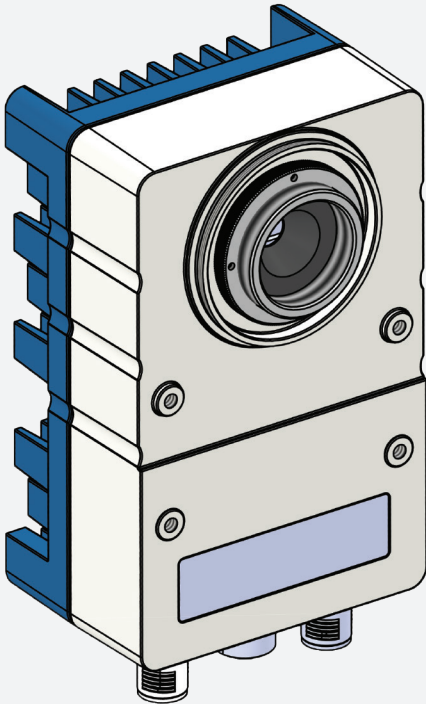


# VRmRIC10-X

Industrial 10 GigE Vision Camera

User Guide



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# 1 General Information

This guide applies to all VRmRIC10-X industrial cameras by VRmagic Imaging. Follow this guide chapter by chapter to set up and understand your device.

## Symbols and Conventions

 <b>DANGER</b>	
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.	
 <b>WARNING</b>	
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.	
 <b>CAUTION</b>	
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.	
<b>NOTICE</b>	
Indicates practices not related to personal injury, but possibly related to property damage or data loss.	
 <b>Info</b>	
Provides helpful information related to the current topic.	

***This headline indicates the beginning of a procedure:***

1. This number indicates the first step of a certain procedure you are expected to follow. Following steps are numbered accordingly.
  - ▶ This arrow indicates an expected result of your action.
- ⇒ This symbol indicates a reference to a different part of this manual or to external documents.

## 2 Safety

### 2.1 Further Documentation

Further product documentation (as far as available and applicable), for example data sheets, operating instructions, or declarations of conformity, are an integral part of this document. Keep the product documentation for future use.

### 2.2 Intended Use

The device is designed for capturing and transmission of digital image data. The image data is transmitted to an external application via the Ethernet interface.

### 2.3 Identification

The model identifier, serial number, and the CE label, if applicable, are specified on the identification plate. The identification plate is located on the device.

### 2.4 Conformity

The device has been tested and complies with the applicable EC and FCC directives. The corresponding declarations of conformity and test reports are available on request.

#### **Federal Communications Commission (FCC) Statement**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## 2.5 General Product Safety

- Installation and operation of the device and the software only may be conducted in accordance with the instructions provided in the product documentation. Faultless and safe operation of the device requires proper transport, storage, setup, and handling.
- Do not subject the device to strong impacts and heat.
- Observe the ambient conditions specified in the product documentation.
- Use accessory parts approved by VRmagic Imaging only.
- Unplug the device during lightning storms or when not in use for longer periods of time.

## 2.6 Installation and Commissioning

### Connecting Interfaces and Power

Connect all required connectors in accordance with the instructions in the provided product documentation.

Connect the device to an appropriate power supply only (24 V DC  $\pm$  10%, 20 W).

### IP 65/67 Rating

If you do not connect the plugs correctly to the camera's connectors, the camera's IP 65/67 rating cannot be guaranteed, and dust or water may enter the camera. To guarantee the IP 65/67 rating, the plugs must be aligned properly with the connectors, and the connector nuts must be tightened with a torque of 0.4 Nm.

If you do not use the camera with the optional IP tube, or if you do not mount the IP tube correctly, the camera's IP 65/67 rating cannot be guaranteed, and dust or water may enter the camera. Always use the supplied IP tube. Screw the IP tube onto the camera by hand until it is hand-tight.

Connectors of the camera that are not used (i.e. where no plug is connected) are possible entry points for dust and water. Leaving the connectors uncovered will compromise the camera's IP 65/67 rating. In order to maintain the IP rating, always cover unused connectors with suitable sealing caps, which are available as accessory part. Tighten the sealing caps with a torque of 0.4 Nm.

### Cable Lengths

Do not shorten the power and I/O cables and their shields below 1.5 m. If the cables are shorter than 1.5 m, the camera's electromagnetic compatibility might be compromised, which may lead to signal interference or even damage to the camera.

**Ventilation**

The camera generates heat during operation. If the heat is not dissipated sufficiently, the camera may overheat and get damaged. Make sure that the operating environment is well ventilated. Do not block the cooling fins of the camera. Do not install the camera in a narrow or cramped space without air exchange.

