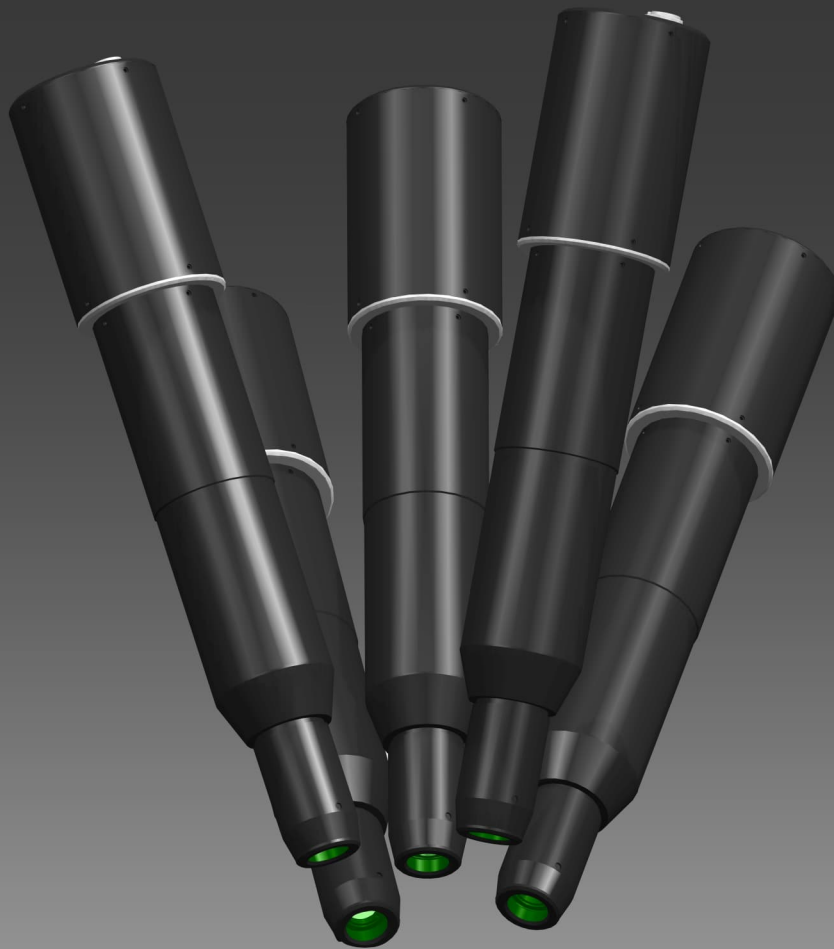




KM Product Line

Collimators for Active Alignment

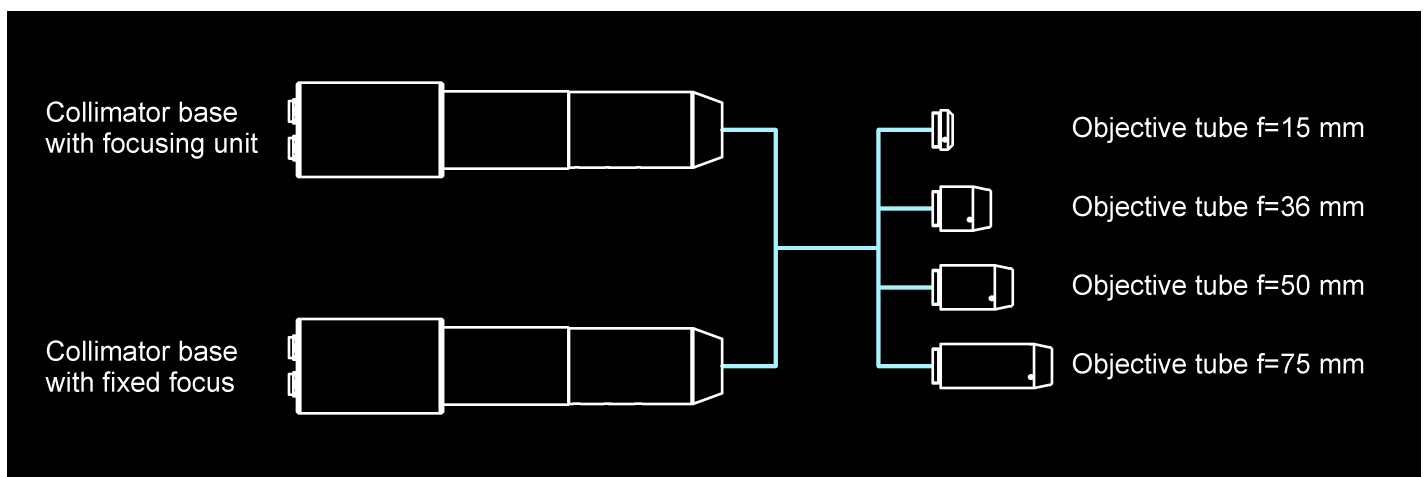
Collimators for Active Alignment

Overview

The collimators are designed for 'active alignment' of cameras for the automotive industry. As standard, the collimators are equipped with a reticle for MTF measurement (transparent crosshair on dark background, slit width 10 μm). There are 4 different focal lengths to choose from. These allow an ideal adaptation of the achievable image distances to the optics to be tested. The collimators are available as fixed focus collimators (non-motorized) or motorized collimators. All motorized collimators feature a high-precision linear guide with a travel of $\pm 9\text{ mm}$. Depending on the focal length, image distances from $+0.1\text{m}$ to $+\infty$ and from $-\infty$ to -0.1m can be generated.

