

IBAK Inspection and Repair Systems in Modular Design



*Illustrations shown in the brochure
may depict optional equipment that is
subject to additional charge.*



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Options for combining the portable components

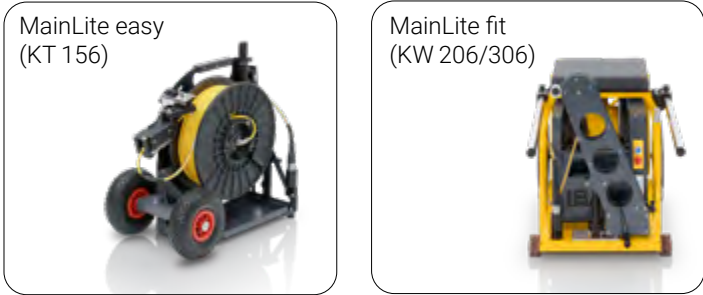


Individual components

Cameras



Winches



Push rod system



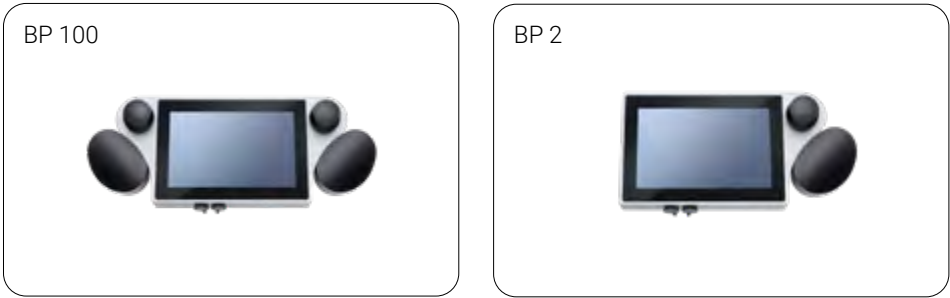
Tractor



Cutting robot



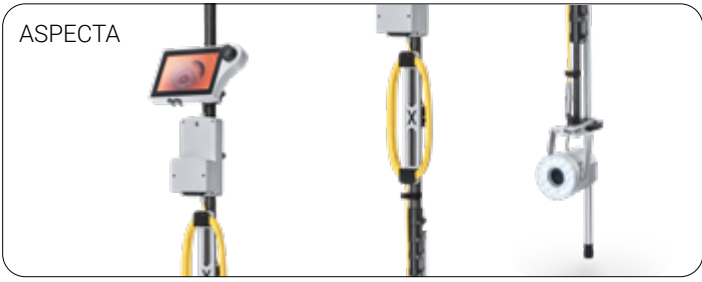
Control units



Software



Zoom pole camera



Modular design principle

From the very start, IBAK inspection systems have always been designed as modular systems: Camera heads can be fitted both on tractors and on push-rod systems. The large majority of tractors and camera systems can be operated with all IBAK cable winches and control systems.

To ensure a future-proof and clearly structured modular design in the further development of our products, the IBAK portfolio is constantly revised and complemented

by additional products. The result of this approach is a modular system that offers maximum flexibility for freely combining its individual elements with each other and which can be expanded any time by additional functions and components. Depending on the respective field of application, IBAK cameras can be operated on the MiniLite push-rod systems, the BP 2 and BP 100 control panels and on tractors with KW 206/306 cable winches (MainLite fit/

MainLite easy). The individual components can also be used in a vehicle using the operating system BS10 and a high-performance PC including the specific inspection software. This also allows integrating cameras and tractors in a built-in system on the vehicle. Furthermore, IBAK constantly develops its cutting robot portfolio and integrates these devices into the IBAK TV inspection range.

Lateral (DN 50 and up)

Lateral – the connection to the mainline sewer

Laterals are used to connect private buildings to the public sewage system. Technical progress allows using inspection systems even in pipes with nominal diameter of DN 50 even in sewage networks with limited accessibility and branches. Depending on nominal diameter and ease of access to the lateral, it is possible to either use a mobile system or a vehicle system with satellite technology.



MiniLite 2.1
Push-rod camera system for small and medium nominal diameter
Range of application starting from DN 50

- **Boundless range of application:** For typical use in laterals – even with heavy branching
- **Added value:** Thanks to extensive measuring functions for qualified condition assessment
- **Versatility:** The different cameras and push rods can be adapted to fit any inspection requirement
- **More possibilities:** The ideal complement to an IBAK vehicle inspection system
- **Fast data transfer:** Easy transfer of inspection results to the customer

The IBAK MiniLite is a compact push-rod camera system for inspecting laterals and drainage systems on properties. Its modular expandability and many accessories offer a wide range of possible applications. The exchange reel can be easily replaced in just a few minutes. On the 80-m push-rod variant, the camera can simply be plugged in: compatible versions are the **ORION**, **NANO** and **POLARIS** which can also be used to determine the diameter. If required, the system can also be equipped with an extension kit in order to work comfortably out of an inspection truck and a special software.

Simple projects not requiring any complex data exchange formats can be carried out using the IKAS recorder. The IKAS mini can be installed to make recordings compliant with the European standard EN 13508-2 and to generate a paper report or a PDF of the inspection results. It is recommended to use a complete IKAS evolution system for certain data exchange formats or to create a 3D location plan after measuring the the pipe run with a 3D GeoSense capable system.

Exchange reels

By default, the MiniLite comes with the interchangeable 500/10 reel with an 80-metres Perfect Push Rod which offers a particularly long range. Alternatively, there are exchange reels with the shorter Magic especially designed for accessing bends and joints. For particularly small pipe dimensions in bended installations, it is recommended to use the 500/12 versions with a permanently installed AxialCam with 30-metres push rod. There are also optional 512-Hz location transmitters which can be retrofitted to the camera system.



with camera	AxialCam	NANO	POLARIS	ORION
Classification	Axial camera	Pan and tilt camera	Pan and tilt camera	Pan and tilt camera
Range of application	DN 50 and up	DN 80 and up	DN 100 and up	DN 100 and up
Push-rod operation	✓	✓	✓	✓
Tractor operation	✗	✓	✗	✓
Bend capability	✗	✓	✓	✓
SD	✓	✓	✓	✓
Upright picture control	✓	✓	✓	✓
Correctly oriented image (ROTAX)	✗	✗	✗	✗
Correctly oriented image every 180° (e-Flip)	✗	✗	✗	✓
3D GeoSense	✗	✓	✓	✓
Optical zoom	✗	✗	✗	2x
Digital zoom	✗	✗	✗	16x
Joint inspection lighting	✗	✗	✗	✗
Explosion protection	✗	✓	✓	✓



Better ergonomics and more stability due to revised brakes, improved rod routing and a modified rewinding direction!

