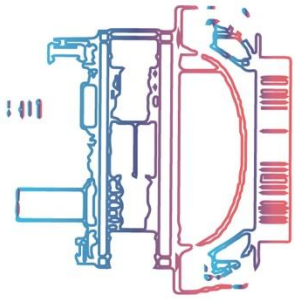
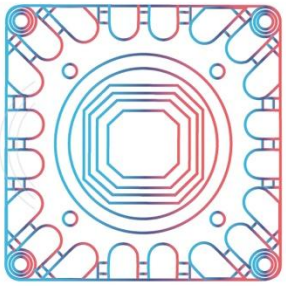
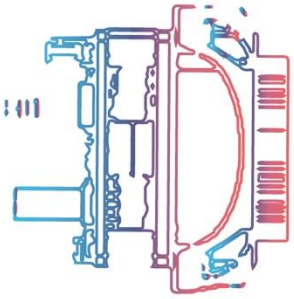
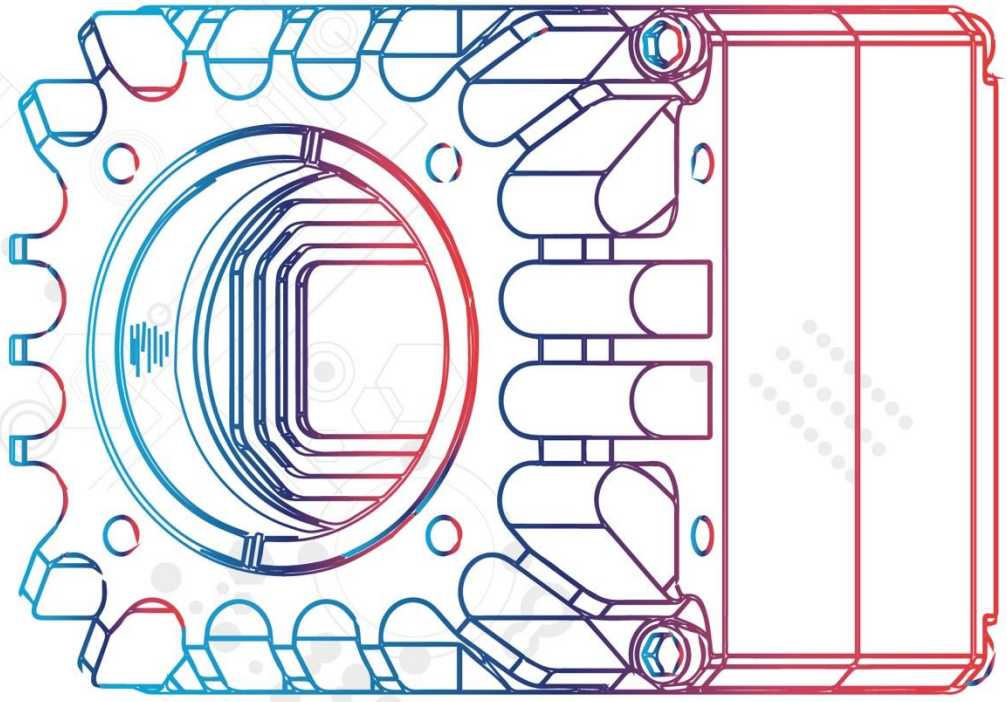
www.new-imaging-technologies.com









SenS 1920V-ST

Camera Datasheet

DOCUMENT

Date	Modification	Revision
10/09/2024	Document creation	V1.0
04/04/2025	Accessories and software update	V1.1

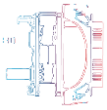


Table of contents

OVERVIEW

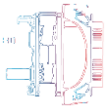
Commercial Reference

Commercial reference	Description	Ordering information
SenS 1920V-ST	USB3.0 TEC FHD CAMERA	9SMC2101AE31VC0X

References

Index	Title of document	Revision	Issued by
R1	SWIR TEC camera interface		NIT
R2	NITVISION Reference Guide		NIT

A reference document contains elements, which are used to draft this specification.



