

# ExCam<sup>®</sup> XI410

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## User Manual



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## History of revisions

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# 1 Introduction

The ExCam XI410 is a powerful thermographic camera with an integrated infrared thermometer and motor focus for use in potentially explosive areas. It delivers excellent infrared images (384x240p) of objects in a temperature range from -20°C to 900°C. In addition, the thermal imaging camera has extensive analysis functions (e.g. thermal analysis with hot and cold spots). The ExCam XI410 cannot only see where it is hot, it can also measure the temperature exactly. When designing the ExCam XI410, our main focus was on safety, mechanical precision and high quality of stainless steel.

Like all cameras of the ExCam series, it is certified according to European regulations (ATEX) as well as international ones (IECEX). The explosion-protected housing is approved for the ATEX group II for zones 1, 2, 21 and 22 including the explosion groups IIC / IIIC. For more information please visit our website at [www.samcon.eu/en](http://www.samcon.eu/en)

## 2 Technical data

### 2.1 Explosion protection

Identification marks

acc. to Directive 2014/34/EU:

 II 2G (zone 1 and 2)

 II 2D (zone 21 and 22)

Explosion protection (gas):

Ex db IIC T6 Gb

Explosion protection (dust):

Ex tb IIIC T80°C Db

Protection class camera:

IP66/68 (IEC /EN 60529)

Protection class terminal box:

IP66 (IEC /EN 60529)

Transport/storage temperature:

-40°C...+70°C

Ambient temperature (EX):

-10°C...+50°C

Named testing laboratory:

TÜV Rheinland (number 0035)

EU type approval certificate:

TÜV 18 ATEX 8218X (2021)

IECEX Certificate of Conformity:

TUR 18.0023X (2021)

Other certificates see:

<https://www.samcon.eu/en/products/network/excam-xi410/>



**Attention!**

**The instructions stated on the type plates have to be observed!**

## 2.2 Illustration of the model key

1) Ex product- name	2) Type	3) Housing- combination	4) Temp.- range	5) Cable length [m]	6) Cable termin.	7) Optic
ExCam XI410	T08-	VA0.4.K1.GER-	N.N-	005.N-	P-	018/029/ 053/080
	T08-	VA0.4.K1.GER-	N.N-	005.N-	T-	018/029/ 053/080

Table 2-1 Model key

### Explanations:

- 1) **ExCam XI410 =** Functional camera description of the ExCam Series (technical data/  
specification of the individual camera module)
- 2) **T08 =** SAMCON Production- Type 08
- 3) **VA0.4.K1.GER =** T07 ex d housing (stainless steel 1.4404) with small diameter  
 $\varnothing_{VA0}=48\text{mm}$   
**VA0.4.K1.GER =** T07 VA0.4 housing with maximum body length ( $L_R = 171.2\text{mm}$ )  
**VA0.4.K1.GER =** K1 cable gland flange  
**VA0.4.K1.GER =** Germanium sight glass, suitable for thermographic applications (MIR/ FIR)
- 4) **N.N =** Normal ambient temperature range ( $T_{amb} > -10^\circ\text{C}$ )  
**N.N=** No high temperature battery installed ( $T_{amb} < +50^\circ\text{C}$ )
- 5) **005.N =** Length of the connection line in meter at delivery; 5m is the  
standard cable length, max. cable length is: 005...100 [m]  
**005.N =** Non armoured cable
- 6) **P =** Plug- termination (standard)  
CAT6, RJ-45 plug, AWG 26-22,  
**TD =** Terminal Box Ex-e termination (optional)
- 7) **0XX =** Different optics available:  
18°, 29°, 53° and 80°

## 2.3 Electrical parameters of the camera

### Power supply of the camera:

Voltage supply:	24 V DC
Reference voltage:	10 - 30 V DC
Maximum power consumption:	2.5 W
Typical power consumption:	< 2.0 W

## 2.4 System cable SKDP03-T

Outside diameter:	12.40 ± 0.3 mm
Bending radius:	8 x D <sub>a</sub> when installed and 4 x D <sub>a</sub> after relocation
Data line:	4 x 2 x AWG23/1 CAT.6
Performance elements:	3G1.5 (BK-BU-GN/YE)
Properties:	PUR halogen-free, flame-retardant, UV-resistant, chemical resistance, shielded

Quick link:

[https://www.samcon.eu/fileadmin/documents/en/60-Assembling%26mounting/SKDP03-T\\_Datasheet.pdf](https://www.samcon.eu/fileadmin/documents/en/60-Assembling%26mounting/SKDP03-T_Datasheet.pdf)

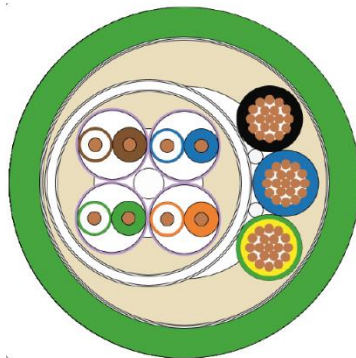


Figure 2-3 Sectional view of SKDP03-T

## 2.5 Optical specifications

A selection of lenses offers the possibility to precisely measure objects in different distances; we offer lenses for close, standard and large distances. Please note that the ExCam XI410 has a fixed optic. A change of optics is not possible. The following table shows a relationship between the measurement object distance and the pixel size on the object level.

HFOV: Horizontal field of view

VFOV: Vertikal field of view

DFOV: Diagonal field of view

IFOV: Instantaneous field of view (size of the single pixel on object level)

### 53°-optic

		Distance to measurement object [m]											
		0,05	0,1	0,2	0,3	0,5	1	2	4	6	10	30	100
Enlargement of total measuring field at object level [m]	HFOV		0,100	0,200	0,300	0,490	0,990	2,000	4,000	5,900	9,900	29,700	98,900
	VFOV		0,057	0,110	0,170	0,280	0,550	1,100	2,200	3,300	5,500	16,500	54,900
	DFOV		0,115	0,230	0,340	0,570	1,130	2,300	4,500	6,800	11,300	33,900	113,100
Size of the single pixel [mm]	IFOV		0,300	0,500	0,800	1,300	2,600	5,100	10,300	15,500	25,800	77,200	257,400

### 18°-optic

		Distance to measurement object [m]											
		0,05	0,1	0,2	0,3	0,5	1	2	4	6	10	30	100
Enlargement of total measuring field at object level [m]	HFOV			0,069	0,102	0,170	0,330	0,660	1,310	2,000	3,300	9,800	32,600
	VFOV			0,043	0,064	0,100	0,210	0,410	0,820	1,200	2,100	6,100	20,500
	DFOV			0,081	0,120	0,200	0,390	0,780	1,550	2,300	3,900	11,500	38,500
Size of single pixel [mm]	IFOV			0,200	0,300	0,400	0,900	1,700	3,400	5,100	8,500	25,500	84,800

### 29°-optic

		Distance to measurement object [m]											
		0,05	0,1	0,2	0,3	0,5	1	2	4	6	10	30	100
Enlargement of total measuring field at object level [m]	HFOV		0,059	0,112	0,170	0,270	0,530	1,070	2,100	3,200	5,300	15,900	52,900
	VFOV		0,036	0,068	0,100	0,160	0,320	0,640	1,300	1,900	3,200	9,500	31,700
	DFOV		0,069	0,131	0,190	0,320	0,620	1,240	2,500	3,700	6,200	18,500	61,600
Size of single pixel [mm]	IFOV		2,000	0,300	0,400	0,700	1,400	2,800	5,500	8,300	13,800	41,300	137,700

### 80°-optic

		Distance to measurement object [m]											
		0,05	0,1	0,2	0,3	0,5	1	2	4	6	10	30	100
Enlargement of total measuring field at object level [m]	HFOV	0,084	0,160	0,320	0,480	0,810	1,600	3,300	6,500	9,800	16,600	49,900	166,400
	VFOV	0,044	0,080	0,170	0,250	0,410	0,800	1,600	3,200	4,800	8,000	24,100	80,400
	DFOV	0,095	0,180	0,360	0,540	0,910	1,800	3,600	7,300	10,900	18,500	55,400	184,800
Size of single pixel [mm]	IFOV	0,200	0,400	0,800	1,300	2,100	4,200	8,500	16,900	25,500	43,400	130,000	433,200

Table 2-2 Measurement field and pixel size

For distances smaller than the minimum measuring distance (0.35m@18°/29°; 0.25m@53°; 0.2m@80°), the measuring accuracy can be outside the specification.

As an alternative to the table, you can use the Optris GmbH [optical calculator](https://www.optris.de/optikkalkulator-fuer-waermebildkamas):



Or the free optris Optikkalkulator App:  
[Optris calculator – Apps bei Google Play](#)



## 2.6 Video-technical characteristics

We use the Optris Xi410 Spot-finder IR-Camera in a pressure-resistant enclosure. For details, please refer to the Product Documentation, video-technical data of optris®:

<https://www.optris.com/xi-410>



## 2.7 Other technical data

	<b>Camera</b>	<b>Terminal box</b>
Permissible ambient temperature	-10°C ... +50°C	-60°C ... +55°C
Protection class as per EN 60529/IEC 529	IP66/68 (Test conditions: 0.5h/8m water column 5°C)	IP66
Housing material	Stainless steel, mat. no. 1.4404	Polyester resin
Weight	About 0.93 kg	1 kg
Dimensions	D48mm x 171.2mm	145mmx145mmx71mm

Table 2-3 Other technical data



### 3 Safety Instructions

Please absolutely observe the installation instruction's safety directions of the T08 ExCam series!



