roboception

Quickstart Guide

rc viscore
English

Version 1.1, May 2023

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Warnings

This guide shows how to initally connect and configure the rc_viscore. It is not meant to provide instructions for permanent installation or operation in an industrial environment.

Before operating the rc_viscore, please read the full rc_viscore and rc_cube documentation. The rc_viscore's and any related equipment safety guidelines must always be followed.

Please refer to the full manual for connection requirements and cable specifications.

The rc_viscore is protected according to IP54. High humidity or temperature can damage the device.

Do not operate in an environment where combustible or explosive fumes may occur.

The rc_viscore is NOT intended for safety-critical applications.

The rc_viscore is NOT intended to be used in dynamic environments or to be mounted to a robot end-effector.

The rc_viscore needs to be properly mounted before use.

Power to the rc_viscore must be supplied through an appropriate, separate DC power source. The rc_viscore's housing must be grounded. Cables must not be longer than 30 m. The 8-Pin power supply cable must not be longer than 15 m.

Make sure the power supply conforms to the EN 62368-1 standard, and check polarity and connections.

1. Introduction

The rc_viscore is a 3D stereo sensor based on passive stereo vision, supported by a white light semi-random dot projector. Together with the SGM®Producer (more information at https://roboception.com/product/sgmproducer), it provides rectified camera images, disparity images, confidence images and error images.

In combination with the rc_cube edge computer (more information at https://roboception.com/product/rc_cube-i), the rc_viscore can support robotic tasks like bin picking.

2. Additional Information

The full manual of the rc_viscore can be accessed online at https://doc.rc-viscore.com.

The documentation of the rc_cube can be accessed online at https://doc.rc-cube.com.

Tutorials for optimizing image quality and pattern projection to obtain dense depth images can be found at https://tutorials.roboception.de.

3. Prerequisites

Standard delivery for an rc_viscore includes:
- rc_viscore stereo sensor
- CalibrationGrid large
- 2 x 10 m gigabit ethernet network cables
- 10 m power cable with one M12 connector and one open end
- Quickstart Guide

The following items are not included in the delivery unless otherwise specified:
- Couplings, adapters, mounts
- Power supply unit and fuses

This guide assumes that you have read and understood the rc_viscore and rc_cube documentation and that the rc_cube is successfully connected and configured.
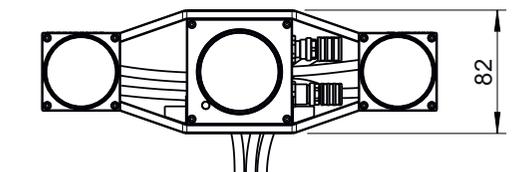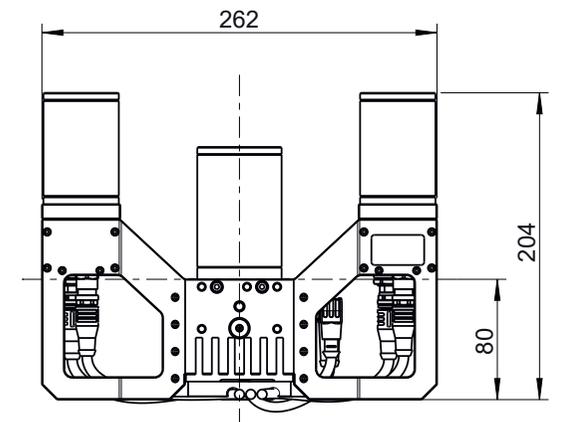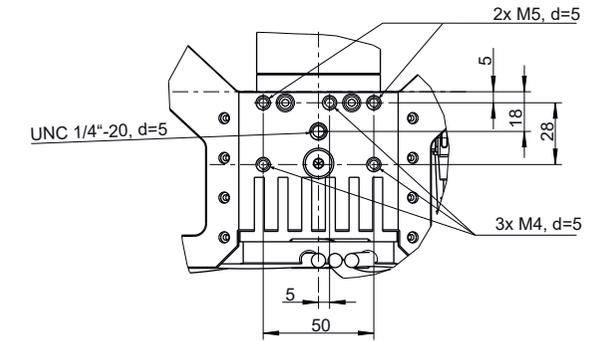A short introduction video demonstrating the installation process can be viewed here:

4. Mounting the Camera

The rc_viscore is intended to be mounted on a wall or ceiling above the target area. It is not intended to be used in dynamic applications mounted to a robot arm. It is the customer's responsibility to provide an adequate mounting bracket.

