

Specifications

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Facility Requirements

Item	Value
Typical workspace	8 ft wide × 6 ft deep
Wall clearance	>12 in, needed for rack cooling air flow
NT220 weight	~260 lbs (~120 kg)
VT200 weight	~507 lbs (~230 kg)
Internet connection	Recommended for remote data access/tool control; not required for operation
Compressed Dry Air (CDA)	>50 psi required for the vibration isolation table (portable compressor acceptable if no facility line)
Vacuum	Required to hold the wafer (portable vacuum pump acceptable if no facility supply)
Power	~2500 W, 120V/240V – 20A

Other recommendations: install away from large mechanical equipment/motors (vibration can degrade specifications); install in as clean an environment as possible to prevent dust/particle contamination of measurements.

NT220 Platform Specification

Parameter	Base	PKG-1	PKG-2
Transient Response	50 ns LED pulse duration (FWHM), 12.5 ns delay resolution	(same)	(same)

Parameter	Base	PKG-1	PKG-2
Operating System	SanjCONTROLLER™ with embedded SanjVIEW (system management, acquisition, processing, analysis)		
Selectable SanjSOURCE™ models	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
Display	30-inch 4K monitor, keyboard & mouse		
Operating temperature	10 °C to 35 °C	10 °C to 35 °C	10 °C to 35 °C
Power	120V/240V, ~1500 W	120V/240V, ~2000 W	120V/240V, ~2500 W
Rack size (D×W×H)	36" × 24" × 29"	36" × 24" × 46"	36" × 24" × 46"
Electronics rack weight	190 lbs (~90 kg)	210 lbs (~95 kg)	260 lbs (~120 kg)

CTR Piezo Calibration (available as an after-purchase option):

Parameter	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 × 40 mm	125 mm × 125 mm

Probe Station (available as an after-purchase option):

Parameter	SPS-400	GPS-150
Chuck	4" vacuum chuck	6" vacuum chuck
X-Y travel	100 mm × 100 mm	150 mm × 150 mm
Probes	3 DC probes	3 DC probes

Optical Microscope / Fiber Illumination (LLGVIS8 / LLGNIR8)

Parameter	LLGVIS8	LLGNIR8
Wavelength range	340 nm to 800 nm	420 nm to 2000 nm

Parameter	LLGVIS8	LLGNIR8
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)

[diagram/image in source – not reproduced here: Figures 1, 2, 4, 5, 6 – microscope frame, C-mount fiber illumination, microscope dimensions/views, camera]

Cameras

- **Visible camera:** 2 megapixel or 4 megapixel; mounted atop the microscope to capture images from the lens.
- **Infrared (LWIR) camera:** compact longwave infrared thermal camera using FLIR infrared video processing architecture; low power consumption. 12 μm pitch Vanadium Oxide (VOx) uncooled detector, 640 × 512 resolution. Available with 2.5x lens or 0.1-0.5x adjustable lens.
- **InGaAs camera:** InGaAs sensor for extended infrared spectral sensitivity, 900–1700 nm, with high sensitivity and high frame rates at full resolution (higher still with a smaller ROI selected).
- **Visible/NIR camera comparison** (Section 10): a visible (monochrome or color) camera captures 400–780 nm to produce human-vision-like high resolution images; a NIR camera captures 780–1400 nm, invisible to the human eye, useful beyond visible light and in low-light conditions.

SanjSOURCE (illumination module)

Nanosecond multi-wavelength light source, auto-selectable, up to eight LED wavelengths: 365, 405, 455, 470, 530, 625, 656, and 780 nm (visible), plus 970, 1050, 1300 nm (near-infrared). Other wavelengths available on request.

Rear-panel connectors:

Connector	Function
A. LED Output	Bias external LEDs — 2.5 A peak pulsed current, 1 A DC

Connector	Function
B. LED Trigger IN	Trigger the light source externally
C. LED Trigger OUT	For external light sources
D. Device Trigger IN (option)	Externally trigger the NT220 system
E. Device Trigger OUT	Trigger external power supplies — 5V into a 50 Ω load. Note: outputs 10V into high impedance and sources 200 mA max into a short circuit

4D Nano Align / Piezo Controller (AF-100)

4D Nano Align houses the power source for the thermal stage's thermo-electric element and the piezo controller. The ATEC302 temperature controller monitors and sets stage temperature manually. Depending on configuration, 4D Nano supports Auto Focus 100 (AF-100) or Auto Focus 200 (AF-200).

