ExCam IP135x

User manual

SAMCON
Prozessleittechnik GmbH

Content

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Revision history

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1 Introduction

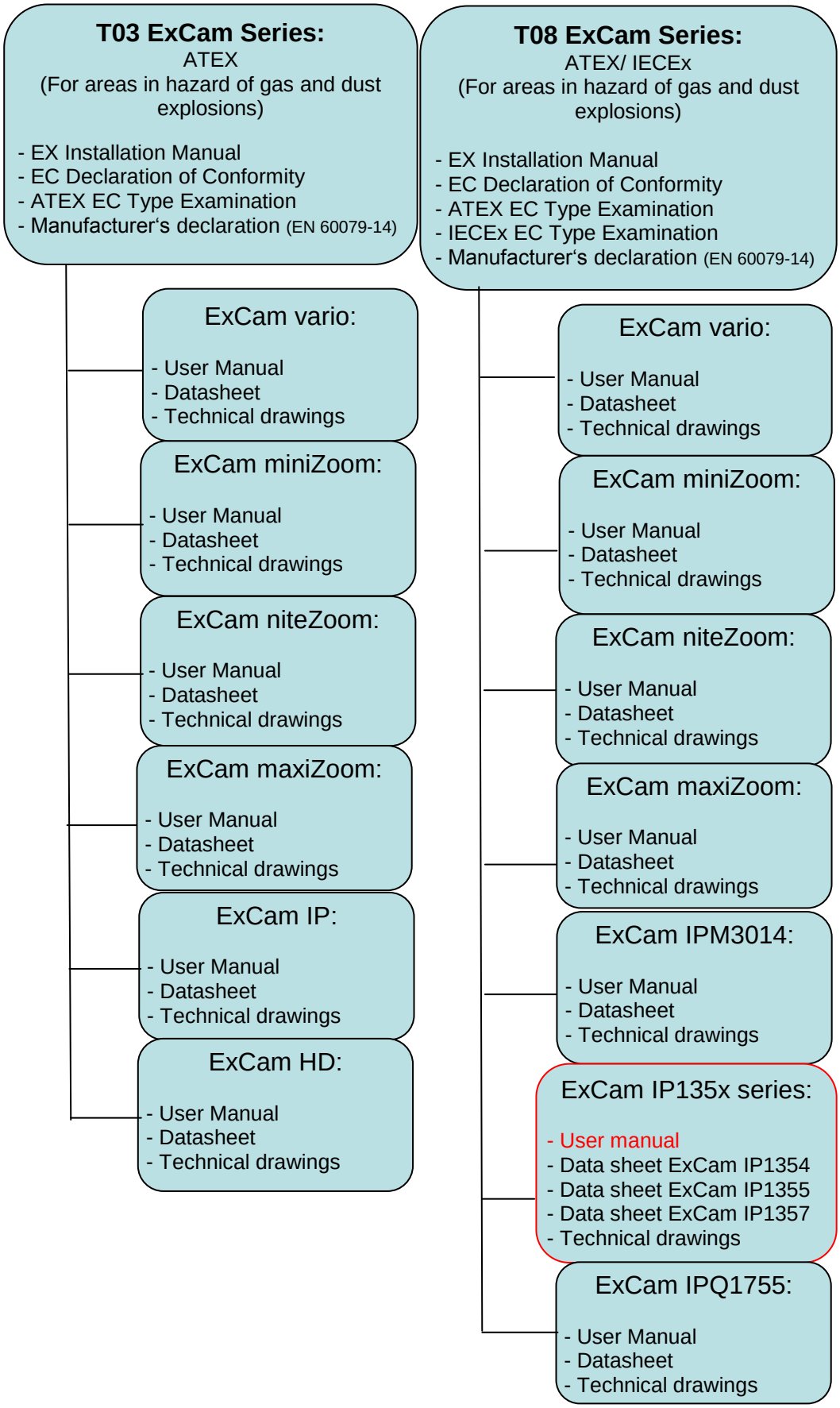
The ExCam IP135x series is a camera system (type 08) manufactured by SAMCON Prozessleittechnik GmbH which can be used for various applications, preferably within hazardous areas of the chemical and/or petro-chemical industry, at offshore plants, in mines, and at biogas plants.

The camera series is suitable for the usage within the Ex zones 1, 2, 21, and 22 including the gas group IIC (all gases, steams, and fogs including acetylene, hydrogen and carbon disulphide) and the dust group IIIC (conductive dusts and flammable fibrous material), as well as in mining. Within the equipment group I (mining), the camera series can be used in areas with a low risk of mechanical danger. In case the camera is to be used in areas with a high mechanical risk, the optical components (sight glass) have to be protected suitably. Within the equipment group II (all hazardous areas except mining); the ExCam IP135x series is without any additional mechanical protection, suitable for all areas with a high mechanical risk. Besides for fixed installation, the T08 ExCam series is certified to be also used for mobile applications (hand-held etc.)

The Ex d stainless steel housing of the ExCam 135x series allows additional alloys, a powder coating, or coats of varnishes as well as various mechanical accessories in order to extend the resistance towards extreme environmental conditions (salt water, acid, solar radiation, high mechanical strains etc.). Due to the usage of high-quality PTFE sealings, not only the protection level IP68 is reached but also the chemical resistance is maximized.

Figure 1.1 – ExCam IP135x series with wall mount bracket and roof

2 Document overview



3 Technical Data

3.1 Parameters of the explosion protection

Identification marks according to Directive 94/9/EG:	Ⓔx II 2G (zone 1 and 2) Ⓔx II 2D (zone 21 and 22) Ⓔx I M2
Explosion protection (gas):	Ex d IIC T6 Gb or Ex d IIC T5 Gb or Ex d IIB T6 Gb or Ex d IIB T5
Explosion protection (dust):	Ex tb IIIC T80°C Db IP68 or Ex tb IIIC T95°C Db IP68 or Ex tb IIIB T80°C Db IP68 or Ex tb IIIB T95°C Db IP68
Explosion protection (mining):	Ex d I Mb
Protection level:	IP 68 (IEC /EN 60529)
Transportation and storage temperature (EX):	-60°C…+85°C
Operation temperature (EX):	-60°C…+80°C (T6) -60°C…+85°C (T5)
Ambient temperature (EX)[1]:	-60°C…+65°C (T6) -60°C…+70°C (T5)
Pressure chamber, internal design:	V = 1960 cm3 (bto), free cross sectional area for free a free gas flow ≥ 40% (for Ex group IIC according to DIN EN 60079-1: 2008)
Nominated body:	TÜV Rheinland (number 0035)
EC Type Examination:	TÜV 14 ATEX 7539 X IECEx TUR 14.0026X
Test protocol ATEX:	557/Ex.539.00/14
Test report IECEx:	DE/TUR/ExTR14.0026/00
Quality Assessment Report:	DE/BVS/QAR14.0006/00

[1] Maximum ambient temperature range relevant for explosion protection might deviate to the maximum functional temperature range. For maximum functional temperature range (MTBF) see chapter 2.12

3.2 Electrical parameters of the camera

Axis P1354

Power supply:	PoE, IEEE 802.3af class 3
Reference power:	48 V DC (44...54 V DC)
Maximum power input:	7.2 W

Axis P1355

Power supply:	PoE, IEEE 802.3af class 3
Reference power:	48 V DC (44...54 V DC)
Maximum power input:	7.1 W

Axis P1357

Power supply:	PoE, IEEE 802.3af class 3
Reference power:	48 V DC (44...54 V DC)
Maximum power input:	7.9 W

3.3 Electrical parameters of the heating (optional)

DBK HP05-1/04-24

Power supply:	12…30 V DC
Reference power:	24 V DC
Maximum power input:	Depending on ambient temperature/ PTC* characteristics (*P = K x A x T (K = 5.5 W/m^2)
Typ L ($T_{AMB} \geq$ -30°):	Max. 20 W (1 x heating element HP05) 12.2 W continuous rating at -30° C (inrush current peak > 2000 mA, typical „inrush“ duration < 120 s)
Typ LL ($T_{AMB} \geq$-60°C):	Max. 40 W (2 x heating elements HP05) 26.8 W continuous rating at -60° C (inrush current peak > 4000 mA, typical „inrush“ duration < 120 s)

Temperature controller B005-MQT8K 5X/C

Function:	Opening/ closing of the heating load power circuit (bi-metal switch, heating element type LL are initiated individually and autarkic, 2x B005-MQT8K)
Switch-on temperature:	5° C (±3 K)
Hysteresis:	5…8 K
Nominal voltage:	12…48 V DC
Switched current:	1.3 A (permanent load)
Contact resistance:	< 70 mΩ

3.4 System cable SKDxx

Description:	Data transfer and power supply of the camera module (DIN EN 60079-14 conform)
Shealth color:	Green (GN), similar RAL6018
Routing:	via cable gland „1“ Ex IIB: ADE 4F MsNi Type5-M20x1.5 Ex IIC: PXSS2K-M 20 x 1.5 (cable gland with integrated pressure stop / compound)
Outer diameter:	8.7 mm ± 0.3 mm
Bending radius:	100 mm
Cable:	4 x 2 x AWG22/1 CAT.6a
Characteristics:	PUR halogen free, flame retardant, UV resistant, chemical resistance, shielded (see www.samcon.eu; data sheet SKD01)
Interface:	P version: RJ-45 (EIA/TIA-568B) e.g. Weidmueller IE-PS-RJ45-FH-BK, Phoenix Contact VS-08-RJ45-5-Q/IP20 etc. 10BASE-T/100BASE-TX PoE K version: 8x single pin twisted pair (solid conductor 0.64 mm^2, about 5 mm stripped) 1x shield (Cu braid 2.5 mm^2, ferules) 10BASE-T/ 100BASE-TX PoE

