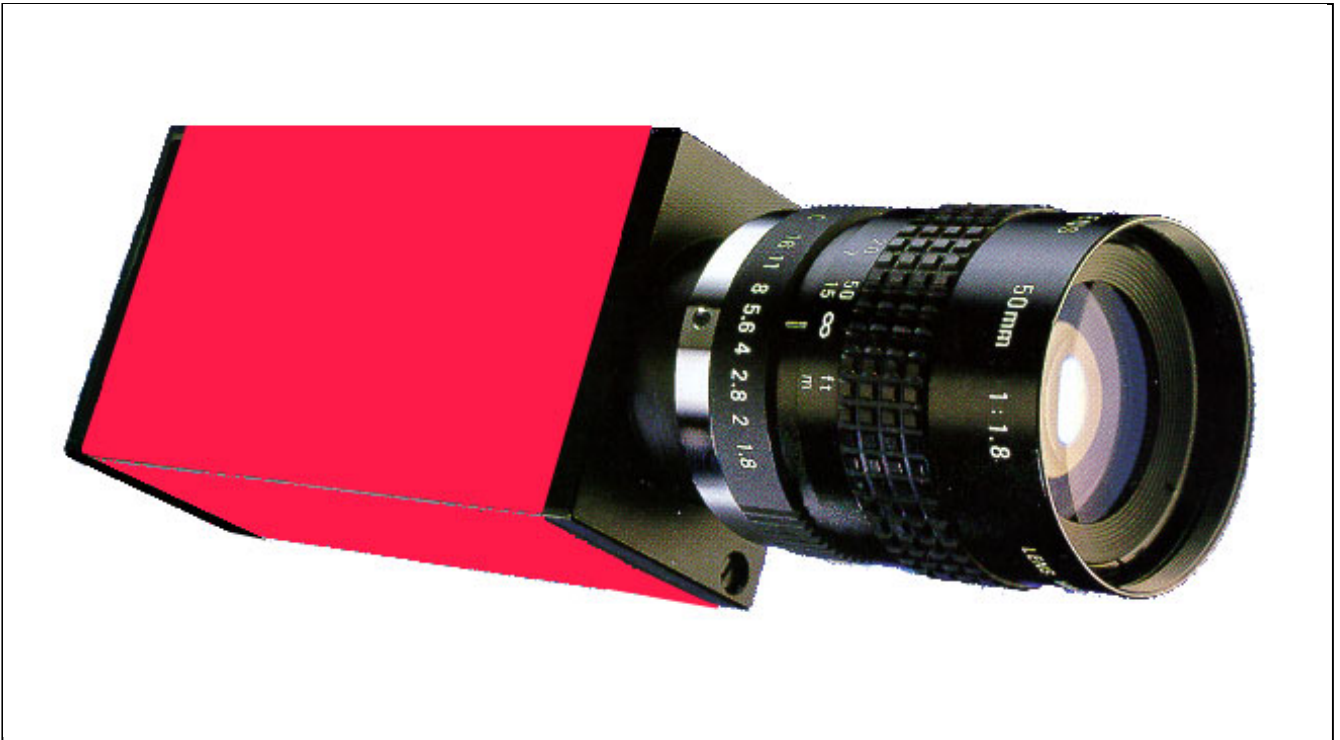




Smartcamera *redCAM*

Technical Information



Note

We have tried to offer this **redCAM** manual to our customers free of errors and easy to understand. However, any information for improving this manual or for the elimination of errors are welcome.

We can not assume responsibility for any error in this manual, or for any operating error which may result from such errors.

Thank you for your understanding.

© Copyright

All rights reserved, especially the right for duplication and translation. For duplication or reproduction in any form (print, copy, microfilm or data acquisition), a written approval from Leuze electronic GmbH + Co. is needed.

Changes, based on technical progress, are reserved.

Leuze electronic GmbH + Co.
PO Box 1111, In der Braike 1
D-73277 Owen/Teck, Germany
Phone +49 (0) 7021-573-0
Fax +49 (0) 7021-573-199
E-mail info@leuze.de
Internet <http://www.leuze.de>