## 2.7 Operation

Never short-circuit any pins during operation of the device.

## 2.8 Transport and Storage

Before transporting or storing the device, disconnect all cables. Transport the device in its original packaging.

## 2.9 Care, Maintenance, and Disposal

**Cleaning**

Clean the device with a dry, lint-free cloth. Do not use solvents or other fluids as they may damage the surface or impair operation of the device.

**Maintenance**

The device does not require any maintenance as long as it is operated and stored under the specified conditions.

**Service and Repairs**

If the device does not function properly or has been damaged, send a service request to VRmagic Imaging. Please always specify the product name and serial number.

Do not make any repairs or alterations to the device, unless explicitly described in the product documentation. Please refer the device to VRmagic Imaging if repairs should become necessary.

Do not disassemble any part of the camera, unless explicitly described in this manual. Disassembly may cause damage and voids the product warranty.



**Disposal**

The device including possibly contained batteries and packaging material must be disposed of in compliance with national laws and guidelines.

## 3 Overview

### 3.1 Scope of Delivery

The standard scope of delivery comprises the camera. Respective software and product documentation can be downloaded from [www.vrmagic-imaging.com/downloads](http://www.vrmagic-imaging.com/downloads).

After unpacking the camera, please check if you have received all components including optional accessories. Check all components for any damages.

### 3.2 Camera Housing

The VRmRIC10-X industrial camera has a compact design with a rugged aluminum housing that comprises a set of industry-standard interfaces.

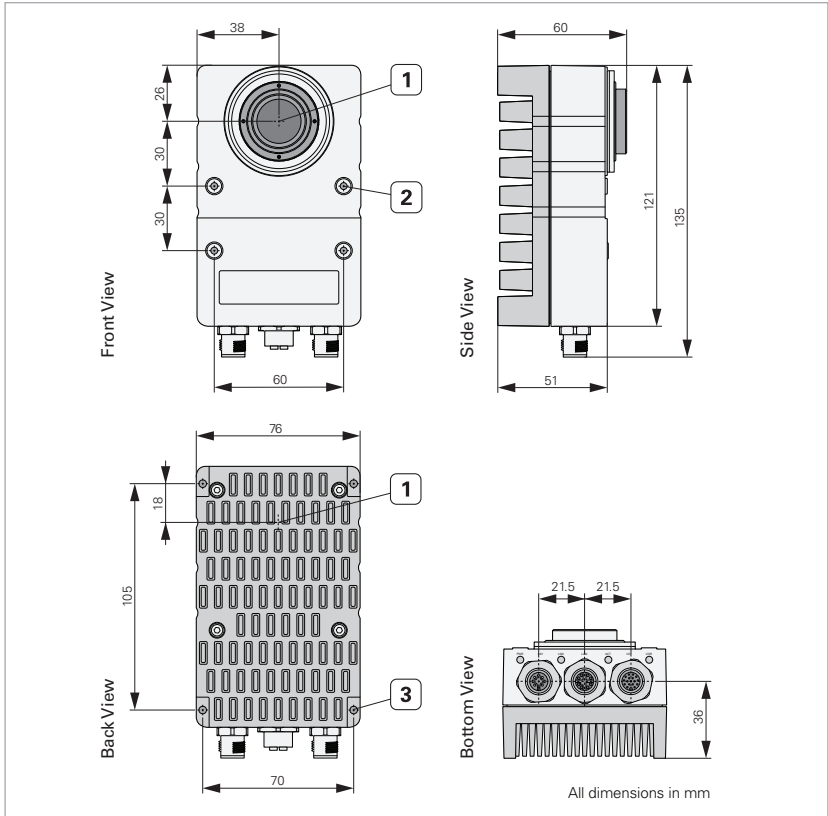


Fig. 1: Dimensions in mm and mounting holes

- 1 Optical center of image sensor
- 2 4 mounting holes on front side (M4 threads)
- 3 4 mounting holes on back side (M4 threads)

### 3.3 Connectors and Indicators



#### Pinout, cable plan, and accessories

Please refer to ...

- ➔ section 10.2 on page 32 for a detailed pinout
- ➔ section 10.3 on page 34 for a cable plan
- ➔ section 10.4 on page 36 for the optional accessories

The part numbers **VRM\_CAB\_\*** refer to the matching optional cables.

