

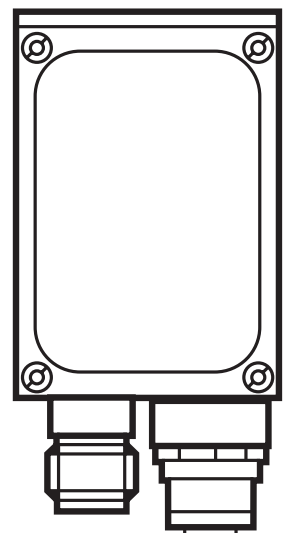


Operating instructions  
Multicode Reader

**efector190<sup>®</sup>**

**O2I10x**

**UK**



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### Open source software

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For software subject to the GNU General Public License or the GNU Lesser General Public License the source code can be requested against payment of the copying and shipping costs.

# 1 Preliminary note

## 1.1 Verwendete Symbole

- ▶ Instruction
- > Reaction, result
- [...] Designation of pushbuttons, buttons or indications
- Target, reference



Important note:  
Non-compliance can result in malfunctions or interference.



Information  
Supplementary note

## 1.2 Warning signs used

### **WARNING**

Warning of serious personal injury.  
Death or serious irreversible injuries may result.

### **CAUTION**

Warning of personal injury.  
Slight reversible injuries may result.

### **NOTE**

Warning of damage to property.

## 2 Safety instructions

These instructions are part of the device. They contain texts and drawings concerning the correct handling of the device and must be read before installation or use.

Observe the operating instructions.

Non-observance of the instructions, operation which is not in accordance with use as prescribed below, wrong installation or handling can affect the safety of people and machinery.

The installation and connection must comply with the applicable national and international standards. Responsibility lies with the person installing the unit.

Only the signals indicated in the technical data or on the device label may be supplied to the connections or wires.

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### **⚠ WARNING**

The unit is equipped with a laser of laser protection class 2.  
Do not stare into beam.

## 3 Items supplied

1 Multicode Reader O2I10x

The device is supplied without installation/connection accessories and software.

### 3.1 Accessories

[www.ifm.com](http://www.ifm.com) → Data sheet direct: → e.g. O2I102 → Accessories

## 4 Functions and features

The device reads and verifies labelled and directly marked 2D DataMatrix codes and 1D barcodes.

### 4.1 Features at a glance

- integrated, configurable code evaluation
- process interfaces RS-232, Ethernet TCP/IP and EtherNet/IP
- parameter setting interface Ethernet TCP/IP and UDP/IP
- internal illumination red light (625 nm) or infrared (850 nm)
- internal or external triggering

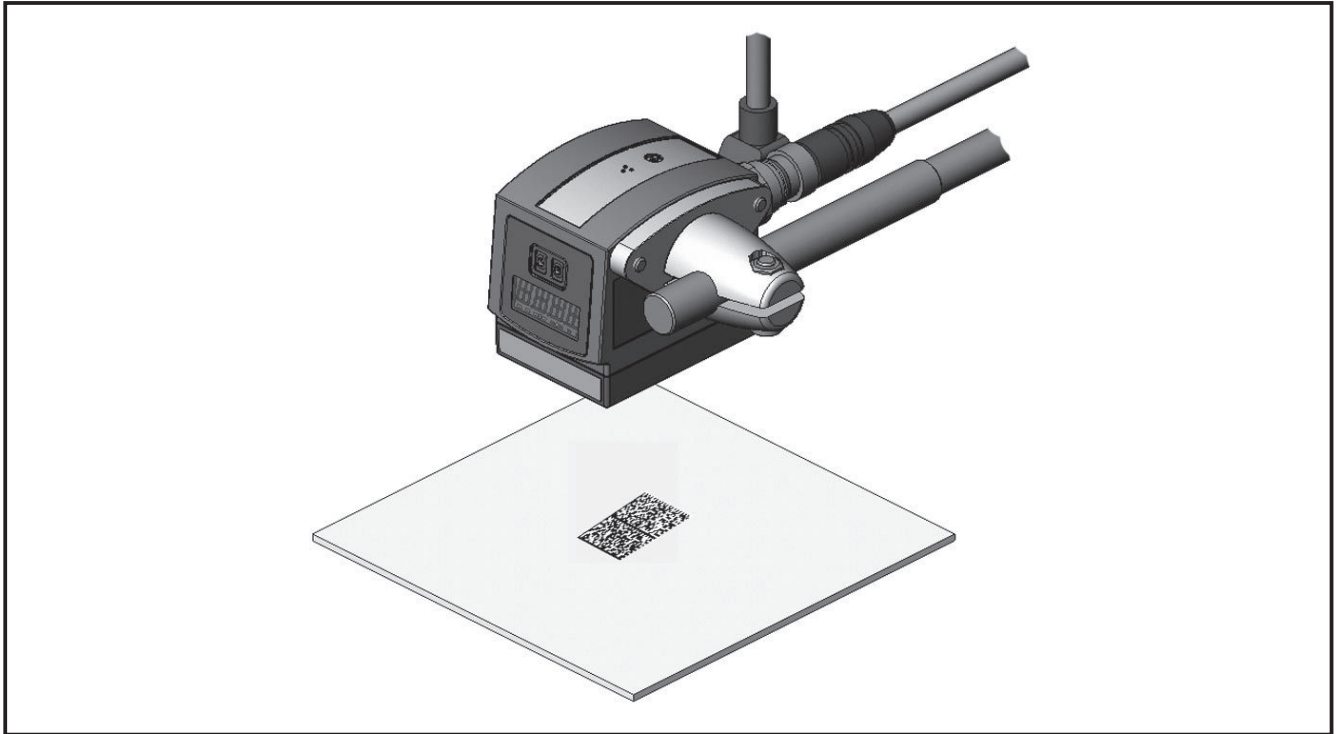
Detailed information → 11 Technical data

## 5 Installation

### 5.1 Mounting accessories

The device is compatible with the mounting accessories of ifm's photoelectric sensors of the O2Dxxx (object recognition), O2Mxxx (EthernetCamera) etc. series.