Quick link:

<https://www.samcon.eu/fileadmin/documents/en/22-Ex-Network-Cameras/ExCam-Series-T08-EX-Installation-Manual-2020.pdf>

It is absolutely mandatory to adhere to the national safety regulations and regulations for prevention of accidents, as well as to the safety instructions given below in this User Manual!



**Attention!**

Cameras of type T08 ExCam are not suitable for use in zones 0 and 20. The ambient temperature, temperature class and explosion group written on the enclosure nameplate must be absolutely adhered to! The customer is not allowed to make any alterations of the camera! The camera must be operated in a proper and sound condition and only in the way intended.



**Attention!**

Repairs may only be carried out by using original parts from the manufacturer. Repairs which affect the explosion protection may only be carried out in accordance with the nationally applied regulations and exclusively by the manufacturer.



**Attention!**

The alignment of the camera to intensive energy sources (e.g. devices which emit laser radiation or reflections of such equipment) can cause an irreparable defect of the infrared detector. This is also valid if the camera is switched off.



**Attention!**

Devices of type T08-VA0.x.K1.GER may not be used in mining/ firedamp hazard (ATEX group 1) or in areas with high risk of mechanical stress (ATEX group 2).



**Attention!**

Prior to installation, take external sources of heat or cold into account! The temperature ranges prescribed for storage, transport and operating must be adhered to!



**Attention!**

**Adhere to the warnings given on the nameplate:**

**“WARNING – DO NOT OPEN IN HAZARD AREAS“**



**Using the camera in explosion-protected areas with regard to temperature and dust layers is defined in the respective national regulations.**



**When installing the ExCam, adhere to the requirements of the EN/IEC 60079-14.**

## 4 Installation

For commissioning and operating the camera, the relevant national regulations, as well as the generally accepted rules of technology shall prevail. Before mounting the camera, thoroughly check it for any transport damage regarding the housing and cable. Installation, electrical connection and the first commissioning must only be carried out by qualified specialists.

### Work preparation:



**Attention!**

**Prepare your work carefully and in accordance with the relevant regulations.**



**Attention!**

**Depending on classification of hazard areas, it is imperative to obtain a work approval first!**

**When you open the pressure-resistant enclosure under voltage, it is absolutely necessary to prevent potentially explosive atmosphere!**

To ensure the best image quality delivered by the network camera, plan the installation site carefully (consider object distance or size, angle and minimum object distance to the focus).

- Use appropriate tools and aids.
- When working, ensure a safe stand.
- Make sure that any static charge is avoided.



**Attention!**

**Please observe the national security, installation and accident prevention regulations (e.g. DIN EN 60079-14) and the safety instructions in this User Manual, as well as the ones in the Installation Guidelines!**



**Attention!**

**Adhere to the provisions of the IECEx, ATEX and EX installation instructions for mounting and starting up!**

The ExCam® XI410 consists of a flame-proof camera housing (T08 Ex-d) and an ex-e terminal box (VA0.4-...-T) or a Plug (VA0.4-...-P). The camera is equipped with a system-cable (5 to 100 m). Mount the camera according to the desired field of view. Install the terminal box so that a good accessibility is given, in order to facilitate the electrical connection.

Drawings for drill hole patterns and further information can be viewed on our product page:

Quick link:

<https://www.samcon.eu/en/products/network/excam-xi410/>



### Optional mounting accessories

<p>Wall bracket WMB-...</p>		<p><b>WALL MOUNT BRACKET WMB-VA0.x/VA1.x</b>          Wall bracket for devices of T08-VA0-series          Suitable for hanging the camera on walls.          Material: stainless steel 1.4404          Weight: 0.68 kg          Dimensions: 80 x 100 x 205 mm</p>
<p>Pole adapter PMB-...</p>		<p><b>POLE MOUNT EXCAM VA1.x (-)</b>          Pole adapter for VA wall mount          Material: stainless steel 1.4404          Suitable for pole diameters          between 50 and 105 mm          Load-bearing capacity: 45 kg          Dimensions: 120x180x130 at masts of Ø 60 mm)</p>
<p>Hinge attachment SCH-...</p>		<p><b>Hinge attachment SCH-VAx.x</b>          Hinge attachment for easy mounting on round          sight glasses acc. to DIN 28120/28121 or similar          for VA          Material: stainless steel AISI 316L/1.4404          Weight: ca. 0.04 kg          Dimensions WxHxD [mm]: 29.2x40x73.1</p>

Table 4-1 Mounting accessories

## 5 Electrical connection



### Attention!

The electrical connection of the equipment may only be carried out by qualified and skilled personnel!



### Attention!

It is absolutely necessary to ground the ExCam® series' housing via the PA connection.



### Attention!

Please observe the national security, installation and accident prevention regulations (e.g. DIN EN 60079-14) and the safety instructions in this User Manual, as well as the ones in the Installation Guidelines!

The delivered ExCam® XI410 is equipped with an electrical connection cable of the type SKDP03-T. The maximum transmission range from the camera to the next active network interface is 100 m and can be specified by the client. The user is NOT authorised to carry out any electrical connection work inside the pressure-resistant enclosure (T08).

### 5.1 Potential equalization

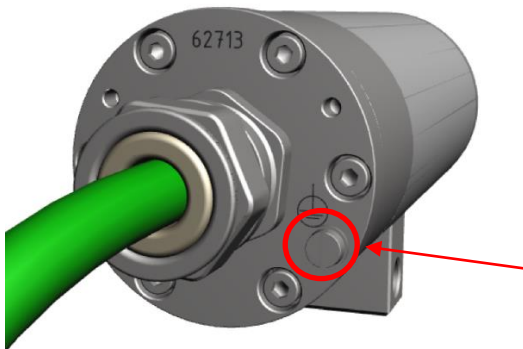


Figure 5-1 ExCam XI410 Potential equalization

Potential equalization/grounding of the camera housing is absolutely necessary, in order to avoid static charges and thus the formation of sparks. For this purpose, a screw terminal is provided at the rear side's bottom (see Figure 5-1). The cross-section of the potential equalization has to comply with the National Ground Rules (at least 4mm<sup>2</sup>).

Wiring table:

Potential	Colour (IEC 60757)	Cross-section	Comment
PA	GN/YE	4 mm <sup>2</sup> (rigid)	Terminal: Slotted screw M3x0.5x5 (DIN 84) with washer Ø3,2mm (DIN 125A), Keep 1.2 Nm tightening torque!

Table 5-1 Potential equalization

## 5.2 Variants of cable termination

Figures 5.2 and 5.3 illustrate the cable termination of the ExCam XI410.

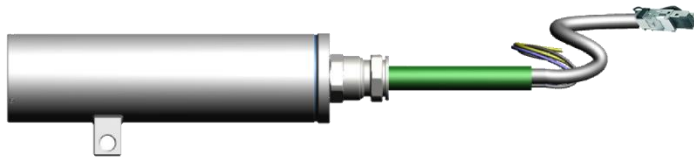


Figure 5-2 ExCam XI410 T08-VA0.4.K1.GER-N.N-xxx.N-P

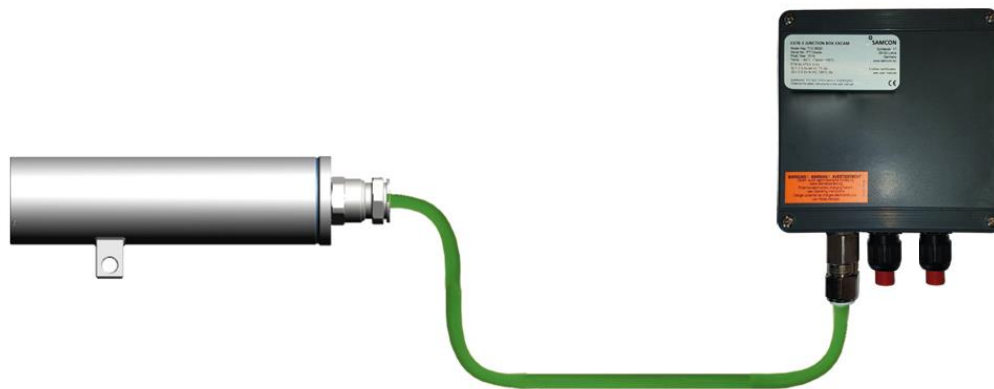


Figure 5-3 ExCam XI410 T08-VA0.4.K1.GER-N.N-xxx.N-I

## 5.3 Connection work at the device (terminal box)



**Attention!**  
**Never open the Ex-e terminal box under voltage!**



**Attention!**  
**Adhere to the international installation regulations for connection chambers with increased safety (Ex-e).**



**Attention!**  
**Adhere to attached separate User Manual for the Ex-e terminal box.**

### Video Tutorial:

Observe our video tutorial:

“SAMCON 01 Wiring the cable SKDP03-T to the junction box ExTB-3”  
<https://go.samcon.eu/v01>