In addition to the focal length, various illuminations can be selected. As white light profiles D65 (6500K), Machine Vision (5700K) or Human Vision (Photopic Eye Filter) are available. Narrowband spectra include 850 nm (NIR) and 940 nm (NIR), further narrowband spectra from the visible to the NIR range are available on request. With the motorized collimators, it is also possible to integrate two different light sources into one collimator as an option:

1. D65, machine vision or a narrowband spectrum
2. a narrowband spectrum from the visible or NIR range



The modular design of the collimators means that the variants can be freely configured. The filter and objective lens can be adapted to the inspection task.

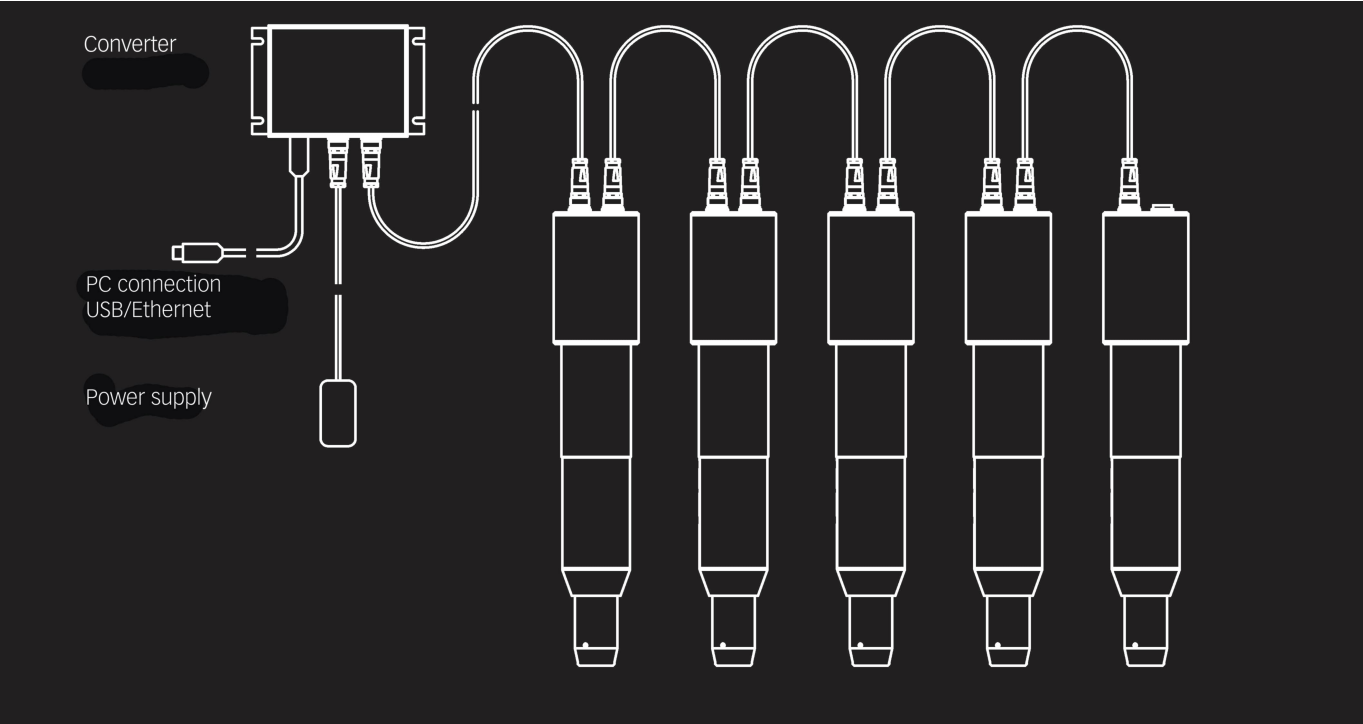
The length measurement system included with motorized collimators, significantly improves the achievable accuracy and reproducibility of positioning.