3.5 Supply cable (optional)

Description:	Power supply of the heating elements including temperature controller, Ölflex® Robust 210[2] (DIN EN 60079-14 conform)
Shealth color:	Black (BK) matt, similar RAL9005
Routing:	via cable gland „2“ Ex IIB: ADE 4F MsNi Type5-M 20 x 1.5 Ex IIC: PXSS2K-M 20 x 1.5 (cable and cable gland with integrated pressure stop/ compound)
Outer diameter:	7.6 mm
Bending radius:	15 x outer diameter (for occasional movement) 4 x outer diameter (for fixed installation)

[2] Further cables available upon request, e.g. „Ölflex® Petro FD 865 CP“ (high resistance against oil and drilling liquids) or „XPLE Armoured 3 x 2.5“ (extremely robust, particularly designed for offshore environments)

Conductor design:	2 x 2.5 mm^2, litz wire made of blank fine wire copper according to VDE 0295 Kl.5 / IEC 60228 Cl.5, no earth conductor, pins twisted in layers, pin isolation made of modified PP
Characteristics:	Special TPE halogen free, flame resistant, UV and ozone resistant, high chemical resistance, heat and cold resistance, reduced outer diameter
Isolation:	> 20 GΩ x cm
Nominal voltage U_0/U:	300/500 V AC/DC
Test voltage:	4000 V
Interface:	P version: N/A or upon request K version: 2 x 2.5 mm^2 Cu litz wire (BK/ BK) with ferule, sheath about 10 cm stripped and furnished with bend relief / shrink tubing

3.6 Sensor

Axis P1354

Type:	1/3‘‘ RGB CMOS, progressive scan, Axis lightfinder technology
Effective sensor resolution:	HDTV 720 p (1280 x 960 px / 4:3)
Light sensitivity:	Color: 0.1 lux, F1.2 BW: 0.02 lux, F1.2

Axis P1355

Type:	1/2,8‘‘ RGB CMOS, progressive scan
Effective sensor resolution:	HDTV 1080p (1920 x 1080 px / 16:9)
Light sensitivity:	Color: 0.2 Lux, F1.2 BW: 0.04 Lux, F1.2

Axis P1357

Type:	1/3,2‘‘ RGB CMOS, progressive scan
Effective sensor resolution:	5 MP (2592 x 1944 px / 4:3)
Light sensitivity:	Color: 0.2 Lux, F1.2 BW: 0.04 Lux, F1.2

3.7 Processor

Type:	ARTPEC-4
Axis P1354/ P1355	
Storage:	256 MB RAM, 128 MB Flash
Axis P1357	
Storage:	512 MB RAM, 128 MB Flash

3.8 Lens[3]

Axis P1354	
Type:	DC-Blende, vario-focus 2.8 – 8 mm, F1.2 IR correction, CS mount
Angle of view:	100° - 34° horizontal, 75° - 26° vertical (4:3)
Focus range:	0.3 m to infinite
Shutter time:	1/24500 s to 2 s @50Hz net frequency 1/29500 s to 2 s @60Hz net frequency
Axis P1355	
Type:	P-Iris, vario-focus 2.8 – 8 mm, F1.2 IR correction, CS mount
Angle of view:	109° - 39° horizontal, 61° - 22° vertical (16:9)
Focus range:	0.3 m to infinite
Shutter time:	1/28000 s to 2 s @50Hz net frequency 1/33500 s to 2 s @60Hz net frequency
Axis P1357	
Type:	P-Iris, vario-focus 2.8 – 8 mm, F1.2 IR correction, CS mount
Angle of view:	92° - 32° horizontal, 52° - 18° vertical (4:3)
Focus range:	0.3 m to infinite
Shutter time:	1/24000 s to 2 s @50Hz net frequency 1/24000 s to 2 s @60Hz net frequency

[3] To account for the individual environment conditions, additional lenses are available upon request to allow adaptions e.g. regarding the tele and wide angle range, the light sensitivity, or the focus. Compatibility has to be checked.

3.9 Streaming

Video compression:	H.264 (MPEG-4 Part 10/AVC), H.264 Base line and main profile, Motion JPEG
<u>Axis P1354/P1355</u>	
Frame rate HDTV (720p/1080p):	25 fps (net freq. 50 Hz) /H.264, Motion JPEG 30 fps (net freq. 60 Hz) /H.264, Motion JPEG
<u>Axis P1357</u>	
Frame rate 5MP:	12.5 fps (net freq. 50 Hz) /H.264, Motion JPEG 12 fps (net freq. 60 Hz) /H.264, Motion JPEG
Frame rate 3MP:	16 fps (net freq. 50 Hz) /H.264, Motion JPEG 20 fps (net freq. 60 Hz) /H.264, Motion JPEG
Frame rate 2MP (HDTV 1080p):	25 fps (net freq. 50 Hz) /H.264, Motion JPEG 30 fps (net freq. 60 Hz) /H.264, Motion JPEG
Functions:	Multiple, individually configurable streams in H.264 and Motion JPEG, controllable frame rate and bandwidth VBR/CBR H.264, Up to 8 individually cropped out view areas, event data streaming, edge storage (Network Attached Storage or File-Server)

3.10 Parameterization

Image settings:	Compression, color, brightness, sharpness, contrast, white balance, exposure control, exposure zones, backlight compensation, fine tuning of behavior at low light, WDR - dynamic contrast, picture rotation: 0°, 90°, 180°, 270° including Corridor Format, text and image overlay, privacy mask, mirroring of images
Intelligent video:	Video motion detection, active tampering alarm
Event triggers:	Intelligent video, time table and edge storage
Event actions:	File upload: FTP, HTTP, network share and email; notification: email, HTTP and TCP; external output activation; pre and post alarm video buffering; video and audio recording to edge storage; PTZ preset; guard tour; play audio clip; day/night switching; status LED activation

Built-in installation aids:	Focus assistant remote back focus, pixel counter
Edge Storage:	MicroSD/microSDHC/microSDXC slot supporting memory card up to 64 GB (card not included). Support for recording to network share (network-attached storage or file server such as NAS, FTP, etc.)

3.11 Network

Security:	Password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, digest authentication, user access log
Supported protocols:	IPv4/v6, http, HTTPS, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP, SNMPv1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS

3.12 Other technical data

Permitted ambient temperature (MFTR)[4]:	-10° C … +40° C (Type N) -30° C … +40° C (Type L) -60° C … +40° C (Type LL)
Protection level EN 60529/IEC 529:	IP 68 Test conditions: 24 h/ 3 m water column at 5° C. An additional mechanical protection against water jets is recommended

[4] Functional temperature range concerning the operational temperature range of the installed components according to manufacture declarations (MTBF – meantime ration duration between failures). For ambient temperature ranges relevant for explosion protection (ATEX, IECEx) see chapter 2.1 – Explosion protection)

Housing material[5] (EN 10027-2): (flameproof enclosure)	Stainless steel MNo.: 1.4301 (X5CrNi18-10), AISI 304 (V2A) – *Standard* Stainless steel MNo.: 1.4305 (X8CrNiS18-9), AISI 303 – *Standard* Stainless steel MNo.: 1.4401 (X5CrNiMo17-12-2), AISI 316 (V4A) – *optional* Stainless steel MNo.: 1.4404 (X2CrNiMo17-12-2), AISI 316L (V4A) – *optional* Edelstahl MNo.: 1.4571 (X6CrNiMoTi17-12-2), AISI 316Ti, (V4A) – *optional*
Additional housing materials:	Zinced spring steel MNo.: 1.0330, PTFE with glass microbeads (GYLON® Style 3504 blue), silicone-coating (Silcoset 105 incl. Cure Agent 28), VMQ (silicone), polyester (acetone resistant), titan (Ti[22])
Sight glass material:	Borosilicate glass (Ilmadur 10/ I-420)
Additional internal materials:	Aluminum die cast, zinced (protection housing of the camera module), polyamid isolatores, mounting adapter made of aluminum (AlMgSi), zinced steel metal sheet, plastics, PUR etc.
Weight (without accessories):	6800 g (with „K1“ cable gland flange) 7500 g (with „K2“ cable gland flange)
Dimension (wxhxd)[6]:	113.0 mm x 138.5 mm x 260.2 mm (K1 flange) 113.0 mm x 138.5 mm x 276.0 mm (K2 flange)

[5] The available stainless steel materials dispose of different specific characteristics such as mechanical and chemical resistance. It is possible to optimize the corrosion behavior in highly acidiferous environments or at offshore applications by selecting the applicable housing material. An electro-polished or powder-coated surface in various RAL colors (standard: RAL7035) is possible.

[6] Dimension stainless steel housing T07 VA2.2 with pin and without cable gland and external accessories. For additional / detailed dimensions see chapter 10 – technical drawings

Fitting of the flame proof gap preventing the transmission of ignition (cylinder) (EX)

T07 VA2.2:	Nominal diameter: 91 mm Clearance fit: H8 f7 (DIN ISO 286) Tolerance: -71µm…+54µm Gap length: > 12.5 mm Gap width: < 0.15 mm Average surface finish: $R_a \leq 6.3$ µm
Media resistance[7] *(excerpt):*	Acetone, alcohol, acetylene, ammoniac, aniline, benzol, butane, chloride, pressurized water, pressurized air, ethane, crude oil, fluoride, glycerin, sea water, methane, oils, phosphoric acid, propane etc.