Figure 5-4 Video Tutorial ExTB-3

The pin assignment of the SKDP03-T is executed in accordance with the standard EIA/TIA-568B for 24VDC, as follows:

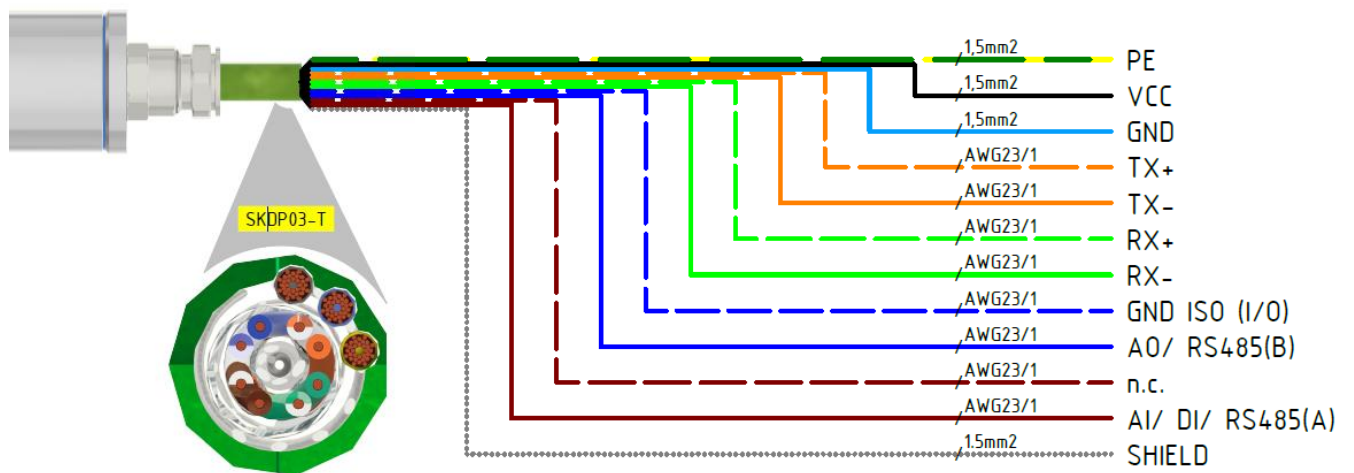


Figure 5-5 Pin assignment of the cable SKDP03-T

Camera (Ex-d) (T568B)	Colour SKDP03-T (IEC60757)	Terminal ExTB-3	Cross-sectional surface	Comment
SHIELD		PE	1.5 mm <sup>2</sup>	Shield
Tx+	WH / OG	1	0.26 mm <sup>2</sup>	Solid conductor
Tx-	OG	2	0.26 mm <sup>2</sup>	Solid conductor
Rx+	WH / GN	3	0.26 mm <sup>2</sup>	Solid conductor
Rx-	GN	4	0.26 mm <sup>2</sup>	Solid conductor
(GND ISO)	WH / BU	5	0.26 mm <sup>2</sup>	Solid conductor
(AO / RS485 B)	BU	6	0.26 mm <sup>2</sup>	Solid conductor
(AI/DI/RS485 A)	BN	7	0.26 mm <sup>2</sup>	Solid conductor
(n.c.)	WH / BN	8	0.26 mm <sup>2</sup>	Solid conductor
(n.c.)		PE		
VCC	BK	9	1.5 mm <sup>2</sup>	24VDC
GND	BU	10	1.5 mm <sup>2</sup>	0VDC
PE/PA	YE / GN	PE	1.5 mm <sup>2</sup>	PE

Table 5-2 Wire assignment of terminal box ExTB-3(SKDP03-T)

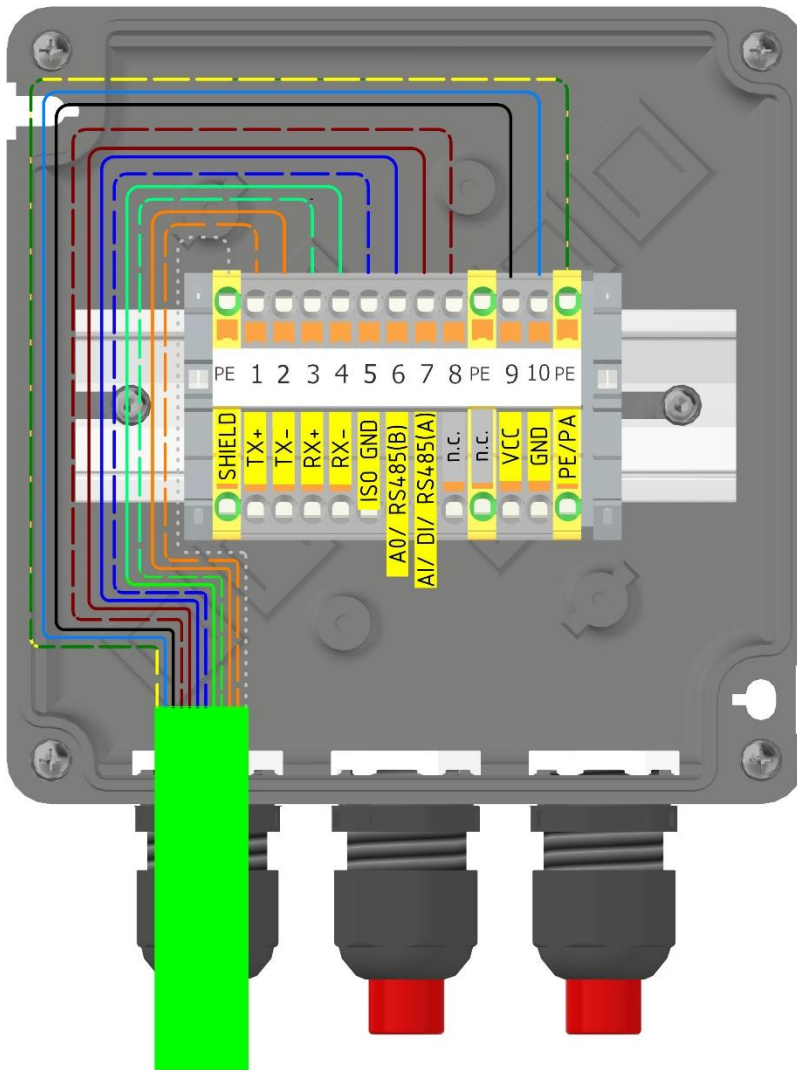


Figure 5-6 Wired terminal box ExTB-3

Particularly in EMC critical environments, it is necessary to make sure that the cable shield is grounded on side of the terminal block! The maximum cable length is 100 m.



**Attention!**  
 Finally, check your network installation.



**Attention!**  
 Cables and wires must comply with the requirements of the IEC 60079-0/1/7 & 14.



**Attention!**  
 The supply line must have a sufficient cross-section. The cable protection must comply with national and international regulations.



