

NEW

X-ray TDI camera C12300-321

High speed readout

Large field of view

High resolution

High sensitivity



Evolutional high speed scanning with TDI technology Bidirectional scanning operation is supported

High speed readout

86.4
m/min.

Detection area

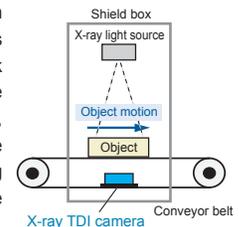
221
mm

Horizontal spatial resolution

4608
pixels

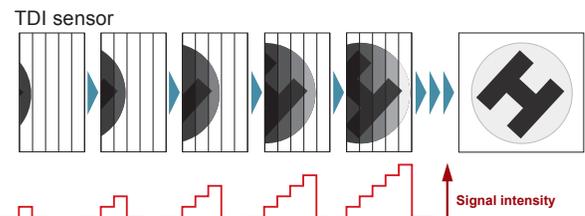
TDI technology

Time Delay Integration is a technology of scanning in which a frame transfer device produces a continuous video image of a moving object by means of a stack of linear arrays aligned with and synchronized to the motion of the object to be imaged in such a way that, as the image moves from one line to the next, the integrated charge moves along with it, providing higher resolution at lower light levels than is possible with a line-scan camera.



X-ray TDI camera is useful for in-line applications requiring high-speed operation, high sensitivity and high resolution with wide area.

C12300-321 is drastically improved the line speed up to 86.4 m/min. With bidirectional scanning operation, it enables to capture the objects effectively and improves the machine cycle time.



Features

- High speed readout (20 kHz)
- Bidirectional scanning operation
- Improving radiation hardness
- High S/N ratio with 12 bit output
- Camera Link interface (Base configuration)
- Single power supply (+15 V) operation
- Real time dark current / shading correction function
- Frame readout mode for easy installation alignment

Printed circuit board (PCB) inspection

Surface-mounted component inspection

Battery inspection

High-resolution in-line non-destructive inspection

HAMAMATSU

PHOTON IS OUR BUSINESS

High resolution, High speed camera with a Large field of view for In-line 100 % X-ray inspection

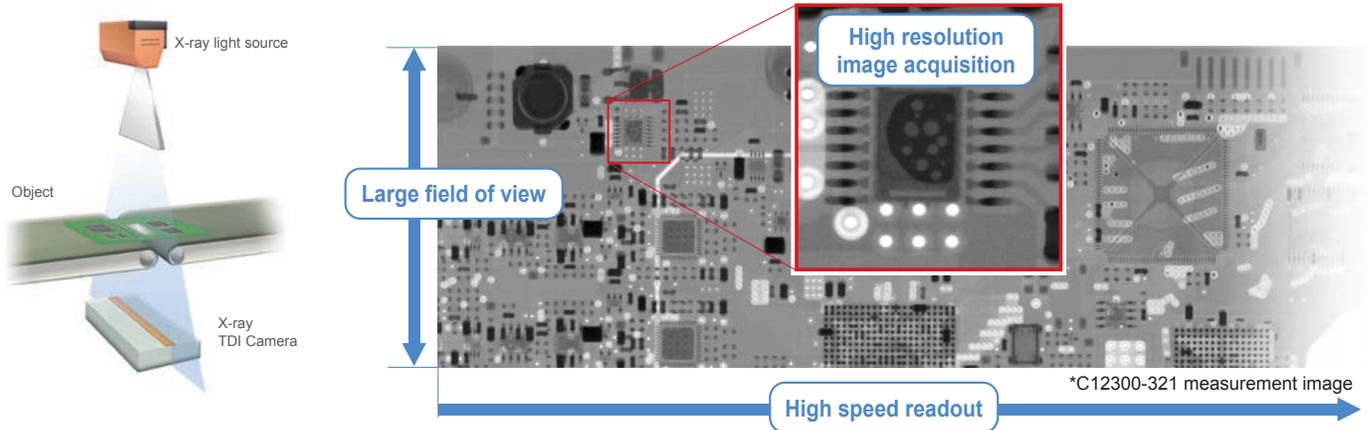
High speed readout

Large field of view

High resolution

High sensitivity

TDI technology offers all four simultaneously.



