



autoVimation

building machine vision

Product Catalogue 2016



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autoVimation GmbH

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Protect your Vision System!

autoVimation's aim is to provide simple to use products to make it possible to **use machine vision cameras in any environment**. Maintenance trips can be expensive, so protecting the sensitive camera equipment from damage or just manipulation is equally important.

Build your Vision System!

The second motivation for autoVimation's products was to allow simpler installation of camera systems in a manufacturing environment - **“plug and play” also for mechanics**.

Once the camera is mounted in a camera enclosure, it can be easily adjusted and robustly installed on the machine, using our mounting kits and brackets as well as our range of matching dovetail profiles. This can avoid expensive and time-consuming manufacturing of dedicated mounting frames and brackets.

Errors and technical alterations are reserved.

Reprints or any kind of electronic reproduction shall only be permitted with our approval in writing. This catalogue supersedes all previous documents which herewith lose their validity.

What we advise both orally and in writing with regard to technical application is based on our experience and to the best of our belief; this should, however, be understood as a pointer without obligation.

Working conditions and varying application conditions outside our sphere of influence shall preclude any warranty claims. We would recommend verifying whether the autoVimation product is suitable for the purpose of application intended. The way the products are applied, used and processed is not a matter we are able to control, and for this very reason lies solely in your area of responsibility. Should there nevertheless be a case for liability, it shall be restricted to the value of the product supplied by us and used by you for all and any damage incurred.

Warranty:

Our warranty refers to the constant quality of our products falling in line with our specifications according to our General Terms of Delivery and Payment.

We presuppose correct handling and treatment of the function and condition, particularly observance of our product specifications and assembly- and operating manuals.

Limitations of use published, such as temperatures, are based on measurements made under our testing conditions and can therefore only serve as an indication for an actual application.

The suitability of the product for the user's application which regard to load capacity (long term application), conforming with temperature limits of 3rd party equipment used, the chemical durability or ageing of sealing materials, as well as the correct mechanical or electrical installation must be checked and ensured by the user him- or herself under the particular practical conditions concerned.



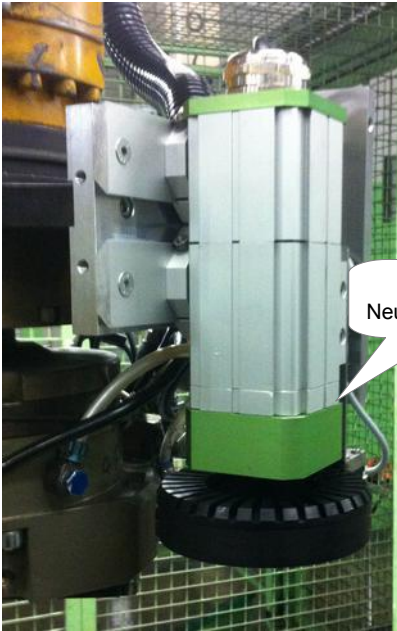
Feedback welcome! Please send us an email to sales@autovimation.com , if you find any errors or find a subject requires more explanation!

Subject to change without prior notice!

Content

1 Application Examples.....	4
2 Profiles.....	6
3 Mounting Kits.....	8
4 Adapter-Plates.....	10
5 Mounting Brackets.....	12
6 Angles.....	15
7 Camera Enclosures.....	17
7.1 Camera Enclosure Selection Guide.....	17
7.2 Enclosure Rear Wall Options.....	19
7.3 Colibri Enclosures.....	20
7.4 Salamander Enclosures.....	22
7.5 Feuersalamander Enclosures.....	24
7.6 Gecko Enclosures.....	26
7.7 Orca Enclosures.....	27
7.8 Nautilus IP68 enclosures.....	29
7.9 Mammoth Enclosures.....	31
7.10 Chameleon Enclosures.....	33
8 Accessories for Camera Enclosures.....	35
8.1 Solutions for dirty Environments.....	35
8.2 Enclosure Extensions.....	36
8.3 Sun roof.....	36
8.4 Mounting Blocks.....	37
8.5 Positioning Rings.....	37
8.6 Windows.....	38
8.7 Mirror Attachment for Orca and Salamander Enclosures.....	38
9 Laser Triangulation Mounting Solutions.....	39
10 Climate Control for Camera Enclosures.....	41
10.1 Passive Cooling through autoVimation's Enclosures.....	41
10.2 Water Cooling and Heating.....	42
10.3 Electrical Heating Plate.....	43
10.4 Peltier Climatisation.....	43
11 Illumination Adapters and Ring Lights.....	45
12 Tools.....	49
13 Appendix.....	50
13.1 Relevant IP protection classes according to EN 60529.....	50
13.2 Chemical durability of autoVimation's sealing materials.....	51
Camera Enclosure and Accessories Selection Guide.....	52

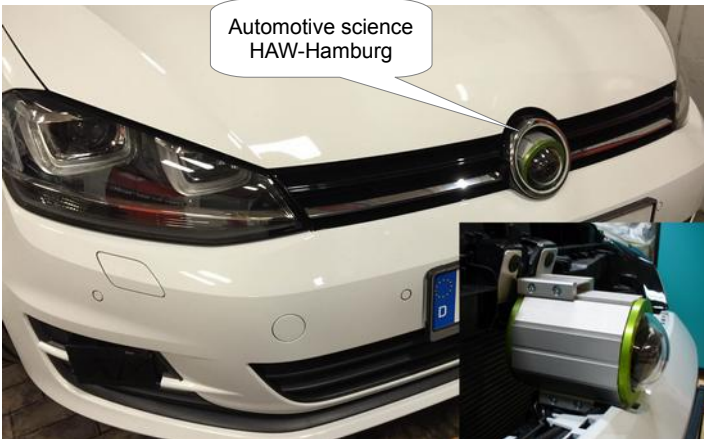
1 Application Examples



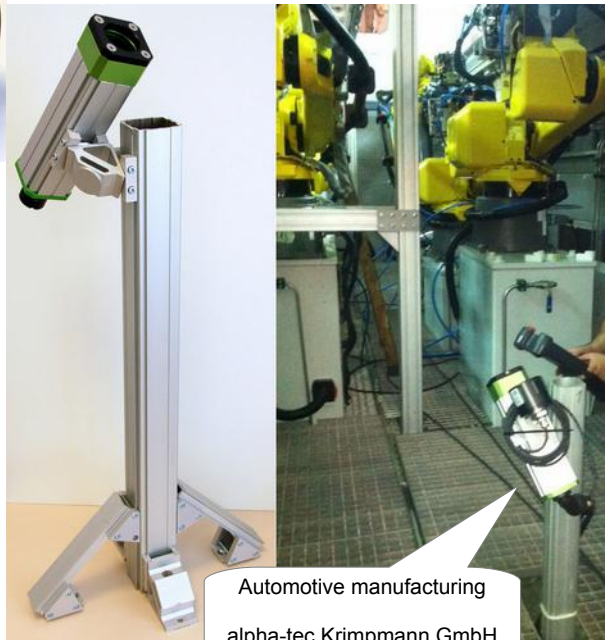
Robotics
NeuroCheck GmbH



Robotics
Kuka AG



Automotive science
HAW-Hamburg



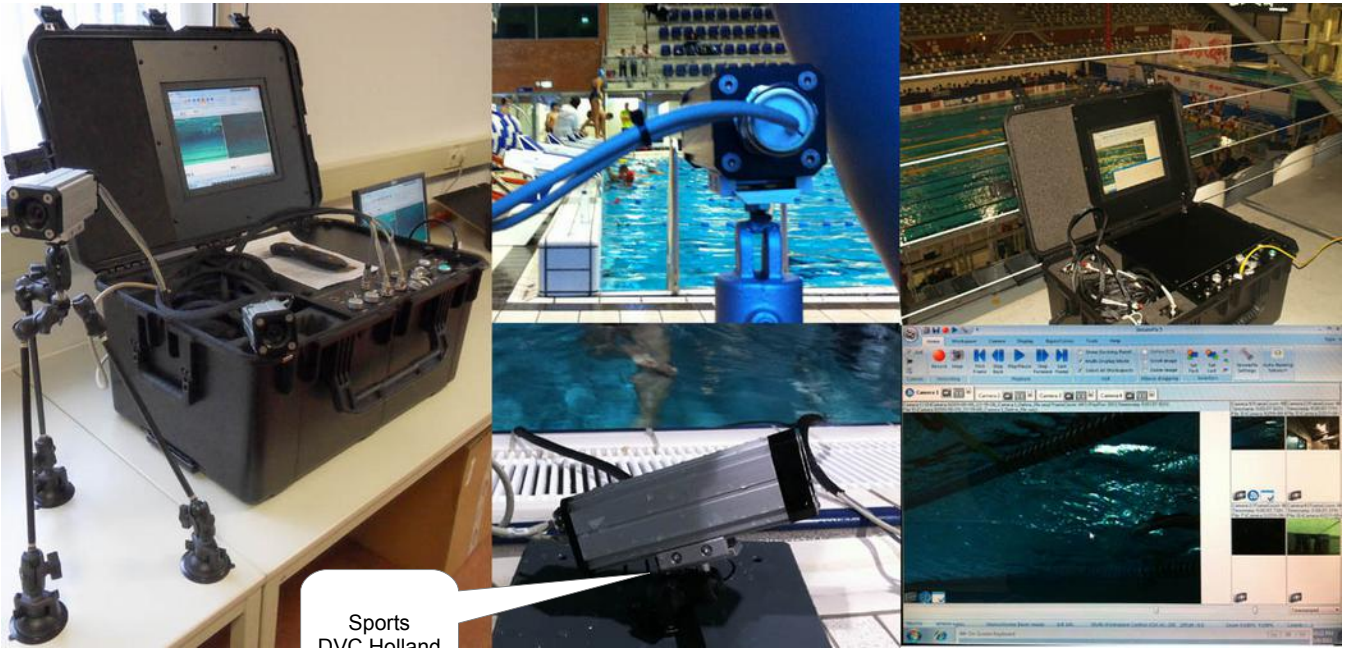
Automotive manufacturing
alpha-tec Krimpmann GmbH



Production /
Quality Control



TV
ZDF Germany



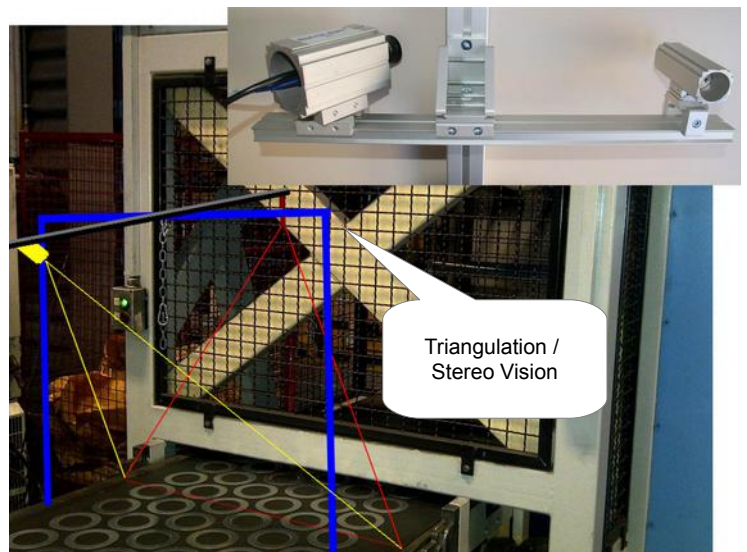
Sports
DVC Holland



Agriculture



Quality Control
Check-In Ltd. Bulgaria



Triangulation /
Stereo Vision

2 Profiles

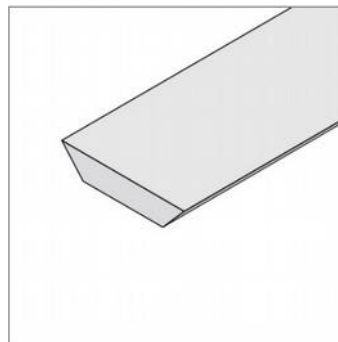
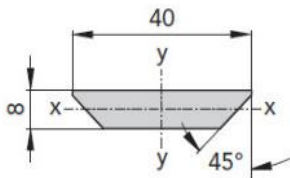


The profiles allow a simple integration of cameras, lights and other components in a machine.

Technical Highlights:

- **Exactly:** more accurate than standard T-Slot profiles, straightness better than 0.5mm/m. Mounting clamps shift along a straight line, moving sliding blocks in a T-slot profile is not exactly.
- **In any desired length available:** up to the maximum length.
- **Universal:** for every application there is the appropriate profile.
- **Defined position:** Attaching camera enclosures with dovetail brackets.
- **Adaptable:** structures can be easily adjusted in height and width, without the need for machining of the profile is required.
- **Stress-able:** by using mounting clamps - as well autoVimation's camera enclosures - your construction is immovable connected and resists a displacement force of up to 3000N!

8x40mm Dovetail Profile single sided, any length



Length	Order Number
0.3m	1.010.300
0.5m	1.010.500
1m	1.011.000
2m	1.012.000
Individual length in mm	1.01X.XXX

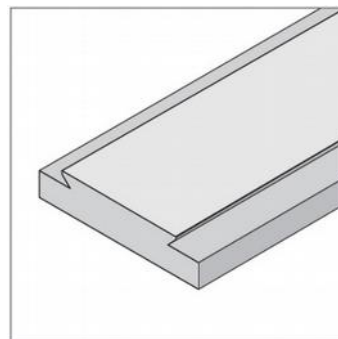
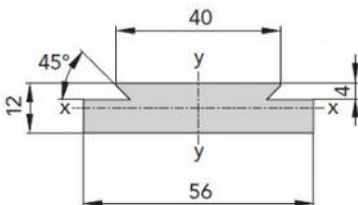
Weight: 0.732 kg/m

$W_x = 0.32 \text{ cm}^3$ | $W_y = 1.36 \text{ cm}^3$

Adapter plates, light mounting arms

Maximum length 2m

56x12 Dovetail Profile single sided wide / strong, any length



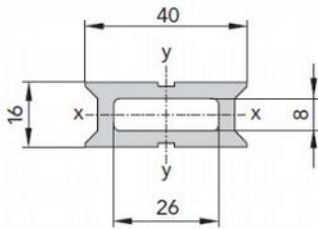
Length	Order Number
0.3m	1.050.300
0.5m	1.050.500
1m	1.051.000
2m	1.052.000
Individual length in mm	1.05X.XXX

Weight: 0.73kg/m

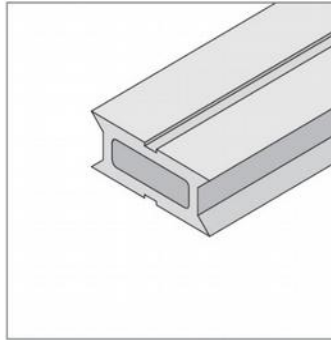
$W_x = 1.04 \text{ cm}^3$ | $W_y = 4.83 \text{ cm}^3$

Adapter plates

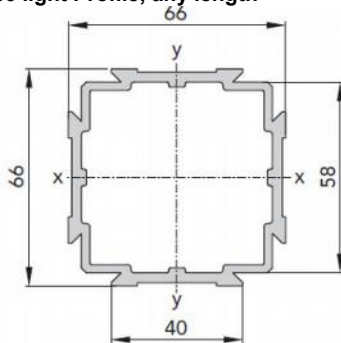
Maximum length 2m

16x40 Dovetail Profile double sided, any length


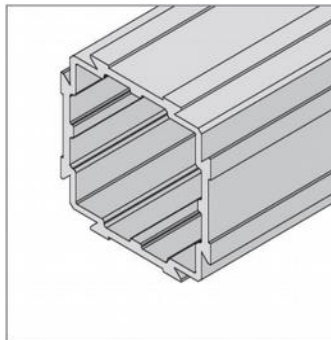
Weight: 0.98 kg/m

 $W_x = 1.025 \text{ cm}^3 \mid W_y = 1.640 \text{ cm}^3$

Camera bridge

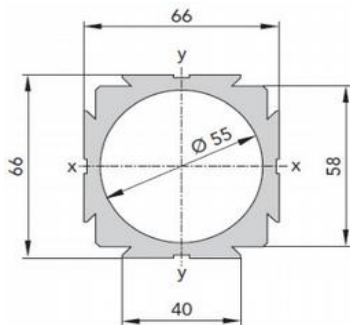
Length	Order Number
0.3m	1.020.300
0.5m	1.020.500
1m	1.021.000
2m	1.022.000
Individual length in mm	1.02X.XXX

Maximum length 2m
66x66 light Profile, any length


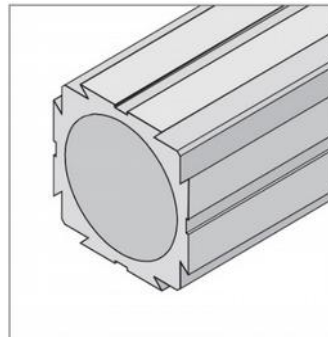
Weight: 2.186 kg/m

 $W_x = W_y = 13 \text{ cm}^3$

Gecko enclosure profile
Medium strength camera frame

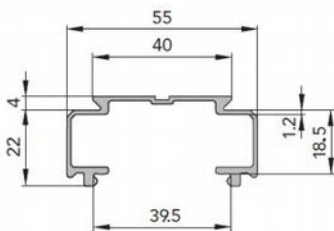
Length	Order Number
0.3m	1.030.300
0.5m	1.030.500
1m	1.031.000
2m	1.032.000
Individual length in mm	1.03X.XXX

Maximum length 3m
66x66 stable Profile, any length


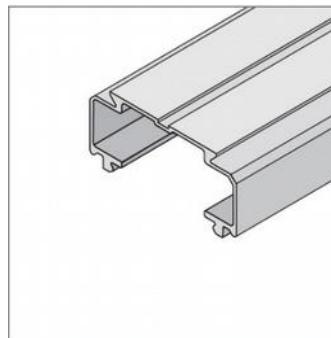
Weight: 3.99 kg/m

 $W_x = W_y = 23 \text{ cm}^3$

Salamander enclosure profile
Strong camera frame

Length	Order Number
0.3m	1.040.300
0.5m	1.040.500
1m	1.041.000
2m	1.042.000
Individual length in mm	1.04X.XXX

Maximum length 3m
Cable channel, snap on, any length


Weight: 0.549 kg/m

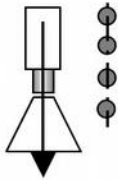

Cable channel
Not suitable for high loads

Length	Order Number
0.3m	1.080.300
0.5m	1.080.500
1m	1.081.000
2m	1.082.000
Individual length in mm	1.08X.XXX

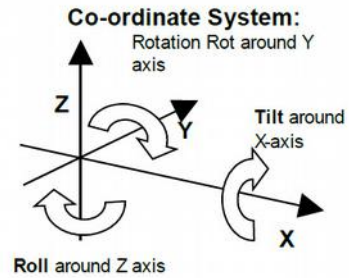
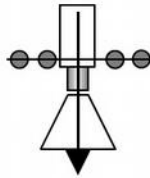
Maximum length 2m

3 Mounting Kits

Parallel mounting pattern:



Right angle mounting pattern:

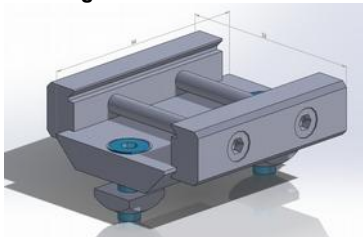


Common examples

Technical Highlights:

- **Easy assembly and adjustment:** autoVimation's dovetail enclosures match on any machine or T-slot profile. It consists of one adapter plate and at least one mounting bracket.
- **Fully compatible:** all adapter plates can be combined with mounting brackets, angles and profiles.
- **Simple image rotation:** due to enclosure mounts on each side.
- **Simple working distance adjustment:** the brackets can hold the enclosure anywhere along its profile.
- **M6 csk screws and 13x13mm slot nuts:** provided with each mounting kit.
- **Robust:** resist a displacement force of up to 3000N!

