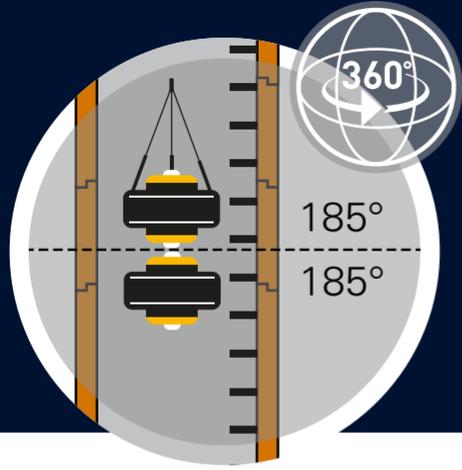


PANORAMO 4K



Two hemispherical photos taken at the same position are put together to form a single picture. In this way, an image file is generated from various angles of view.

Comprehensive Scanning in 3D

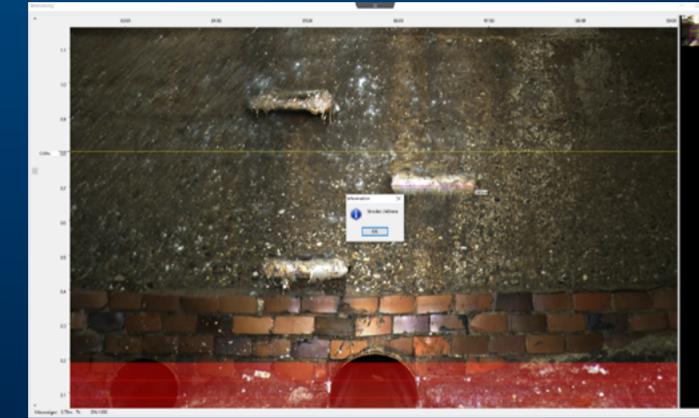
Left mouse button:
Navigate in all directions
(360°, continuously variable)



Right mouse button:
Move downwards faster



Analysis



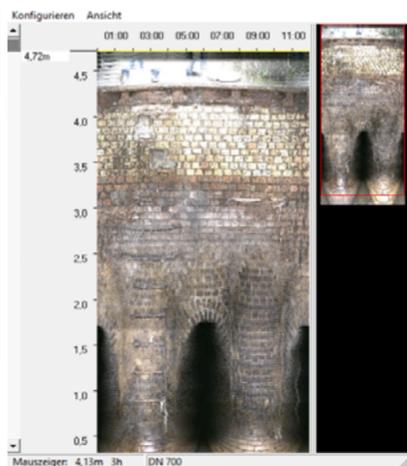
With the **IBAK PANORAMO SI 4K**, the user also has all the advantages of PANORAMO technology at his disposal for manhole inspection. The result is a rapid, comprehensive optical scan of the manhole condition.

The 3D scanner uses two high-resolution digital cameras with distortion-free wide-angle lenses that were specially designed for this purpose. The cameras scan the entire interior of the manhole optically in a single vertical movement and in only a few seconds.

Whereas only the view in the camera's line of vision at the time of recording is saved in a video from a conventional pan and rotate camera, PANORAMO SI 4K technology makes comprehensive manhole inspection possible. The scanning procedure is not affected by the number of features or defects in the manhole so it is possible to make a time schedule for inspections. When the camera is moving, motion blurring in the images is avoided by the use of xenon flash-lighting and pin sharp images are generated even when the system is navigating through the manhole at a speed of up to 35 centimetres per second.

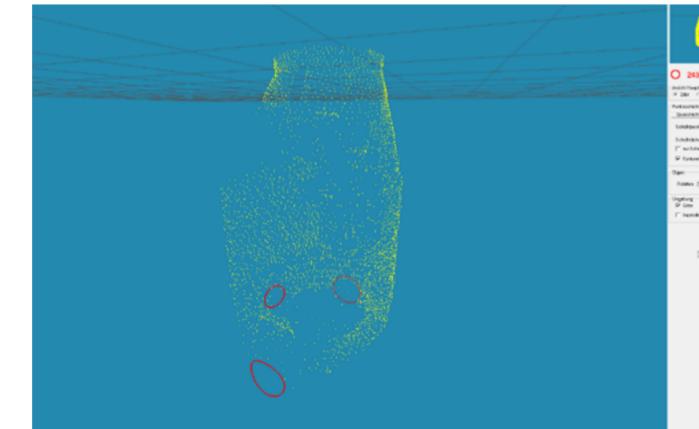


The result of the optical inspection is a PANORAMO SI film with 4K resolution (3,840 x 1,920 pixels over 360°) and this can be viewed and analysed straight away with the IBAK sewer analysis software IKAS (PANORAMO SI manhole inspection option). What is special and unique about this is that you can stop at any position in the manhole, do a 360° pan, zoom, and also save still photos. Condition assessment can be performed optionally in the office or directly at the job site. As IBAK viewers are licence-free, they can also be passed on to the customers to give them a full overview of their commissioned project.