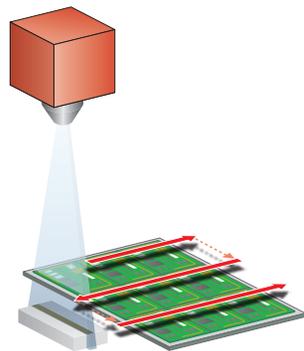
SPECIFICATIONS

| | | |
|------------------------------------|---|----------------------------|
| Type number | C12300-321 | |
| Scintillator | Csl Scintillator | |
| Window | FOS (Fiber optic plate with scintillator) | |
| Effective X-ray tube voltage range | Approx. 25 kV to 130 kV *1 | |
| CCD pixel size | 48 μm × 48 μm | |
| Number of pixels | 4608 (H) × 150 (V) | |
| X-ray sensitive area | 221.1 mm (H) × 7.2 mm (V) | |
| Line speed | 0.576 m/min to 57.6 m/min | |
| TDI line rate | 1 × 1 | Max. 20.0 kHz (57.6 m/min) |
| | Binning 2 × 2 | Max. 15.0 kHz (86.4 m/min) |
| CCD pixel clock | 10.0 MHz | |
| A/D converter | 12 bit | |
| Digital interface | Camera Link | |
| Interface (Camera Link) | Base Configuration | |
| Pixel clock (Camera Link) | 48 MHz | |
| Output signals (Image data) | 12 bit digital output | |
| Power supply | DC +15 V | |
| Power consumption | Approx. 45 VA | |

*1 Usable range of X-ray strength may vary depending on the tube current, the tube voltage and the distance.

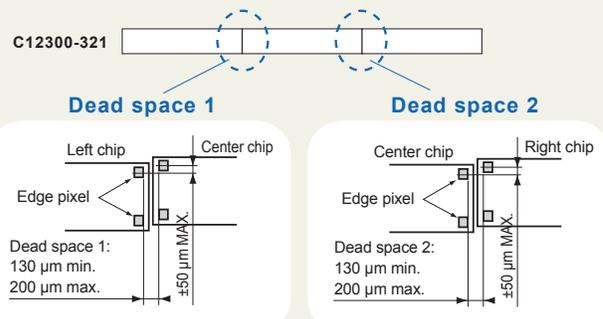
Bidirectional scanning operation is supported

C12300-321 enables for the bidirectional scanning (inverse direction scanning) operation. It is useful when the scanning direction is different in the same inspection system or the rescanning is needed for NG judgement. Also the machine cycle time can be improved for large objects such as PCBs.



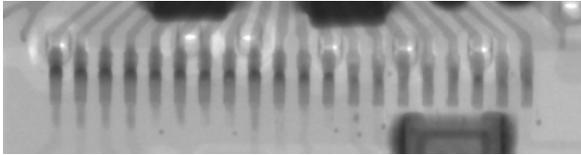
Dead space between chips

C12300-321 has a following dead space between chips.

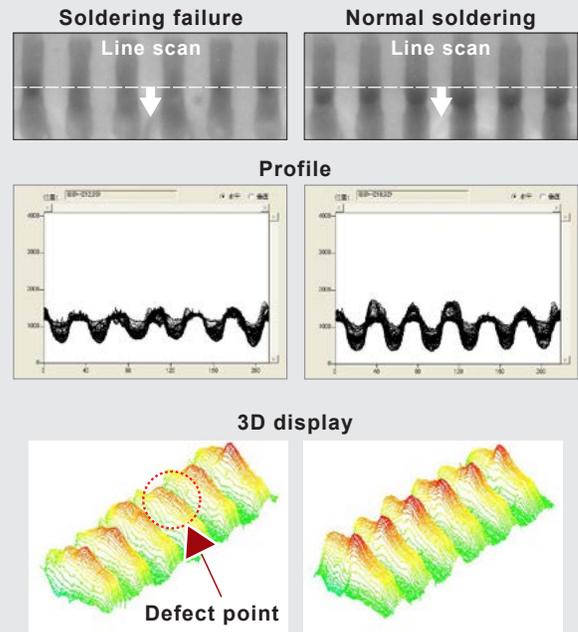


MEASUREMENT EXAMPLES

Inspection of a solder's back fillet



If the back fillet of the solder on a PCB has a defect, a connection error will occur even with small vibrations. For observation of the back fillet part, X-ray transmission technique has been applied but only with an off-line system. Our X-ray TDI camera realizes in-line inspection because it can acquire high speed profile data with high sensitivity. 3D brightness level can be displayed using software.