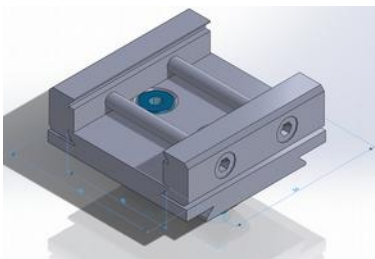
Mounting Kit 1



Order Number:
5.010.000

Parallel mounting pattern, working distance adjustment, 90° image rotation.

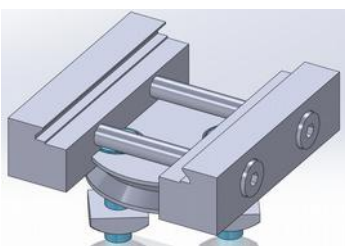
Mounting Kit 2



Order Number:
5.020.000

Vertical mounting pattern, working distance adjustment, 90° image rotation.

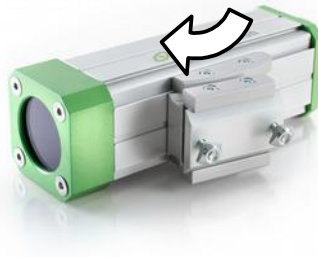
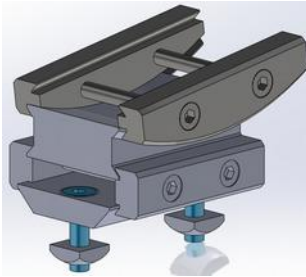
Mounting Kit 6



Order Number:
5.060.000

360° rotation, working distance adjustment, 90° image rotation.

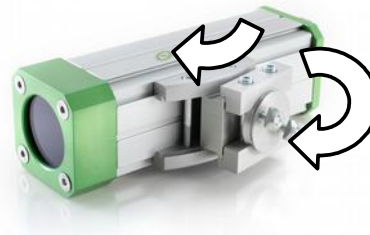
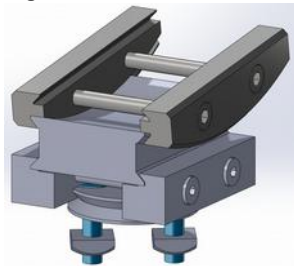
Mounting Kit 7



Order Number:
5.070.000

+/- 8° tilt adjustment, working distance adjustment, 90° image rotation.

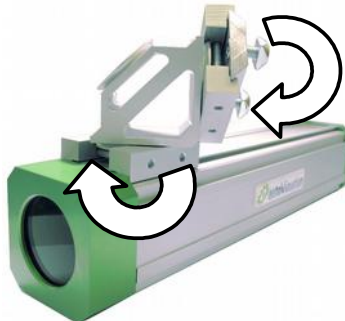
Mounting Kit 9



Order Number:
5.090.000

360° rotation and +/- 8° tilt adjustment, working distance adjustment, 90° image rotation.

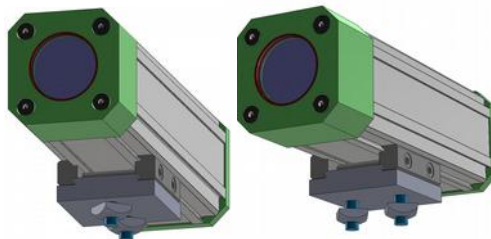
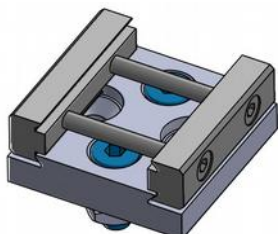
Mounting Kit 15



Order Number:
5.090.000

360° rotation + 360° tilt adjustment, working distance adjustment, 90° image rotation.

Mounting Kit 21



Only for the 30mm Colibri profile!

Order Number:
5.210.000

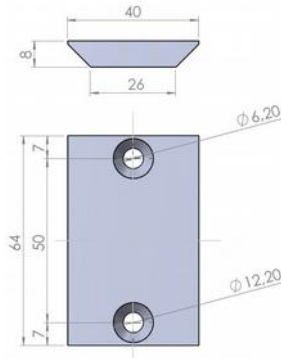
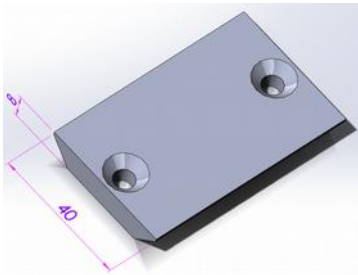
Parallel and vertical mounting pattern, working distance adjustment, 90° image rotation, economical.

Mounting bracket screws usually zinc plated steel, but also available in high grade stainless steel (V4A / AISI 316L).

4 Adapter-Plates

Adapter plates allow to mount dovetail enclosures or profiles on any standard T-slot profile or machine frame. It can also be used to attach 3rd party equipment to our products. autoVimation also manufactures application-specific adapter plates.

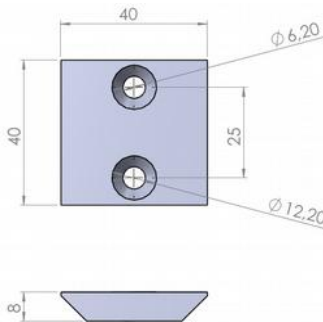
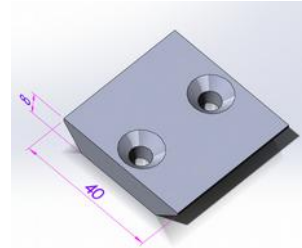
**Parallel adapter plate 64mm f
or 2x countersink screws M6**



Order Number:
6.041.141

Standard adapter plate, base for a variety of Mounting Kits.

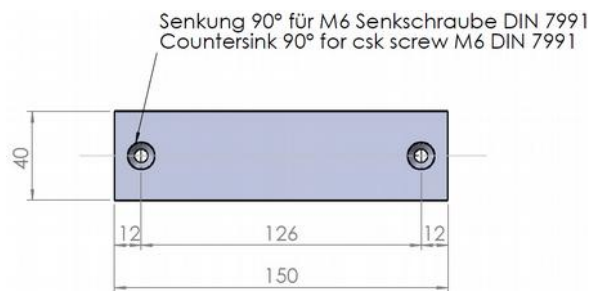
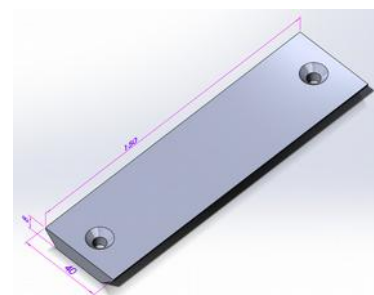
**Parallel adapter plate 40mm
for 2x M6 countersink screws**



Order Number:
6.041.142

Shorter adapter-plate for e.g. laser enclosures.

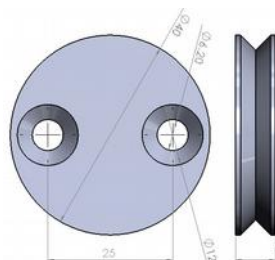
**Parallel adapter plate 150mm
for 2x M6 countersink screws**



Order Number:
6.041.144

Longer Adapter-plate for e.g. Mammoth enclosures.

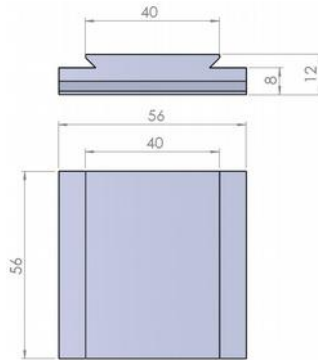
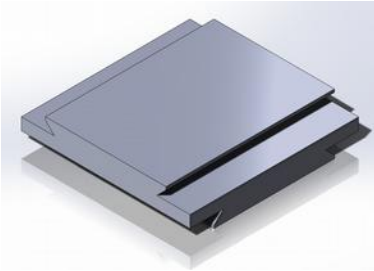
**Rotational mounting plate
for 2x M6 countersink screws**



Order Number:
6.042.388

Rotary disk, base for Mounting Kit 6 and 9.

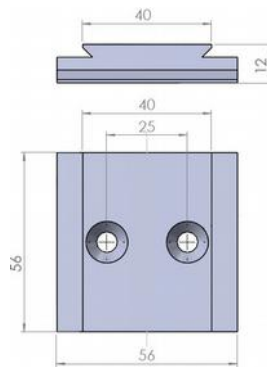
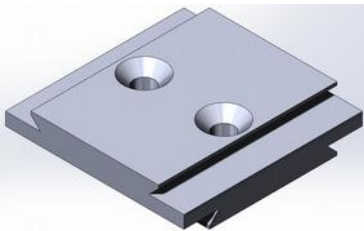
90° mounting plate



Order Number:
6.046.199

Connecting profiles in a right angle.

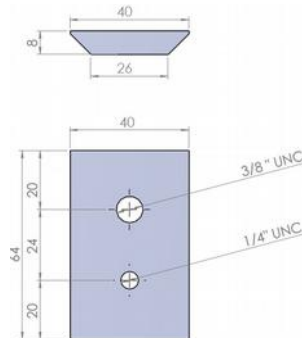
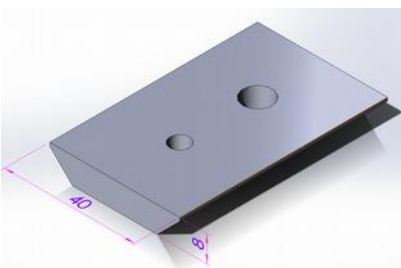
90° mounting plate for
2x M6 countersink screws



Order Number:
6.046.200

Connecting enclosures or profiles in a right angle to a T-Slot profile.

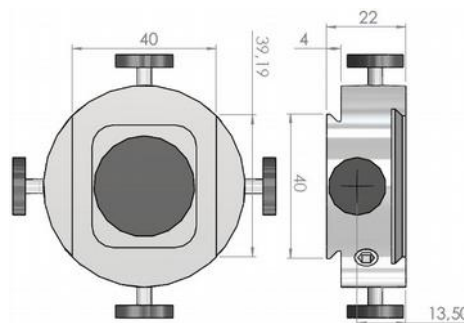
Tripod mounting plate 1/4" and 3/8"



Order Number:
6.041.935

Adapter plate to mount enclosures on camera tripods.

Fine adjustment table with knurled head
screws



Order Number:
6.045.836

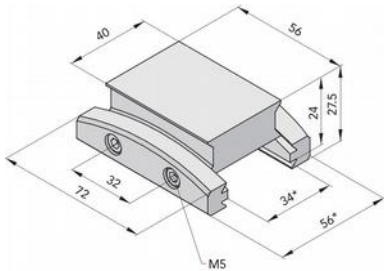
Fine adjustment in two directions +/-3mm, the locking mechanism is independent from the adjustment mechanism, so no misalignment can occur during fixation.

For custom made adapter-plates contact sales@autovimation.com

5 Mounting Brackets

These mounting brackets allow precise and vibration proof connection of enclosures to adapter plates or directly to dovetail profiles. Combining several mounting brackets can meet any adjustment requirements of camera systems.

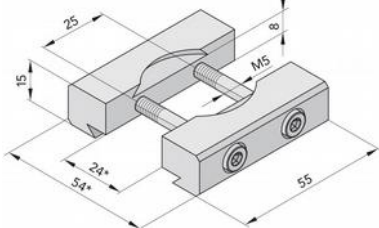
Tilt adjustment bracket +/- 8°



Order Number:
10.054.638

Allows robust tilt adjustment of the camera enclosure. Part of mounting kit 7 + 8

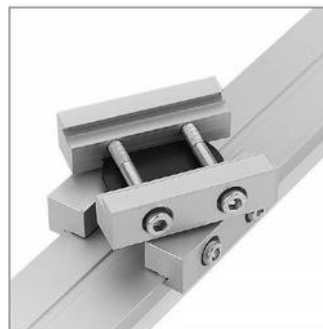
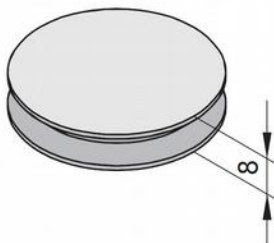
Rotational mounting bracket



Order Number:
10.040.202

Allows accurate 360° rotation of dovetail profiles. Strongly resists rotation once tightened in position.

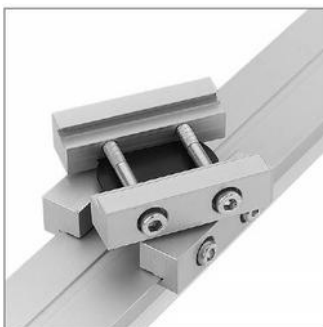
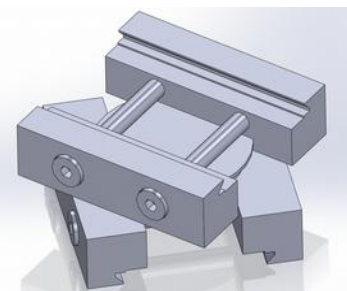
Rotational disc without holes



Order Number:
10.040.857

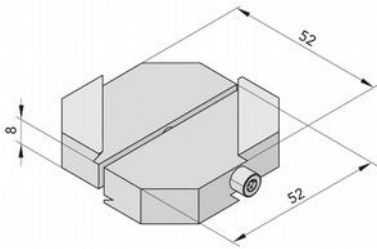
Required for rotational double joint – see next article.

Rotational double joint



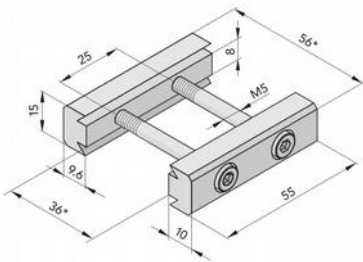
Order Number:
10.040.860

Required for rotational connection of 2 dovetail profiles (for instance Orca enclosure on triangulation profile (16x40 double sided dovetail profile))

Orthogonal bracket


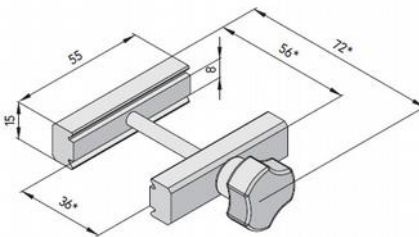
Order Number:
10.044.984

Accurate vertical connection of 2 dovetail profiles. Builds a slim and simple to adjust camera bridge with 16x40 profiles.

Parallel slim bracket


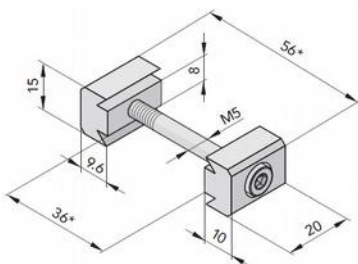
Order Number:
10.040.201

Most widely used mounting bracket. Strong parallel connection of dovetail profiles, angles, enclosures, etc.

Parallel slim bracket with hand knob


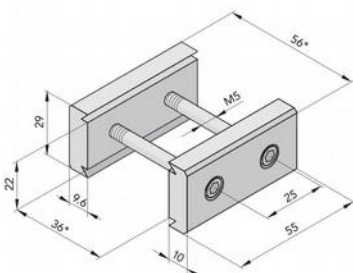
Order Number:
10.054.598

Allows tool free adjustment of components. suitable for smaller loads.

Parallel slim bracket short


Order Number:
10.041.190

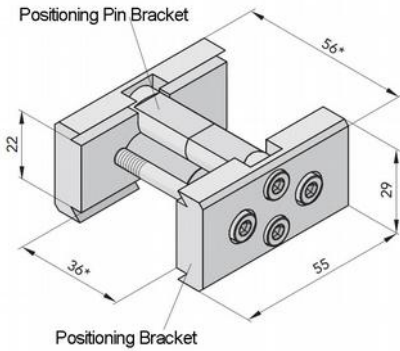
Parallel connection of lighter objects (for instance laser enclosure).

Parallel wide bracket


Order Number:
10.045.942

Parallel connection with wider distance (dovetails 22mm apart instead of 8mm).