Mainline sewer (DN 100 and up)

The main sewage pipe for wastewater disposal

A properly functioning sewage system is essential for our modern life. It is a significant aspect for our health and for the quality of life and it protects our environment. One decisive factor is to determine the entire sewer assets and to make a visual record of the sewer's condition to use this as a basis for assessing its condition and for the proper planning of rehabilitation projects on the sewage system. Solutions that can be used in the mainline sewer include inspection, cleaning and repair applications. Apart from fully equipped vehicle systems, IBAK also offers a number of mobile systems which can be used for works in the inspection and rehabilitation range.



MainLite easy

Mobile inspection system for mainline sewers

Range of application starting from DN 100

- **Can be used anywhere:** Easy transport even to hard-to-reach places
- **Added value:** Thanks to extensive measuring functions for qualified condition assessment
- **Extends radius of action:** With the portable base for main sewer inspections independently of the vehicle
- **Fast data transfer:** Easy transfer of inspection results to the customer

MainLite easy is used for the high-quality inspection of mainline sewer pipes in places that are hard to reach with a vehicle, because it is easy to transport the system independently to such places. MainLite easy consists of a motor-driven cable winch with 150/180 metres of camera cable and a control panel (BP 100).

It is possible to install a full-fledged software version such as the IKAS evolution on the PC of the control panel. Alternatively, if the user only requires the basic features of the IKAS recorder for recording, storing and sharing videos and images, there is the option to simply use this set-up or to install IKAS mini. That version allows recording inspections of wastewater systems in accordance with the applicable European standard EN 13508-2 or WRc. An intuitive menu navigation makes it particularly easy to enter and save information on the condition and damages of sections and manholes as well as video and photo recordings. Inspection results are documented in well-arranged reports and saved as PDF files. There is the option to use a USB flash drive or a Wi-Fi connection to transfer the data to the client.

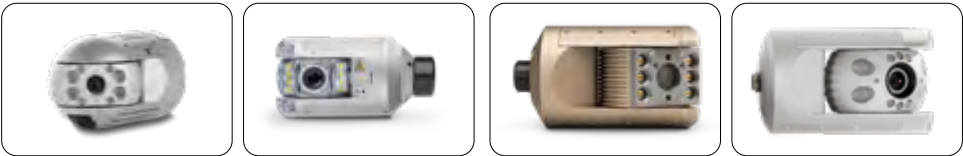
Winding up the camera cable onto the cable winch

KT 156 is supported by a motor. Compared to using a manually operated cable reel, this feature makes the handling of the cable much more convenient. Large wheels and a foldable transport handle ensure smooth transport and a safe footing even on uneven ground. Due to the low weight of the KT 156, the device can be handled by a single person and transported to places that are difficult to access.

An integrated counter determines the length of the cable. The measured value is transferred to the control panel and displayed in the video image. All that is needed to operate the system is a 230-V socket or a battery pack.

MainLite easy can be used to operate the IBAK tractors T66 and T76 and the cameras NANO (L), ORION 3 SD (L), ORPHEUS 2/3 and ARGUS 5.





with camera	NANO	ORION	ORPHEUS	ARGUS
Classification	Pan and tilt camera	Pan and tilt camera	Pan and tilt camera	Pan, tilt and rotate camera
Range of application	DN 80 and up	DN 100 and up	DN 150 and up	DN 200 and up
Push-rod operation	✓	✓	✗	✗
Tractor operation	✓	✓	✓	✓
Bend capability	✓	✓	✗	✗
SD	✓	✓	✓	✓
Upright picture control	✓	✓	✓	✓
Correctly oriented image (ROTAX)	✗	✗	✗	✓
Correctly oriented image every 180° (e-Flip)	✗	✓	✓	✗
3D GeoSense	✓	✓	✓	✓
Optical zoom	✗	2x	10x	10x
Digital zoom	✗	16x	16x	16x
Joint inspection lighting	✗	✗	✓	✓
Explosion protection	✓	✓	✓	✓



With tractor	T66	T76
Range of application	DN 100 and up	DN 150 and up
Steerable	✓	✓
Cruise control	✓	✓
Quick-release system for wheel change	✓	✓
Speed	Continuously adjustable	Continuously adjustable
Pressure monitoring	✓	✓
Tilt control	✓	✓
Temperature measurement	✓	✓
Explosion protection	✓	✓

MainLite fit

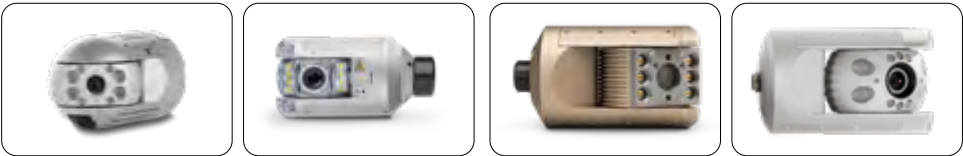
Mobile inspection system for mainline sewers

Range of application starting from DN 100

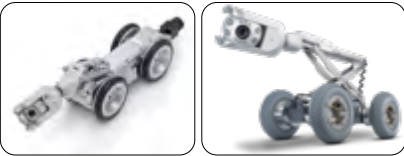
- **Added value:** Thanks to extensive measuring functions for qualified condition assessment
- **Safe investment:** Flexible and future-proof thanks to modular system design
- **Variable use:** In a vehicle and as a mobile inspection system
- **Turnkey solution:** Hardware and software from a single source
- **Fast data transfer:** Easy transfer of inspection results to the customer

