Tough**Cam**® IP

User manual

SAMCON
Prozessleittechnik GmbH

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1 Document Overview

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Figure 1.1 Document overview

The present document is marked in red.

2 Technical Data

2.1 Electrical parameters

Power supply:	PoE, IEEE 802.3af class 1
Reference power:	max. 48 V DC
Maximum power input:	3.84 W
Input current:	350 mA

2.2 System cable SKDxx

Outer diameter:	8.7 ± 0.3 mm
Bending radius:	100 mm
Data connection:	4 x 2 x AWG22/1 CAT.6a
Characteristics:	Halogen free, flame retardant, UV resistant, chemical resistance, shielded (see www.samcon.eu; data sheet SKD01)
Interface:	P version: RJ-45 10BASE-T/100BASE-TX PoE K version: Single Conductor, twisted-pair 10BASE-T/ 100BASE-TX PoE

2.3 Sensor

Type:	1/4" RGB CMOS, progressive scan
Effective sensor resolution:	1 Megapixel, 1280x800 (16:10)
Light sensitivity:	1 – 100000 lux, F2.0

2.4 Processor

Storage:	128 MB RAM, 128 MB Flash

2.5 Lens

Type:	2.8 mm, F2.0, fixed
Angle of view:	80° horizontally, 50° vertically (16:10)
Shutter time:	1/25000 s to 1/6 s

2.6   Streaming

Video compression: H.264 (MPEG-4 Part 10/AVC), Motion JPEG
Frame rate: 25 fps (Net freq. 50 Hz) /H.264, Motion JPEG
                           30 fps (Net freq. 60 Hz) /H.264, Motion JPEG
                           30 fps /MPEG-4 Part 2
Functions: Several, individually configurable streams in
                           H.264 and Motion JPEG, controllable frame rate
                           and bandwidth, VBR/ CBR H.264, digital PTZ,
                           pre-positioning, guard tour surveillance, Edge
                           Storage (Network Attached Storage or
                           File-Sever)

2.7   Parameterization

Picture settings: Compression, color, brightness, sharpness,
                           contrast, white balance, exposure control,
                           exposure zones, backlight balance, fine adjust-
                           ment at low light, picture rotation and mirroring,
                           text and picture overlay, private zone masking
Intelligent Video: Video motion recognition, active manipulation
                           alarm
Event trigger: Intelligent Video
Event actions: Data upload: FTP, HTTP, network clearance and
                           e-mail notification: E-mail, HTTP and TCP, pre
                           and post alarm, video buffer, recording on local
                           storage

2.8   Network

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

2.9 Other technical data

Permissible ambient temperature: -5° C to +50° C

Protection level EN 60529/IEC 529:   IP 67

Housing material: Aluminum die cast or
V2A Stainless steel 1.4301 (standard) or
V4A Stainless steel 1.4401 (customized)
V4A Stainless steel 1.4404 (customized)

Glass material: Borosilicate glass

Weight: 2100 g (Stainless steel T03-VA)
1900 g (Aluminum housing T03-AL)

Dimensions (L x D_{max}):   128 mm x 79 mm with K1 flange
141 mm x 79 mm with K2 flange
(stainless steel T03-VA without cable gland)
163mm x 98 mm
(Aluminum T03-AL without cable gland)

3   Illustration of the model key

The following model options are currently available for the ToughCam IP:

Product name	Model options					
	ATEX Type	Housing option[1]	Explosion-group[2]	Meter SKD01[3]	Cable termin. [4]	Temp. range[5]
ToughCam IP	T03-	VA-	0	005-	K-	N
	T03-	VA-	0	005-	P-	N
	T03-	VA-	0	005-	K-	N
	T03-	VA-	0	005-	P-	N
	T03-	AL-	0	005-	K-	N
	T03-	AL-	0	005-	P-	N
	T03-	AL-	0	005-	K-	N
	T03-	AL-	0	005-	P-	N