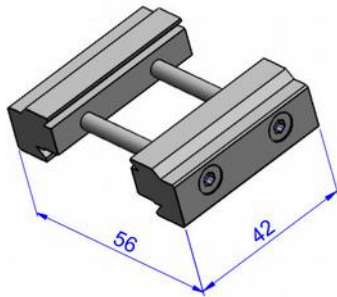
Repeatable positioning bracket with two position pins



Order Number:
10.044.421

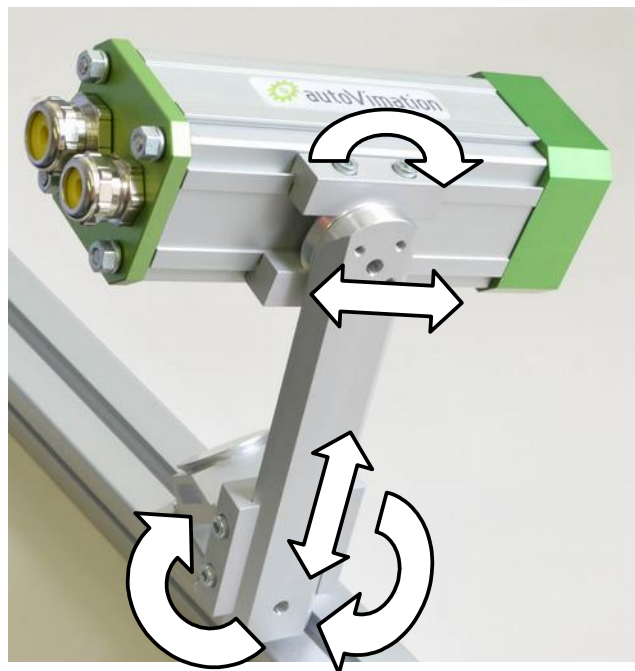
This bracket with 2x positioning pin brackets allows accurate prepositioning of camera enclosures after their removal. Also allows to use cameras at several machines in turns without the need for camera readjustment!

Adapter bracket from 30mm to 40mm profile



Order Number:
10.062.979

Adaptation from the 30mm (Colibri) profile to the standard 40mm dovetail.



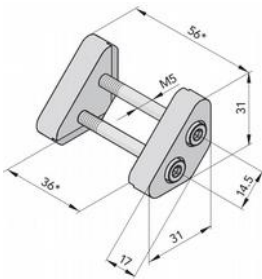
As many adjustment options as needed - thanks to the modular use of mounting brackets

6 Angles



autoVimation angles in different sizes combine profiles, enclosures, walls and other components for a robust long-live connection.

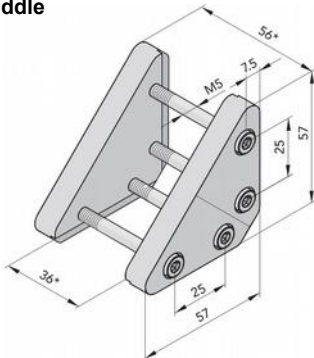
Angle small



Order Number:
10.044.607

Angle for light mechanical stress.

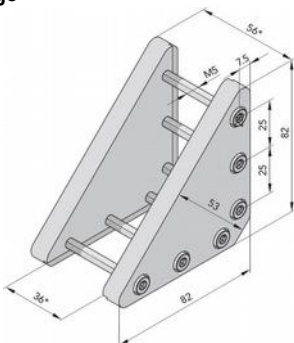
Angle middle



Order Number:
10.059.296

Angle for medium mechanical stress.

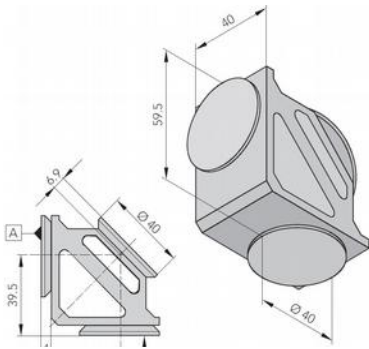
Angle large



Order Number:
10.059.297

Massive angle also for heavy mechanical stress.

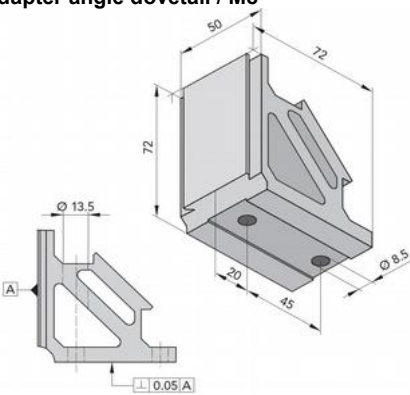
Rotational adjustment angle



Order Number:
10.045.852

Multi-axle adjustable rotation angle for maximum flexibility.

Adapter angle dovetail / M8



Order Number:
10.045.715

Adapter angle – with M8 screws mounts directly to the floor, machine or T-slot profile.



7 Camera Enclosures

7.1 Camera Enclosure Selection Guide

autoVimation offers a large range of camera enclosures, in order to match all requirements.

These are the main reasons for offering so many different enclosures:

- **Camera and lens size**
- **Environment used** (standard manufacturing or corrosive, food, outdoors)
- **High degree of adaptability** (modular mounting, large range of accessories)
- **Climatic challenges** (hot / cold / dirty).

Selection criteria according to common application requirements:

Enclosure family	Compatible to dovetail system	For Camera size	Passive cooling	Range of Accessories	Food/Pharmacy/ Medical ¹	Suitable for hot/cold
Aluminium dovetail:						With accessories
- Colibri (30mm)	(Yes)	S	A	M	in no contact areas	Yes
- Salamander	Yes	S/M	A	L		Yes
- Gecko	Yes	M	A	L		Yes
- Orca	Yes	S/M/L	A	L		
- Mammoth	Yes	XL	B	M	See above	Yes
Stainless Steel:						
- Feuersalamander	No	S/M	A	S	Yes	Up to 50°C depending on camera
- Chameleon M stainless	No	right angle	A	S	Yes	
Right angle type:		right angle				
- Chameleon S	No	S	C	S	No contact	-20°C (with heating) to +40°C depending on camera
- Chameleon M stainless	No	S/M	A	S	Yes	
- Chameleon L	No	M	C	S	No contact	
Peltier climatisation:						
- Turtle M	No	S/M/L	N/A	S	No contact	Yes
- Turtle L	No	L	N/A	S	No contact	Yes
- Turtle XL	No	XL	N/A	S	No contact	Yes

Evaluation criteria indicative only – if in doubt, contact autoVimation!

Evaluation criteria: S=small, M=medium, L=Large, XL=extra large, A=very good, B=good, C=average.

¹ Largely depending on customer and application requirements!

Selection criteria according to camera and lens size:

Enclosure	Camera size in mm	Maximum lens diameter in mm (enclosure inner size)	Length of camera system in mm (including lens and connectors)
Colibri	Cross section up to: 29 x 29 or 30 x 30	39	170
Salamander	From 46 x 29 to 40 x 40 (max. diagonal 55)	55 (52 when protruding into the lid)	Salamander S: 136² Salamander M: 189² Salamander L: 219²
Gecko	Cross section up to: 39 x 53 or 43 x 40	55 (52 when protruding into the lid)	Gecko XS: 170 Gecko S: 215 Gecko M: 265
Orca	Cross section up to: 62 x 62 (max. 85 diagonal)	85 (52 when protruding into the 2" lid, 78 into the 3" lid).	Orca S: 130³ Orca M: 180³ Orca L: 250³
Mammoth	Cross section up to: 90 x 150	97	Mammoth S: 180 Mammoth M: 250 Mammoth L: 300
Feuersalamander, stainless	Cross section up to: From 46 x 29 to 40 x 40 (max. diagonal 55)	55 (52 when protruding into the lid)	Feuersalamander S: 110 Feuersalamander M/MS: 160
Chameleon M, stainless	60 x 120 x 47 approx.(w x l x h)	Camera sensors with S-mount lenses	Camera height including lens < 47
Right angle type: - Chameleon SW - Chameleon ST - Chameleon L65 - Chameleon L75 - Chameleon L80 - Chameleon L90	w x l x h including connectors 72 x 150 x 44 45 x 160 x 72 110 x 200 x 48 110 x 200 x 58 110 x 200 x 63 110 x 200 x 73	Most suitable for: S-mount lenses C-mount lenses S-mount lenses S-mount lenses C-mount lenses C-mount lenses	 h max = 44 h max = 72 h max = 48³ h max = 58³ h max = 63³ h max = 73³
Peltier climatisation: - Turtle M - Turtle L - Turtle XL	Cross section up to: 62 x 62 62 x 62 80 x 130	 85 90 85	 250 335 300

² 30 or 60mm more with Salamander extension.

³ 60 mm more with Orca extension.

7.2 Enclosure Rear Wall Options



Standard Rear Wall Options for most enclosures at a flat price

Following table specifies the cable diameter as well as the maximum connector diameter that fits through the cable gland or protective tube. The full seal inserts are suitable for self drilling, so any cable diameter up to the maximum connector diameter can be sealed by the cable gland. It is also possible to seal several cables (and connectors) with one cable gland! The pre-drilled cable gland inserts feature a colour coding – for instance yellow inserts seal cable diameter from 4-6.5mm Ø. In case the sealing range does not match the cable diameter – use the full insert for self drilling or contact autoVimation for a different insert colour and cable diameter range! The 13.5mm Ø usually fits a 6-pin Hirose connector, the 16mm Ø a RJ45 LAN (without rubber padding or screws). Small Camera-Link connectors may fit through the M32 cable gland with 26.5mm aperture. Larger Camera Link connectors with 40mm width require the M50 cable gland with 42mm aperture (rear wall G)

Rear Wall	Laser enclosure	Colibri enclosure	Salamander/Gecko enclosures	Orca/Mammoth enclosures
A	N/A	N/A	Push in insert for PA6 corrugated tubing Ø internal = 23mm max. Temp: 100°C, short term 130°C Order tube (#20.000.006) and second push-in fitting (#20.000.008) separately!	Push in insert for PA6 corrugated tubing Ø internal = 23mm max. Temp: 100°C, short term 130°C Order tube (#20.000.006) and second push-in fitting (#20.000.008) separately!
B	1xM20 cable gland, yellow seal insert, cable-Ø 4-6.5, conn.-Ø 13.5 max.	1xM25 cable gland, yellow seal insert, cable-Ø 4-6.5, conn.-Ø 16.0	1xM20 cable gland, yellow seal insert, cable Ø 4-6.5, connector- Ø 13.5, 1xM25 cable gland, yellow seal insert, cable Ø 4-6.5, connector- Ø 16.0	N/A
C	1xM20 cable gland, full white insert, mult. cable Ø any, conn.-Ø 16.0 max.	1xM25 cable gland, full white insert, mult. cable Ø any, conn. Ø 16.0 max.	1xM32 cable gland, full white insert for self drilling, multiple cables with any diameter, connector- Ø 26.5 max.	1xM32 cable gland, full white insert for self drilling, multiple cables with any diameter, connector- Ø 26.5 max.
D	N/A	N/A	Rear wall completely closed for self – machining.	
E	N/A	N/A	N/A	Closed rear wall with ball bearing (non rotating) inner plate for self machining.
G	N/A	N/A	M50 cable gland with full insert, multiple cables and connectors up to Ø 42 Order separately: M50 cable gland and rear wall modifications #20.000.023	

Standard configuration (and delivery status if not specified otherwise) for each enclosure family **printed bold!**

7.3 Colibri Enclosures



IP66 Protection for compact cameras with 29 x 29mm or 30 x 30mm cross section

Technical Highlights:

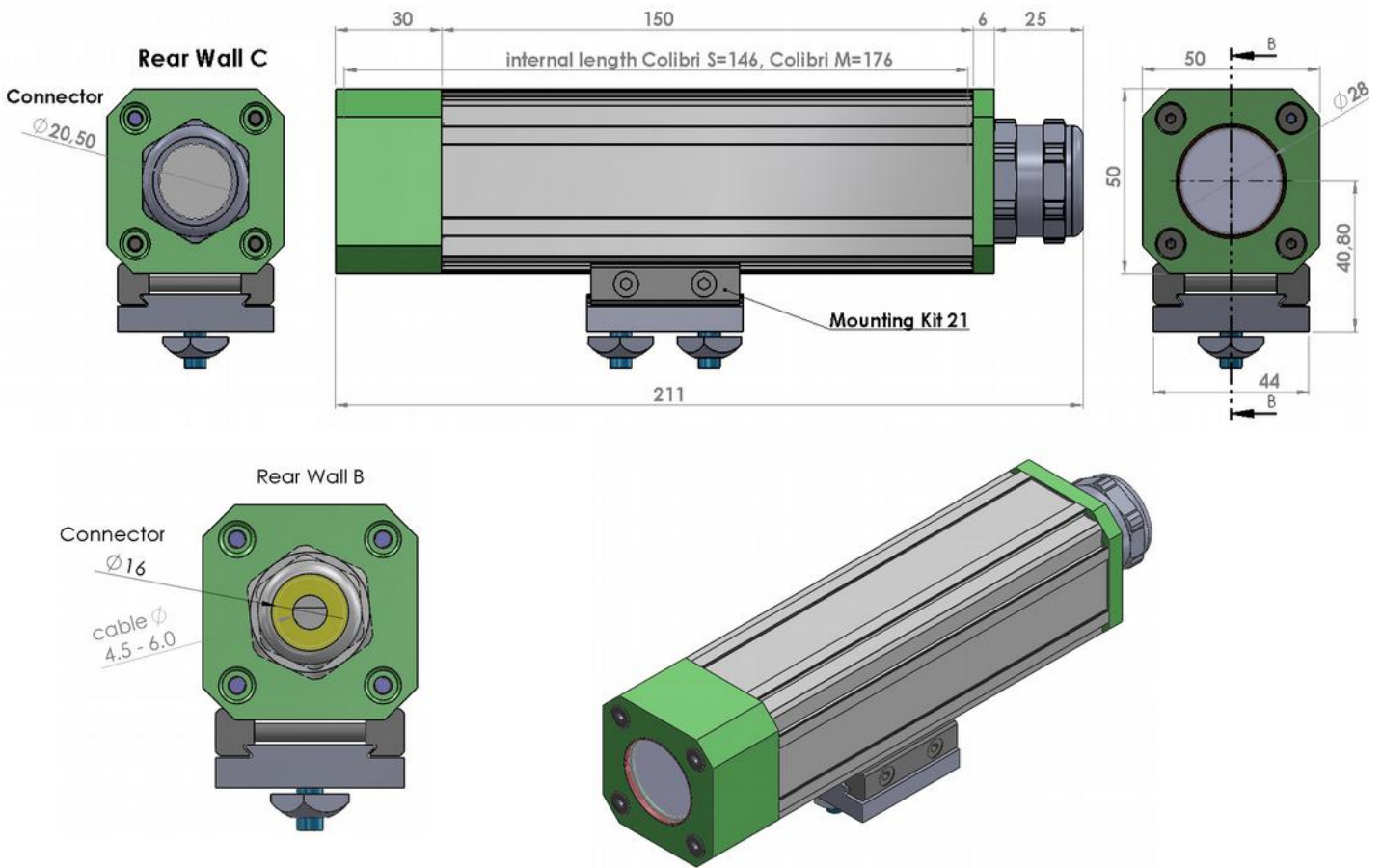
- **Robust built:** aluminium extrusion profile.
- **Small form factor:** cross section only 50 x 50mm – adding only 10mm around a 30 x 30mm camera!
- **Weight of the enclosure just over 400g:** ideal for light weight applications.
- **Flexible camera positioning:** camera lens mounts directly behind the front window.
- **Robust enclosure mounting:** fixation on all four sides along the entire profile possible. Simple adjustment of working distance.
- **Compatible with dovetail accessories:** with help of an adapter bracket.
- **High chemical resistance:** NBR and TPE sealing materials. Contact us for any special requirements!
- **Vibration proof mounting and passive camera cooling:** thanks to autoVimation's patented Quick-Lock and Heat-Guide camera mounting system (part of delivery).



The Colibri enclosure – only little larger than a compact camera!

- **Camera can be mounted either just from the front or from the rear side.**
- **Passive camera cooling:** assembled inside the enclosure the camera is at least 10°C cooler than without enclosure.
- **Also available with tamper-proof pin-torx screws.**

Degree of protection	Dimensions	Material details
<ul style="list-style-type: none"> ■ IP66 - Protection from high pressure water jets (Nema 4) 	<ul style="list-style-type: none"> ■ Exclusively for cameras with 29 x 29mm or 30 x 30mm cross section. ■ Cable gland allows for assembly of several cables with connectors up to 20.5mm diameter. ■ Clear aperture 28mm diameter: lenses up to 39mm diameter. 	<ul style="list-style-type: none"> ■ Enclosure: anodised aluminium ■ Window: BK7, double-sided broadband anti-reflective coating. ■ Window seal: Teflon ■ Enclosure seal: NBR (Viton at request) ■ Cable gland seal: TPE (TPEV at request)

Dimensions:

Combinable options:

- Rear wall B: for one cable – diameter 4.5-6mm and connectors up to 16.0mm (for instance PoE – one LAN cable with standard RJ45)
- Rear wall C for several cables and connectors up to 20.5mm (self drilling of cable gland inserts).