[7] Additional media resistance as well as well as validation of chemical resistances possible upon request

4 Safety guidelines

Please observe the safety guidelines indicated in der EX installation manual of the T08 ExCam series!

5 Illustration of the model key

The following model options are currently available for the ExCam IP135x series:

Ex product name	Model options					
1)	Type[2)]	Housing combination[3)]	Gas expl. group[4)]	Cable length/m SKDxx/SKLxx[5)]	cable termin.[6)]	Temperature range[7)]
ExCam IP135x	T08-	VA2.2.K1.BOR-	B-	005-	K-	N
	T08-	VA2.2.K1.BOR-	B-	005-	P-	N
	T08-	VA2.2.K1.BOR-	C-	005-	K-	N
	T08-	VA2.2.K1.BOR-	C-	005-	P-	N
	T08-	VA2.2.K2.BOR-	B-	005-	K-	N
	T08-	VA2.2.K2.BOR-	B-	005-	P-	N
	T08-	VA2.2.K2.BOR-	C-	005-	K-	N
	T08-	VA2.2.K2.BOR-	C-	005-	P-	N
ExCam IP135x	T08-	VA2.2.K1.BOR-	B-	005-	K-	L
	T08-	VA2.2.K1.BOR-	B-	005-	P-	L
	T08-	VA2.2.K1.BOR-	C-	005-	K-	L
	T08-	VA2.2.K1.BOR-	C-	005-	P-	L
ExCam IP135x	T08-	VA2.2.K1.BOR-	B-	005-	K-	LL
	T08-	VA2.2.K1.BOR-	B-	005-	P-	LL
	T08-	VA2.2.K1.BOR-	C-	005-	K-	LL
	T08-	VA2.2.K1.BOR-	C-	005-	P-	LL

Table 5.1 – Model key

1) ExCam IP135**x =** Functional camera description of the ExCam IP135x series. Distinctive characteristics are, for example: Sensor resolution, light sensitivity, angle of view, iris control, input power etc. Currently available are the following models: ExCam IP1354/ IP1355/ IP1357

2) **VA2**.2.K1.BOR = T07 Ex d housing with large diameter ($Ø_{VA}$=113 mm) and large sight glass (Q_{BOR}=72 mm)

3) VA2.**2**.K1.BOR = T07 housing with maximum body length (l_R = 238 mm)
VA2.2.**K1**.BOR = K1 cable gland flange (straight cable gland(s))
VA2.2.**K2**.BOR = K2 cable gland flange (orthogonal cable gland)
VA2.2.K1.**BOR** = Borosilicate sight glass (Standard execution, for video cameras within visible spectral range: λ = 350…2000 [nm]. Not suitable for thermographic applications)

4) **B** = Explosion group IIB/ IIIB (Standard execution. Suitable for all gases except hydrogen, acetylene, carbon disulfide, flammable fibrous material and non-conductive dusts

C = Explosion group IIC/ IIIC (Optional execution. Suitable for all gases, flammable fibrous materials and conductive dusts)

5) **005** = Length of the connection line in meter at delivery. The standard cable length is 5 m (minimum/maximum cable length: 001…100 [m])

6) **K** = Terminal block execution (standard)

SKDxx: 8x single pin twisted pair (solid conductor 0.64 $mm^{2,}$ about 5 mm stripped) 1x shield (Cu braid 2.5 mm^2, ferules)

Supply: („Ölflex Robust 2102 x 2.5 mm2 Cu litz wire with ferule, sheath about 10 cm stripped and furnished with bend relief/shrink tubing

P = Plug termination (optional)

SKDxx: RJ-45 network plug (heavy duty), AWG 26-22. Type Weidmueller IE-PS-RJ45-FH-BK, pin assignment according to EIA/TIA-568B

Supply: („Ölflex Robust 210“) n.a. / upon request

7) **N** = Normal ambient temperature range (MTBF): T_{AMB_N}: -10 … +40 [°C]

L = Low ambient temperature range (MTBF): T_{AMB_L}: -30 … +40 [°C]

LL = Lowest ambient temperature range (MTBF): T_{AMB_LL}: -60 … +40 [°C]

6 Commissioning

Attention!
Please observe the national regulations regarding security, installation, and accident prevention (e.g. DIN EN 60079-14) as well as the safety guidelines described in this user manual and the EX installation manual!

Attention!
Please observe the installation and commissioning advices described in the Ex installation manual!

6.1 Step 1: Installation

Install the ExCam® IP135x at the desired location.
Mounting options, accessories, as well as safety guidelines are described in the EX installation manual of the ExCam® series.

6.2 Step 2: Electrical connection

Attention!
The electrical connection of the equipment must be executed by qualified personnel only!

Attention!
It is mandatory that the housing of the ExCam® Series has to be grounded via a PE-connection!

Attention!
The minimum cable length of the connection line must not be less than one meter! The connection cable has to be laid in a protected manner!

Attention!
Please observe the national regulations regarding security, installation, and accident prevention (e.g. DIN EN 60079-14), as well as the safety guidelines described in this user manual and the EX installation manual!

The ExCam® IP135x is delivered with an electrical connection cable type SKDxx (System Kabel Digital) and optional with an additional supply cable e.g. of the type „Ölflex® Robust 210“.The maximum cable length is 100 m (depending on electromagnetic tolerance) and can be determined individually to reflect the particular customer specifications. The minimum cable length is 1 meter.

The ExCam® IP135x is manufactured with a pigtail reflecting the desired cable length. Any electro-technical work inside the camera's flameproof enclosure done by the user is prohibited. Depending on the model option, the ending of the camera's cable connection is either stripped to the blank Cu conductors or furnished with a plug.

6.2.1 Potential equalization

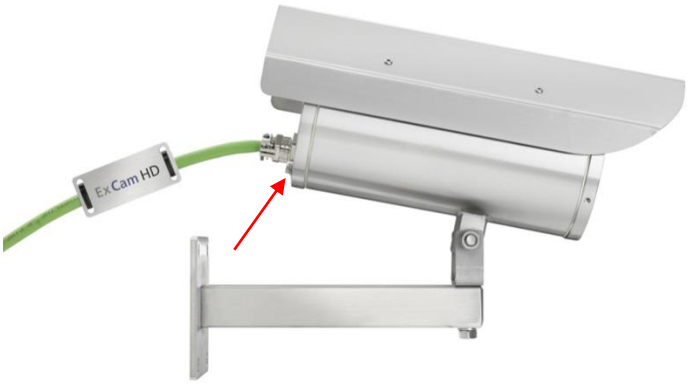


Figure 6.1 – ExCam IP135x potential equalization

The potential equalization / earthing of the camera housing is mandatory in order to avoid electrostatic charging and hence spark generation. The screw terminal at the lower right hand side of the housing's rear side is intended for that purpose (q.v. figure 6.1). The profile of the potential equalization has to reflect the national grounding instructions (min. 4mm^2).

Connection table:

Potential	**Color** (IEC 60757)	**Profile**	**Comment**
PE	GN/YE	4 mm^2 (fix)	Screw terminal: Slotted screw M4 x 0.7 (DIN 84) with washer Ø 9 mm (DIN 125A)

Table 6.1 – Potential equilization

6.2.2 Connection and protection

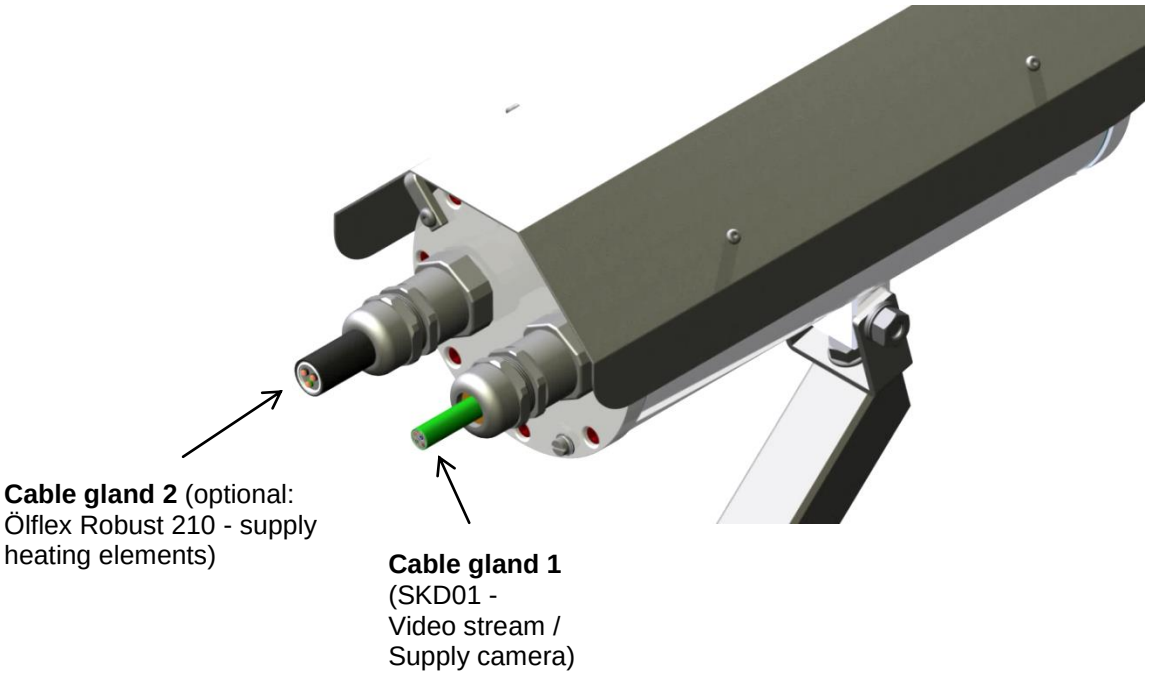


Figure 6.2 – Cable gland and supply cable

Figure 6.3 – ExCam IP135x T08-VA2.2.K1.BOR-B-XXX-**K**-N

Figure 6.4 – ExCam IP135x T08-VA2.2.K1.BOR-B-XXX-**P**-N

Figure 6.5 – ExCam IP135x T08-VA2.2.K1.BOR-B-XXX-P(K)-**L(L**)