Example: Direct routing from ExTB-3 to safe area

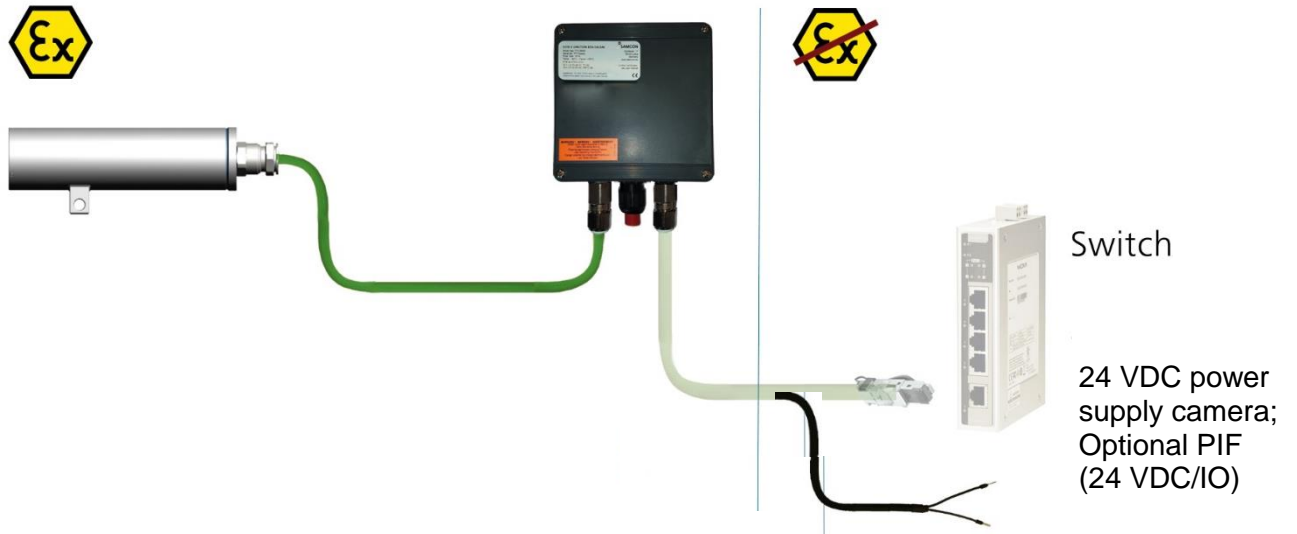


Figure 5-7 ExTB-3 -> Safe area

#### 5.4 Plug-assignment (RJ45)

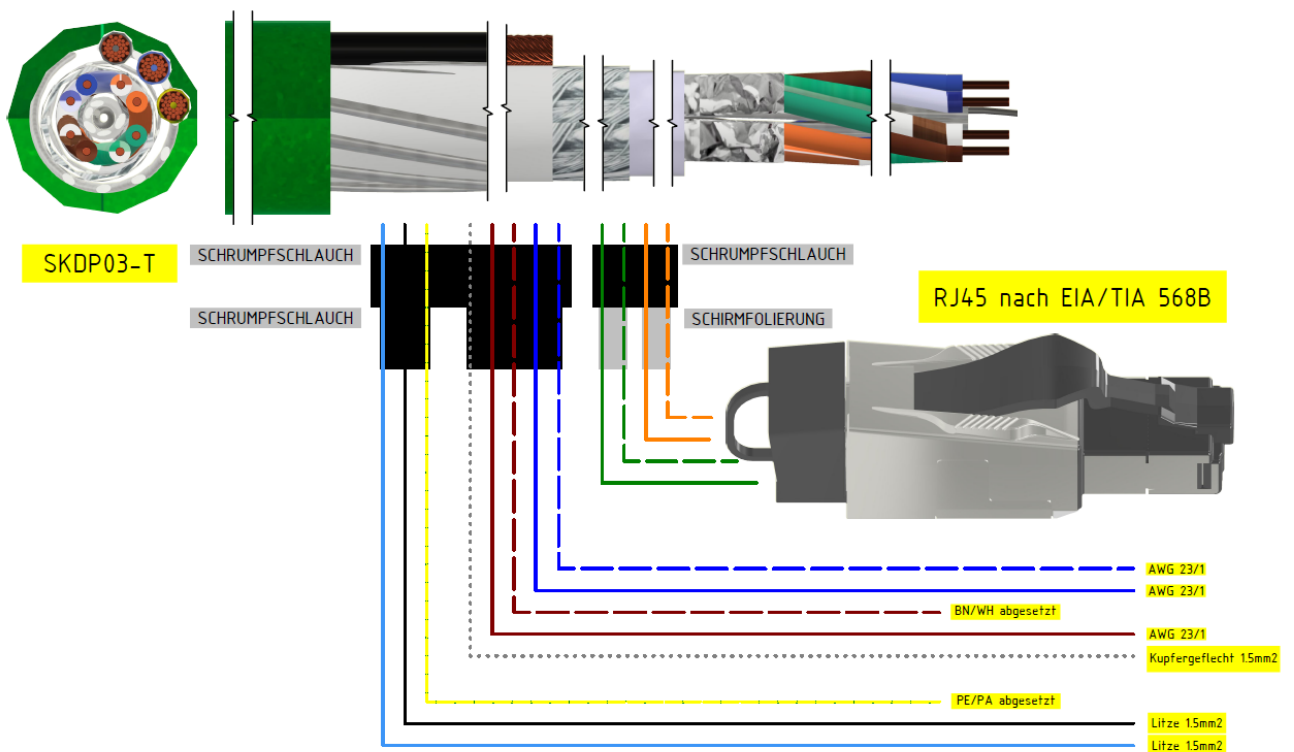


Figure 5-8 Plug assignment RJ45

If the cable termination uses a plug, the latter should be plugged into the RJ45 slot of the network device (PSE). Prior to connecting it to the camera, the network device (PSE) can

already be supplied with power, hence there is no „power ON“ priority which has to be observed.



**Attention!**

**Use appropriate RJ45 plugs! Check the cable shielding, cross-section and the outside diameter!**



**Attention!**

**It is imperative to ensure a correct routing of the individual wires according to the EIA/TIA-568B"**

Detailed instructions on how to connect an RJ45 plug are available in our video tutorial: "SAMCON 03 Mounting and installing the RJ45 jack to SAMCON cables" <https://go.samcon.eu/v03>



Figure 5-9 Plug assignment, RJ45

## 5.5 Appropriate cables & cable entries

An integral part of the device safety is the correct selection of the cables, wires and cable entries.



**Attention!**  
**Cables and wires must comply with the requirements of the IEC 60079-0/1/7 & 14.**



**Attention!**  
**The supply line must have a sufficient cross-section. The cable protection must comply with national and international regulations.**

For non-binding configuration and planning guidelines, please visit our website:



Perhaps our video will help you: "Cables for flameproof devices in potentially explosive atmospheres"

<http://go.samcon.eu/video-cable-ex>



Figure 5-10 Ex-d cable selection

## 5.6 Fusing

The power supply fusing depends on the cable cross-section and length. 300 mA mT- fuse is recommended.



**Attention!**  
 Please pay attention to the national and international regulations regarding selectivity and line protection.

## 5.7 Tests prior to switching on voltage



### Attention!

Prior to starting the device, perform all tests as indicated by the national regulations. Furthermore, check the correct function and installation of the device in accordance with this User Manual and other applicable regulations.



### Attention!

Incorrect installation or operation of the camera may lead to a loss of warranty!



### Attention!

Do not switch on the camera at temperatures below 0°C!

## 5.8 Optional accessory: Industrial Process Interface (PIF)

An industrial process interface with 500 VACeff insulation voltage between ExCam XI and process is available for permanent monitoring of hardware and software during operation. The PIF is equipped with self-monitoring (fail-safe mode) so that states such as interruptions in the cable connection, termination of the software, etc. can be recorded and output as an alarm. The fail-safe time constant is 1.5 seconds. The PIF is not explosion-proof and may therefore only be used in safe areas.

### 5.8.1 Process Interface of the camera

ExCam XI 80/410 offers the following direct In- and Outputs:

Name	Description	Max. range / status
AI or DI	Analog Input	0 - 10 V <sup>1)</sup>
	Digital Input (Low-aktive = 0 ... 0.6 V)	24 V
AO	Analog Output	0/4 – 20 mA
	Alarm Output	0/4 – 20 mA

<sup>1)</sup> the AI is designed for max. 24 V, voltage level above 10 V is not interpreted

In addition the above direct in- and outputs the ExCam XI80/410 has a RS485- interface. This interface can be used to control the external, industrial PIF. When using the RS485 interfacethe direct out- and inputs are not available.

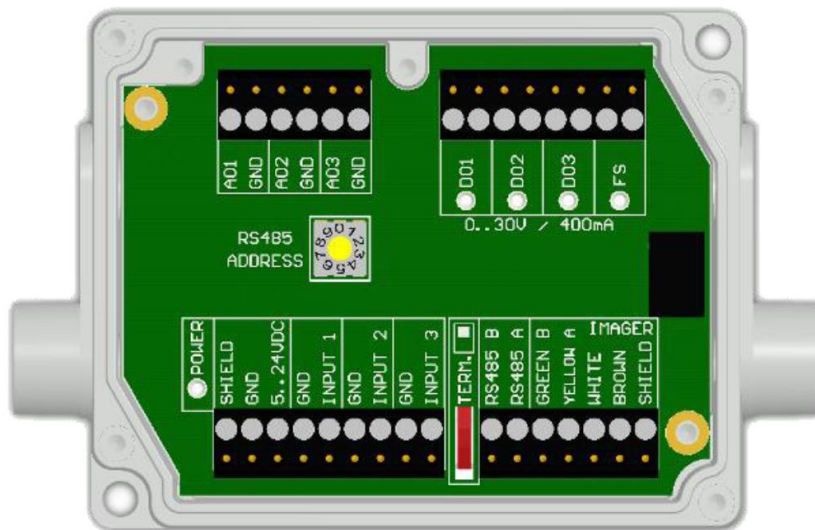
If the process interface of the camera is directly connected to external hardware (without using the supplied PIF cable) an activation of the field „Support proprietary PIF cable“ in the menu Tools/ Configuration/ Device (PIF) in the PIX Connect Software is necessary.

Support proprietary PIF cable



Consider that the input of the PIF is not protected if there is a direct PIF connection! A voltage > 3 V on the INT-pin will destroy the device!

### 5.8.2 Pin assignment Industrial Process Interface (PIF)



GN	RS485 B
YE	RS485 A
WH	12 V
BN	GND
SHIELD	GND

Figure 5-11 PIF connections

### 5.8.3 Programmable functions PIF

Analog Input (AI)	Emissivity, ambient temperature, reference temperature, un-committed value, flag control, triggered recording, triggered snapshots, triggered line-scanner, triggered event grabber, reset peak-/valley-hold, switch temperature range
Analog Output (AO)	Main measure area, measure area, internal temperature, flag status, recording status, line scan status, alarm, frame sync, fail-safe, external communication, autonomous status
Digital Output (DO)	Flag status, recording status, line scan status, alarm, frame sync, fail-safe, external communication, autonomous status

## 5.8.4 In- and outputs

Name	Description	Max. range <sup>1)</sup> / status
INPUT 1/2/3	Analog- or digital input	0 - 10 V <sup>2)</sup>
AO 1/2/3	Analog output 1, 2 and 3 Alarm output 1,2 and 3	0 – 10 V 0/4 – 20 mA
DO 1/2/3	Relay output 1,2 and 3 Alarm output	open/closed (red LED on)/ 0...30 V, 400 mA 0/4 – 20 mA
FS	Fail-safe relay	open/closed (green LED on)/ 0...30 V, 400 mA

1) depending on supply voltage; for 0-10 V on the AO the PIF has to be powered with min. 12 V.

