Pulsar Photonics GmbH
Steinbachstrasse 15
52074 Aachen
Tel. 0241 8906 8079
www.pulsar-photonics.de

Manual

Camera System CM-R1

Installation, adjustment and use of the Camera Module CM-R1

Version 1.2, May 2015

Annotation according to DIN EN 82079-1:

IMPORTANT

READ MANUAL CAREFULLY BEFORE USAGE

Prepare for future references and for the readability of technical documentation throughout the whole product life cycle.

Aachen, May 2015

Content

1 Identification

The delivered Camera Module Type is: CM-R1-650-4

Serial-No.: 140.202.0814-02.02 (Stronglaser)

Serial-No of camera: 4102731435, Type: UI1240-ME-C

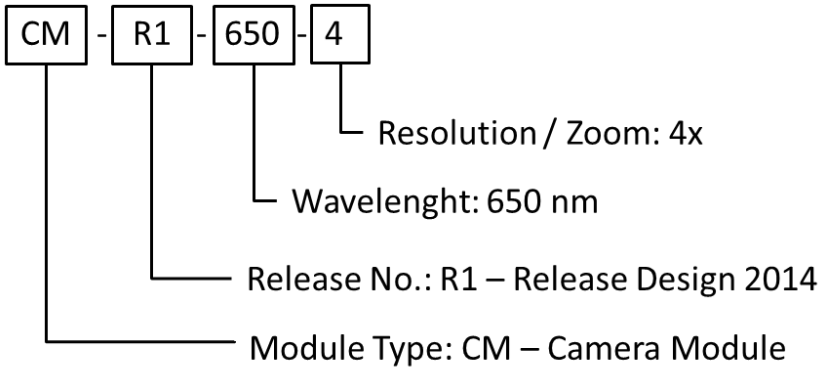


Figure 1:
product Ident

2 Technical Data

	Specification	Value
Focussing Objective	Field of View (FoV)	1.6 mm x 1.2 mm
	Optical Magnification	4x
	Working Distance (WD)	110 mm
Camera	Resolution Camera	1280 x 1024 pixel, 1.3 MP
	Camera Sensor Type	CMOS, Size 1/1.8“, (color optional)
	Data Connection Type	USB 2.0, Hirose
Laser pointer	Laser Radiation Class	Class 2
	Output Power	0.4 mW
	Wavelength	650 nm
LED Ring light	LED Radiation Class	
	Amount of LEDs	
	Output Power	mW
	Wavelength	Nm

2.1 Scope of delivery

The scope of delivery includes the following components

- Camera Module CM-R1
- Software (USB-Stick)
    - Basic software for control and use of the CM-R1 (Labview)
    - Driver for the camera (IDS-Driver)

3 Safety Instructions

3.1 Laser Radiation

The camera system CM-R1 contains a laser pointer for work piece alignment. Continuous wave laser radiation of the wavelength of **650 nm (red)**, with an average laser power of **0.4 mW** is focused coaxially by the integrated objective to a focal spot size of a diameter of 1.5 mm. The corresponding intensity is calculated to 226 W/m². The laser pointer can be controlled (on/off) by the delivered installation software.

	**LASER** **Class II** DIN EN 60825-1	**CAUTION** **Laser radiation** **Avoid direct eye exposure** **CLASS II Laser Product**

Annotation

Class II lasers are low power (< 1mW), visible light lasers that could possibly cause damage to a person's eyes. Some examples of Class II laser use are: classroom demonstrations, laser pointers, aiming devices and range finding equipment. If class II laser beams are directly viewed for long periods of time (i.e. > 15 minutes) damage to the eyes could result. Avoid looking into a Class II laser beam or pointing a Class II laser beam into another person's eyes. Avoid viewing Class II laser beams with telescopic devices. Realize that the bright light of a Class II laser beam into your eyes will cause a normal reaction to look away or close your eyes. This response is expected to protect you from Class II laser damage to the eyes.

3.2 LED Radiation

3.3 Electrical safety

USB-Camera: Protection class of the camera, IP30
For more information please check the manual of the USB-camera provided at www.ids-imaging.com.

4 Use of the Product

4.1 Intended Usage

The camera system CM-R1is designed for the use in laser / CNC machining systems. The product can be used as a stand-alone system or can be integrated in the Pulsar Photonics software environment. Basic functions of the product are

- Delivery of a magnified camera video picture for the live view of parts in the machine.
- Integrated laser pointer for faster discovery of the area of interest.

This product is not intended to be used in explosive or any other hazardous atmosphere, not intended to be used outside of a machining environment. Surrounding conditions are specified to temperatures between 10°C and 40°C, with a humidity between 50% and 80%.

4.2 Installation

4.2.1 Mechanical Installation

The monolithic housing of the camera system can mechanically be adapted by using the mounting interface. Figure 2 shows the installation space and specifies the mounting interface.