Order number key:

Colibri S, 181 x 50 x 50mm			Colibri M, 211 x 50 x 50mm		
Camera Height	Rear Wall	Order Number	Camera Height	Rear Wall	Order Number
29mm	B	22.901.120	29mm	B	22.901.150
	C	22.902.120		C	22.902.150
30mm	B	23.001.120	30mm	B	23.001.150
	C	23.002.120		C	23.002.150

Accessories:

- Mounting Kit 21 for parallel or vertical mounting (for the smaller 30mm dovetail profile) | Order number: 5.210.000
- Adapter bracket 30mm to 40mm profile | Order number: 10.062.979

7.4 Salamander Enclosures



IP67 protection for compact MV cameras up to 40 x 40mm cross section

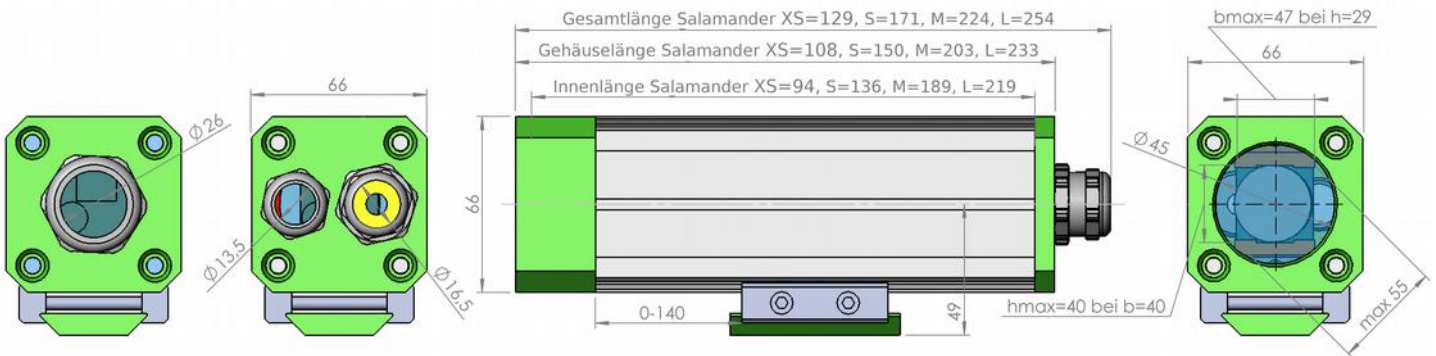
Technical Highlights:

- **Robust build:** aluminium extrusion profile.
- **Small form factor:** only 66 x 66mm cross section, easy to integrate into existing machines.
- **Flexible camera positioning:** angle and position.
- **Dovetail profiles enable robust enclosure mounting:** on all 4 sides along the entire profile. Mounting brackets resist a displacement force of up to 3000N! Simple adjustment of working distance.
- **Compatible with large range of accessories:** variety of mounting and adjustment brackets, water cooling, controlled heating plate, wind curtain, pneumatic shutter, positioning ring for simple camera replacement, and more.
- **High chemical resistance:** due to Viton, NBR and TPE sealing materials. Contact us for any special requirements!



- **Vibration proof mounting and passive camera cooling:** thanks to autoVimation's patented Quick-Lock and Heat-Guide camera mounting system.
- **Fits all cameras from 29 to 40mm height:** cameras with 29mm height can be up to 47mm wide down to 40mm width at 40mm high.

Degree of protection	Dimensions	Material details
<ul style="list-style-type: none"> ■ IP66 - Protection from high pressure water jets (Nema 4) ■ IP67 - Protection from occasional submersion (Nema 6) <ul style="list-style-type: none"> ○ Up to 1h duration ○ Up to 1m water depth 	<ul style="list-style-type: none"> ■ For up to 40 x 40mm cross section ■ For connectors up to 26mm Ø ■ Salamander S, length: 171, 136 (internal) ■ Salamander M, length: 203, 189 (internal) ■ Salamander L, length: 233, 219 (internal) ■ Custom up to 400mm internal length ■ Clear aperture with 2" window: 45mm Ø ■ Lens up to 55mm Ø 	<ul style="list-style-type: none"> ■ Enclosure: anodised aluminium ■ Window: BK7, double-sided broadband anti-reflective coating ■ Window seal: Viton ■ Enclosure seal: EPDM (Viton at request) ■ Cable gland seal: TPE (TPEV at request)

Dimensions:


Rear wall C

Rear wall B

Salamander with Mounting Kit 1

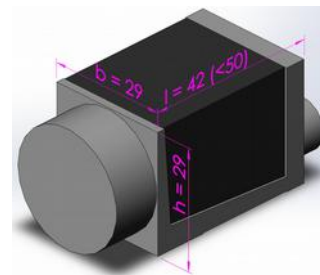
Front lid

Accessories:

- **Mounting kits**
- **Wind curtain and pneumatic shutter** for dirty environments
- **60mm extension piece** for easier adjustment of large lenses
- **Water cooling and heating**
- **Electric heating plate with temperature control**
- **Positioning ring** to allow repeatable camera assembly
- **Laser-Triangulation building kit**

Relevant dimensions:

Only the length of the rectangular camera body is relevant for ordering the right enclosure (l = 42mm in above image).


Order number key:

Example: Salamander M, Rear Wall B, for Basler Ace (h x w x l = 29 x 29 x 42mm):

Order Number	2	0	.3	1	1	.192
	↓	↓	↓	↓	↓	↓
Enclosure	Camera height		Camera body smaller than	Salamander	Rear wall	Length
	29: 0	34: 5	50mm: 3		Rear wall A: 0	XS: 070
	30: 1	35: 6	74mm: 5		Rear wall B: 1	S: 139
	31: 2	36: 7	92mm: 7		Rear wall C: 2	M: 192
	32: 3	38: 8			Rear wall D: 3	L: 222
	33: 4	40: 9				



Pneumatic Shutter
Order Number: 50.200.010



Wind Curtain
Order Number: 50.100.010



60mm Extension
Order Number 15.015.060

7.5 Feuersalamander Enclosures



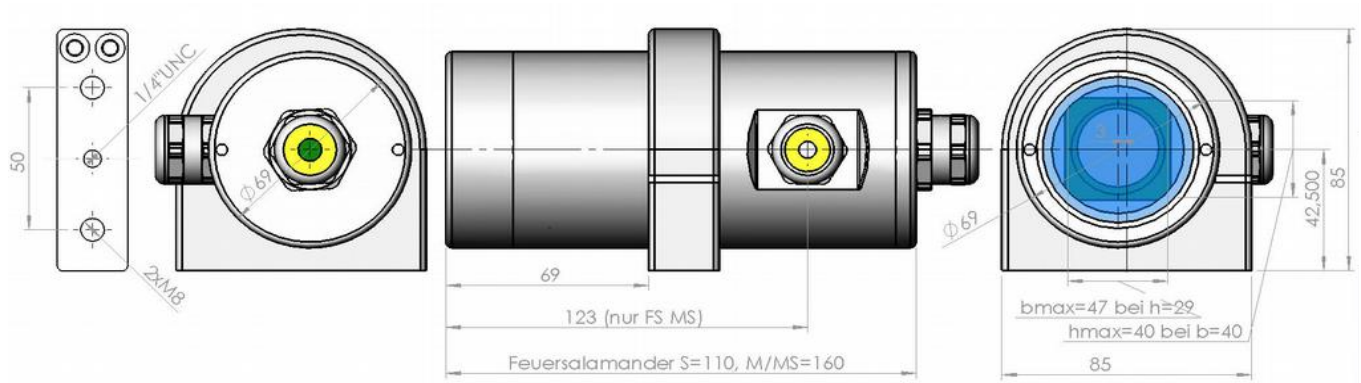
P67 protection of compact machine vision cameras up to 40 x 40mm cross section
in V4A stainless steel hygienic design

Technical Highlights:

- **High grade electro-polished stainless steel AISI 316L:** for demanding applications in food- and pharmaceutical industries.
- **Small form factor:** only 69mm diameter.
- **Flexible camera positioning:** any angle and position.
- **Hygienic design:** avoiding corners and edges, hidden mounting threads, FDA approved seal for clamping gap, flush front window, hygiene cable gland available on request (see image above).
- **High chemical resistance of all seals:** by using silicone, Viton and TPE seal material. Contact us for any special requirements!
- **Vibration proof camera mount:** by means of autoVimation's patented Quick-Lock / Heat- Guide camera mount.
- **Excellent camera heat dissipation:** despite the bad heat conductivity of stainless steel, the outer housing still cools the camera by up to 9° C (measurement with installed Basler Ace at room temperature).
- **Fits all cameras from 29 to 40mm height:** cameras with 29mm height can be up to 47mm wide, down to 40mm width with 40mm height.

Degree of protection	Dimensions	Material details
<ul style="list-style-type: none"> ■ IP67 - Protection from occasional submersion (Nema 6) <ul style="list-style-type: none"> ○ Up to 1h duration ○ Up to 1m water depth 	<ul style="list-style-type: none"> ■ For up to 40 x 40mm cross section ■ Feuersalamander S, length: 110 ■ Feuersalamander M, length: 160 ■ Clear aperture with 2" window: 45mm Ø 	<ul style="list-style-type: none"> ■ Enclosure: stainless steel AISI 316L ■ Window: BK7, double-sided broadband anti-reflective coating ■ Window seal: EPDM ■ Enclosure seal: EPDM (Viton at request) ■ Cable gland seal: TPE (TPEV at request)

Dimensions:

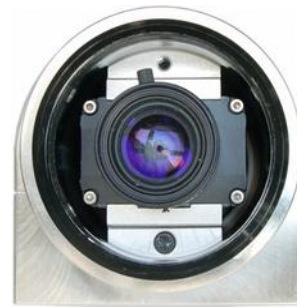
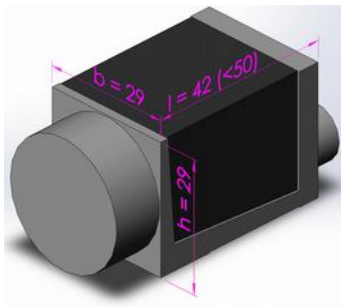


Mount

Rear wall C

Feuersalamander

Front lid



Relevant dimensions: only the length of the rectangular camera body is relevant for ordering the right enclosure

The patented Quicklock / Heat guide assembly system promises easy installation and excellent heat dissipation

Order number key:

Example: Feuersalamander M for Basler Ace (h x w x l = 29 x 29 x 42mm):

Order Number	2	0	.3	30	.160
	↓	↓	↓	↓	↓
Enclosure	Camera height	Camera length smaller than	Cable exit	Length	
	29: 0 30: 1 31: 2 32: 3 33: 4	34: 5 35: 6 50mm: 3 74mm: 5 92mm: 7	back: 30 side: 31	S: 110 M/MS: 160	

Please order separately:

Accessory	Order Number	Accessory	Order Number
Mount for Feuersalamander	5.120.000	Assembly tool for front lid (for first order)	90.000.004

7.6 Gecko Enclosures

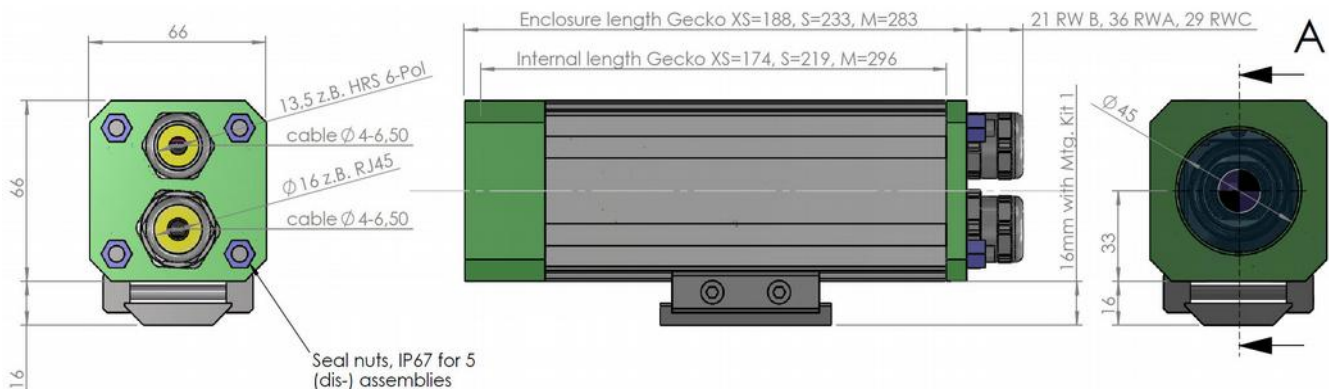


IP66 protection for machine vision cameras up to 39 x 53mm cross section. The Gecko enclosure is currently used for the Flir ax5 and the Vision Components VC4XXX cameras!

Technical Highlights:

- **Space for slightly larger cameras:** that do not fit into the Salamander enclosure, for instance the Flir ax5 and Vision Components' VC4xxx camera series. The outer form factor is however the same as with the Salamander enclosure.
- **Robust built:** aluminium extrusion profile.
- **Easy adjustment of the working distance.**
- **Flexible Positioning and orientation of the camera.**
- **Dovetail profiles enable robust enclosure mounting:** on all 4 sides along the entire profile. Mounting brackets resist a displacement force of up to 3000 N! Simple adjustment of working distance.
- **Small form factor:** easy to integrate into existing machines.
- **Compatible with large range of accessories:** variety of mounting and adjustment brackets, water cooling, controlled heating plate and more.
- **High chemical resistance:** due to Viton, NBR and TPE sealing materials. Contact us for any special requirements!
- **Vibration proof mounting and passive camera cooling:** thanks to autoVimation's patented Quick-Lock and Heat-Guide camera mounting system (part of delivery).
- **Available with Germanium window for thermal cameras.**

Dimensions:



Order Number Key:

Camera enclosure	Camera height in cm	Rear wall	Enclosure length
2	X.X	A:20, B:21, C:22	188 (XS), 233 (S), 283 (M)

Example Gecko XS for Flir ax5 with rear wall A: Order Number 24.020.188

7.7 Orca Enclosures



IP67 protection for cameras up to 62 x 62mm cross section

Technical Highlights:

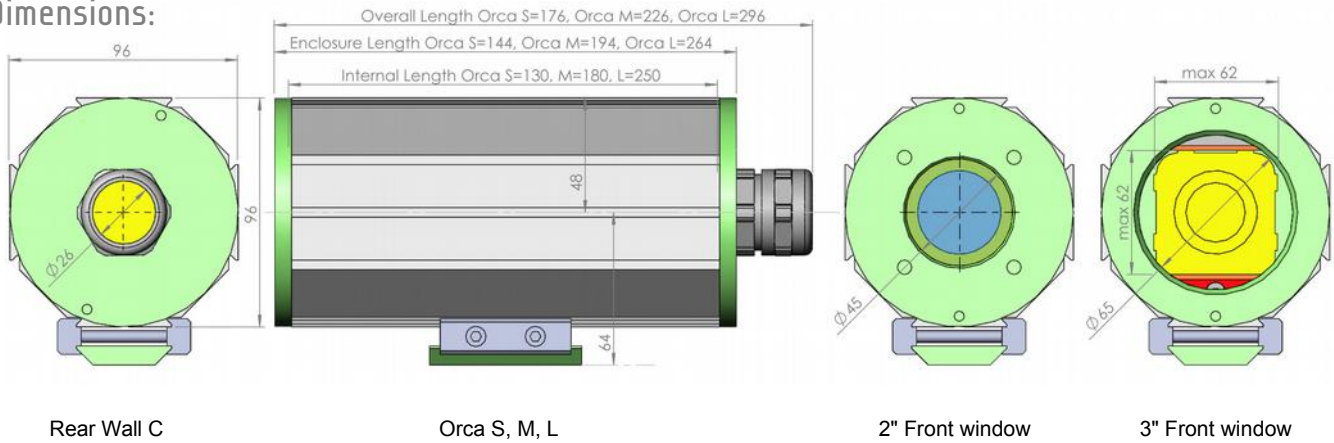
- **Robust build:** aluminium extrusion profile.
- **Small form factor:** easy to integrate into existing machines.
- **Flexible camera positioning:** angle and position
- **Dovetail profiles enable robust enclosure mounting:** on all 4 sides along the entire profile. Mounting brackets resist a displacement force of up to 3000N! Simple adjustment of working distance.
- **Compatible with a large range of accessories:** various mounting and adjustment brackets, triangulation set-ups, water cooling, controlled heating plate, wind curtain, positioning ring for simple camera replacement and more.
- **High chemical resistance** by using Viton, EPDM and TPE sealing materials. Contact us with special requirements!
- **Special enclosures:** for Sick Ranger, Basler Runner/Aviator, Sony FCB block cameras or FLIR A300 thermal imaging cameras.



- **Assembly of ring lights with up to 78mm Ø:** directly into the 3" front lid possible.
- **Vibration proof camera mounting with good heat dissipation:** thanks to the patented Quick-Lock / Heat-Guide mounting system.