2) the AI is designed for max. 24 V, the voltage level above 10 V is not interpreted

## 5.8.5 Extension up to 9 outputs

The industrial PIF has a maximum of 3 analog outputs. To use up to 9 analog or alarm outputs maximum 3 PIFs can be connected. Each stackable industrial PIF must have its own RS485 address. The address must be set directly on the board. For the PIF which is the furthest away the 120R switch (TERM. –Termination) has to be set.

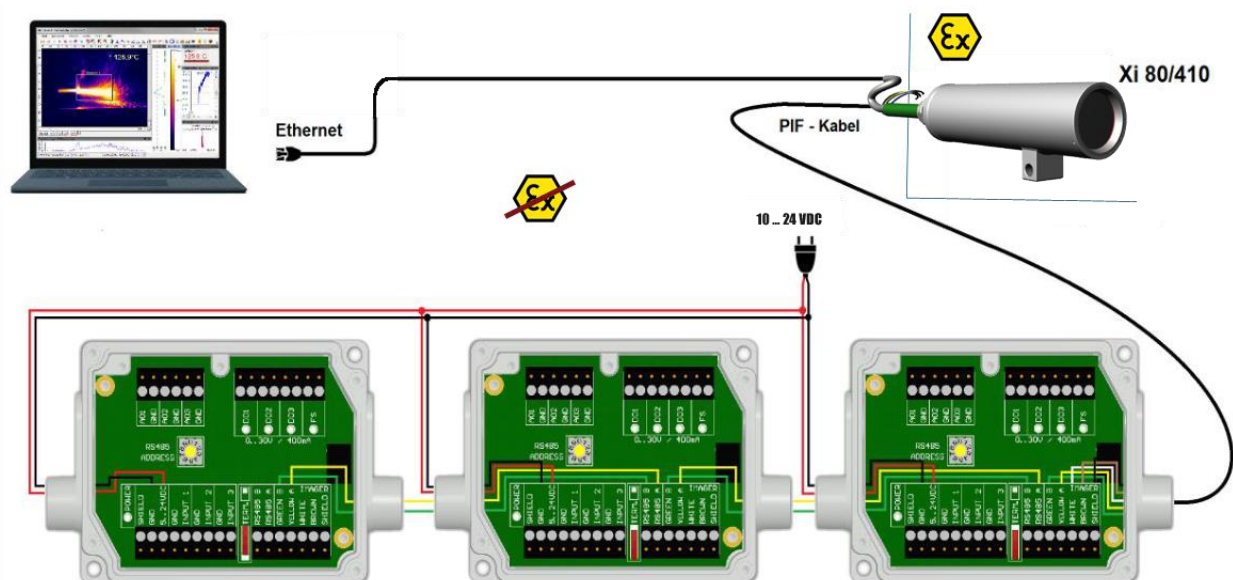
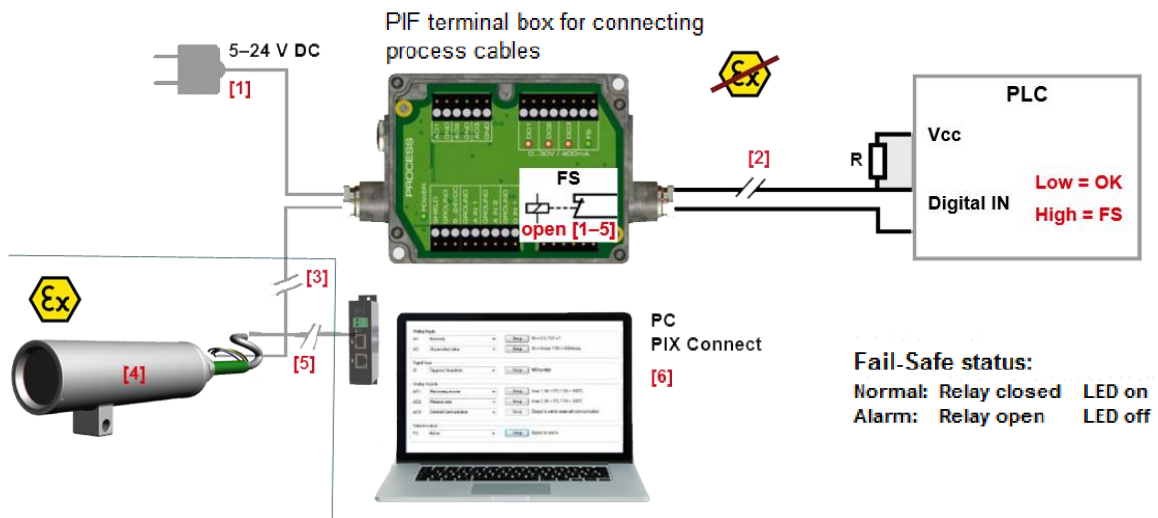


Figure 5-12 Connection of 3 PIFs

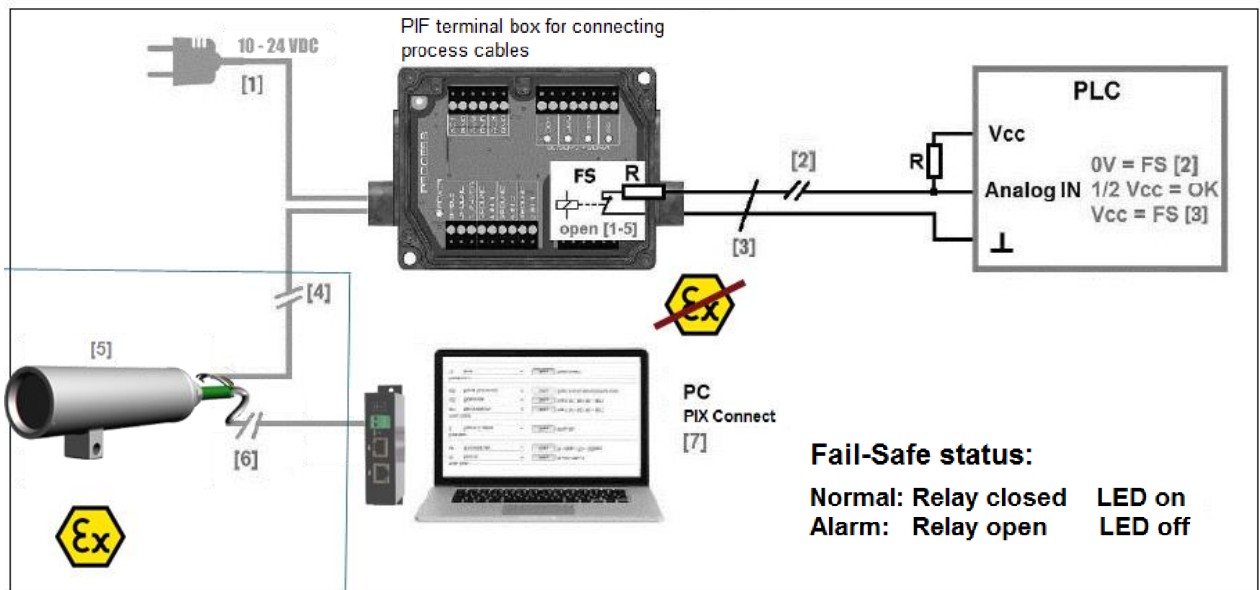


### 5.8.6 Example for a Fail-Safe monitoring



#### Fail-Safe monitoring states

- |                                    |   |
|------------------------------------|---|
| [1] Breakdown of PIF power supply  | [4] Malfunction of Xi                                       |
| [2] Cable break of fail-safe cable | [5] Breakdown of Xi power supply/ Interruption of USB cable |
| [3] Interruption of cable Xi-PIF   | [6] Malfunction of PIX Connect software                     |



#### Fail-Safe monitoring states

- |                                      |   |
|--------------------------------------|---|
| [1] Breakdown of PIF power supply    | [5] Malfunction of Xi                                       |
| [2] Cable break of fail-safe cable   | [6] Breakdown of Xi power supply/ Interruption of USB cable |
| [3] Short circuit of fail-safe cable | [7] Malfunction of PIX Connect software                     |
| [4] Interruption of cable Xi-PIF     |   |

Figure 5-13 Fail-Safe monitoring states

## 6 Network access and visualization

The most important procedures of initially starting the camera are described below. A detailed software description can be found on the supplied USB stick and in the Help menu in the PIX Connect software under `Help → Documentation`. Alternatively, the software can also be downloaded from the Optris website at the following link: <https://www.optris.global/pix>

### 6.1 Minimum system requirements

- Windows 7, 8 or 10
- USB port
- Hard disk with min. 30 MByte free storage
- Minimum 128 MByte RAM

### 6.2 Set up installation / first use

All drivers are loaded automatically by the Windows operating system. No driver installation is necessary. The software starts automatically in the installed language.

1. Connect the supplied USB stick to your PC
2. Start the Setup.exe. Follow the instructions of the wizard until the installation is finished.  
After installation, you will find the software on your desktop (as a program icon) and in the start menu: `Start \ Programs \ Optris GmbH \ PIX Connect`
3. Select the desired language in the menu `Tools → Language`

### 6.3 Allocating IP address

The ExCam XI410 is designed for use in an Ethernet network and requires an IP address for access and control.