Subject

This document specifies the camera:

- Sensor description
- Presentation
- Mechanical dimension and optics interface
- Electrical and video interface
- Functionalities
- Software compatibility
- Electro-optics characteristics
- Environment
- Accessories
- Annexes

Definitions, Terminology and abbreviations

- NIT : New Imaging Technologies
- FPGA : Field Programmable Gate Array
- L : Length
- H : Height
- W : Width
- WDR : Wide Dynamic Range
- FPN : Fixed Pattern Noise

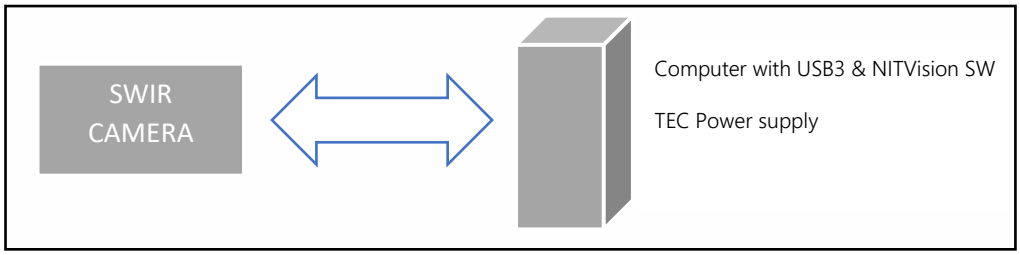
Sensor description

Optical format	1.1 inch
Active pixel	1920x1080
Material	InGaAs
Pixel size	Square 8 x 8µm
Readout mode	Global Shutter
Packaging	Metal PGA

PRESENTATION AND CONFIGURATION

General presentation

The SenS 1920V-ST integrates the T-Cooled sensor NSC2101T-SI Monochrome. This camera integrates control of temperature to improve the intrinsic characteristics of the sensor.



Camera configuration

The camera is composed of Sensor, ADC, FPGA and Interface boards:

- Sensor board which includes the sensor and the Peltier (thermoelectric cooling).
- 14 bits ADC board which digitizes the output
- FPGA board which integrates the sensor timings and the USB 3.0 synchronization and data
- Interface board which integrates the management of the main power supply, the trigger, the Peltier management and the USB3.0 transceiver.

