RoughCam® miniTube

User Manual

SAMCON
Prozessleittechnik GmbH

Content

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Revision history

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1	27.10.2021	E. Schneider	Change of the camera module	
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1 Introduction

The RoughCam miniTube is an ultra compact and robust analog camera (type T10) which is manufactured by SAMCON Prozessleittechnik GmbH and can be used very flexibly for various applications. The RoughCam® miniTube is a static camera system with a fixed lens. Besides for fixed installation, the T10 RoughCam series is also certified to be used for mobile applications (hand-held etc.DIN EN 60079: 0 2012). Due to the usage of high-quality PTFE sealings, not only the protection level IP66/68 is met but also the chemical resistance is maximized.

2 Technical Data

2.1 Illustration of the model key

Productname	Model versions					Option
1)	2) Type	3) Housing-combination	4) Temp.-range	5) Cable length [m]	6) Termination	7) Lens
RoughCam miniTube	T10-	VA0.1.K1.BOR-	N.N-	005.N-	P-	080/056/041
	T10-	VA0.1.K1.BOR-	N.N-	005.N-	K-	080/056/041

Table 2.1 – Model key

Explanations:

1) RoughCam miniTube **=** Functional camera description of the RoughCam Series (technical data / specification of the individual camera module)

2) T**10** = SAMCON Production type 10 cameras for safe areas

3) **VA0**.1.K1.BOR = T11 housing (stainless steel 1.4404) with small diameter ($Ø_{VA}$=48mm)
VA0.**1**.K1.BOR = T11 VA0.x housing with maximum body length ($L_{VA0.1.R}$ = 127mm)
VA0.1.**K1**.BOR = K1 cable gland flange (axial cable gland, standard)
VA0.1.K1.**BOR** = Borosilicate sight glass DIN7080 standard execution, for video cameras within visible spectral range and photographical infrared range (NIR), not suitable for thermographic applications (MIR/ FIR)

4) **N.**N = Normal ambient temperature range, no heater installed (T_{amb} > -10°C)
N.**N**= No cooling system installed (T_{amb} < +50°C)

5) **005**.N = Length of the connection line in meter at delivery. The standard cable length is 5 m, minimum / maximum cable length is: 005…250 [m]
005.**N** = Non armoured cable

6) **P** = Plug- termination (*standard*): cable stripped ca. 30 cm with anti-kink grommet, 4x single wire 0.75mm² with wire end ferrules (grey) and 1x double wire (Koax) on BNC angle plug AWG24 crimped

K = Terminal block execution (*optional*): Approx. 30 cm of the system cable is stripped and equipped with tension reliefs, 6x single conductors with ferrules

7) **Lens Options**

Model	Lens	Iris	Horizontal AoV@16/9
T10-VA0.1.K1.BOR-X.X-XXX-X-080 (Standard)	Megapixel Objektiv 3.6mm	F3.6	80°
T10-VA0.1.K1.BOR-X.X-XXX-X-056	Megapixel Objektiv 6.0mm	F1.9	56°
T10-VA0.1.K1.BOR-X.X-XXX-X-041	Megapixel Objektiv 8.0mm	F1.8	41°

2.2 Electrical parameters

Power supply camera: 12VDC ± 0.3 V DC

2.3 System cable

Outer diameter: 9.4 ± 0.3mm
Bending radius: >12 x outer diameter
Temperature range: -20°C to +80°C (at point of installation)
-40°C to +80°C (fixed installed)
Conductor design: Koax 75OHM 2x2x0,25mm² +4x0,75mm² AWG24
Shielding: Copper braid, multiple wires 0.10 vz, opt. coverage approx. 90%
Outer sheath/characteristics: PUR FHF, halogen free, flame resistant (EN 60332-1-2), EMV shielded

2.4 Technical specification of the camera module

Please note:
Technical details of the internal module such as light sensitivity, resolution, frame rate sensor, lens details and optional accessories are thoroughly provided in the data sheets on our homepage and are not part of the T10 RoughCam user manual.

