STN Series Uncooled MWIR Cameras

1. Uncooled 128x128pixels MWIR Infrared Camera

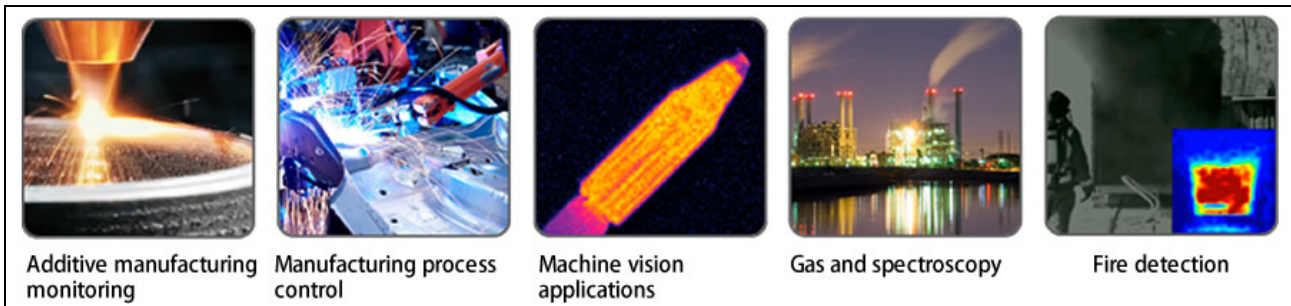

Features
- Uncooled MWIR 128x128 pixels infrared camera with high-speed frame rates up to 4000 frames per second
- Configurable ROI windowing (allows faster frame rates)
- Maximum added value and affordability to ensure a full integration in the industry 4.0 applications
- Multiple industrial applications: machine vision, laser process monitoring, gas detection, QA

Typical Applications
- Additive manufacturing
- Industrial process monitoring
- Machine vision
- Gas and flame detection
- Spectroscopy
- Glass manufacturing quality assurance
- R&D industries
- Automotive industry
- Home appliance manufacturing
- Metallurgy and steel industry
- Petrochemical industry
- Glass manufacturing industry

Additive manufacturing monitoring | Manufacturing process control | Machine vision applications | Gas and spectroscopy | Fire detection

Sintec Optronics

Specifications

- Detector type: VPD PbSe FPA with digital interface, uncooled operation
- Array format: 128x128 (16384 pixels)
- Pixel size: 50x50um (square format)
- Spectral range: MWIR, 1.0μm to 5.0μm
- Peak wavelength of detection: 3.7microns
- Integration time: 10-1000μs, selectable
- Raw data communication, 14 bit
- Interfaces: GigE version2.0 (GenICam compatible) with PoE; Multipurpose DI/DO connector (trigger IN/OUT) (cable sold separately)
- Maximum frame rate: 4000fps
- ROI windowing function
- Mechanical shutter for 1-pt offset correction
- Start-up time: < 10 seconds
- Power supply: PoE, 8 W (non-PoE operation requires 12 VDC)
- Metal housing with rear connectors and tripod screw holes (M3 and M4)
- Dimensions and weight (w/o optics): 66(L)x62(W)x62(H)(mm), 400 grams
- Optics (standard option): f=35 mm, F#1.1, FoV 10.5°x10.5°, AR coating (1-5μm), manual focus with CS-mount interface
- Software included: acquisition and visualization SW; SDK available for custom software programming
- Minimum temperature of detection: 100°C