#### Connectors

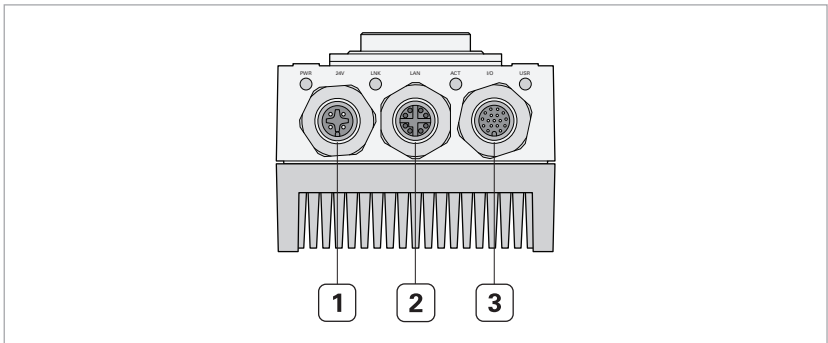


Fig. 2: M12 connectors on the bottom side of the camera

- 1** Power in (+24 V DC) | **VRM\_CAB\_PWR\_0001**
- 2** 10 G Ethernet | **VRM\_CAB\_ETH\_0001**
- 3** I/O connector (trigger/strobe, digital inputs and outputs) | **VRM\_CAB\_IO\_0007**

## Indicators

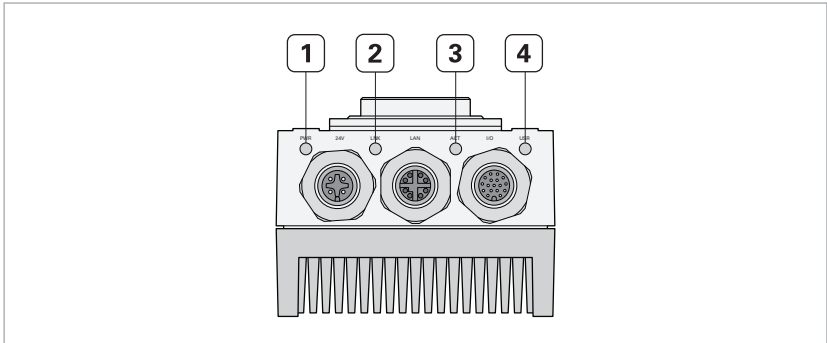


Fig. 3: Status LEDs on the bottom side of the camera

- 1 PWR: Power LED
- 2 LINK: Ethernet link LED
- 3 ACT: Ethernet Activity LED
- 4 USR: Status Led

### Signals of the LEDs

The color of the Ethernet link LED indicates the current data transmission rate:

Ethernet link LED Color	Data Transmission Rate
Red	1G *
Orange	2.5 G/5 G
Green	10 G

\* 1G link speed not supported by the RIC10 hardware Rev. B

The color of the Status LED indicates the current camera status:

Status LED Color	Camera status
Green	Idle
Orange	Grabbing On
Bright orange	Image acquisition active

## 4 Mechanical Installation

### 4.1 Mounting the Lens and IP tube

The camera is equipped with a standard C-mount lens mount. To achieve the IP65/67 rating, a protective IP tube must be used (available as accessory, ➔ section 10.4 on page 36). You may use any C-mount lens that fits into the IP tube. A 10 mm IP tube extension for longer lenses also is available as accessory.

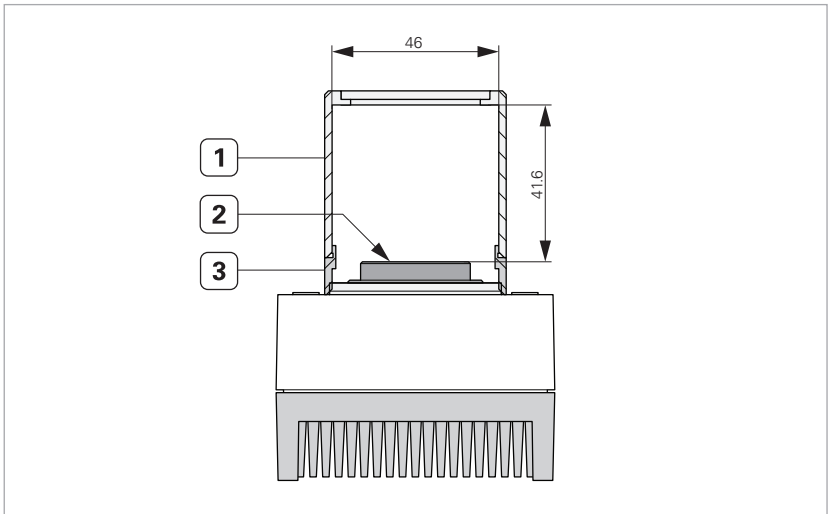


Fig. 4: Camera (top view) with IP tube and IP tube extension

- 1 IP tube (optional)
- 2 Lens flange of C-mount
- 3 10 mm IP tube extension (optional)

Lens within IP tube	Maximum value
Diameter	45 mm
Length (starting from lens flange) with standard IP tube	30 mm
Length (starting from lens flange) with IP tube extension	40 mm

## NOTICE

**Possible entry of water or dust into the camera if camera is operated without IP tube!**

If you do not use the camera with the optional IP tube, or if you do not mount the IP tube correctly, the camera's IP 65/67 rating cannot be guaranteed, and dust or water may enter the camera.