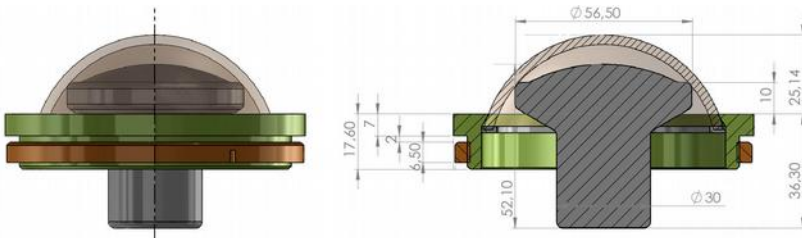
Degree of protection	Dimensions	Material details
<ul style="list-style-type: none"> ■ IP66 - Protection from high pressure water jets (Nema 4) ■ IP67 - Protection from occasional submersion (Nema 6) <ul style="list-style-type: none"> ○ Up to 1h duration ○ Up to 1m water depth 	<ul style="list-style-type: none"> ■ For cameras up to 62 x 62mm cross section (max. 85mm diagonal) ■ For connectors up to 26mm Ø ■ Orca S, length: 176, 130 (internal) ■ Orca M, length: 226, 180 (internal) ■ Orca L, length: 296, 250 (internal) ■ Custom up to 450mm (internal) ■ Aperture of 2" windows: 45mm Ø ■ Aperture of 3" windows: 65mm Ø 	<ul style="list-style-type: none"> ■ Enclosure: anodised aluminium ■ Window: BK7, double-sided broadband anti-reflective coating ■ Window seal: Viton ■ Enclosure seal: EPDM (Viton at request) ■ Cable gland seal: TPE (TPEV at request)

Dimensions:



Accessories:

- **Mounting kits**
- **Wind curtain and air nozzle:** for dirty environments
- **Water cooling and heating**
- **90° deflection mirror**
- **Adapter plate for 3" ring light:** in housing lid
- **Positioning ring:** for repeatable camera assembly
- **60mm Enclosure extension:** for easier lens adjustment



BK7 Dome window front lid for fisheye lenses with up to 200° image angle



Order number key:

Example: Orca L, camera height h: 52mm, 2" front window with rear wall C, length 250mm:

Order Number	2	5.2	4	2	.250
	↓	↓	↓	↓	↓
Enclosure	Camera height h in cm	Orca	2" window with rear wall	3" window with rear wall	Length
	Standard for h = 4.0 – 6.2cm		A: 0 C: 1 D: 2	A: 5 C: 6 D: 9	S: 130 M: 180 L: 250
			Surcharge rear wall E: Order Number 20.040.014		

Please order separately:

Accessory	Order Number	Accessory	Order Number
Adapter plate for camera height h = 29 - 39mm	20.040.001	Mounting tool for Orca lids (add to your first order)	90.000.004

7.8 Nautilus IP68 enclosures



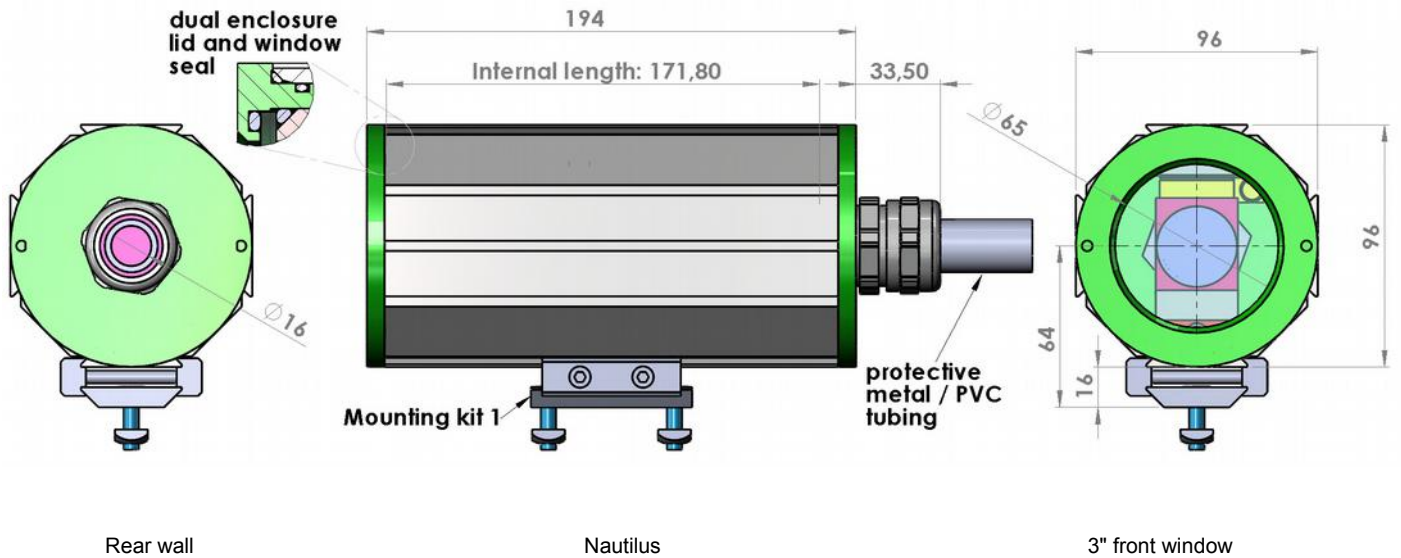
IP68 for cameras up to 60 x 60mm cross section

Technical Highlights:

- **IP68 protection:** for under water use of up to 12 hours down to 10m depth in pool or sea water environments.
- **Robust built:** aluminium extrusion profile with end faces anodized for extra corrosion protection.
- **Small form factor:** for cameras with up to 60 x 60mm cross section.
- **Sufficient space for cameras and lenses:** internal length: 172mm, internal diameter 85mm.
- **“Dual seal principle”:** all seal elements like enclosure lids, front window and the cable gland are fitted with 2 sealing mechanisms (i.e. double O-rings), providing extra safety for under-water camera use.
- **Water tight with any cable:** Protective metal conduit with robust PVC sheathing protects the cables from the water and eliminates the risk of an exposed cable entry.
- **Flexible camera positioning:** angle and position.
- **Dovetail profiles enable robust enclosure mounting:** on all 4 sides along the profile. Simple adjustment of working distance.
- **Assembly of ring lights with up to 78mm Ø:** directly into 3" front lid possible.
- **Compatible with a large range of accessories:** various mounting and adjustment brackets, positioning ring for simple camera replacement, and more.
- **High chemical resistance:** by using EPDM O-Rings, a Polyurethane cable gland seal and a PVC tube sheathing. Please check if these sealing materials meet your requirements and contact us with special needs!
- **Vibration proof camera mounting with good heat dissipation:** with the patented Quick-Lock / Heat-Guide mounting system.

Degree of protection	Dimensions	Material details
<ul style="list-style-type: none"> ■ IP66 - protection from high pressure water jets (Nema 4) ■ IP68 - protection from continuous submersion in water (Nema 6) <ul style="list-style-type: none"> ○ Up to 10m water depth ○ Up to 10 hours <p>IP68 only guaranteed, if assembly and operation instructions are followed carefully!</p>	<ul style="list-style-type: none"> ■ Camera size: up to 60 x 60mm, internal tube diameter: 16mm ■ Enclosure length: 228, 172 (total incl. cable gland, internal) ■ Window aperture with 3" window: 65mm diameter ■ Lens diameter: up to 85mm 	<ul style="list-style-type: none"> ■ Enclosure: anodised aluminium ■ Cable gland enclosure: V4A (AISI 316L) high grade stainless steel. ■ Window: BK7, double-sided broadband anti-reflective coating ■ Window seal: EPDM ■ Enclosure seal: EPDM ■ Cable gland seal: Polyurethane ■ Protective tube sheathing: PVC

Dimensions:



Accessories:

- **Mounting Kits**
- **Mounting bracket:** also with stainless steel screws
- **Adapter plates:** with 1/4" and 3/8" for tripod mounting
- **Adapter plate for 3" ring light:** in housing lid
- **Positioning ring:** for repeatable camera assembly



Nautilus in use for German Television ZDF (source "Kontakt Magazin")

Order number key:

Nautilus enclosure and accessories	Order Number
IP68 Nautilus enclosure, protective tube length 5m, camera height in cm (X.X)	2X.X50.200
Strip wound metal conduit with PVC sheathing, price per meter	20.000.005
Replacement O-Ring set, EPDM	20.000.040
Mounting tool 4mm pins for enclosure lids	90.000.004



7.9 Mammoth Enclosures

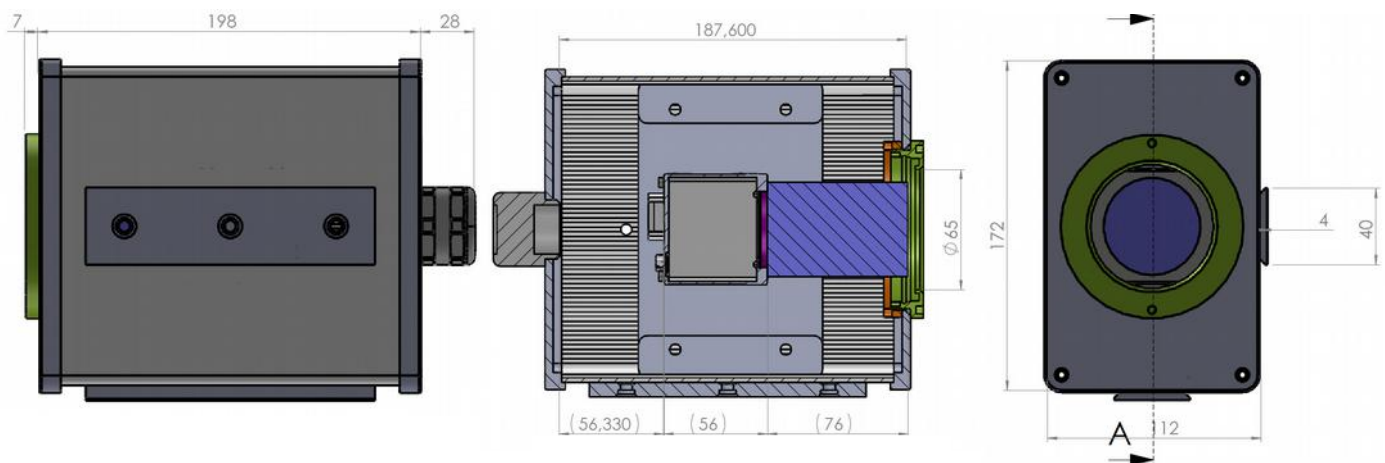


IP65 protection for larger cameras up to 90 x 150mm cross section

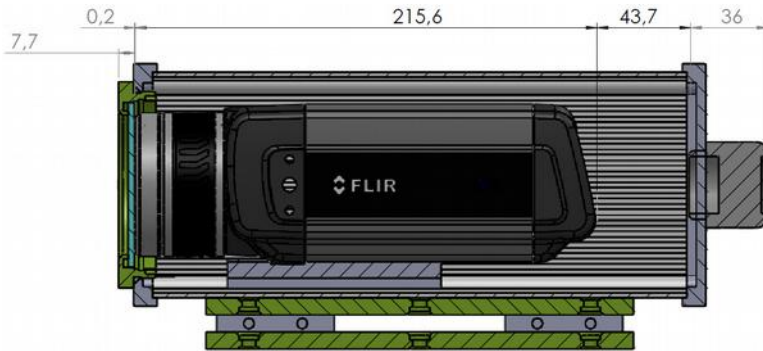
Technical Highlights:

- **Robust built** aluminium extrusion profile.
- **Flexible camera positioning** lengthwise position
- **Dovetail profiles enable robust enclosure mounting** on 2 sides along the entire profile.
- **Assembly of ring lights with up to 78mm Ø** directly into 3" front lid possible.
- **Compatible with a large range of accessories:** various mounting and adjustment brackets, triangulation set-ups, water cooling, wind curtain, and more.
- **High chemical resistance** by using NBR and TPE sealing materials. Contact us with special requirements!
- **The mounting base plate is especially machined to your requirements (for instance for the Flir A600 series, Dalsa Spyder, etc.)**
- **Vibration proof camera mounting with good heat dissipation** with a new Quick-Lock / Heat-Guide mounting system.
- **Fits all cameras with a cross section of up to 90 x 150mm.**

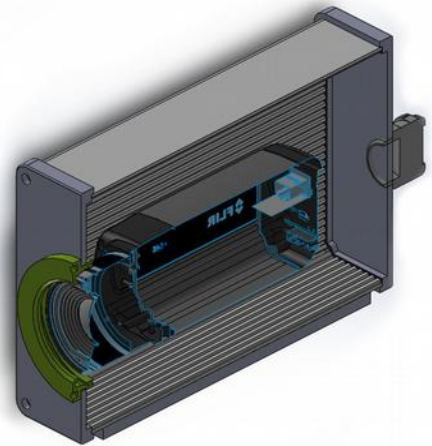
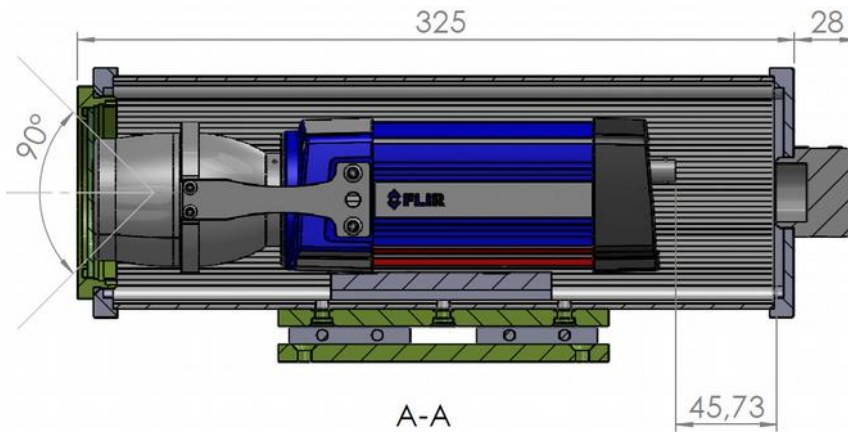
Dimensions Mammoth M:



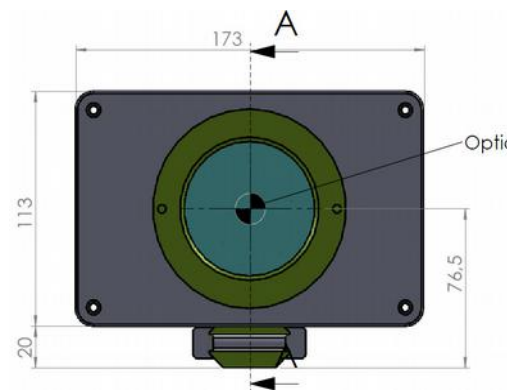
Mammoth M with Dalsa Spyder

Dimensions Mammoth L:


Mammoth L with Flir A600


Dimensions Mammoth XL:


Mammoth XL with Flir A300 and 90° large lens



Front view with optical axis

Order numbers:

Enclosure Type	Rear Wall	Order Number	Enclosure Type	Rear Wall	Order Number	
Mammoth S, 3" window	A, without PA tube	2X.X65.140	Malamute XL, 3" window	C	2X.X66.300	
Mammoth M, 3" window		2X.X65.180	Mammoth L, 3" Germanium-window 8 -12nm, for Flir A600		2X.X68.250	
Mammoth L, 3" window		2X.X65.250	Mammoth S, 3" window		D	2X.X67.140
Mammoth XL, 3" window		2X.X65.300	Mammoth M, 3" window			2X.X67.180
Mammoth S, 3" window	C	2X.X66.140	Mammoth L, 3" window	2X.X67.250		
Mammoth M, 3" window		2X.X66.180	Mammoth XL, 3" window	2X.X67.300		
Mammoth L, 3" window		2X.X66.250				

Recommended Accessories for Mammoth Enclosures	Order Number
3" Germanium front window (if required and not already included as in 2X.X68.250)	20.000.018
Water cooling module base plate for mammoth enclosure	60.100.020
Mounting tool with 4mm pins for Orca front lids (please add to your first order)	90.000.004

7.10 Chameleon Enclosures

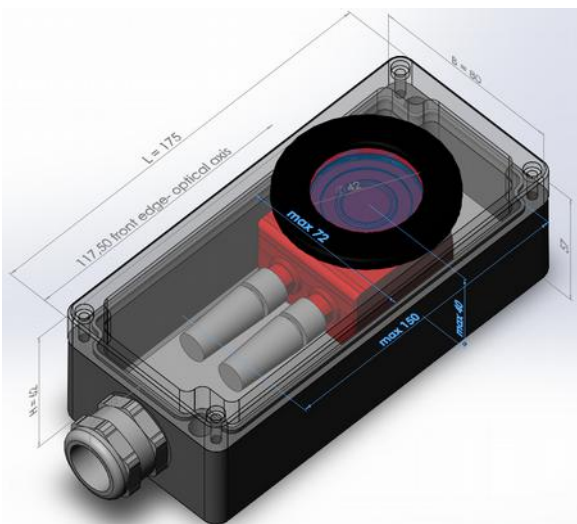


IP66 - IP67 (Nema 4) protection for cameras with 90° viewing direction

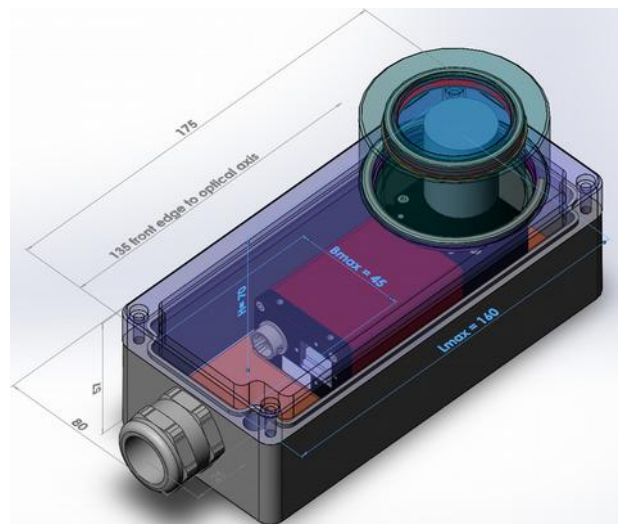
Technical Highlights:

- **Robust build** from aluminium or high grade stainless steel (AISI 316L).
- **Small form factor** - enclosures are not much larger than the protected camera.
- **Different sizes available** - for S-mount vision sensors and C-mount cameras with larger lenses.
- **Custom colours and prints possible.**
- **Adaptation to specific camera models:** regularly without additional costs.
- **Good chemical resistance:** through NBR, TPE and Poron seals. Contact us for any special requirements!
- **Also suitable for vision sensors with inbuilt LED lighting:** thanks to double sided anti-reflective window coating.
- **Pressure equalising valve:** avoids condensation for outdoor use.
- **Cable gland for several cables and connectors up to 26mm diameter.**

Chameleon S, aluminium



- **For vision sensors up to 150 x 72 x 44mm** (l x w x h incl. connectors).
- **Example:** Balluff BVS vision sensor.



- **For angular C-Mount cameras up to 160 x 45 x 72mm** (l x w x h incl. connectors).
- **Example:** AVT Manta W90 with 35mm C-Mount lens.

Enclosure Type	Dimensions (l x w x h)	Order Number
Chameleon SW	175 x 80 x 62mm	20.100.062

Enclosure Type	Dimensions (l x w x h)	Order Number
Chameleon ST	175 x 80 x 92mm	20.100.092

Chameleon M, stainless steel

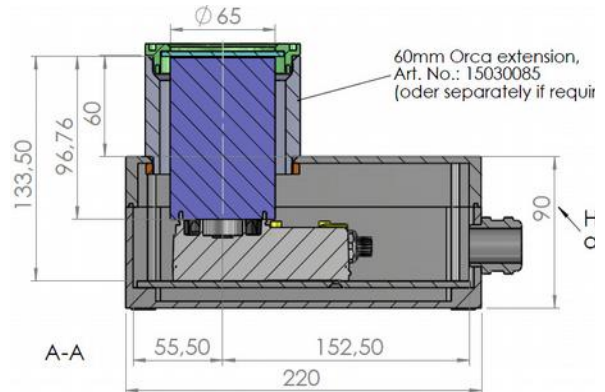
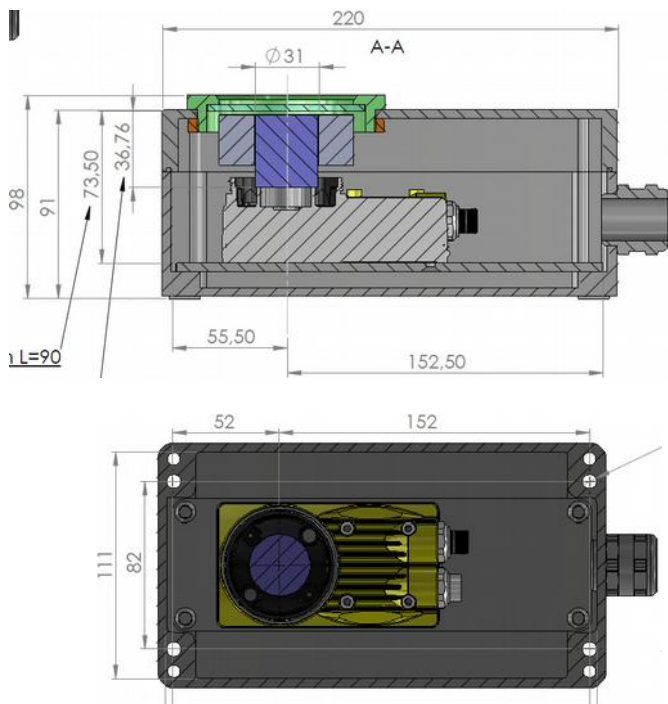

- **High grade surgical stainless steel (V4A, AISI 316L).**
- **Hygienic design** – no concave surfaces, FDA approved seals between all metal surfaces. Special hygienic cable gland available.

