SPECIM
SPECTRAL IMAGING

Rotary Stage 10 User Documentation 1.0

Contents

Rotary Stage 10

Warranty Conditions

SPECIM warrants the Product, provided the serial number appears on the Product and it is as originally configured by the factory, against defects in materials or due to faulty workmanship, as follows:

For a period of **two years (24 months)** from the date of delivery to the customer there will be no labor and material charges for repairing or replacing (depending on the defect type) the defective Product. When the parts are sent to SPECIM for repair the customer will cover the delivery costs and after the repair the parts are sent back to the customer at SPECIM’s cost.

SPECIM's liability to user of the Product shall in no event exceed the actual cash amount received by SPECIM for the defective Product. If failure of the Product has resulted from accident, abuse, or misapplication, SPECIM shall have no responsibility under this limited warranty. SPECIM shall not be liable for any direct or indirect damages arising out of the use of, or inability to use this product.

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2. The aggregate liability of SPECIM is limited to the sum of money, actually paid by the Customer to SPECIM for the system delivered.

The Warranty and Limited Liability clauses above in this quote shall supersede other possible contract clauses between SPECIM and the customer regarding SPECIM's warranty responsibility and liability.

Contacting Support

Further information and technical support are available from **Specim, Spectral Imaging Oy Ltd.** in Finland. Contact information:

- WWW: *www.specim.fi*
- Email: *support@specim.fi*
- Tel: +358 (0)10 4244 400

Legal Information

Certification

Specim, Spectral Imaging Ltd has developed Quality Management System for its use covering design, development, manufacturing, sales and support of optical measurement devices. QMS follows ISO9001:2015 and enables more efficient operation and product management in a systematic way utilizing metrics. Specim QMS has been audited by Bureau Veritas Certification Holding SAS – UK Branch and found to be in accordance with the requirements of the management system standards.

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Technical Description

Rotary Stage 10

With a **Rotary Stage 10** scanner a line imaging push-broom hyperspectral camera can be easily used to scan an image of a stationary target or scenery in the lab and field.

Rotary Stage 10 can be attached directly to a standard tripod with a 3/8” screw. The Spectral Camera is attached to the rotating scanner with an adapter that is equipped with a special bayonet, enabling the quick installation and release of the Spectral Camera.

Rotary Stage 10 has one connector for both the operating voltage (+24 VDC) and the scanner control (serial RS232 interface). A cased Spectral Camera can be electrically connected directly to Rotary Stage 10, without any additional power supply and serial cable to the computer. For an OEM type Spectral Camera, Rotary Stage 10 is delivered with a separate power supply/serial cable. There is a switch for immediate stop of the scanner operation in emergency.

Rotary Stage 10 can be controlled for scanning speed and angle with the SPECIM Lumo Scanner data acquisition software. The maximum scanning angle of the scanner is limited to 180 degrees with electrical limit switches.

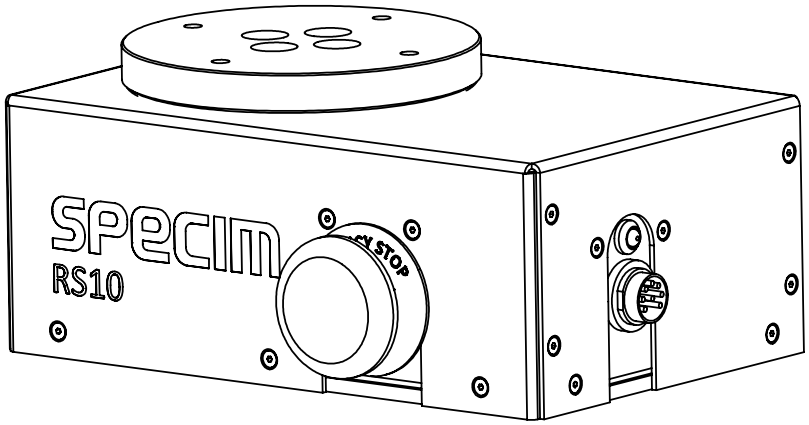

Figure 1: Rotary Stage 10

Rotary Stage 10 applications are, for example:

- Vegetation research and mapping
- Environmental research and monitoring
- Urban planning
- Spectral color scanning
- Mineralogical mapping for research and mine face scanning
- Water reservoir monitoring
- Target detection and security applications
- Scanning of human body and other biological targets

Parts and Dimensions

Different parts of the Rotary Stage 10 are presented in the picture below.