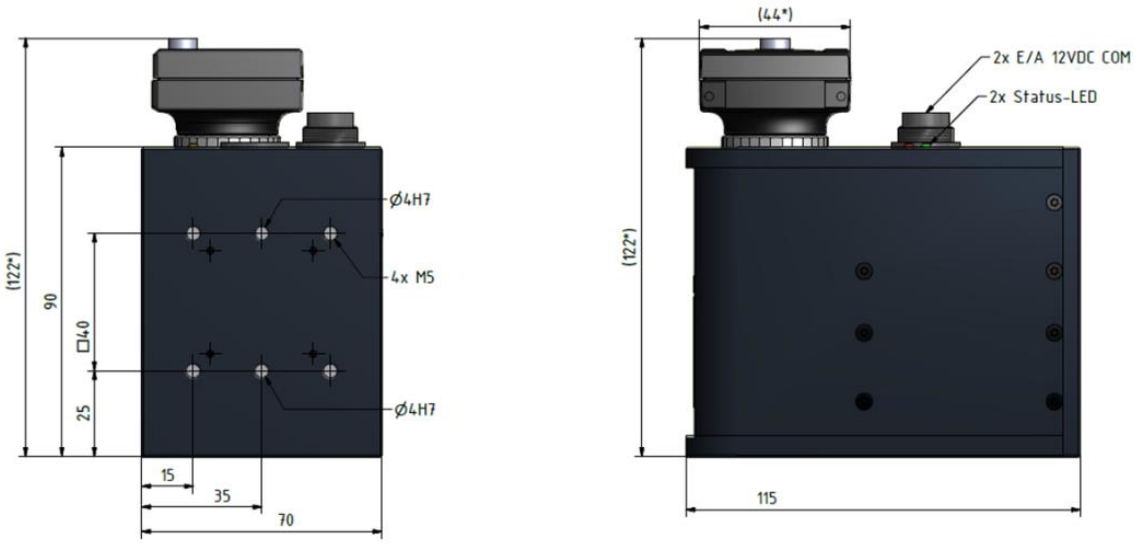


Figure 2: Outer Dimensions, Mounting Interface

WARNING

Do not open the product (screws or connectors). Opening of the product is just allowed for the manufacturer. Opening the product will mean the loose of product warranty!

4.2.2 Electrical Installation

From side of electrical installation two types of connections have to be considered, the USB-camera connection for power supply and communication with the camera and the module connections for power supply and communication with the module.

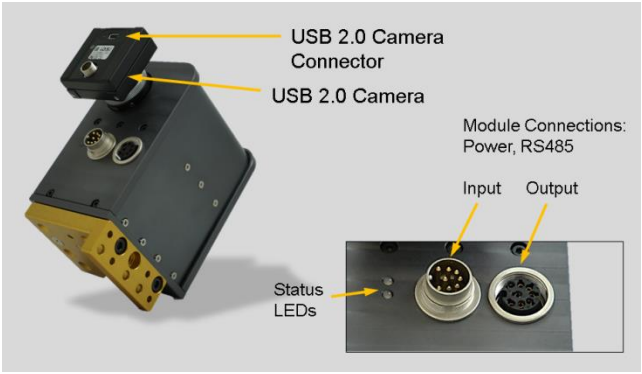
Connecting

1. Connect the USB camera output to a USB port on the PC.

2. Connect the camera module cable to the Camera Module Input Port .(Lumberg Connectors). The Output port is intended for the connection of multiple Camera Modules via Daisy Chain.

3. Ensure a proper installation of all cables for the whole traversing distance of the axes of the machine. Provide strain reliefs at camera and control or pc side. Do not lead cables over sharp edges – provide cable protection.