Example mounting with clamp and bracket:



Depending on the intended location and type of mounting the following mounting accessories are available:

Description	Art. no.
Mounting set for shaft Ø 12 mm (clamp and bracket for types O2Dxxx, O2Mxxx, O2Ixxx)	E2D110
Shaft, straight Ø 12 mm, length 130 mm, M10	E20938
Shaft, angled Ø 12 mm, length 200 mm, M10	E20940
Mounting set for shaft Ø 14 mm (clamp and bracket for types O2Dxxx, O2Mxxx, O2Ixxx)	E2D112
Shaft, straight Ø 14 mm, length 130 mm, M12	E20939
Shaft, angled Ø 14 mm, length 200 mm, M12	E20941

You can find more information about the available accessories at:

[www.ifm.com](http://www.ifm.com) → Data sheet direct: → e.g. O2I102 → Accessories  
or directly

[www.ifm.com](http://www.ifm.com) → Data sheet direct: → e.g. E2D110

## 5.2 Mounting dimensions

The device is mounted using 2 M4 screws and nuts.  
Hole dimensions → 10 Scale drawing.

## 5.3 Installation location

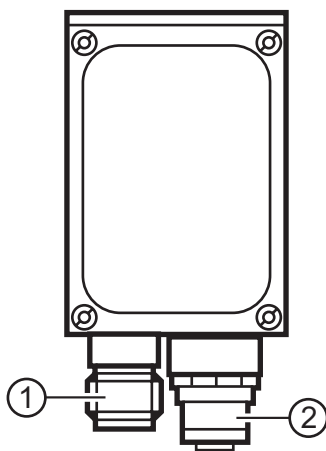
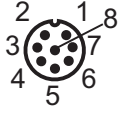
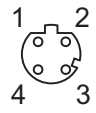
- ▶ Mount the camera in front of or above the area to be monitored.  
The detectable field of view size depends on the operating distance → 11 Technical Data.
- ▶ Back light or scattered light situations and continuously changing light conditions are to be avoided.
- ▶ Do not position illumination elements directly facing the camera lens.
- ▶ To avoid adverse effects on the image detection, avoid installation in heavily polluting areas of the machine.
- ▶ The connected cables must be provided with a strain relief.

## 6 Electrical connection

### NOTE

The unit must be connected by a qualified electrician.  
Disconnect power before connecting the unit.

### 6.1 Wiring

	<b>Process interface (1)</b>	
	M12 connector, A-coded, 8 poles	
		<ul style="list-style-type: none"> <li>1 U+</li> <li>2 trigger input, positive switching</li> <li>3 0 V</li> <li>4 trigger output/switching output 1, positive switching (reading/verification)</li> <li>5 RxD RS-232</li> <li>6 TxD RS-232</li> <li>7 switching output 2 (ready), positive switching</li> <li>8 GND RS-232 (electrically separated up to 50 V)</li> </ul>
	<b>Parameter/process interface (2)</b>	
M12 socket, D-coded, 4 poles		
	<ul style="list-style-type: none"> <li>1 Ethernet TxD +</li> <li>2 Ethernet RxD +</li> <li>3 Ethernet TxD -</li> <li>4 Ethernet RxD -</li> </ul>	

For information about available sockets/connectors see:

[www.ifm.com](http://www.ifm.com) → Products → Accessories

### 6.2 External illumination

► Connect external illumination to the trigger output of the device.

Example	Art. no.
Illumination unit, transmitter red light 630 nm	O2D909

For information about the a.-m. example see:

[www.ifm.com](http://www.ifm.com) → Data sheet direct: → O2D909

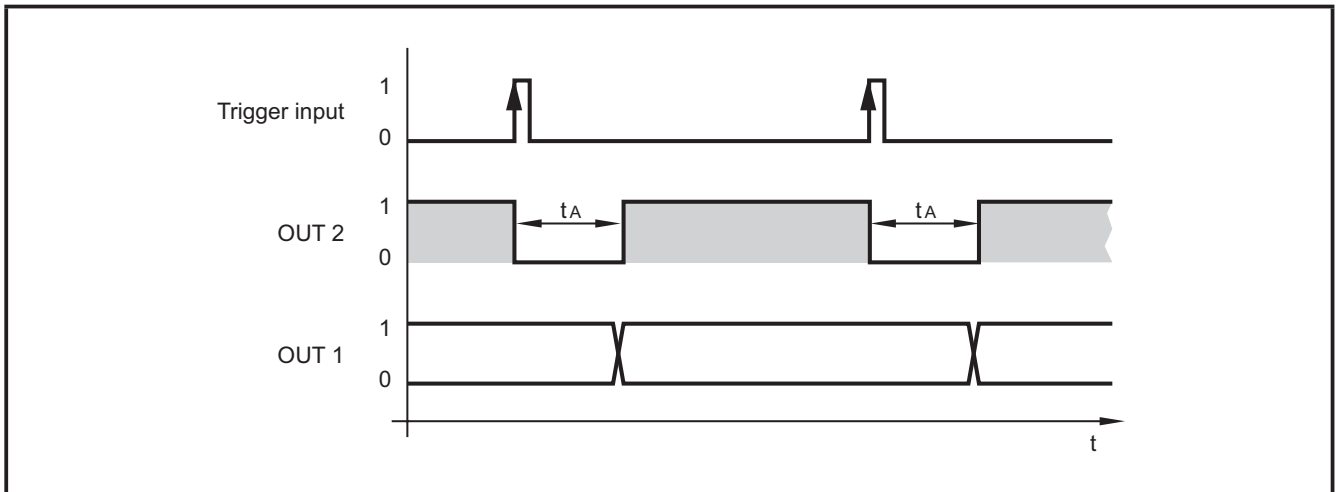
### 6.3 External trigger source

► Connect an external trigger source (e.g. a diffuse reflection sensor) to the trigger input of the device.

For information about available articles see:

[www.ifm.com](http://www.ifm.com) → Products

### 6.3.1 Timing diagram



Example: Triggering positive edge

OUT2	Switching output 2	ready signal 0: device busy 1: device ready for trigger signal
OUT1	Switching output 1	reading/verification 0: reading not successful, no verification 1: reading successful, verification

Reading / verification times  $t_A$ : 50...200 ms

The times depend for example on the image preprocessing time.