Data sheets:
https://www.samcon.eu/en/products/roughcam/roughcam-minitube/

2.5 Other technical data

Protection level:	IP 68 (IEC/ EN 60529) (0.5h/ 8m water column)
Transportation / storage temperature:	0°C … +50°C
Ambient temperature:	-10°C … +50°C
Housing material (*standard*)	MNo.: 1.4404 (X2CrNiMo17-12-2), **AISI 316L** / V4A

Additional metallic and non-metallic materials:

Zinced spring steel MNo.: 1.0330, PTFE with glass microbeads (GYLON® Style 3504 blue), silicone-coating (Momentive), thermos transfer foil made of polyester (acetone resistant), cable glands made of brass, nickel-plated (MsNi)

Sight glass material:	Borosilicate glass “Ilmadur 10/ I-420” (DIN7080[1]:2005-05)
Internal materials:	Optical and electronical components, div. thermoplastic plastics: polyamide (PA6.6/ PA2000) and polyoxymethylene (POM) isolators and supporting adapters, aluminum die cast, zinced (protection housing T08 aluminum universal adapter (EN AW-ALSi1MgMn), PUR, etc.
Weight (without accessories):	600 g (with K1 cable flange
Weight of accessories:	800 g (wall mount bracket WMB-VA1.x) 50 g (hinge attachment SCH-VA1.x) (*further accessories upon request)*
Dimensions housing (wxhxd):	48.0mm x 48.0mm x 127.0mm
Dimensions with accessories (WxHxD):	97.0mm x 193.0mm x 299.5mm (*with wall mount bracket and hood*)
Media resistance:	***Exclusively checked upon request!*** Generally: Corrosion as well as chemical highly resistant against a variety of fluid and gaseous components of the industrial area

1 Valid standards for translucent components in a pressure-tight housing: DIN7080:2005-05 „Round sight glasses made of borosilicate glass for compressive stress without limitation of the low temperature ranges“

3 Safety guidelines

Please observe the national safety regulations and regulations for prevention of accidents, as well as to the safety instructions given below in this User Manual!

Attention!
Repairs may only be carried out by using original parts from the manufacturer. Repairs may only be carried out in accordance with the nationally applied regulations and exclusively by the manufacturer.

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

4 Commissioning

For the camera's installation and operation, the relevant national regulations, as well as the generally accepted rules of technology shall prevail. Before mounting the camera, thoroughly check it for any transportation damages, especially at the housing and cable. Installation, electrical connection, and the first commissioning must only be carried out by qualified personnel.

4.1 Step 1: Installation

Install the RoughCam® miniTube at the desired location.

4.2 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 T10 RoughCam® miniTube is delivered with an electrical connection. The maximum transmission distance from camera to receiver typically is 250 m (depending on electromagnetic tolerance/ EMC environment) and can be determined individually to reflect the particular customer specifications.

The RoughCam® miniTube is manufactured with a cable pigtail reflecting the desired cable length. Any electro-technical work inside the camera's enclosure which is done by the user is prohibited and not required. Depending on the model option, the ending of the camera's cable connection is either furnished with a plug or terminal block execusion.

4.2.1 Potential equalization

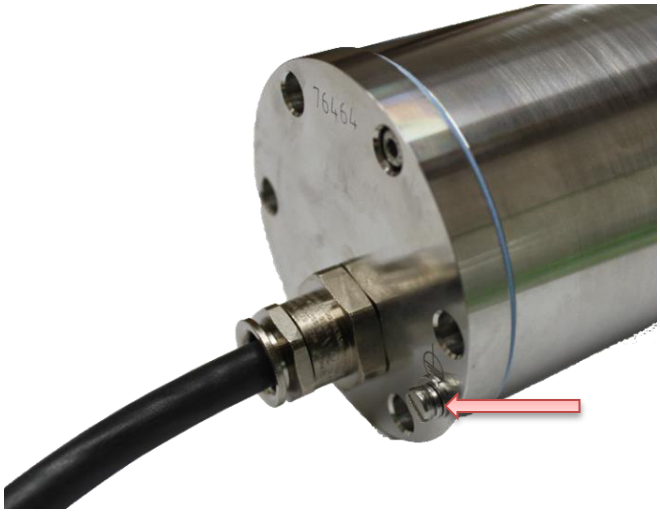


Figure 4.1 – PE connection RoughCam miniTube

The potential equalization (earthing of the camera housing) is mandatory in order to avoid electrostatic charging and hence spark generation. The screw terminal on the housing's rear side is intended for this purpose (q.v. figure 4.1). The profile of the potential equalization has to reflect the national grounding instructions (min. 4 mm^2).

Connection table:

Potential	**Color** (IEC 60757)	**Profile**	**Comment**
PE	GN/YE	4 mm^2 (fix)	Screw terminal: Slotted screw M3 x 0.5 (DIN 84) with washer Ø 9 mm (DIN 125A). 1.2Nm tightening torque has to be observed!