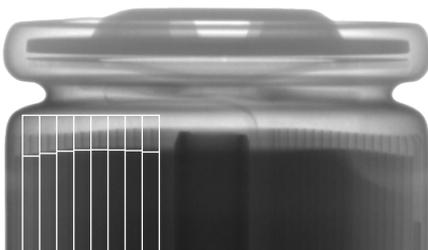


Lithium-ion battery inspection

In case of 2D sensor, the dimensional measurement cannot be implemented correctly because the image is distorted on the corner areas of the X-ray irradiation. The long length sample needs to be located on center of X-ray light source, so the sample has to be relocated each time. X-ray TDI camera can capture the image with no distortion by line scan method, so it is not necessary to relocate the samples and it enables the continuous inspection for long length object without stopping.

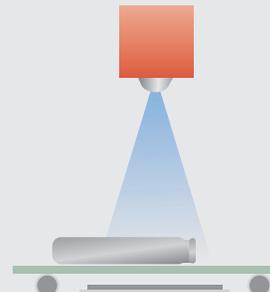


Not necessary to relocate the samples and possible to inspect the long length object with no distortion.



Possible to inspect the mismatch of rolling and measure the length of electrode with no distortion.

Inspection by 2D sensor

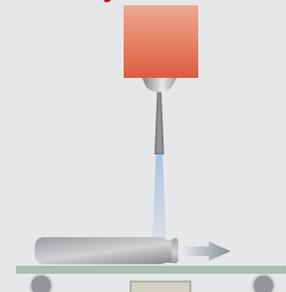


X-ray image intensifier (I.I.) camera :

The image is distorted on the corner areas in thickness direction, and the dimensional measurement cannot be implemented correctly.

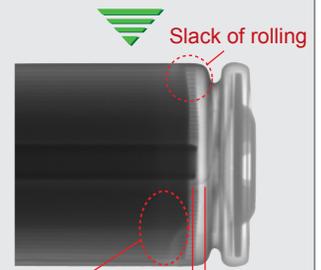


Inspection by X-ray TDI camera



X-ray TDI camera :

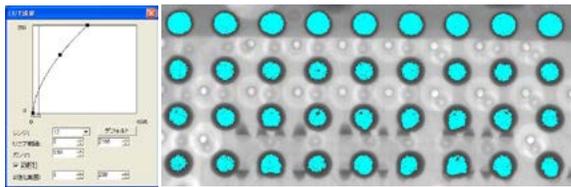
The non-distortion image can be realized since X-ray is radiated vertically to the object and the dimensional measurement can be implemented correctly.



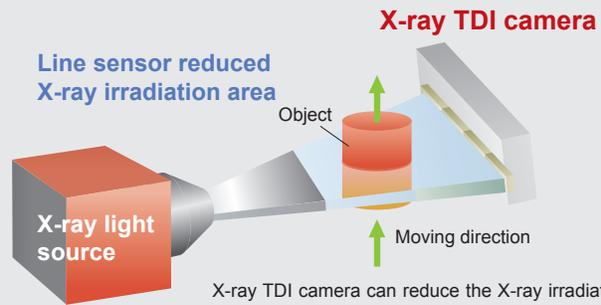
Short of the solution
Condition of the connection on electrode

MEASUREMENT EXAMPLES

Void inspection of BGAs (Ball Grid Array)



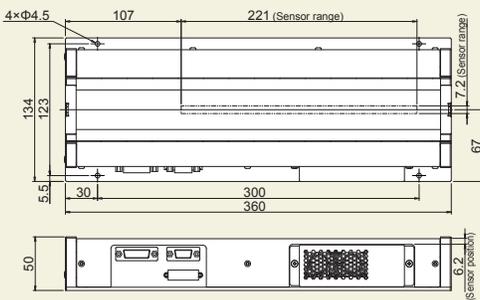
X-ray TDI camera can inspect the samples easily by high speed scan with narrow irradiate area.
S/N ratio is one of advantage and low X-ray radiation is enough to inspect the void existence.
Furthermore it contribute to make a smaller size of system by reducing a lot of X-ray irradiation.



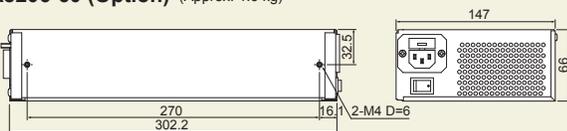
X-ray TDI camera can reduce the X-ray irradiation on the sample dramatically by high speed with narrow irradiation area. So it can reduce the risks to break down the ICs on the PC.

DIMENSIONAL OUTLINES (Unit: mm)

● C12300-321 (Approx. 4.4 kg)



● A8206-60 (Option) (Approx. 1.6 kg)



OPTIONS

- Power supply unit : A8206-60
- Power cable 5 m : A13967-05
- Software API Support (Microsoft Windows) :
DCAM-API (<http://www.dcamapi.com>)

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