The green patch cable SKDxx disposes of 8(+1) conductors used for the data transfer with other network devices as well as to power the camera.
In order to guarantee the power supply (Power Device, PD) of the ExCam IP135x, a Power-over-Ethernet component (Power Sourcing Equipment, PSE) has to be available at the connecting side (e.g. a PoE Switch, a PoE Injector, or Midspan) which meets the specification IEEE 802.3af of the power class 3 (6.49–12.95W/ 26-30mA). A 100 Mbit Ethernet Connection (100BASE-TX) is used for the ExCam IP135x data transfer.

In case the camera disposes of a plug, (figure 6.4), it has to be plugged into the RJ45 PoE slot of the network device. Due to the design, a faulty connection or pin assignment

is not possible. The network device can already be supplied with power, prior to connecting it to the camera, hence there is no „power ON“ priority which has to be observed.

In case the ExCam IP135x disposes of a terminal block termination, the correct connection of the individual pins in accordance with EIA/TIA-568B has to be observed (q.v. table 6.2). Generally, the pins of the same color code are connected.
Attention: The general specification for PoE allows different operation modes for PDs (ExCam IP1354, ExCam IP1355, ExCam IPQ1755 etc.):
Mode A (end span): This is usually used by switches; the supply voltage is executed as phantom power on the data lines. Both polarities are possible.
Mode B (mid span): This is usually used by PoE injectors; the power supply and protocol transfer is executed on separate pins (plug / pin contact 4.5 is the positive pole and 7.8 is the negative pole). The T08 ExCam series supports both modes and the used power source (PSE) determines the mode.

For executing a reboot, it is possible to separate the ExCam IP135x from the network and to switch it on again while in operation or in interaction with a visualization system (hot plugging).

Attention: „Hot plugging“ as well as the connection and separation of the data and power cable SKDxx with/of network devices and terminal blocks under power is only allowed within the safe area (non-hazardous atmosphere)!

The pin assignment of the SKDxx according to EIA/TIA-568B standard for 100BaseTX with PoE (IEEE 802.3af) is done as follows:

Pin / Potential		**Color SKDxx** (IEC60757)	**Plug / pin contact** (TIA-568B)	**Cross section area**	**Remarks**
Mode A	*Mode B*				
Tx+ / PoE ±48 VDC	Tx+	WH / OG	1	0.64 mm^2	Solid conductor
Tx- / PoE ±48 VDC	Tx-	OG	2	0.64 mm^2	Solid conductor
Rx+ / PoE GND	Rx+	WH / GN	3	0.64 mm^2	Solid conductor
n.a.	PoE +48 VDC	BU	4	0.64 mm^2	Solid conductor
n.a.	PoE +48 VDC	WH / BU	5	0.64 mm^2	Solid conductor
Rx- / PoE GND	Rx-	GN	6	0.64 mm^2	Solid conductor
n.a.	PoE GND	WH / BN	7	0.64 mm^2	Solid conductor
n.a.	PoE GND	BN	8	0.64 mm^2	Solid conductor
shield/ GND (complete conductor bunch)		BK	9	n.a.	Shield braid of tinned copper wires Ø=0.13 mm (AWG 36)
shield (single, twisted pair pins)		n.a.	n.a. (10)	n.a.	Aluminum synthetic strapp, twisted

Table 6.2 – Pin assignment SKDxx and plug contact RJ45

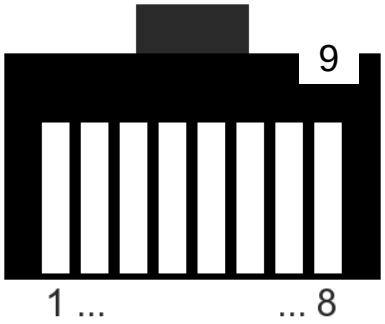


Figure 6.6 - RJ45 Contact assignment

Particularly in EMC critical environments, it is important to earth the shield at the terminal block side (q.v. figure 6.3 – pin with black shrink tubing and blue ferule).

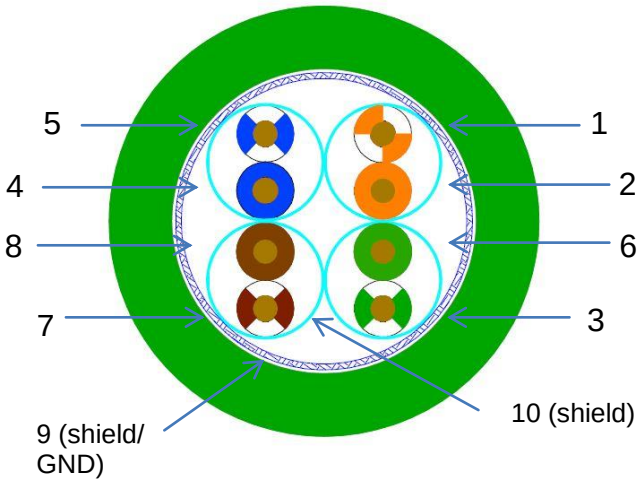


Figure 6.7 – SKD01 Pin assignment

In case the ExCam IP135x is supplied via a PoE capable device, an additional safe-guarding of the power supply is not necessary. The power supply is executed by the PoE network device via an electronic with intelligent set-up. The camera as well as the connection is permanently monitored in order to avoid any failure or defects in case of a short-circuit fault.
For a camera with terminal block execution, it is possible to operate the camera either with a PoE capable network device or with a separate 48 V DC power supply (supply voltage and network streams are self-sustaining). In this event an adequate supply safe-guarding has to be dimensioned.

Recommended is a **300 mA medium time lag fuse**.

If the Ex CCTV application calls for a separate 48 V DC supply voltage, the wire/pin assignment has to reflect **Mode B** operation mode (q.v. table 6.2)!

If the camera is equipped with a heating (type L or type LL), a second power supply with a separate supply protection at the „L+“ has to be available. Standardly the supply is carried out via the supply cable Ölflex® Robust 210 (cable gland 2, q.v. figure 6.2 and 6.5). Connection assignment and supply protection according to table 6.3.

Potential/ Pin no.	**Color „Ölflex Robust 210“** (IEC60757)	**Cond. design**	**Voltage**	**Maximum power input / protection** (type L)	**Maximum power input / protection** (type LL)
L+ / 1	BK	2.5 mm^2 litz wire	+24 VDC	20 W / fuse (L+) 2000 mA -T- time lag (high inrush current!)	40 W / fuse (L+) 4000 mA -T- time lag (high inrush current!)
L- / 2	BK	2.5 mm^2 litz wire	0 VDC / GND		

Tab.6.3 – Pin assignment supply cable

6.2.3 Tests prior to switching on voltage

Attention!
Prior to commissioning, all tests as indicated by the national regulations have to be executed. In addition, it is mandatory that the proper functioning of the operating device in accordance with this user manual and all other applicable regulation has been executed.

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

6.3 Testing of the status LED

Through the sight glass, the status LED is visible. Prior to accessing the camera via the web interface, the proper functioning of the camera should be tested. The booting process of the ExCam IP135x can take up to one minute. Additional LEDs for checking network activities or the bandwidth are only visible when the housing is open.
The status of the applicable network camera as reflected by the LED indicators is as follows:

Status LED		
Operation mode	*Color*	*Comment*
	Green	At normal operation, a constant green light shows Note: It is possible to configure the status LED in such a manner that in normal operation it is not illuminated or only blinks when the camera is accessed
	Yellow	It is illuminated permanently when the camera is turned on as well as when the camera is set back to default settings
	Red	In case of an activation failure the light blinks slowly
Usage of the focus assistant	*Color*	*Comment*
	Green	Focus assistant is activated. The lens is set to optimum
	Yellow	The camera was moved or an object was placed in front of the lens. Complete the focus assistant and restart it. The lens was not set to optimum
	Red	The camera was moved or an object was placed in front of the lens. Complete the focus assistant and restart it. The lens was set insufficiently

Table 6.4 – Status and control LED

6.4 Step 3: Adjusting the lens

This step is only required in case the default settings of the picture or the user settings carried out via the web interface (focus assistant, sharpness, digital zoom etc.) do not deliver the desired results. If so, the focus (sharpness) as well as the angle of view (tele) has to be readjusted. This requires opening the flameproof enclosure.