*all model options are available in stainless steel and aluminum housing with K1 or K2 supply flange (q.v. chapter 9 – technical drawings)

(1)   VA = Execution in stainless steel
        AL = Execution in aluminum die cast

(2)   0 = Execution without explosion protection

(3)   Length of the connection line in meter (001 - 100)
        (5 meter is the standard length)

(4)   K = Terminal block connection (standard)
            The cable insulation is stripped to the twisted-pair strand (ca. 5 cm), including the shield.
            The individual strands are stripped at the end (ca. 0.5 cm). The fixed Cu inner conductor is
            blank to allow connecting the camera to the terminal block
        P = Plug connection
            The cable is equipped with an RJ-45 network plug (heavy duty), AWG 26-22.
            Type: Weidmueller IE-PS-RJ45-FH-BK, pin assignment according to T568B

(5)   N = Normal temperature (-5° C to +50° C)

4 Commissioning

4.1 Step 1: Installation

Install the ToughCam® IP 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 ToughCam® Series has to be grounded via a PE-connection!

The ToughCam® IP is delivered with an electrical connection cable type SKDxx (System Kabel Digital). The maximum cable length is 100m and can be determined individually to reflect the particular customer specifications.

The ToughCam® IP 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.
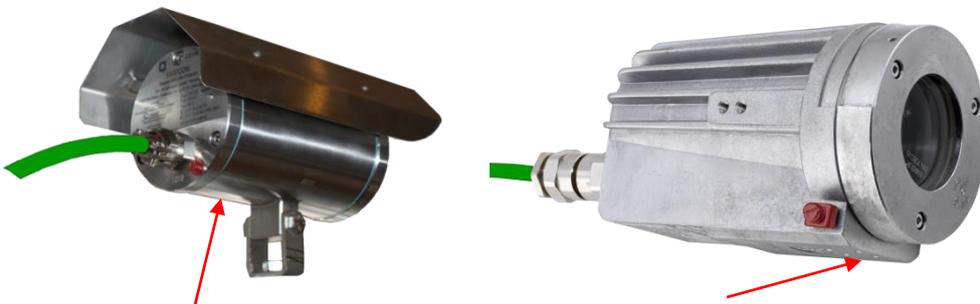
4.2.1 Potential equalization

Figure 4.1 Potential equalization T03-VA and T03-AL

Depending on the housing execution, the equipment's potential equalization is to be carried out at the place indicated in above figure. The profile of the potential equalization has to reflect the national grounding instructions (min. 4mm^2).

Connection table:

Potential:	Color (IEC 60757)	Profile	Comment
PA	GN/YE	4 mm² (fixed)	

4.2.2 Power supply & protection

Figure 5.2 ToughCam IP – T03-VA-B-XXX-<u>K</u>-N

Figure 5.3 ToughCam IP – T03-VA-B-XXX-<u>P</u>-N

The green patch cable SKDxx disposes of 8 conductors used for the data transfer with other network devices as well as to power the camera.
In order to guarantee the power supply of the ToughCam IP, a PoE (Power over Ethernet) capable component has to be available (e.g. a PoE Switch, a PoE Injector, or Midspan) which meets the specification IEEE 802.3af of the power class 1 (0.44 – 3.84 W). An 100 Mbit Ethernet Connection (100BASE-TX) is used for the ToughCam IP's data transfer.

In case the camera disposes of a plug, (figure 4.3) it has to be plugged into the associated 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.
It is also allowed to separate and re-connect the ToughCam IP from the network when in operation or when interacting with the visualization software (hot plugging).

If the ToughCam IP's pigtail has a single conductor termination (figure 4.2) it is mandatory to observe the correct pin assignment on the terminal block. To do so, the potentials of the ToughCam IP have to be connected to the corresponding conductors of the network device. Hence the conductors of the twisted pair cable have to be connected to the conductors with identical color code.