Table of contents

1	GENERAL INFORMATION	4
2	HOUSING	4
2.1	Dimensions and mass	5
3	SENSOR	5
4	LENS MOUNT	6
5	POWER SUPPLY	6
6	INTERFACES	6
6.1	Parallel I/O	7
6.2	V.24 (RS 232)	7
6.3	Monitor	8
7	CONNECTOR PIN ASSIGNMENTS	8
7.1	Power supply: DC IN	8
7.1.1	Sensor connection	8
7.1.2	Cable	9
7.2	Parallel I/O	9
7.2.1	Sensor connection	9
7.2.2	Cable	10
7.3	V.24 (RS 232)	10
7.3.1	Sensor connection	10
7.3.2	Cable	10
7.4	Monitor	11
7.4.1	Sensor connection to video monitor (BNC)	11
7.4.2	BNC cable	11
7.4.3	Sensor connection to SVGA monitor	12
7.4.4	SVGA cable	12
8	GENERAL TECHNICAL DATA	12

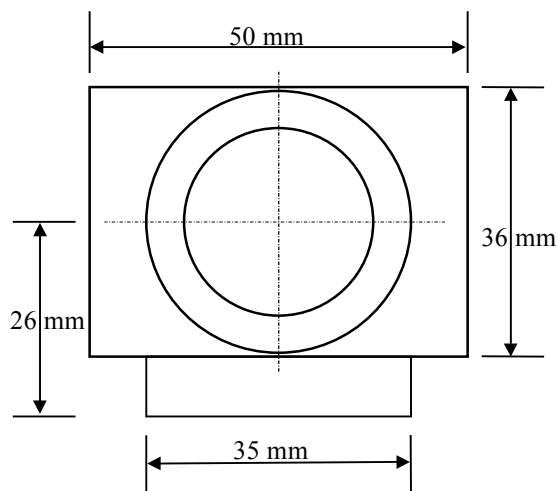
1 GENERAL INFORMATION

The smartcamera **redCAM** consists of a compact, light-weight black&white camera. It is equipped with memory and a fast signal processing unit. The processing unit is used to evaluate the acquired images from this smartcamera. By means of a dynamic RAM, parameters for the software as well as the images from the CCD sensor are stored. For the communication with higher-level controllers, interfaces are provided.

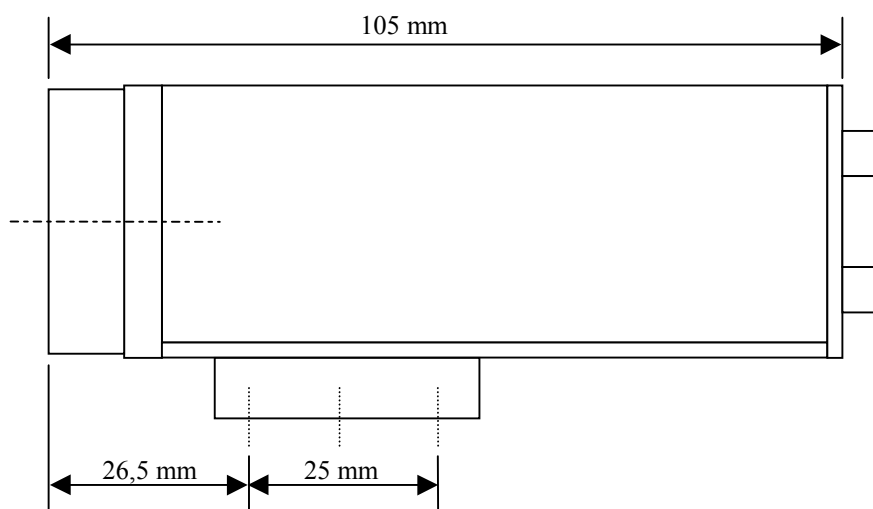
The smartcamera requires a 12 volt power supply for the operation.

2 HOUSING

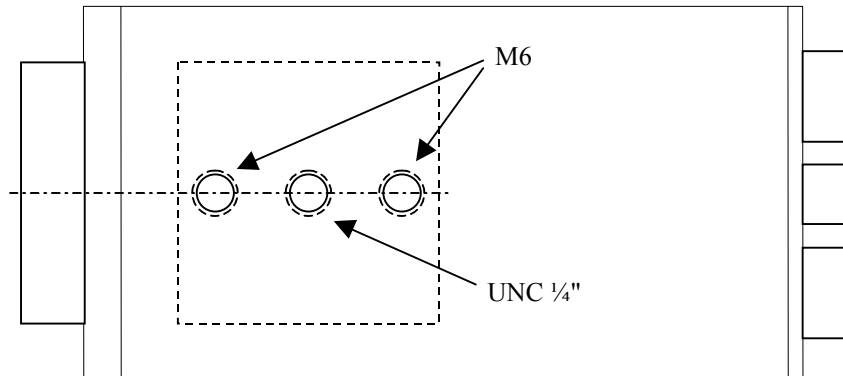
Front view:



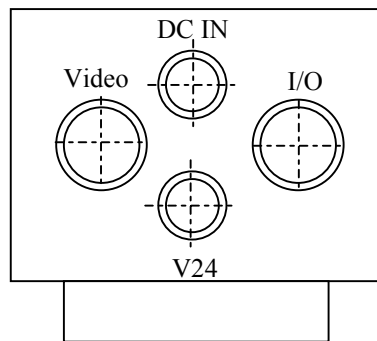
Side view:



Top view:



Rear view:



2.1 Dimensions and mass

The drawings above show the dimensions of the smartcamera **redCAM**. The camera has a mass of approx. 250 g. For the fixture of the camera different threaded bores are provided (2x M6, 1x 1/4" UNC). The bores are in a metal plate on the bottom of the camera.

3 SENSOR

For the acquisition of images only CCD chips from Sony are used. Depending on the camera type, different specifications are offered;

Chip size [Inch]	1/3 ^{1,2,3,4} ,	1/2 ^{5,6} , 2/3 ⁷
Pixel number [H x V]	500 x 582 ¹ , 782 x 582 ^{5,6} ,	752 x 582 ^{2,3,4} , 1300 x 1030 ⁷ ,
Pixel dimension [µm]:	9,8 x 6,3 ¹ , 8,3 x 8,3 ^{5,6} ,	6,5 x 6,25 ^{2,3,4} , 6,7 x 6,7 ⁷
Min. Shutter time [s]	1/10.000 ^{2,3,4,7} , 1/200.000 ^{5,6}	1/80.000 ¹ ,
Image	B&W ^{1,2,3,5,7} ,	Colour ^{4,6}

Also the evaluation electronics offers different specifications;

Performance [MIPS]	32 to 160 ^{1,2,3} , 40 to 200 ^{4,5,6,7}
Image storage [MB]	2 ^{1,2,3} , 8 ^{4,5,6,7}
Flash EPROM [kB]	512 ^{1,2,3} , 2048 ^{4,5,6,7}
Video output	BAS ^{1,2} , SVGA ^{3,4,5,6,7}

For the identification of the different camera types, we have used;

1 : ViS 5	5 : ViS 8 P
2 : ViS 7	6 : ViS 8 CP
3 : ViS 7 V	7 : ViS 10 MP
4 : ViS 7 CV	

4 LENS MOUNT

Because of the C-type mount all standard CCTV lenses with their corresponding threads can be used. The seating dimension is 17.53 mm.

5 POWER SUPPLY

The vision sensor is powered with +12 Volt ($\pm 20\%$), max. 18 Volt. The hardware is internally electrically isolated from the supply voltage by means of a DC/DC transformer. A polarity reversal protection diode provides additional protection. The power consumption of the smartcamera is approx. 4 watts.

6 INTERFACES

The smartcamera **redCAM** comprises the following interfaces;

- Four parallel inputs and outputs each
- V.24 (RS 232) serial interface
- BNC or SVGA monitor connection (dependent on type)

6.1 Parallel I/O

The smartcamera has four input pins and four output pins. Each of them is optodecoupled and can be used for steering purposes or for process controller tasks.

The inputs are PLC compatible (12V to 24V level, plus is switched) and have a input protection. During the operation, the input current is 5 mA with 24V. The response threshold for a logical high signal is 8V at a current flow of 2mA. The outputs are externally supplied with 12V to 24V. A protection diode avoids a short-circuit by polarity reversal of the supply voltage from a higher-level controller.

Technical data for the input and output ports in tabular form;

<i>Inputs</i>	
Operating voltage [V]	12 to 24
Type	Electrically isolated optical couplers
Input current [mA]	5
Response threshold [V]	8
<i>Outputs</i>	
Operating voltage [V]	12 to 24 (externally supplied)
Type	Electrically isolated optical couplers
Output current [mA]	≤ 150 per output
Total max. output current [mA]	≤ 500 (for all outputs)
Switching capacity [W]	≤ 3.6
Polarity reversal protection	Yes (reversing diodes for inductive load)

6.2 V.24 Interface (RS 232)

The smartcamera comprises a serial interface which can be used for the setting of sensor parameters as well as for the communication with a PLC. The parameters of the serial interface are;

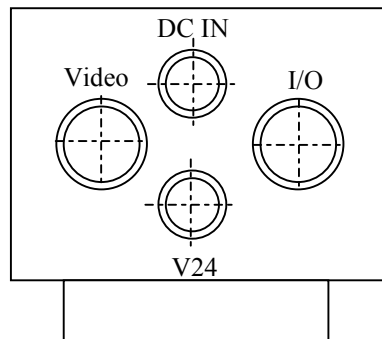
Transmission rate [Baud]	9600
Data bits	8
Parity	None
Stop bits	1

6.3 Monitor

Dependent on the camera type (see chapter 3, page 6), a BNC socket is provided for the transmission of a standard video signal (BAS). The other camera types are equipped with a socket for the direct connection via cable to a standard SVGA monitor.