The system can be used in many different camera- tractor configurations for various pipe dimensions and applications. For small pipe diameters starting from DN 100 it is possible to use a T66 with an ORION camera, for example, while in pipe diameters of DN 150 or more there is the option to operate a T76 tractor with an ORPHEUS. MainLite fit consists of the versatile control panel BP 100 with its 10-inch touch-screen display and two joysticks for camera and tractor control. The Mobile Rack allows transporting the motorized winches with 200 metres (KW 206) and 300 metres (KW 306) of camera cable to places that are hard to reach. The integrated seat ensures a comfortable working position even when not working inside an inspection vehicle.





with camera	NANO	ORION	ORPHEUS	ARGUS
Classification	Pan and tilt camera	Pan and tilt camera	Pan and tilt camera	Pan, tilt and rotate camera
Range of application	DN 80 and up	DN 100 and up	DN 150 and up	DN 200 and up
Push-rod operation	✓	✓	✗	✗
Tractor operation	✓	✓	✓	✓
Bend capability	✓	✓	✗	✗
SD	✓	✓	✓	✓
Upright picture control	✓	✓	✓	✓
Correctly oriented image (ROTAX)	✗	✗	✗	✓
Correctly oriented image every 180° (e-Flip)	✗	✓	✓	✗
3D GeoSense	✓	✓	✓	✓
Optical zoom	✗	2x	10x	10x
Digital zoom	✗	16x	16x	16x
Joint inspection lighting	✗	✗	✓	✓
Explosion protection	✓	✓	✓	✓



With tractor	T66	T76
Range of application	DN 100 and up	DN 150 and up
Steerable	✓	✓
Cruise control	✓	✓
Quick-release system for wheel change	✓	✓
Speed	Continuously adjustable	Continuously adjustable
Pressure monitoring	✓	✓
Tilt measurement	✓	✓
Temperature measurement	✓	✓
Explosion protection	✓	✓

	MG Air	MG GT Lite
Range of application	DN 200 and up (relined)	DN 200 and up (depending on the system)
Maximum working range	Up to 300 m	Depending on the system
Drive type of the cutting motor	Pneumatic	✗
Pressure monitoring	✓	✓
Speed	Continuously adjustable	Continuously adjustable
Monitoring camera	✓	✓
Front camera	✗	✗
Rear view camera	✓	✓
Lens cleaning of the camera	✓	✓
Inspecting	✓	✓
High-pressure water-jet cutting (UHP)	✗	✓
Placing top heads	✓	✗
Placing relining cuffs	✓	✗
Lateral connection repair with mortar	✗	✓

Manhole inspection

The manhole as a central structure in the sewer system

Mainline sewer pipes are accessed via the connected manholes. Regular inspection, recording and documentation of the manhole's condition using high-quality camera systems allows an early detection and the repair of damages.



PANORAMO SI 4K

Mobile inspection system for manholes
Range of application starting from DN 300

- **Productive inspection processes:**
Thanks to the quick recording of the entire manhole interior
- **Objective basis for decision:**
Thanks to the unique 360° all-round view inside the manhole
- **Complete documentation:**
Precise data capture including measurements serves as a basis for qualified condition assessment capture including measurements serves as a basis for qualified condition assessment
- **Versatile use:** Can be used inside the vehicle and as a stand-alone mobile inspection system
- **Safe investment:** Flexible and future-proof due to the modular design of the system
- **Fast data transfer:** Easy transfer of inspection results to the customer

The PANORAMO SI 4K manhole inspection system provides ultra-high-resolution 3D manhole images and precise survey data.

The system can be used inside the vehicle or as a mobile stand-alone system. It can be converted in just a few simple steps which allows the user to respond flexibly to local conditions and to reach manholes that are otherwise not easy to access.

	PANORAMO SI 4K
Classification	360-degree camera
Intended use	Manhole inspection
Range of application	DN 300 and up
4K	✓
Cruise control	✓
Pressure monitoring	✓
Explosion protection	✓



Quick optical inspection of the Sewer



Quick assessment of the condition of the sewer system

The IBAK Zoom pole camera system allows the user to carry out an immediate visual inspection using very little time and equipment. It can be used to quickly inspect and assess the condition of wastewater pipes from adjacent manholes.

ASPECTA

Portable inspection system for mainline sewers

Range of application starting from DN 150

ASPECTA allows the user to quickly inspect and assess the condition of wastewater pipes from adjacent manholes.

- **Immediate visual inspection:** For a quick first impression without spending much time and without deploying a lot of equipment
- **Time-saving tool:** For the efficient and targeted use of existing inspection resources
- **Helpful basis for decision-making:** For prioritizing inspection, cleaning and repair activities
- **Meaningful insights:** For more confidence in assessing hard-to-reach structures
- **Versatile use:** Also allows inspecting tanks, pits, furnaces and many other containers apart from wastewater pipes



Technical data



AxialCam

Axial view camera

Range of application starting from DN 50



- Very small design
- Allows inspections in pipes as small as DN 50
- Optimized bending capability
- Permanently Upright picture control

Attached to the push-rod camera system MiniLite, the **AxialCam** is the ideal camera for inspecting the small-diameter branches of lateral pipes. It is suitable for use in pipes with a diameter starting from DN 50 and is permanently connected to the push rod. Its small diameter of only 39 mm and its optimized mobility in bends make it the perfect camera for inspecting the branches of a lateral line. The integrated controllable LEDs provides optimal illumination of the examined area. Even with its small size, this axial view camera is capable of always delivering an Upright picture.