### 6.4 Process interface RS-232 (factory setting)

Bits per second: 9,600 bits/s  
 Data bits: 8  
 Parity: none  
 Stop bits: 1  
 Flow control: none

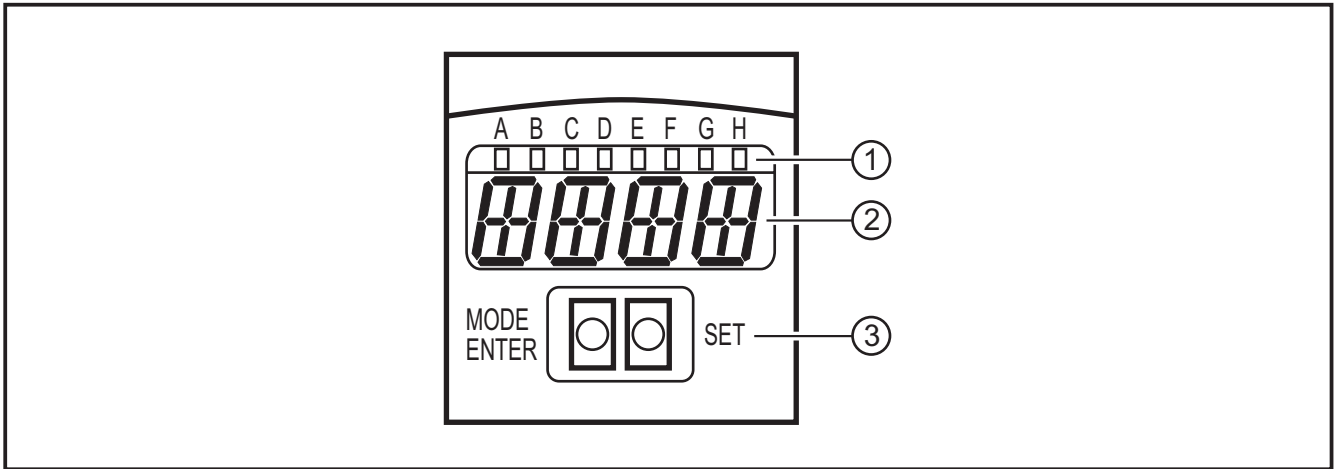
### 6.5 Process interface TCP/IP, EtherNet/IP

RS-232, TCP/IP or EtherNet/IP can be selected in the PC operating program at "Global settings" → Programming manual E2I200.

Pushbutton-controlled selection is not possible.

## 7 Operating and display elements

### 7.1 View of the unit



1. LEDs (Function display)
2. Display (Operation indication/dialogue/parameters)
3. Pushbuttons (Parameter setting)

### 7.2 LEDs

LED	Name	Colour	Status	Meaning
A	power	green	on	supply voltage applied device ready for operation
			flashing (2 Hz)	no configuration saved in the device (factory setting)
			flashing (20 Hz)	device fault
B	Eth	green	on	Ethernet connection exists
			flashing	Ethernet signal
C	Con	green	on	connected with PC operating program
D	–	–	–	not used
E	TxD	yellow	off / flashing	RS-232 TxD status
F	RxD	yellow	off / flashing	RS-232 RxD status
G	1	yellow	on	switching output 1 switched reading successful / verification complete
			flashing (20 Hz)	short circuit switching output 1
H	2	yellow	on	switching output 2 switched (ready signal) device ready for next trigger signal
			flashing (20 Hz)	short circuit switching output 2

## 7.3 Display

### 7.3.1 Operation indication

Display	Meaning
ui05	Version number of the IO controller software (1st indication after power on)
Init	Device initialisation (2nd indication after power on)
nnnn	Firmware version, e.g. 3009 (3rd indication after power on)
rEdY	Device ready for trigger (4th indication after power-on if one configuration is active with external triggering. Device waiting for triggering.)
WAIT	No active/valid configuration available Unit is busy (4th indication after power-on if no configuration is active or valid = on delivery)
nr28	Configuration number after successful reading/verification
SCAn	Indication with internal triggering until a code has been found
run	Device is waiting for the connection, no active configuration or group
LOAd	Loading a new configuration
donE	Loading a new configuration terminated (indication 1 s)
uLoc	Pushbuttons unlocked parameter values can be displayed and changed
Lok1	Pushbuttons locked parameter values cannot be displayed and changed
Lok2	Pushbuttons locked parameter values can be displayed but not changed
FWUP	Firmware update running

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### 7.3.2 Connection via operating program

Display	Meaning
OnLI	Configuration mode
Parm	Creating or modifying a configuration
Moni	Monitor mode
SerP	Service mode

### 7.3.3 Error messages

Display	Meaning
FAIL	Last reading/verification not successful

Display	Meaning
ErrT	Temperature of the device too high or too low
ErrD	Fatal device error
SC	Short circuit of a switching output
DHCP noIP	No DHCP server found. Both character strings are displayed alternately.

Parameter designations → 8.2.2 Parameter structure

## 7.4 Pushbuttons

Button	Function
MODE/ENTER	Change to the parameter setting mode Selecting the parameters Confirming the parameter values
SET	Selecting the subparameters Setting/changing/selecting the parameter values - incremental by pressing briefly - scrolling by holding pressed

## 8 Setup

Depending on the application and the code quality, the device is set up via pushbutton-controlled parameter setting or via menu-guided PC operating software.

The device stores up to 32 configurations (= parameter sets).

A configuration consists of for example the type of image preprocessing, the exposure time or the format of the process data.

The settings of the process interface (baud rate, parity ...) cover all configurations.

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### 8.1 Overview of possible parameter settings

With pushbutton-controlled parameter setting the partly predefined standard values are used (→ 8.2.3 Parameter description → tCod).

Parameter setting	Pushbutton-controlled without PC operating software	with PC operating software
Creating configurations	•	•
Administering, naming configurations	–	•
Grouping configurations	–	•
Switching laser marking on/off	•	•
Rotating/switching off display	•	–
Focusing	manual	manual
Image preprocessing	predefined	•
Code recognition	predefined	•
Process data	predefined	•
Trigger mode	predefined	•
Network settings	•	•
Selecting process interface RS-232, TCP/IP, EtherNet/IP	–	•
Querying firmware	•	•
Reset the device to factory setting	•	–