The pin assignment of the SKDxx is in accordance with the standard EIA/TIA-568B for 100BaseTX with PoE according to 802.3af and is executed as follows:

Connection table:

Pin/ Potential	Color (IEC 60757)	Plug contact (TIA-568B)	Profile	Comments
Tx+	WS / OR	1	0.64 mm^2	Solid Conductor
Tx-	OR	2	0.64 mm^2	Solid Conductor
Rx+	WS / GN	3	0.64 mm^2	Solid Conductor
PoE 48 VDC	BL	4	0.64 mm^2	Solid Conductor
PoE 48 VDC	WS / BL	5	0.64 mm^2	Solid Conductor
Rx-	GN	6	0.64 mm^2	Solid Conductor
PoE Gnd	WS / BR	7	0.64 mm^2	Solid Conductor
PoE Gnd	BR	8	0.64 mm^2	Solid Conductor
Shield/ GND	SW	0	*NA*	Braids of tinned copper wire p=0.13mm (AWG 36)

Sheath: PUR, green (similar RAL 6018), Q_A=8.7 mm, halogen free, flame retardant, UV stable, chemical resistance
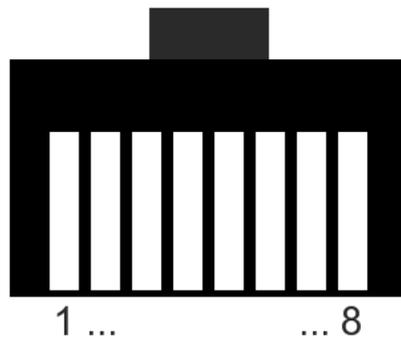
Figure 4.4 ToughCam IP – RJ45 pin assignment

Particularly in EMC critical environments, it is necessary to make sure that the cable shield is grounded on side of the terminal block (q.v. figure 4.2 – pin with black shrink hose and ferrules).
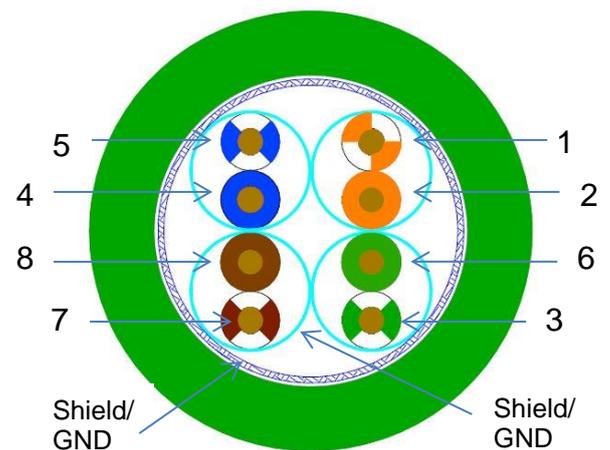

Figure 4.5 ToughCam IP – SKDxx Pin assignment

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.

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!

4.3 Step 3: Adjusting the picture

This step is only necessary in case the picture's default settings (angle, focus, iris, or backlight settings) do not deliver a suitable picture quality.

Lens data:

Lens	F2.0, 2.8mm, fixed
Aspheric technology	No
Focal distance	2.8 mm
Horizontally angle of view	80°
Iris Control	No
MOD (Min. Object Distance)	0.15 m

Information!
If not determined differently, the default setting for the ToughCam® IP is set to a 16:10 picture size (1280x800). The focus range is set from 0.5 m to infinite. If desired, we customize the ToughCam ® IP settings to reflect specific picture sizes (16:10, 16:9, 4:3) and object distances. Please advise accordingly at order placement.

4.3.1 Work preparation

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

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

4.3.2 Opening the housing

In case it is necessary to adjust the picture, the 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.

Stainless steel housing (VA)

Loosen the three screws on the flange of the stainless steel housing. Avoid skin or clothing contact with the screw threads which disposes of LOCTITE (chemical basis: Dimethacrylatester) to secure the screws. It is not allowed to open the sight glass flange.

