

IMAGER 5006EX –
the world's only explosion proof
3D laser scanner

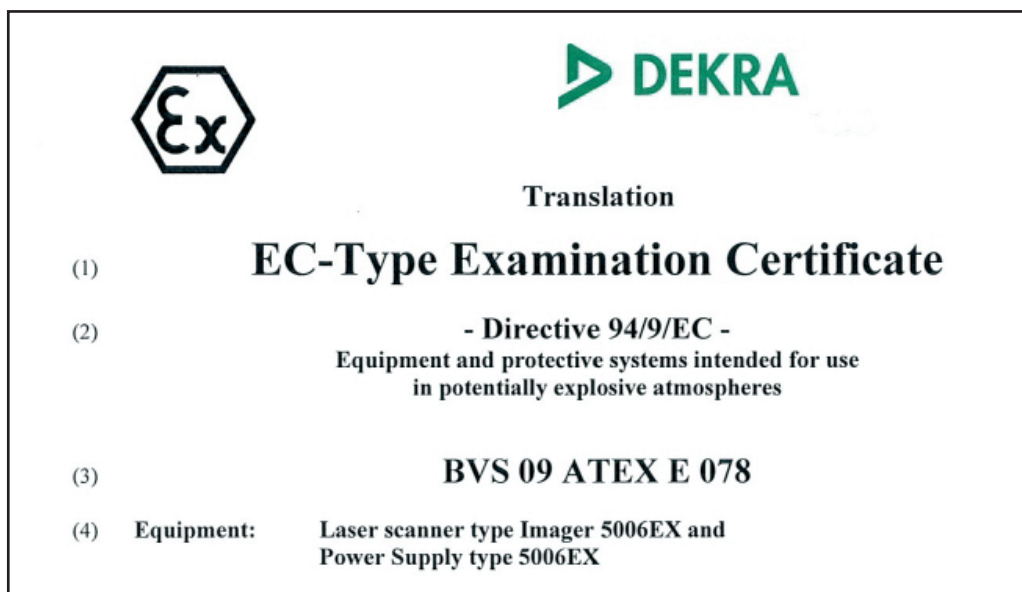
IMAGER 5006EX



Based on the high quality laser scanner Z+F IMAGER® 5006i, Zoller+Fröhlich GmbH and DMT GmbH & Co. KG have developed the first explosion proof 3D laser scanner.

The IMAGER 5006EX revolutionizes surveying in underground mining and industries where explosive atmospheres could occur.

The IMAGER 5006EX is the world's first ATEX approved 3D laser scanner for use in mining and industrial applications under explosive conditions.



The IMAGER 5006EX is class I and class II approved according to ATEX directive 94/9/EC.

ATEX approval description

The ATEX directive 94/9/EG “Equipment and protective systems intended for use in potentially explosive atmospheres” is a European standard.

The ATEX approval for this equipment is widely accepted outside the European community.

Class I (equipment marking: I M2 Ex d [ib] op is I)

Mining conditions are likely to cause operational difficulties for any piece of equipment. However the IMAGER 5006EX is able to cope with these difficult conditions throughout a wide range of mining applications. The equipment is tested and certified for ATEX equipment category 2.

Class II (equipment marking: II 2G Ex d [ib] op is IIB T4)

There are a diverse range of industrial applications. The IMAGER 5006EX is approved for class II, however it is important to review the industrial environment against the appropriateness of the IMAGER 5006EX prior to use.

The IMAGER 5006EX with its pressure-resistant case is tested for usage in category 2G. It can be used in areas where explosive atmospheres caused by gases, vapours or mists are likely to occur. Such equipment could be used in zone 1 and zone 2 environments where explosive conditions prevail.

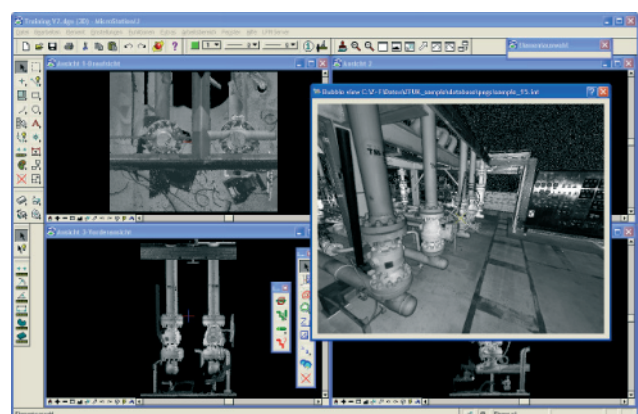
Furthermore the scanner is tested for different ambient conditions. The IMAGER 5006EX is approved for gas group IIB. In this gas group the reference gases are ethylene, coke oven gas and other industrial gases.

Another important figure is the temperature classification. The classification specifies the maximum equipment surface temperature. The IMAGER 5006EX is approved for temperature class T4, where the surface temperature is allowed to reach 135°C. This is an important consideration for plant operators.

The calibrated scanner can operate in temperatures of 0°C to 40°C.



Point cloud of a pumping station



Working with point cloud data

Product Advantages

The IMAGER 5006EX is built upon the highly regarded technology established in the Z+F IMAGER® 5006i.

Power supply

The IMAGER 5006EX has a changeable internal battery pack that allows wireless scanning for 1 hour.

The battery pack has been designed to allow the user to change it in an explosive environment, ATEX standards define that there is no external power supply allowed.