7 CONNECTOR PIN ASSIGNMENTS

The rear view of the smartcamera is equipped with four plug connectors for the following functions:

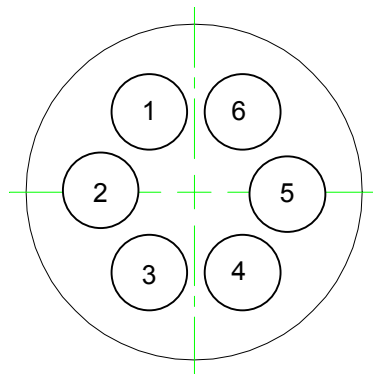


- DC IN (Power supply): Hirose 6-pole pin contact (HR10A-7R-6PB)
- Parallel I/O: Hirose 10-pole pin contact (HR10A-10R-6PB)
- Serial Interface V.24 (RS 232): Hirose 6-pole jack (HR10A-7R-6SB)
- Video BNC jack or SVGA socket

7.1 Power supply: DC IN

7.1.1 Sensor connection

Pin assignment:



HR10A-7R-6PB

<i>Signal:</i>	<i>No.:</i>	<i>Wire color:</i>
Power 12V	1	Green
Power 12V	2	Yellow
Reset SGN	3	-
Reset GND	4	-
Power GND	5	White
Power GND	6	Brown

7.1.2 Cable

Hirose 6-pole jack connector: HR10A-7P-6SC

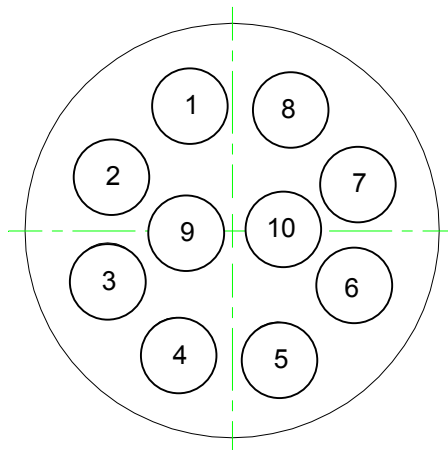
Description:

- Preassembled, on one end with Hirose connector
- 4-pole, shielded with tinned copper braiding, for example LiYCY 0.25mm²
- Outer diameter [mm] 4.8 to 5.2
- Temperature range [°C] -5 to +70
- Screened on connector end
- Length [m]: 5 (other length as option)

7.2 Parallel I/O

7.2.1 Sensor connection

Pin assignment:



HR10A-10R-6SB

Selected	Input 2	Input 1
Program 1	0	0
Program 2	0	1
Program 3	1	0
Program 4	1	1

Signal:	No.:	Wire color:	Function:
OUT 0	4	White	System ready
OUT 1	3	Brown	Passed
OUT 2	2	Green	Failed
OUT 3	1	Yellow	Error
IN 0	9	Gray	Trigger
IN 1	8	Pink	Select program (see table)
IN 2	10	Blue	Select program (see table)
IN 3	7	Violet	Monitor refresh
24V external	6	Red	External voltage
GND external	5	Black	External ground

Note: All input and output ports are active-high (≡1)

7.2.2 Cable

Hirose 10-pole jack connector: HR10A-10P-10SC

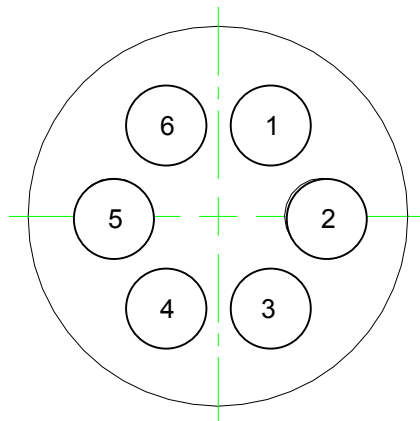
Description:

- Preassembled, on one end with Hirose connector
- 10-pole, shielded with tinned copper braiding, for example LiYCY 0.14mm²
- Outer diameter [mm] 6.8 to 7.2
- Temperature range [°C] -5 to +70
- Screened on connector end
- Length [m]: 5 (other length as option)