• = adjustable / – = not adjustable

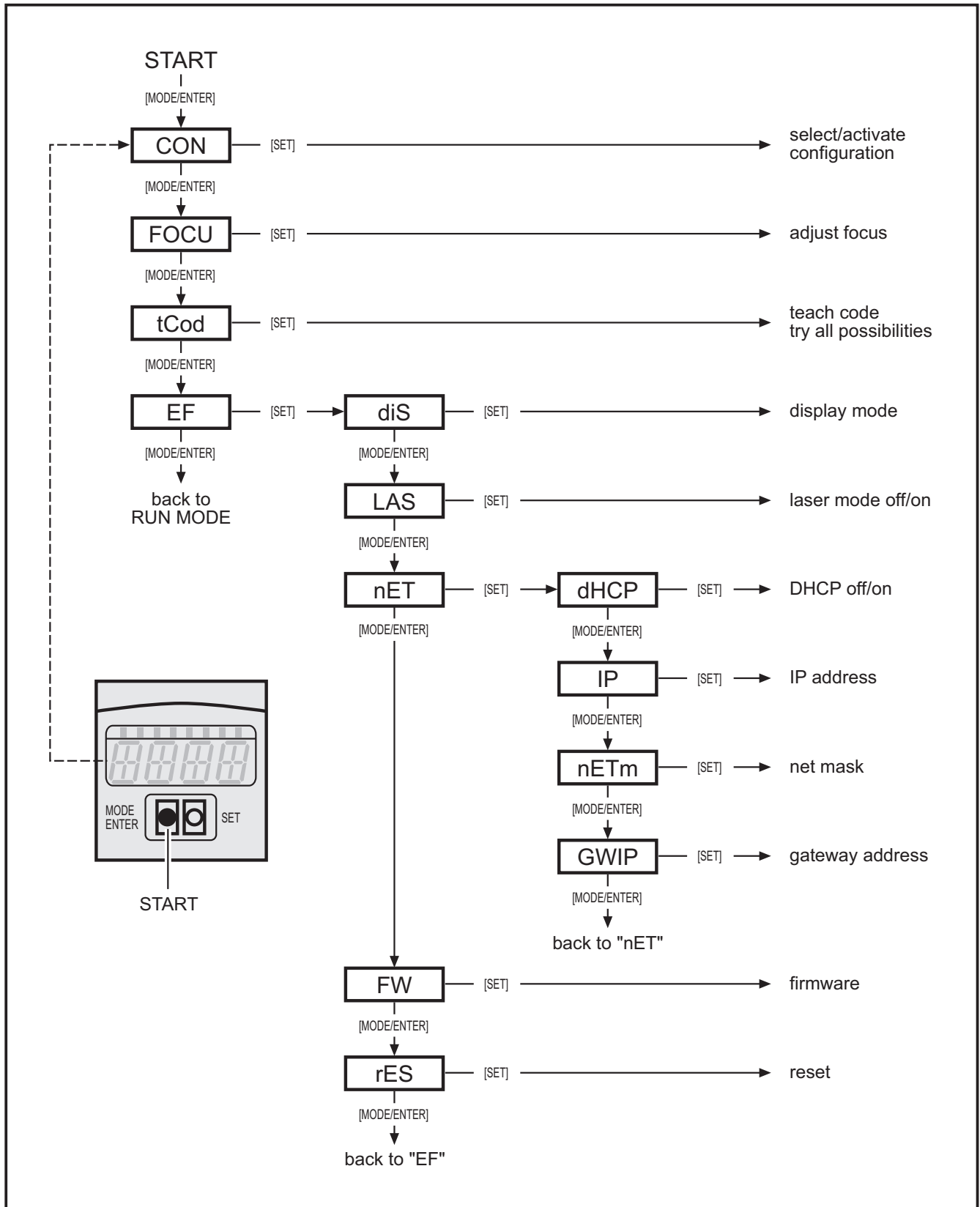
### 8.2 Parameter setting without PC operating software

The device parameters are set using the 2 buttons [MODE/ENTER] and [SET].

Basic principle:

1. Activate a parameter with [MODE/ENTER].
2. Display/set/select the parameter value with [SET].
3. Confirm the value with [MODE/ENTER].

### 8.2.1 Parameter structure



## 8.2.2 Parameter setting

### 1. Change to the parameter mode and activate parameters:

- ▶ Press [MODE/ENTER] 1 x.
- > The first parameter is displayed (CON).
- ▶ If necessary, press [MODE/ENTER] again until the requested parameter is displayed (CON, FOCU, tCod, EF).
- ▶ If necessary, activate subparameters with [SET] (e.g.: EF → diS)

### 2. Display/set/select the parameter value:

- ▶ Press [SET].
- > The current value or the current setting of the parameter is displayed.
- ▶ Press [SET] again and keep it pressed.
- > Display starts flashing (approx. 5 s)
- > Display stops flashing.
- ▶ Release [SET].
- ▶ Set/select the value with [SET] by pressing the button once or continuously by keeping the button pressed. Preset selection values are continuously passed through when the button is kept pressed (e.g.: off, on, off, on, etc.).

### 3. Confirm parameter value

- ▶ Confirm the displayed setting/selection with [MODE/ENTER].
- > Display changes to the output parameter.

If no button is pressed for 15 s, the device returns automatically to the respective output parameter (e.g. IP → nET → EF → evaluation mode). Settings that were not confirmed with [MODE/ENTER] are rejected.

## 8.2.3 Parameter description

Parameter		Description	Adjustable values: factory setting ( <u>x</u> )
CON		Configuration Creating/activating a configuration Numeric filing (0.01...0.32) <u>n</u> .nn group number (1...8) n. <u>nn</u> configuration number (1...32)	0. <u>01</u> F...0.32F
		Abbreviations: F: memory location free I: memory location used by an inactive application A: memory location used by the active application e.g. 0.14A = configuration 14, not assigned to any group, active	

Parameter		Description	Adjustable values: factory setting ( <u>x</u> )
<b>FOCU</b>		Focusing	—
		<p>Manual setting of the lens via focal setter on the back of the device.</p> <p>The optimum definition is obtained once the max. possible value is displayed.</p> <p>Note: The value displayed does not relate to the actual operating distance. It is merely an internal operand.</p>	
<b>tCod</b>		Teaching code	
	TEACH	Starting the teach process	
		<p>The configuration via teaching is made using predefined standard values:</p> <ul style="list-style-type: none"> <li>● trigger mode: once, positive edge</li> <li>● no image preprocessing with filters</li> <li>● code representation black on white, not mirrored</li> <li>● only one code is read in the image</li> <li>● internal illumination, all segments lit</li> <li>● sensor characteristics linear</li> <li>● exposure time is determined automatically</li> <li>● trigger output for illumination control</li> <li>● code search zone is full screen</li> </ul>	
		<p>Indications/response (approx. 1 s):</p> <p>1 = teach process successful (automatic change-over to parameter EF)</p> <p>0 = teach process not successful (automatic return to parameter tCod)</p>	
<b>EF</b>		Extended functions	
	diS	<p>Display mode</p> <p>Rotate display by 180° or switch off in evaluation mode.</p>	<u>norm</u> , USd, off
	LAS	<p>Laser marking (laser pointer)</p> <p>The laser marking serves as alignment aid and is parallel to the optical axis.</p> <p>It is located approx. 2 cm above the middle of the field of view.</p>	<u>off</u> , on
	nET	<p>Network</p> <p>Parameters for network operation (DHCP, IP, nETm and GWIP). These parameters are intended for setup using the PC operating software or for use in another network.</p>	