Figure 4.6 Opening of the stainless steel housing (1)

Carefully pull out the lead flange in a straight manner, ensuring that the board module does not tilt. Avoid skin and clothing contact with the cylindrical fit, the surface is treated with lubrication paste (oleaginous).

Figure 4.7 Opening of the stainless steel housing (2)

Aluminum die cast housing (AL)

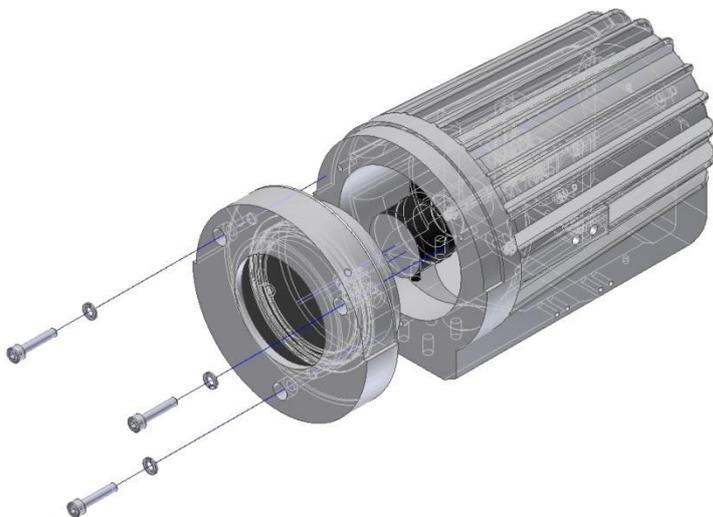Loosen the three screws at the lock ring (glass flange) of the aluminum die cast housing and carefully take it off.

Figure 4.8 Opening of the AL housing

⚠️ **ATTENTION:**
Please make sure not to damage housing sealings

4.3.3   Adjusting the focus

The default focus of the ToughCam IP network camera is 0.5 m to infinite and usually no adjustment is necessary. In order to focus on objects in lesser distance, or in case the focus has not been adjusted correctly please follow the below steps:

1.   Loosen the knurled screws of the focal lens (q.v. figure 4.10)
2.   Turn the lens manually until desired quality in the „Live View" of the web browser has been achieved (q.v. chapter 5 „web browser access")
3.   Tightly secure the knurled screws again

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

Varifocal lens

Figure 4.9 Lens and circuit board of the ToughCam IP

Knurled screws for focus adjustment
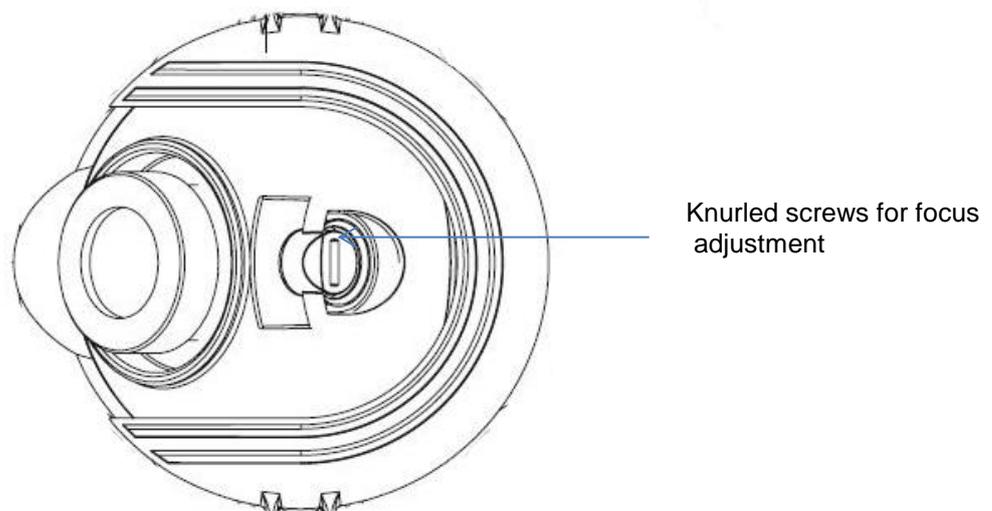
Figure 4.10 Mechanical adjustment of the ToughCam IP

