

Specifications

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NT220 Platform Specification Table

(Source Section 5, "Nano THERM Specification." The EZ530 corresponds to the PKG-2 column — see Overview note above.)

Parameter	Base	PKG-1	PKG-2
Transient Response	50 ns LED Pulse Duration (FWHM), 12.5 ns Delay Resolution (all tiers)		
Operating System	SanjCONTROLLER™ with embedded SanjVIEW, for system management, image data acquisition, and data processing/analysis (all tiers)		
Display	32-inch 4K Monitor, Keyboard & Mouse (all tiers)		
Operating Temperature	10 °C to 35 °C	10 °C to 35 °C	10 °C to 35 °C
Power	120V/240V, ~1500W	120V/240V, ~2000W	120V/240V, ~2500W
Rack Size (D x W x H)	36" x 24" x 29"	36" x 24" x 46"	36" x 24" x 46"
Electronics Rack Weight	190 lbs (~90 kg)	210 lbs (~95 kg)	260 lbs (~120 kg)

Selectable SanjSOURCE™ illumination models (as listed in the source; the exact model-to-tier mapping is not made explicit in the source table):

- **NT220-40 / LS310-40:** 365, 470, 530, 780 nm
- **NT220-80 / LS310-80:** 365, 405, 455, 470, 530, 625, 656, 780 nm
- **NT220-44 / LS310-44:** 365, 470, 530, 780, 985, 1064, 1210, 1370 nm

CTR PIEZO Calibration (available as an after-purchase option, AF-100 or AFP-200):

	AF-100	AFP-200
Temperature Range	20 °C to 120 °C ±1% Typ	20 °C to 150 °C ±1% Typ
Leveling Adjustment	±5 Degrees	±2 Degrees
Heating/Cooling Capacity	50 W	500 W
Stage Working Area	40 mm x 40 mm	125 mm x 125 mm

Probe Station (available as an after-purchase option, SPS-400 or GPS-150):

	SPS-400	GPS-150
Chuck	4" Vacuum Chuck	6" Vacuum Chuck
X-Y Travel	100 mm x 100 mm	150 mm x 150 mm
Probes	3 DC Probes	3 DC Probes

Facilities & Power Requirements

(Source Section 2)

- Typical workspace: 8 ft wide x 6 ft deep.
- Allow >12" clearance from the wall for airflow needed for rack cooling.
- EZ530: ~260 lbs (~120 kg).
- VT200 (Vibration Isolation Table): ~507 lbs (~230 kg).
- Internet connection is recommended (remote data access/tool control) but not required for tool operation.
- Compressed Dry Air (CDA) >50 psi is required for the vibration isolation table. A portable air compressor can be used if no facility line is available.
- Vacuum is required to hold the wafer. A portable vacuum pump can be used if no facility vacuum is available.
- Power: ~**2500W, 120V/240V - 20A.**
- Install away from large mechanical equipment or motors to avoid reduced specifications due to vibration.
- Install in as clean an environment as reasonably possible.

Optical Microscope & Illumination

(Source Section 3.1)

The Optical Microscope allows the user to change objectives and use a manual focus knob. Two main adjustments are used routinely: focusing via the frame knobs, and changing objectives on the

nosepiece. The camera adapter can be rotated by loosening threaded screws with the provided blue Allen wrench.

[diagram/image in source — not reproduced here: Figure 1 Microscope Frame & C-Mount Fiber Illumination for LLGVIS8; Figure 2 C-Mount Fiber Illumination for LLGVIS8; Figure 4 Microscope Dimensions; Figure 5 Microscope Views; Figure 6 Camera]

LLGVIS8 / LLGNIR8 fiber illumination specifications:

	LLGVIS8	LLGNIR8
Wavelength Range	340 nm to 800 nm	420 nm to 2000 nm
Numerical Aperture	0.59	0.59
Half Angle	36°	36°
Minimum Bend Radius	60 mm	60 mm
Core Diameter	5 mm	5 mm
Length	8 ft (2.4 m)	8 ft (2.4 m)
Temperature Range (Continuous)	-5 to 35 °C (23 to 95 °F)	-5 to 35 °C (23 to 95 °F)

Cameras

(Source Sections 3.2–3.5)

- **Visible Camera (Optional):** Collects individual pixel data used by SanjVIEW™ . Mounted on top of the microscope to capture images from the lens. Available in 2 Megapixel or 4 Megapixel.
- **Infrared Camera:** Compact longwave infrared (LWIR) thermal camera using FLIR infrared video processing architecture for advanced image processing and industry communication interfaces at low power. 12 μm pitch Vanadium Oxide (VOx) uncooled detector, 640 x 512 resolution. Available with a 2.5x lens or a 0.1–0.5x adjustable lens.
- **Scientific CMOS (sCMOS) Camera (Optional):** Next-generation CMOS sensor design offering extremely low noise, rapid frame rates, wide dynamic range, high quantum efficiency, high resolution, and large field of view.
- **InGaAs Camera:** InGaAs sensor extends sensitivity further into the infrared (900–1700 nm) than classic CCD/CMOS cameras. Supports high frame rates at full resolution, with further frame-rate increases available by selecting a smaller ROI.

