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Manual

# CR50 and CR50-FO

Version 1.1



**ASTECH**  
Angewandte Sensortechnik

## Notes

The information contained in this manual has been thoroughly researched and prepared. Nevertheless, we cannot assume liability for omissions or errors of any nature whatsoever. We would, however, be grateful for your comments or suggestions.

We shall not accept any claims for damages, except for those resulting from intent or gross negligence.

As this product is available in several designs, there might be deviations between the descriptions and instructions in hand and the product supplied.

We reserve the right to make technical changes, which serve to improve the product, without prior notification. Thus, it cannot be assumed that subsequent versions of a product will have the same features as those described here.

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CR50 and CR50-FO - Manual V1.1

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## Revision history

Manual version	Date	Changes
1.1	10.05.2014	New design



The instruments are not to be used for safety applications, in particular applications in which safety of persons depends on proper operation of the instruments.  
These instruments shall exclusively be used by qualified personnel.  
Repair only by ASTECH.

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# 1 Technical Data

**Table 1 : General technical data**

Sensing channels	1 Sensing channel, 1 Internal stabilization channel
Drift stabilization	CROMLASTAB®
Receiving detector	Three range photo diode
Sensitivity	Automatic, Adjustable by user
Sensitivity steps	4 (20x, 40x, 80x, 200x)
Receiving signal resolution	3 x 4096 Steps
Object illumination	Power white light LED Adjustable (4096 Steps)
Ambient light compensation	Always active
Standard interfaces	4 Switching outputs 1 Control input
Keylock	Via control input
Optional field bus interfaces	Not available
Displays	9 LEDs for outputs and status
Buttons	3 buttons for Teach-In
Color resolution (L*a*b*)	$\Delta E_{Lab} \leq 1$
Response time	10 ms, 1 ms
Off-Delay (global)	0 ms, 50 ms
On-Delay	Non-existent
Hysteresis	10 % fixed
Color value memory cells	4
Color output channels	4
Protection standard	IP54
Power supply	18 ... 28 VDC, max. 500 mA
Case temperature for operation	-10 °C ... 55 °C
Coupling in signal path	CR50: Via optical fiber CR50-FO: Fixed optics
Optical fiber adaption CR50	M18x1
Working distance CR50-FO	30 mm ... 60 mm
Spot size CR50-FO	5 mm ... 10 mm
Housing material	Aluminum, anodized
Housing size	50 mm × 50 mm × 21 mm
Weight	Ca. 80 g

**Table 2 : Operational functionality**

Color space modes	Non-self-shining objects Lab
Color recognition modes	Check spherical tolerance Minimal distance
Operating modes	Continuously External triggering
Parameterization	Via 3 buttons

## 2 Specification electrical interfaces

Figure 1 shows the electrical connector (type M9) of the sensor.

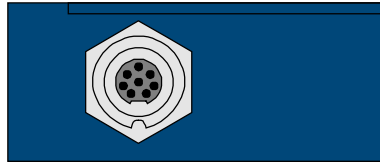


Figure 1 : Electrical interface

The counting order of the round connector is shown in Figure 2.

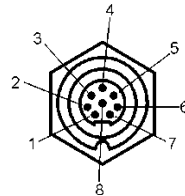


Figure 2 : Counting order of the round connector

Table 3 : Signal description sensor connector AB1

Pin (color)	Name	Description
1 (white)	OUT1	Sensor output 1
2 (brown)	OUT2	Sensor output 2
3 (green)	KEYLOCK	Input for Keylock, Keylock active at HIGH level
4 (yellow)	TRG0	Input for updating the sensor outputs in mode "Extern Trig."
5 (grey)	OUT3	Sensor output 3
6 (pink)	OUT4	Sensor output 4
7 (blue)	GND	Ground
8 (red)	+U <sub>B</sub>	Power supply
Shield	SH	Device shield (earth)