The working range of the rc_viscore is usually preset by Roboception prior to delivery, based on information provided by the customer on their intended application and mounting distance. In case of doubt on the intended working range, please contact the Roboception support team immediately before final mounting of the rc_viscore. The support team will assist the setup procedure in this case.

For mounting, the rc_viscore provides an M4 and M5 thread pattern on its top and bottom sides. A medium-strength thread-locker or Tuflok® screws must be used to protect it against vibrations. M5 screws must be tightened to 4.0 Nm, M4 screws must be tightened to 3.3 Nm.

4. Mounting the Camera
continued

Only the surface containing the thread pattern must be in contact with the mounting bracket, all other surfaces must remain free. At least 10 cm clearance must be provided behind the rc_viscore to facilitate adequate air flow for cooling.

5. Connecting the Cables

The rc_viscore is delivered with a sync cable already connected between projector and cameras. It is the customer's responsibility to connect the two provided M12 X-coded network cables to the left and right camera, as well as the power cable with angled M12 connector to the projector. The network cables must be clipped into the cable guide for strain relief. All cables must be secured to the mounting bracket.

Due to the resistive voltage drop, the maximum power cable length is limited to 15 m. The supply voltage should be set to the specified 24 V and must not be set above 26 V due to the highly variable current draw of the rc_viscore.

Network cable left camera
Fasten into cable guide
Power cable
Network cable right camera
Fasten into cable guide
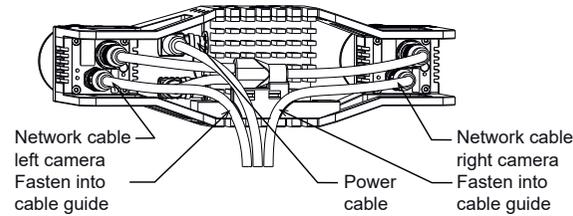
6. Camera Pin Assignments

Pin number	Cable Color	Designation	Details
1	White	nc.	
2	Brown	Power +24V	2 A @ 24 V
3	Green	GPIO In 1	12 - 24 V, 15 mA max.
4	Yellow	GPIO GND	
5	Grey	GPIO Vcc	5 - 24 V, 50 mA max.
6	Pink	GPIO out 1	Projector exposure signal
7	Blue	Power GND	
8	Red	GPIO out 2	

7. Technical Specifications

	rc_viscore
Field of View	Horizontal: 47° / Vertical: 35°
Wavelength	Visible
Power Supply	24 V, 48 W
Connectors	M12, 8 Pin, A-coded (Power) and X-coded (Network)
Weight	1640 g
Dimensions	262 mm x 204 mm x 82 mm (w x d x h)
Temperature Range	0 - 45° C (passive cooling)
Protection Class	IP 54

8. Connecting the rc_viscore to the rc_cube

Both network cables of the rc_viscore must be connected directly, without a switch, to sensor ports of the rc_cube. For rc_cube models with only one sensor port, Roboception can recommend suitable options for connecting an rc_viscore. For more information, see also the documentation at https://doc.rc-viscore.com/en/installation.html#connecting.

In the Web GUI of rc_cube, the pipeline type must be set to rc_viscore. Additionally, if more than one rc_viscore is connected, it must be specified in each pipeline separately which rc_viscore should be used. See also https://doc.rc-cube.com/latest/en/pipelines.html.

9. Connecting the rc_viscore to a Computer with SGM®Producer

Both network cables of the rc_viscore should be connected directly to individual gigabit ethernet ports of the computer. A switch can only be used if the network connection between the switch and the computer offers a bandwidth of at least 2 gigabits, e.g. 2.5, 5 or 10 gigabit.

9. Connecting the rc_viscore to a Computer with SGM®Producer
continued

In the default network configuration, the rc_viscore cameras try to obtain their configuration from a DHCP server and fall back to the Link-Local self-configuration protocol if a DHCP server cannot be found. For direct connection without a DHCP server, the Ethernet ports of the computer should be configured for Link-Local. It is also possible to manually configure the IP addresses of the left and right rc_viscore cameras. For more information, see https://doc.rc-viscore.com/en/installation.html#connecting.

