RoughCam IPM1145-(L)

User manual

SAMCON
Prozessleittechnik GmbH

Content

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Revision history

Product:	T10 RoughCam® IPM1145-(L)
Title:	User manual of RoughCam® IPM1145-(L)
Doc.-Id.:	180516-PT10BA-ES-RoughCam IPM1145-(L)_en_rev.01.docx
Author:	Eva Schneider
Date:	May 16, 2018
Last revision:	Dec. 20, 2018

Rev.-Index	Date	Name	Remarks	Authorization
0	May 16, 2018	E. Schneider	Compilation of the document Derived from the following docu-ment150903-PT08BA-TG-ExCam IPM1145_en_rev.01.docx	
1	Dec. 20, 2018	E.Schneider	Adding the PoE+ Versions	Digital unterschrieben von Steffen Seibert DN: cn=Steffen Seibert, o=SAMCON, ou, email=s.seibert@samcon.eu, c=DE Datum: 2019.01.29 16:33:25 +01'00'

1 Introduction

The RoughCam IPM1145-(L) is a high-performance digital camera system (type T10), manufactured by SAMCON Prozessleittechnik GmbH. The system is intended for network transmission via IP/ TCP/ RTSP protocols and Web Interface access. The device is very compact in design, covers all relevant features of a professional CCTV surveillance camera and is available as RoughCam IPM1145 or RoughCam IPM1145-L.

Via the data cable, the camera systems are also supplied with power via Power-over-Ethernet (PoE IEEE802.3af/at) so that ideally only one connection cable is required.

The high-performance of the RoughCam IPM1145-(L) regarding its usage for industrial process, plant, or person surveillance is based on a high-resolution output (1080p) to achieve a detailed and high contrast picture quality even at difficult light settings, day/night functionality, edge storage, individually configurable H.264 and Motion JPEG video streams, an intelligent and fast P-Iris aperture control as well as optional I/O interfaces. The highly efficient infrared LEDs of the RoughCam IPM1145-L are adjustable to meet the individual application requirements to allow a surveillance of objects also in complete darkness.

The camera system is suitable for indoor as well as outdoor applications. It is extremely robust and therefore perfect for even the roughest industrial conditions. The stainless steel housing 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 – RoughCam IPM1145-L with wall mount bracket and roof

2 Technical Data

2.1 Electrical parameters of the camera module

2.1.1 RoughCam IPM1145-(L) (PoE+) (Camera and Heater)

Power supply:	PoE, IEEE 802.3at type 2 class 4
Reference power:	48 V DC (44...54 V DC)
Maximum power input:	24.9 W (30 W from the PSD)

2.1.2 RoughCam IPM1145

Power supply:	PoE, IEEE 802.3af/ 802.3at type 1 class 2
Reference power:	48 V DC (44...54 V DC)
Maximum power input:	6.0 W

2.1.3 RoughCam IPM1145-L

Power supply:	PoE, IEEE 802.3af/ 802.3at type 1 class 3
Reference power:	48 V DC (44...54 V DC)
Maximum power input:	10.5 W

2.2 Electrical parameters of the PTC heat load circuit (optional)

Reference power U_N:	24 V DC
Nominal voltage P_N:	20 W at type L (T_{AMB} ≥ -30°C)
	40 W at type LL (T_{AMB} ≥ -60°C)

Attention!

The power consumption of the housing heating is determined by the ambient temperature or, respectively, by the PTC features[1] found in the modules' individual operating points. In addition, the performance of the PTC load circuit is influenced by the switching-on characteristics of the CB06 circuit board, the load operation of the internal camera module as well as the convection cooling on the outside (heat dissipation via housing).

Per module, the switch-on power can reach ***P_{max} > 100W****! Supply cable fine wire fuses have to be dimensioned accordingly by the end user. A super-slow (-TT-) trigger characteristic is recommended.*
The typical continuous power rating at the low temperature range (T_{AMB} -30°C) is ***$P_{(-30°C)}$ = 12.2 W*** *at a saturated condition*
The typical continuous power rating at the artic temperature range (T_{AMB} -60°C) is ***$P_{(-60°C)}$ = 26.8 W*** *at a saturated condition*

The typical start-up peak at the low temperature range (1x HP05 heating element) is ***I_{max} > 4000mA*** *!*
The typical start-up peak at the artic temperature range (2x HP05 heating element) is

[1] P_{HP05} = KxAxT (K=5.5W/m²)

I_{max} > 8000mA !
The typical in-rush-duration for I_{PTC} < 1000mA per module is ***t_{ON} ≤ 45s***
The typical in-rush-duration for I_{PTC} < 500mA per module is ***t_{ON} ≤ 120s***
(saturated range/ steady current)

2.3 Connection cable SKD01-T

Description:	Samcon System Cable Digital (type „SKD01-T“) for low temperature ranges, data transfer and power supply of the camera modules M1145 and M1145-L
Sheath color:	Yellow-green (GN), similar RAL6018
Outer diameter:	9.1 ± 0.2mm
Wall thickness:	1.0 ± 0.1mm
Bending radius:	10 x outer diameter at installation 5 x outer diameter after installation
Tensile:	Max. 140N
Temperature range:	-10° C to +50° C (at point of installation) -60° C to +80° C (fixed installed)
Conductor design:	4 x 2 x AWG22/1 blank, CAT.6a
Isolation:	SFS-PE foamed
Core diameter:	1.52 ± 0.02 mm
Color code:	IEC 708-1
Pair shielding:	Compound aluminum foil
Shielding:	Copper braid, multiple wires 0-10 vz, opt. coverage approx. 85%
Outer sheath:	PUR FHF
Characteristics:	PUR halogen free, flame resistant (EN 60332-1-2), UV and ozone resistant, high chemical resistance, EMV shielded (q.v. www.samcon.eu, data sheet SKD02-T)
User interface:	**P**(Plug) version: RJ-45 Stecker (EIA/TIA-568B), e.g. Weidmüller IE-PS-RJ45-FH-BK, Phoenix Contact VS-08-RJ45-5-Q/IP20 etc., 10BASE-T/100BASE-TX PoE **K**(terminal block) version: about 12 cm stripped: 8 x single conductors twisted pair (solid conductor A=0.33mm^2, ø=0.64 mm approx. 6 mm stripped), 1 x shield (Cu braid tinned 1.5 mm^2, ferule color code according to DIN 46228) 10BASE-T/ 100BASE-TX PoE

2.4 Power Supply cable (optional)

Description:	Ölflex® 440P[2] (*U.I. Lapp GmbH*), power supply for the PTC heat load circuit as well as for the electronical regulation of the CB06 for T10 RoughCam with the model key „L“ and „LL“,
Sheath color:	Silver grey (GY) matt, similar RAL7001
Outer diameter:	7.5 mm
Outer sheath:	Polyurethane mixture TMPU according to EN 50363-10-2 / VDE 0207-363-10-2
Bending radius:	12.5 x outer diameter (occasional movement) 4.0 x outer diameter (fixed installation)
Conductor design:	3G1.5 (0012838), 3 x 1.5 mm^2 (ø=1.4 mm), Fine wired tinned copper strand according to. IEC 60228 / VDE 0295, class 5, with protective earth (GN/YE)
Copper index:	43.0 kg/km
Weight:	96.0 kg/km
Tensile strength:	15 N/mm^2
Characteristics:	Resistant to oil and drilling fluids according to IEC 61892-4: supplement D, wear and notching resistant, halogen free (VDE 0472-815) and flame-retardant according to IEC 60332-1-2, resistant to hydrolysis and microbes, UV resistant, additional testing requirements according to IEC 60811, EN 50396 and EN 50396 (q.v. www.samcon.eu, data sheet Ölflex 440P)
Conductor identification code:	Black conductors with white numbers with GN/YE- protective earth according to DIN EN 50334 / VDE 0293-334
Classification:	ETIM 5.0 Class-ID: EC 000104, ETIM 5.0 type: Control cable
Conductor insulation:	Thermal Plastic Elastomer (TPE)
Nominal current U_0/U:	300/500 V AC/DC
Test voltage:	3000 V
Temperature range:	-40°C to +90°C (occasional movement) -50°C to +90°C (fixed installation)
User interface:	**P**(Plug) version: *n/a / upon request* **K**(terminal block) version: 3x 1.5 mm^2 (3G1.5) Cu strand with ferules (color code according to DIN 46228). Sheath about 12 cm stripped and furnished with bend relief / shrink tubing

[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)

2.5 Technical specification of the camera modules

Note:
Technical details of the internal CCTV module such as light sensitivity, resolution, frame rate sensor, shutter times, lens details, streaming functions, supported network protocols, event trigger, storage options, and picture parameter setting via the web interface are thoroughly provided in the data sheets of the camera manufacturer and not part of the T10 RoughCam user manual.