The calibration procedure used to determine the focus position and the high positioning accuracy of the linear guide allow the reticle to be set at the factory to within $\pm 5\text{ }\mu\text{m}$ of the focus of the objective lens being used. The average deviation from the ideal focus position is then stored as the zero reference for the system.

Collimators for Active Alignment

Hardware and Software Integration

The collimator contains the illumination unit and all the control and evaluation electronics. Multiple collimators can be addressed and connected in series. The customer software communicates via USB or Ethernet with the converter box, which in turn controls the individual collimators.



Flexible Replacement

In addition to the ease of software implementation, the series connection allows for easy cabling and maintenance of the collimators. When replacing a single collimator, only the addressing needs to be transferred. This means that replacement can be carried out in a very short time and with very little effort. Each collimator is supplied with a RS-485 connection cable.

Converter

A converter is required for each collimator system. The converter-system can control multiple collimators. The scope of delivery of the converter includes the power supply and the connection cable to the PC or control cabinet (Ethernet/USB 2.0).



Technical Data

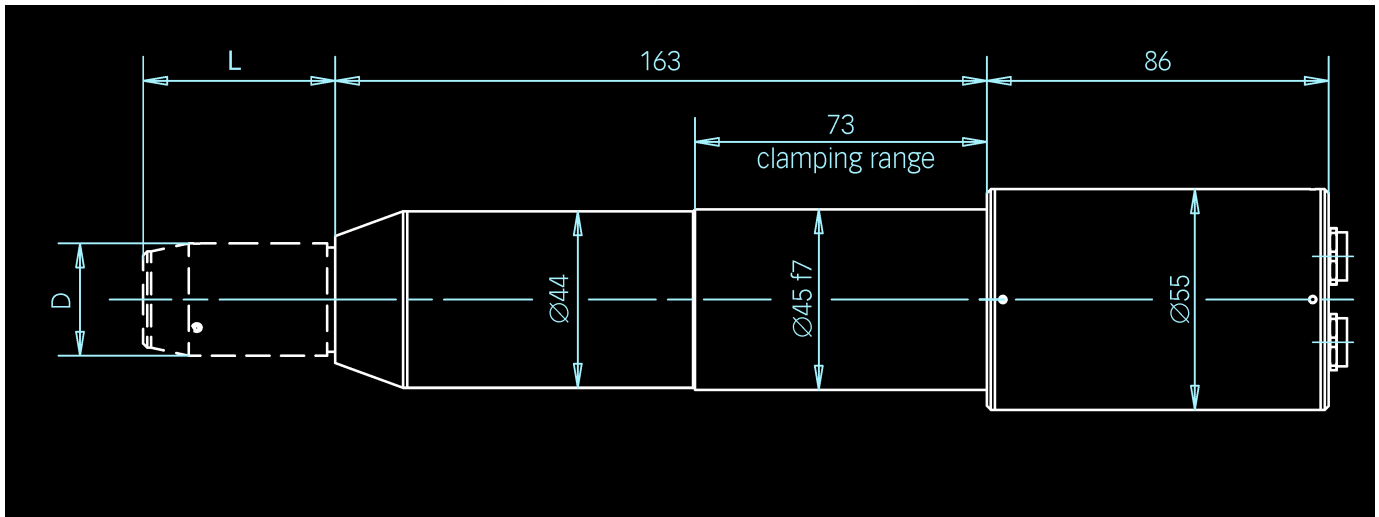
Data Connection	Collimator – Converter: RS-485 Converter – PC: USB or Ethernet
Power Supply	8..24V
Connector on the Collimator	Binder 712 4-pol. socket current and data summarized
Format	UART, RS-485 level
Data rate	115200 Baud, 8N1

Collimators for Active Alignment

Technical Data

Dimensions

The clamping range and clamping diameter are the same for all variants. Even if the collimators are retrofitted with different objective tubes, users can continue to use their existing mechanical mounts. For dimensions (Length and Diameter) of objective tubes, please see technical data below.



Objective Tubes

Focal Length f	15 mm	36 mm	50 mm	75 mm
Length (L)	8 mm	36 mm	41 mm	69 mm
Diameter (D)	25 mm	25 mm	25 mm	30 mm
Free Aperture	5 mm	8 mm	11 mm	16 mm
F-Number (F#)	3.0	5.6	4.5	4.7
Distance between aperture and mechanical end	2 mm	8 mm	8 mm	5 mm
Distance between rear principal plane and mechanical end	14.2 mm	25.2 mm	16.8 mm	17.3 mm

Movement (Motorized Collimators only)

Traveling Range	±9 mm
Traveling Speed	4 mm per second
Positioning Accuracy (unidirectional/bidirectional)	±2 µm / ±3 µm
Reproducibility (unidirectional/bidirectional)	±1 µm / ±1 µm
Repeatability (unidirectional/bidirectional)	±1 µm / ±1 µm

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