uSkan

Description

uSkan is an ultra-fast submillimeter imaging system that incorporates uFrame radar arrays, a proprietary patented technology developed by Optikan. These arrays are composed of a multitude of radar pixels centered at 120 GHz, similar to those in uSense or uSense LITE, and are directly integrated onto a dedicated electronic board, without motorized components or III-V elements.

Designed for online acquisition, it is perfectly suited to high industrial speeds while guaranteeing high-quality measurements.

Features

- Static imaging modules featuring 192 radars designed to be installed around a conveyor and scan a 192 mm wide area
- Multiple modules can be daisy-chained together to address wider conveyors (up to 2 meters wide)
- Fixed resolution of 1 mm in the direction perpendicular to the conveyor
- Adjustable resolution in the conveyor flow direction, typically 1 mm at a speed of 3 m/s
- Working distance of 50 mm up to 250 mm
- Compatible with different types of conveyors

Applications

- See-through non-intrusive imaging for foreign body detection such as wet spots, delamination, glue, metallic or plastic objects or knots in wood
- Process validation and systematic quality control of products before packaging
- Sorting of different types of materials for waste management, sorting and recycling

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Electrical specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Comment
Grid voltage	V_{eff}	85	230	264	V	Based on internal power supply characteristics[1].
Grid frequency	f_{grid}	50	50	60	Hz	
Power draw	P_{in}	-	225	370	W	For a single imaging module (192 mm scan width).

Note :

[1]Default uSkan features CEE 7/7 plugs, compatible with type E and type F sockets. Adaptations to other types of plugs, such as American NEMA 1-15P or NEMA 5-15P, or Japanese JA1-15P or JA5-15P, is possible on demand.

Mechanical specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Comment
Length	L	-	-	800	mm	
Width[1]	W	-	208	330	mm	Account for the 192 mm width and supporting parts.
Height	H	-	-	151	mm	
Weight	m	-	-	20	kg	For a single imaging module.

Note :

[1]Width includes mechanical supporting parts on both sides of the imaging section of the device. For a given conveyor width, the total width of uSkan is calculated as follows : $W = 208 \times \left\lceil \frac{W_C}{192} \right\rceil + 122$ where W is the width of the uSkan and WC is the width of the conveyor's area to be scanned (all dimensions in [mm]).

Optical performance

Parameter	Symbol	Min.	Typ.	Max.	Unit	Comment
Scanning width[1]	W_{scan}	-	192	-	mm	For a single imaging module.
Acquisition rate	f_{acq}	-	-	3000	Hz	-
Lengthwise resolution[2]	R_X	-	1	-	mm	Resolution in the conveyor axis.
Transverse resolution	R_Y	-	1	-	mm	Resolution perpendicular to the conveyor.
Signal to Noise Ratio	SNR	-	-	35	dB	-
Optical power[3]	P_{opt}	-	20	24	dBm	Total output power over a 0.118 m^2 area.
Working distance[4]	WD	-	50	-	mm	Fixed for a given configuration.
Focal length[4]	F	-	50	-	mm	-
Numerical Aperture	NA	-	0.16	-		-

Notes :

[1]Imaging modules can be daisy chains to increase the width depending on your needs.

[2]Depends on the speed of the conveyor and the acquisition rate such that : $R_X = \frac{v_{conv}}{f_{acq}}$ where v_{conv} is the speed of the conveyor and f_{acq} the acquisition rate.

[3]Maximum and typical power transmitted by all chips together. For reference, 20 dBm = 100 mW, and 24 dBm ≈ 250 mW.

[4]Working distance is set by lenses and is application dependent. Contact Optikan for more information.

Computer requirements

The user computer should meet the following requirements in order to control the uSense and run the included software adequately :

- Operating system : Windows 11 with administrative privileges or Linux Ubuntu 20.04 or higher
- Memory : At least 32 GB of RAM
- Storage : At least 7 GB for the software, with 4 TB recommended for storing the scan images (at its peak performance, a 192 mm wide device will fill a 4 TB drive after 12 hours of continuous scanning. In practice, storage requirements may be lower depending on the application)
- Connectivity : at least one Gigabit Ethernet port or better

Others

Parameter	Symbol	Min.	Typ.	Max.	Unit	Comment
Humidity	HR	40	-	50	%	Non-condensing.
Operating temperature[1]	T_{op}	0	-	50	°C	-
Storage temperature[1]	T_{sto}	0	-	50	°C	-

Note :

[1]Significant cooling is required to ensure adequate performance. uSkan features multiple fans intake and exhaust which should never be obstructed. Dust filters also protect the system and ensure long-lasting reliable operation. These filters should be cleaned regularly to ensure best performance.

For more information, please contact Optikan at : support@optikan.com.