4.3.4 Closing of the housing

For closing the housing, please follow, in reversed order, the steps described in chapter 4.3.3 (opening the housing). Exclusively use the associated cylinder head screw M4 x 0.7 A2 (DIN912).

Do not lock-in any <u>foreign objects</u> in the housing.

Please make sure that the disassembled <u>screw locks (washer spring DIN7980) are reassembled</u>.

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.

Tighten the M4 flange screws with approx. 3 Nm at a non-lubricated thread. Please avoid extensive tightening – this might lead to a torn screw.

5 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:

http://www.axis.com/de/files/manuals/um_p1355_49956_en_1303.pdf

Network access of the ToughCam IP 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^{TM} 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 ToughCam IP 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".

5.1 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

5.2 Assigning the IP address

The ToughCam IP 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 ToughCam IP'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/en/downloads/drivers-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 ToughCam devices and displays them. It can also be used to manually assign a static IP address. Please note that the ToughCam IP 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. It has the network ID „M3014" (figure 5.11) The MAC address and the serial number are also displayed.

Figure 4.11 Axis IP Utility

5.3   Password assignment

When a system reset of the equipment has been carried out, please follow the instructions below.

In order to allow access to the ToughCam IP, 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 ToughCam IP 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 change the default administrator user name „root")
5. Enter the previously determined password and click on „OK". In case you have forgotten the password, the ToughCam IP 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 ToughCam IP is now displayed. With the setup link it is possible to open the menu options to allow personal camera settings

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. During maintenance, focus has to be put on checking parts concerning the IP 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.

7 Repairs and Maintenance

Repairs must only be carried out with original parts of SAMCON Prozessleittechnik GmbH. Any repairs must only be carried out by SAMCON Prozessleittechnik GmbH or a qualified electrical technician authorised by SAMCON Prozessleittechnik GmbH in accordance with nationally applied regulations. Rebuilding of or alterations to the devices are not permitted.

8 Disposal / Recycling

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

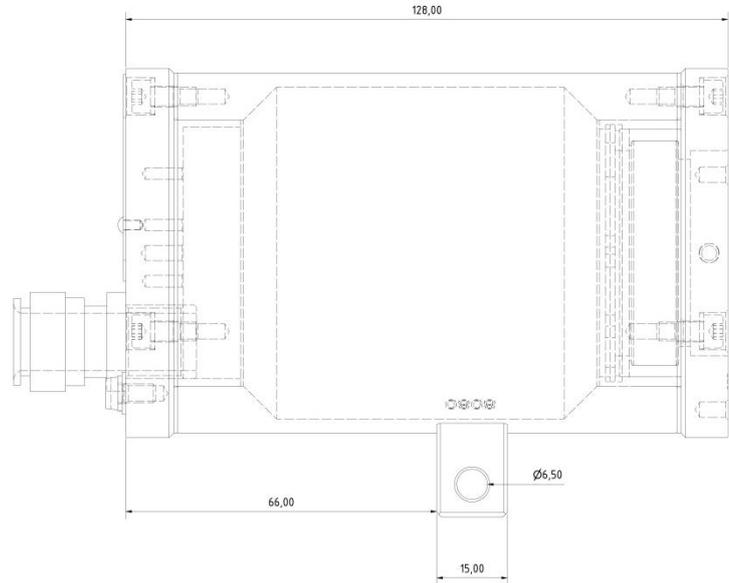This document is subject to alterations and additions.
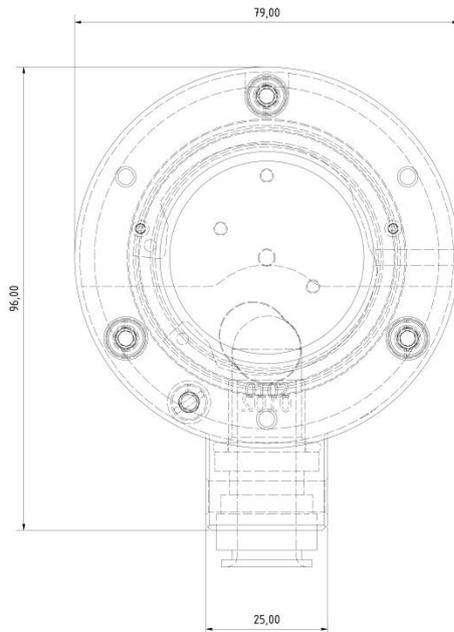
9   Drawings