Parameter		Description	Adjustable values: factory setting (x)
	DHCP	<p>Dynamic Host Configuration Protocol</p> <p>Ensures dynamic assignment of an IP address using a DHCP server.</p> <p>With the setting "on" the device setting <b>must</b> be operated in a network with DHCP server. Otherwise it cannot be accessed via the PC operating software E2I200.</p> <p>With the setting "off" the fixed network settings (→IP, nETm, GWP) are used.</p>	<u>off, on</u>
	IP	<p>IP address</p> <p>Is used when the device does not operate in the DHCP mode.</p> <p>The input is made in the "dotted decimal notation", e.g. 192.168.000.079. The respective group is visualised by a letter in the first position of the display (A, B, C, D).</p> <p>After parameter selection the 4 groups are automatically displayed consecutively or can be activated and set with [SET].</p>	<p>Annn. Bnnn. Cnnn. Dnnn <u>192.168.000.079</u></p>
	nETm	<p>Subnet mask</p> <p>Is used when the device does not operate in the DHCP mode.</p> <p>The subnet mask must match the IP address. It is input analogically to the input of the IP address.</p>	<p>Annn. Bnnn. Cnnn. Dnnn <u>255.255.255.000</u></p>
	GWIP	<p>Gateway address</p> <p>Is used when the device does not operate in the DHCP mode.</p> <p>It is input analogically to the input of the IP address.</p>	<p>Annn. Bnnn. Cnnn. Dnnn <u>192.168.000.201</u></p>
	FW	<p>Firmware</p> <p>Query of the installed firmware version.</p>	
	rES	<p>Reset</p> <p>Reset the device to factory setting (display mode, laser marking etc.).</p> <p>Note: Stored configurations remain unchanged.</p>	

### 8.2.4 Lock/unlock pushbuttons

- ▶ Press [MODE/ENTER] and [SET] simultaneously > 10 s.
- > The current setting is displayed (e.g. uLoc = pushbuttons unlocked).  
(→ 7.3.1 Operation indication)
- ▶ Select the requested setting with [SET].
- ▶ Confirm setting with [MODE/ENTER].
- > Setting is saved.
- > Device returns to the read/verification mode.

### 8.2.5 Reset device to factory settings

- ▶ Activate the parameter "rES".
- ▶ Press [SET] > 5 s.

## 8.3 Parameter setting via PC operating software

The PC operating software is described in a separate document → Programming manual E2I200.

[www.ifm.com](http://www.ifm.com) → Data sheet direct → E2I200 → Additional data

## 9 Operation

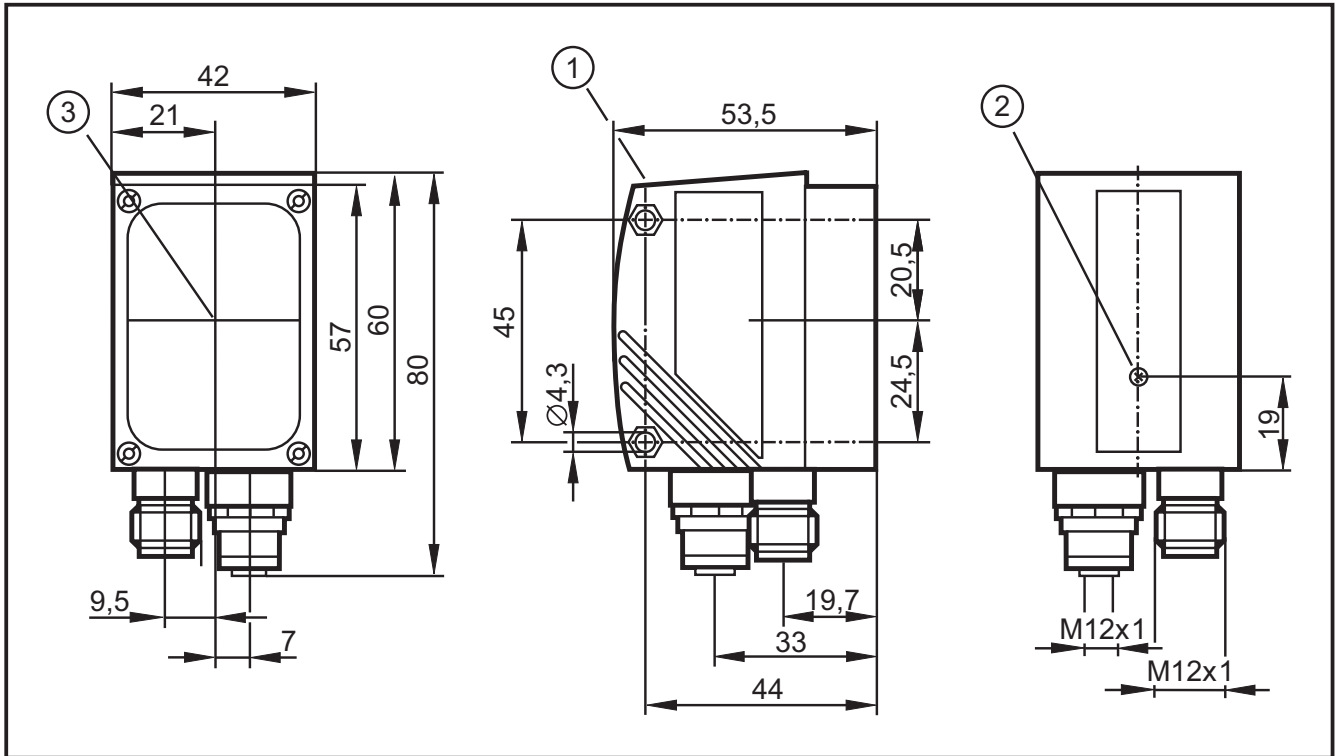
### 9.1 Read/verification mode

When the supply voltage has been applied, the unit is automatically in the evaluation mode. If an active configuration is stored on the device, it will perform a configured read/verification function and create output signals according to the set parameters.