Handling

The IMAGER 5006EX can be operated via the integrated keyboard-display combination.

For external operation the scanner is equipped with a Wi-Fi interface. Therefore a PDA or notebook (ATEX certification needed) can be used to operate the scanner from a distance if required.

The captured data is stored on the internal hard disk.

The Ethernet interface can be used for outside explosive environment.

Data capture/quality

The IMAGER 5006EX could be used in various applications due to the great point density and excellent accuracy. The data acquisition rate of 508,000 points per second allows very fast data capture and project time savings. The scan data is stored on an internal hard disk, capable of holding at least 60GB of data. This allows very intense scanning.

Compatibility

The IMAGER 5006EX is compatible with all Z+F software products such as Z+F LaserControl and LFM®.

The scanner can be mounted on a special tripod available from Z+F. The tripod allows the user to level the scanner horizontally.

To allow survey control a standard prism can be mounted on top of the scanner.

The laser scan data is also compatible with software products supplied by other supported external vendors such as Visual Sensor Fusion (VSF), JRC 3D Reconstructor etc..

For more information please contact:



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Technical Data

Laser measurement system

| | | |
|---|--|--|
| ATEX certification: | I M2 Ex d [ib] I / II 2G Ex d [ib] II B T4 | |
| Ambiguity interval: | 79 m | |
| Min. range: | 0.4 m | |
| Resolution Range: | 0.1 mm | |
| Data acquisition rate: | ≤508,000 pixel/sec | |
| Linearity error up to 50 m ¹ : | ≤1mm | |
| Range noise at 10 m ^{1 2} : | | |
| - Reflectivity 10% (black): | 1.2 mm rms | |
| - Reflectivity 20% (dark grey): | 0.7 mm rms | |
| - Reflectivity 100% (white): | 0.4 mm rms | |
| Range noise at 25 m ^{1 2 3} : | | |
| - Reflectivity 10% (black): | 2.6 mm rms | |
| - Reflectivity 20% (dark grey): | 1.5 mm rms | |
| - Reflectivity 100% (white): | 0.7 mm rms | |
| Range noise at 50 m ^{1 2} : | | |
| - Reflectivity 10% (black): | 6.8 mm rms | |
| - Reflectivity 20% (dark grey): | 3.5 mm rms | |
| - Reflectivity 100% (white): | 1.8 mm rms | |
| Temperature drift (0°C to 40°C): | negligible due to internal reference | |

Optical transceiver

| | |
|--------------------------------|---------------------|
| Laser: | visible |
| Beam divergence: | 0.22 mrad |
| Beam diameter at 1 m distance: | 3 mm circular |
| Laser safety class: | 3R (ISO EN 60825-1) |

Deflection unit

| | |
|---|---------------------------------|
| System vertical/horizontal: | rotating mirror/rotating device |
| Field of view vertical/horizontal: | 310°/360° |
| Resolution vertical/horizontal: | 0.0018°/0.0018° |
| Accuracy vertical ¹ /horizontal: | 0.007° rms/0.007° rms |
| Max. scanning speed vertical: | ≤50 rps |
| Typ. scanning speed vertical: | 25 rps |

Resolution

| Resolutions: | Pixel/360° (vertical, horizontal) | Scanning time/360° |
|--------------|--------------------------------------|--------------------|
| - „preview“: | 1,250 | 25 sec |
| - „middle“: | 5,000 | 1 min 40 sec |
| - „high“: | 10,000 | 3 min 22 sec |

Technical Data

| Resolutions: | Pixel/360° (vertical, horizontal) | Scanning time/360° |
|-------------------------------------|--------------------------------------|--------------------|
| - „super high“: | 20,000 | 6 min 44 sec |
| - „ultra high“: | 40,000 | 26 min 40 sec |
| - „max. resolution for selections“: | 100,000 | variable |

Miscellaneous

| Tilt measurement: | |
|---------------------------------------|-----------------------|
| - Resolution: | 1/1,000° |
| - Accuracy (zero point): ⁴ | 1/500° |
| Data storage: | Internal HDD (>=60GB) |
| Data interface: | Wi-Fi/Ethernet |
| Communication interface: | Wi-Fi/Ethernet |
| Integrated operation panel: | |
| - Keypad: | 6 Buttons |
| - Display: | 4 Lines |
| Power supply: | |
| - Input voltage: | 18V DC (scanner) |
| Power consumption: | 65 W max. |
| Battery life time: | |
| - Changeable battery pack: | 1.0 h |

| Ambient conditions: | |
|-------------------------------|--|
| - Calibrated temperature: | 0°C to 40°C |
| - Storage temperature: | -20°C to 50°C |
| - Humidity; Dust/air humidity | non-condensing; IP 53 |
| - Target reflectivity: | no retro-reflectors |
| - Illumination: | all conditions from darkness to daylight |

Dimensions and weights

| Scanner (w x d x h)/weight: | 250 mm x 395 mm x 414 mm/30.6 kg |
|---------------------------------------|----------------------------------|
| Bottom of scanner to horizontal axis: | 343 mm |
| Tripod: | |
| - Height/weight: | approx. 800 mm -1,400 mm/9 kg |
| - Diameter: | approx. 1,200 mm |

¹ detailed explanation on demand – please contact imager5006@zf-laser.com; ² data acquisition rate: 127,000 pxl/sec; ³ values extrapolated;

⁴ zero point determination by two layer measurements

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