Technical system data for the AxialCam	
Product classification	Axial view camera
Range of application	DN 50 and up
Dimensions	Ø 39 mm / length 47 mm
Weight	180 g
Push-rod operation	✓
Tractor operation	✗
Upright picture control (UPC)	✗
Correctly oriented image	✗
Zoom	✗
F (aperture)	1 : 2.2
f (focal distance) (mm)	2.5
Lighting	6 high-power LEDs
Sensitivity to light (lux)	0.025 lux
Protection type	IP 68
Permitted ambient temperature	0 °C to +40 °C in operation
Pressure monitoring	✗
Aperture function	Fixed aperture
Panning range	Axial view
Angle of rotation	–
Focus	5 cm to 20 cm fix
Sensor	1/4" CMOS
TV standard	NTSC or PAL
Horizontal image resolution	420 TVL
Integrated laser	✗
Integrated location transmitter	✗
Explosion protection	✗
3D GeoSense	✗
Can be combined with	
IBAK push-rod system	MiniLite

NANO/NANO L

Pan and tilt camera

Range of application starting from DN 80



- Optimized bending capability
- Automatic return to zero position
- Optional 3D GeoSense sensor
- Can be used flexibly on a push-rod system or a tractor
- Optional explosion protection

The **NANO / NANO L** camera is the smallest pan and tilt camera in the IBAK portfolio. It can be used in pipes as small as DN 80 and is available both with and without the special “Kieler Stäbchen” rods. A microprocessor is used to move the head to the desired viewing direction. The head can be rotated indefinitely around its own axis. The panning function allows views in all directions including an automatic circumferential view into pipe joints and the “rearwards” view into a branch. The special UPC function (Upright Picture Control) allows the NANO camera to always provide an Upright picture control in axial view. Due to its smallsmall diameter of 47 mm, the camera can be connected to all current IBAK push-rod systems, tractors and to the IBAK satellite system LISY and move easily around bends (capable of turning into bends in pipes of a diameter of up to DN 150). Furthermore, the optional sensor on a 3D GeoSense system allows using it for generating a 3D pipe plan. It is possible to extend the range of applications of an IBAK system by adding an IBAK NANO / NANO L – this small camera is particularly suited for inspections in pipes that have been repaired using and/or in DN-100 lateral pipes with all their branches. NANO and NANO L are also ideal for industrial settings which are often characterised by poorly accessible, long and heavily branched pipe networks.

Technical system data for the NANO	
Product classification	Pan and tilt camera
Range of application	DN 80 and up
Dimensions	Ø 47mm / length 83 mm
Weight	320 g
Push-rod operation	✓
Tractor operation	✓
Upright picture control (UPC)	✓
Correctly oriented image	✗
Zoom	✗
F (aperture)	1 : 2.0
f (focal distance) (mm)	3.8
Lighting	4 White power LEDs
Sensitivity to light (lux)	0.025 lux
Protection type	IP 68
Permitted ambient temperature	0 °C to +40 °C in operation
Pressure monitoring	2 Integrated pressure sensors
Aperture function	Fixed aperture
Panning range	±120°
Angle of rotation	Endless
Focus	Manual 1 cm – ∞, remote-controlled in endless operation, autofocus
Sensor	1/4" CMOS
TV standard	NTSC or PAL
Horizontal image resolution	420 Lines PAL
Integrated laser	✓
Integrated location transmitter	✓
Explosion protection	Optional
3D GeoSense	Optional
Can be combined with	
IBAK tractors	All current tractor models
IBAK push-rod system	MiniLite
IBAK satellite system	LISY
IBAK operating systems	BS 3.5, BS 5, BS 7, BS10, BP 2, BP 100

POLARIS
Pan and tilt camera
Range of application starting from DN 100



The push-rod camera **IBAK POLARIS** is suited for bended pipes, it can make 90° turns, has a 100% field of view and can be used in pipes with a diameter of DN 100 or larger. Since the camera is positioned right at the front, no guiding device can be seen on the image recorded during the inspection. Furthermore, the operator can pan the camera at an angle of 90° towards the pipe wall to ensure optimum inspection results. POLARIS can also automatically record a circumferential view of pipe joints (360°). Two pre-selectable focus points stored on the device facilitate the process of panning the camera lens circumferentially along the pipe joint and speed up the survey process because frequent refocussing is no longer required.

- 90° bends in DN 100 upwards
- 360° panning around joints
- 100% unobstructed field of view
- Optional 3D GeoSense sensor
- Optional explosion protection

Technical system data for the POLARIS	
Product classification	Pan and tilt camera
Range of application	DN 100 and up
Dimensions	Ø 60 mm / length 285 mm (can be folded)
Weight	Approx. 800 g
Push-rod operation	✓
Tractor operation	✗
Upright picture control (UPC)	✓
Zoom	✗
F (aperture)	1 : 2.0
f (focal distance) (mm)	3.8
Lighting	4 White power LEDs
Automatic return to zero	✓
Sensitivity to light (lux)	0.025 lux
Protection type	IP 68
Permitted ambient temperature	0 °C to + 40 °C
Pressure monitoring	2 Integrated pressure sensors
Aperture function	Fixed aperture
Panning range	±120°
Angle of rotation	Endless
Focus	Manual 1 cm – ∞, remote-controlled in endless operation, auto-focus
Sensor	1/4" CMOS
TV standard	NTSC or PAL
Horizontal image resolution	420 Lines PAL
Viewing range	±150°
Integrated laser	✓
Integrated location transmitter	✓
Explosion protection	Optional
3D GeoSense	Optional

Can be combined with	
IBAK push-rod system	MiniLite
IBAK satellite system	LISY
IBAK operating systems	BS 3.5, BS 5, BS 7, BS10, BP 2, BP 10



ORION/ORION L
Pan and tilt camera
Range of application starting from DN 100



IBAK ORION (version 3 SD) can be connected to all push-rod systems and to all tractors which makes it the most versatile of all IBAK cameras. Its pan and tilt head is controlled by a microprocessor which allows attaining any viewing direction without delay. Furthermore, the camera head can rotate endlessly around its own axis. The panning function allows views in all directions including an automatic panning around joints and the "rearwards" view into a branch. The UPC function (Upright Picture Control) guarantees that the recorded image is always upright. Its small diameter of 60 mm allows the camera to be mounted on every IBAK tractor and to be used on a push-rod system to go around any bend. The system is secured by an internal operating pressure of 1 bar and an internal pressure monitoring device. When the pressure drops, the operator will receive a warning note on the LCD screen and hear a warning tone emitted by the control panel. ORION has a large aperture angle, high sensitivity to light, a powerful zoom and a high depth of focus. It allows inspections in pipe diameters up to DN 600 without using any extra headlights. The 3D version of the ORION can be used to measure the course of a pipe – and includes, if required, special explosion protection. The selectable location transmitter can be used at any time to determine the position of the ORION. A built-in laser (used in combination with the IBAK software "IKAS") provides comfort when measuring diameters and deformations while inspecting the sewer pipe. For measurements in pipe networks with a lot of branches, it is convenient to use the ORION L version: Its guiding unit, the so-called "Kieler Stäbchen" rod, can be rotated and panned in any direction and makes it easy to steer the camera into any branch of the network.