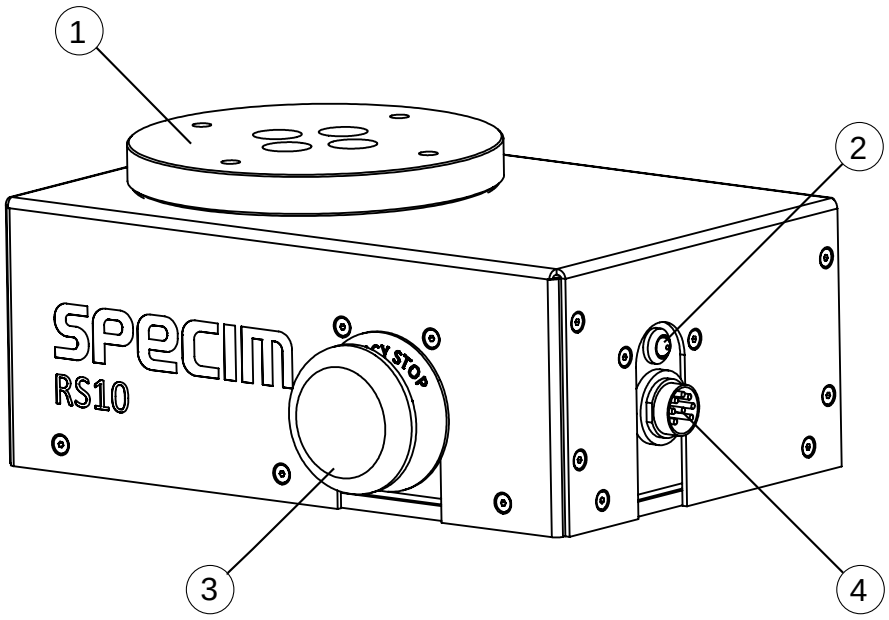

Figure 2: Parts of the Rotary Stage 10

Table 1: Parts of the Rotary Stage 10

	name
1	Rotational Stage
2	Power Led
3	Emergency Stop Switch
4	Power and RS232 -connector

The dimensions of the Rotary Stage 10 are presented in the picture below in millimeters.

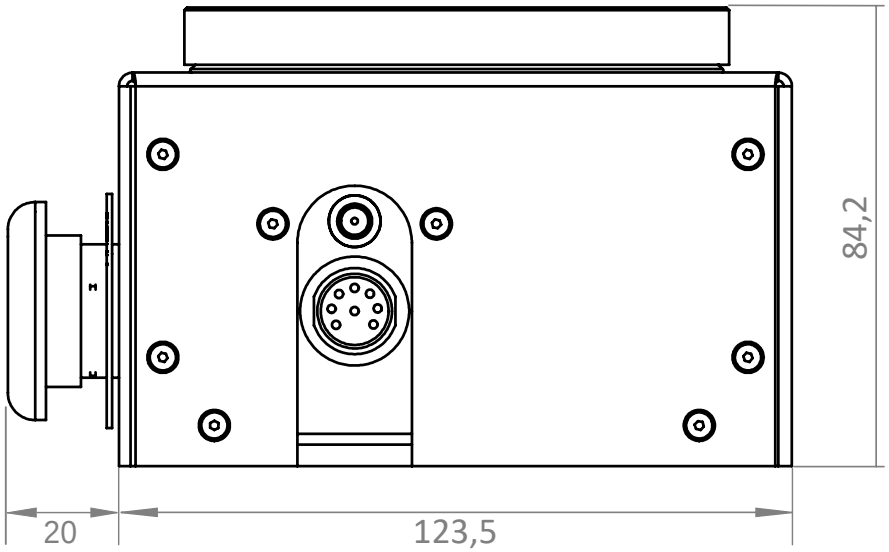

Figure 3: Dimensions - Front View

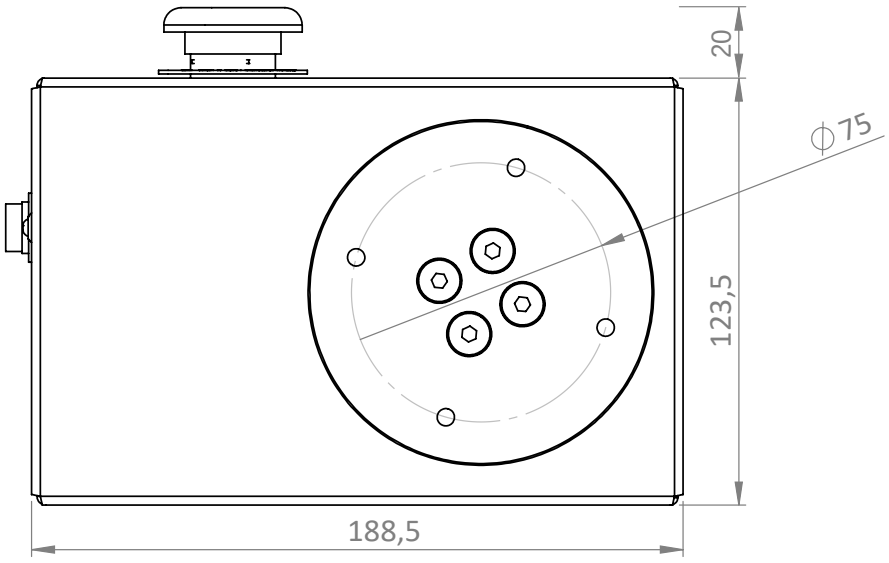

Figure 4: Dimensions - Top View

Mechanical Specifications

This section provides the mechanical specifications for Rotary Stage 10.