#### Software configurations based on OEM operating instructions (Optris)

Ethernet setup (point-to-point connection)

After you have connected the Ethernet cable to the camera and the PC, you first have to make the network settings on the PC.

The devices are delivered with the following factory settings:

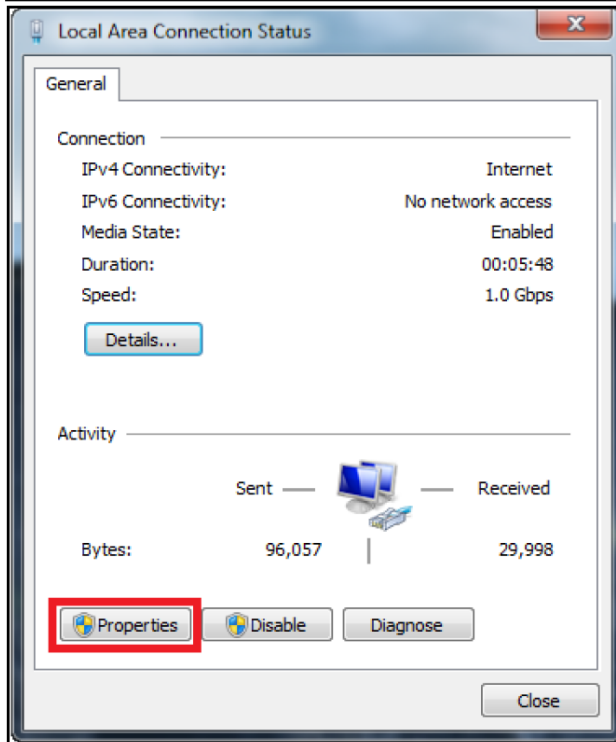
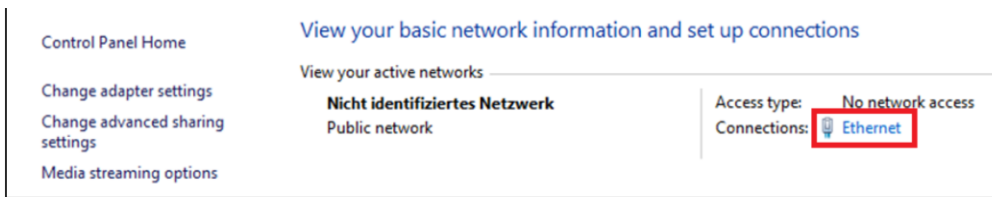
- **IP-address camera: 192.168.0.101**
- **IP-address PC: 192.168.0.100**
- **Port-number: 50101**



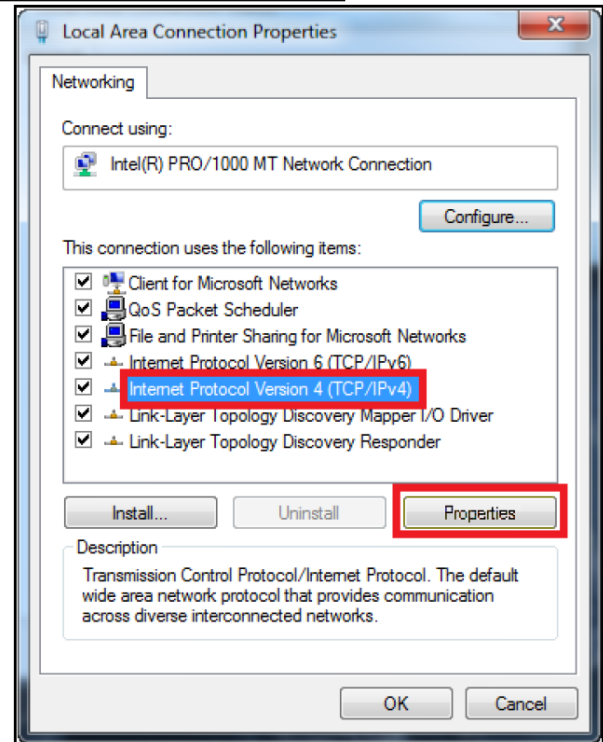
1.



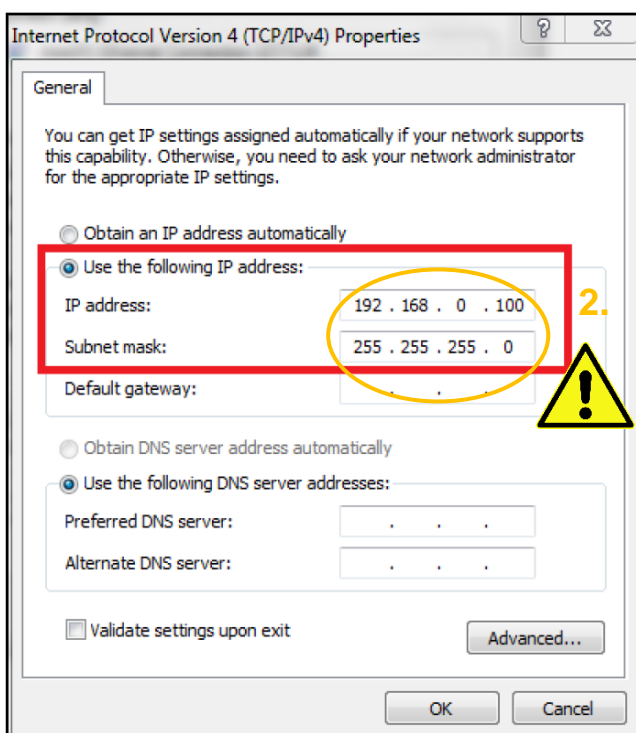
To do this, go to **All Control Panel Items** and open the **Network and Sharing Center**. Go to **Ethernet**.



Now press **Properties**.



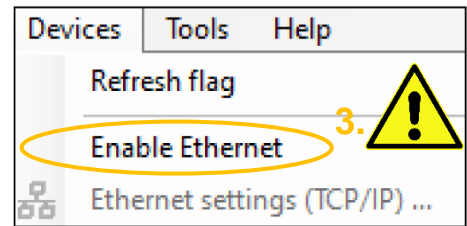
Now select **Internet Protocol Version 4 (TCP / IPv4)** in the properties window and then go to **Properties** again.



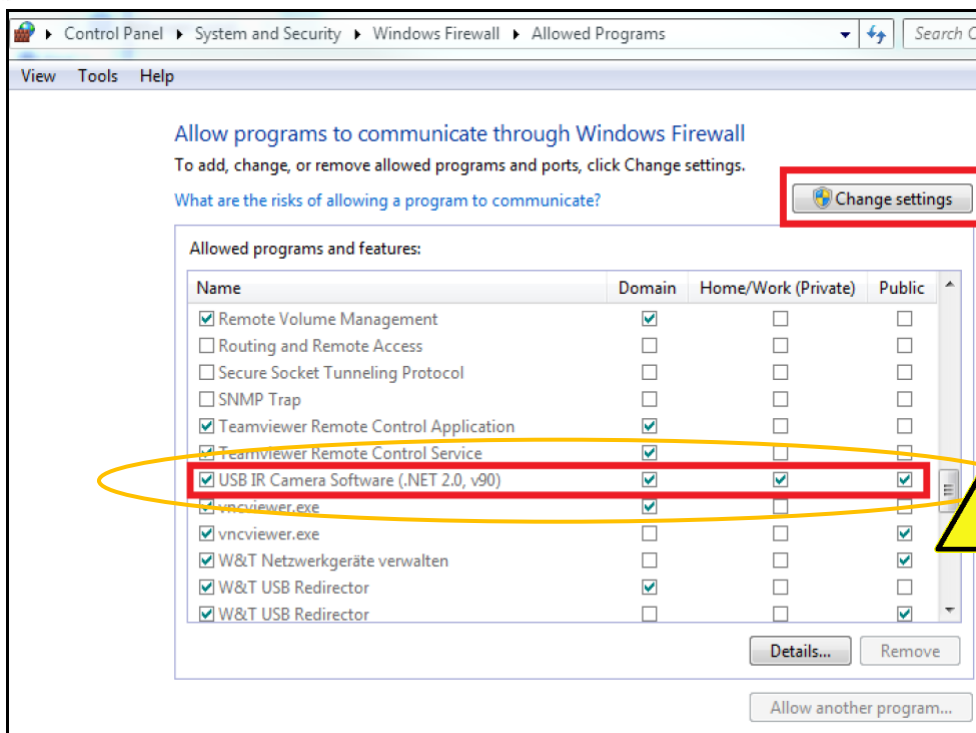
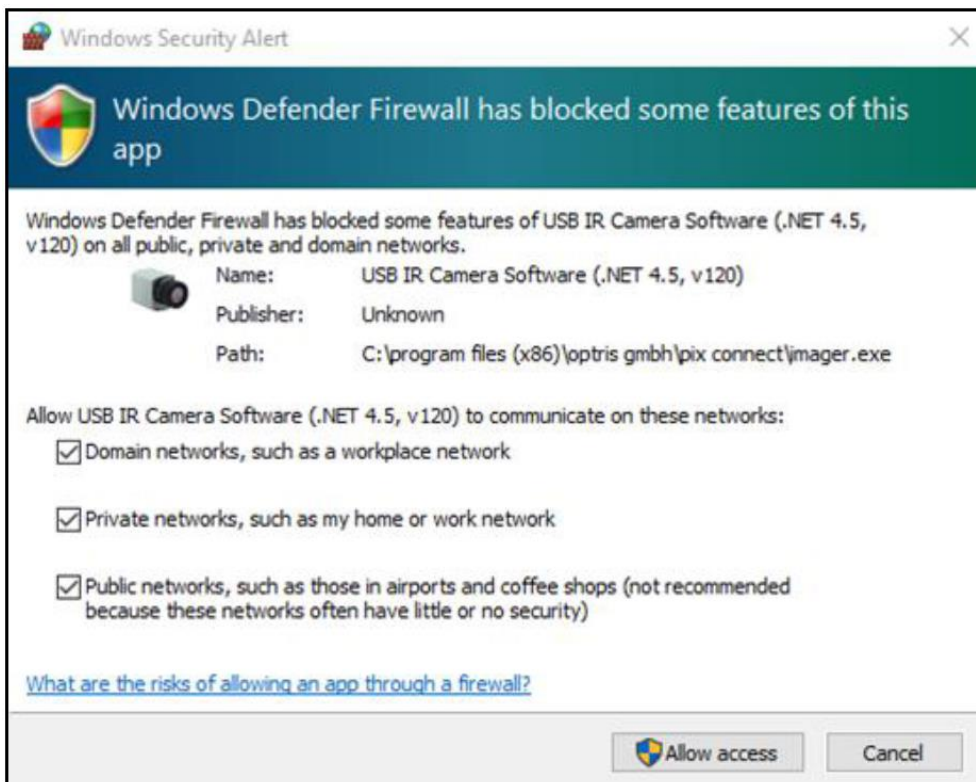
In the register card **General**, activate the check box **“Use the following IP address”**. Now enter a **user-defined IP address** for your PC (192.168.0.100). This must be identical to the address set in the PIX Connect software.