T03-VA-XX (K1)
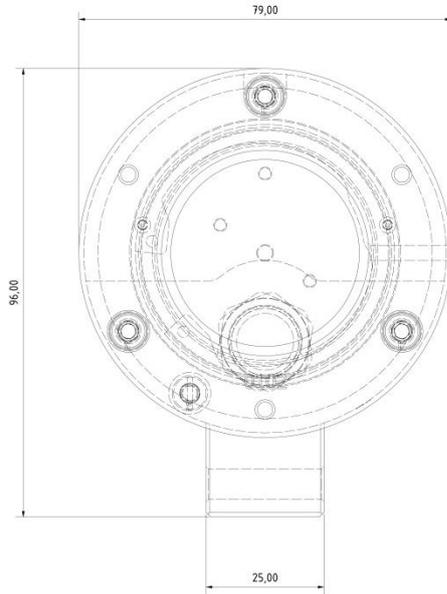
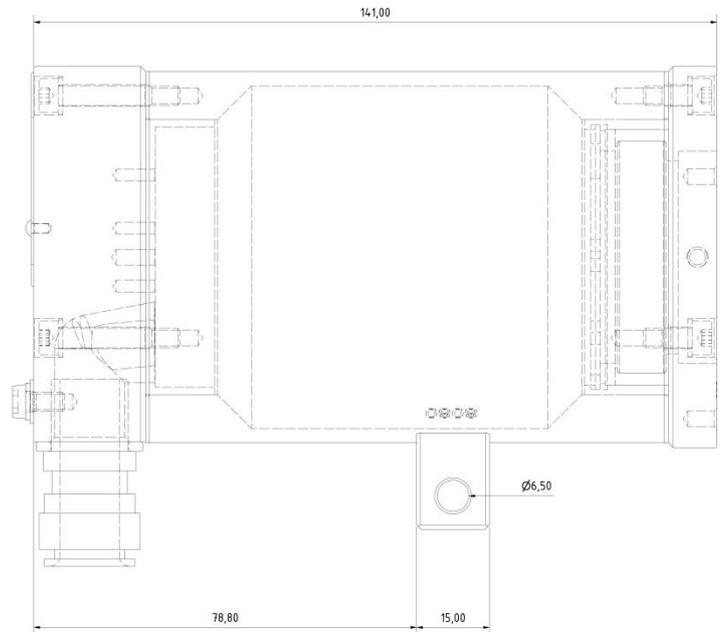Front view   Side view from left
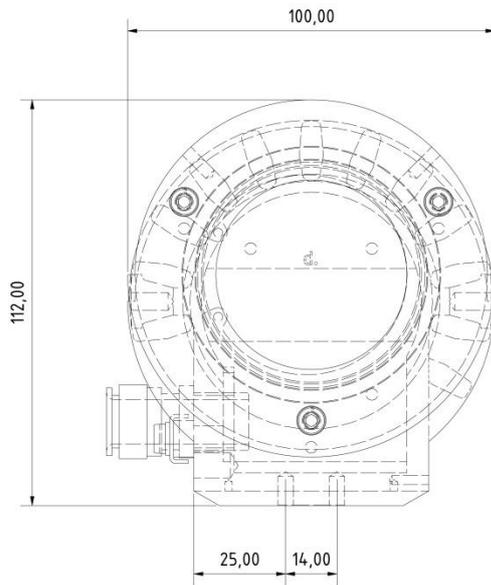