	IP 1354	IP 1355	IP1357
Lens type	Varifocal, IR-correction, CS mount		
Lens	DC-iris, F1.2/ 2.8 – 8 mm	P-Iris, F1.2/ 2.8 – 8 mm	P-Iris, F1.2/ 2.8 – 8 mm
Aspherical technology	No	No	No
Focal distance	2.8 – 8 mm	2.8 – 8 mm	2.8 – 8 mm
Horizontal angle of view	100°(wide) – 34°(tele)	109°(wide) – 39°(tele)	92°(wide) – 32°(tele)
Iris control	Automatic	Precision-automatic	Precision-automatic
MOD (Minimum object distance)	0.30 m		

Table 6.5 – Lens data[8]

Information!
If not determined differently, the default setting for the ExCam® IP135x is set to a 16:9 picture size (1920 x 1080). The focus is optimized for a distance of approximately 10 m.
If desired, we customize the ExCam® IP135x settings to reflect specific picture sizes (16:10, 16:9, 4:3) and object distances. Please advise accordingly at order placement.

[8] Standard lens at delivery. Please inquire for additionally available lenses

6.4.1 Work preparation

Attention!
Please carry out any preoperational work carefully and in accordance with the applicable regulations.

Attention:
Note: Depending on the zone classification, it might be necessary to obtain a work permit/clearance! When adjusting the camera settings potentially explosive atmosphere must be avoided by any means!

Please consider that in order to carry out the applicable settings, a feedback regarding the picture quality is required. Please use appropriate devices (laptop, CCTV tester, walkie-talkie to the control room)

- Use appropriate tools
- Make sure you have a secure foothold
- Avoid static charge

6.4.2 Opening the pressure-resistant housing

In case it is necessary to adjust the picture, the pressure-resistant housing has to be opened and, after completion of the work, securely tightened again. Please be very careful and follow thoroughly the steps of this manual.

„WARNING – DO NOT OPEN IN HAZARDOUS AREA“

Note: Depending on the zone classification, it might be necessary to obtain a work permit/clearance! When adjusting the camera settings, potentially explosive atmosphere must be avoided by any means!

If the T08 ExCam IP135x is equipped with a protection roof it has to be removed first. To do so, loosen the applicable 4 screws situated on the both ends of the brackets (figure 6.8).

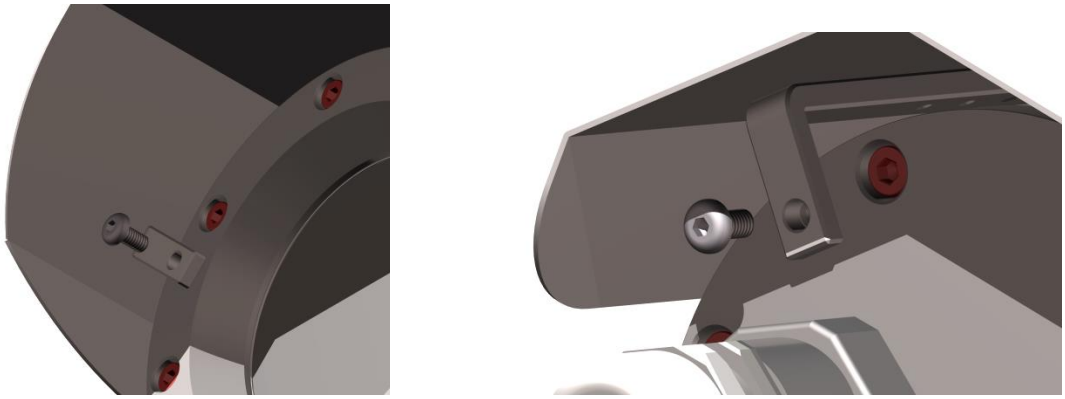


Figure 6.8 – Removing the protection roof_1

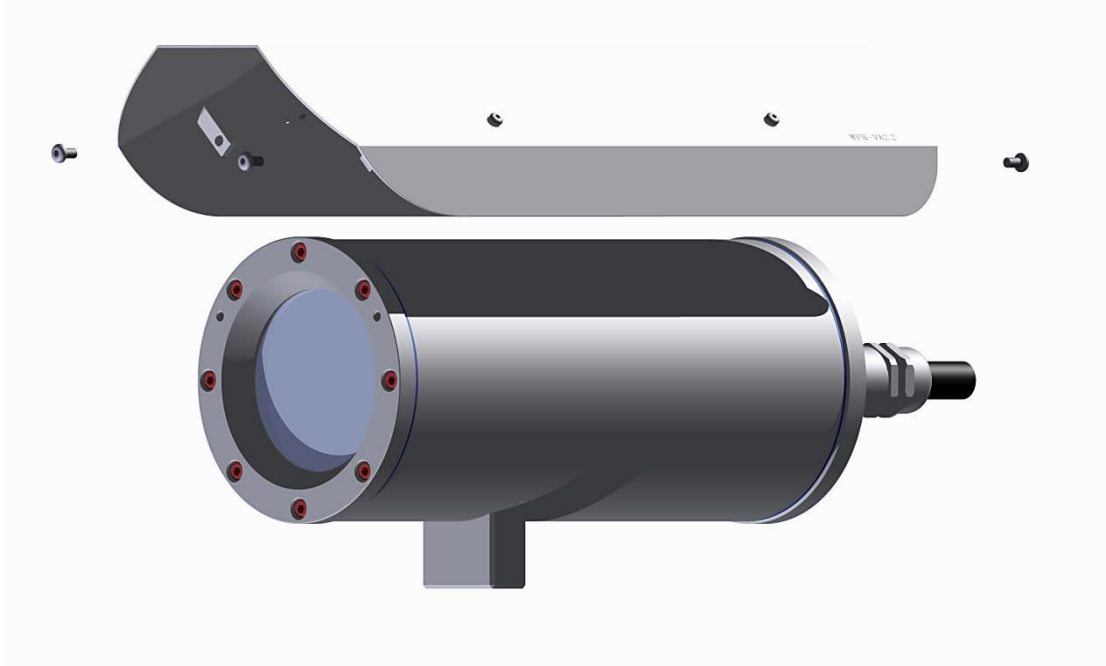


Figure 6.9 – Removing the protection roof _2

To open the enclosure (T07 VA2.2) of the ExCam IP135x, loosen the four hexagon socket screws (DIN 912/ ISO 4762) located at the cable gland flange of the stainless steel housing, including the washer springs (DIN 127 A) (q.v. figure 6.10). Avoid skin or clothing contact with the screw threads as they dispose of LOCTITE ® 243™ (chemical basis: Dimethacrylatester). It is used to protect the screws from losing due to shocks, vibrations but also for sealing purposes. It is not allowed to open the sight glass flange!

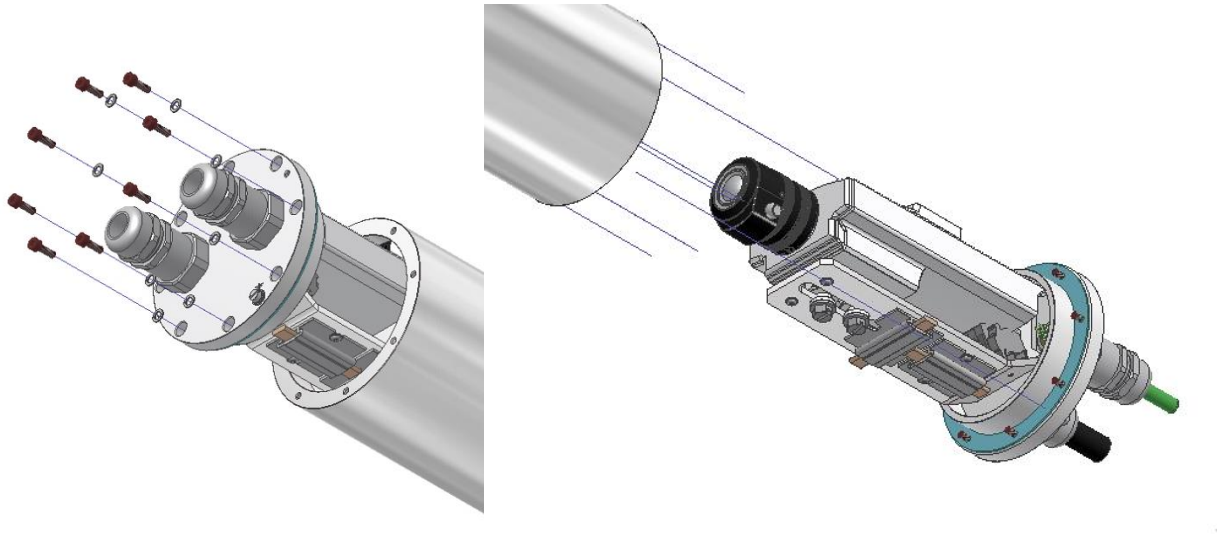


Figure 6.10 – Opening the T07 VA2.2 housing

Pull out very carefully the lead flange in a straight manner, ensuring that the board module does not tilt. Due to the created lower pressure this might require some additional effort. The cylindrical clearance fit (H8f7 - DIN ISO 286) of the body as well as flange components must not be tilted as this runs the risk of damaging the flame proof gap preventing the transmission of ignition (DIN EN 60079-1:2012)!
Attention: The mounting adapter with the heating module, the temperature controller, the camera module and the optical module are fixed to the cable gland flange. Beware also of tilting and work very carefully to avoid damaging the components! Avoid skin and clothing contact with the cylindrical fit, the surface is treated with lubrication paste (oleaginous) to protect the surface against frictional corrosion and mechanical strain.

When opening the housing, make sure not to damage or to pollute the Gylon sealing (blue)! The sealing is not firmly attached to the cable and supply flange and only fixed by the means of the screw connections.