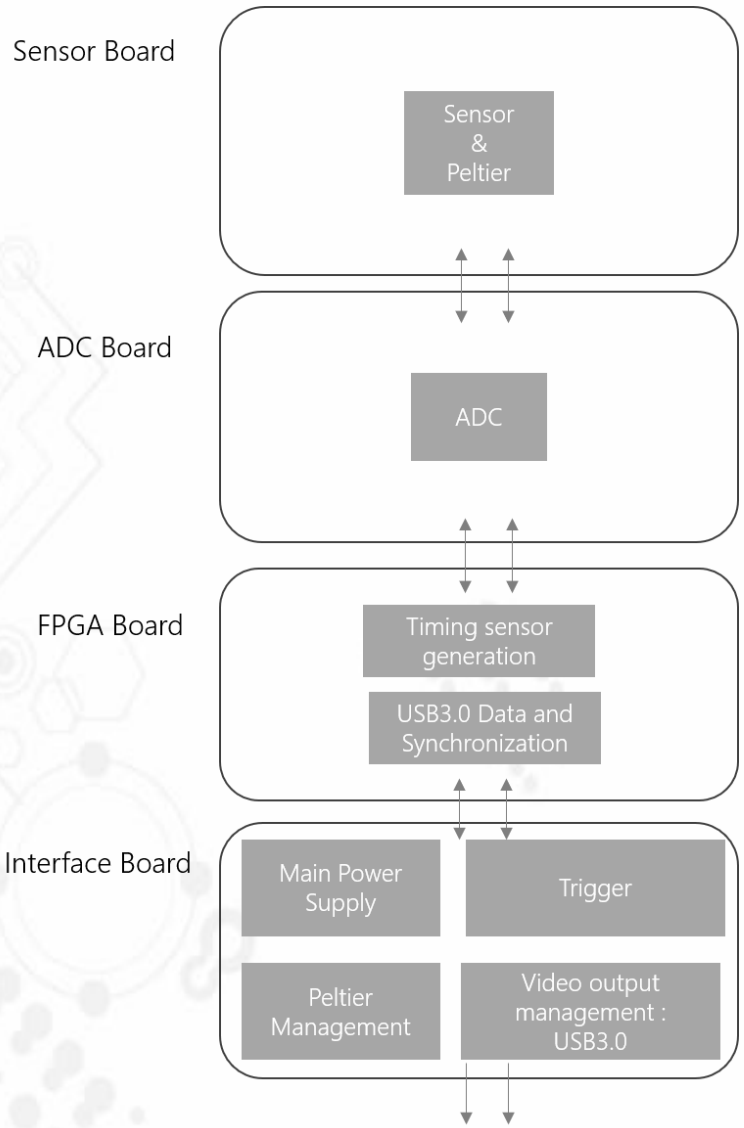
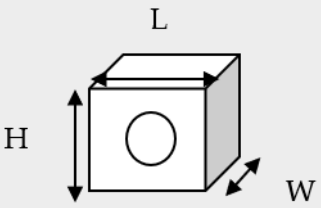
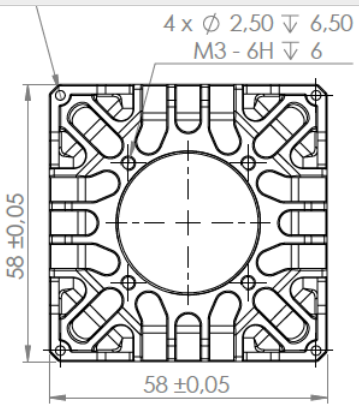
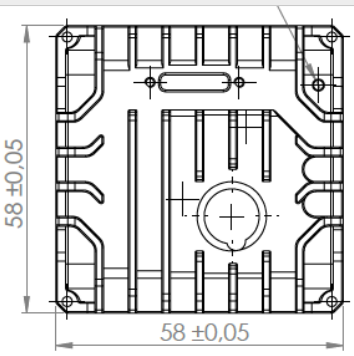
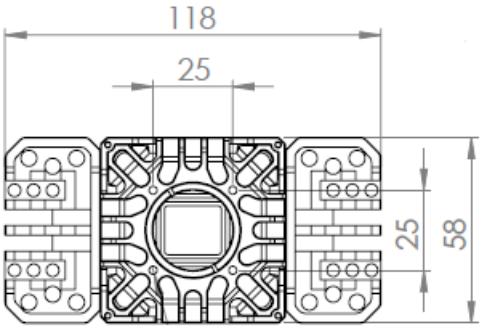
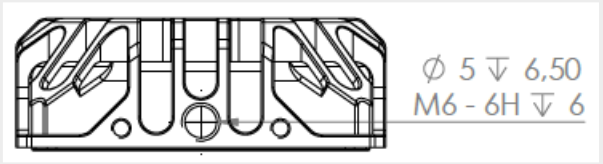
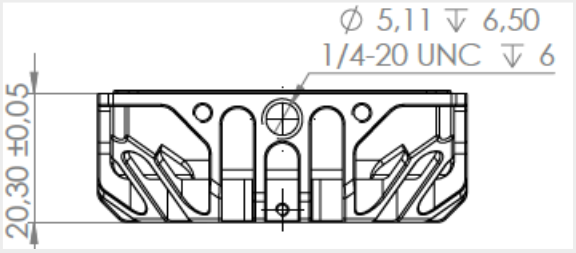


Figure 1 Camera architecture

SPECIFICATIONS

Mechanical dimension and optics interface

Mechanical dimensions	L : 58mm H: 58mm W: 69,8mm 
Camera	 FRONT  BACK
Mount	C
Weight	Camera <350g without accessory heatsinks
Heat management	2 Heat Sinks are provided and can be mounted on any side; Fans can be mounted on these heatsinks. A specific heat sink mounting document is provided. Note: Unless otherwise specified heatsinks are mounted in factory and can be removed by the user.
	