Part number	STN-16K	STN-16K+
Maximum frame rate	2000 images per second @ 128×128 Allows higher frame rates using embedded ROI windowing functions	4000 images per second @ 128×128 Allows higher frame rates using embedded ROI windowing functions
Windowing modes	128×128 64×64 (center of FPA) 32×32 (center of FPA) 1×128 (center of FPA)	Size and position of the ROI: configurable via SW
Acquisition mode	128×128: Interlaced mode 64×64, 32×32, 1×128: Snapshot acquisition	All modes: Snapshot acquisition
NUC correction tables	Software correction	Hardware correction (4 tables stored)
Data transmission modes	RAW data, 14 bit	Selectable: – RAW data, 14 bit – NUC corrected, 16 bit – High-speed mode RAW/NUC: 12bit
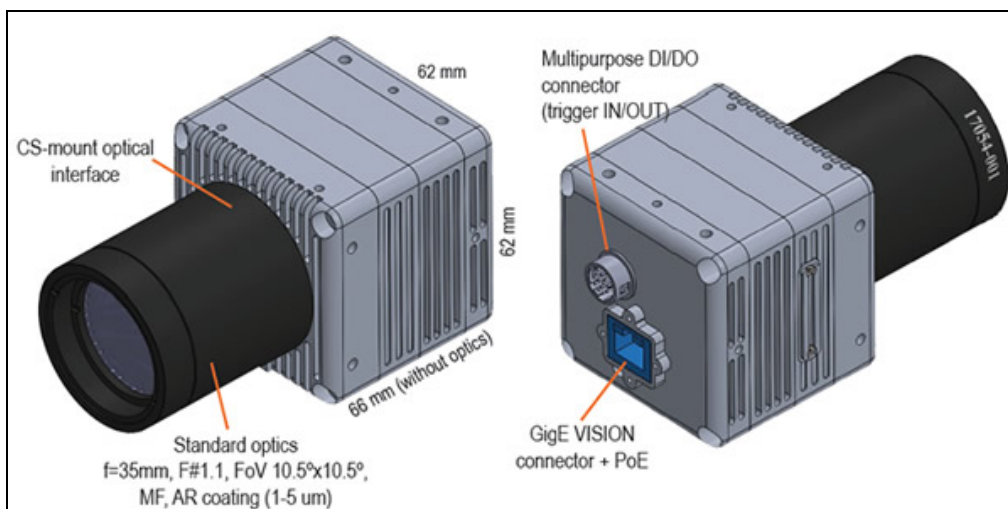
2. Uncooled MWIR(1-5um) Camera

Features
- Uncooled MWIR camera IP67-rated with industrial USB connection and 1 kHz frame rate
- Optimized size and affordable cost to ensure a perfect integration in the production process: priced for cost sensitive machine vision applications!

Applications
- Industrial manufacturing process control (welding, cutting, etc.)
- Industrial automation
- Laser process monitoring
- Gas and fl ame detection
- Machine vision
- OEM integration

Industries
- Automotive industry
- Home appliance manufacturing
- Metallurgy and steel industry
- Glass manufacturing
- Petrochemical industry

Specifications
- Part number: STN-1024
- Miniaturized uncooled infrared MWIR camera for industrial applications
- Band of detection: MWIR (1 - 5 microns)
- Peak wavelength of detection: 3.7 microns
- FPA resolution: 32x32 (1024 pixels)
- Shutter incorporated for 1-pt offset correction
- Integration time: adjustment via software (100 – 500 us)
- Maximum frame rate: 1000 Hz (slower rates are possible)
- Global-shutter (snapshot) image acquisition
- Electrical interface: USB powered, industrial M12 mini-USB connector in the back (optional: connector in the bottom part)
- Communication interface: USB 2.0, high-speed (up to 480 Mbps)
- Data transmission: raw data, 10 bits
- Lens: f=24 mm, F#1.2, FoV 10.2ºx10.2º (IP67-rated)
- Optional lens: f=48 mm, F#1.6, FoV 5.1ºx5.1º (IP67-rated)