**Always use the optional IP tube to ensure the 65/67 rating. Screw the IP tube onto the camera until it is hand-tight.**

### *Mounting the lens and IP tube:*

1. Screw the lens onto the camera's C-mount lens mount.
2. Adjust the lens as required (focus, aperture).
3. Screw the IP tube onto the IP tube thread until it is hand-tight.

## 4.2 Mounting the Camera

## NOTICE

**Possible overheating of the camera due to insufficient ventilation**

The camera generates heat during operation. If the heat is not dissipated sufficiently, the camera may overheat and get damaged.

**Make sure that the operating environment is well ventilated. Do not block the cooling fins of the camera. Do not install the camera in a narrow or cramped space without air exchange.**

### *Mounting the camera:*

1. Mount the camera to a suitable mounting plate using the M4 mounting holes on the front or on the back of the camera (➡ Fig. 1 on page 12).

## 5 Electrical Installation

### NOTICE

#### Possible entry of water or dust into the camera if plugs are not tightened correctly!

If you do not connect the plugs correctly to the camera's connectors, the camera's IP 65/67 rating cannot be guaranteed, and dust or water may enter the camera.

**To guarantee the IP 65/67 rating, the plugs must be aligned properly with the connectors, and the connector nuts must be tightened with a torque of 0.4 Nm.**

### NOTICE

#### Possible entry of water or dust into the camera if connectors are left uncovered!

Connectors of the camera that are not used (i.e. where no plug is connected) are possible entry points for dust and water. Leaving the connectors uncovered will compromise the camera's IP 65/67 rating.

**In order to maintain the IP rating, always cover unused connectors with suitable sealing caps, which are available as accessory part. Tighten the sealing caps with a torque of 0.4 Nm.**



### Info

#### Connection of I/O cable

Do not disconnect or connect the I/O cable while the camera is connected to power.

### Pinout, cable plan, and accessories

The following instructions assume that you have ordered the optional cables and the DIN rail power supply (➔ section 10.4 on page 36).

A pinout is provided in ➔ section 10.2 on page 32.

Cable plans are provided in ➔ section 10.3 on page 34.



## 5.1 Ethernet

**Required cable:** VRM\_CAB\_ETH\_0001

### *Connecting to Ethernet:*

1. Align the X-coded M12 plug of the Ethernet cable with the camera's Ethernet connector (⇒ Fig. 2 on page 13).
2. Push the plug into the connector.
3. To secure the connection, tighten the connector nut (torque: 0.4 Nm).
4. Connect the RJ45 plug to your local area network.


## 5.2 I/Os

**Required cable:** VRM\_CAB\_IO\_0007

### *Connecting the I/Os:*

1. Align the A-coded M12 plug of the I/O cable with the camera's I/O connector (⇒ Fig. 2 on page 13).
2. Push the plug into the connector.
3. To secure the connection, tighten the connector nut (torque: 0.4 Nm).
4. Connect the open ends of the I/O cable to your application.

## 5.3 Power Supply

 Info	Further documentation
Please refer to the separate operating instructions of the optional DIN rail power supply (part no. VRM_DINSUP_24V_1.7A) for technical data and detailed installation instructions.	

**Required cable:** VRM\_CAB\_PWR\_0001 power cable

**Connecting the camera to the power supply:**

1. Align the A-coded M12 plug of the power cable with the camera's power in connector (⇒ Fig. 2 on page 13).
2. Push the plug into the connector.
3. To secure the connection, tighten the connector nut (torque: 0.4 Nm).
4. Connect the other end of the camera power cable to the power output of the DIN rail power supply (part no. **VRM\_DINSUP\_24V\_1.7A**).
5. Connect the DIN rail power supply to an adequate AC power source using the AC power lead (part no. **VRM\_PWR\_OE\_EU**).
  - ▶ The camera starts to boot up.
6. Wait for the PWR LED to light up (⇒ Fig. 3 on page 14).
  - ▶ The camera is ready to use.

## 6 PC Configuration

Before you start working with the camera in your image processing software, your PC needs to be configured according to the technical conditions of the camera's data transmission process.