Interface	TOP  BOTTOM  2 M3 fixing threaded holes on top, bottom, and sides. See Appendix for details

Electrical Video Interface

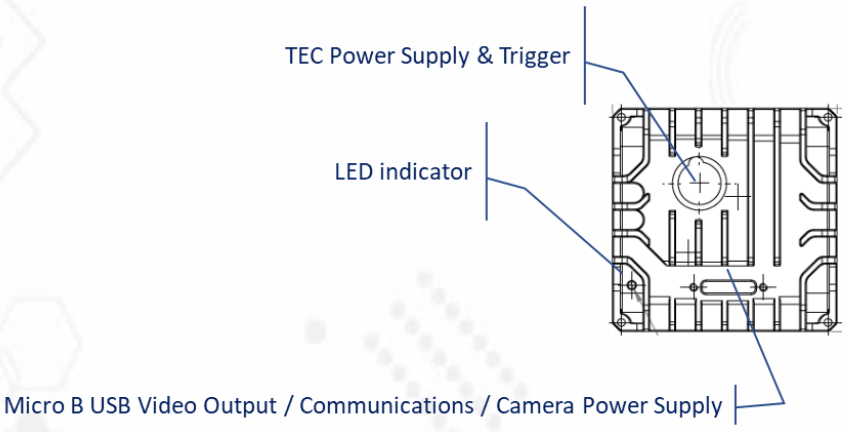
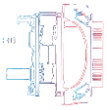


Figure 2 electrical and videos interface

- Power supply

Power supply signal for the camera and sensor is provided through standard female micro-B USB3.0 plug connector. Power supply range is 4 to 6V
Power supply for the Thermal-Electrical Cooler (TEC) is provided through Hirose 12 point female connector. Power supply range is 6V to 15V.

Reference	Designation	Manufacturer
897-10-010-00-300002	Mini USB 3.0	MILL-MAX
HR10-10R-12SA	12 position female	Hirose



Output Data

The SenS 1920V-ST provides a 14-bit output data through the USB 3.0 connector. The software displays the processed image sensor (8 bits).

LED indicator Data

RGB LED indicator. Modes to be defined. Please contact support@new-imaging-technologies.com .

Synchronization and TEC Power Supply

Please Connect the External Power Supply with the Hirose HR10-10R-12SA connector that includes the trigger connections using the included 1.5m long cable. The power cables are supplied with a jack connector by default.

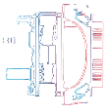
The corresponding pins on the cable are as follows:
- Red and Violet/(or Orange) cables: Power
- Blue and Brown cables: Power Ground
- Green cable: Trigger (In)
- Yellow cable: Trigger1 Out (programmable)
- White cable: Trigger2 Out (programmable)
- Black cable: Trigger Ground

A synchronization signal can be provided through the Hirose connector.
2 configurations modes are available:
- Internal mode: The trigger is defined as an output. The trigger high level duration coincides with the exposure time.
- External mode: the trigger is defined as an input.

The voltage range of the trigger signal must be [0-3.3V / LVTTL format].

<u>2 options in External trigger mode:</u>
1/
High level: integration start on sensor pixels.
Falling edge: Integration stop and beginning of the reading and send of the image on the video output connector.
2/
High level: Integration start on sensor pixels
Integration time is equal to the exposure time register.

A delay is selectable in trigger input and output.



7 options For Trigger Out mode (2 Outputs programmable independently):

a. « Trigger input »: Recopy Trigger in
b. « Trigger ready » : Trigger rises to 1 at the end of reading
c. « Exposing » : rising edge/falling edge with exposure time
d. « Readout » : rising edge/falling edge with readout
e. « Imaging » : rising edge/falling edge with exposure + readout
f. "GPIO Low" : fall to low when trigger in
g. "GPIO High" : rise to high when trigger in

Hirose Connector : HR10-10R-12SA73		
Pin	Signal Name	Note
1	+ Voltage	Power Supply (+12V)
2	- Voltage	Return Power Supply
3	Trigger OUT2	
4	Trigger OUT1	
5	Not connected	
6	Not connected	
7	Reserved	
8	- Voltage	Return Power Supply
9	+ Voltage	Power Supply (+12V)
10	Trigger	LVTTL (3.3V)
11	Not connected	
12	GND	

FUNCTIONALITIES

Camera

Different features can be controlled with NITVISION Software - for more details see [R2].