Attention!
Beware not to damage the surface of bore hole and shaft (fit) at the flame proof gap preventing the transmission of ignition.

Attention!
Please make sure not to damage housing sealings and to keep them clean

6.4.3 Adjusting the focus and angle

The default focus of ExCam IP135x network camera is set to an object distance of approximately 10m; the angle is set to the maximum „wide“ range (92° - 109° angle, depending on the individual camera module). Usually it is not necessary to carry out any adaption. For focusing objects in shorter or higher distances or to change the zoom settings (wide -> tele) the settings can be adjusted as follows:

1. Via the web browser (Mozilla Firefox, MS Internet Explorer etc.), please open the user interface of the ExCam IP135x (q.v. chapter 7 „web browser access”). Navigate through the „Setup“ menu via the „Basic Setup“ to the „Focus“ settings
2. Below the button „Basic“, please click on “Open iris“. If the button is deactivated (greyed out) the aperture is already open
3. Now click on „Reset“ in order to reset the focal lens to default value
4. Loosen the zoom as well as sharpness control at the lens by turning counterclockwise. Move both controllers and adjust the zoom as well as the sharpness as required. Check the picture quality in the window below
5. Tighten the zoom as well as sharpness control again
6. Within the configuration menu, click afterwards on the button „Fine-tune focus automatically“ and wait until the automatic optimization is completed
7. To activate the aperture again, click on “Enable iris“. If the button is deactivated (greyed out) the aperture is already activated
8. If necessary, additional adjustments can be carried out at the tab „Advanced“

Note:
Prior to starting the automatic fine adjustment, adjust the sharpness as precisely as possible by the means of the sharpness control or the focus assistant. The sharpness controller usually provides the best results.

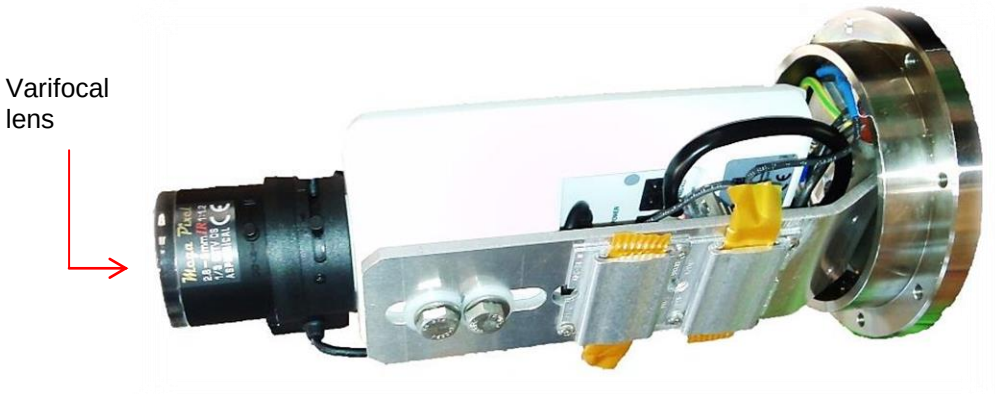


Abb.6.11 – Mounting adapter with installation components

Figure 6.12 – Mechanical adjustments at the lens

6.4.4 Extracting/inserting an SD storage card

The ExCam IP135x is delivered with a 16GB microSDHC storage card. Saved video files can be viewed or deleted via the web interface; they are also available in a download list or as an ftp file to the network. The videos saved on the storage card can be accessed also via the FTP server within the network.
If the SD card has to be changed, the new storage card should be blank and pre-formatted with an „ext4“ or „vFAT“ data system. The SD card slot is located on the bottom side behind the camera module (q.v. figure 6.14).

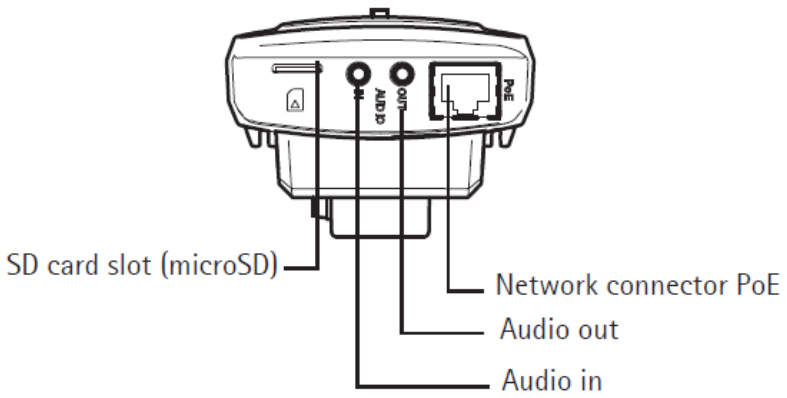


Figure 6.13 – microSD card slot

Please pay attention when inserting / extracting the storage card. Do not damage electronic parts or the cable gland! Do not bend the mounting adapter as otherwise the optical axis of the equipment is not guaranteed anymore!

When touching electrical components, potential equalization (grounding of the body) has to be observed (carry a PE wristband etc.)!

6.4.5 Closing of the pressure-resistant housing

For closing the housing, please follow, in reversed order, the steps described in the chapter 6.4.2 regarding the opening of the housing. Do not use any other screws than those which are part of the delivery scope. For the execution with a „K1“ cable gland, 8 x cylinder head screws M4 x 0.7 (ISO metric right-hand thread) with a thread length of 12 mm (DIN 912/ ISO 4762, quality 6g) are used. The material of the screw connection is variable, e.g. stainless steel MNo. 1.4301 (A2-70) corresponding to the pressure resistant housing or a titan execution (Ti22) in metallic red.
For the execution with a „K2“ cable gland, 7 x cylinder head screws M4 x 0.7 (ISO metric right-hand thread) with a thread length of 30 mm are used.
Please check that the bore holes and flameproof joint (cylindrical fit) are clean and intact.

Attention!
In case the flameproof joint has been damaged mechanically, the housing must not be used anymore!

Attention!
Do not lock-in any foreign objects inside the housing

Please make sure that the disassembled screw locks (washer spring DIN 127A) are reassembled.

The Gylon sealing must be intact and has to be reassembled according to the hole-pattern of the flange. There is no restriction regarding the installation direction of the sealing.

If, when closing the housing, it is noted that the surface of the flameproof joint is dirty or not lubricated sufficiently, please clean it with a clean cloth and suitable cleaning detergent. Afterwards, re-lubricate it with a suitable lubrication agent.

The screw connection of the flange and housing have to be tightened in crosswise sequence with a torque of **3 Nm** Please avoid extensive tightening – this might lead to a torn screw.

If the camera does not provide the anticipated results, steps 6.4.2 to 6.4.5 have to be repeated.

For the fixed installation of the ExCam IP135x, either with a wall mount bracket, with a hinge attachment for sight-glass installations or for the optional installation of a roof, please observe the instructions of the EX installation manual!
The T08 ExCam series is certified to be also used for mobile applications (hand-held etc.)

The cylinder head screws for the safe connection of the housing body and the flange have to be tightened with a torque of 3 Nm!

7 Network access and visualization

The following steps describe the most important steps for the initial commissioning of the camera. The configuration menu of the web surface allows an intuitive navigation and offers several configuration possibilities. For a comprehensive user manual of the web surface, please refer to the to the Axis user manual which can be found on the provided USB stick or which can be accessed at:

ExCam IP1354 http://www.axis.com/de/files/manuals/um_p1354_51348_en_1303.pdf
ExCam IP1355 http://www.axis.com/de/files/manuals/um_p1355_49956_en_1303.pdf
ExCam IP1357 http://www.axis.com/de/files/manuals/um_p1357_49958_en_1303.pdf

Network access of the ExCam IP135x series is supported by most operating systems and browsers. The recommended browsers are Internet Explorer with MS Windows, Safari with Macintosh and Firefox with Windows and additional operating systems.
To carry out „video streaming“ via the Microsoft Internet Explorer, installing the “AXIS Media Control” (AMC) is required. The installation request is executed during the initial commissioning. In order to visualize the „H.264“ video streams, QuickTime™ is recommended. For „Motion JPEG“ coded video streams, Java Applet is suggested which requires JVM (J2SE) 1.5 or higher, or JRE (J2SE) 5.0 or higher.

At delivery, the ExCam IP135x is set to the applicable net frequency (50Hz or 60Hz). If the camera is used at a location with a differing net frequency, a flickering of the picture might be noticeable, particularly in surroundings with fluorescent tubes. In such a case, the applicable settings have to be carried out within the menu “System Options > Advanced > Plain Config”.