2.5.1 Axis M1145

Data sheet:
http://www.axis.com/files/datasheet/ds_M1145_1480602_en_1604.pdf

User manual:
http://www.axis.com/files/manuals/um_m1145_57266_en_1512.pdf

2.5.2 Axis M1145-L

Data sheet:
http://www.axis.com/files/datasheet/ds_m1145l_1480603_en_1506.pdf

User manual:
http://www.axis.com/files/manuals/um_m1145l_57268_en_1512.pdf

2.6 IR-LED Illumination

2.6.1 Axis M1145

Specification: *n/a*
(the Axis M1145 camera module does not have integrated IR LED illumination with additional photo diode for measuring the light conditions)

2.6.2 Axis M1145-L

Specification: 2 x highly efficient LEDs[3]

- with optimized infrared spectral components ($\lambda_{centroid}$ = 850 [nm]), allows high-contrast black and white pictures in darkness and under difficult light conditions
- Adjustable intensity and illumination angle, typical range up to 15 m
- Light sensor for automatic activation or deactivation of the infrared diodes

[3] Depending on the adjusted illumination angle, it is possible that at turned on IR LED illumination, the angle of view is slightly restricted or a minor shadowing is noticeable

- Includes a particularly developed chloroprene rubber adapter for limiting the scattering angle due to infrared light reflections within the pressure resistant housing (q.v. optimization of shadowing and interferences due to multiple LED light reflections at the borosilicate sight glass of the stainless steel housing)
- Radiation angle: Max 30°

Figure 2.1 – RoughCam IPM1145-L

2.7 Temperature range (MTBF)

2.7.1 RoughCam IPM1145(-L) PoE+

Permitted functional ambient temperature (MTBF)[4]:	-30 °C to +40 °C	(type L)

2.7.2 RoughCam IPM1145

Permitted functional ambient temperature (MTBF)	0 °C to +40 °C	(type N)
	0 °C to +70 °C	(type H) (T5)
	-30 °C to +40 °C	(type L)
	-60 °C to +40 °C	(type LL)
	-30 °C to +70 °C	(type LH) (T5)

2.7.3 RoughCam IPM1145-L

Permitted functional ambient temperature (MTBF)	0 °C to +40 °C	(type N)
Axis M1145-L	0 °C to +65 °C	(type H) (T5)
	-30 °C to +40 °C	(type L)
	-60 °C to +40 °C	(type LL)
	-30 °C to +65 °C	(type LH) (T5)

[4] Functional temperature range concerning the operational temperature range of the installed non-Ex components according to AXIS manufacture declarations (MTBF – mean time between failures) under consideration of thermal power loss and the temperature coefficient of the housing.

2.8 Other technical data

Protection level EN 60529/ IEC 529:	IP68 *Test conditions (>IP67): 24h/ 3m* water column*, pH-neutrality, temperature of the liquid medium: +5° C ≤ T_{Water} ≤ +20° C.* An additional mechanical protection against water jets is recommended

Housing material[5] according to DIN EN 10027-2: 2015-07 (making system for steel):

Housing material (*standard*)	MNo.: 1.4404 (X2CrNiMo17-12-2), **AISI 316L** / V4A
Housing material (*optional*)	MNo.: 1.4301 (X5CrNi18-10), **AISI 304** / V2A MNo.: 1.4305 (X8CrNiS18-9), **AISI 303** MNo.: 1.4401 (X5CrNiMo17-12-2), **AISI 316** / V4A MNo. 1.4571 (X6CrNiMoTi17-12-2), **AISI 316Ti** / V4A
Protective coating:	Standard color RAL7035 (all RAL colors and special colors possible!), DURALMIT® 2K-PUR structure, type DSPT (isocyanate netted, polyester modified acrylate resin, fine structure (1.6…2.0 [mm] nozzle), surface resistance ≤ 9^11[Ω], layer thickness ≤ 0.2 [mm], screw connections, flat gaskets and cable glands are excluded from the coating
Additional metallic/non-metallic materials of the housing protection system:	Zinced spring steel MNo.: 1.0330, PTFE with glass microbeads (GYLON® Style 3504 blue), silicone-coating (Silcoset 105 incl. CureAgent 28), VMQ (silicone), thermos transfer foil made of polyester (aceton resistant), cable glands made of brass, nickle-plated (MsNi)
Sight glass material:	Borosilicate glass (Ilmadur 10/ I-420) (DIN7080:2005-05)

[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.

Internal materials:	Aluminum die cast, zinced (protection housing of the camera module), polyamide (PA6.6/ PA2000) and polyoxymethylen (POM) isolators and supporting adapters, T08 aluminum universal adapter (EN AW-ALSi1MgMn), PTC-ceramics, infrared anti-reflection adapter made of chloroprene rubber (CR4100/ Z-150), PUR and additional thermoplastic plastics, optical and electronical components etc. **Attention**: *The Axis module is equipped with an ML614R battery which supplies the real time clock (RTC). These lithium button celsl (3.0 V) dispose of 1.2 dimethoxymethane; ethylenglycoldimethylether (EGDME), CAS-No. 110-71-4*
Weight (without accessories):	4700 g (with „K1“ cable gland flange) 5950 g (with „K2“ cable gland flange) 6600 g (PoE+)
Weight accessories:	900 g (wall mount bracket WMB-L) 700 g (wall mount bracket WMB-S) 800 g (Twin adapter WMB-xTA) 650 g (Hood WPR-VA2.1) 100 g (Hinge attachment SCH-VA2.x) 450 g (clamp attachment CMB-S) 1000 g (Samcon cool.Jacket) *Further accessories upon request!*
Dimension Housing (BxHxT)[6]:	113.0mm x 138.5mm x 210.2mm (K1 flange) 113.0mm x 138.5mm x 226.0mm (K2 flange) 113.0mm x 138.5mm x 260.2mm (PoE+)
Dimension with accessories (BxHxT)[7]:	135.0mm x 238.0mm x 393.0mm (with wall mount bracket and hood)
Media resistance:	***Checked upon request only!*** Generally: Resistance to corrosion as well as chemically high-resistance to a variety of substances used in the industrial environment and suitable for offshore applications (q.v. the general specifications of stainless steel MNo.: 1.4404, surface finish of the housing, Gylon flat sealing etc.)

[6] Dimension stainless steel housing T11 VA2.1.x.x with mounting, without cable gland, without external accessories, for further / more detailed dimension please refer to chapter 10 – Technical Drawings
[7] Dimension camera housing T11 VA2.1 with wall mount bracket WMB-L and hood WPR-VA2.1 (axially aligned, maximum depth)

- The resistance significantly depends on the following factors: *Temperature, concentration, duration and media type (liquid, gas, steam etc.). The resistance towards environmental influences and mechanical strain can be maximized by an optional certified protective coating! To increase the corrosion characteristics it is also possible to electro-polish the applicable components* -

3 Safety guidelines

Please observe the national regulations regarding security, installation, and accident prevention for the erecting of electrical plants as well as the safety guidelines described in this user manual!

Attention!
If components have to be repaired this must be done with original components of the Samcon Prozessleittechnik GmbH.

4 Illustration of the model key

The following model options are currently available for the T10 RoughCam IPM1145-(L):

	Model options				
Product name[1)]	Type[2)]	Housing combination[3)]	Cable length [m] SKD01-T /Ölflex®440P[4)]	Cable Termin.[5)]	Temp. range[6)]
RoughCam IPM1145 RoughCam IPM1145-L	T10-	VA2.1.K1.BOR-	005-	K-	N
	T10-	VA2.1.K1.BOR-	005-	P-	N
	T10-	VA2.1.K2.BOR-	005-	K-	N
	T10-	VA2.1.K2.BOR-	005-	P-	N
	T10-	VA2.1.K1.BOR-	005-	K-	L
	T10-	VA2.1.K1.BOR-	005-	P-	L
	T10-	VA2.1.K2.BOR-	005-	K-	L
	T10-	VA2.1.K2.BOR-	005-	P-	L
	T10-	VA2.1.K1.BOR-	005-	K-	LL
	T10-	VA2.1.K1.BOR-	005-	P-	LL
	T10-	VA2.1.K1.BOR-	005-	K-	H
	T10-	VA2.1.K1.BOR-	005-	P-	H
	T10-	VA2.1.K1.BOR-	005-	K-	LH
	T10-	VA2.1.K1.BOR-	005-	P-	LH
…PoE+	T10-	VA2.2.K1.BOR-	x	x	x

Table 4.1 – Model key

Explanation:

1) RoughCam = IP**M1145-(L)** — Functional camera description of the T10 RoughCam Series regarding the installed camera module and characteristics: Sensor resolution, light sensitivity, camera angle of view, aperture control, power intake, zoom characteristics (wide/tele range, optical/digital, motor controlled/varifocal), special features (e.g. IR LEDs, Lightfinder or WDR technology) etc.