### 6.1 Requirements

Your PC must be equipped with a 10G compatible network adaptor. Note that network adaptors which support NBASE-T also feature 2.5G and 5G modes. The following network adaptor was tested by VRmagic Imaging:

- DeLock PCI Express Card > 1 x 10 Gigabit LAN NBASE-T RJ45

### 6.2 Network adaptor configuration

#### *Configuring the network adaptor of your PC:*

1. In the BIOS setup of your PC, configure the settings of the network adaptor. Make sure that the number of available PCIe lanes is sufficient for the network adaptor of your PC.
2. Configure the properties of your PC's network adaptor. Choose **Jumbo frames** on the **Advanced** tab and set a value of a least **8228**.
3. Install the supplied GigE Vision filter driver of your image processing software on your PC. How to install the VRm GigE Vision filter driver, refer to ➔ section 8 on page 24. Keep in mind that several GigE Vision drivers installed on your PC could interfere each other and could cause technical problems.

### 6.3 Optimizing transfer performance

Set the following camera features using your image processing software.

#### *Maximizing the transmission packet size*

1. Select the skill level **Expert** or **Guru**.
2. Select the feature **Transport Layer Control > Gev Stream Channel Selector[0] > Gev SCSPacket Size** and set the value **8228**.

3. Use the **GevSCPD** feature to shape the camera traffic. The **GevSCPD** feature controls the delay to insert between each packet for the stream channel in camera clock ticks. The corresponding clock ticks per second can be read from the **GEV timestamp counter unit** feature.

## 7 Camera Acquisition Modes

This chapter describes the set up of the camera acquisition modes available with firmware version B-1.0.13. All camera modes comply with the GenICam standard.

### 7.1 Free Running Mode

Using the free running mode, the highest frame rate can be achieved.

#### *Setting the free running mode*

1. Select the skill level **Expert** or **Guru**.
2. Select the feature **Acquisition Control** > **Trigger Selector** > **Trigger Mode** and set the value **Off**.
3. Optimize the frame rate using the features **Acquisition Control** > **ImageFormat Control** > **Height** and **Acquisition Control** > **Frame Duration**. Note that the **Height** value always must be smaller than the **Frame Duration** value.
  - ▶ The current frame rate can be read out from the feature **Acquisition Control** > **Acquisition Frame Rate**.

### 7.2 External Trigger Mode

This mode features an external trigger input and a strobe output. The lines are configured as follows:

- Line0 fixed as trigger input
- Line0 or Line1 selectable as strobe input
- Line4 fixed as strobe output

#### *Setting the external trigger mode*

1. Select the skill level **Expert** or **Guru**.
2. Select the feature **Acquisition Control** > **Trigger Selector** > **Trigger Mode** and set the value **On**.

3. To set the trigger, use the features listed in following table which can be found under **Acquisition Control > Trigger Selector**:

Feature	Description
Trigger Selector	FrameStart (fixed)
Trigger Source	Line0 (fixed)
Trigger Activation	Rising Edge (fixed); if a falling edge trigger is required, you can invert the incoming signal under Digital I/O Control > Line0 > Line Inverter
Trigger Delay	in $\mu\text{s}$
Digital I/O Control > Line0 > Line Debounce	Incoming signal needs to remain stable for the specified time (in $\mu\text{s}$ ) until a pulse is accepted.

4. To set the strobe, use the features listed in following table which can be found under **Counter and Timer Control > Timer Selector**:

Feature	Description
Timer Selector	Timer1 (fixed)
Timer Trigger Source	Line0: synchronously to trigger Line1: separate input Off: disabled strobe
Timer Trigger Activation	Rising Edge (fixed); if a falling edge trigger is required, you can invert the incoming signal under Digital I/O Control > Line0/1 > Line Inverter
Timer Delay	in $\mu\text{s}$
Timer Duration	in $\mu\text{s}$

## 8 First Steps with VRmGevCamlab

### 8.1 Available Software and Documentation

The following software and product documentation can be found under [www.vrmagic-imaging.com/downloads](http://www.vrmagic-imaging.com/downloads):

- **VRmagic GevSuite** (VRmGevSuite\_<platform>\_<version>-<datecode>.msi) containing
  - VRm GevCamlab
  - VRm GigE Vision filter driver
- **RIC10 User Guide** (this document)

### 8.2 Installing the VRmagic GevSuite

#### *Installing the VRmagic GevSuite*

1. Download the installer package from [www.vrmagic-imaging.com/downloads](http://www.vrmagic-imaging.com/downloads) to the hard drive of your PC.
2. To start the installation procedure, execute the installer package.
3. Follow the on-screen instructions. Choose to install the complete feature package when asked during the installation procedure.
  - ▶ You are notified when the installation is complete.

## 8.3 Overview

This section describes the functions available in VRmGevCamlab. VRmGevCamlab helps you to configure the camera's network settings and, furthermore, it enables you to test and to demonstrate the capabilities of the camera API.