Chiller Specifications

(Source Sections 3.10–3.11)

500W Internal Chiller — RMUP-500 (Optional): 6U rack-mount design; $\pm 0.1^{\circ}\text{C}$ temperature stability via PID control; refrigerating power up to 650W; 220V supply; front-mounted water level indicator; water temperature settable between 5°C and 35°C in constant-temperature or intelligent-control mode.

500W External Chiller:

Model	CWUL-10DH	CWUL-10AH
Voltage/Frequency	AC 110V / 60Hz	AC 220V-240V / 50Hz
Current	0.5–9.9A	0.5–7.2A
Cooling Capacity	750W	750W
Max Pump Pressure	1.2 bar	1.2 bar
Max Pump Flow	13 L/min	13 L/min

- Temperature stability: $\pm 0.3^{\circ}\text{C}$.
- Placement: well-ventilated, dry environment, away from heat sources. Keep ≥ 30 cm from the air outlet (rear) and ≥ 10 cm between the two side air inlets and any obstruction.
- Use distilled water only; drain the chiller before extended non-use or transport.
- Liquid replacement: every 3 months under light usage; monthly under heavy usage.
- At the maximum flow rate (13 L/min), image vibration may be visible on high-magnification lenses (especially 100x) — not noticeable at 50x or below. To minimize this, reduce flow with the valve (clockwise reduces flow, counter-clockwise increases flow). **Do not close the flow by turning the valve handle clockwise 90° while the chiller is operating.** Only reduce flow when vibration is observed on a specific lens, and return to full speed for lower-magnification lenses.

Piezo Controller (AF-200)

(Source Section 3.12)

Digital Multi-Channel Piezo Controller with 20 kHz sampling rate and 1 ms cycle time. AF-200 provides 3-axis XYZ positioning with $200 \times 200 \times 200 \mu\text{m}$ travel range and $\pm 2^{\circ}$ tip-tilt adjustment.

ATEC302 Temperature Controller

(Source Section 3.13)

Bi-directional temperature controller/indicator for thermoelectric applications.

- 4 temperature zone control modes: P, PI, PD, PID, Auto Tuning, Open-Loop Control
- High-speed ADC; wide-range T/C, RTD, Thermistor input selectable
- DC power supply: 9–36V or 5V DC
- 2 programmable alarm outputs
- RS232, RS485, and USB communication with GUI software
- Supports complex program scripts for sophisticated temperature profile control

Optical Head Models

(Source Section 5, "Single/Dual TR Mount Optical Heads")

Single TR Mount Optical Heads:

Model	Sensor	Spectral Range	Resolution	FOV	NETD
SMC40-VIS2PK	2MP CMOS	400 nm to 800 nm	59 nm/pixel @100x	2.3 x 1.4 mm @5x	100 mK
SMC40-VIS4PK	4MP CMOS	365 nm to 1050 nm	55 nm/pixel @100x	2.3 x 2.3 mm @5x	250 mK
SMC40-NIRIPK	InGaAs, 630 x 508 pixels	900 nm to 1700 nm	150 nm/pixel @100x	3.8 x 3.0 mm @2.5x	—
SMC40-NIREPK	1MP EMCCD	480 nm to 1060 nm	130 nm/pixel @100x	5.3 x 5.3 mm @2.5x	—

Included VIS Band Objectives: 5x (5SVIS35), 20x (20SVIS22), 100x (100SVIS14). Included NIR Band Objectives: 2.5x (2.55NIR12), 20x (20SNIR12).

Dual TR Mount Optical Heads:

- **SMC40-V4NIPK**: SMC40-VIS4PK plus SMC40-NIRIPK, plus VIS and NIR band objectives.
- **SMC40-V4NEPK**: SMC40-VIS4PK plus SMC40-NIREPK, plus VIS and NIR band objectives.

Additional Accessories and Options

(Source Section 5)

Infrared Sensor:

- **EZIR-LW12PK / EZIR-LW12SPK**: Uncooled VOx LWIR sensor, 640 x 512 pixels, 30 fps (8.6 fps for the -SPK variant), 7.5–13.5 μm spectral range, 10 mK NETD.
- **L05LWIR**: 0.5x lens, 24 μm/pixel resolution, FOV 15.4 mm x 12.3 mm.
- **L25LWIR**: 2.5x lens, 4.8 μm/pixel resolution, FOV 3.1 mm x 2.5 mm.

Other accessories:

- **SA-200 SanjANALYZER-PLUS™**: For advanced post-data processing and analysis.
- **Optional Objectives**: NUV, VIS, or NIR bands, 1x to 100x, with varied Numerical Apertures (NA) and Working Distances (WD).
- **Optional Illumination Sources**: Alternatives to the wavelengths included with LS310-40/-80/-44 are available on inquiry.
- **VT100 Vibration Table**: 30" x 36" (750 mm x 900 mm) area vibration isolation table.
- **VT200 Vibration Table**: 30" x 36" (750 mm x 900 mm) area vibration isolation table with dark box enclosure.

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