Figure 3: Connections CM-R1



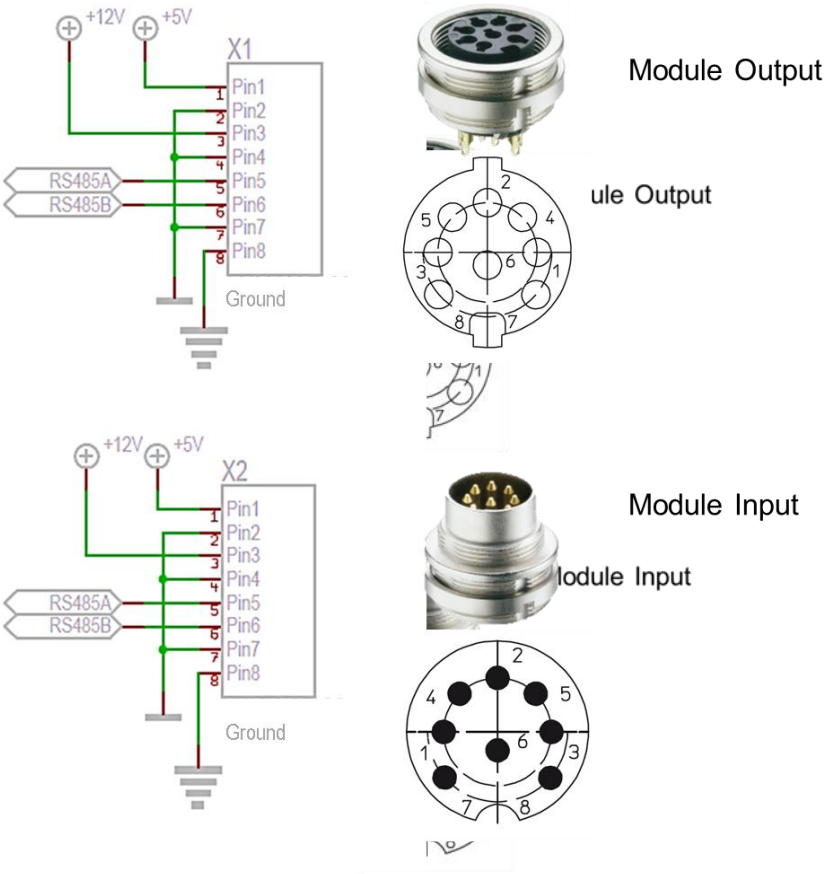
Wiring of the Module Connections (RS485)

The camera system CM-R1 has two *Lumberg* connectors on the top side of the module (cf. Figure 3), module output and module input. The module output allows the control of multiple modules via daisy chain connection. The module input connector provides the supply voltages (5VDC, 12VDC) and the data connection according to the RS485 protocol. The wiring has to follow the following configuration.

WARNING

Any faulty wiring of the module input or output can lead to a malfunction of the camera module or to a damage of the module. Do only use the correct wiring according to the wiring diagram specified in this manual!

Figure 4: I/O PIN Configuration, Camera Module



Wiring of module input

The wiring of the module output connector follows the pin configuration in Figure 2.

Pin number / Module Input X2	Function
Pin 1	Input supply voltage +5V
Pin 2	GND
Pin 3	Input supply voltage +12V
Pin 4	GND
Pin 5	RS485A / Data+
Pin 6	RS485B / Data-
Pin 7	GND
Pin 8	PE / Earth

4.2.2.1 Wiring of module output

The wiring of the module output connector follows the pin configuration in Figure 2. For the RS485 connection the following settings apply

Pin number / Module Output X1	Function
Pin 1	Supply voltage +5V
Pin 2	GND
Pin 3	Supply voltage +12V
Pin 4	GND
Pin 5	RS485A / Data+
Pin 6	RS485B / Data-
Pin 7	GND
Pin 8	PE / Earth

4.3 Communication with the camera module

4.3.1 Communication with the USB camera (USB)

The camera module uses a camera manufactured by IDS[1]. The model type is: UI1240-ME-C. In order to communicate with the USB camera the drivers have to be installed:

1. Put the Driver CD or USB-stick provided with this module in the according drive of the control computer.

2. Install the camera driver **"DRIVER_uEye_BatchInstall_4.40.1_vv_WHQL_Windows.zip"** in the right version on your computer. Alternatively you can find the camera driver on (account required)

   http://de.ids-imaging.com/manuals/uEye_SDK/DE/uEye_Handbuch/index.html

3. For simple use of the USB-camera you can also install the IDS-Cockpit software which allows a control and test of the camera.

4.3.2 Communication with the camera module (RS485)

For the RS485 connection the following settings apply:

Settings of the half-duplex RS485 communication port 19200 kbaud / 8N1.

The data line is terminated with 120Ω. If further modules will be connected, the according soldered jumper has to be opened.

Each command has the following form:

Address Parameter=Value CR

Send string for setting duty cycle of LED ring light: 123 4D=11\r
Answer string 123 4D=11\r

or

Send string for querying duty cycle of LED ring light: 123 4D\r
Answer string 123 4D=11\r

[1] IDS GmbH, Germany: Homepage: www.ids-imaging.com

Parameter	Data type	Read / write	Description
MF	char*	Read only	Read manufacturers name
MT	char*	Read only	Read module type name
FW	char*	Read only	Read firmware version
HW	char*	Read only	Read hardware version
SN	char*	Read only	Read serial number
CA	uint8	Read / write	Read/write communication address default: 123
PS	uint16	Read only	Read voltage of LED power supply in mV
ID	-	-	Blink with LED at module
LO	bool	Read / write	Switch laser pointer on: 123 LO=1\r Switch laser pointer on: 123 LO=0\r
4O	bool	Read / write	Switch LED ring light on / off or read status
4D	bool	Read / write	Duty cyle / intensity of LED ring light Value range 0 …100
LF	uint16	Read / write	LED ring light PWM frequency in kHz default: 3kHz