Table 4 : Electrical specification sensor connector AB1

Pin	Spezification
1 (OUT1)	Push-Pull LOW: 0 V; HIGHT: +U <sub>B</sub> - 1 V; max. 100 mA
2 (OUT2)	Push-Pull LOW: 0 V; HIGHT: +U <sub>B</sub> - 1 V; max. 100 mA
3 (KEYLOCK)	LOW: 0 V ... 3 V; HIGH: 18 V ... 28 V
4 (TRG0)	LOW: 0 V ... 3 V; HIGH: 18 V ... 28 V
5 (OUT3)	Push-Pull LOW: 0 V; HIGHT: +U <sub>B</sub> - 1 V; max. 100 mA
6 (OUT4)	Push-Pull LOW: 0 V; HIGHT: +U <sub>B</sub> - 1 V; max. 100 mA
7 (GND)	0 V
8 (+U <sub>B</sub> )	18 ... 28 VDC, max. 500 mA (optional 9 ... 28 VDC)

**Make sure that the respective shield wires of the used sensor cables are properly connected to earth!**

### 3 Drawings

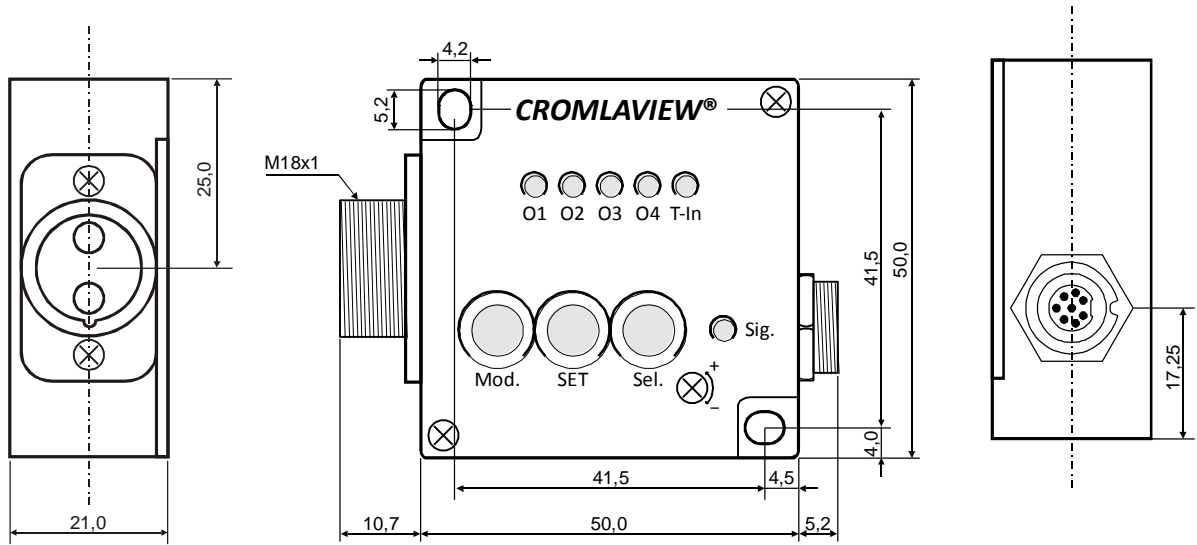