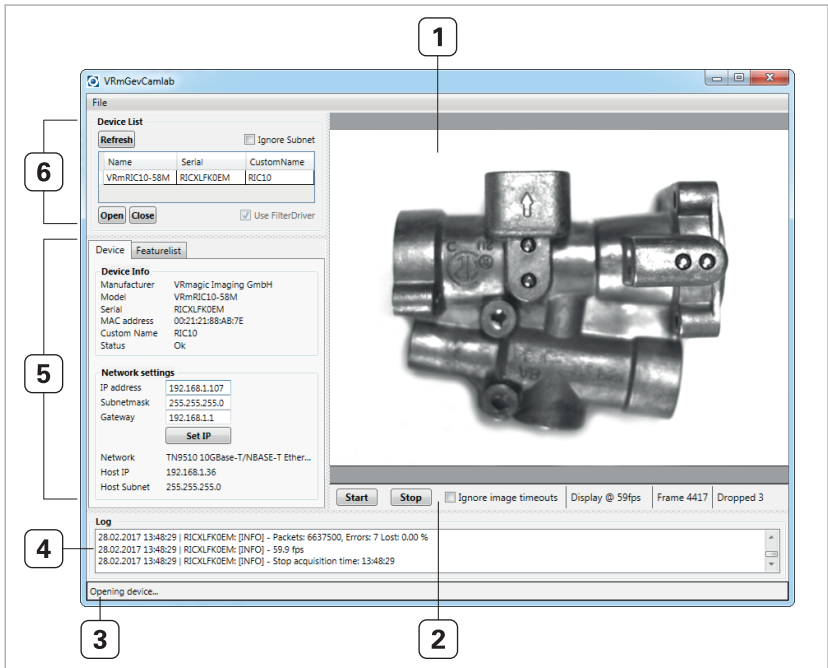


Fig. 5: GevCamlab window

- 1 Live view of the camera
- 2 Camera start/stop buttons and camera operation indicators
- 3 Program status bar
- 4 Log viewer
- 5 Device information and camera features
- 6 Device list




### 8.3.1 Color Codes of the Device List

The **Device List** uses a color code reporting if the listed cameras are accessible over the network:

- **Red:** The camera is opened by another application. The camera is not accessible until it is released by the application.
- **Orange:** The camera does not reside within the subnet of your PC. The camera needs to be configured accordingly. Refer to ↗ section 8.4 on page 26 for further information.
- **No color:** The camera is accessible.

## 8.4 Configuring the Camera's Network Settings

 <b>Info</b>	<b>Assigning IP address and subnet mask</b>
<p>To access the camera from your PC, the camera and your PC must reside within the same subnet.</p> <p>If the camera has been assigned an IP address that is not within the current IP address range, you can change the camera's current IP address temporarily. This is described in the following procedure. The changes you make will remain until the camera is restarted.</p> <p>To assign an IP address to the camera permanently, you can change its network configuration via the <b>Transport Layer Control</b> category in the <b>Feature list</b> (↗ section 8.6 on page 28).</p>	

#### *Assigning a static IP address to the camera temporarily*

1. Start VRmGevCamlab.
  - ▶ The VRmGevCamlab window is displayed. The software automatically starts scanning for VRmagic GigE Vision cameras in the network. All cameras connected to the network are displayed in the **Device List** on the left-hand side menu.
2. Identify the camera by comparing the displayed serial number with the serial number printed on the camera label.
3. If the required camera is not displayed in the **Device list**, click **Refresh**.

4. If the required camera is still not displayed because the camera's IP address resides outside the current IP address range, check **Ignore Subnet** and click **Refresh**.
5. Select the required camera in the device list.
  - ▶ Information on the camera is listed on the **Device** tab below.
6. If the camera's list entry is colored, check the color code if the camera is accessible (➔ section 8.3.1 on page 26).
7. If the camera is accessible, activate the **Device** tab on the left hand side menu.
8. Specify **IP address**, **Subnet mask**, and **Gateway** (optional) in the corresponding fields.
9. To assign the IP address to the camera, click **Set IP**.
  - ▶ The **Device list** is updated automatically.