The display indicates the current evaluation result, the yellow LEDs signal the switching status of the outputs.

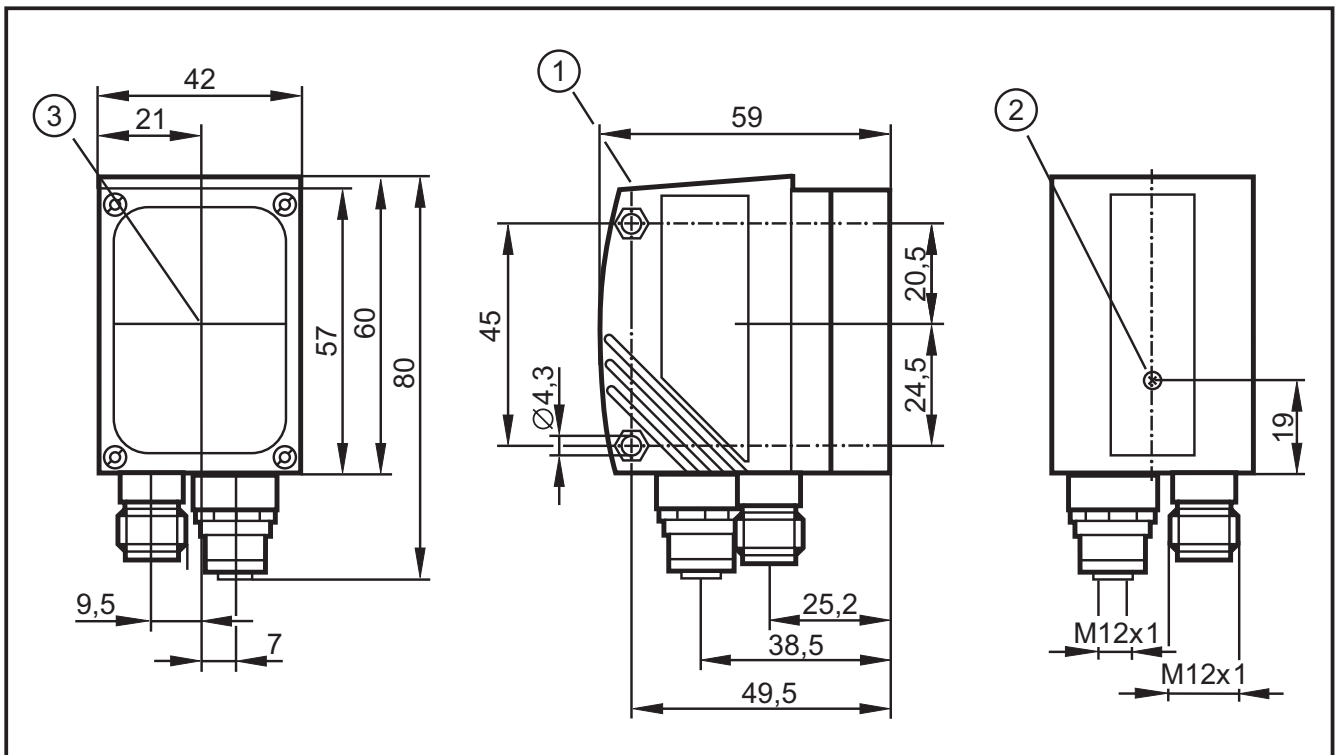
## 10 Scale drawing

### 10.1 O2I100, O2I101, O2I102, O2I103



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### 10.2 O2I104, O2I105



1. Operating and display elements
2. Focal setter
3. Middle of the optical axis

## 11 Technical data

Type of sensor		CMOS image sensor black/white VGA resolution 640 x 480						
Readable codes		ECC200, PDF-417, QR Interleaved 2-of-5, Industrial 2-of-5, Code 39, Code 128, Pharmacode, Code 93, Codabar EAN13, EAN13-Add-On 2, EAN13-Add-On 5 EAN8, EAN8-Add-On 2, EAN8-Add-On 5 UPC-A, UPC-A Add-On 2, UPC-A Add-On 5 UPC-E, UPC-E Add-On 2, UPC-E Add-On 5						
Operating distance		mm	<b>50</b>	<b>100</b>	<b>200</b>			
Field of view size	<b>O2I100</b> <b>O2I101</b>	mm	20 x 14	36 x 26	68 x 50			
Field of view size	<b>O2I102</b> <b>O2I103</b>	mm	46 x 32	77 x 56	140 x 100			
Operating distance		mm	<b>75</b>	<b>100</b>	<b>200</b>	<b>400</b>	<b>1000</b>	<b>2000</b>
Field of view size	<b>O2I104</b> <b>O2I105</b>	mm	15 x 11	20 x 14	40 x 30	80 x 60	200 x 150	400 x 300
Omnidirectional reading		yes						
Inclination to the image plane		≤ 45°						
Readings		≤ 20/s						
Motion speed		≤ 7 m/s						
Function display		3 x LED green (Power, Ethernet, PC) 4 x LED yellow (RS-232, Out1/Trigger, Out2)						
Operation indication / dialogue		4-digit 10-segment display						
Possible parameter settings		via 2 pushbuttons and 10-segment display or via PC/notebook with operating software E2I200						
Laser marking		red, laser protection class 2 to DIN EN 60825-1						
Operating voltage		24 V DC (± 10%)						
Current consumption		< 300 mA						
Current rating		100 mA (per switching output)						
Voltage drop		< 2 V						
Short-circuit protection, pulsed		yes						
Overload protection		yes						
Reverse polarity protection		yes						
Material		housing: die-cast zinc, powder coating lens window: glass LED window: polycarbonate						