Figure 3 : Drawing CR50

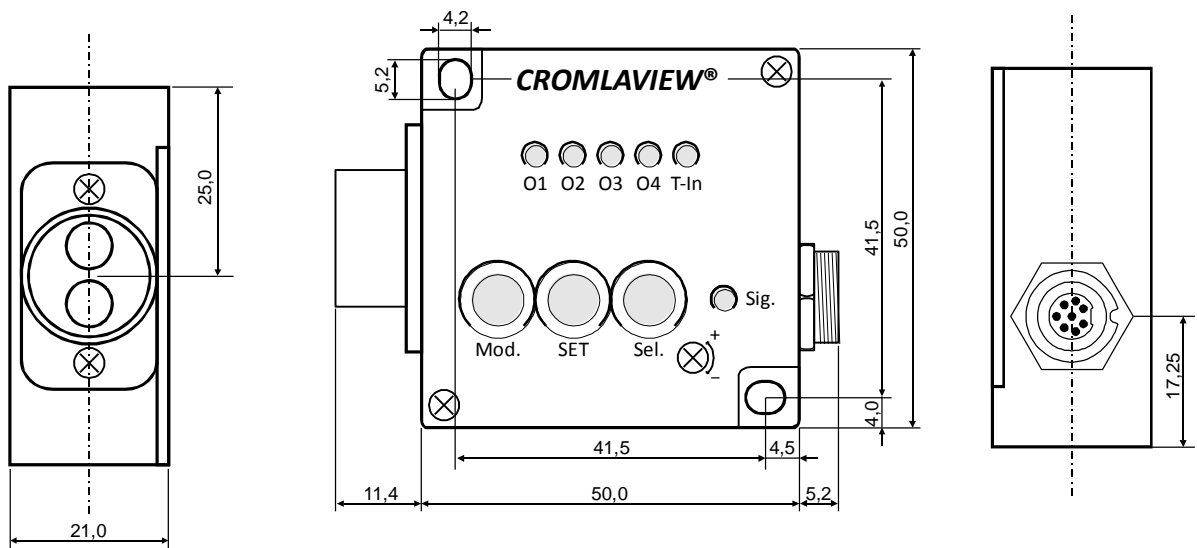


Figure 4 : Drawing CR50-FO (fixed optics)

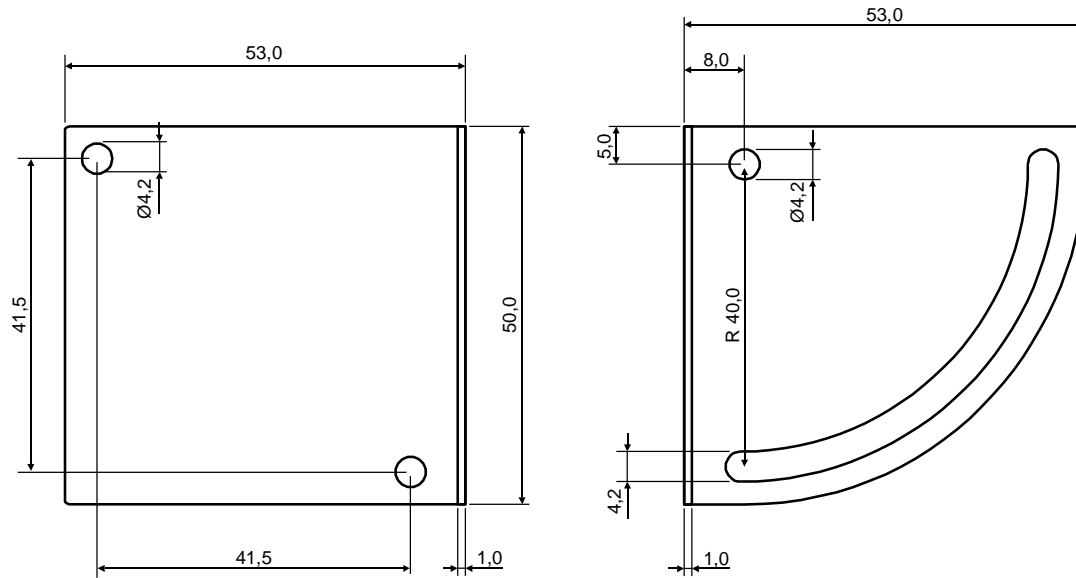


Figure 5 : Mounting bracket CR50-FO and CR100-FO

## 4 Thermal specifications

The sensor is stabilized against thermal drift. With setting of very high power of LED light in connection with a high scanning frequency the temperature will increase and thus drift phenomena may occur. To ensure a safe color recognition, the sensor should be screwed to a heat sink with a heat resistance small than 0.5 K / W. For example this can be a standard aluminum heat sink with the size of 200 mm x 200mm with a gill height of 50mm. Large parts of machines also can be used.