7.3 V.24 (RS 232)

7.3.1 Sensor connection

Pin assignment:



Signal:	No.:	Wire color:
V.24 CTS	1	Green
V.24 TxD	2	Brown
V.24 RxD	3	White
V.24 +12V	4	Pink
V.24 GND	5	Gray
V.24 RTS	6	Yellow

HR10A-6R-6SB

7.3.2 Cable

Hirose 6-pole pin connector: HR10A-7P-6PC

Description:

- Preassembled, on one end with Hirose connector
- 6-pole, shielded with tinned copper braiding, for example LiYCY 0.14mm²
- Outer diameter [mm] 4.8 to 5.2
- Temperature range [°C] -5 to +70
- Screened on connector end
- Length [m]: 5 (other length as option)

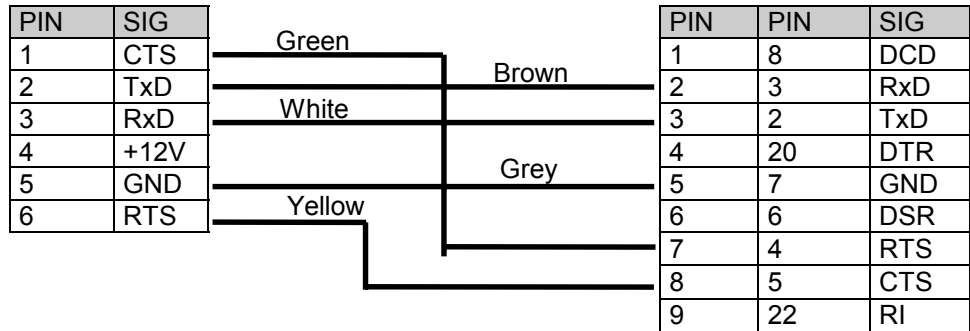
Connection:

redCAM

Hirose connector
6 pins

Controller

Sub-D socket
9 pins 25 pins



7.4 Monitor

7.4.1 Sensor connection to video monitor (BNC)

Pin assignment:

<i>Signal:</i>	<i>No.:</i>
Video signal	Inner lead
Video shield	Outer lead

7.4.2 BNC cable

BNC connector:

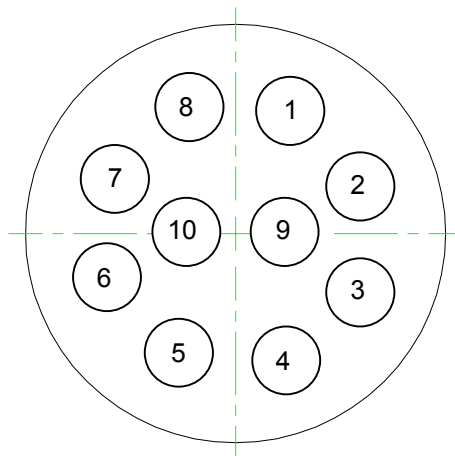
Pin connector

Description:

- Preassembled, on both ends with straight BNC connector and cable sleeve
- Coax cable, 75 Ohm, cable type RG 59 B/U, type SS
- Outer diameter [mm] 6.15
- Temperature range [°C] -5 to +70
- Length [m]: 5 (other length as option)

7.4.3 Sensor connection to SVGA monitor

Pin assignment:



Signal:	No.:	Wire color:
R OUT	4	Red signal
R GND	3	Red shield
G Out	2	Green signal
G GND	1	Green shield
B Out	9	Blue signal
B GND	8	Blue shield
HS Out	10	White signal
HS GND	7	White shield
VS Out	6	Grey signal
VS GND	5	Grey shield

HR10A-10R-6SB

7.4.4 SVGA cable

Hirose 10-pole pin connector: HR10A-10P-10PC

Description:

- Preassembled, on one end with Hirose connector
- 5x Mini coax cable, 75 Ohm
- Outer diameter [mm] 7
- Temperature range [°C] -5 to +70
- Length [m]: 5 (other length as option)

8 GENERAL TECHNICAL DATA

Operating temp. [°C]	0 to 45
Storage temp. [°C]	-20 to +60
Rel. Humidity [%]	≤ 80 (non-condensing)
Mains supply [V], [Hz]	100 to 230, 47 to 63
Impact resistance [gn]	70
Vibration resistance [gn]	7 (11 to 200 Hz)
Dimensions [mm]	100 x 50 x 36
Lens mount	C-mount
Mass [g]	approx. 250
Standards	Relevant CE-standards