Camera mode	Frame rate	Up to 60Hz (in full resolution)
	Mode of sensor	Standard Global shutter: Dual gain : CTIA High Gain and Low Gain (HG / LG) Sensor Reading : ITR
	Trigger	In/Out LVTTL Delay selectable
	Partial reading mode	Possible to activate just a part of the sensor (ROI) and display only this window on the video output. This option allows a frame rate increase on the ROI. Selectable every-n-line mode and up to 5 line-blocs.
Software control (all functions are realized on computer)	Min/Max Settings for display – Histogram Stretching	Automatic or Manual. In Automatic the gain and offset are calculating depending of the histogram. In Manual you can choose the gain and offset you want to apply on the image.
	Zoom	Bicubic zoom function available.
	Gamma correction	From 0 to 3.
	Contrast enhancement	Contrast improvement by local histogram equalization
	Colour maps	Grey, Jet, Hot, HSV, Rainbow, Cool, Night Vision
	Cross Hair	Display of the cross hair with variable position, color and dimension.
	Filters	Canny, Laplace, Sharp, High Boost, Invert
	NUC correction	Offset, gain and dark correction (Correction calculated in factory (possible to realize it also by user) – For more details See [R2]
	Bad pixel correction	Correction of bad pixel in factory (possible also by user)– For more details See [R2]
	Recording videos	Recording video in .AVI or. PTW (Raw 14 bits)
	Image capture	.jpeg, .png or. Tiff
	Temperature	Temperature reading. Resolution: TBD°C/LSB
	Horizontal and vertical inversion	Flip on the image in horizontal and vertical
Analysis Functions (all functions are realized on computer)	Histogram computation	
	Statistics analysis	
	ROI (region of interest)	
	Cross section Profiles	
	Rectilinear profiles	
	Linear profiles	

Peltier / Control of the temperature

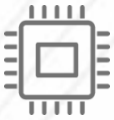
PELTIER	Control of temperature +/- 1°C	Single stage TE cooler *Note: The NUC and BPR files are delivered only for +20°C*
	Cooling capacity	ΔT (sensor vs ambient air) with heat dampers >15 C° ΔT can be higher with proper external heat dissipation solutions

*Available in option.

SOFTWARE COMPATIBILITY

The Software NITVision uses Cypress driver.

NITVision is compatible only with Windows 10 and 11.
We do not guarantee that the software will work properly with previous versions of Windows.