7.1 Browser Support

A list with the currently supported web browsers, operating systems, and required add-ons can be viewed at:

http://www.axis.com/techsup/cam_servers/tech_notes/browsers.htm

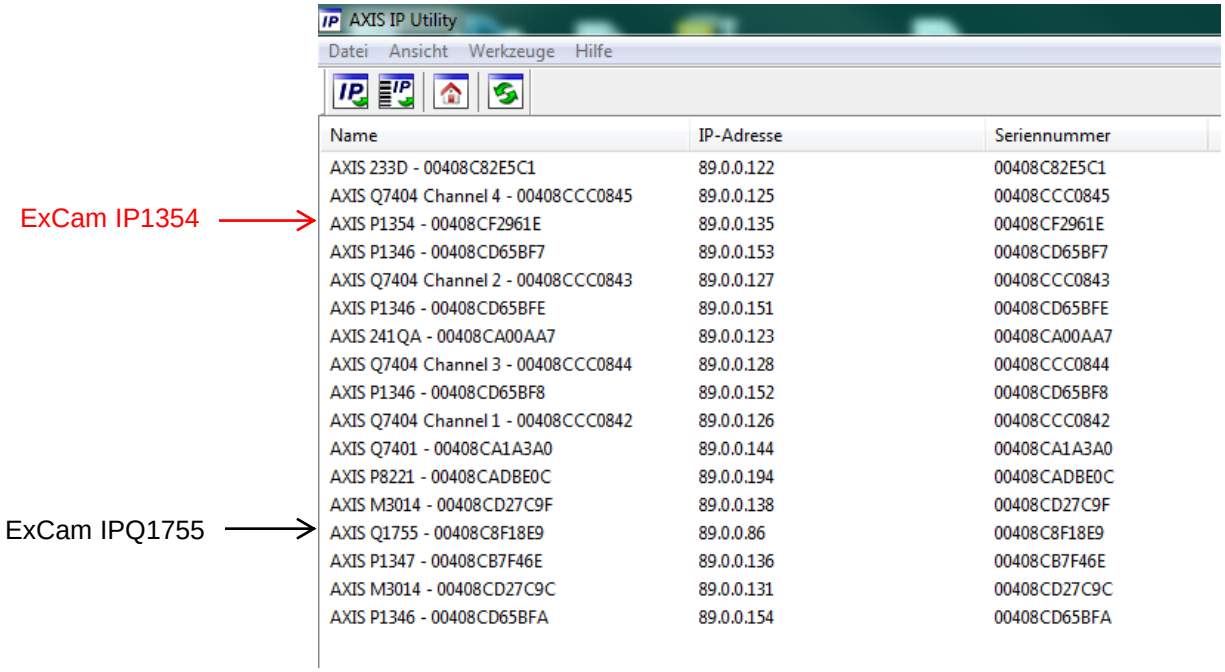
7.2 Assigning the IP address

The ExCam IP135x is an Ethernet network camera requiring an IP address to access it. Usually a DHCP server is integrated in most networks which automatically assigns an IP address. In case there is no DHCP server available in the network, the ExCam IP135x's default address "192.168.0.90" (subnet masking 255.255.255.0) is used.
With the "AXIS IP Utility" it is possible to determine the IP address under Windows; the included USB stick contains this application. It is also available for download:

http://www.samcon.eu/downloads-ex-videokameras-atex/download-treiber-software/

In case it is not possible to assign the IP address, it might be necessary to change the firewall settings!

The "AXIS IP Utility" tool automatically recognizes all ExCam devices and displays them. It can also be used to manually assign a static IP address. Please note that the ExCam IP135x network camera has to be installed within the same network segment (physical subnet) as the computer on which the "AXIS IP Utility" tool is executed. For example, the ExCam IP1354 network identification is „Axis P1354" (q.v. figure 7.1). MAC address and serial number are also determined and displayed so that a non-ambiguous identification is possible.



Name	IP-Adresse	Seriennummer
AXIS 233D - 00408C82E5C1	89.0.0.122	00408C82E5C1
AXIS Q7404 Channel 4 - 00408CCC0845	89.0.0.125	00408CCC0845
AXIS P1354 - 00408CF2961E	89.0.0.135	00408CF2961E
AXIS P1346 - 00408CD65BF7	89.0.0.153	00408CD65BF7
AXIS Q7404 Channel 2 - 00408CCC0843	89.0.0.127	00408CCC0843
AXIS P1346 - 00408CD65BFE	89.0.0.151	00408CD65BFE
AXIS 241QA - 00408CA00AA7	89.0.0.123	00408CA00AA7
AXIS Q7404 Channel 3 - 00408CCC0844	89.0.0.128	00408CCC0844
AXIS P1346 - 00408CD65BF8	89.0.0.152	00408CD65BF8
AXIS Q7404 Channel 1 - 00408CCC0842	89.0.0.126	00408CCC0842
AXIS Q7401 - 00408CA1A3A0	89.0.0.144	00408CA1A3A0
AXIS P8221 - 00408CADBE0C	89.0.0.194	00408CADBE0C
AXIS M3014 - 00408CD27C9F	89.0.0.138	00408CD27C9F
AXIS Q1755 - 00408C8F18E9	89.0.0.86	00408C8F18E9
AXIS P1347 - 00408CB7F46E	89.0.0.136	00408CB7F46E
AXIS M3014 - 00408CD27C9C	89.0.0.131	00408CD27C9C
AXIS P1346 - 00408CD65BFA	89.0.0.154	00408CD65BFA

Figure 7.1 – Axis IP Utility

7.3 Password / identification

The default user name is: **root**
The default password is: **root**

When a system reset of the equipment has been carried out, please follow the instructions below.
In order to allow access to the camera, the password for the standard administrator user „root“ has to be determined. When accessing the camera for the first time, the dialog field „Configure Root Password“ is displayed and the password can be determined there. For security considerations, it is possible to use an encrypted HTTPS-connection requiring an HTTPS certificate (see steps below).
For assigning the password via a standard HTTP connection, please just enter the password directly in the dialog window „Configure Root Password“.

For using an encrypted HTTPS connection when determining the password, please follow the below steps:

1. Click on the button „Create self-signed certificate“
2. Enter the desired information and click „OK“. The certificate is issued and the password can be entered. Please note that the entire data transfer of the ExCam IP135x will be encrypted
3. Enter the desired password and repeat it in order to ensure correct spelling. Click on “OK“ to configure that password
4. Enter the username “root“ (it is not possible to delete the default administrator user name „root“)
5. Enter the previously determined password and click on „OK“. In case you have forgotten the password, the ExCam IP135x has to be reset to default settings
6. Click on „Yes“ in order to install AMC (AXIS Media Control). After the completion of the installation, it is possible to view the video streams with the Microsoft Internet Explorer or Mozilla Firefox (administrator rights are required)
7. The page „Live View“ of the ExCam IP1355 is now displayed. With the setup link it is possible to open the menu options to allow personal camera settings

8 Maintenance / Servicing / Alterations

The national regulations concerning the maintenance and servicing of electrical devices within hazardous areas are to be observed.

The required maintenance intervals are specific to the individual devices. The operating company has to determine these intervals depending on the application parameters. During maintenance, focus has to be put on checking parts concerning the ignition protection category such as the integrity of the housing, the sealings and the cable glands. If maintenance measures are necessary they have to be initiated and/or executed.

9 Repairs and Maintenance

Repairs must only be carried out with original parts of SAMCON Prozessleittechnik GmbH. Damaged pressure-resistant housings have to be replaced completely. If in doubt, return the applicable part to SAMCON Prozessleittechnik GmbH.
Repairs concerning the explosion protection must only be carried out by SAMCON Prozessleittechnik GmbH or a qualified electrical technician authorized by SAMCON Prozessleittechnik GmbH in accordance with nationally applied regulations. 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

T08-VA2.2.K1.BOR-C-XXX-X-LL (housing)