The sensor can be very hot without using a heat sink. The use of a heat sink is strongly recommended to avoid injury.

## 5 Displays

Table 5 : LED meaning

LED	Meaning
O1	State output 1
O2	State output 2
O3	State output 3
O4	State output 4
T-In	Teach-In mode active
Sig.	Signal mode active
Sel.	Sensing channel 2 active
SET	Tolerance

Table 6 : Assignment of flash impulses to tolerance values

Flash impulses	Tolerance	Tolerance value
1	Very small	3
2	Small	6
3	Medium	9
4	Large	15
5	Very large	20

**If the sensor signal is clipping the LEDs are flashing alternately.**



## 6 Button operation

### Automatic signal adjustment

- Position sensor to object
- Press "Mode" button shortly until "Sig." mode active
- Press "SET" button for at least 2 seconds
- Press "Sel." Button shortly, to check the drive of the stabilization channel
- To store parameters press "Mode" button for at least 2 seconds

### Teaching in colors

- Position sensor to object
- Press "Mode" button shortly until "Teach-In" mode active
- Press "Sel." button to select table entry
- Press "SET" button for at least 2 seconds
- To store parameters press "Mode" button for at least 2 seconds

### Adjust tolerance

- Press "Mode" button shortly until "Teach-In" mode active
- Press "SET" button shortly to select tolerance
- To store parameters press "Mode" button for at least 2 seconds

### Clear color table

- Press "Mode" button shortly until "Teach-In" mode active
- Press "Sel." button for at least 2 seconds
- To store parameters press "Mode" button for at least 2 seconds

### Adjust sensor configuration

- Press and hold "Mode" and power-up the sensor
- Select the parameter (see table) with "Sel." button
- Set or unset the parameter with "SET" button
- To store parameters press "Mode" button for at least 2 seconds

**Table 7 : LED meaning in sensor configuration mode**

Display	Parameter	SET LED ON	SET LED OFF
O1	Response time	10 ms	1 ms
O2	Off-delay	0 ms	50 ms
O3	Color recognition mode	Check spherical tolerance	Minimal distance
O4	Operation mode	Continuously	External triggering

## 7 Part numbers

Part	Part number
CR50 Color sensor	10-3003-00
CR50-FO Color sensor	10-3003-02
Fiber optical cables	See catalogue (18-0003-00)
Connection cable, 8-pin, M9 / open, 2 m	15-3000-00
M9 protection cap	15-3010-00
Mounting bracket CR50-FO / CR100-FO	12-3000-00

### Surge protection

To use the sensor in systems where the supply voltage line > 3 meters, it is recommended to use a filter module to protect against surges. A suitable 24 V DC filter module (surge) is available from the company WAGO under order number 750-626.

## 8 Declaration of Conformity

<b>Manufacturer</b>	<b>ASTECH Angewandte Sensortechnik GmbH</b>
<b>Address</b>	18057 Rostock Schonenfahrerstr. 5 Deutschland
<b>Product name</b>	CR50 / CR50-FO
<b>Device description</b>	Farbsensor



### EG Declaration of Conformity

In accordance with the Directive of Electromagnetic compatibility 2004/108/EG

#### Conforming to the following standards

Radio disturbance characteristics: EN 61000-6-3:2007

In addition the following standard is passed:

EN 61326-1:2006; Electrical equipment for measurement, control and laboratory use –  
EMC requirements;  
Classification: Class B (emission);  
Industrial equipment (immunity)

**Place** Rostock

**Date** September 2013

ASTECH Angewandte Sensortechnik GmbH

A handwritten signature in blue ink, appearing to read 'J. Mirow', is placed over a faint, light blue circular stamp.

Jens Mirow

Geschäftsführer