

X-Scan T02 series



High-resolution TDI X-ray linear detector arrays



- Provides superior image quality, high sensitivity, and spatial resolution with low X-ray doses
- Enables fast scanning speeds
- Compatible with the GigE Vision protocol
- Features the highest level of integration and a simplified system design
- Built on a well-proven sensor platform
- Future-proof design
- Minimizes the need for imaging magnification
- Has compact, industry-standard mechanics
- Equipped with state-of-the-art radiation hardness
- Optimized for demanding industrial applications
- Comes with SW developer kit

The X-Scan T02 is a series of TDI line cameras that are optimized for demanding industrial environments. The series comes with the unique high-resolution, high-speed CMOS (complementary metal oxide semiconductor) sensor design and upgraded front- and back-end electronics to maximize the benefits of industrial inspection.

X-Scan T02 is a perfect match for quality inspection of battery cells and modules at different stages of manufacturing processes. It is optimized for battery inspection of electric vehicles to cover all types of battery cells such as cylindrical, prismatic, and pouch cells with Li-Ion and other commonly used battery chemistries. The TDI-boosted line-scan modality enables rapid and accurate inspection of the placement and alignment of laminated electrode layers and other critical features without imaging distortion or projection errors.

Furthermore, the X-Scan T02 series is fitted for use cases where very high spatial resolution is critical. Examples of such applications are quality inspection of high-value automotive, aerospace, and electronic components, parts, and assemblies, and food and pharmaceutical goods.

X-Scan T02 features a CMOS sensor with a 50 μm pixel size to enable high sensitivity and spatial resolution with low X-ray doses. The series enables fast scanning speeds of up to 20-30 kHz line rates. Depending on the cell size, this means 1-1.5 m/s object movement or 1,000-2,500 parts-per-minute

speed with TDI-processed native pixel size. X-Scan T02 is equipped with smart options, which enable object movement to be sped up further, or to multiply parts-per-minute inspection rates.

X-Scan T02 comes with a 10 Gigabit Ethernet interface and is compatible with the GigE Vision



protocol. This enables robust, reliable, and fast communication between the detector and X-ray systems and supports third-party software platforms without the need to have specific image grabber hardware on the system computer.

The series operates in the energy range of 20–200 keV. Its industry-standard mechanics support easy system integration and upgrades. The product family has active area length options of 205 and 410 mm and a compact size. In addition,

Key features

- TDI (Time Delay Integration) technology-based platform with digital TDI operating modality
- CMOS (complementary metal oxide semiconductor) sensor design
- 50 μm pixel size
- Energy range 20–200 kV
- Active area length options of 200 and 400 mm
- 10 Gigabit Ethernet interface
- Bidirectional scanning operation
- Defect pixel mapping and correction functionality
- Programmable ROI (region of interest) configuration
- Pixel binning 2x, 4x, 8x

Applications

- In-line quality inspection of battery cells and modules
- Automotive, aerospace, and electronic components and assemblies
- Food
- Pharmaceutical goods

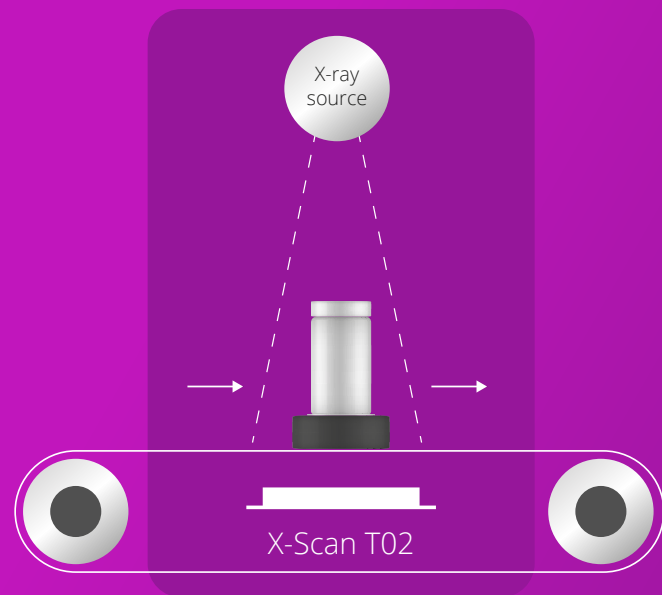
X-Scan T02



its high resolution enables the system configurations to be shrunk even further, as there is less need for high magnification.

X-Scan T02 has the highest level of integration and a simplified system design for digitally enhanced image quality, total cost savings, minimized risks, longer lifetimes, and maximized up-time. Furthermore, the series is equipped with state-of-the-art radiation hardness. For speeding up design and system integration, world-class engineering support and a customer evaluation unit are available.

PARAMETER	X-Scan T02	
Product code	3000038372	3000038373
Operational mode	Time delay integration (TDI)	
Number of TDI stages	128	
TDI algorithm	Built-in	
Pixel size	50 µm	
Pixel matrix	4096 x 128	8192 x 128
Active area	205 mm x 6.4 mm	410 mm x 6.4 mm
Maximum scanning speed	1 m/s @ 50 µm pixel pitch	
TDI line rate	20 kHz	
Energy range	~20–200 kV	
Mechanical dimensions (L x W x H)	~250 mm x 160 mm x 50 mm	~450 mm x 160 mm x 50 mm
Weight	~5 kg	~7 kg
Internal radiation shield	Yes, X-ray beam max width at detector: ≤10 mm for 205 mm model / ≤32 mm for 410 mm model	
Lifetime under X-ray	10 kGy	
Collimator	Yes, internal shielding collimator	
Interface	10 Gb ENET over fiber (FSP+)	
Data output	12–16 bit in TDI mode	
External trigger support	Yes, including A/B/Z encoder (Differential input)	
Operational voltage	+24 V DC	
Power consumption	< 100 W	< 200 W
Ingress protection rating	IP56	
Temperature and humidity	• Operational • Storage • Transport	
	0 – +50 °C / 10 – 95 % (non-condensing) 0 – +40 °C / 10 – 95 % (non-condensing) -10 – +60 °C / 10 – 95 % (non-condensing)	
Compliances	CE, UKCA, RoHS, China RoHS, WEEE, EMC: IEC61326-1	



TDI-sensor

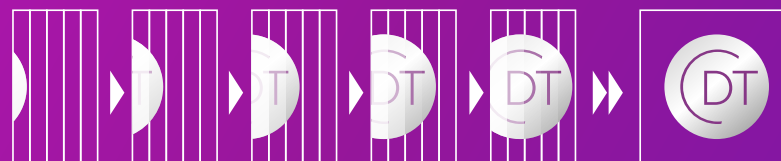


Image contrast