- Integrated temperature sensor
- Dimensions (in mm): 98.0 (L) x 49.5 (W) x 61.0 (H) (connector in the back)
- Weight: 250 grams
- Minimum temperature of detection: 100 ºC
- IP67-rated metal housing with CS-mount optics interface
- Water-block and DLC coating for harsh environment
- Software included: NIT SOFTWARE SUITE (Acquisition and visualization SW)
- DLL for custom software development available
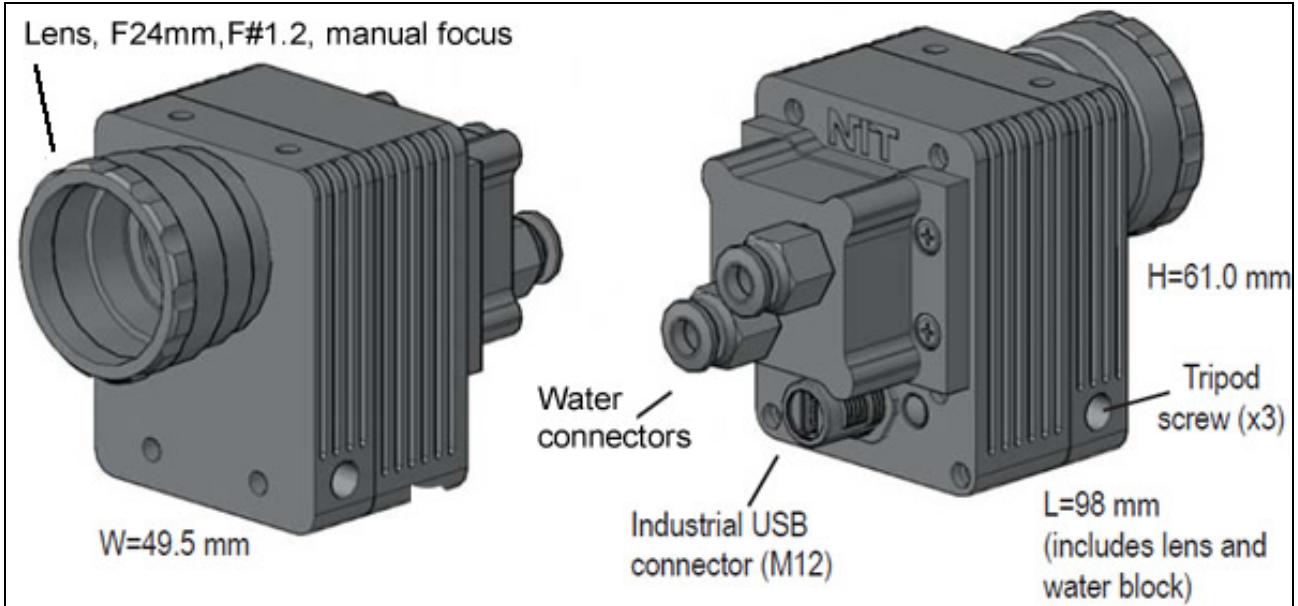
3. Inline Infrared Imaging Monitoring System for industrial Processes (Laser & Arc Welding, LMD/cladding, WAAM, others)


- Inline infrared imaging monitoring system for industrial process monitoring
- Continuous monitoring and measurement of the melt pool and heat-affected-zone (HAZ) geometry
- Ensures quality monitoring
- Allows coaxial integration and off-axis operation
- Standalone operation
- 2-alarm levels configuration, PC data ogging
- Main applications: laser welding, LMD, cladding, WAAM, others

Part number	STN-I3MS
Components	Infrared camera with real-time processing electronics and waterblock connection box, multi I/O cable (3 m), power supply (24 VDC) Software package for system configuration, datalogging and log files analysis

	Infrared emitter for optical calibration
Process compatibility	Laser and arc welding, LMD, cladding, WAAM, others
Mechanical integration	Coaxial & off-axis operation
Laser optics compatibility (coaxial integration)	Transmission of infrared signal (above 1.1 um) from the process area to the optical port is required
Output	Analog signal output (0 VDC - 10 VDC) proportional to width of melt pool / HAZ Configurable span
Dimensions (mm)	Infrared camera: 88 mm x 60 mm x 92 mm Connection box: 124.5x102x28mm
Weight	0.5 kg
Power supply	24 VDC, 6 W; Power supply included
Imaging lens	CaF2, f=50 mm, F#2.25 with manual focus mechanism (other focal lengths available)
Mechanical enclosure (camera)	IP67 rated mechanical enclosure with embedded heatsink Embedded waterblock for air /water cooling
Mechanical interface (front side of optics)	C-mount thread with counter thread for tight adjustment
Field of view Resolution per pixel	Coaxial: dependent on the optical system installed in the laser optics Offaxis: FoV=3.7ºx3.7º (focal length f=50 mm)
Infrared camera	VPD PbSe camera, 64x64 pixels (pixel size: 50 microns) MWIR response (1 -5 um), frame rate 1000 images per second
Communication interface	Gigabit Ethernet (RJ-45)
Software	Acquisition and Configuration SW v.1.0; Visualization SW v.2.1
Minimum requirements	PC with processor i5, RAM memory: 8 GB Hard disk available: 1 GB, O.S.: Windows 10 or later (32/64 bits)
Process monitoring configuration	Selectable configurations: manual, tracks, continuous track length (tracks mode), alarm levels, alarm delay laser ON delay & auto detection
Indicators	Melt pool / HAZ width, Infrared image, laser status, alarm (2 configurable alarm levels)
Other features	Laser ON/OFF digital input (opto-coupled) Monitoring alarm digital output (opto-coupled), process data logging, circular & rectangular region-of-Interest (ROI)
Accessories	3-color light pole indicator