Trigger (optional)		internal external (24 V PNP to IEC 61131-2, type 2) via RS-232, TCP/IP or EtherNet/IP
Number switching outputs		max. 2 (24 V PNP)
Internal illumination	<b>O2I100</b> <b>O2I102</b> <b>O2I104</b>	red light (625 nm) 4 lighting segments (individual control via PC operating program)
	<b>O2I101</b> <b>O2I103</b> <b>O2I105</b>	infrared (850 nm) 4 lighting segments (individual control via PC operating program)
Connection external illumination		24 V DC PNP
Process interfaces		RS-232: 9600...115200 bits/s Ethernet TCP/IP, EtherNet/IP: 10Base-T/100Base-TX
Parameter setting interface		Ethernet TCP/IP, UDP/IP
IP address		192.168.0.79
Subnet mask		255.255.255.0 (class C)
Gateway IP address		192.168.0.201
MAC address		see type label
Operating temperature		-10...50 °C
Storage temperature		-40...85 °C
Protection		IP 67, III
EMC		interference emission / immunity to DIN EN 61326
Mechanical tests		shocks to IEC 60068-2-27 vibration to IEC 60068-2-6

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## 11.1 Module size specifications (ECC200)

### 11.1.1 General specifications

Image size O2I10x	640 x 480 pixels
Code size in the image	max. $\frac{2}{3}$ image size ( $\approx$ approx. 430 x 320 pixels)
Module size (standard recognition)	min. 6 pixels
Module size (extended recognition)	min. 2 pixels

### 11.1.2 Module size in dependence of the operating distance

Article no.	Operating distance	50	100	200
<b>O21100</b> <b>O21101</b>	Field of view size	20 x 14	36 x 26	68 x 50
	Module size (min.) Standard recognition	0.28	0.51	0.96
	Module size (min.) Extended recognition	0.09	0.17	0.32
<b>O21102</b> <b>O21103</b>	Field of view size	46 x 32	77 x 56	140 x 100
	Module size (min.) Standard recognition	0.65	1.08	1.97
	Module size (min.) Extended recognition	0.22	0.36	0.66

Values in mm

Article no.	Operating distance	75	100	200
<b>O21104</b> <b>O21105</b>	Field of view size	15 x 11	20 x 14	40 x 30
	Module size (min.) Standard recognition	0,21	0,28	0,56
	Module size (min.) Extended recognition	0,07	0,09	0,19
	Operating distance	<b>400</b>	<b>1000</b>	<b>2000</b>
	Field of view size	80 x 60	200 x 150	400 x 300
	Module size (min.) Standard recognition	1,13	2,81	5,63
	Module size (min.) Extended recognition	0,38	0,94	1,88

Values in mm

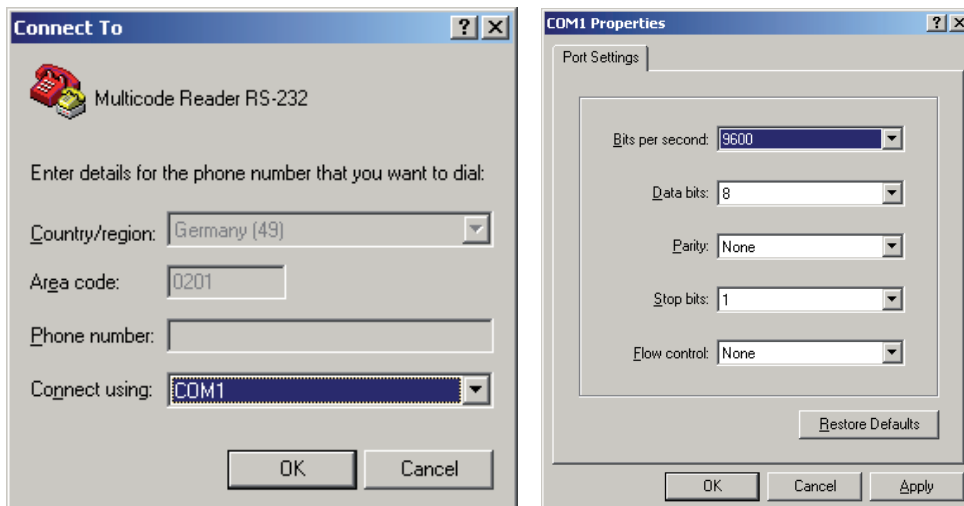
## 12 Process data protocol

The process interface ensures communication between the process PC (e.g. PLC) and the device. A command from the process PC can for example activate trigger pulses, enquire read/verification results or activate configurations/groups.

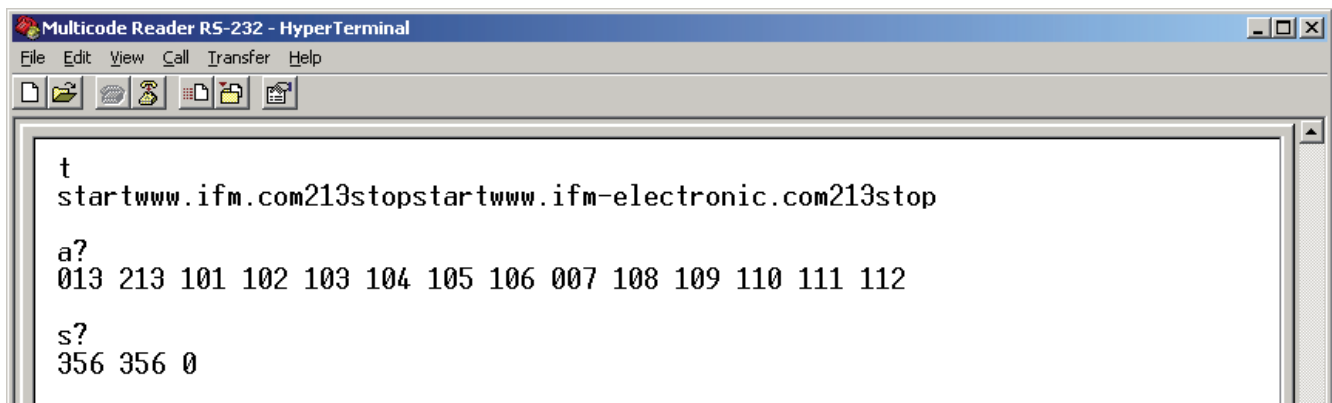
The process data can be displayed via a terminal program, below described using the example "HyperTerminal".

### 12.1 Establish the RS-232 connection

- ▶ Start HyperTerminal.  
The program can be accessed for example via: Start → All programs → Accessories → Communication → HyperTerminal.
- ▶ Enter a name and choose an icon for the connection.
- ▶ Select connection "COM" (here for example COM1).
- ▶ Apply the parameters of the device (→ 6.4 process interface RS-232).



- ▶ Click on [Apply] and close window with [OK].
- > Connection is established and the terminal window is opened.