2) T**10 =** — Production type concerning the certifications of the „T10 RoughCam Series“

3) **VA2**.1.K1.BOR = T11 housing with large diameter ($Ø_{VA}$=113 mm) and large sight glass (Q_{BOR}=72 mm) effective, translucent area)
VA2.**1**.K1.BOR = T11 housing with minimum body length ($L_{VA2.1.R}$ = 188 mm)
VA2.**2**.K1.BOR = T11 housing with medium body length
VA2.1.**K1**.BOR = K1 cable gland flange (straight cable gland(s) - *Standard* -
VA2.1.**K2**.BOR = K2 cable gland flange (orthogonal cable gland)
VA2.1.K1.**BOR** = Borosilicate sight glass DIN7080 (standard execution, for video cameras within visible spectral range: λ = 350…2000 [nm]. Not suitable for thermographic applications)

4) **005** = Length of the connection line in meter at delivery. The standard cable length is 5 m (minimum/maximum cable length: 001…100 [m])

5) **K** = Terminal block termination (*standard*)
SKD01-T: CAT6a, 8x single conductor AWG22/1 „twisted pair“ solid conductor copper blank, 0.33 mm² / Ø=0.64 mm, approx. 6 mm striped, 1x shield CU-braid tinned 1.5 mm² with ferules blue
Ölflex 440P: Supply, 3G1.5mm², Cu Sheath about 12 cm stripped and furnished with bend relief / shrink tubing

P = Plug- termination (*optiona*l)
SKD01-T: CAT6a, RJ-45 network plug (heavy duty), AWG 26-22, e.g.: Type Weidmüller „IE-PS-RJ45-FH-BK“ or type Phoenix Contact „VS-08-RJ45-5-Q/IP20“, contact assignment always acc. to specification EIA/TIA-568B 1
Ölflex 440P: Q.v. terminal block termination
Plug-termination *n/a* or upon request

(6)

N =	Normal ambient temperature range (MTBF):	T_{AMB_N}:	0 to +40 [°C]
L =	Low ambient temperature range (MTBF):	T_{AMB_L}:	-30 to +40 [°C]
LL =	Lowest ambient temperature range (MTBF):	T_{AMB_LL}:	-60 to +40 [°C]
H =	High ambient temperature range (MTBF):	T_{AMB_H}:	0 to +70 [°C]
LH =	Broad ambient temperature range (MTBF):	T_{AMB_LH}:	-30 to 70 [°C]

5 Commissioning

Before mounting the camera must be checked for transport or storage damage.

Attention!
Please observe the national regulations regarding security, installation, and accident prevention for the erecting of electrical plants as well as the safety guidelines described in this user manual!

5.1 Step 1: Installation

Install the RoughCam® IPM1145-(L) at the desired location. More detailed description of mounting options and accessories you can find on http://www.samcon.eu.

5.2 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 RoughCam® Series has to be grounded via a PE-connection!

The RoughCam® IPM1145-(L) Series is delivered with the electrical connection cable type SKD01-T. Optionally, the camera can dispose of a power cable (standard is a type „Ölflex® 440P“).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 RoughCam® IPM1145-(L) is manufactured with a pigtail reflecting the desired cable length. 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.

5.2.1 Potential equalization

Figure 5.1 – RoughCam IPM1145-(L) 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 5.1). 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)), 3Nm Tightening torque has to be observed!

Table 5.1 – Potential equilization

5.2.2 Connection and protection

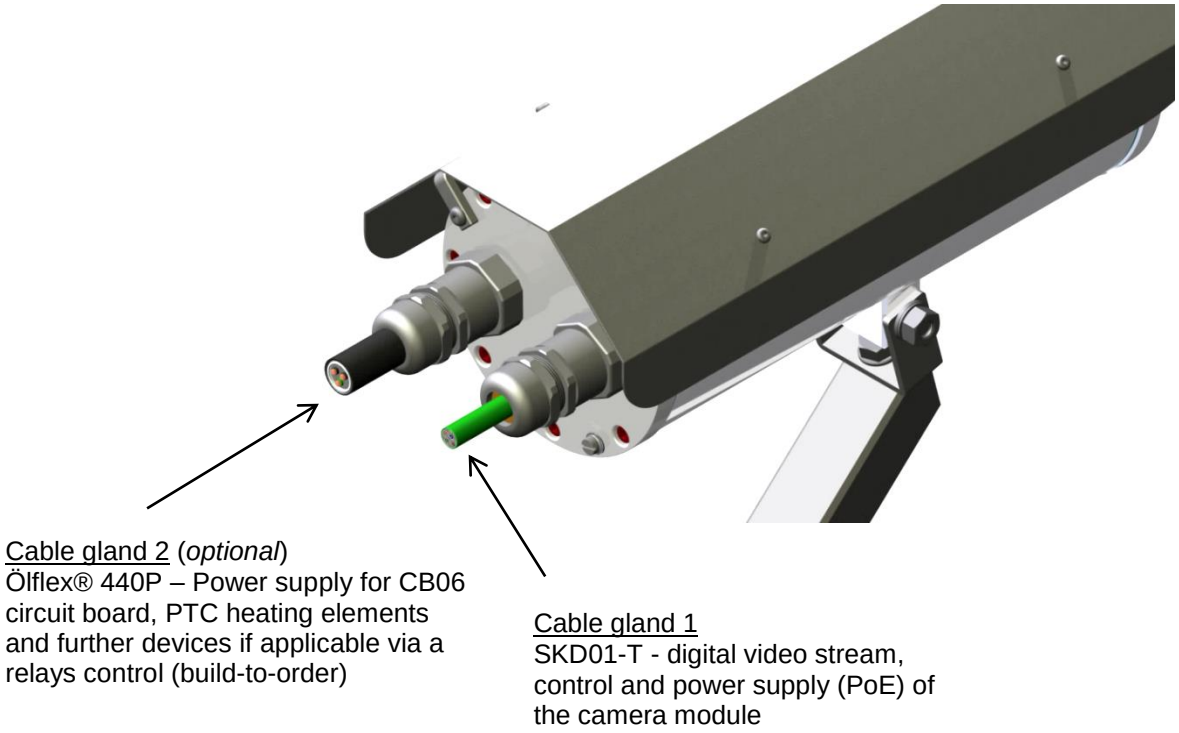


Figure 5.2 – Cable glands and supply cable

Figure 5.3 – RoughCam IPM1145-(L) T10-VA2.1.K1.BOR-XXX-**K**-X

Figure 5.4 – RoughCam IPM1145-(L) T10-VA2.1.K1.BOR-XXX-**P**-X

Figure 5.5 – RoughCam IPM1145-(L) T10-VA2.1.K1.BOR-XXX-X-**L(L)**

RoughCam IPM1145(-L)	Use PoE PSE for 802.3at type 1 class 3 or Use PoE PSE for 802.3at type 2 class 4 (30W)
RoughCam IPM1145(-L) PoE+	Use PoE PSE for 802.3at type 2 class 4 (30W)

Via the 8 (+1) -wire green patch cable SKD01-T, the communication and the data transfer to connected network devices as well as the power supply (PoE) of the camera is carried out. In order to guarantee the power supply (Power Device, PD) of the RoughCam IPM1145-(L), 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 or 802.3at Type 1 Class 3 *(„classification power: 26-30 mA @48 VDC, max. feed power PSE: 15.4 W, max. removal power PD: 6.49 – 12.95 W“*). A 100 Mbit Ethernet Connection (100BASE-TX) is used for the RoughCam IPM1145-(L) data transfer.
In case the camera disposes of a plug, (figure 5.4), 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 RoughCam IPM1145-(L) 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 5.2). Generally, the pins of the same color code are to be connected.