## 8.5 Accessing the Camera

### *Accessing the camera using VRmGevCamlab:*

1. Start VRmGevCamlab.
  - ▶ The VRmGevCamlab window is displayed. All the cameras connected to the network are displayed in the **Device List** on the left-hand side menu.
2. Identify the camera by comparing the displayed serial number with the serial number printed on the camera label.
3. If the required camera is not displayed in the **Device list**, click **Refresh**.
  - ▶ The **Device List** is updated. The required camera should be displayed in the **Device List**.
4. Select the required camera in the **Device List**.
  - ▶ Information on the camera is listed on the **Device** tab below.
5. If the camera's list entry is colored, check the color code if the camera is accessible (➔ section 8.3.1 on page 26).
6. If the camera is accessible, click **Open** or double-click on the camera's list entry.
  - ▶ VRmGevCamlab opens the camera. The camera's features are listed on the **Feature list** tab below.
7. Click **Start** to view the live image of the camera.
8. To **Stop** the live view of the camera or to **Close** the camera, click the corresponding button.

## 8.6 Setting the Camera Features

According to the GenICam standard, the camera features are described by the camera's XML file. All camera features can be adjusted to your specific requirements using the **Feature list** tab.

1. Access the camera as described in → section 8.5 on page 27.
2. Activate the **Feature list** tab on the left-hand side menu.
3. To increase/decrease the level of detail of the available camera features, choose your skill level (beginner, expert, guru) in the drop-down menu.
4. To display the tooltip of a feature, hover your cursor over the respective feature.
5. To get additional information from a feature, right-click on the respective feature.
6. Choose the required feature in the **Feature list** and set the desired value.  
Text field: To apply a value, press Enter. To discard a value, press Escape.  
Any other control element: Values are applied immediately.
7. Control the changes you have made on the live camera view.

## 9 Inputs and Outputs

<b>i</b> Info	<b>Pinout</b>
Please refer to <a href="#">↩</a> section 10 on page 30 for a pinout of the I/O connector.	

### Available Inputs and Outputs

GPIO Number	Type
TRIG0 ... TRIG3	Trigger inputs
STROBE0 ... STROBE2	Strobe outputs

All inputs are digital 24 V-tolerant TTL-inputs. The outputs are digital 24 V push-pull outputs. The following voltage levels will result in low or high.

	Low (zero)	High (one)
Trigger In $V_{in}$	0 ... 1.5 V	3.5 ... $V_{IO}$
Strobe Out $V_{Out}$	0 ... 1.0 V	$V_{IO}$

# 10 Appendix

## 10.1 Technical Data

<b>Image sensor</b>	
Product name	VRmRIC10-58
Sensor name	IMX253
Resolution	4096 x 3000
Chromaticity	Monochrome or color
Sensor type	CMOS
Sensor size	1.1"
Optical area	14.131 mm x 10.35 mm
Shutter type	Global
Pipelined trigger	-
Pixel size	3.45 $\mu\text{m}$ x 3.45 $\mu\text{m}$
Trigger Modes	Internal, external
Max. frame rate (full frame)	64
<b>I/Os</b>	
Trigger / Digital Inputs	4 digital inputs, TTL inputs, 24 V-tolerant, opto-isolated
Strobe / Digital Outputs	3 digital outputs, push-pull outputs, opto-isolated
Ethernet	2.5/5/10 Gigabit
<b>Electrical</b>	
Voltage Requirements	24 V DC, +/- 10%
Typical Power Consumption	12 W

**Ambient Conditions and Physical Characteristics**

Dimensions	121 mm x 76 mm x 51,3 mm
Connectors	Power: M12 4-pin A-coded male (Phoenix 1419768) I/O: M12 12-pin A-coded male (Phoenix 1441943) Ethernet: M12 8-pin X-coded female (Phoenix 1424177)
Operating Temperature	Tbd
Storage Temperature	Tbd
Certification	CE, FCC
IP Rating	IP65/IP67