4. Closed Loop Control for Laser Power in LMD/Cladding Processes
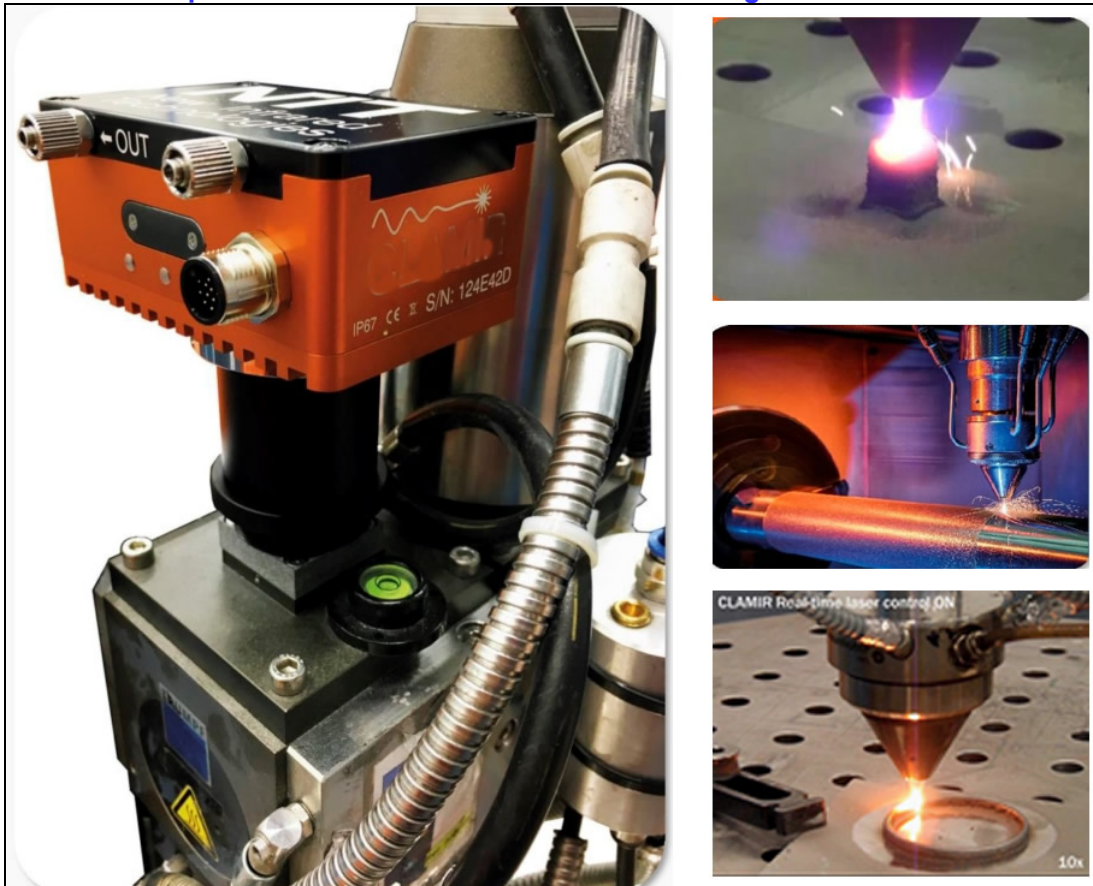
- Continuous monitoring and measurement of the melt pool geometry
- Closed-loop control of the laser power during the complete process, ensuring quality and repeatibility
- Compatible with most of laser optics and powders
- Easy mechanical integration and quick configuration
- Consistent operation, no need of reconfiguration during the process
- Main applications: LMD and cladding