Attention: The general specification for PoE allows different operation modes for PDs (e.g. RoughCam IP1365, RoughCam IPM1145-L, RoughCam IPQ1775 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 T10 RoughCam series supports both modes and the used power source (PSE) determines the mode.

During operation and interaction with a visualization / video management software or during web interface access, it is allowed disconnecting the RoughCam IPM1145-(L) from and later reconnecting it to the network (hot plugging). The same is valid for a switching of due to rebooting purposes.

The standard pin assignment of the SKD02-T in accordance with EIA/TIA-568B for 100BaseTX with PoE (IEEE 802.3af/at) is 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 mm²	Solid conductor
Tx- / PoE ±48 VDC	Tx-	OG	2	0.64 mm²	Solid conductor
Rx+ / PoE GND	Rx+	WH / GN	3	0.64 mm²	Solid conductor
n.a.	PoE +48 VDC	BU	4	0.64 mm²	Solid conductor
n.a.	PoE +48 VDC	WH / BU	5	0.64 mm²	Solid conductor
Rx- / PoE GND	Rx-	GN	6	0.64 mm²	Solid conductor
n.a.	PoE GND	WH / BN	7	0.64 mm²	Solid conductor
n.a.	PoE GND	BN	8	0.64 mm²	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 5.2 – Pin assignment SKD01-T and plug contact RJ45

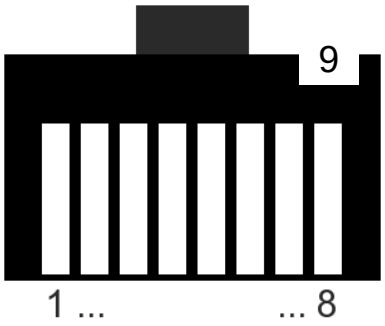


Figure 5.6 – RJ45 Contact assignment

Particularly in EMC critical environments, it is important to earth the shield at the terminal block side (q.v. figure 5.3 – pin with black shrink tubing and blue ferule).

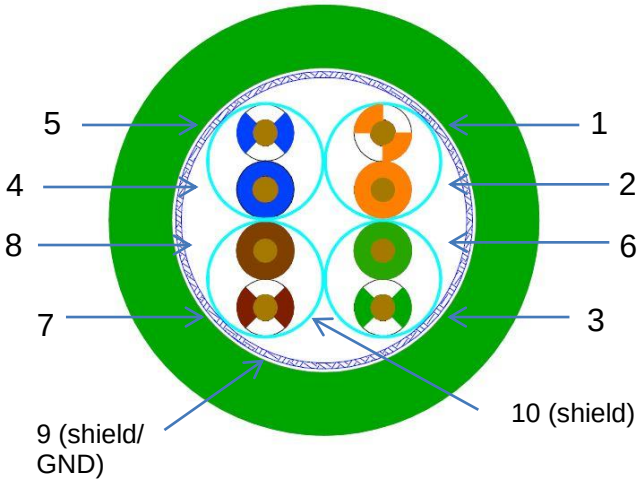


Figure 5.7 – SKD01-T Pin assignment

In case the RoughCam IPM1145-(L) is supplied via a PoE capable device, an additional safeguarding 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 (BTO, supply voltage and network streams are self-sustaining). In this event an adequate supply safeguarding has to be dimensioned.

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

If the 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 5.2)!

If the camera is equipped with a heating or a cooling (type L, LL, LH), 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® 440P (cable gland 2, q.v. figure 5.2 and 5.5). Connection assignment and supply protection according to table 5.3.

Potential/ Pin no.	**Color „Ölflex Robust 440P“** (IEC60757)	**Cond. design**	**Voltage**	**Maximum power input / protection** (type L)	**Maximum power input / protection** (type LL)
L+ / 1	BK	1.5 mm² 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	1.5 mm² litz wire	0 VDC / GND		

Table 5.3 – Pin assignment supply cable for heating type L

Power supply fuse type H q.v. table 5.4 or upon request available!

Note:
If the camera is equipped with a pneumatic camera cooling system (SAMCON **cool.Jacket** for model key type H), also an additional cable gland at the camera housing is required. A „decentral“ magnet valve (ex or non-ex, depending on the application) is accessed in order to control the supply of the pressurized air (cold air feed). For further information, please refer to the applicable user manual of this accessory. The magnet valve’s power supply is executed via an integrated circuit board control and the transistor outputs of the Axis M1145-(L) camera module. The electrical control of the cool.Jacket can either be done via the SKD01-T cable (4 x free conductors at PoE supply Mode A/ phantom power) or a 3G1.5 supply cable of type Ölflex® 440P.

The standard wiring is executed via the power cable and as described in table 5.4 below:

Potential/ Pin no.	**Color Ölflex® 440P (IEC60757)**	**Cond. design**	**Voltage U_N**	**Nominal power I_N**	**Nominal capacity P_N**	**Power supply fuse rating**
L+ / 1	BK	1.5mm², litz wire	+24 VDC	486 mA	11.7 W	Fine fuse 1000 mA -f- flink
L- / 2	BK	1.5mm², litz wire	0 VDC / GND			
PE / 3	GN/GY	1.5mm², litz wire	0 VDC			

Table 5.4 – Pin assigment supply cable for cooling type H

5.2.3 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!

Attention!
When commissioning the camera at temperature below 0°C, it has to be secured that the camera is not switched-on prior to the housing heating. The PTC heating has to warm up the housing before turning on the camera. This can be realized, for example, by the means of an external time relay.

5.3 Testing of the status LED

The camera module's status LED is located in the back of the stainless steel enclosure and is only visible when the housing is open.

The status of the RoughCam IPM1145-(L) is 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	n.a.	

Table 5.5 – Status and control LED

5.4 Step 3: Adjusting the lens

Parametrization measures at the lens of the RoughCam IPM1145-(L) are exclusively done via the Web Interface or the visualization software. Mechanical adjustments at the varifocal lens by the user are not possible. The camera models RoughCam IPM1145 and RoughCam IPM1145-L dispose of a so called „remote Zoom" functionality (q.v. figure 5.8)

The remote zoom function is less capable than a motor zoom lens (slower response time, lower range) but more compact. It allows the user making the final settings via the com-

puter in order to conveniently set the best focus and resolution. Due to the remote focus function, the manual focus adjustment becomes obsolete and the settings can be done via the computer also.

Concerning the configuration and the additional camera settings please refer to chapter 2.6.1 and 2.6.2