Technical system data for the ORION SD	
Product classification	Pan and tilt camera
Range of application	DN 100 and up
Dimensions	Ø 60 mm / length 100 mm
Weight	500 g
Push-rod operation	✓
Tractor operation	✓
Upright picture control (UPC)	✓
Correctly positioned image	✓ (e-Flip)
Zoom	Digital: 16-fold digital, analogue 2-fold optical without loss
F (aperture)	1 : 4.0
f (focal distance) (mm)	4
Lighting	12 High-power LEDs
Sensitivity to light (lux)	0.01 lux
Protection type	IP 68
Permitted ambient temperature	0 °C to +40 °C in operation
Pressure monitoring	2 Integrated pressure sensors
Aperture function	Fixed aperture
Panning range	±120°
Angle of rotation	Endless
Focus	One-Push autofocus, manual focus, ~10 mm to ∞
Sensor	1/2.8" CMOS
TV standard	NTSC or PAL
Horizontal image resolution	700 TVL
Integrated laser	✓
Integrated location transmitter	✓
Explosion protection	Optional
3D GeoSense	Optional

Can be combined with	
IBAK tractors	All current tractor models
IBAK push-rod system	MiniLite
IBAK satellite system	LISY
IBAK operating systems	All current systems

- 360° panning around joints
- Optionally with rod for direction changing
- Recall of programmable viewing positions
- Powerful LED lighting (can be replaced in the field)
- 3D GeoSense, optional equipment
- Can be used on a push-rod system or a tractor
- Optional explosion protection

ORPHEUS 2/3
Pan and tilt camera
Range of application starting from DN 150



- 360° panning around pipe joints
- Automatic return to zero
- Programmable movement to viewing positions
- Automatically controlled power LED lighting
- One-Push autofocus
- Explosion protection, optional equipment (ORPHEUS 3)
- Internal pressure monitoring
- 3D GeoSense, optional equipment
- LaserScan profile and deformation measurement, optional equipment

IBAK ORPHEUS is a camera that can be operated on the IBAK tractors in pipe diameters of DN 150 or larger. Features like the optional explosion protection, a location transmitter or a 3D sensor for measuring the pipe run, make ORPHEUS a versatile all-rounder. Furthermore, integrated lasers allow a continuous measurement of deformations and profiles across the entire length of the section.

IBAK ORPHEUS is characterized by a high sensitivity to light and a strong illumination provided by 12 powerful LEDs, making it possible to inspect even larger pipe dimensions without extra lighting. The powerful LEDs can be switched on and off as required and have an integrated lighting for the joint gaps and automatic lighting control which adjusts the LEDs' brightness to the ambient light conditions inside the pipe. Factors such as the pipe diameter and pipe material have an influence on how much light is required. The automatic lighting control ensures that only the amount of electricity is consumed that the LEDs need and prevents excessive illumination. The camera head can rotate endlessly, the entire circumference of pipe joints can be viewed without restrictions. In addition to that, ORPHEUS provides a 10-fold optical zoom function.

Technical system data for the ORPHEUS 2/3	
Product classification	Pan and tilt camera
Range of application	DN 150 and up
Dimensions	Ø 110 mm / length 160 mm
Weight	1.6 kg
Push-rod operation	✗
Tractor operation	✓
Upright picture control (UPC)	✓
Correctly positioned image	✓ (e-Flip)
Zoom	10-fold optical, 12-fold digital (optional)
F (aperture)	1 : 1.8 to 1:22
f (focal distance) (mm)	3.3 to 33
Lighting	10+2 High-power LEDs, (2x joint gap), can be switched on and off and adjusted, with monitored operating temperature
Sensitivity to light (lux)	0.5 lux
Protection type	IP 68
Permitted ambient temperature	0 °C to +40 °C in operation
Pressure monitoring	2 Integrated pressure sensors
Aperture function	Manual, automatic, remote controlled
Panning range	±120°
Angle of rotation	Endless
Focus	Manual 1 cm to ∞ Remote controlled, autofocus
Sensor	1/3" CMOS
TV standard	NTSC or PAL
Horizontal image resolution	> 530 Lines PAL
Integrated laser	✓ (2 pieces, laser scan mode)
Integrated location transmitter	Optional
Explosion protection	2: no 3: yes
3D GeoSense	Optional

Can be combined with	
IBAK tractors	All current tractor models
IBAK operating systems	BS 3.5, BS 5, BS 7, BS 10, BP 100



LaserScan measurement and 3D GeoSense
All currently available ORPHEUS models allow the user to carry out **LaserScan deformation and profile measurements**, i.e. creating an analysis of the pipe profile or the deformation across the entire length of the inspected section. The measurement is carried out via two laser points aligned at a 90°angle to the pipe wall while the device is reversing from the sewer pipe. The camera is rotated and captures the entire section profile: This creates a spiral of laser measuring points which are then evaluated by the software and displayed in diagrams as well as in reports. If the user does not only need an analysis of the pipe profile but also the position and height coordinates of the pipe network, it is possible to include a **3D GeoSense measurement of the course of the pipes** to capture the xyz coordinates of the network.