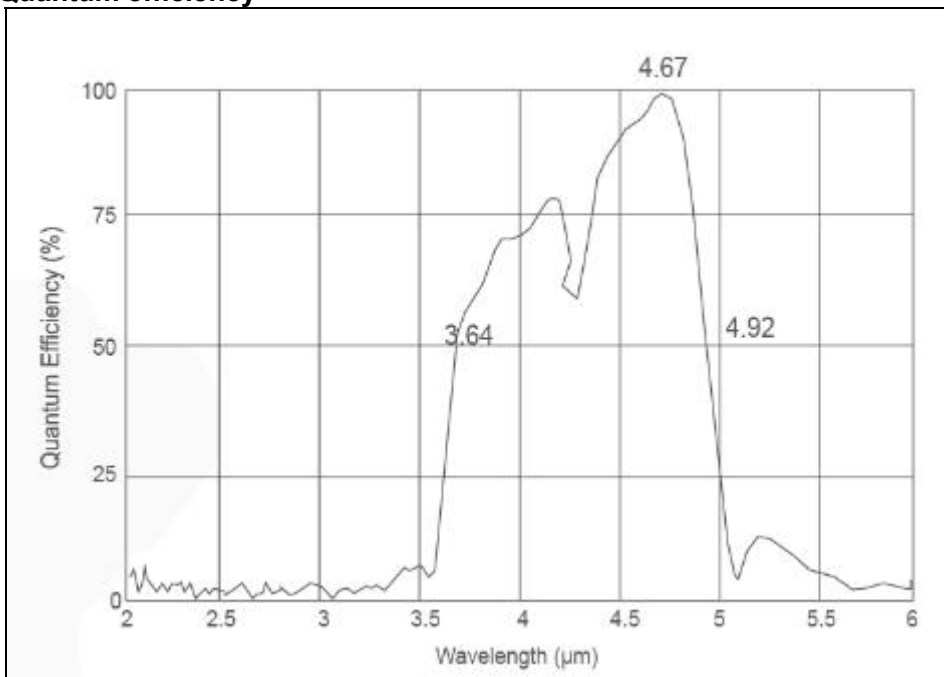| Part number	STN-C
Components	Infrared camera with real-time processing electronics and waterblock connection box, multi I/O cable (3 m), power supply (24 VDC), software package for system configuration, data logging and log files analysis, infrared emitter for optical calibration
Process compatibility	LMD process (Laser Metal Deposition) cladding
Optical compatibility	Transmission of infrared signal (above 1.1 um) from the process area to the optical port is required
Material compatibility	Steel powder, Stainless steel powder, Stellite powder, Inconel, others
Laser power control	Analog signal output for laser power control, 0-10VDC
Dimensions (mm)	Infrared camera: 88x60xmm connection box: 124.5x102x28mm
Weight	0.5 kg
Power supply	24VDC, 6W, power supply included
Imaging lens	CaF2, f=50mm with manual focus mechanism (other focal lengths available)
Mechanical enclosure (camera)	IP67 rated mechanical enclosure with embedded heatsink Embedded waterblock for air /water cooling
Mechanical interface to laser optics	C-mount thread with counter thread for tight adjustment
Field of view Resolution per pixel	Dependent on the optical system installed in the laser head and diameter of the noozle
Infrared camera	VPD PbSe camera, 64x64 pixels (pixel size: 50 microns), MWIR response (1-5 um), frame rate 1000 images per second
Communication interface	Gigabit Ethernet (RJ-45)
Software	Acquisition and configuration SW v.2.0; Visualization SW v.2.1
Minimum requirements	PC with processor i5, RAM memory: 8 GB; Hard disk available: 1 GB, O.S.: Windows 10 or later (32/64 bits)
Process control	Selectable modes: automatic, manual
Process configuration	Selectable process configuration: tracks, continuous, initial laser power, track length (tracks mode) laser ON delay & auto detection, feedback control parameters
Indicators	Melt pool width, laser power, infrared image, laser status
Other features	Laser ON/OFF digital input (opto-coupled); Monitoring alarm digital output (opto-coupled); Process data logging, Circular & rectangular region-of-interest (ROI)

STL Series Cooled MWIR Cameras

STL series MWIR camera is developed with resolution 640x512pixels, wavelength range 3.7~4.8um, standard CL connector, supporting standard analog PAL video and external trigger. The camera is Stirling refrigerator cooled and provides with 14bit and 117Hz output.

Features
1. Digital image detail enhancement (DDE)
2. Low noise
3. 14bit digital signal output
4. High stability, adapt to harsh environment
5. Short delivery time

Quantum efficiency

Comparisons of Images

The pictures on the right are the images with digital image detail enhancement (DDE turned on).

Part number		STL-M640
Imaging	Detector	MCT
	Resolution	640x512
	Wavelength range	3.7~4.8um
	F number	F2
	NETD	18mk
	QE	>70%
	Image cell	15x15um
	Frame rate	117Hz
	ROI	Window for higher frame rate
	Cooling	Striling refrigeration, lifetime 6000h; cooling 5min @ room temp; 8min @60°C
Electrical	External trigger	TTL
	Data port	Standard CL port, PAL
	Data output	Minicamera Link, digital, image AD16bit, ready for 14bit output
	Communication	RS422 series
	Input power	24VDC, 30W@25 °C normal status
Others	Weight	3kg not incl. camera lens
	Dimension	222x117x98mm
	Operation temp.	-40 to +70°C
	Store temp.	-45 to +75 °C