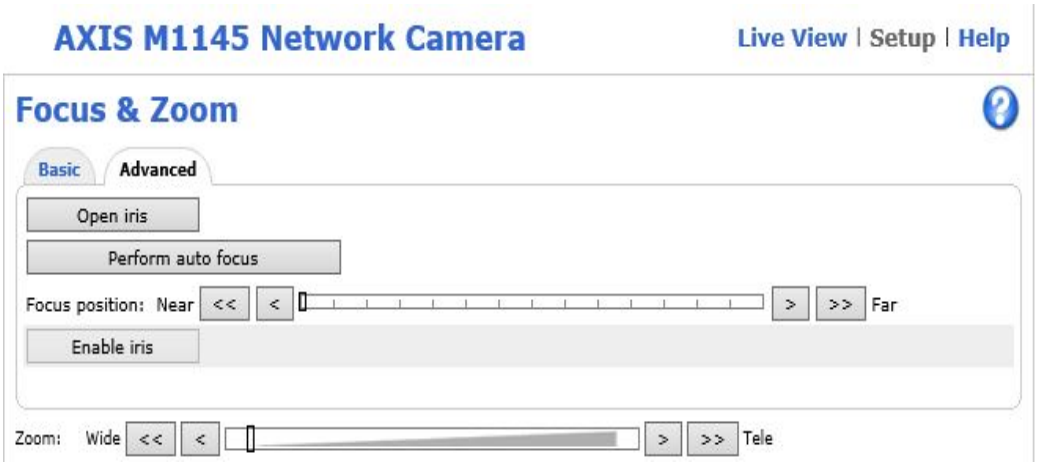


Figure 5.8 – Remote Zoom control of the RoughCam IPM1145-L

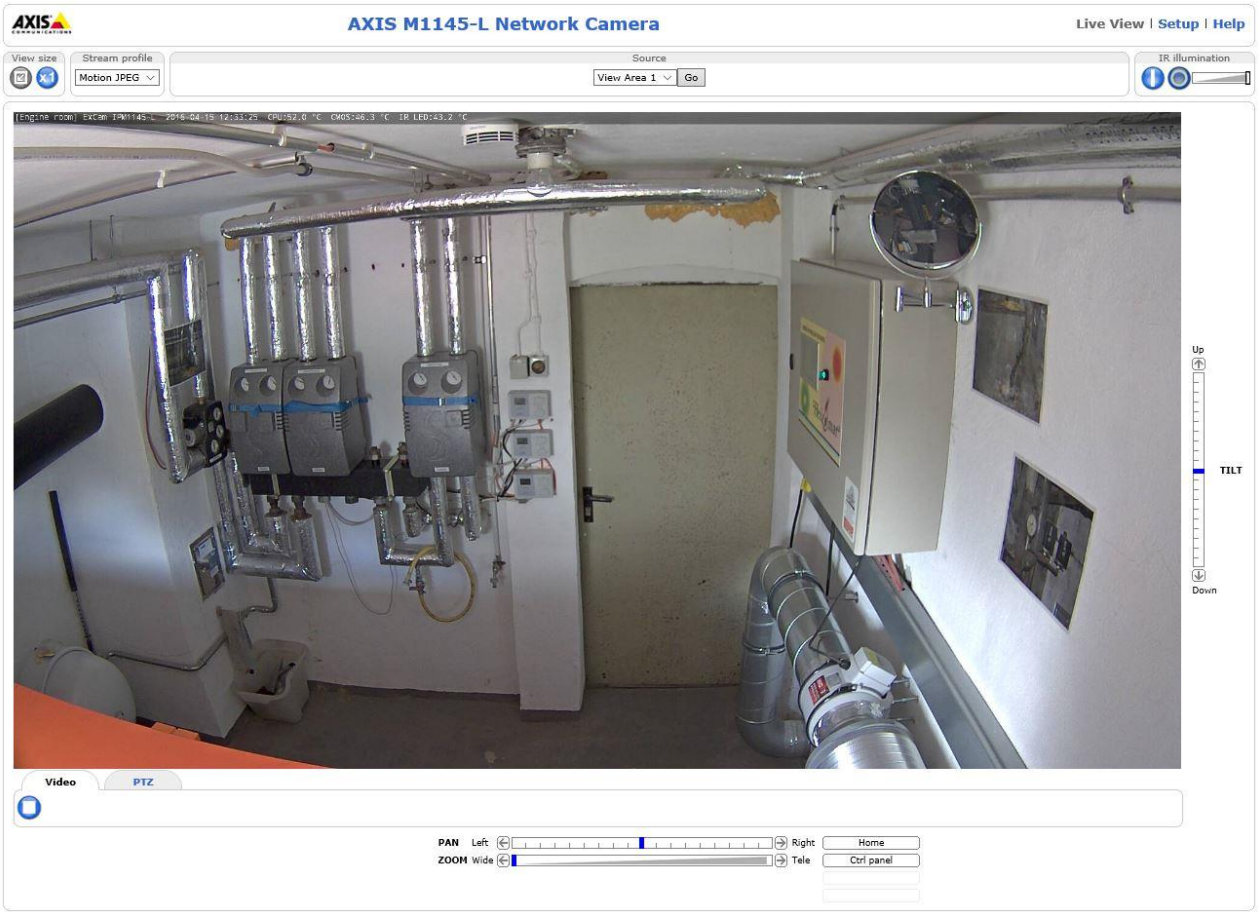


Figure 5.9 – Live View with IR control of the ExCam IPM1145-L

	IPM1145	IPM1145-L
Lens type	Vario-Focus-lens, integrated infrared cut filter, lens fixed installed in the module (no CS mount), motorized remote zoom and remote focus	
Lens	P-Iris, F1.4 / f3.0 – 10.5 mm	
Aspherical technology	Nein	
Focal distance	3.0 – 10.5 mm	
Horizontal angle of view	95°(wide) – 34°(tele)	
Iris control	Precision-automatic	
MOD (Minimum object distance)	0.30 m (wide) / 1.00 m (tele)	

Table 5.6 – Lens data

Information!
If not determined differently, the default setting for the RoughCam® IPM1145-(L) is set to maximum sensor resolution (HDTV 1080p/ 16:9) and low picture compression (high picture quality, high bandwidth requirement). The focus is optimized for a distance of approx. 10 m

It is possible to individually adjust the RoughCam IPM1145-(L) settings to meet the requirements of objects, environmental conditions, or network and hardware performances. The same is valid for passwords, user names, streaming profiles, or IP addresses etc. which can also be pre-configured

5.4.1 Work preparation

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

For the network camera to deliver the best picture quality possible, please select the appropriate installation place; considering the light conditions, object distance and size, angle of view and the minimum object distance for focusing (MOD).

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

5.4.2 Opening the housing

Opening the housing of the RoughCam IPM1145-(L) is allowed for exchanging/extracting the SD storage card or in case a “Hardware Reset“ of the camera module is necessary. After completion of the work, the enclosure has to be tightened securely again. Please be very careful and follow thoroughly the steps of this manual.

If the T10 RoughCam IPM1145-L is equipped with a protection roof, this has to be removed first. To do so, loosen the 4 x 8mm screws M4*0.7 situated on the both ends of the brackets (figure 5.10 and 5.11).

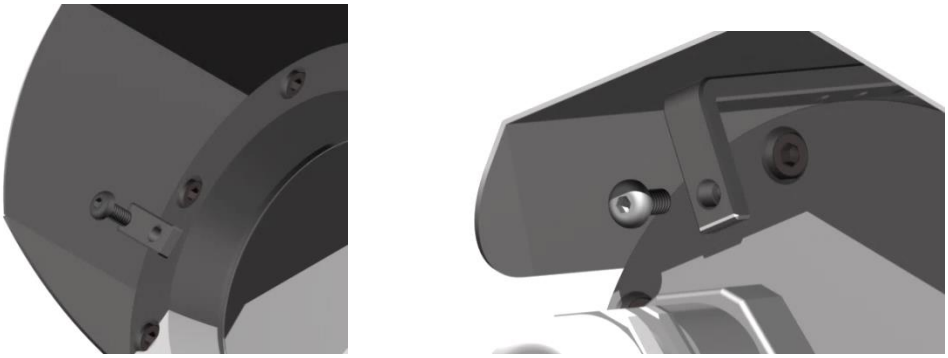


Figure 5.10 – Removing the protection roof (1/2)

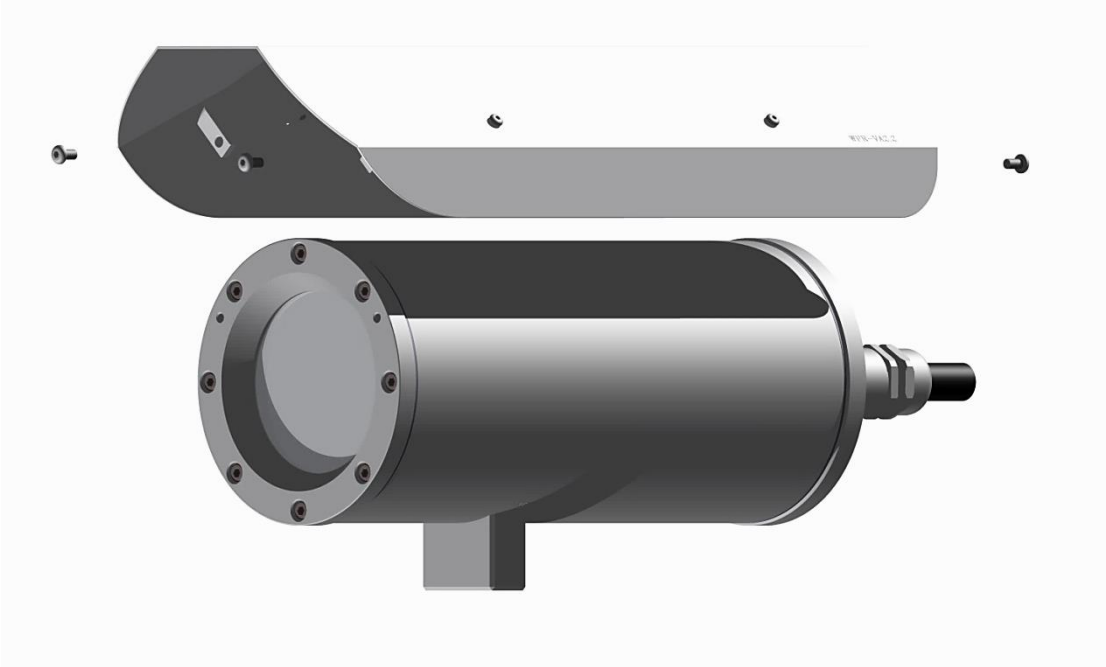


Figure 5.11 – Removing the protection roof (2/2)

To open the stainless steel enclosure (T11 VA2.1.x.x) of the RoughCam IPM1145-(L), loosen the eight 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. fig-

ure 5.12). 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.