ELECTRO-OPTICS CHARACTERISTICS

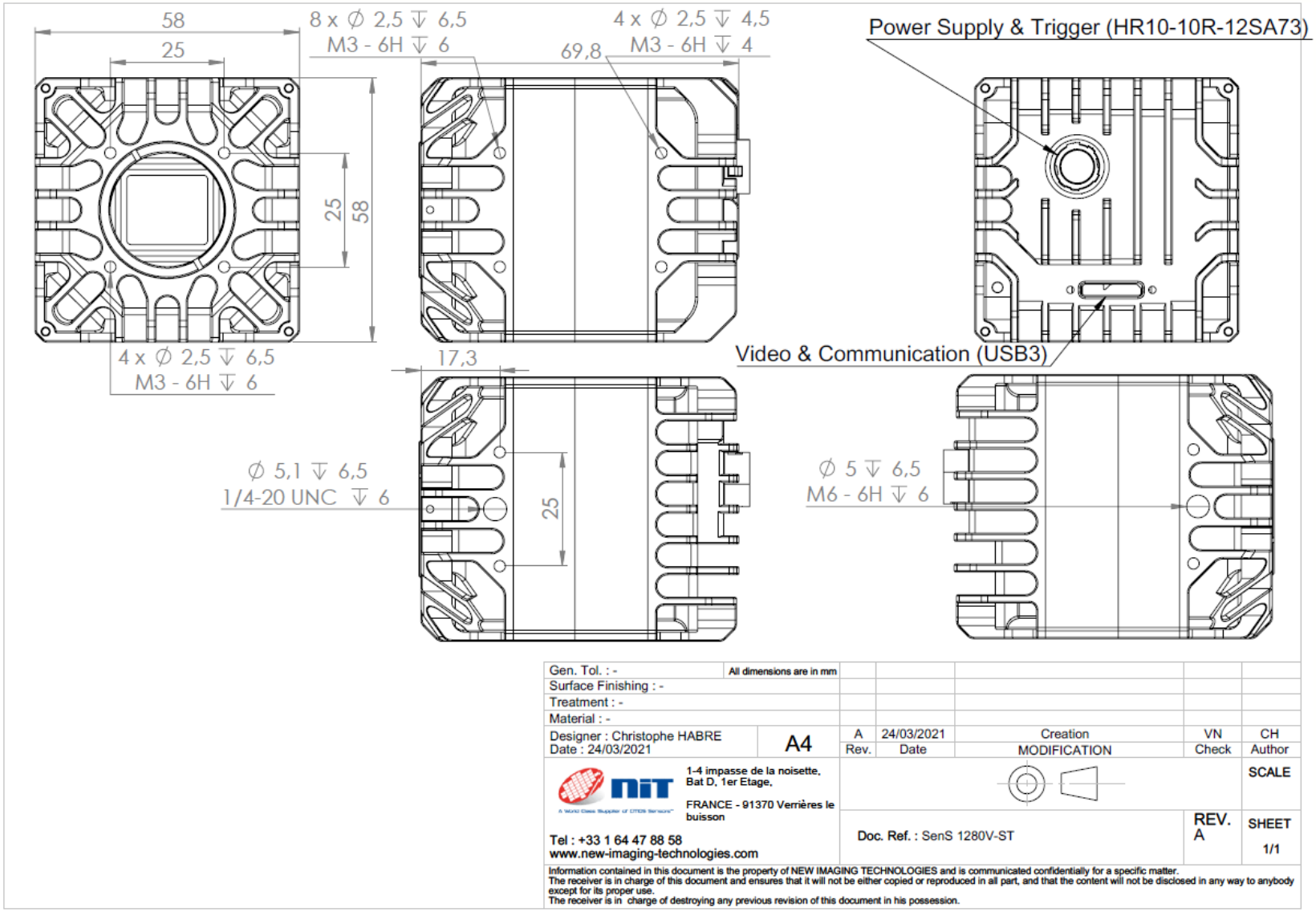
Consumption	<3.3 W TECless
	8 W TEC depending on heatsink and setting
Dynamic Range	63dB typical in CTIA (LG) 54 dB typical in CTIA (HG) with CDS
Full well capacity (in CTIA)	>215ke- (LG) >13ke- (High Gain)
Exposure time	LG: min 10µs – max 500ms HG: min 10µs - max 100ms (50% well fill) Max depending on sensor temperature setting
Dark current	Typical: 35ke$^-$ /pix/s @20°C
Typical Sensor Noise	HG with CDS: typ 25e$^-$ LG: 150e$^-$
Peak QE	>80% LG

