

Description



uFrame is the standalone version of the radar-equipped sensors found in uSkan product line. Most notably, uSkan is designed from a multitude of uFrame modules daisy-chained together. Therefore, while uCore cannot provide the same imaging resolution as a uSkan, it can take measurements at twelve distinct positions at the same speed of 3000 Hz at a fraction of the cost.

Like its single-sensor counterpart uCore, uFrame is designed for maximum versatility for OEM whose main concern is about compacity and integration of a diverse ecosystem of quality control equipment that are based on distinct technologies, all the while keeping a low acquisition cost.

Features

- Static sensing FMCW radar-based module featuring 12 chips operating at frequencies and bandwidth of 119.6 → 125.8 GHz
- Fixed resolution of 16 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
- Unique set of 12 collimation lenses
- Ethernet connectivity for legacy compatibility with existing devices
- Comes alongside with Optikan's Software Development Kit to facilitate implementation inside existing quality control ecosystems

Applications

- See-through non-intrusive sensing 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
- Integration of multi-sensor devices for Original Equipment or Manufacturers

Table of Contents

Description.....	1
Features	1
Applications	1
Table of Contents.....	1
Electrical specifications	2
Mechanical specifications.....	2
Optical performance.....	2
Computer requirements	3
Others.....	3



Electrical specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Comment
Input voltage ¹	V _{in}	9.6	12	13.2	V	Powered using a 5.5x2.5 mm 12V DC Barrel Plug.
Power draw	P _{in}	-	26.41	34.08	W	Computed from sub-components datasheets.

Note :

¹Most commercial 12V DC power supplies provide voltage between 10.6V and 12.7V in the worst-case scenario. It is advised to stay within this interval for better performance.

Mechanical specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Comment
Length	L	-	-	210	mm	
Width	W	-	-	120	mm	
Height	H	-	-	70	mm	
Weight	m	-	-	1000	g	

Optical performance

Parameter	Symbol	Min.	Typ.	Max.	Unit	Comment
Scanning width	W _{scan}	-	192	-	mm	For a single imaging module.
Acquisition rate	f _{acq}	-	-	3000	Hz	-
Lengthwise resolution ¹	R _x	-	1	-	mm	Resolution in the conveyor axis.
Transverse resolution	R _y	-	16	-	mm	Resolution perpendicular to the conveyor.
Signal to Noise Ratio	SNR	-	-	35	dB	-
Optical power ²	P _{opt}	-	7.8	11.8	dBm	Total output power over a 0.003 m ² area.
Maximum range	R _{max}	-	250	-	mm	Limited by the sample rate of ADCs.
Beam divergence ³	θ	-	TBA	-	°	Half-angle for each collimation lens.

Notes :

¹Depends 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.

²Maximum and typical power transmitted by all chips together. For reference, 7.8 dBm ≈ 6.03 mW, and 11.8 dBm ≈ 15.14 mW.

³The included collimation lenses are made from HDPE and have an index of 1.53. They are designed to compensate for the natural divergence of the radar chip, but do not compensate fully to account for manufacturing tolerances and avoid overconvergence of the beam. Please note that a set of focalization lenses is recommended for best performance.



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
- Memory : At least 32 GB of RAM
- Storage : At least 2 GB for the software, with 256 Go recommended for storing the measurements
- Connectivity : at least one Gigabit Ethernet port or better
- Monitor size : for a better experience, it is recommended to use a monitor with at least a 1920x1080 resolution
- Any code writing or IDE software of your choice from which to open, edit, and recompile the SDK according to your needs

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 :

¹Cooling 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.