Table 4.1 – Potential equalization

4.2.2 Connection and protection

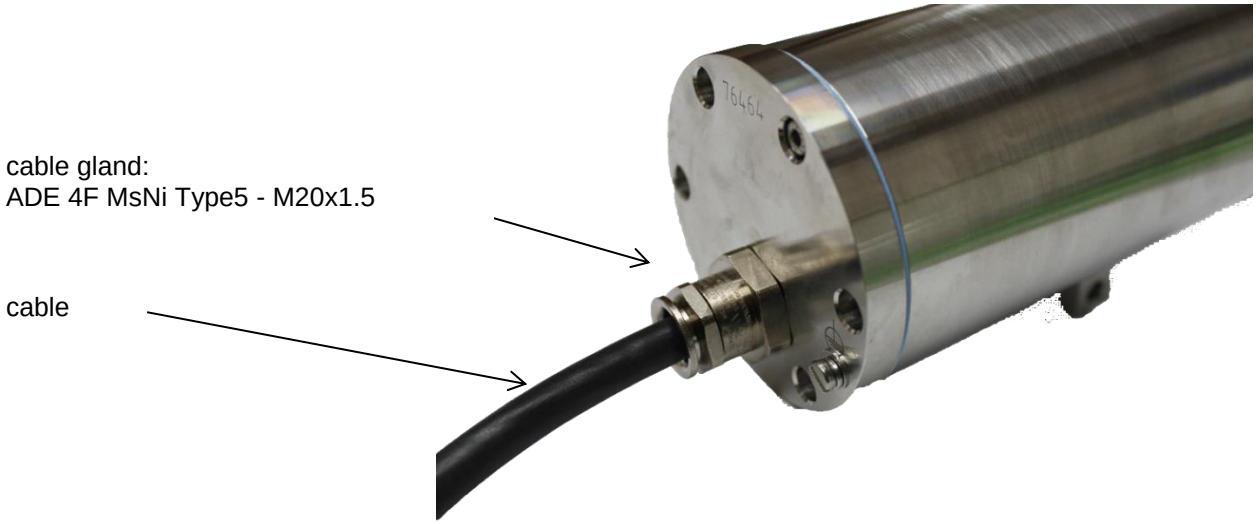


Figure 4.2 – cable gland with cable (figure similar)

Figures 4.3 and 4.4 illustrate the possible cable terminations available for the RoughCam miniTube.

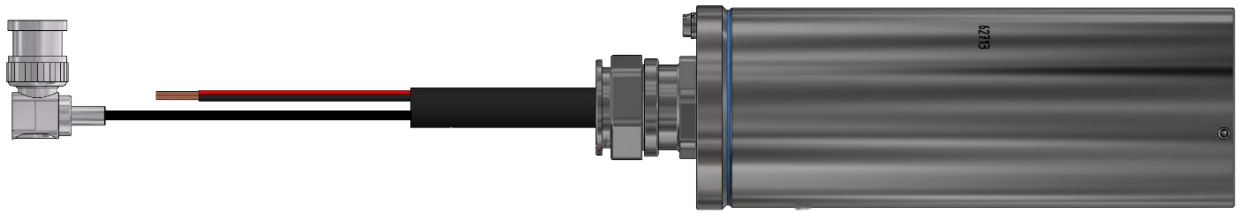


Figure 4.3 – RoughCam miniTube T10-VA0.1.K1.BOR-N.N-xxx.N-**P**

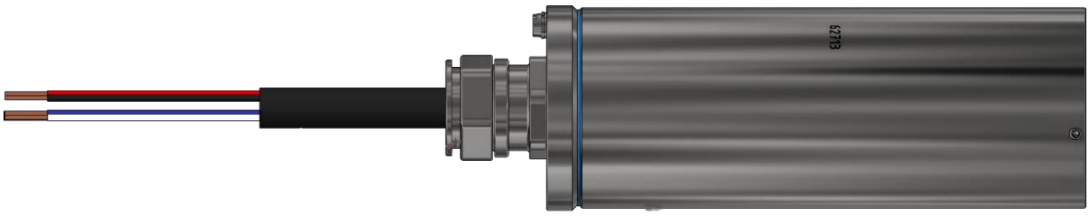


Figure 4.4 – RoughCam miniTube T10-VA0.1.K1.BOR-N.N-xxx.N-**K**

Via the system cable the AHD or CVBS signal is transferred. The power supply of the camera and the optional heating mode is also conducted via this cable.