## 10.2 Pinout

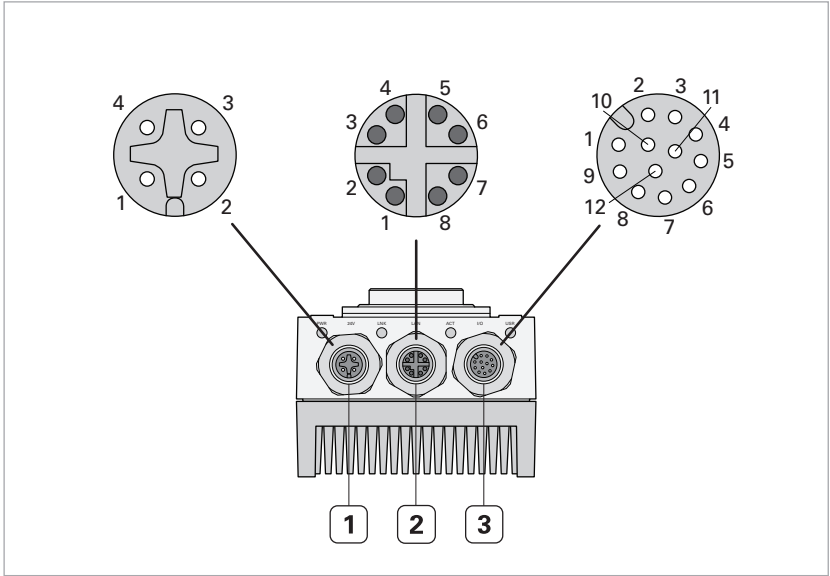


Fig. 6: Connectors with pin assignment

Interface Name	Description
1 24 V	Power input
2 LAN	10 G Ethernet
3 I/O	I/Os

### 24 V | Power input |

#### M12 A-coded male IEC 61076-2-101 (Phoenix 1419768)

Pin(s)	Signal	Pin(s)	Signal
1	24 V DC IN (+/-10%)	2	24 V DC IN (+/-10%)
3	GND	4	GND

**I/O | Trigger/strobe, digital inputs and outputs |**  
**M12 A-coded male IEC 61076-2-101 (Phoenix 1441943)**

Pin(s)	Signal	Pin(s)	Signal
1	GND_IO Power	2	GND_IO Power
3	V_IO: 8 ... 24 V Power	4	V_IN: 24 V Power
5	STROBE0 Line 4, push-pull output	6	GND_IN Power
7	STROBE2 Line 6, push-pull output	8	TRIG1 / A Line 1, TTL-Input, 24 V-tolerant
9	TRIG3 / Z Line 3, TTL-Input, 24 V-tolerant	10	TRIG2 / B Line 2, TTL-Input, 24 V-tolerant
11	STROBE1 Line 5, push-pull output	12	TRIG0 / GATE Line 0, TTL-Input, 24 V-tolerant

**Info****Using I/O**

In case I/Os are used, pin #3 must be connected.



## 10.3 Cable Plans

<b>i</b> Info	<b>Accessory cables</b>
The following cable plans refer to the optional cables that you can obtain from VRmagic Imaging (➔ section 10.4 on page 36).	

### Power Cable

VRmagic order number: VRM\_CAB\_PWR\_0001  
 Manufacturer order number: Phoenix 1407785  
 Connector #1: M12 4-pin A-coded female IEC 61076-2-101  
 Connector #2: Open ends

#1 pin	Signal	Cable Color
1	+24 V	brown
2	+24 V	white
3	GND	blue
4	GND	black

### CAT-6A Ethernet Cable

VRmagic order number: VRM\_CAB\_ETH\_0001  
 Manufacturer order number: Phoenix 1407473  
 Connector #1: M12 8-pin X-coded male IEC 61076-2-109  
 Connector #2: RJ45

#1 pin	Signal	#2 Cable Color
1	MDI0_P	white/orange
2	MDI0_N	orange
3	MDI1_P	white/green
4	MDI1_N	green
5	MDI2_P	white/brown
6	MDI2_N	brown
7	MDI3_P	white/blue
8	MDI3_N	blue

**I/O Cable**

VRmagic order number: VRM\_CAB\_IO\_0007  
 Manufacturer order number: Phoenix 1430145  
 Connector #1: M12 12-pin A-coded female IEC 61076-2-101  
 Connector #2: Open ends

#1 pin	Signal	Cable Color
1	GND_IO	brown
2	GND_IO	blue
3	V_IO (8V ... 36V)	white
4	V_IN (24V)	green
5	STROBE0	pink
6	GND_IN	yellow
7	STROBE2	black
8	TRIG1 / A	gray
9	TRIG3 / Z	red
10	TRIG2 / B	violet
11	STROBE1	gray/pink
12	TRIG0 / GATE	red/blue

## 10.4 Accessories

<b>VRmagic Part Number</b>	<b>Description</b>
VRM_DINSUP_24V_1.7A	DIN rail power supply 40.8 W, 24 V DC, 1.7 A
VRM_PWR_OE_EU	AC power lead (EU plug <> open ends)
VRM_CAB_PWR_0001	Camera power cable, 5 m (M12 4-pin plug female <> open ends) Phoenix 1407785
VRM_CAB_ETH_0001	Gigabit Ethernet cable, 5 m (M12 8-pin plug male <> RJ45) Phoenix 1407473
VRM_CAB_IO_0007	I/O cable, 5 m (M12 12-pin plug female <> open ends) Phoenix 1430145
VRM_IP_TUBE_0001	IP67 tube
VRM_IP_TUBE_EXT_0001	IP67 tube extension
VRM_MOUNT_90_0001	90 degree mount (including screws)
VRM_MOUNT_FLAT_0001	Flat mounting plate (including screws)
VRM_M12_CAP_M	Sealing Cap Power/IO-Connector
VRM_M12_CAP_F	Sealing Cap Ethernet-Connector