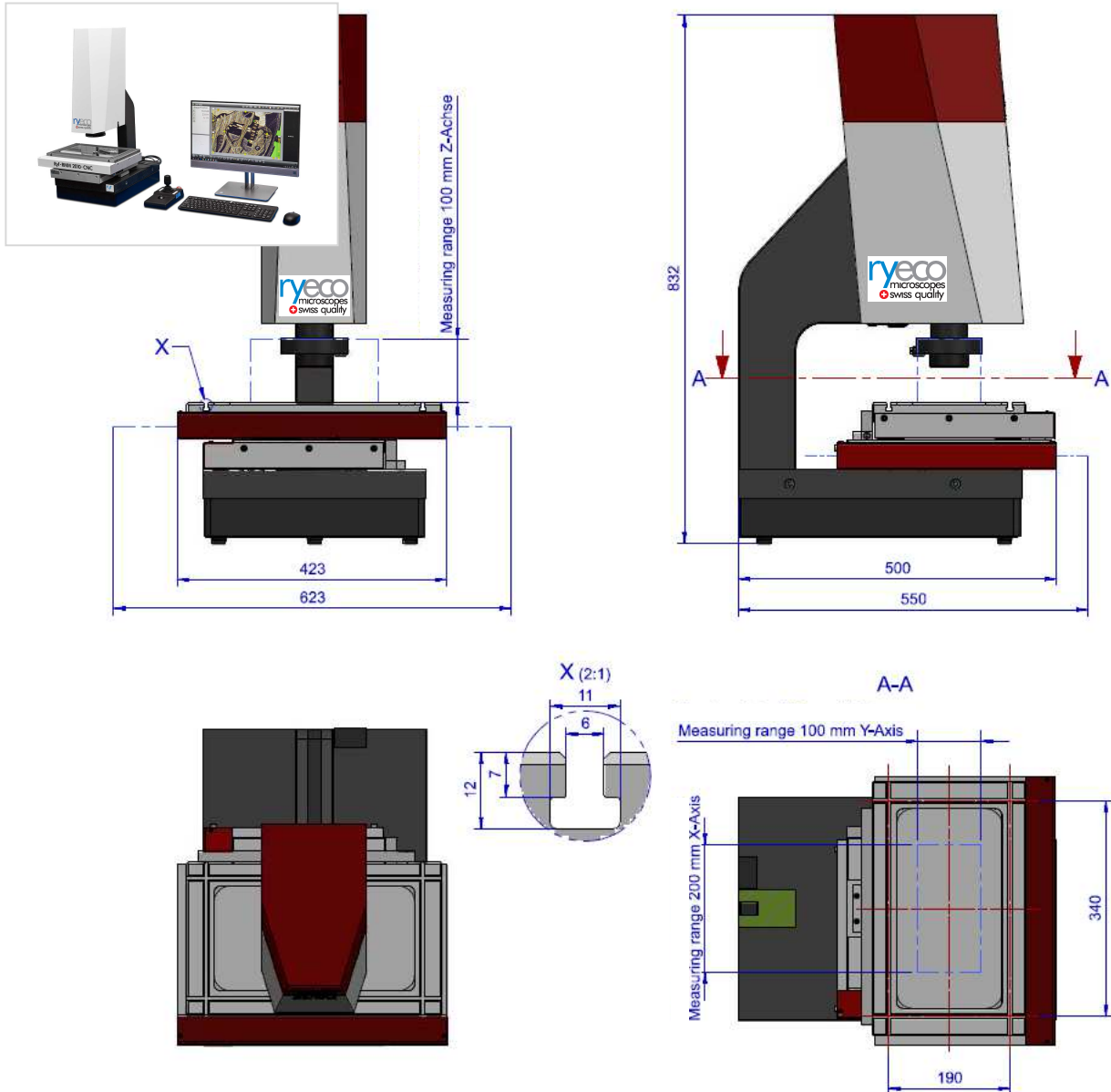
To avoid unnecessary remnants, recycling assemblies and individual parts of Ryeco / Ryf Ltd, Messtechnik products is preferable to disposal.

Mechanical or electric replacement parts should be overhauled and reused. Operating and auxiliary materials and any replacement parts, that can no longer be used, should be disposed of safely and in an environmentally friendly way observing relevant specifications, including applicable internal regulations. The provisions of the Waste Management and Product Recycling must be observed.

## 10 Wear parts, spare parts and accessories

Please note that wear parts, spare parts and accessories that are not supplied by us, have also not been tested or approved by us. The installation and/or use of such components may therefore change the specified characteristics of your product. Ryf Ltd. is not liable for any damage caused by the installation and/or use of **non-original parts**. We recommend that you always consult Ryf Ltd first if you encounter any difficulties when installing or disassembling wear parts, spare parts or accessories.

# Operating Instructions Ryeco RMM2010 - CNC



**Space requirement for service:**  
minimum of 800mm all around  
free space behind the machine for cable  
at least 150mm

**Floor vibration:**  
below  $5 \times 10^{-3} \text{ m/s}^2$   
corresponds to an amplitude below  $5 \mu\text{m}$  at 5HZ

**Humidity:** 40-70% RL

**Acceptable gradient of temperature:** 0,5K/h  
(relative to the reference temperature)

**Power consumption:** 850W

**Heat dissipation:** 500 - 1000W

**Power supply:**  
 $3 \times 1.5 \text{ mm}^2$  (lead) 230V 50Hz  
the electric lead should be fuse-protected by K16A



Wir machen Qualität sichtbar  
Nous rendons la qualité visible  
Making quality visible

[ryfag.ch](http://ryfag.ch)

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