Table 2: Mechanical Specifications for Rotary Stage 10

Characteristic	Description
Dimensions (L x W x H)	188.5 x 123.5 x 84.2 (only chassis, without Emergency Button and connector surfaces)
Weight	2.12 kg with Quicklock
Construction	Anodized aluminum / powder coating

Electrical Specifications

This section provides the electrical specifications for Rotary Stage 10.

Table 3: Electrical Specifications for Rotary Stage 10

Characteristic	Description
Input Voltage/Current	Nominal current: 0.17 A at 24 VDC (80% run current)
Scanner type	Stepper motor with encoder

Performance Specifications

This section provides the Performance specifications for Rotary Stage 10.

Table 4: Performance Specifications for Rotary Stage 10

Characteristic	Description
Applied load capacity / maximum payload	10 kg

Characteristic	Description
Output torque	0.22 Nm (peak, without gear) 90*0.22 Nm (with gear, efficiency approximately 85 %)
Gear Ratio	90:1
Encoder Resolution / error	512 lines, 2048 counts per revolution
Repeatability / Reproducibility	< 0.01°
Increment	0.005 arc-min
Scanning angular velocity	0.01 - 25 °/s
Scanning angle / angular scan range	~ 180°

Environmental Specifications

This section provides the environmental specifications for Rotary Stage 10.

Table 5: Environmental Specifications for Rotary Stage 10

Characteristic	Description
Operating temperature	+20 … +60°C, non-condensing
Storage temperature	-20 ... +50°C
IP class	32
RoHS compliant	Yes

Mounting Instructions

Mounting Rotary Stage 10

This section describes how to mount Rotary Stage 10.

Proceed as follows:

1. Unpack the device.
2. Check that all parts have been delivered.
3. If you want to mount the scanner on a tripod or another mount, in the horizontal or vertical position, proceed as follows:

   On a tripod:

   1. Disconnect the scanner from power.
   2. Use camera screw at the bottom of the scanner to mount the scanner on the tripod.
   3. Tilt the tripod in a way that the target is in front of the scanner.

   On another mount:

   1. Disconnect the scanner from power.
   2. Use the fixing pattern (M6) at the bottom of the scanner to mount the scanner on the mount.
   3. Tilt the mount in a way that the target is in front of the scanner.
4. If you want to mount the scanner on the quick lock, proceed as follows:
   a) Pull and rotate the index plunger on the female quick lock adapter so that it gets stuck outside the mounting hole.
   b) Connect the male quick lock to the camera fixing bracket.
   c) Place the male quick lock adapter with the camera on top of the female quick lock adapter and push it so that they are both centered.
   d) Release the index plunger and tighten the screws positioned next to the index plunger.
5. There are two ways to use the scanner.

   With a camera, you can control both the camera and the scanner through the same USB cable.

   1. Connect the USB cable and the power cable to the control box.
   2. Connect the control box to the camera.
   3. Connect the scanner to the camera.

   Without a camera, you will need a scanner control cable.

   1. Connect one end of the cable to the scanner connector.
   2. Connect the other end of the cable to the RS232 source and DC power unit.
6. Plug in the power cable and ensure that emergency switch is not pressed down.
7. Rotary Stage 10 is ready for use.

Scanner Control Cable Pins

The scanner control cable pins are depicted in the figure below:

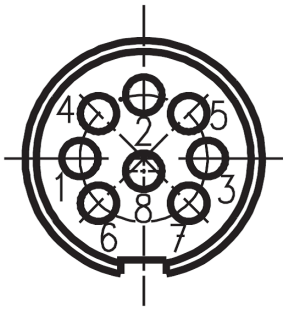

Figure 5: Scanner Control Cable Pins

Table 6: Pins of the Scanner Control Cable

Pin	Description
1	NC
2	RS232 TX
3	RS232 RX
4	NC
5	GND
6	NC
7	+24V
8	-24V

Operating Guide

Using Rotary Stage 10

Before you use Rotary Stage 10 check that:

- Reserve space for the Cables so that they can move freely when scanning takes place.
- Cables are not in the way of the scanner.
- The camera is mounted properly to avoid damage.
- The weight of the scanned object does **not** exceed **10 kg**.

Maintenance Guide

Maintenance Guide

Keep the moving parts of the scanner clean of dirt and dust. Moving parts are:

- Emergency break switch
- Rotational stage

Troubleshooting

This section provides troubleshooting instructions for Rotary Stage 10.

Problem	Solution
The scanner does not respond to commands sent by the Lumo Scanner software.	• Check if the emergency switch is pressed. If yes, turn the switch clockwise to reset. • Check that the power cord is connected. • Check if the power supply cable is damaged. Do not use Rotary Stage 10 with damaged cables. • Check the mains connection for a damaged plug.
The scanner makes abnormal sounds.	• Carry out the initialization procedure again from the Lumo Scanner software. • Make sure that nothing is blocking the movement of the camera or the rotational stage.