Enclosure Type	Dimensions (l x w x h)	Order Number
Chameleon M	198 x 89 x 71.5mm	20.102.047

Chameleon L, aluminium


- **Large 3" window with 65mm aperture.**
- **Camera lens always close to the window:** thanks to different enclosure heights of 65, 75, 80 and 90mm.
- **Longer lenses can be used:** combined with the Orca 60mm extension.

Enclosure Type	Dimensions (l x w x h)	Order Number
Chameleon L65	220 x 120 x 65mm	20.105.065
Chameleon L75	220 x 120 x 75mm	20.105.075
Chameleon L80	220 x 120 x 80mm	20.105.080
Chameleon L90	220 x 120 x 90mm	20.105.090



8 Accessories for Camera Enclosures

8.1 Solutions for dirty Environments

autoVimation offers various solutions to prevent dust and dirt on the front window of the camera enclosure. So the cameras can be used even under unfavourable conditions.

Air curtains for enclosures with 2" or 3" windows
including pneumatic fitting for 4mm tube.

- **Intermittent use:** blowing non-sticky dust from the enclosure window.
- **Permanent use:** preventing sticky dust or light moisture mist from reaching the window (Effectiveness depends on weight, speed and direction of particles).



2" air curtain

3" air curtain

For 2" windows

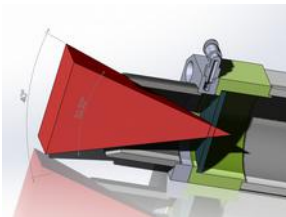
Order Number:
50.100.010

For 3" windows

Order Number:
50.100.011

Additional tube for 2" wind curtain
further increasing efficiency. For diagonal image angles <math>< 40^\circ</math>.

- The tube limits the direction of particle movement and increases the efficiency of the air flow required. This way the air flow can be reduced or the effect of the air curtain increased⁴.



Order Number:
50.100.015

Holder for tube
Order Number:
50.100.016 +
10.040.201

Pneumatic shutter
including cylinder, speed control valves, push in fittings for 4mm tube.

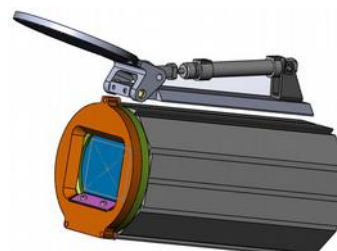
- **Completely seals the front window** during camera intervals.
- The use with wind curtain helps preventing particles reaching the window while the shutter is open.
- **Application example:** Area of a milling machine where part position needs verification prior to machining.



For Salamander or Gecko enclosures
Order Number:
50.200.010



For Orca enclosure with 2" window
Order Number:
50.200.020



For Orca enclosure with 3" window
Order Number:
50.200.021

8.2 Enclosure Extensions

autoVimation offers a variety of options and extensions to facilitate the daily work.

Enclosure extensions - Technical Highlights:

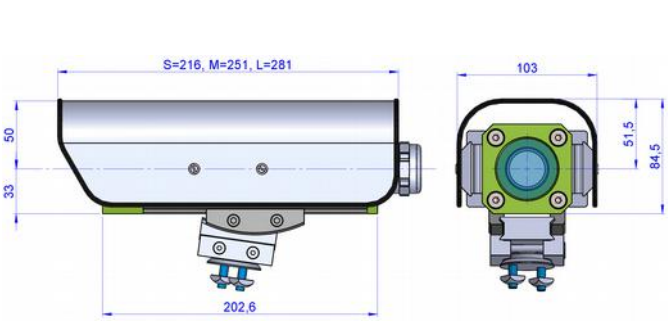
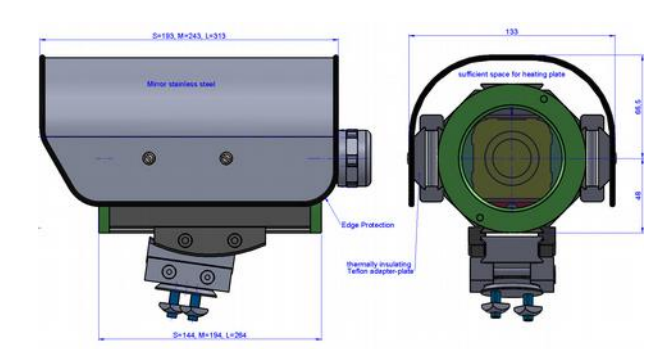
- **Simplified settings:** aperture and focus can be adjusted comfortably after removing the extension.
 - **Simplified exchange of lenses and filters**
- **Cost-effective extension of already acquired protective case:** for example, when changing to a longer lens.
 - **Easy installation:** together with the housing front cover.

Salamander 30mm Extension	Salamander 60mm Extension	Orca 60mm Extension
		
Order Number 15.015.030	Order Number 15.015.060	Order Number 15.030.085

8.3 Sun roof (available from spring 2016)

Sun roof - Technical Highlights:

- **Effective sun protection:** high reflection grade due to stainless steel.
- **Easy installation:** thanks to dovetail profiles.
 - **Combinable with heating or cooling module.**

Sun roof for Salamander enclosures			Sun roof for Orca enclosures		
					
Order Number			Order Number		
Size S	Size M	Size L	Size S	Size M	Size L
20.010.001	20.010.002	20.010.003	20.011.001	20.011.002	20.011.003

8.4 Mounting Blocks

Mounting Blocks - Technical Highlights:

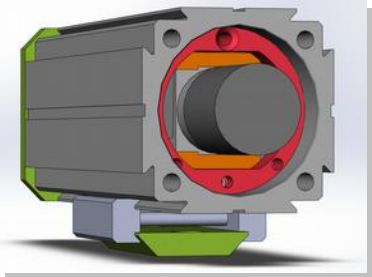
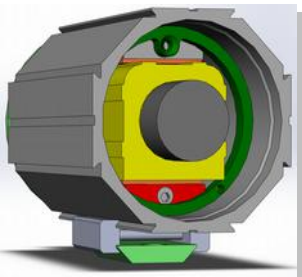
- **Robust and cost-effective camera mount:** perfect for all applications in all places where there is no all-round protection of the camera needed.
- **Flexible mounting options:** thanks to the dovetail profile.
- **Good heat dissipation:** thanks to the patented Quick lock / Heat-guide mounting system.
- **Simply adaptable:** suitable for nearly all autoVimation mounting kits and profiles.

Salamander Mounting Block		Orca Mounting Block	
			
For cameras up to 40 x 40mm cross section (55mm diagonal)		For cameras up to 62 x 62mm cross section (85mm diagonal)	
Length	Order Number	Length	Order Number
60mm	15.010.060	80mm	15.030.080
100mm	15.010.100		
164mm	15.010.164		

8.5 Positioning Rings

Position Rings - Technical Highlights:

- **Allows reproducible positioning and orientation of cameras after dismounting:** the ring inside the housing profile remains in position and "remembers" so the exact camera placement.

Position Ring for Salamander	Position Ring for Orca
	
Order Number 20.020.003	Order Number 20.040.002

8.6 Windows

Window type	Order Number
Surcharge for Schott heat-absorbing 2" glass for Salamander and Orca front lid	20.000.009
Surcharge for 2" IR-mirror (heat-reflective glass)	20.000.010
Surcharge for 2" Sapphire front window	20.000.016
Surcharge 2" for Germanium front window	20.000.017
Surcharge 3" for Germanium front window	20.000.018
2" replacement window (Orca, Salamander), 51.2mm diameter, s= 3mm, BK7, double sided anti-reflective coating	20.000.013
2" window for Feuersalamander, 51.2mm diameter, s= 3mm, BK7, double sided anti-reflective coating, with distance ring	20.000.026
30mm replacement window for Laser- and Colibri enclosure, s=2mm, BK7, double sided anti-reflective coating.	20.000.030
76mm replacement window BK7 for Orca 3" front lid	20.000.035
Surcharge for Orca „Dome“ front lid	20.040.015
2" acrylic front window, uncoated standard glass	20.000.027
2" acrylic front window, broadband anti-reflective coating (450-700nm), high scratch and chemical resistance	20.000.029
3" acrylic front window, broadband anti-reflective coating (450-700nm), high scratch and chemical resistance	20.000.033


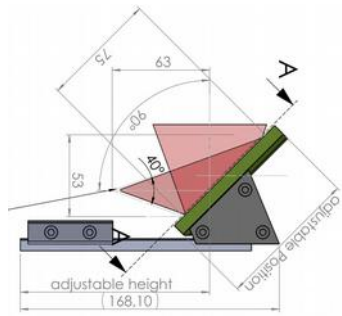
All enclosures can be shipped ex works with filters or other special windows. Please contact autoVimation with special requirements!

8.7 Mirror Attachment for Orca and Salamander Enclosures

Deflecting mirror - Technical Highlights:

- Suitable for Orca, Salamander and Gecko enclosures.
- Allows image acquisition with limited space: by changing the angle of view of 90°.
- 4-6 λ surface mirror: reflection >90% of the visible radiation.
- Mirror size 51 x 76mm.
- Avoids costly prisms: or other optical attachments.
- Suitable for mid range to long focal lenses.

Deflecting mirror for Salamander, Orca and Gecko enclosures

	
<p>The order Number including the enclosure mount.</p>	<p>Order Number: 20.020.004</p>

9 Laser Triangulation Mounting Solutions



IP66 protection and robust mounting for cylindrical laser with standard diameter of 19mm or 20mm

Technical Highlights:









- **Robust build:** aluminium extrusion profile.
- **Small form factor:** easy to integrate into existing machines.
- **Vibration proof laser mounting inside the laser enclosure with good heat dissipation.**
- **The laser enclosure extension allows focal adjustment of laser from the side:** while it is mounted into the laser-enclosure-profile.
- **Compatible to autoVimation's dovetail profiles:** simple set-up of laser-triangulation systems with:
 - **Dovetail profiles (triangulation rail):** easy positioning of the laser and camera enclosure.
 - **Vertical and rotational laser mounts:** allow free adjustment but stay in position once the system has been calibrated.
 - **13mm and 29mm distance pieces:** ensure the optical axes of camera and laser are in the same plane.

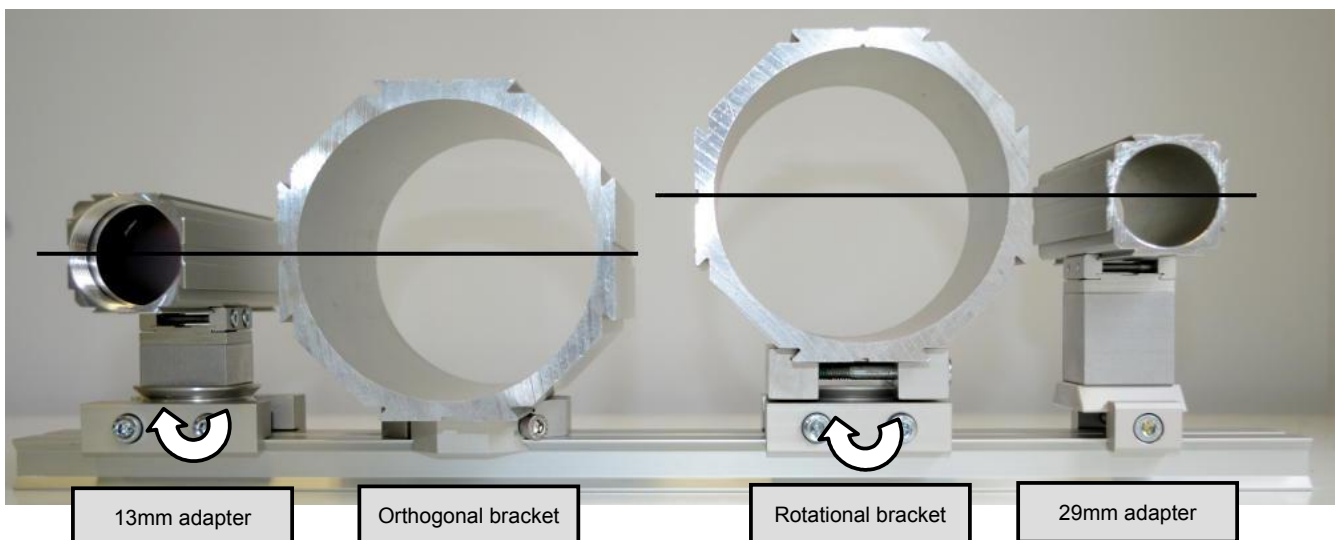
Degree of protection	Dimensions	Material details
<ul style="list-style-type: none"> ■ IP66 - Protection from high pressure water jets (Nema 4) 	<ul style="list-style-type: none"> ■ For laser with 19mm or 20mm diameter ■ Enclosure length 120/150/180mm 	<ul style="list-style-type: none"> ■ Enclosure: anodised aluminium ■ Window: BK7, double-sided broadband anti-reflective coating ■ Window seal: Viton ■ Enclosure seal: EPDM ■ Cable gland seal: TPE

Order numbers:

Enclosure length	Laser diameter	Order Number	Enclosure length	Laser diameter	Order Number
120mm	19mm	40.010.020	120mm	20mm	40.010.021
150mm		40.010.030	150mm		40.010.031
180mm		40.010.040	180mm		40.010.041

Accessories:

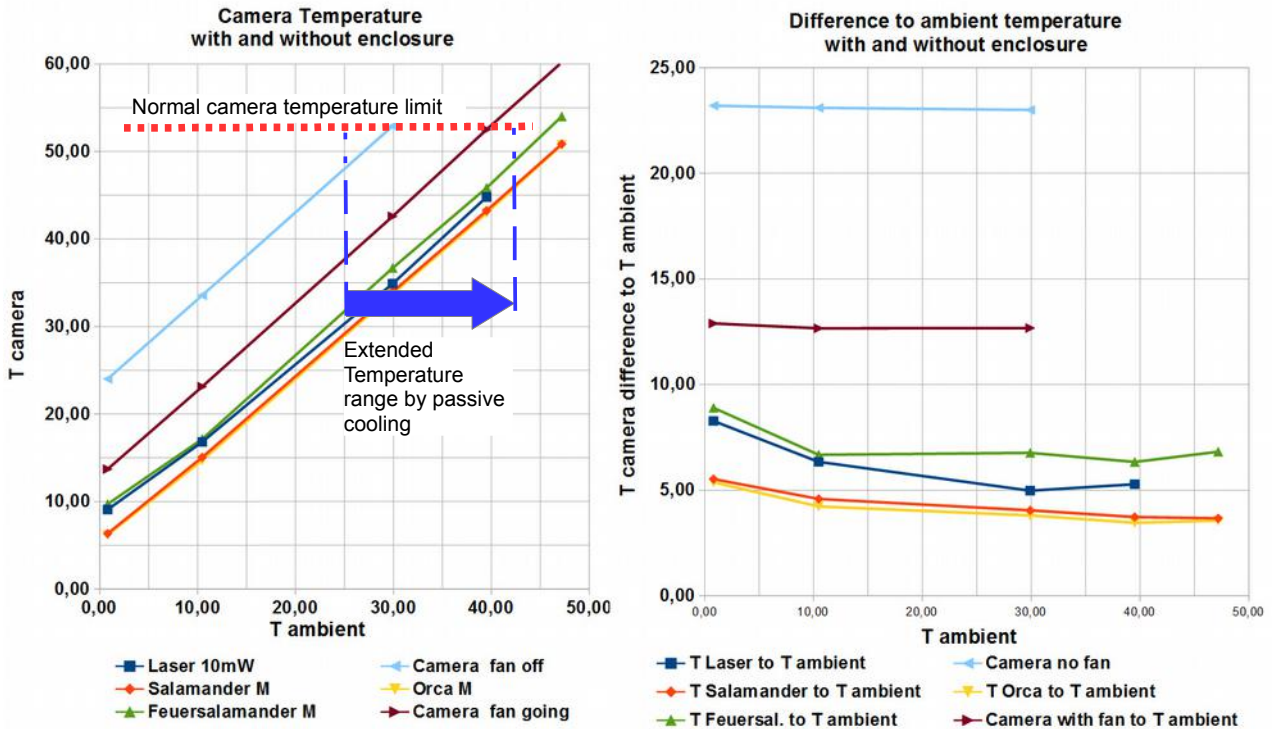
Product		Order Number	Product		Order Number
Adapter bracket from 20mm to 40mm profile to use standard profiles with the laser enclosures		10.049.051	Quick-lock mount for 19mm laser in the Gecko enclosure for special applications		40.010.012
Adapter laser enclosure to 40mm profile same as order number: 40.001.005 without clamp		40.001.004	Laser enclosure extension 25mm allows the focusing of the laser while it is attached in the housing		40.010.025
Vertical laser mount to fix the laser enclosure vertical to a dovetail profile		40.001.005	13mm adapter brings laser (rotational mount) and Orca (orthogonal bracket) in the same optical axis		40.001.007
Rotational laser mount to fix the laser enclosure rotationally to a dovetail profile		40.001.006	29mm adapter brings laser (vertical mount) and Orca (rotational bracket) in the same optical axis		40.001.008



Thanks to the adapters the laser and the camera enclosure can be placed on the same optical axis

10 Climate Control for Camera Enclosures

10.1 Passive Cooling through autoVimation's Enclosures



Latest tests have shown that autoVimation's patented Heat-Guide system significantly reduces the camera or laser temperature:

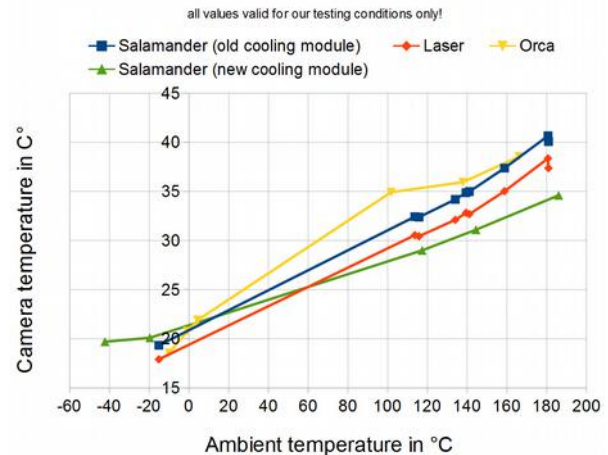
- Where the camera temperature **without enclosure** and air movement has been around **23°C higher than the ambient temperature**, the camera temperature is **only about 4 K above the ambient temperature if installed in Orca or Salamander enclosures**. Laser- and Feuersalamander enclosures show a similar cooling effect – and that almost constant from 0°C to 50°C ambient temperature!
- This means that autoVimation's enclosures can significantly extend the temperature range a camera can be used in!
- The cooling effect however depends on the camera used and the installation conditions, so the camera temperature should be monitored, when operating at higher ambient temperatures!



