



360° VIEW OPTICS

BOROSCOPIC PROBES are used to inspect holed objects such as engine parts, containers and tubes whose hidden features can only be controlled by introducing a probe into the cavity.

The catadioptric (refracting + reflecting) optical design ensures much higher resolution than fiber-based probes and enables a complete 360° inner view throughout the entire cavity length. Boroscopic Probes are intended to be handled by a Robot Arm or S.C.A.R.A. in order to scan even the deepest cavities. Built-in illumination keeps the device very compact and makes it suitable for simple 3D profile and diameter measurements by means of panoramic triangulation techniques.

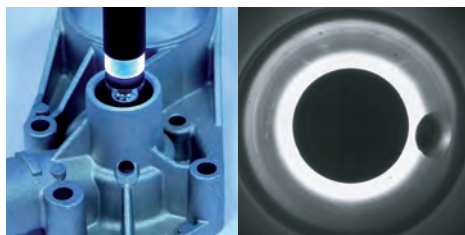
BOROSCOPIC PROBE

Panoramic cavity imaging and measurement from inside



Examples of images taken with a Boroscopic Probe:

Inspection of holed parts of an engine



Tube scanning for integrity inspection



Defect and impurities detection inside containers



Rubber sealings control for leak prevention



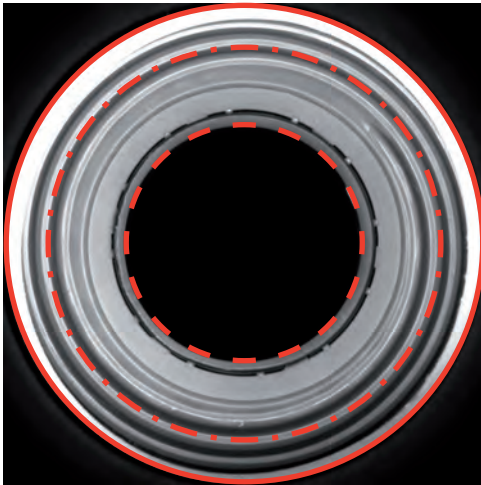
KEY ADVANTAGES

- 1 Inspection of cavities from inside:** hidden internal features and defects are clearly viewed
- 2 High Resolution:** the catadioptric design enables the detection of tiny defects over a very wide view angle
- 3 3D measurement capability:** deformation and diameter are measured through LED pattern reflection
- 4 Surface defect enhancement:** mixing direct and indirect illumination makes it possible to emphasize tiny and scarcely visible defects.



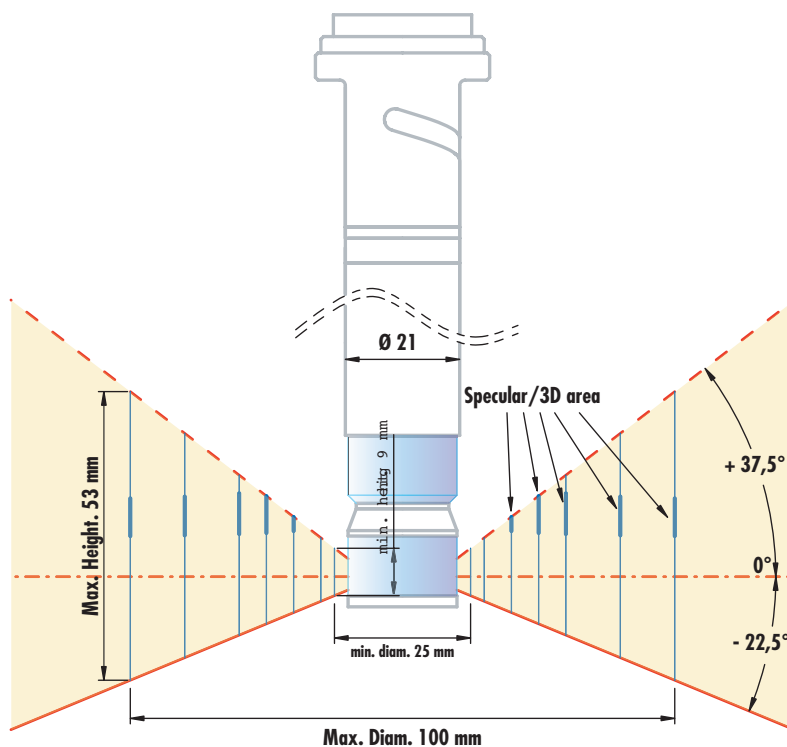


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Inspection Area	
diameter (mm)	height (mm)
25	9
30	12
40	18
50	23
60	29
80	41
100	53

The image of the cavity covers around 50% of the detector height; the continuous red line indicates the bottom view of the cavity (-22.5°), the dashed line shows the upper view ($+37.5^\circ$) while the dash-dotted line refers to the lateral view (0°).



part number		PCBP013	PCBP012
detector size		1/3"	1/2"
min. FOV (diam x height)	(mm x mm)	25 x 9	25 x 9
max. FOV (diam x height)	(mm x mm)	100 x 53	100 x 53
wavelength range	(nm)	450 .. 650	450 .. 650
viewing angle	(deg)	60	60
CTF @ 50 lp/mm	(%)	> 25	> 20
f-number		14	16
diameter	(mm)	21,0	21,0
length	(mm)	167,0	137,0
weight	(g)	113	92
mount		c	c
LED voltage	(volt)	16 .. 24	16 .. 24
LED power	(watt)	<2,0	<2,0

BOROSCOPIC PROBES can image cavities whose diameter ranges from 25 mm to 100 mm and over: the table on the left shows the inspection range allowed.

An integrated LED engine illuminates the cavity both diffusely and directly (specular illumination). The diagram below shows the different illumination areas. The diffused illumination is used for defect detection and component inspection. The direct/specular illumination can be efficiently used to check for surface deformation on metal and highly reflective objects as well as to measure the hole diameter.



The LED illumination device is integrated into the unit.

The optical tip of the probe can be easily replaced in case of damage.

The best focus is achieved by means of a lockable focusing mechanism.

Power supply cables exit the device nearby the device's C-mount.