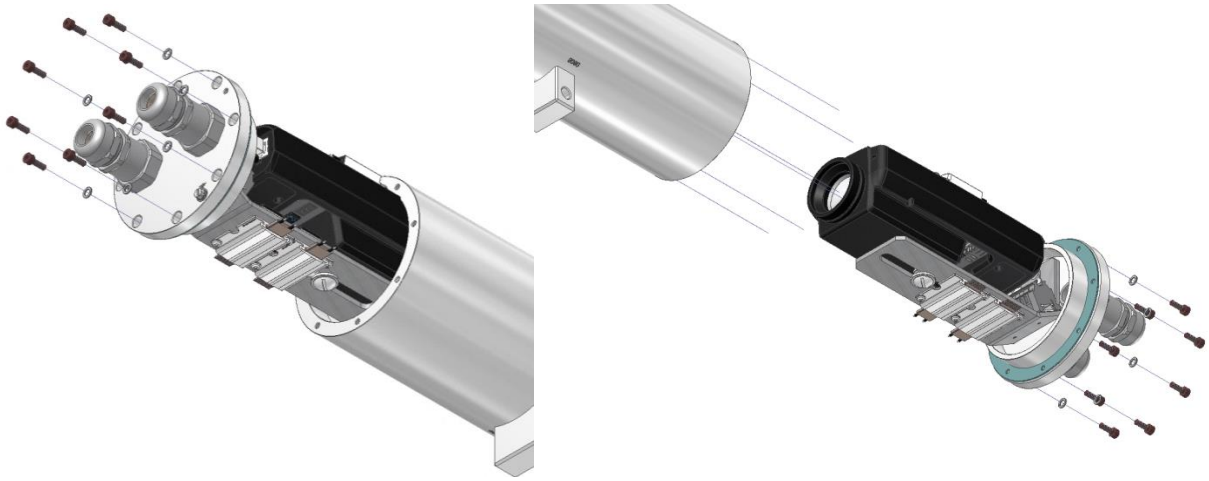


Figure 5.12 – Opening the RoughCam IPxxx

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.
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).

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

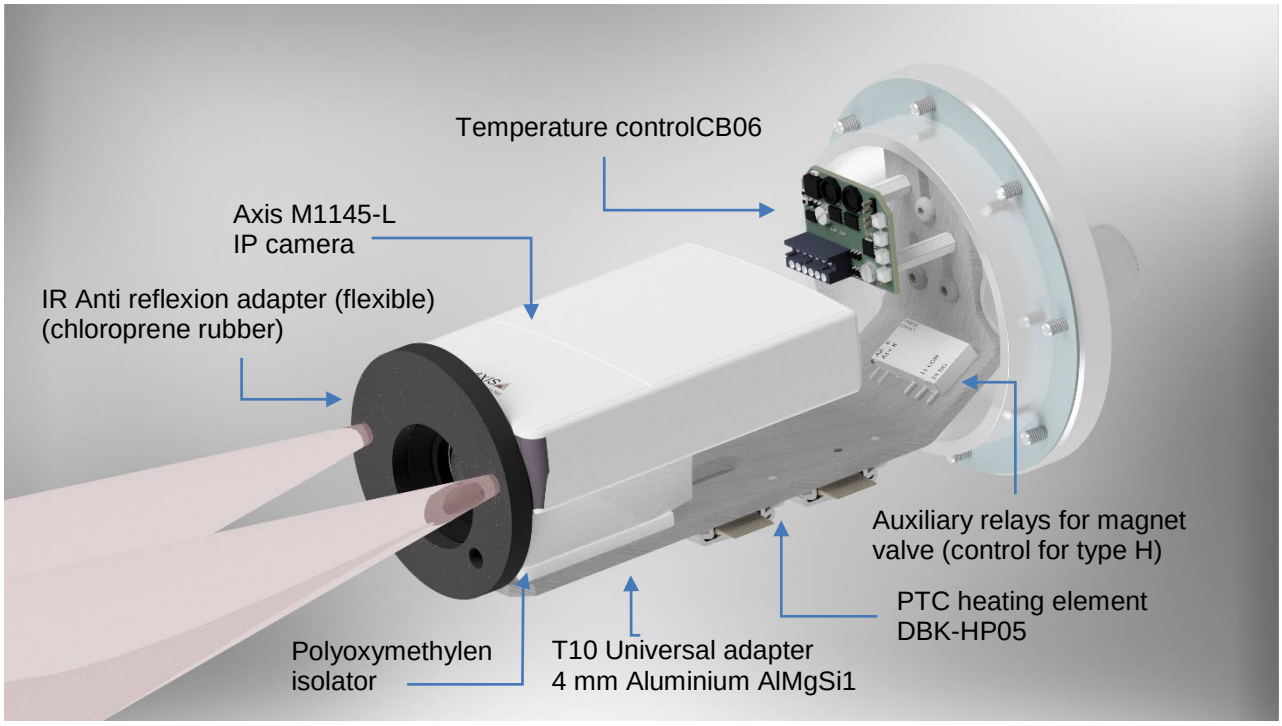
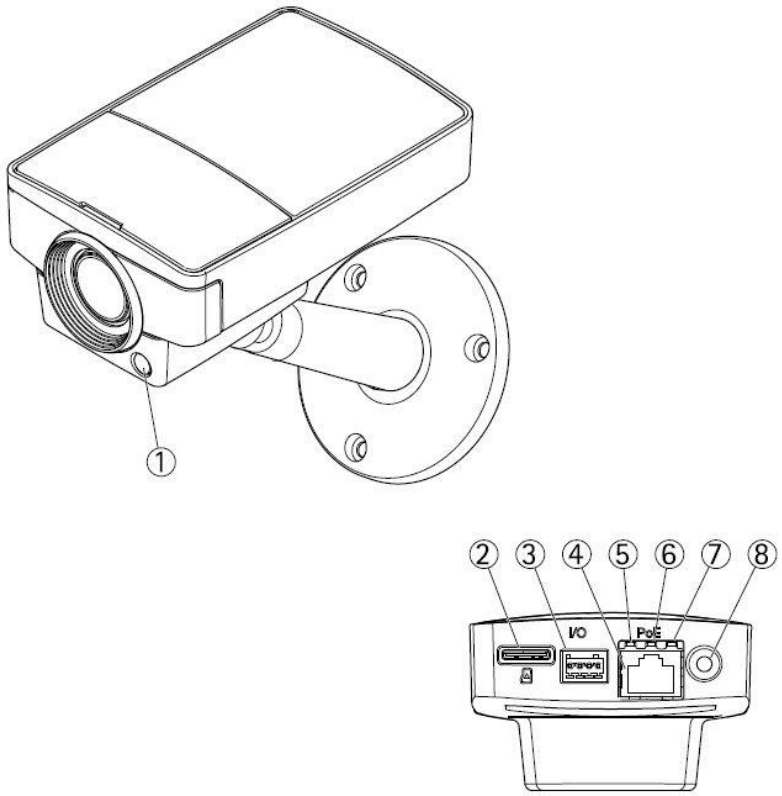


Figure 5.13 – RoughCam IPM1145-L installation components

5.4.3 Extracting/inserting an SD storage card

Note:
The RoughCam IPM1145-(L) can at a customers request be delivered with a microSDHC storage card (not included). 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 5.14).



1. *Light sensor (only for AXIS M1145–L)*
2. *microSD card slot*
3. *I/O connector*
4. *Network connector*
5. *Network LED*
6. *Status LED*
7. *Power LED*
8. *Control button*

Dimensions (HXWXD)
44 x 75 x 114 mm (1.7 x 3.0 x 4.4 in)

Figure 5.14 – MicroSD card slot

Please pay attention when inserting / extracting the storage card. Do not damage electronic parts, clamps, the CB06 circuit board, or the cable gland! Do not bend the mounting adapter as otherwise the optical axis of the equipment is not guaranteed anymore!
The black Infrared-Antireflexionadapter (Neopren see Fig.5.13) must not be applied to any mechanical stress.