ARGUS 5

Pan, tilt and rotate camera

Range of application starting from DN 150



- ROTAX mechanism (upright and correctly oriented image when panning, rotating or tilting the camera head)
- 360° panning around joints
- One-Push autofocus
- Integrated location transmitter

Technical system data for the ARGUS 5	
Product classification	Pan, tilt and rotate camera
Range of application	DN 200 and up
Dimensions	Ø 120 mm / length 195 mm
Weight	Approx. 3.5 kg
Push-rod operation	✗
Tractor operation	✓
Upright picture control (UPC)	✓
Correctly oriented image	✓ (ROTAX)
Zoom	10-fold optical, 4-fold digital (optional)
F (aperture)	1.8 to 2.9
f (focal distance) (mm)	4.2 to 42
Lighting	8 White power LEDs, 6 white 5-mm LEDs for illuminating pipe joint gaps
Sensitivity to light (lux)	1.5 lux
Protection type	IP 68
Permitted ambient temperature	0 °C to +40 °C in operation
Pressure monitoring	2 Integrated pressure sensors
Aperture function	Manual, automatic, remote controlled
Panning range	±120°
Angle of rotation	Endless
Focus	Manual 1 cm to ∞ Remote controlled, autofocus
Sensor	1/4" CMOS
TV standard	NTSC or PAL
Horizontal image resolution	460 Lines PAL
Integrated laser	✓
Integrated location transmitter	✗
Explosion protection	Optional
3D GeoSense	✗

Can be combined with	
IBAK tractors	T66, T76
IBAK push-rod systems	–
IBAK operating systems	BS 3.5, BS 10, BS 5, BS 7, BP 100

IBAK ARGUS 5 is a camera with a rotating, tilting and panning head for the inspection of mainline sewers with a diameter of DN 200 or larger. The ROTAX panning mechanism ensures that the transmitted camera image is always upright and correctly orientated when panning, rotating or tilting the camera head. Furthermore, a simple touch of a button is enough to adjust the ARGUS 5 to the individual requirements of any work order. Pre-selection buttons are available to choose between pan mode (viewing direction right/left, e.g. for lateral pipes) or tilt mode (viewing direction up/down, e.g. for pipe bases), for example. Additional optional functions such as “45° viewing direction” (on the BS 5 model), “90° viewing direction” (in all directions: right/left/up/down), “neutral position” or “automatic panning around joints” provide extra comfort for more efficient work. Integrated adjustable power LEDs are ideally suited to illuminate both the near focussing distance and the far focussing distance, allowing the device to move through pipes with larger diameters without additional lighting. Lighting devices that are panned with the camera head and can be switched on and off separately make it easier to identify damages unambiguously and to clearly differentiate such damages from shadows cast by coatings used to repair the pipes, for example. Furthermore, the camera has an integrated Joint inspection lighting that can be switched on and off separately as well as an automatic function for viewing the circumference of pipe joints. The “One-Push autofocus” function triggers the autofocus once after the panning head of the camera has changed positions or after it has been reset to neutral position and instantly produces a sharp image. The integrated laser allows determining the pipe’s diameter and deformations and helps measuring damages found in the pipes.

ASPECTA

Zoom pole camera

Electronic Zoom pole camera



Technical system data for the ASPECTA	
Product classification	Tilting head camera
Range of application	DN 150 to DN 1200
Dimensions	Ø 123 mm, length 136 mm
Weight	System approx. 11 kg Camera approx. 1.5 kg
Push-rod operation	✗
Tractor operation	✗
Upright picture control (UPC)	✗
Correctly oriented image	✗
Zoom	30-fold optical, 32-fold digital
F (aperture)	1.6 to 4.7
f (focal distance) (mm)	4.3 mm to 129 mm
Lighting	11 White power LEDs, reflectors with 15° beam angle
Sensitivity to light (lux)	0.5 lux
Protection type	IP 68
Permitted ambient temperature	-10°C to +35°C during operation
Pressure monitoring	✗
Aperture function	Manual, automatic, remote controlled
Panning range	Down 90°, up 60°
Angle of rotation	–
Focus	Manual 1 cm to ∞ Remote controlled, autofocus
Sensor	1/3" CMOS
TV standard	NTSC, PAL
Horizontal image resolution	700 TVL
Integrated laser	✓
Integrated location transmitter	✗
Explosion protection	✗
3D GeoSense	Optional

Can be combined with	
IBAK tractors	–
IBAK push-rod systems	–
IBAK operating systems	BP 2, BP 100

The ASPECTA (zoom pole camera or electronic sewer mirror) allows looking into the connected sewer pipes from a manhole without having to climb into the manhole. ASPECTA is used to check the operating conditions and can be used, for instance, to plan needs-based sewer cleaning and additional inspection measures. The high zoom factor (30-fold optical) and the lighting which is adequate even in large diameter sewers allow inspecting parts of the sewer sections that are up to 30 m away from the manhole. Furthermore, the integrated laser can be used to measure the distance to certain points across the entire length of 30 metres.

Telescopic rod	
Material	GRP/CFRP (black)
Weight	2.4 kg (default 5-piece) / 2.6 kg (optional 6-piece)
Diameter of the handle/ tip	40 mm / 21 mm (default 5-piece) 40 mm / 17 mm (optional 6-piece)
Locking system	Quick-action clamp
Length	1.90 m to 8.15 m (default 5-piece) 1.95 m to 10.0 m (optional 6-piece)

Power supply	
Rechargeable battery	18 V DC, 5 Ah (Li-ion), 1 piece

Operation / Data transmission	
=> see individual BPs / control panels	

Accessories	
Two-legged camera stand	Aluminium, adjustable between 109 cm and 180 cm, weight: 1.95 kg
Manhole grid	Work grid Ø 670 mm with recess, weight: 5.6 kg

PANORAMO SI 4K
Manhole inspection camera
Range of application starting from DN 300



- 4K resolution
- Efficient way of working: Independent inspection process separated from the analysis in the office
- Versatile application options: As part of large systems or mobile systems
- Space saving: Can be installed in a vehicle in combination with KW SI
- Mobile frame: can be used for manholes that are difficult to access

Technical system data for the PANORAMO SI 4K	
Product classification	Manhole inspection
Range of application	DN 300 to DN 2000
Dimensions	Ø 250 mm / height 184 mm
Weight	Approx. 7.6 kg
Protection type	IP 68
Permitted ambient temperature	0 °C to +40 °C in operation
Scan speed	Max. 35 cm/sec
Zoom	Digital
Recording	360° spherical image
Lighting	Xenon flashlight