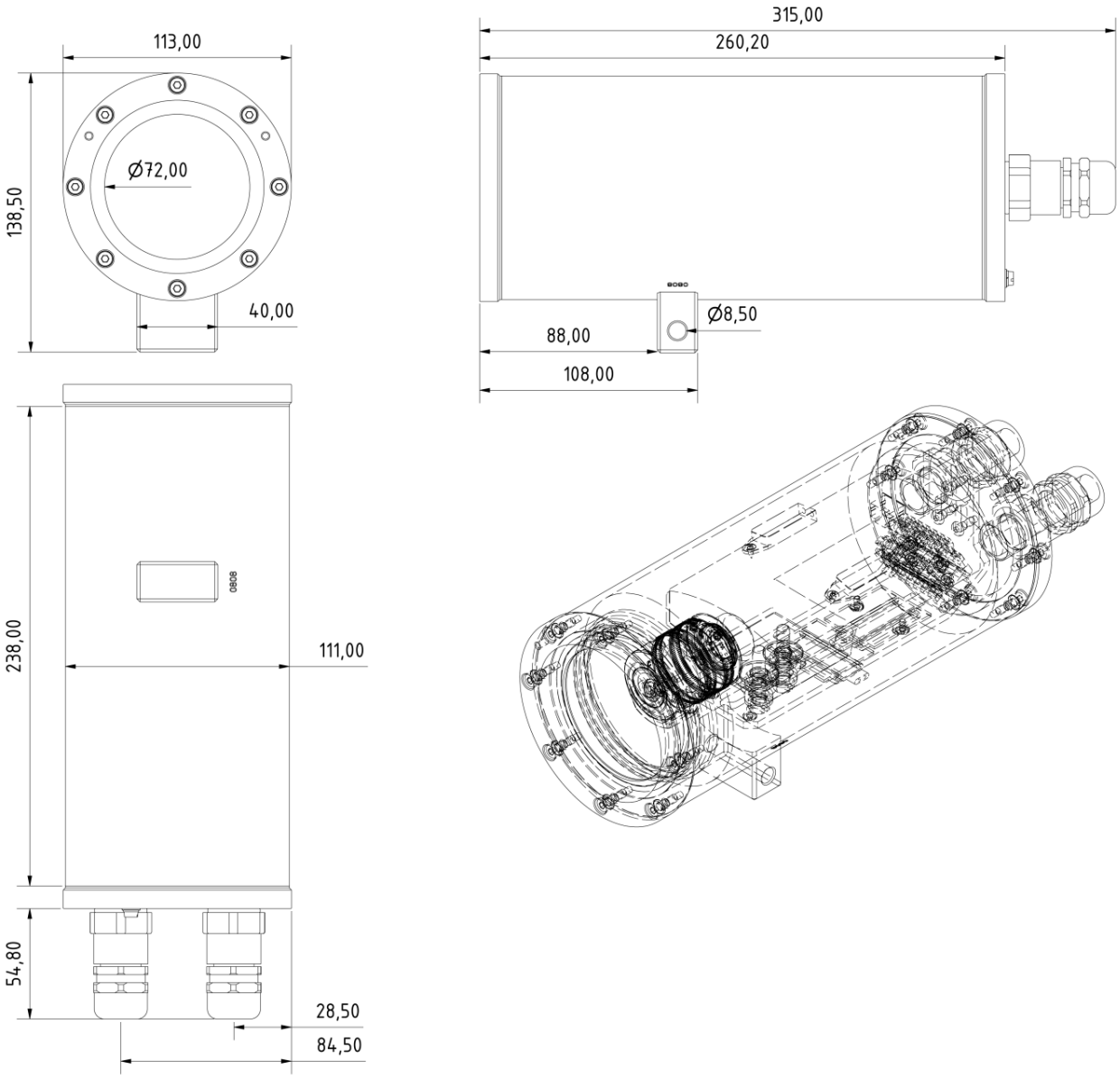


Figure 10.1 – Dimensions of the T08 ExCam IP135x with K1 flange

T08-VA2.2.K2.BOR-B-XXX-X-N (housing)

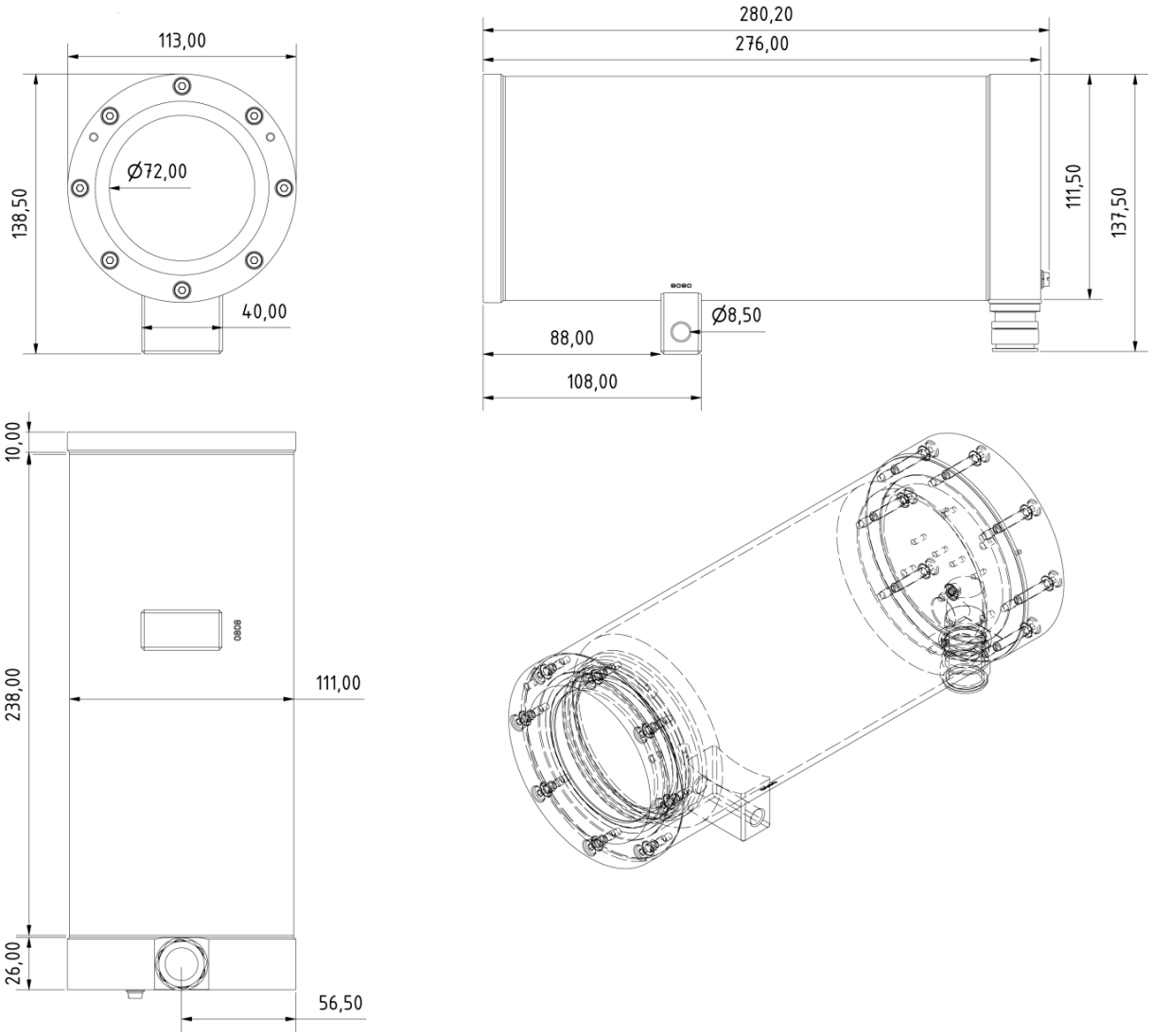


Figure 10.2 – Dimensions of the T08 ExCam IP135x with K2 flange

T08-VA2.2.K1.BOR-C-XXX-X-LL (accessories)

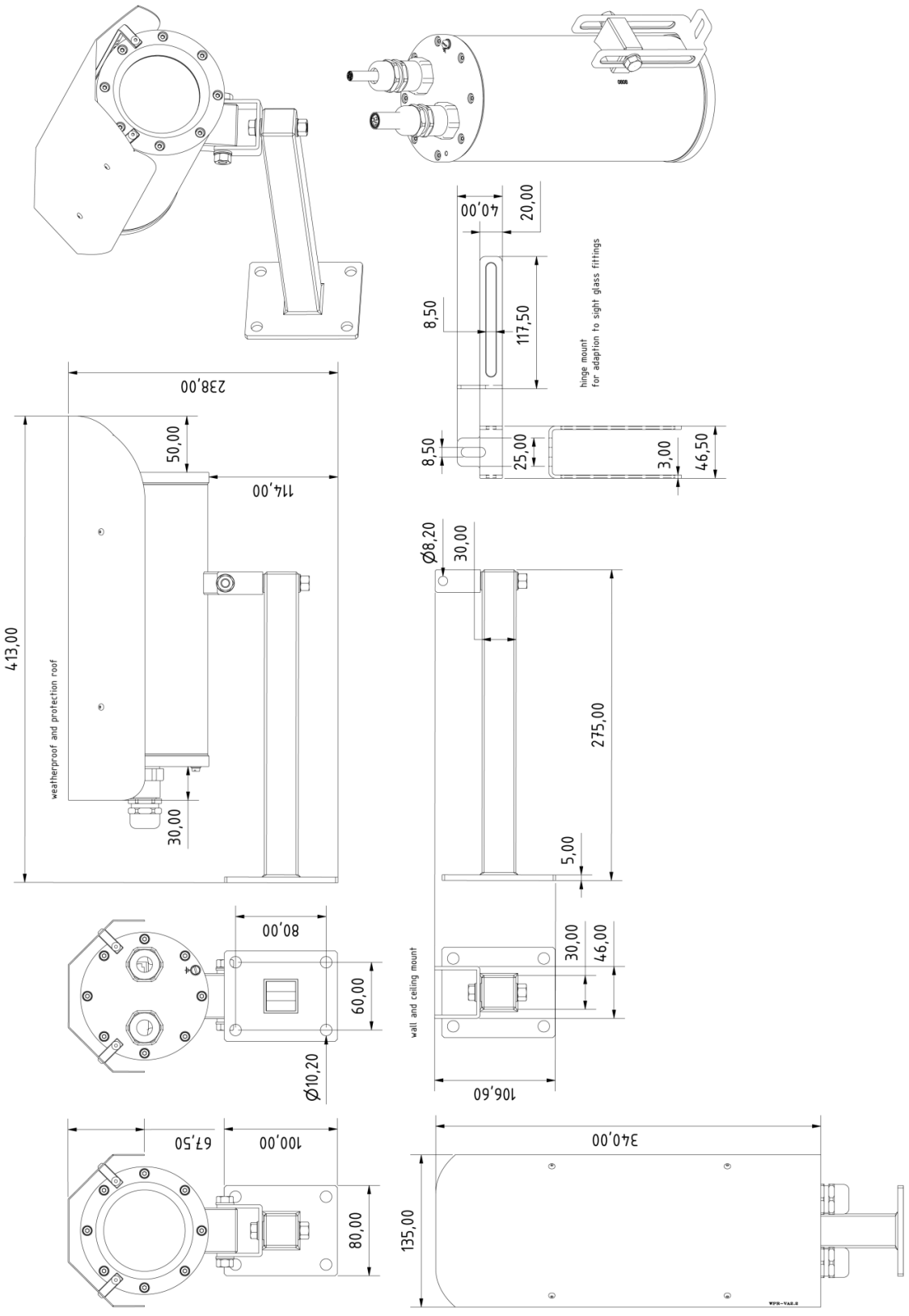


Figure 10.3 – Dimensions of the T08 ExCam IP135x with accessories

12 Notes

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