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

5.4.4 Hardware Reset

In order to change all parameters, including the IP address, of the RoughCam IPM1145-(L), to the default settings, a hardware reset has to be carried out.
It is possible to reset the parameters either via the web interface or manually. If the camera cannot be accessed anymore via the network or in an uncontrollable state, the reset has to be done manually. To do so, please follow the steps below:

1. Disconnect the camera module (Axis M1145-(L)) from power
2. Press control button 8 (q.v. figure 5.14); simultaneously switch-on power (PoE)
3. Keep the control button pressed until the status light 6 (Abb.6.14) blinks yellow. This may take up to 30 seconds
4. Release the control button. As soon as the status light is green, the camera module Axis M1145-(L) has been reset to Axis default settings. This may take up to one minute. If no DHCP Server is available within the network, the IP address is 192.168.0.90 (subnet masking 255.255.255.0).
5. Now, IP address and password can be re-assigned. If the hardware reset was not successful or if the cameras still does not work properly anymore, (faulty browser visualization, picture freezing, control functions are not carried out, the system generally displays slow response times etc.), please re-install the applicable firmware or carry out an update (qv. chapter 6.4).

5.4.5 Closing of the pressure-resistant housing

For closing the housing, please follow, in reversed order, the steps described in the chapter 5.4.2 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.

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

Attention!
The cylinder head screws for the connection of the housing body and the flange have to be tightened with a torque of 3 Nm! Tighten the screws in a crosswise sequence.

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

The GYLON® flat 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 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 (e.g. Molykote® P-40 paste for standard applications or special lubrication agents such as OKS 403 for seawater environments

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.

For the fixed installation of the RoughCam IPM1145-(L), 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 installation manual! Additional accessories are available upon request.

6 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:

RoughCam IPM1145
http://www.axis.com/us/en/products/axis-m1145/support-and-documentation

RoughCam IPM1145-L
http://www.axis.com/us/en/products/axis-m1145-l/support-and-documentation

Network access of the RoughCam IPM1145-(L) 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 RoughCam IPM1145-(L) 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” (requires a system reboot).

6.1 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

6.2 Assigning the IP address

The RoughCam IPM1145-(L) 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 RoughCam IPM1145-(L)'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 or t consult the network administrator!

The "AXIS IP Utility" tool automatically recognizes all RoughCam devices and displays them (also applies to the subnet). It can also be used to manually assign a static IP address. Please note that the RoughCam IPM1145-(L) 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 RoughCam IPM1145 has the following default network marking: „AXIS M1145 – ACCC8E3A4EBB" (q.v. figure 6.1). MAC address and serial number are also determined and displayed so that a non-ambiguous identification is possible. The network name (host name) of the network camera (web server) can be changed as desired by the user (max. 64 characters).

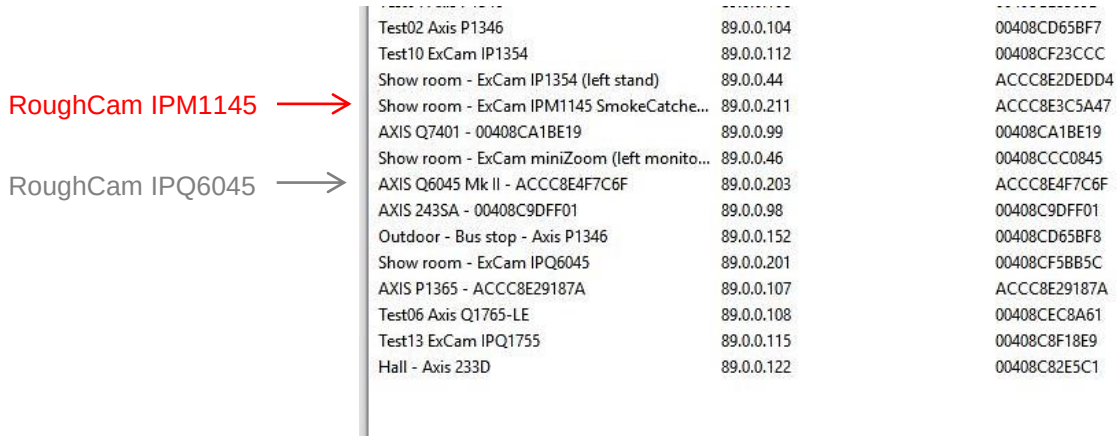


Figure 6.1 – Axis IP Utility

6.3 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 RoughCam IPM1145-(L)
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 RoughCam IPM1145-(L) 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 IPM1145-(L)is now displayed. With the setup link it is possible to open the menu options to allow personal camera settings

7 Maintenance / Servicing / Alterations

The national regulations concerning the maintenance and servicing of electrical devices 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. If maintenance measures are necessary they have to be initiated and/or executed.

8 Repairs and Maintenance

Repairs must only be carried out with original parts of SAMCON Prozessleittechnik GmbH. If in doubt, return the applicable part to SAMCON Prozessleittechnik GmbH.
Repairs 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.

9 Disposal / Recycling

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

This document is subject to alterations and additions.

10 Drawings

Attention: For the cable gland execution K2 the dimensions deviate slightly. The drawings below exclusively show gland execution K1 flange (standard)!

T10-VA2.1.K1.BOR-XXX-X-XX

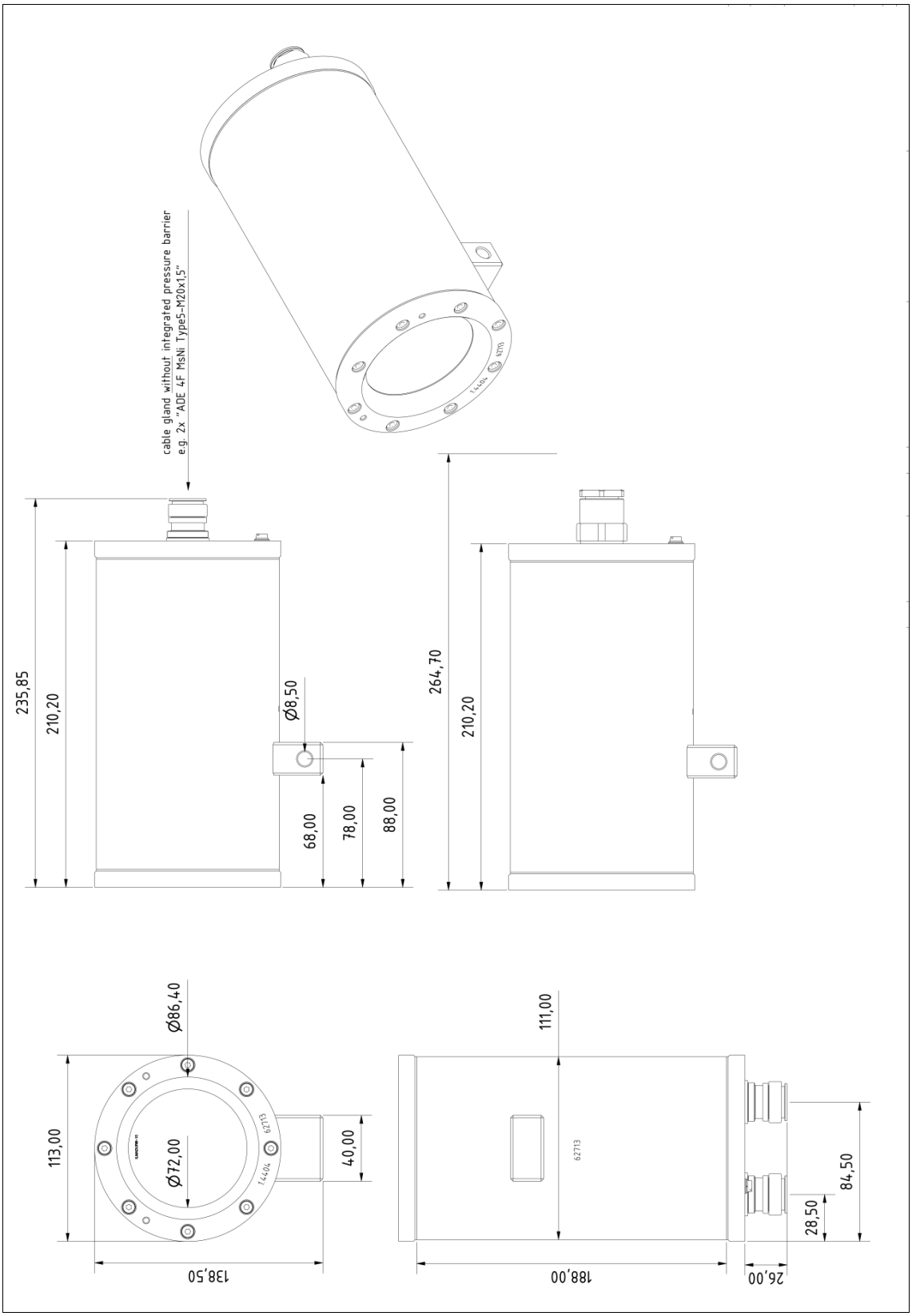


Figure 10.1 – Dimensions T10 RoughCam IPM1145-(L)