Can be combined with	
IBAK cable winches	KW 310, KW 505, KW SI
IBAK operating systems	BS 5, BS 7, laptop computer (with KW SI)

IBAK PANORAMO SI 4K provides all the benefits of the PANORAMO technology in a device for manhole inspection enabling the user to carry out comprehensive and quick assessments of the optical condition of a manhole. Two high-resolution digital cameras with special distortion-free wide-angle lenses designed for this purpose are used to capture the entire interior of the manhole in just a few seconds in one single vertical inspection movement. The digitally transmitted live images are instantly available to the operators making it possible to assess the condition either in the office or directly on site. In contrast to the video image of a conventional pan and tilt camera, which only stores the image section that is viewed at the time of recording, the IBAK PANORAMO SI 4K viewing software allows creating a comprehensive continuous manhole inspection. It is possible to stop at any place inside the manhole, to pan the camera head by 360°, to zoom in and to take still pictures. At the same time, it is possible to generate an unfolded view of the

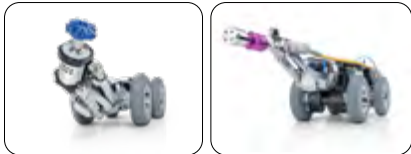
manhole that provides a quick overview of the condition of the structure and allows measuring objects on the walls of the manhole. Furthermore, the software creates a so-called point cloud of the geometric data which are then displayed as a three-dimensional model of the structure. For further analysis of the data, IBAK offers a special sewer analysis software called IKAS, which can be used in its PANORAMO SI manhole inspection version for this purpose. This software provides a simple and efficient way to analyse the films recorded with PANORAMO SI. The survey reports and inspection data produced in this analysis are supported by all common data interfaces. The free IBAK viewer allows the client to get a complete overview without purchasing a license for a special software. PANORAMO SI 4K can be operated as a mobile version on the KW SI with 12-m camera cable and a laptop computer, just as on the larger systems with the KW 310 4K and the KW 505 4K with BS 7 or BS 5.



MicroGator Air
Pneumatic cutter
Range of application starting from DN 200 (relined)



- The IBAK system for pneumatic cutting and repair work inside the mainline sewer.
- Effective cutting: Precise control of the cutting process
 - Reliable in everyday use: Pneumatic and powerful
 - Safe investment: Flexible and future-proof due to the modular design of the system
 - Added value: Placing top hats and relining cuffs, ultrahigh pressure cutting and inspection
 - Versatile use: Can be used inside the vehicle and as a stand-alone mobile repair system



	MG Air	MG GT Lite
Range of application	DN 200 and up (relined)	DN 150 and up
Maximum working range	Up to 300 m	Depending on the system
Drive type of the cutting motor	Pneumatic	✗
Pressure monitoring	✓	✓
Speed	Continuously adjustable	Continuously adjustable
Monitoring camera	✓	✓
Front camera	✗	✗
Rear view camera	✓	✓
Lens cleaning of the camera	✓	✓
Inspecting	✓	✓
High-pressure water-jet cutting (UHP)	✗	✓
Placing top hats	✓	✗
Placing relining cuffs	✓	✗
Lateral connection repair with mortar	✗	✓

Technical system data	
Range of application	Mainline sewer
Pipe dimension	DN 200 (relined) up to DN 800
Milling motor	
Maximum speed	10,000 rpm
Comfort and safety	
Claws and lowering hooks	✓
Lowering hooks with chain hoist	Optional
Pressure monitoring of electronics housings	✓
Camera	
Camera type	CutterCam
Lighting	LED
Special features	Cleaning function
Can be combined with	
IBAK cable winches	KW 206, KW 306
IBAK control system	BP 100, BS10



For mobile applications, the control panel BP 100 is used in combination with the KW 206/306. This device configuration ensures user-friendly operation while offering a particularly high degree of flexibility in terms of the many different possible cutting applications.

KT 156
Cable reel for MainLite easy
150 / 180m cable



MainLite easy

The MainLite easy is a portable system with 150 m/180 m of cable which consists of the control panel **BP 100** and the electronically driven cable reel **KT 156**.

The KT 156 can carry 150/180 metres of camera cable. The winding process of the cable is supported by a motorised drive. Its compact design, the large wheels and the foldable transport handle allow using the device for inspections in places that are hard to reach and which cannot be accessed with a vehicle and not even with the MainLite fit. The system's low weight allows it to be carried by a single person. A 230-V power socket or a battery pack is required to operate the system.

KT 156	
Product classification	Cable winch
Range of application	DN 100 and up
Max. cable length	150 m/180 m
Width x height x depth	420 x 660 x 770 mm
Weight	Approx. 41 kg without BP 100 approx. 45 kg with BP 100
Length measurement	✓
Motor operated	✓
Correctly orientated cable winding	✗
Remote control	✗
Emergency stop	✗
Can be combined with	
IBAK cameras	All analogue IBAK cameras
IBAK tractors	T66, T76
IBAK operating systems	BS 10, BP 100

KT206/306
Cable winches for MainLite fit
200 m / 300 m cable



MainLite fit

The MainLite fit consists of a cable winch (**KW 206/KW 306**) with up to 300 m of cable, a Mobile Rack and the control panel **BP 100**. The Mobile Rack allows transporting the motorized winches with 200 metres (KW 206) and 300 metres (KW 306) of camera cable to places that are hard to reach. The integrated seat ensures a comfortable working position even when not working inside an inspection vehicle.

KW 206/306	
Product classification	Cable winch
Max. cable length	200 m / 300 m
Width x height x depth in mm	Cable winch only: KW 206: 360x410x650 KW 306: 430x410x650 With Mobile Rack KW 206: 550x300x970 KW 306: 550x300x970
Weight	KW 206: approx. 44 kg including cable KW 306: approx. 54 kg including cable Mobile Rack: approx. 12 kg
Length measurement/display	✓
Motor operated	✓
Correctly orientated cable winding	✓
Remote control	✗
Emergency stop	✓
Can be combined with	
IBAK cameras	All analogue IBAK cameras
IBAK tractors	T 66, T 76
IBAK operating systems	BS 10, BP 100



BP 2, BP 100
Control panels

The control panel versions **BP 2** and **BP 100** both have a touch-screen display and are used for operating the software and for controlling the IBAK cameras and tractors. Both control panels are equipped with powerful PCs that allow installing and using the entire IBAK sewer analysis software package with all its functions. The **BP 2** has been optimised for the operation of the MiniLite and ASPECTA systems.