10.2 Water Cooling and Heating



Camera or Laser temperature with water cooling



The water cooling unit extends the temperature range of your application by a multiple

Technical Highlights:

- **Simple set-up and operation:** the cooling module is connected with up to 20m long PU tubes to the cooling unit, that is placed in an area with room temperature.
- **High range:** the water cooling unit extends the temp. range of a camera from typically 0 - 50°C to -40 - 180°C.
- **Automatic heating and cooling:** since the water temp. is drawn to the ambient temperature of the cooling unit.
- **High efficiency:** water as cooling medium allows a more efficient heat transport compared to air cooling.
- **Compatible to Salamander and Orca enclosures:** and autoVimation's Mounting Kits.
- **No cooling fluid is pumped through the enclosure:** the camera can be cooled through the enclosure wall.
- **No oily compressed air inside the enclosure:** that is often alternatively used for camera cooling.
- **Ideal for hot or cold industrial environments:** if there is a place with moderate temperatures within a 20m radius of the camera enclosure.

Self-contained cooling unit

- **Safety features:** permanent monitoring of camera temperature and water flow and fan operation with emergency shut down function for camera protection in case of any system failure.
- **Included in delivery:** the self-contained cooling unit includes pump (pumping height up to 1,6m), fans and radiator with a maximum cooling power of 1000W, 6m PU water tubing (-20°C to +60°C operating temperature) and 250ml coolant concentrate.
- **The unit can cool up to 5 camera enclosures:** depending on the installation.



Product	Order Number
Self contained water cooling unit (dimensions l x w x h = 456 x 105 x 203mm)	60.101.519
Water cooling module for Orca enclosures (starting from enclosure size M)	60.100.009
Water cooling module for direct mount on Salamander and Gecko enclosures (starting from enclosure size M)	60.100.010
Water cooling module base plate for Mammoth enclosures	60.100.020
Water cooling module for Laser enclosures	60.100.030
12V, 20W Power supply	60.010.422
Polyurethane (PU) water tubing if the distance between enclosure and cooling unit exceeds 3m (price per meter)	60.101.478
Teflon high temperature water tubing (price per meter)	60.101.477
Additional cooling concentrate (from 10m total tube length)	60.101.333

10.3 Electrical Heating Plate



The controlled heating plate heats the entire enclosure to maximal 20°C. So it is ensured that the camera cannot overheat and there is no dew-point inside the enclosure. This heating plate maintains the camera temperature typically at around +10°C even at -30°C ambient temperature.

Product	Order Number
For Salamander enclosure, 35W, set to maximal 20°C, 24V, power supply separately.	70.100.010
For Orca enclosure, 35W, set to maximal 20°C, 24V, power supply separately.	70.100.011

10.4 Peltier Climatisation

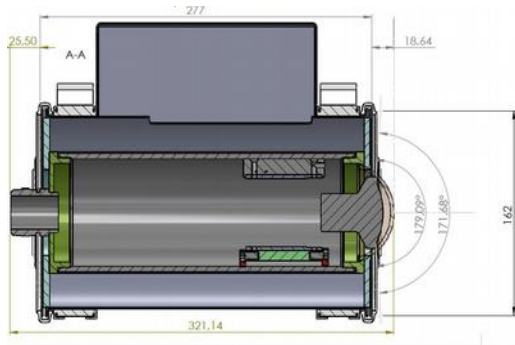


Optimal climate for cameras in outdoor use even under extreme temperature conditions

Technical Highlights:

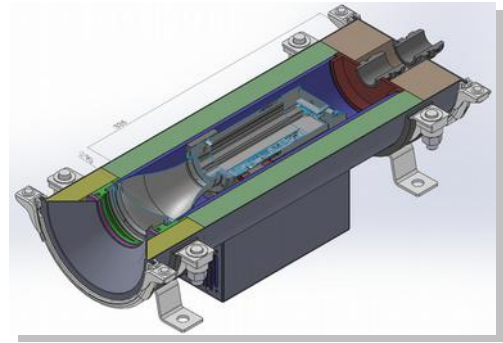
- **Robust build** with stainless steel outer enclosure.
- **Camera is always kept within the permitted temperature range** - automatic heating- and cooling mode (threshold adjustable).
- **Permanent camera temperature control** - with emergency camera shut down for camera protection.
- Designed for **operation under extreme climatic conditions**, ambient temperatures up to 50°C and sun radiation intensity of up to 350W/ m².
- **High degree of protection:** Inner enclosure IP67, outer enclosure IP54 (fan)
- **Proven systems** with more than 2 years successful operation in the worlds' hottest deserts.
- **Simple, fully automatic operation** - only power supply required.
- **Good UV and ageing resistance** of all sealing components, EPDM seals and high temperature silicone cables.
- **Autonomous operation** - power supply by solar cells possible.
- Application areas: solar industry, surveillance, astronomy, and more.
- **Different front windows available** - 3" BK7 window or dome lid for fish eye lenses as well as Germanium windows for use with thermal imaging cameras.

Turtle M



Dome window front lid for with Fisheye lenses

Turtle L



FLIR A300 with f=76mm lens

Technical details:

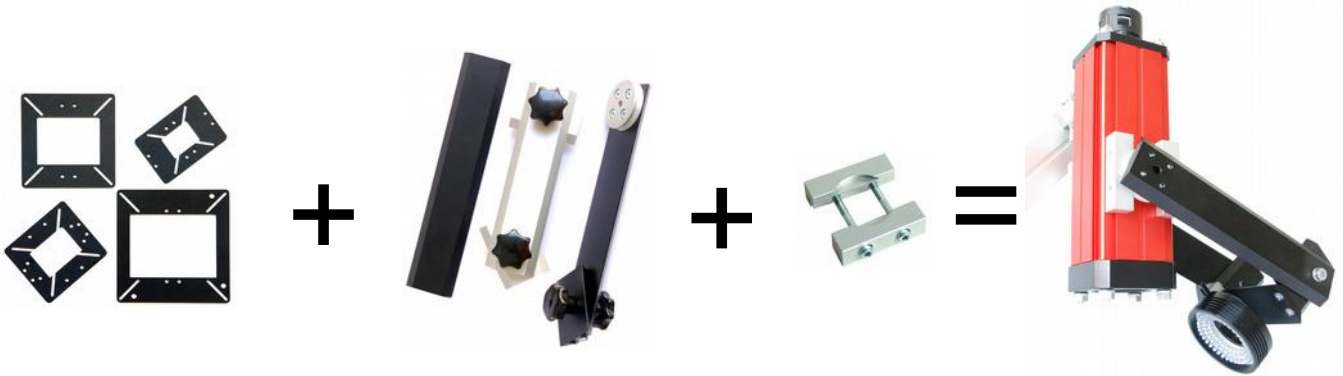
Enclosure type	Turtle M	Turtle L
Dimensions (w x h x l)	85 x 160 x 300mm	215 x 240 x 500mm
Maximal camera size	60 x 60 x 165mm (incl. connectors) max. 90mm lens diameter	70 x 70 x 335mm (incl. connectors) max. 90mm lens diameter
Protection class inside enclosure	IP54 (Nema 3)	IP54 (Nema 3)
Protection class outside enclosure	IP66/67 (Nema 4 and 6)	IP66/67 (Nema 4 and 6)
Cooling/heating power	Up to 45W/70W	Up to 60W/120W

Peltier enclosure types and accessories:

Product	Order Number
Turtle M Enclosure with up to 70W cooling and 90W heating power, BK7 window with 65mm aperture diameter, outer enclosure stainless steel, wall mounting brackets, 5m thermometer and power supply cable*.	70.300.242
Turtle MD Enclosure with up to 70W cooling and 90W heating power, dome window for fisheye lenses, outer enclosure stainless steel, wall mounting brackets, 5m thermometer and power supply cable*.	70.300.245
Turtle L Enclosure with up to 60W cooling and 90W heating power, 3" BK7 front window, outer enclosure stainless steel, wall mounting brackets, 5m thermometer and power supply cable*.	70.300.250
Turtle LG Enclosure for thermal imaging cameras, 68mm aperture Germanium Window, up to 60W cooling and 90W heating power, outer enclosure stainless steel, wall mounting brackets, 5m thermometer and power supply cable*.	70.300.260
Turtle XL Enclosure with peltier climatisation for large cameras with cross section up to 83x135mm (based on Mammoth enclosure). 3" BK7 front window, internal length 310mm, up to 80W cooling and 120W heating power*.	70.300.290
Peltier Controller Din rail mount, 16A max. current, digital display, programmable heating- and cooling levels, temperature control with emergency shut down function, max. ambient temperature 60°C (5A current), external 24V/DC power supply required.	70.300.270
Thermo Sensor Double NTC 10k with 5m high temperature cable.	70.300.280

*External Peltier controller and power supply required.

11 Illumination Adapters and Ring Lights



The illumination construction kit enables simple and flexible integration of LED-ring lights

Technical Highlights:

- **Robust build:** aluminium profile.
- **Small form factor:** easy to integrate into existing machines.
- **Flexible positioning:** angle and position.
- **Different arm length available.**
- **Simple adjustment of the working distance.**
- **Compatible with large range of accessories:** variety of mounting and adjustment brackets.
- **No-tool adjustment option:** for laboratory use.

Mounting Arms

Type	Order Number	Type	Order Number
Mounting arm one side, straight, 175mm, mounting tabs for illumination adapter plates	30.009.175	Mounting arm one side, straight, 175mm, mounting tabs for rotational mounting plates	30.010.175



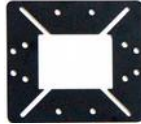
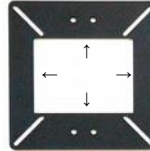
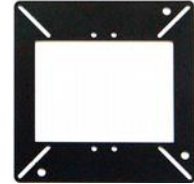
Spider mounting example



Albatross mounting example

Spider Adapter Plates

Spider 1

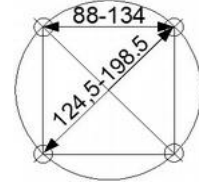
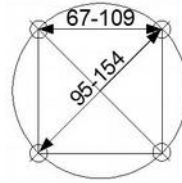
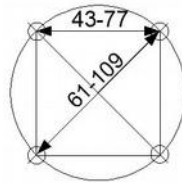
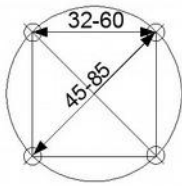
Spider 2

Spider 3

Spider 4


Aperture size 40 x 30 mm (w x h)

Aperture size 54 x 40 mm (w x h)

Aperture size 80 x 60 mm (w x h)

Aperture size 110 x 80 mm (w x h)


Suitable for hole pattern
square distance:

 32 – 60mm \triangleq 1.25" – 2.36"
diameter:

 45 – 85mm \triangleq 1.77" – 3.35"

Suitable for hole pattern
square distance:

 43 – 77mm \triangleq 1.70" – 2.36"
diameter:

 61 – 109mm \triangleq 2.40" – 4.29"

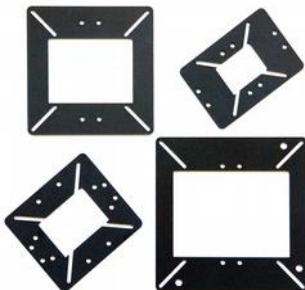
Suitable for hole pattern
square distance:

 67 – 109mm \triangleq 2.64" – 4.29"
diameter:

 95 – 154mm \triangleq 3.70" – 6.06"

Suitable for hole pattern
square distance:

 88 – 134mm \triangleq 3.46" – 5.28"
diameter:

 124.5 – 198.5mm \triangleq 4.90" – 7.81"


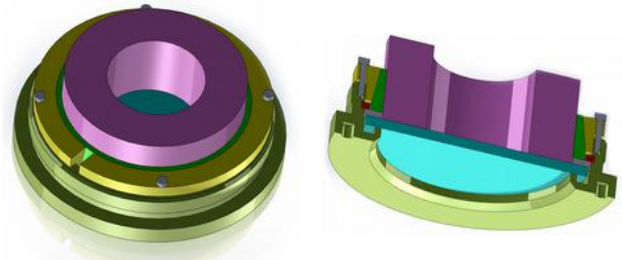
Spider Adapter Plates

Adapter Type	Order Number
Spider 1 – M3, 70 x 98mm	30.150.010
Spider 1 – M4, 70 x 98mm	30.150.011
Spider 2 – M3, 90 x 98mm	30.150.020
Spider 2 – M4, 90 x 98mm	30.150.021
Spider 3 – M3, 120 x 120mm	30.150.030
Spider 3 – M4, 120 x 120mm	30.150.031
Spider 4 – M3, 144 x 144mm	30.150.040
Spider 4 – M4, 144 x 144mm	30.150.041

Albatross Adapter Plates

Adapter Type	Order Number
Albatross 1 – M3, 40 x 58mm	30.200.010
Albatross 1 – M4, 40 x 58mm	30.200.011
Albatross 2 – M3, 40 x 128mm	30.200.020
Albatross 2 – M4, 40 x 128mm	30.200.021
Albatross 3 – M3, 72 x 158mm	30.200.030
Albatross 3 – M4, 72 x 158mm	30.200.031

Ring light mounting options for Orca and Mammoth enclosures



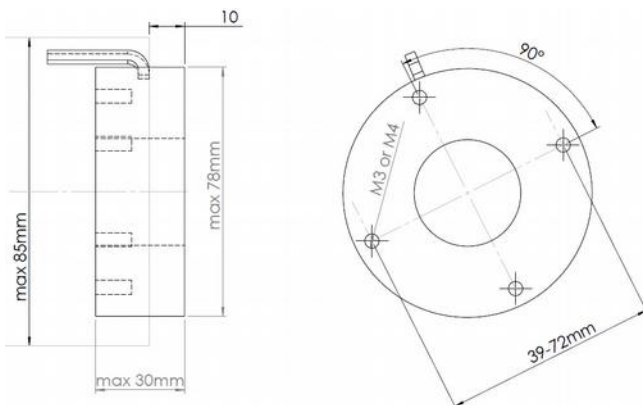
Ring light mount with Spider adapter plate

- **Suitable for Orca 3" window:** 65mm aperture, mounting tabs for Spider Adapter Plate included
- **Flexible solution** (fits most ring lights with diameter of up to 78mm), limited heat dissipation (recommended for strobe use only).

Mounting ring for 65mm ring lights

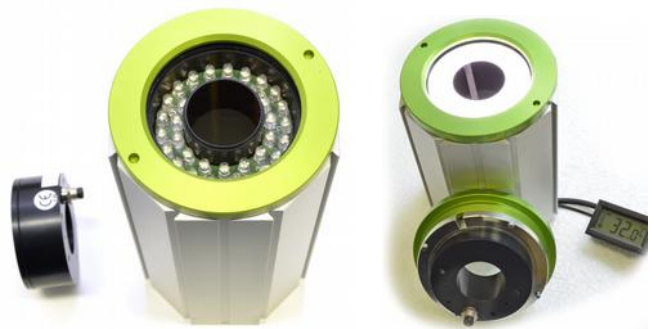
- **Suitable for Orca 3" window:** 65mm aperture, 31mm inner aperture
- Mounting rings ensure good heat dissipation from the LED light not only to the front lid of the Orca enclosure but also to the enclosure profile. The LED temperature is greatly reduced from over 50°C to 32°C (RL60 @ room temperature)

Matching ring lights



- Every ring light with a regular mounting thread pattern (i.e. 180° or 90° as shown) on a circle of 39 to 72mm.
- Best with an axial cable exit. If the cable exit is radial as shown, the cable should not exit on the first 10mm of the light, where it is inserted into the Orca front lid. In this case the maximum ring light diameter might be less than 78mm to allow for the cable.
- Check if the LED is operated within the permitted temperature range!