Unfolded view of a manhole

Besides the 3D view, an unfolded view of the manhole can be displayed – for this, the manhole is virtually cut open lengthwise and the sides are folded down to provide the viewer with a rapid overview of the entire manhole. In particular, you can see the structural condition of the manhole at a glance in the unfolded view and defects, inflow and outflow pipes and the distance between the step irons can be measured. All inspection reports and inspection data can be handed over to the customer in the usual data interfaces with all the required values, e.g. both in ISYBAU and DWA M-150 format.

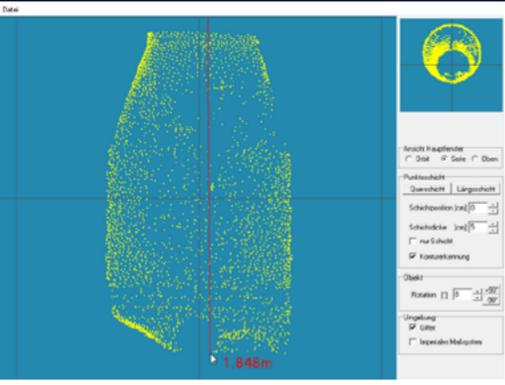


IBAK

PANORAMO SI 4K

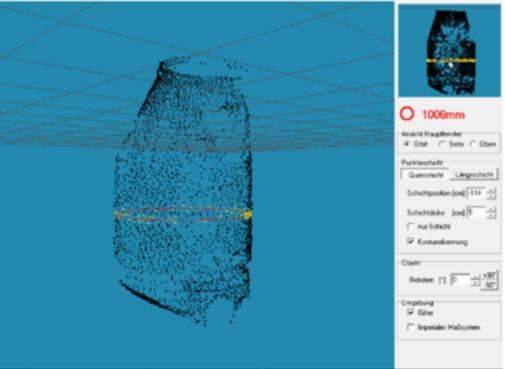


Point Clouds



Side view of a point cloud with the results of a depth measurement. The measured distance of 1.848 m (red line) is indicated next to the mouse pointer.

Manholes often have unknown and / or irregular geometries that are difficult to determine. For this reason, the software automatically generates a point cloud from the image data consisting of a large number of 3D measuring points and this can also be analysed with the supplied 3D viewer program. By means of these points, the structure (geometrical shape) of the manhole can be shown graphically by the point cloud measurement. Besides the automatic identification of the diameter of the manhole rings or the length and width of manhole components, any desired longitudinal or transverse sections can be placed in the point cloud in order to determine e.g. the manhole depth or the dimensions of components not previously documented.



Orbital view of a point cloud with the results of the automatic recognition of contours. The diameter of the circular contour is 1006 mm (shown in red), the position in the transverse section in question is shown in yellow in the point cloud.

Manhole Inspection with a Modular System



The PANORAMO SI 4K system combines the advantages of a mobile system with those of a compact vehicle-based system for efficient manhole inspection from a van. The winch with 12 m of camera cable can be easily removed from the van together with the mobile rack and converted into a mobile system in a few steps by means of quick-acting fasteners. All components of the mobile system are designed for outdoor use: with the big air-filled tyres, even manholes that are difficult to access can be reached; the laptop to operate the system is particularly robust and splashproof (a rugged notebook is optional). Power is supplied from high-efficiency standard rechargeable batteries (like for instance with the MiniLite) or from a lithium battery installed in the van.



PANORAMO SI 4K

Operating the system from a vehicle can save a great amount of time as the system does not then have to be carried from manhole to manhole. The manholes are accessed one after the other and efficiently inspected.

Technical data	
Deployment range	from DN 300 upwards, manhole inspection
Pressure monitoring	yes
Explosion protection	yes
Combinable with	
IBAK cable winches	KW 310, KW 505, KW SI
IBAK control systems	BS 5, BS 7, Laptop (with KW SI)



IBAK – Made in Germany

All IBAK products have one thing in common: they are made in Germany. All system components are designed, manufactured, assembled and tested by IBAK. With their high quality standards, IBAK products set the benchmark for security of investment and economic efficiency – and have now done so for 75 years.



IBAK Helmut Hunger GmbH & Co. KG
 Wehdenweg 122 | 24148 Kiel | Germany
 Tel. +49 (0) 431 7270-0
 Fax +49 (0) 431 7270-270