T10-VA2.1.K1.BOR-XXX-X-XX with accessories

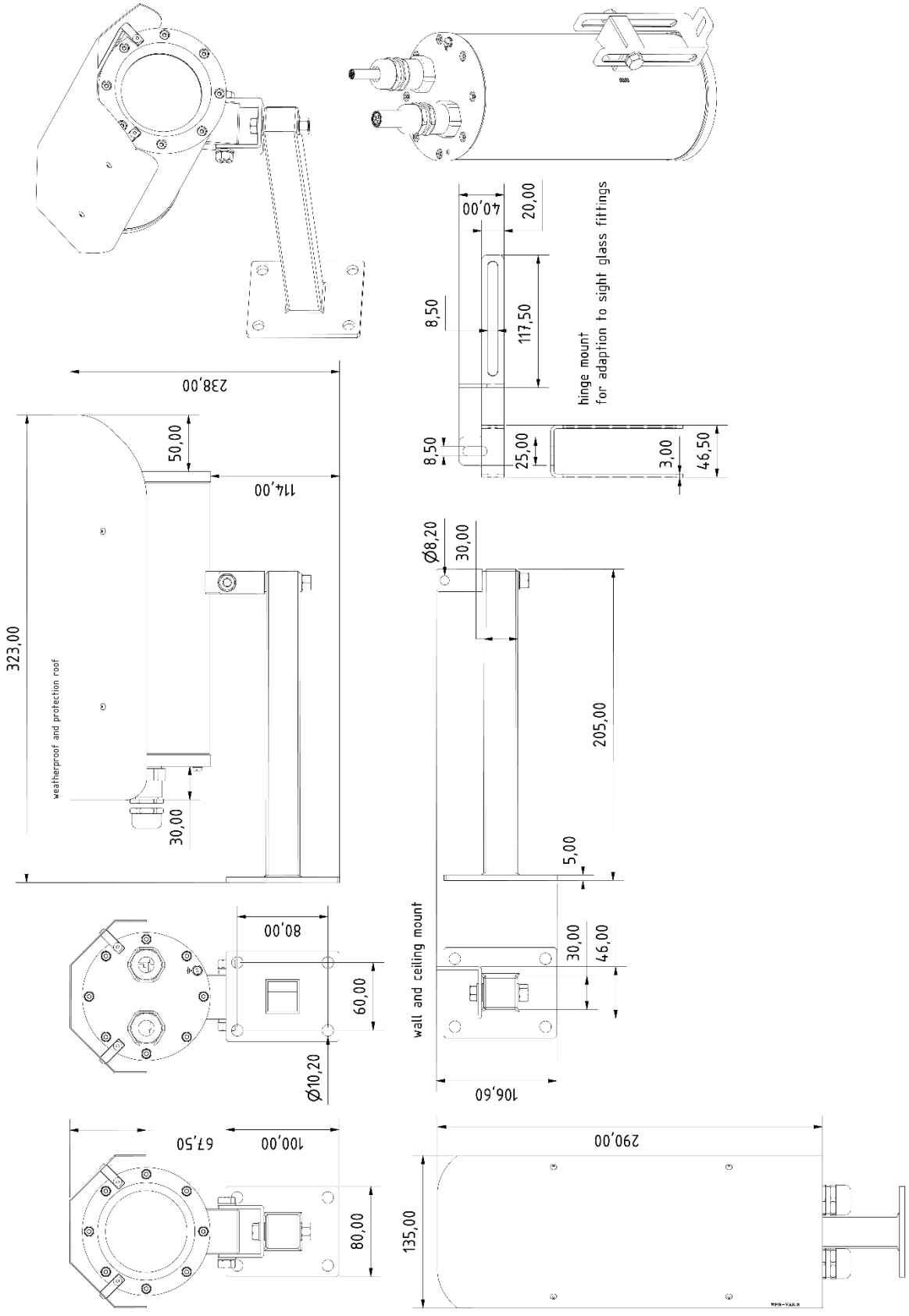


Figure 10.2 – Dimensions T10 RoughCam IPM1145-(L) accessories

cool.Jacket „active housing cooling“

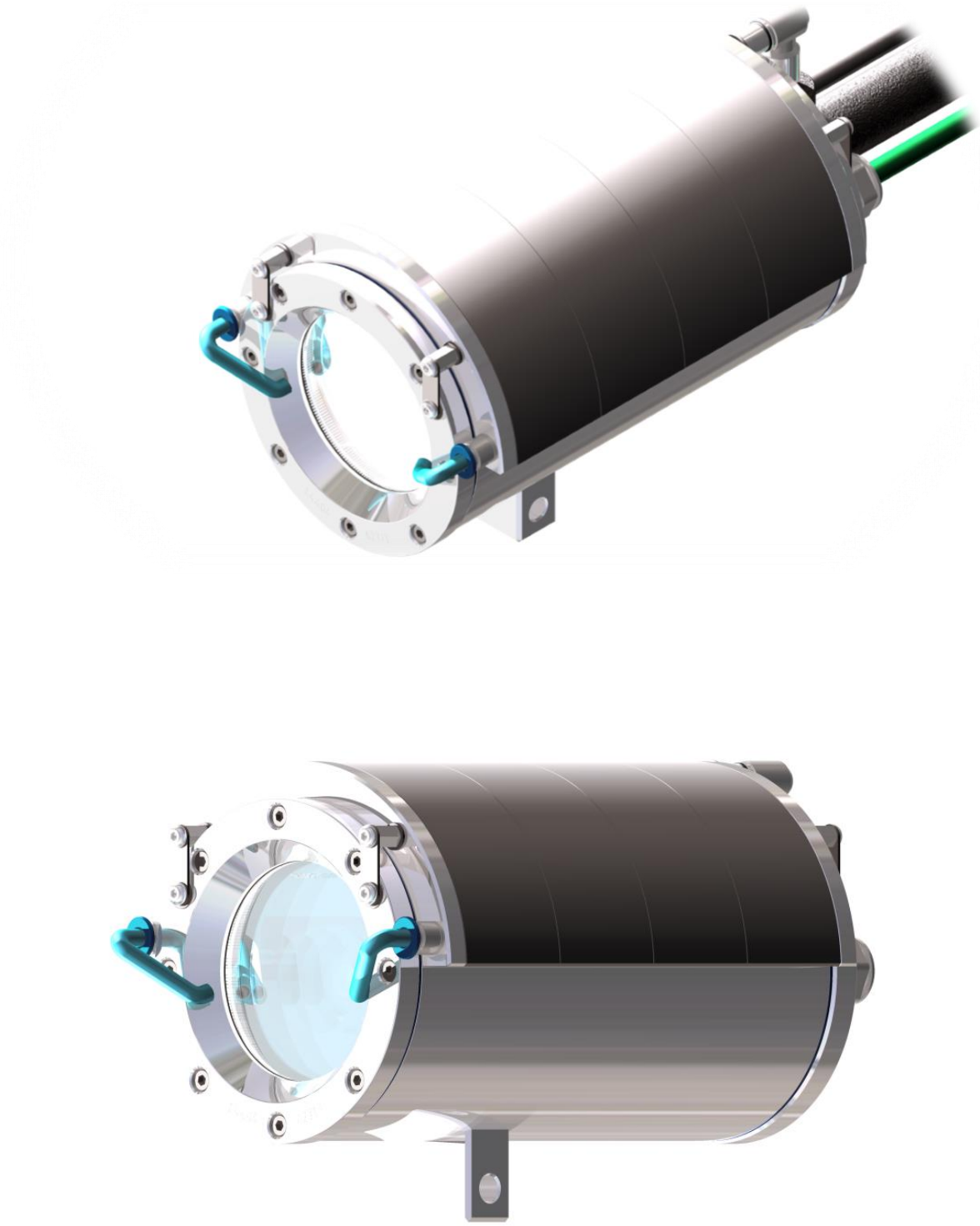


Figure 10.3 – cool.Jacket (example)

11 Notes

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