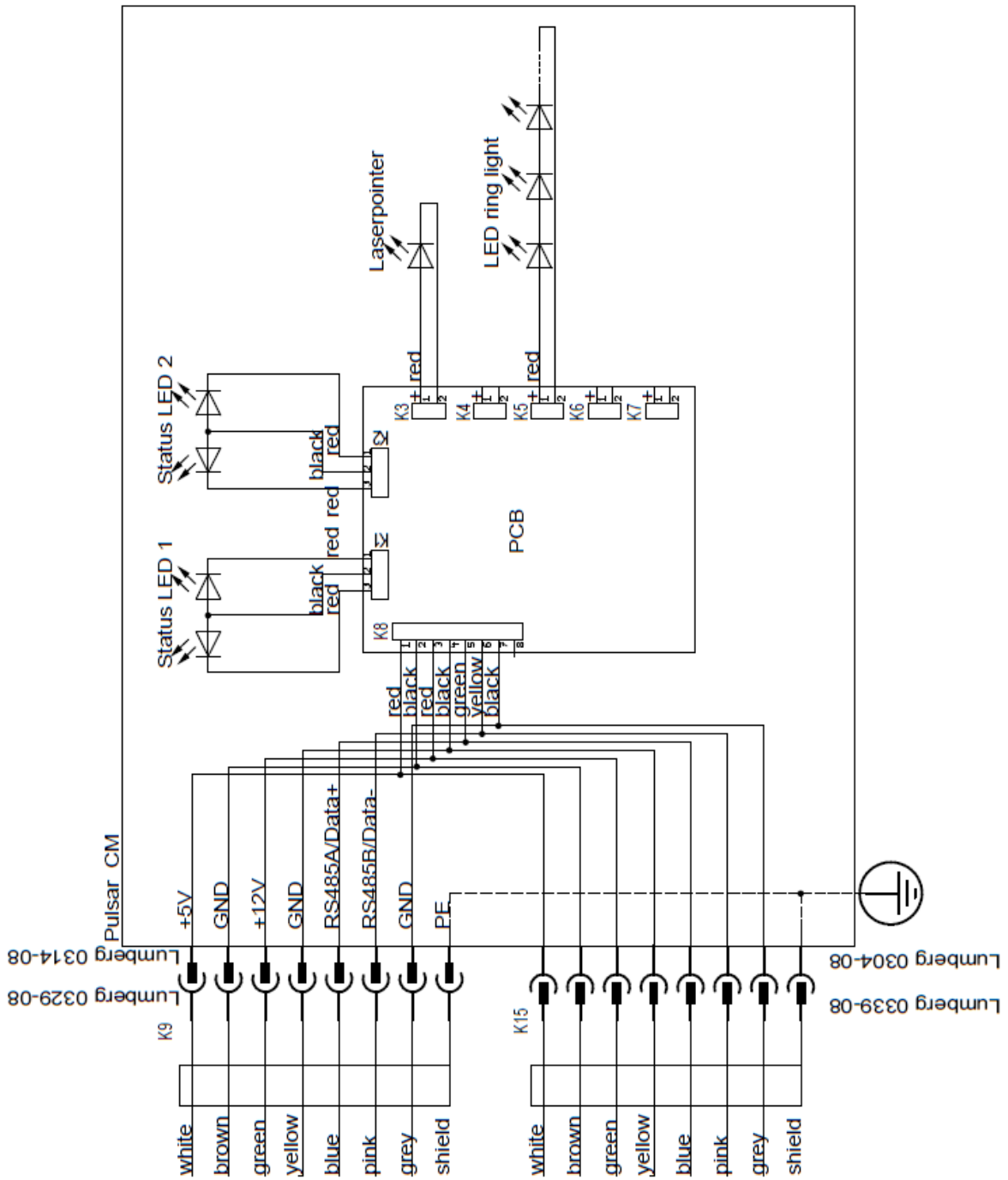


Figure 5: Wiring diagram of camera module (Lumberg connector)

5 Accessories supplied

- currently none-

6 Modification

Any modification of the product results in changes of the technical data and can cause deviating risks and safety measures. The present manual is to be adapted by the modifier.

Only the change of the USB camera is allowed to the customer. After installation / reinstallation or replacement of the camera, the pixel-µm-calibration of the camera image has to be re-executed.

WARNING

Do not open the product (screws or connectors). Opening of the product is just allowed for the manufacturer. Opening the product will mean the loose of product warranty!

7 Optional modules, extras, specifications

- currently none -

8 Maintenance and Repair by the customer service

Chapter will be updated

9 List of consumables, spare parts

-none-

10 Annexes

Table of used symbols and their explanations: none

List of setting parts and displays [DIN EN 62079, DIN EN 82079-1]: will be updated