Then close the window with **OK**. The network settings on the PC are complete.

Start the PIX Connect software and activate the **Ethernet** function. To do this, go to **Devices** and **Enable Ethernet** in the menu.



Make sure that all three networks (Domain, Private, Public) are allowed in the Windows Firewall window to ensure a connection to the device



With the option “**port no. assign automatically**” a port number is assigned automatically.

If several cameras with different port numbers are connected and communication is to take place with a specific camera, the corresponding camera can be determined by reacting to port number.

The authorizations of programs can also be activated retrospectively in the Windows firewall settings of the PC (**Windows firewall** and **allow a program or feature through Windows Firewall**).

The port range used should be between **49152 ... 65535**. When using other ports, it is possible that these are already reserved or assigned.

When using several XI80 cameras in one network, pay attention to the data rate:

- Switch with 100Mbits/s: approx. 17 devices (XI80)
- Switch with 1000Mbits/s: approx. 170 devices (XI80)

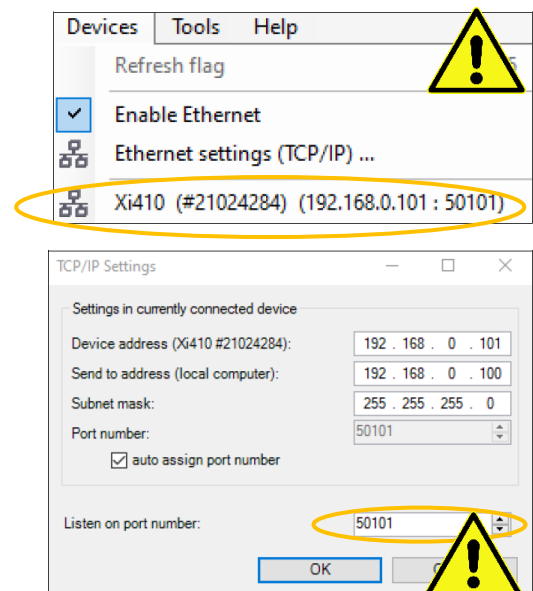
In addition to the data rate, you should also pay attention to the PC performance. A separate instance is required for each device used.

The device is now ready for the Ethernet connection and is listed in the menu **Devices**. The camera is identified by a network symbol and the network address and port number. Select the device. A connection to the device is established and the temperature measurement can begin.

To change the corresponding address settings, go to **Devices** and **Ethernet Settings (TCP/IP) Settings** in the menu.

The address for the device is assigned under **Device address**. This must have a different address (last block) to the other participant (e.g. PC) (**Send to address** (local computer)). It is important that the network part (first three blocks) must be identical for both addresses. The address range of the individual blocks can be between 0 and 255.

In addition, a separate port number must be configured. The selected number can be between 1 and 65535.



**If you cannot assign the IP address, it may be necessary to check the firewall settings!**

## 7 Visualization/ Analysis Software PIX Connect

### 7.1 General information about PIX Connect


The configuration menu of the web surface allows an intuitive navigation and offers several configuration possibilities. For detailed documentation and information how to use the web interface, please see the Optris PIX Connect Operator's Manual or visit the following web-site:

<https://www.optris.com/xi-410>



The radiometric processing of the image data enables subsequent detailed image analysis with the convenient PIX Connect software.

### 7.2 Focusing the thermal image

To make sure that the focus of thermal channel is adjusted correctly the motorized focus can be adjusted in the PIX Connect software (Menu → View/ Windows/ Distance or over the icon ). Adjustment to the left = near, adjustment to the right = infinite.

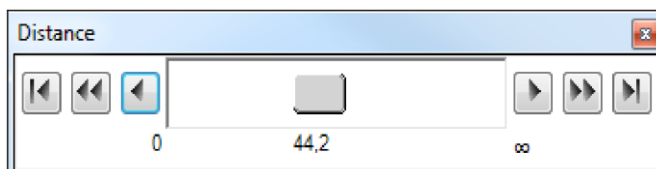


Figure 7-1 Motorized focus settings in PIX Connect Software

### 7.3 Adjustment of temperature range

Set the temperature range that suits you in the field at the bottom left.

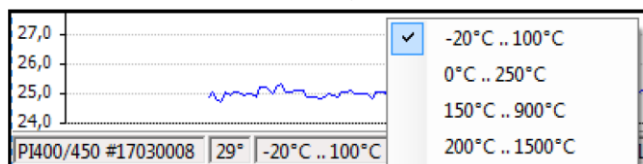


Figure 7-2 Adjust temperature range

## 7.4 User interface

There are many possibilities within the user interface.

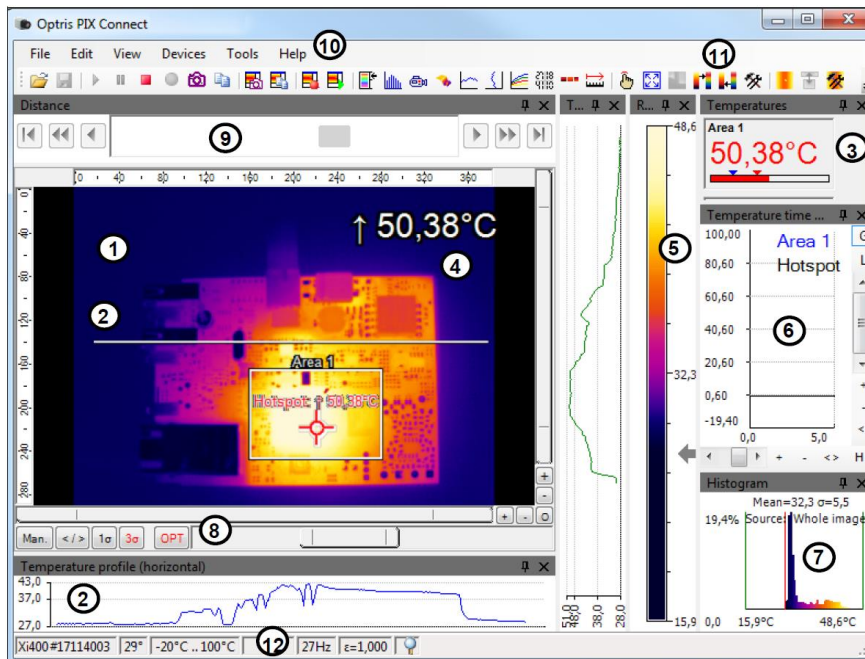


Figure 7-3 User interface

1. IR-Live view from the camera
2. Temperature profile: Temperature distribution on a maximum of two lines, which can be positioned anywhere in the image in terms of size and position.
3. Digital display group: Possible display of all temperatures from e.g. defined measuring fields, cold spots, hot spots, temperature at the mouse pointer, the internal temperature and the chip temperature. Alarm Settings: Bar with graphical representation of a defined lower temperature threshold (blue arrow) and an upper threshold (red arrow). The color of the digits of the displayed temperature changes to **RED** when the upper alarm value is exceeded and to **BLUE** when it falls below.
4. Temperature of measure area: Analyses the temperature according to the selected shape of the field, e.g. the mean value of the rectangle. This value is also shown in the live image (top right) and in the digital display.
5. Reference bar: Shows a color scale with the corresponding temperature values.
6. Temperature-time diagram: Shows the temperature curve over time for the selected ROI (region of interest).
7. Histogram: Statistical distribution of individual temperature values in the image.
8. Automatic / manual scaling of the reference bar and thus the displayed temperature range: Man., </> (min, max), 1  $\sigma$ : 1 sigma, 3  $\sigma$ : 3 sigma, OPT: Optimized palette
9. Distance Function: Adjusting the motor focus to focus the image
10. Menu and toolbar (icons)
11. Symbol for switching the individual palette views in the reference bar.
12. Status bar: Serial number, optics, temperature range, mouse cursor position, device frame rate/display frame rate, emissivity, ambient temperature, flag status

There are also many helpful video tutorials for the PIX-Connect software from Optris

[https://www.youtube.com/results?search\\_query=optris+pix+connect+software](https://www.youtube.com/results?search_query=optris+pix+connect+software)

Configure your device according to your individual requirements.