Piezo Controller for AF-100: voltage amplifier with closed-loop control and a PC-interfaced display showing actuator position, operating mode, and internal amplifier temperature. AF-100 provides 3-axis XYZ positioning, $100 \times 100 \times 100 \mu\text{m}$ travel range, $\pm 5^\circ$ tip-tilt adjustment. Applications include drift-compensated control of piezo actuators with resistive measurement systems, lab, and industrial use.

600 W Rack Mount Chiller

19" wide, 3U-height, compressor-refrigerant recirculating liquid chiller rated at 600 W (2047 BTU/hr at 25 °C liquid & ambient).

Parameter	Value
Operational temperature range	0–40 °C (ambient and liquid)
Pump	10 manual levels: 3.5 LPM (level 1) to 6.5 LPM (level 10)
Liquid coolant	Koolance 702 (required — see Maintenance)
Power source	100–240 VAC, 50–60 Hz
Maximum operating temperature	40 °C
Minimum operating temperature	–20 °C

ATEC302 Temperature Controller

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 Heads (Single TR Mount)

Note: the source PDF's table extraction interleaved these columns; values below are reconstructed by matching row-position across the four model columns and should be spot-checked against the original PDF figure before external use.

	SMC40-VIS2PK	SMC40-VIS4PK	SMC40-NIRIPK	SMC40-NIREPK
Sensor	2MP CMOS	4MP CMOS	630 × 508 pixels InGaAs	1MP EMCCD
Wavelength range	400 nm to 800 nm	365 nm to 1050 nm	900 nm to 1700 nm	480 nm to 1060 nm
Resolution @100x	59 nm/pixel	55 nm/pixel	150 nm/pixel	130 nm/pixel
Field of View	2.3 × 1.4 mm @5x	2.3 × 2.3 mm @5x	3.8 × 3.0 mm @2.5x	5.3 × 5.3 mm @2.5x
NETD	100 mK	250 mK	— (not stated)	— (not stated)

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

Item	Spec
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EZIR-LW12PK / EZIR-LW12SPK (infrared sensor)	Uncooled VOx LWIR sensor, 640 × 512 pixels, 30 fps, 7.5–13.5 μm spectral range, 10 mK NETD. EZIR-LW12SPK frame rate is 8.6 fps.
L05LWIR	0.5x lens; resolution 24 μm/pixel; FoV 15.4 × 12.3 mm
L25LWIR	2.5x lens; resolution 4.8 μm/pixel; FoV 3.1 × 2.5 mm
SA-200 SanjANALYZER-PLUS™	Advanced post-data processing & analysis
Optional Objectives	NUV, VIS, or NIR bands, 1x to 100x, varied Numerical Apertures (NA) and Working Distances (WD)
Optional Illumination Sources	Wavelengths other than those in LS310-40/-80/-44; inquire with Microsanj
VT100 Vibration Table	30" × 36" (750 × 900 mm) area vibration isolation table
VT200 Vibration Table	30" × 36" (750 × 900 mm) area vibration isolation table with dark box enclosure

Output Module Signal Reference

Signal	I/O	Function
VI EXT (A) — DC voltage in	Input	Used in "Relay" mode for pulsing device. ±60V, 3A maximum
VO EXT (B) — DC voltage in	Output	Modulated output of VI DC input voltage
AUX INT (C) — Aux out	Output	±10V, 500 mA max (not pulsed)
VO INT (D) — Voltage out	Output	Main output, ±10V, 1A maximum. Output when used in "Relay" mode: ±60V, 3A max
VO INT (D), 20 mA Range	Output	500 Ω output impedance, approximately 2 mA/V into low impedance
TRIG (E) — Trigger out (Movie mode only)	Output	Synchronizes external equipment with Movie mode. TTL high-impedance output

Device Biasing / Trigger Connectors (SanjCONTROLLER

Connector	Function
A. VI EXT	Input for fixed DC voltage up to +60V
B. VO EXT	Pulsed output of DC voltage input to VI EXT
C. AUX INT	Up to ±10V DC for secondary DUT bias
D. VO INT	Up to ±10V pulse for DUT pulsed bias
E. TRIG	Internal mode output — 5V TTL pulse to sync external DUT bias supply

[diagram/image in source – not reproduced here: Section 9.2–9.8 timing/biasing diagrams – "Relation to Timing Sequence for Transient Analysis," "Internal Biasing," "External DC Supply," "Triggering an External Source," "Slave Mode," "Transient Timing Signal," "Transient Software with Light Emission"]

Camera / LED Compatibility (NIR mode)

Camera Selection (F1)	Select LED (F3)
VISIBLE	405, 470, 530, 780 nm
NIR	1050, 1100, 1200, 1300 nm