### 12.2 Establish TCP/IP or EtherNet/IP connection

RS-232, TCP/IP or EtherNet/IP can be selected in the PC operating program at "Global settings" → Programming manual E2I200.

## 12.3 Basic communication

- 8-bit ASCII characters are allowed.
- All commands to the unit are terminated with a linefeed character (LF = ASCII 10 dec).
- All transmissions from the device are terminated with a carriage return and a linefeed character (CR + LF = ASCII 13 dec + 10 dec).
- The device ignores received carriage return characters (CR = ASCII 13 dec).
- As a reply to a valid command the device provides the character string \* CR LF (ASCII 42 dec + 13 dec + 10 dec).
- As a reply to an invalid command the device provides the character string ? CR LF (ASCII 63 dec + 13 dec + 10 dec).
- If the device is busy, it provides the character string ! CR LF (ASCII 33 dec + 13 dec + 10 dec) as a reply.
- A command to the unit has to be transmitted within 5 s. Otherwise the unit will cancel command recognition.
- A sequence of 16 consecutive cancel characters (CAN = ASCII 24 dec) reinitialises command recognition.

### 12.3.1 Prepend reply length

With activated function the device transmits a length telegram before every message. This telegram indicates how many characters the subsequent message contains (incl. linefeed and carriage return characters).

The function is available from firmware 3029 and PC operating program version 1.1.

Examples		Contents
Command	t	Release trigger
<b>Reply</b>	L000000003 !	Length of message: 3 characters Message: device busy with evaluation
Command	s?	Enquire statistics
<b>Reply</b>	L000000011 356 356 0	Length of message: 11 characters Message: total of 356 readings, 356 good readings, 0 bad readings

Default setting = function not activated

The function is activated in the PC operating program under "Global device settings" → programming manual E2I200, version 1.1.

## 12.4 Release trigger

<b>Command</b>	t
<b>Response</b>	
Successful reading	<start_string><code contents>[<quality parameters>] [<group+config>]<stop string>
Successful verification	<start_string><match string>[<quality parameters>] [<group+config>]<stop string>
Failed reading/verification	<start_string><fail string>[<group+config>]<stop string>
Device busy with evaluation	!
Another trigger source has been configured	?
<b>Note</b>	<p>&lt;start_string&gt;, &lt;code contents&gt;, &lt;fail string&gt;, &lt;match string&gt;, &lt;stop string&gt; are defined by the user during parameter setting → Programming manual E2I100.</p> <p>[&lt;quality parameters&gt;] and [&lt;group+config&gt;] are transmitted when they have been selected via the operating program.</p> <p>[&lt;group+config&gt;] is a 3-digit figure with the number of the group and configuration used.</p> <p>[&lt;quality parameters&gt;] is a string of figures of up to 8 digits with the code quality parameters to ISO/IEC 15415.</p> <p>In the event of faulty reading and active group the group number and 00 for the configuration are transmitted.</p>

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## 12.5 Permanently activate configuration / group

<b>Command</b>	a<group><number>
	<p>&lt;group&gt; is a 1-digit figure and designates the group. Group 0 designates "no group".</p> <p>&lt;number&gt; is a 2-digit figure, possibly with leading zero to designate the configuration.</p> <p>&lt;number&gt; is ignored if the group is not equal to zero.</p>
<b>Response</b>	
Configuration/group was activated	*
Device busy with evaluation	!
Group is empty or configuration not available	?
<b>Example</b>	
Activating group 3	a300
Activating configuration 12, not assigned to any group	a012
<b>Note</b>	<p>The configuration / group is permanently activated, i.e. it is automatically active after the next power-on.</p> <p>By activating a configuration/group this configuration/group is selected automatically.</p>

## 12.6 Activate configuration/group

<b>Command</b>	c<group><number>
	<p>&lt;group&gt; is a 1-digit figure and designates the group. Group 0 designates "no group".</p> <p>&lt;number&gt; is a 2-digit figure, possibly with leading zero to designate the configuration.</p> <p>&lt;number&gt; is ignored if the group is not equal to zero.</p>
<b>Response</b>	
Configuration/group was activated	*
Device busy with evaluation	!
Group is empty or configuration not available	?
<b>Example</b>	
Activating group 3	c300
Activating configuration 12, not assigned to any group	c012
<b>Note</b>	<p>The configuration / group is not permanently activated, i.e. it is not automatically active after the next power-on.</p> <p>By activating a configuration/group this configuration/group is selected automatically.</p>

## 12.7 Enquire configuration/group

<b>Command</b>	a?
<b>Response</b>	
List of all configurations	<number> <G><NN> <G><NN> <G><NN> ...
	<p>&lt;number&gt; is a 3-digit number and designates the number of configurations.</p> <p>&lt;G&gt; designates the group</p> <p>&lt;NN&gt; designates the configuration number.</p> <p>At first the number of the active configuration is output.</p> <p>The 3-digit numbers are separated by a blank.</p>
Device busy with evaluation	!

## 12.8 Set reference code

<b>Command</b>	r<number><refcode>
	<number> is a 3-digit number, possibly with leading zeros to designate the code length.
<b>Response</b>	
Reference code has been set	*
Device busy with evaluation	!
Error in the command (e.g. length 0)	?
<b>Example</b>	
Set reference code with 13 characters (e.g. 4711081547110)	r0134711081547110
<b>Note</b>	Setting the reference code only has an effect if the unit is in the verifier mode. The submitted reference code is not stored permanently.

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## 12.9 Enquire statistics

<b>Command</b>	s?
<b>Response</b>	
Total number of readings (number <sub>1</sub> ) Number of good readings (number <sub>2</sub> ) Number of bad readings (number <sub>3</sub> )	<number <sub>1</sub> > <number <sub>2</sub> > <number <sub>3</sub> >
	The max. 10-digit numbers are separated by a blank.
Device busy with evaluation	!

## 13 Maintenance, repair and disposal

- ▶ Keep the lens window free from soiling.  
Soiling may considerably affect the reading result!
- ▶ To clean the lens window, do not use any detergents or solvents which might damage the front glass.
- ▶ Do not open the housing, as the device does not contain any components which must be maintained by the user. The device must only be repaired by the manufacturer.
- ▶ Dispose of the device in accordance with the national environmental regulations.

## 14 Approvals/standards

Test standards and regulations → 11 Technical data.

The CE Declaration of Conformity is available at:

[www.ifm.com](http://www.ifm.com) → Data sheet direct: → e.g. O2I102 → Approvals