4.2.2.1 Power supply & protection of the camera circuit

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

Attention!
Use only terminals approved by SAMCON.

The power supply has to be done via the red (RD) as well as the black (BK) connection strand.
Connection table:

Potential	**Color** (IEC 60757)	**Potential level**	**Profile**	**Remarks**
L+	RD	+12 V DC	0.75 mm²	
L-	BK	0 V DC / GND	0.75 mm²	

Table 4.2 – Electrical connection camera module

The camera's typical power consumption is 1.2 Watt.
The dimensioning of the equipment or the supply protection depends on:

- The selected power supply
- The cable length
- The national regulations

The following safety recommendations may serve as a basis:

Supplied power	**Length system cable**	**Recommended protection**	**Comments**
12.3 V DC	< 100 m	500 mA - mT	In case the transmission range exceeds 100 m and it is intended to supply the camera with 12.3 V DC, please make sure to use an adjustable power supply in order to compensate voltage drops
13 V DC	100 m - 250 m	500 mA - mT	In case the transmission range exceeds 100 m and it is intended to supply the camera with 13 V DC, please make sure to use an adjustable power supply in order to compensate voltage drops

Table 4.3 – Supply protection camera module

The release current of the protection has to be less than the maximum short-circuit current of the power supply (switch-mode power supply)!

4.2.2.2 Video picture connection (CVBS or AHD)

Depending on the model key, the video signal of the RoughCam® miniTube is either provided with wire-end (K-option) or with a BNC connector (P-option). The video signal is only to be connected to a monitor, a video matrix, or a video server.
The video output is always 16:9. For systems with a resolution at 4:3, a video converter (see chapter 5) is needed.

Connection table (T10-VA0.1.K1.BOR-N.N-xxx.N-K)

Potential	**Color** (IEC 60757)	**Potential level**	**Profile**	**Comments**
CVBS+	WH/ BU	1.0 V_{p-p} (sync negative)	0.5 mm^2	
CVBS _GND	BU	0 V / GND	2.7 mm^2	

Table 4.6 – Terminal block connection CVBS signal

Connection table (T10-VA0.1.K1.BOR-N.N-xxx.N-P)

Potential	**BNC connector**	**Potential level**	**Profile**	**Comments**
CVBS +	Center (Pin) / core	1.0 V_{p-p} (sync negative)		AWG24
CVBS _GND	Shield (bayonet cap)	0 V / GND		

Table 4.7 – Plug connection CVBS signal

4.2.3 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!
Do not switch on the camera at temperatures below 0°C!

5 Video converter (optional accessory)

To switch the image format from 16:9 to 4:3 the video converter is needed. It is an optional accessory and not included.

Figure.5.1 – Setting of the DIP Switch Videoconverter

To configure the Underscan, the arrow buttons have to be pressed: The left arrow minimizes the Underscan, the right arrow increases it. Maximum Underscan is up to 20%. By pressing both arrow buttons at the same time, the format can be selected 16:9 or 4:3.
3 possible signal-output-options (HDMI, VGA, CVBS) can be displayed at the same time.