T03-VA-XX (K1)

Front view   Side view from left
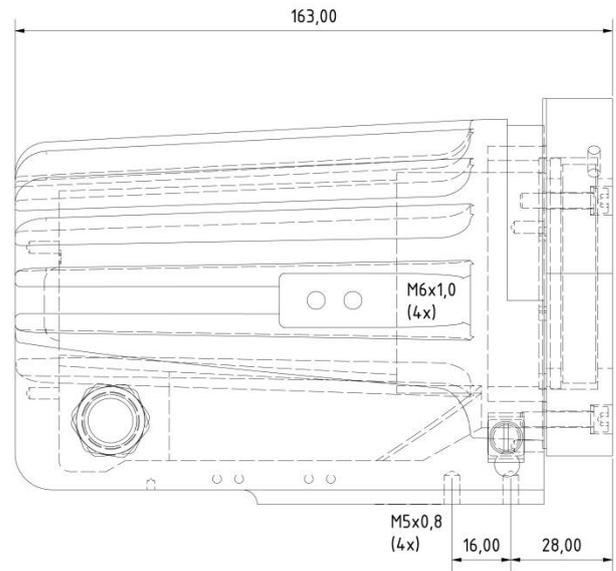
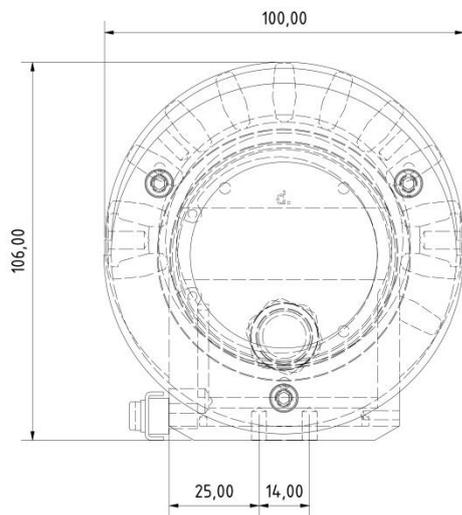## T03-AL-XX (K1)

Front view
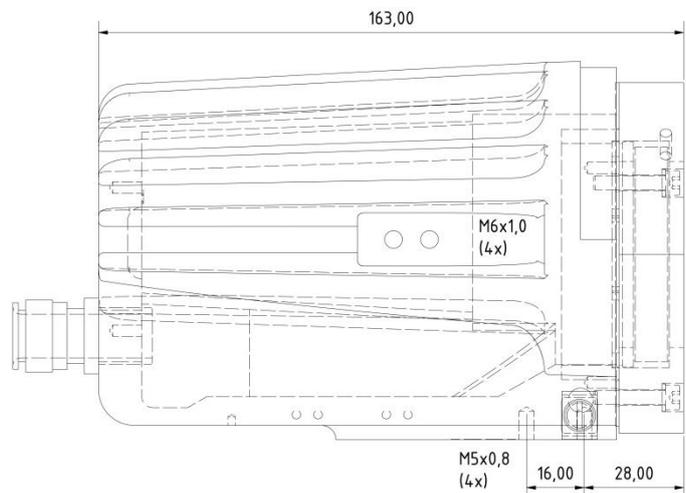
Side view from left

T03-AL-XX (K2)

Front view

Side view from left

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