ENVIRONMENT & ACCESSORIES

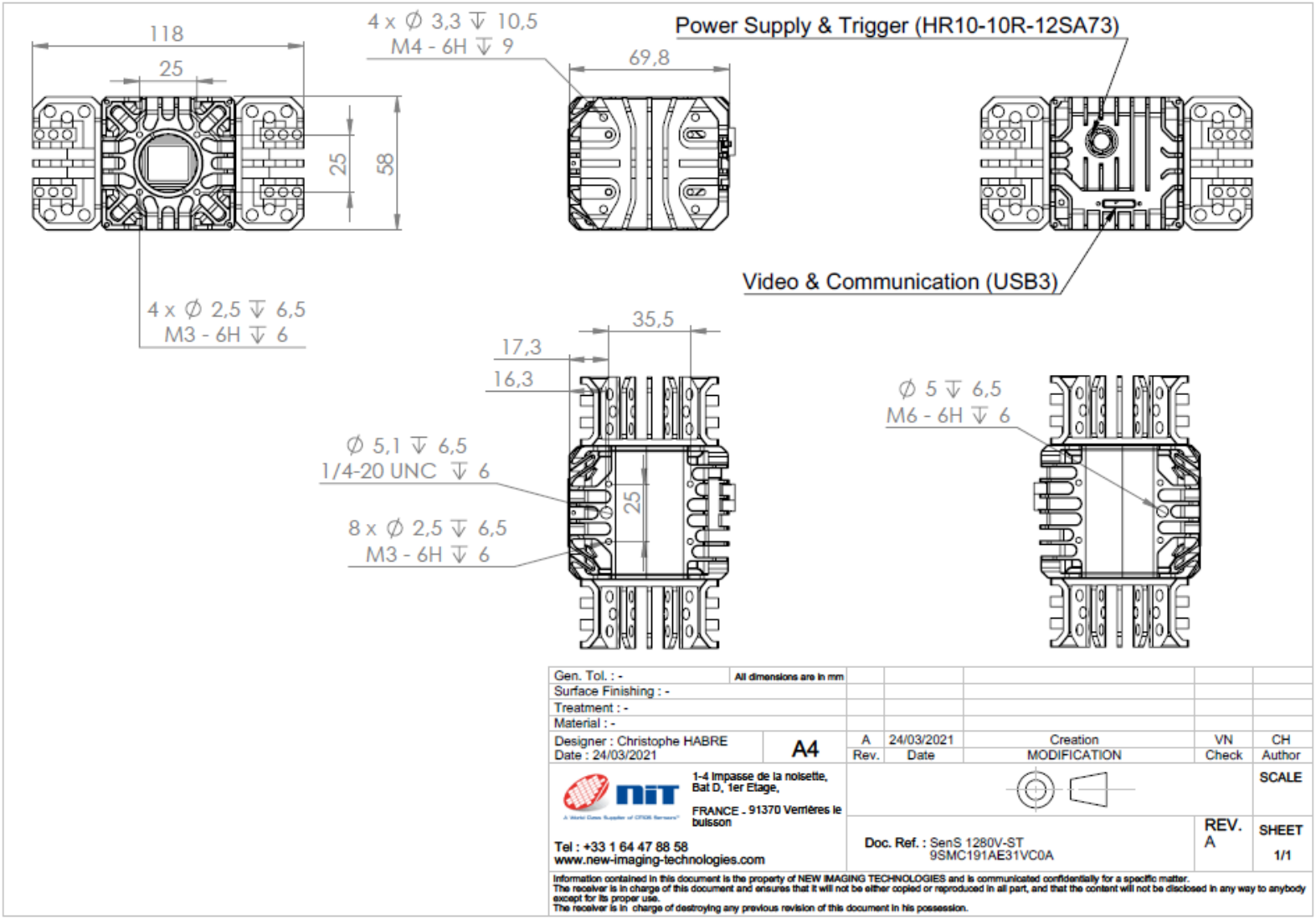
	HeatSink (x2)	USB3 / Micro USB3	SDK & Software	Hirose cable	Power Supply
SenS 1920V-ST	✓	✓	✓	✓	✓

Storage	**-40 to 80˚C**
Operating Temperature	-40 to 71˚C

ANNEXES \ Camera Interface (without heatsinks)



ANNEXES \ Camera Interface (with heatsinks)



NEW IMAGING TECHNOLOGIES

NIT
1 Impasse de la noisette, Bat D- 1er étage, BP426
91370 Verrières Le Buisson Cedex, France
Tel +33(0) 1 64 47 88 58
www.new-imaging-technologies.com
info@new-imaging-technologies.com