Matching ring lights



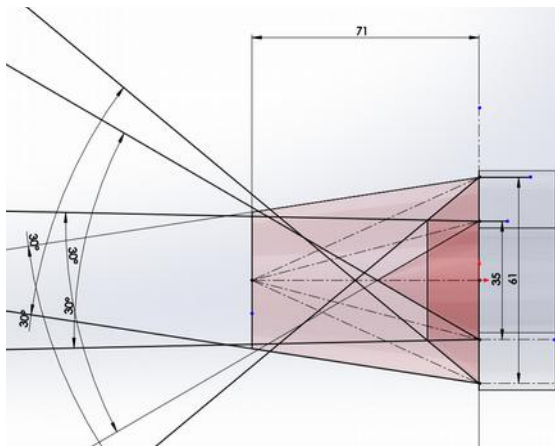
- Any ring light with 65mm external diameter (+0,1mm).
- Cable exit axial or radial not at the first 15mm of the LED light.
- 65mm ring lights we sell from a reputable German LED light manufacturer – see the product list on the following page:

Mounting Ring Type	Order Number	Mounting Ring Type	Order Number
Ring Light Mount with Spider Adapter Plate	30.160.010	Mounting Ring for 65mm Ring Light	30.160.020

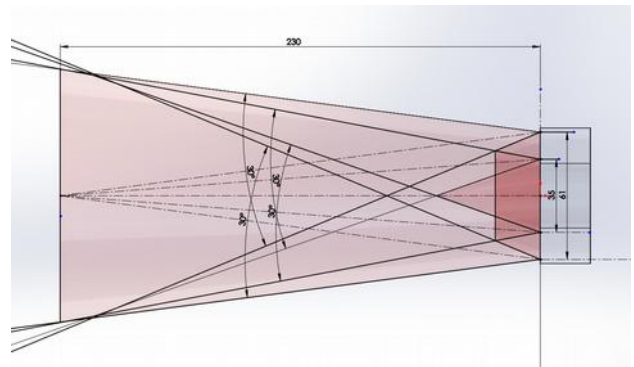
65mm Ring Lights from autoVimation

Ring Light Type (3-pin connector, 24V/DC)	Order Number	Ring Light Type (3-pin connector, 24V/DC)	Order Number
Red, 36 LED, 23°, diffusion disk	35.100.010	White, 36 LED, 15°, no optics	35.100.021
Red, 36 LED, 23°, no optics	35.100.011	White, 36 LED, 15°, diffusion disk	35.100.022
Red, 36 LED, 23°, directed	35.100.012	White, 36 LED, 15°, directed	35.100.023
Red, 36 LED, 23°, Fresnel lens f=71mm	35.100.013	IR, 36x LED, 6°, directed	35.100.024
Red, 36 LED, 23°, Fresnel lens f=230mm	35.100.014	IR, 36x LED, 17°, directed	35.100.025
White, 36 LED, 20°, no optics	35.100.015	IR, 36x LED, 30°, directed	35.100.026
White, 36 LED, 20°, diffusion disk	35.100.017	IR, 36x LED, 6°, no optics, directed	35.100.027
White, 36 LED, 20°, directed	35.100.018	IR, 36x LED, 17°, no optics, directed	35.100.028
White, 36 LED, 20°, Fresnel lens f=71mm	35.100.019	IR, 36x LED, 30°, no optics, directed	35.100.029
White, 36 LED, 20°, Fresnel lens f=230mm	35.100.020		
Flash Module	Order Number	Sensor Cable	Order Number
U _b =24VDC/8A, U _{out} =48V, U=const., I _{ges} = 3A, 2 channels, dimensions 86x70x60mm, flash time adjustable in 16 steps tan=5µs to 20ms, duty/cycle=10*tan, trigger 5...24VDC, opto isolated, TRGDelay may 20ms	35.150.010	M8, 3-pin for ring light	35.205.000

The Fresnel lenses direct the centre of the LED illumination to the corresponding working distance. This can increase the light intensity and also may reduce reflection on shiny surfaces. The following images show the effect of the f=71mm and 230mm lenses with a 30° LED opening angle.



f=71mm, LED angle = 30°



f=230mm, LED angle = 30°

12 Tools

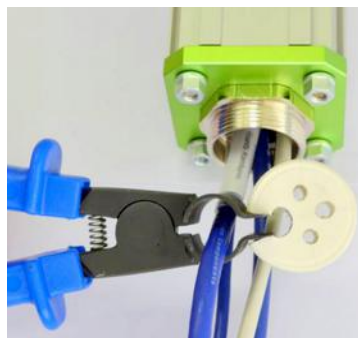


autoVimation offers specialized tools to facilitate the daily work

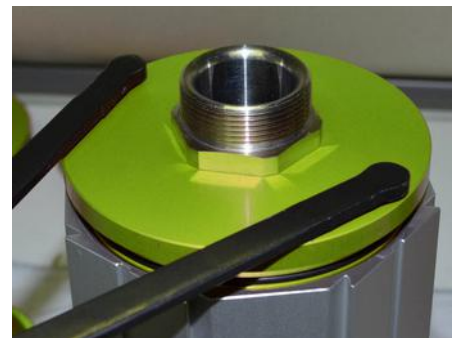
Tool	Order Number
Mounting tool with 4mm pins for Orca and Feuersalamander front and back lids	90.000.004
Allen key 4.5mm	90.000.001
Allen key, T-handle, 4mm, length 100mm	90.000.002
Allen key, T-handle, 4mm, length 150mm	90.000.008
Allen key, T-handle, 3mm, length 150mm	90.000.003
Allen key, T-handle, 3mm, length 200mm	90.000.006
Allen key, T-handle, 3mm, length 350mm	90.000.007
Adjustor, a tool for fine adjustment of the rotational angle of camera enclosures	90.000.005
Ratchet wrench AF10, 72 teeth, 5° movement	90.000.009
TX20H bit for tamper-proof screws Torx with pin	90.000.010
Spreading pliers, helpful for cable gland inserts	90.000.011



The Adjustor enables fine tuning of the rotational angle of the camera enclosure



The spreading spiers helps to insert cables into a gland insert



The mounting tool helps to tighten front and back lids

13 Appendix

13.1 Relevant IP protection classes according to EN 60529

Solid particle protection (source: Wikipedia):

The first digit indicates the level of protection that the enclosure provides against access to hazardous parts (e.g., electrical conductors, moving parts) and the ingress of solid foreign objects.

Level	Object size protected against	Effective against
5	Dust protected	Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment; complete protection against contact (dust proof)
6	Dust tight	No ingress of dust; complete protection against contact (dust tight)

Liquid ingress protection (Source: Wikipedia):

The second digit indicates the level of protection that the enclosure provides against harmful ingress of water.

Level	Protected against	Testing for	Details
4	Splashing of water	Water splashing against the enclosure from any direction shall have no harmful effect.	Test duration: 5 minutes Water volume: 10 litres per minute Pressure: 80–100 kPa
5	Water jets	Water projected by a nozzle (6.3 mm) against enclosure from any direction shall have no harmful effects.	Test duration: at least 3 minutes Water volume: 12.5 litres per minute Pressure: 30 kPa at distance of 3 m
6	Powerful water jets	Water projected in powerful jets (12.5 mm nozzle) against the enclosure from any direction shall have no harmful effects.	Test duration: at least 3 minutes Water volume: 100 litres per minute Pressure: 100 kPa at distance of 3 m
6K	Powerful water jets with increased pressure	Water projected in powerful jets (6.3 mm nozzle) against the enclosure from any direction, under elevated pressure, shall have no harmful effects.	Test duration: at least 3 minutes Water volume: 75 litres per minute Pressure: 1000 kPa at distance of 3 m
7	Immersion up to 1 m	Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion).	Test duration: 30 minutes 1000 mm below the surface of the water.
8	Immersion beyond 1 m	The equipment is suitable for continuous immersion in water <i>under conditions which shall be specified by the manufacturer</i> . However, with certain types of equipment, it can mean that water can enter but only in such a manner that it produces no harmful effects.	Test duration: continuous immersion in <i>water depth specified by manufacturer</i> , Generally up to 3 m
9K	Powerful high temperature water jets	Protected against close-range high pressure, high temperature spray downs.	Spray nozzle with 80 °C water at 8–10 MPa (80–100 bar) and a flow rate of 14–16 L/min

Common misconceptions with IP ratings:

1. **“Lower IP ratings are included in higher IP numbers”**- This is the case with similar exposure (i.e. splash water and (powerful) water jets), but for instance **IP66 is not part of IP67** and also **IP68 and IP 69k do not include any other ratings!** An IP67 enclosure that can be submersed for a limited time and depth might leak with powerful water jets (IP66), unless it is also specified as IP66!
2. **“The highest IP rating is always the best”**- Best is if the rating corresponds with the actual application demand! An mere **IP67 enclosure is not suited for wash-down conditions** and machine vision under water is very rare and then probably requires IP68.
3. **“IP68 means the use under water is guaranteed for an unlimited time”**. The EN 60529 only requires testing for up to 1 hour and that is only what for instance cable gland manufacturers warrant (in clear fresh water)!
4. **“Any cable can be used to full-fill the IP rating of a cable gland”**- cable gland IP tests are done with a rigid pin and assume a suitable cable (i.e. no office LAN cable!) that does not change its shape over time.

13.2 Chemical durability of autoVimation's sealing materials

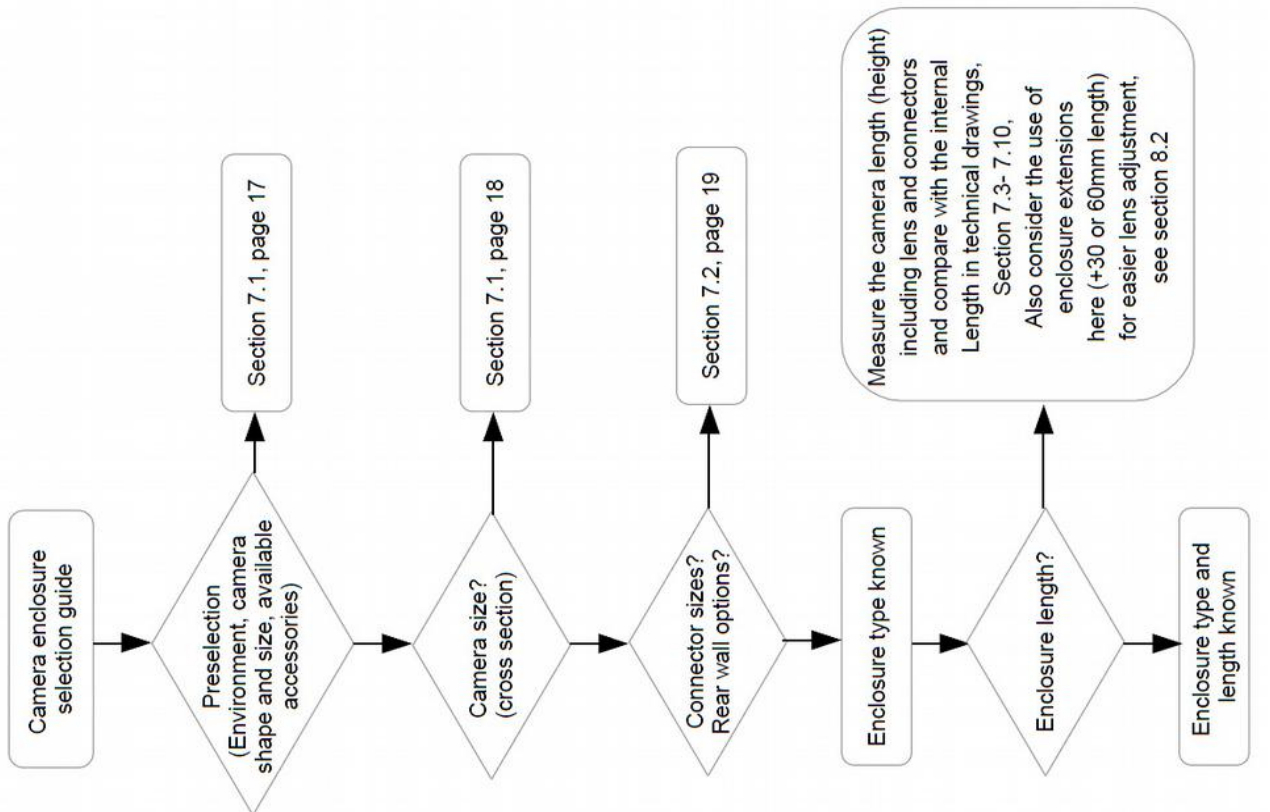
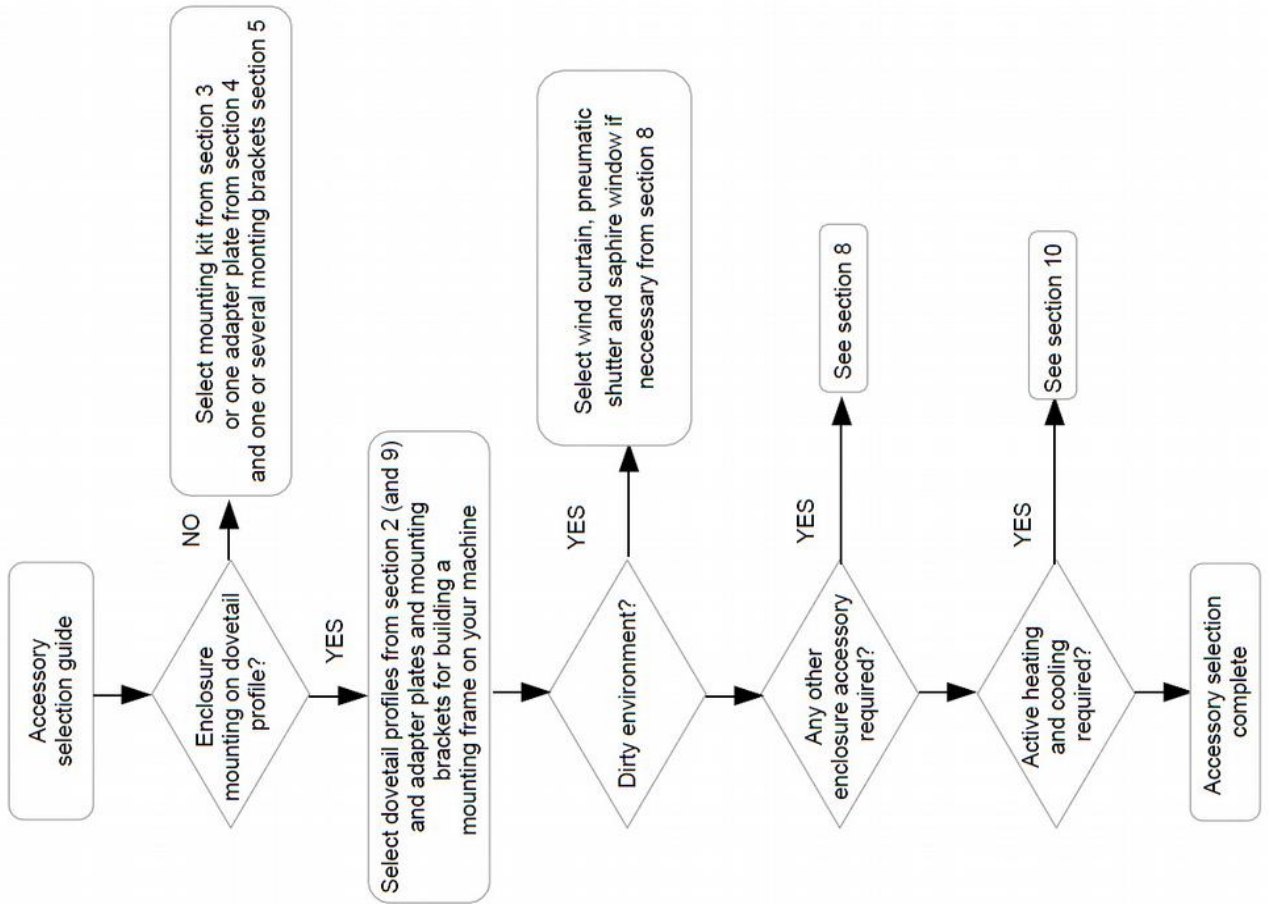
1= very good chemical resistance, 2 = good resistance, 3-4 limited resistance, 5-6 not resistant

This table has been compiled from several sources, the classification may therefore vary and is a general guideline only!

For critical applications please request sealing material samples from autoVimation for testing!

	NBR 872 70Sh A	VMQ (Silicone)	FKM (Viton)	EPDM	TPE	TPEV	PU-foam (Poron)
temperature (min., max)	-35 ;+100	-40; +200	-20; +200 (230)	-40; +120 (150)	-40; +130	-40; +135 (150)	-40, +90°C
ageing		1	1	1	1	1	1
ozone	4	1	1	1	1	1	1
gas permeability	1	5	1				
suitable for food appl.		1					
water	3	3	2	1	1	1	1
hot water (100°C)	up to 90°C 2	4	3	1			
sea water	2	3	2	2	1	1	1
steam	5	5	5 - only special mixes durable	1			
chlorine	5	4	3	3			
chlorine (gaseous, 20°C)	5	5	3	3	3	3	
hydrocarbons:	2	4	2	5	2	2	
mineral oil	1	3	2	5	2	2	1
petrol	3	5	2	5	3	3	1
diesel	1	3	2	3			1
alcohol			5			2	
ethanol (20°C)	1	1	5 - only special mixes durable	1	1	1	
ketone			5	2			
acetone (100%, 20°C)	5	5	5		3	3	5
ammonia, diluted (10%, 20 °C)	2	3	5		3	3	n.s
servo steering fluids					5		
break fluids based on Glycol-ether	5	3	5	1	5		n.s
cyclohexane							
Acids:				2			
acetic acid 30%	4	4	4	3			n.s
acetic acid 50%	5	5	5	3			n.s
acetic acid (100%, 20°C)	5	5	5	5	2	2	n.s
silicic acid, diluted, 60 °C	2	4	2	2			
phosphoric acid, diluted (20°C)	5	up to 85% 2			bis 85% 2	bis 85% 2	
nitric acid, concentrated.	5	5	5	5			5
nitric acid, diluted (50%, 20 °C)	3	bis 10% 3	3	3	up to 30% 2	up to 30% 2	5
hydrochloric acid (20 °C)	5	5	2	2			5
Hydrochloric acid, diluted (30%, 20°C)	3	up to 10% 3	2	2	up to 10% 1	up to 10% 1	5
sulfuric acid, concentrated 50°C	5	5	5	2			n.s
sulfuric acid, diluted (20°C)	5	up to 10% 1	2	2	up to 98% 1	up to 98% 1	n.s
citric acid (up to 10%, 40°C)	up to 20°C 2	5	5 - only special mixes durable	1	2	2	
Bases:				2			
caustic soda, diluted, (10%, 20°C)	3	up to 30% 2	5	2	up to 50% 2	up to 50% 2	n.s
bleaching lye (20 °C)	5	3					
potassium hydroxide, diluted (50%, 20°C)	3	5	5	2	up to 10% 2	up to 10% 2	

Camera Enclosure and Accessories Selection Guide



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