The **BP 100** control panel has two joysticks that are used to control cameras and tractor. For this purpose, the BP 100 is either connected directly to the compact system that is supposed to be operated or built into the vehicle by means of a vehicle extension (including an emergency stop for the BP 100 and a support to mount it on a table). There is a wide range of accessories available for all BP versions, such as display extensions and extension cables.

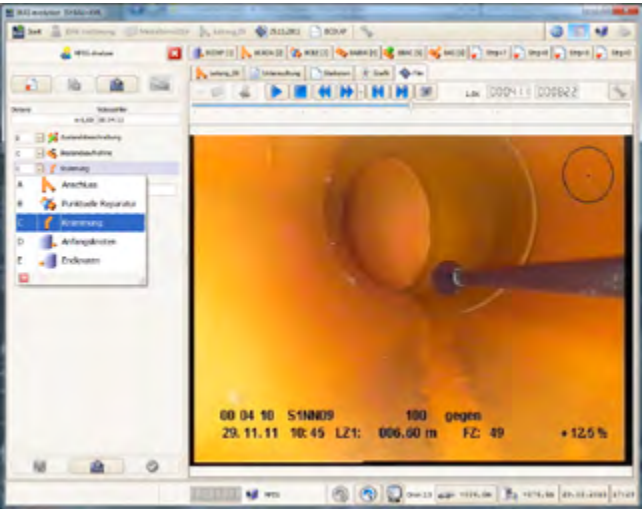


Control panel	BP 2	BP 100
Width x height x depth	337 x 190 x 40 mm	405 x 190 x 40 mm
Weight	Approx. 2.8 kg	Approx. 3.0 kg
Interfaces	2x USB 3.0 1x HDMI 1x USB 2.0	2x USB 3.0 1x HDMI 1x USB 2.0
Data storage	Text input or storage of image and video files (MPEG 4 AVC/H.264) on the built-in PC, data exchange via USB 3.0 and Wi-Fi	Text input or storage of image and video files (MPEG 4 AVC/H.264) on the built-in PC, data exchange via USB 3.0 and Wi-Fi
Monitor	Protected against dust and water jets (IP55), 10-inch touch-screen display, external monitor can be connected via HDMI	Protected against dust and water jets (IP55), 10-inch touch-screen display, external monitor can be connected via HDMI
Indication of the battery's charging level	✓	✓
Battery replacement indicator	✓	✓
Length measurement/display	✓	✓
Can be combined with		
IBAK cameras	AxialCam	AxialCam
	NANO, NANO L	NANO, NANO L
	POLARIS	POLARIS
	ORION, ORION L	ORION, ORION L
	ASPECTA	ASPECTA
		ORPHEUS 2/3
IBAK push-rod system	MiniLite	MiniLite
IBAK tractors		T66, T76
IBAK cutters		MicroGator AIR
IBAK cable winches		KT 156
		KW 206
		KW 306
IBAK software	IKAS recorder (default), IKAS mini, IKAS evolution (depending on the device configuration, the available software licenses include IKAS evolution Push, IKAS evolution Starter and IKAS evolution Professional)	
Power Pack	18 V DC 4 Ah (Li-ion), 2 pieces (not included)	

Software equipment variants

BP 2, BP 100

			
Functions			
Project management	✗	✗	✓
Sewer database	✗	✓	✓
Video recording	✓	✓	✓
Video overlay (from hotkey and text input)	✓	✓	✓
Video overlay from sewer database	–	✓	✓
Single photos	✓	✓	✓
Condition codes according to standard (EN13508, WRc)	✗	✓	✓
Sewer data interface	✗	✗	✓
Data transmission			
Video and photo files	✓	✓	✓
Inspection video player with data index and PDF reports	✗	✓	✓
Complete sewer data viewer (reports, films, photos, MAP/GIS)	✗	✗	✓
Options			
DN determination	✓	✓	✓
Measurements	✗	✗	✓
MAP (GIS)	✗	✗	✓
Other IKAS evo options	✗	✗	✓



Creating projects and generating reports

The recording software IKAS recorder is installed on all control panels. This basic configuration is sufficient to record, store and share videos and pictures.






IKAS mini allows recording inspections for wastewater systems in accordance with the applicable standard in Europe EN 13508- 2 and with WRc. An intuitive menu navigation makes it particularly easy to enter and save information on the condition and damages of sections and man-holes as well as video and photo recordings.

Inspection results are documented in well-arranged reports and saved as PDF files. It is possible to transfer the data to the client on a USB flash drive or via a Wi-Fi connection. Information on damages can thus be presented in a clearly structured manner including the associated photos and videos. This ensures that all damages to the sewer pipes will be revealed and become traceable. IKAS mini provides flexibility in inspection without demanding the inspector to follow a rigid set of rules.

If the inspection is supposed to follow specific municipal regulations or data exchange formats (such as DWA-M 150), it is always possible to purchase an upgrade to IKAS evolution. IKAS evolution allows purchasing specific licenses for each type of application. The following pages provide a rough overview of IKAS evolution licensing options.

Software licenses

Dongle/device detection

						
System				Push	Starter	Professional
Push-rod and manhole operation	MiniLite	✓	✓	✓	✓	✓
	ASPECTA	✓	✓	✓	✓	✓
Mobile systems in vehicle operation	KW 206/306 (MainLite fit) + BP 100	✓	✓	✗	✓	✓
	KT 156 (MainLite easy) + BP 100	✓	✓	✗	✓	✓
Vehicle installation in vehicle operation	KW 206/306 (MainLite solid) + PC	✓	✓	✗	✗	✓

Depending on the device configuration, the available IKAS software licenses include IKAS evolution Push, IKAS evolution Starter and IKAS evolution Professional.

Contact persons
Consulting and Sales



IBAK



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