10. Adjusting Focus

It is highly recommended to check and adjust the focus of the rc_viscore to the actual working range. Please note that the depth of focus range is limited due to the high resolution of the sensor and must be adapted to the application. At close distance, the depth of focus range is much smaller than at higher distance. Therefore, the minimum distance for focusing should be chosen as far away as useful for the application. Please contact the Roboception support team in case of questions regarding working distance and calibration of the rc_viscore.
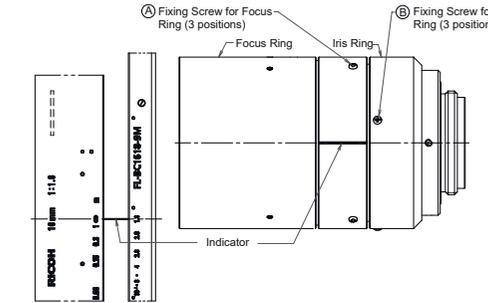
The rc_cube Web GUI offers a focus helper as part of the camera calibration. For users of SGM®Producer, the focus helper is part of the calibration program. For more information, see https://doc.rc-viscore.com/en/installation.html#adjust-focus. For checking the focus, place the calibration grid in the minimum and maximum working distance, e.g. on the top and bottom of a bin. The bars of the focus helper should be at a minimum. A value near the lowest dividing line of the bars can be considered good.

If focus adjustment is needed, remove the protective lens caps of the left and right cameras by unscrewing them.

Aperture Focus
Unscrew and remove lens caps
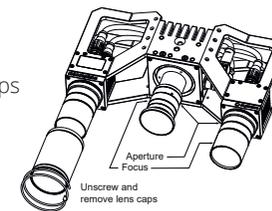
10. Adjusting Focus
continued

The focus ring and the aperture ring are locked by 3 screws for each ring. All three screws must be loosened for moving the ring.

Ⓐ Fixing Screw for Focus Ring (3 positions)
Ⓑ Fixing Screw for Iris Ring (3 positions)
Focus Ring
Iris Ring
Indicator

For setting the focus correctly, the CalibrationGrid should be placed in the middle of the working range. Then, the focus ring should be turned until the bars in the images become a minimum. After focusing in this way, the grid should be placed at the minimum and maximum working distance.

If the blur is unsatisfactory at the minimum and maximum working distance (e.g. near the second dividing line or higher), the aperture can be closed a bit by choosing a higher aperture number. Please be aware that this increases exposure time and potentially gain, which increases noise in the image. The optimal tradeoff is application-dependent.

To change focus and aperture settings of the projector, loosen the three small fixing Phillips screws on the respective ring of the projector lens, turn the ring to the desired setting and lightly tighten the screws again. For focus adjustments, the projector should be turned on permanently by setting the Out1 mode to High in the WebGUI. For aperture adjustments, Out1 should be set to ExposureAlternateActive and exposure mode should be set to 'Auto' in the WebGUI Camera tab. Perfectly focusing the projector is not crucial. Slightly blurred projection will not degrade the depth image.

Re-attach all protective lens caps to restore the IP54 rating of the rc_viscore.

11. Calibration

After mounting the rc_viscore, checking and potentially adjusting the focus, the next step is to check calibration. **This step should never be skipped. It is mandatory (as opposed to all rc_visard products).**
Please note that the working range of the rc_viscore is predefined and the calibration should be checked for the minimum and maximum working range. Please contact the Roboception support team in case of questions regarding working distance and calibration of the rc_viscore.
The rc_cube manual explains the checking and re-calibrating in detail (see https://doc.rc-cube.com/latest/en/camera_calibration.html#verify-calibration).
The procedure is the same for the `rc_calib` program for users of the SGM®Producer.

For more detailed information on how to set up the rc_viscore, please refer to the documentation at https://doc.rc-viscore.com.

12. Support

Please refer to rc_cube WebGUI and full rc_cube and rc_viscore documentation at:
https://roboception.com/documentation
For further support issues, please refer to
https://roboception.com/support
or email support@roboception.de
or phone +49-89-8895079-0.*
*phone support during CET business hours only

13. Conformity

CE
RoHS 2002/95/EC

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