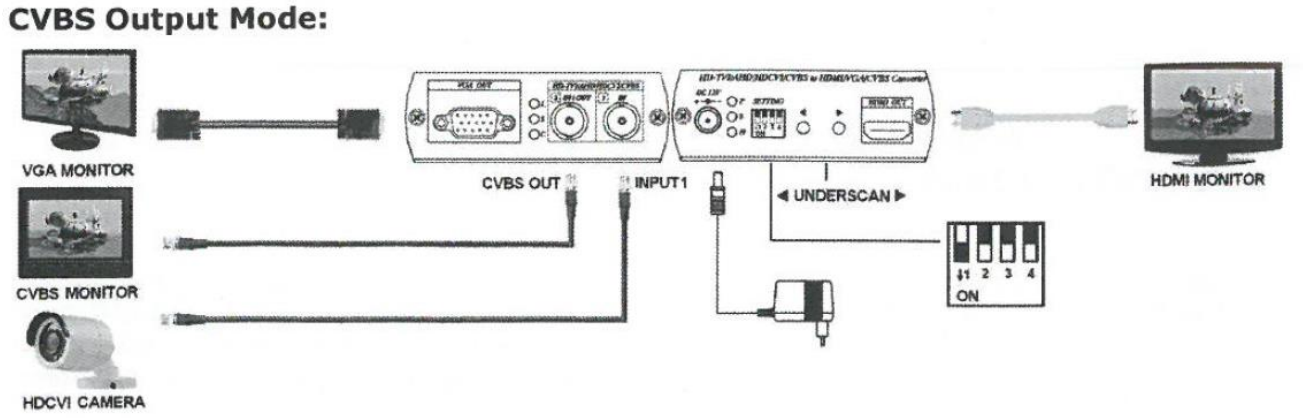
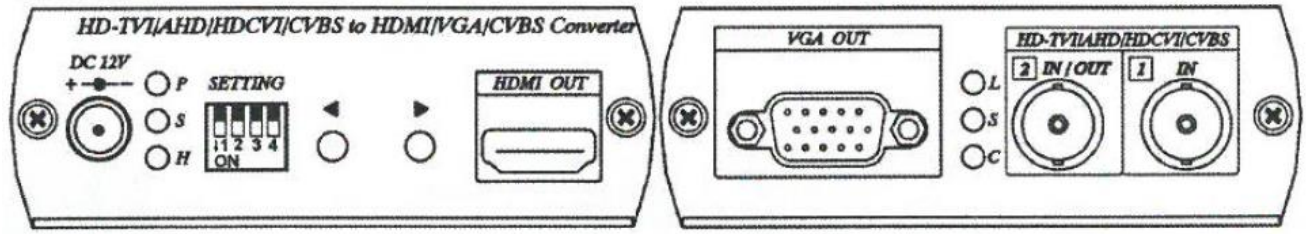


Figure.5.2 –Signal-output-variants



DC 12 V	12 V DC power supply
HDMI OUT	HDMI Out-connection
VGA OUT	VGA Out-connection
1 IN	Camera Input (AHD IN 16:9)
2 IN/OUT	Camera Output (CVBS OUT 4:3)

Figure.5.3 – Panel-View

6 Maintenance / Servicing / Alterations

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.

7 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.
Rebuilding of or alterations to the devices are not permitted.

8 Disposal / Recycling

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

This document is subject to alterations and additions.

9 Drawings

The drawings below are technical drawings of the T10 RoughCam miniTube.
Further drawings also for additional accessories, 3D models, STEP files and DXF shapes are available on the SAMCON homepage:

https://www.samcon.eu/en/products/roughcam/roughcam-minitube/

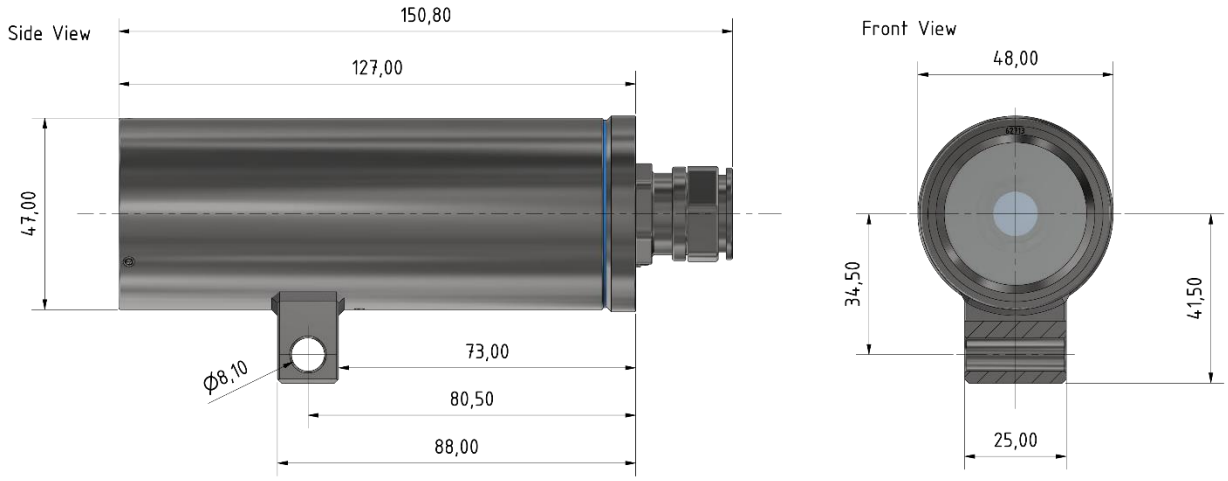


Figure 9.1 – Dimensions of the T10 RoughCam miniTube

10 Certificates and further documentation

Certificates and further technical documents can be found on our homepage:

https://www.samcon.eu/en/products/roughcam/roughcam-minitube/

11 Notes

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