## **8 Cleaning**

Dirt on the viewing window must be removed as it can falsify the result of the temperature measurement. For regular cleaning, never use cleaning agents containing solvents (neither for the optics nor for the housing). Loose particles can be blown away with clean compressed air (Attention in dust-explosive environments). The sight glass can be cleaned with a soft, damp microfibre cloth (moistened with water) or a lens cleaner (e.g. Purosol or B+W Lens Cleaner).

## **9 Maintenance / Modification**

The applicable regulations for the maintenance and servicing of electrical devices in potentially explosive atmospheres must be adhered to.

The required maintenance intervals are specific to the individual devices. The operating company has to determine these intervals depending on the application parameters. The maintenance tasks especially include examination of parts on which the ignition protection depends (e.g., proper condition of the casing, seals and cable entry points). If maintenance measures are necessary they have to be initiated and/or executed.

Repairs may only be carried out with original parts of SAMCON Prozessleittechnik GmbH. Damaged pressure-resistant housings have to be replaced completely. In case of doubt, send the part in question back to SAMCON Prozessleittechnik GmbH.

Reparations concerning the explosion protection must only be carried out in accordance with nationally applied regulations by SAMCON Prozessleittechnik GmbH or by an authorised electrical technician authorised by SAMCON Prozessleittechnik GmbH. Rebuilding of or alterations to the devices are not permitted.

## **10 Disposal / Recycling**

When disposing of the device, nationally applicable regulations must be observed.

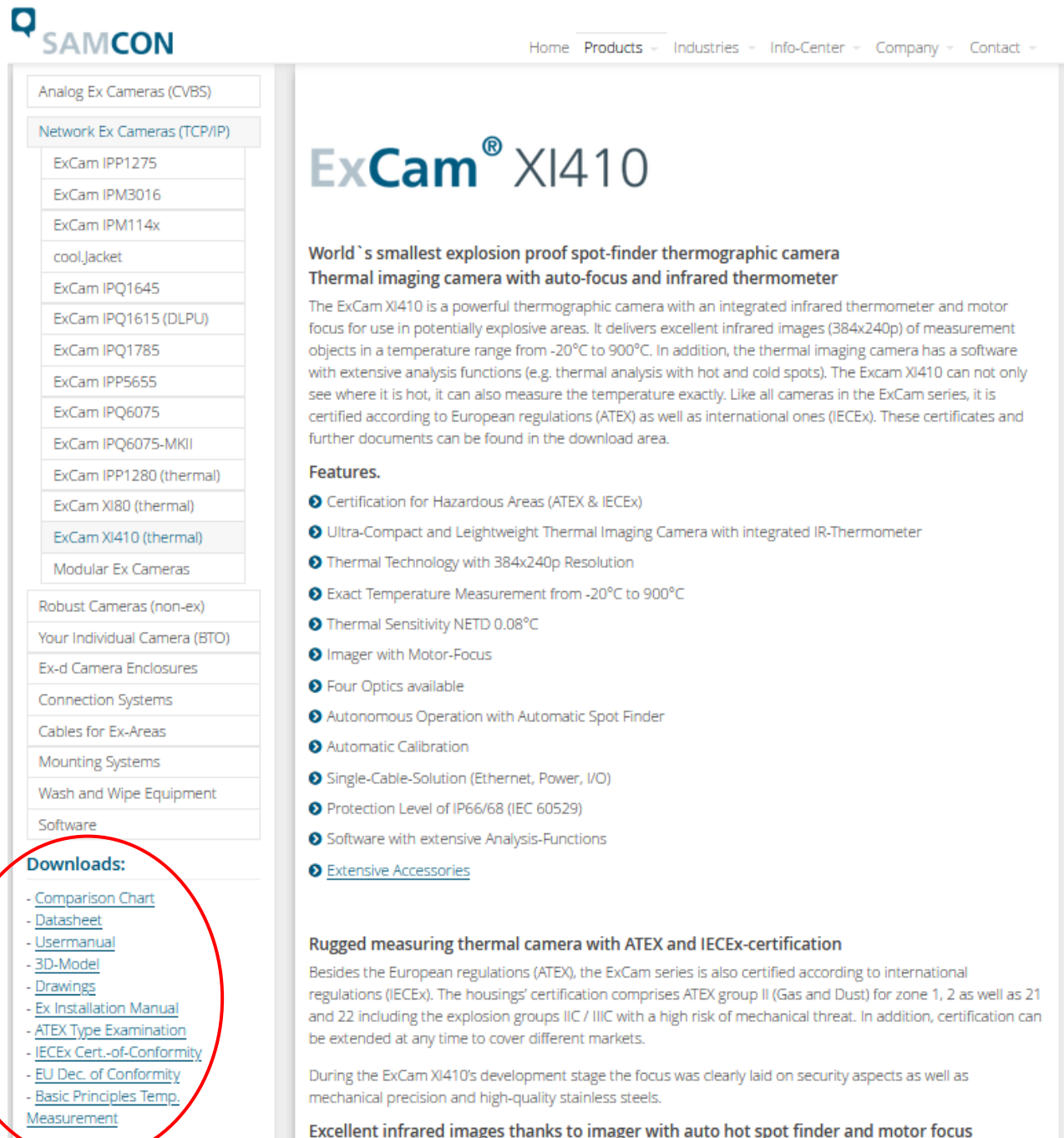
This Document is subject to alterations and additions.



## 11 Drawings & 3D models

All drawings, 3D models, certificates and other information are available in the download area of the product page on our website:

<https://www.samcon.eu/en/products/network/excam-xi410/>



**SAMCON** Home Products Industries Info-Center Company Contact

Network Ex Cameras (TCP/IP)

- ExCam IPP1275
- ExCam IPM3016
- ExCam IPM114x
- coolJacket
- ExCam IPQ1645
- ExCam IPQ1615 (DLPU)
- ExCam IPQ1785
- ExCam IPP5655
- ExCam IPQ6075
- ExCam IPQ6075-MKII
- ExCam IPP1280 (thermal)
- ExCam XI80 (thermal)
- ExCam XI410 (thermal)**
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- [Drawings](#)
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- [ATEX Type Examination](#)
- [IECEX Cert.-of-Conformity](#)
- [EU Dec. of Conformity](#)
- [Basic Principles Temp. Measurement](#)

# ExCam<sup>®</sup> XI410

**World`s smallest explosion proof spot-finder thermographic camera**  
**Thermal imaging camera with auto-focus and infrared thermometer**

The ExCam XI410 is a powerful thermographic camera with an integrated infrared thermometer and motor focus for use in potentially explosive areas. It delivers excellent infrared images (384x240p) of measurement objects in a temperature range from -20°C to 900°C. In addition, the thermal imaging camera has a software with extensive analysis functions (e.g. thermal analysis with hot and cold spots). The Excam XI410 can not only see where it is hot, it can also measure the temperature exactly. Like all cameras in the ExCam series, it is certified according to European regulations (ATEX) as well as international ones (IECEX). These certificates and further documents can be found in the download area.

**Features.**

- Certification for Hazardous Areas (ATEX & IECEx)
- Ultra-Compact and Lightweight Thermal Imaging Camera with integrated IR-Thermometer
- Thermal Technology with 384x240p Resolution
- Exact Temperature Measurement from -20°C to 900°C
- Thermal Sensitivity NETD 0.08°C
- Imager with Motor-Focus
- Four Optics available
- Autonomous Operation with Automatic Spot Finder
- Automatic Calibration
- Single-Cable-Solution (Ethernet, Power, I/O)
- Protection Level of IP66/68 (IEC 60529)
- Software with extensive Analysis-Functions
- [Extensive Accessories](#)

**Rugged measuring thermal camera with ATEX and IECEx-certification**

Besides the European regulations (ATEX), the ExCam series is also certified according to international regulations (IECEX). The housings' certification comprises ATEX group II (Gas and Dust) for zone 1, 2 as well as 21 and 22 including the explosion groups IIC / IIIC with a high risk of mechanical threat. In addition, certification can be extended at any time to cover different markets.

During the ExCam XI410's development stage the focus was clearly laid on security aspects as well as mechanical precision and high-quality stainless steels.

**Excellent infrared images thanks to imager with auto hot spot finder and motor focus**

If you wish additional technical information, please contact us at: [support@samcon.eu](mailto:support@samcon.eu)



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Phone: +49 6426 9231-0, fax: - 31

