



Extreme-Rugged Waterproof Embedded and GPU Computers

Propel AI Applications into Extreme Environments



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Harnessing AI in the Most Challenging Environments

With the popularity of edge AI deployments in recent years, embedded systems deployed at the edge are usually positioned in harsh environments, such as mining trucks, agricultural machinery, military unmanned vehicles, maritime, waste or food production lines. This means that extremely rugged computing systems are required, capable of providing powerful AI computation for data and image processing while operating stably in high or low temperatures, corrosive environments, water-cleaning situations, or in-vehicle conditions.

Neosys' rugged waterproof series computers are designed specifically for these extreme edge AI applications. With ratings from IP66 to IP69K, these computers feature powerful processing capabilities with advanced thermal management. Enclosed in a reinforced stainless-steel chassis, its M12 connectors can ensure uninterrupted operation in extreme temperatures ranging from -40°C to 70°C.

Evolution Through Innovation



Waterproof & Dustproof

Featuring corrosion-proof stainless steel and aluminum chassis, our computers are built air-tight to withstand moisture, salinity, and other environmental contaminants.



Rugged Designs

Supporting -40°C to 70°C wide-temperature operation and complies with stringent MIL-STD-810H shock and vibration standards to ensure reliable operation.



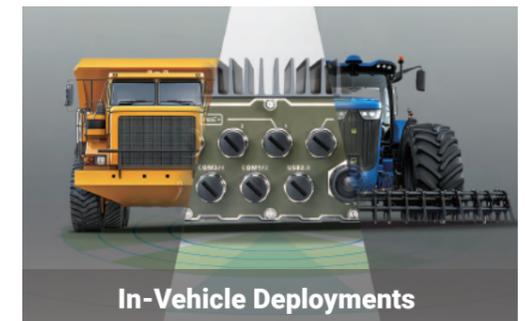
x86/ NVIDIA® Jetson™ Support

Powered by Intel processors or NVIDIA® Jetson™ modules, the systems deliver high-performance AI computation for diverse customer needs.



MIL-STD-461G/ 1275D Compliance

Tested for electromagnetic compatibility (CE102, RE102, RS103) and vehicle power stability, ensuring dependable performance in ground and in-vehicle defense systems.



In-Vehicle Deployments

Equipped with 8V to 48V DC input with built-in ignition power control, RS-232/ 485, CAN bus and mini-PCIe for wireless communication expansion.

Extreme-Rugged Waterproof Embedded and GPU Computers

Neusys waterproof computers are available from IP66 up to IP69K ratings. From AWP series with waterproof functionality, to the rugged SEMIL series, boasting extreme-rugged grade durability. Powered by NVIDIA® Jetson™ system-on-module, Intel processor, or Intel® processor coupled with NVIDIA® GPU, we offer a variety of configurations to meet your needs.

x86-based

NVIDIA® Jetson™ based

IP69K



Half-Rack Rugged Computer SEMIL-2000/ SEMIL-2200

- Intel® 14th/ 13th-Gen Core™
- 2x 10GbE, 1x GbE, 4x 2.5GbE with PoE+ ports
- MIL-STD-461G, MIL-STD-1275D compliant (SEMIL-2200)



19" Rack Mount GPU Computer SEMIL-2000GC/ SEMIL-2200GC

- Intel® 14th/ 13th-Gen Core™
- 2x 10GbE, 1x GbE, 4x 2.5GbE with PoE+ ports
- MIL-STD-461G, MIL-STD-1275D compliant (SEMIL-2200GC)

IP67



Half-Rack Rugged Computer SEMIL-1700

- Intel® 9th/ 8th-Gen Core™
- 8x PoE+ GbE ports

Fanless Embedded Computer POC-766AWP

- Intel® Alder Lake Core™ i3-N305
- 2x 2.5GbE, Isolated COM ports
- MIL-STD-810H compliant



19" Rack Mount GPU Computer SEMIL-1700GC

- Intel® 9th/ 8th-Gen Core™
- 8x PoE+ GbE ports

IP66



Ultra-Compact Computer POC-465AWP

- Intel® Elkhart Lake Atom® x6425E
- 2x 2.5GbE, Isolated COM ports

Rugged Computer Nuvo-9650AWP

- Intel® 14th/ 13th-Gen Core™
- 3x 2.5GbE, 1x GbE with PoE+ ports



Low-Profile AI Computer NRU-161V-AWP/ NRU-162S-AWP

- NVIDIA® Jetson Orin™ NX/ Orin™ Nano
- 6x GMSL2, 4x PoE+ GbE ports

10.1" AI Panel PC NRU-171V-PPC/ NRU-172S-PPC

- NVIDIA® Jetson Orin™ NX/ Orin™ Nano
- 6x GMSL2, 4x PoE+ GbE ports

Rugged AI Computer NRU-230V-AWP/ NRU-240S-AWP

- NVIDIA® Jetson AGX Orin™ / NVIDIA® Jetson AGX Orin™ Industrial
- 8x GMSL2, 1x 10GbE, 4x PoE+ GbE ports

Military/ Defense

Mining/ Construction/ Forestry

Agriculture/ Husbandry

Seaport/ Maritime

Food/ Beverage

Extreme-Rugged

Cost-Effective

Autonomous Mining Truck & Remote Monitoring



The application of edge AI technology allows for autonomous mining vehicles and its effects are threefold: **(1) Safety**, removing human error from the equation; **(2) Operation cost reduction**, capable of fleet management and predictive maintenance, avoiding unexpected failures and downtime; and **(3) Increase efficiency** by introducing autonomous machines that can work 24/7 without fatiguing.

Requirements



IP rating dust, dirt, moisture, vibrations fluctuations



Operate in 50°C plus temperature environments



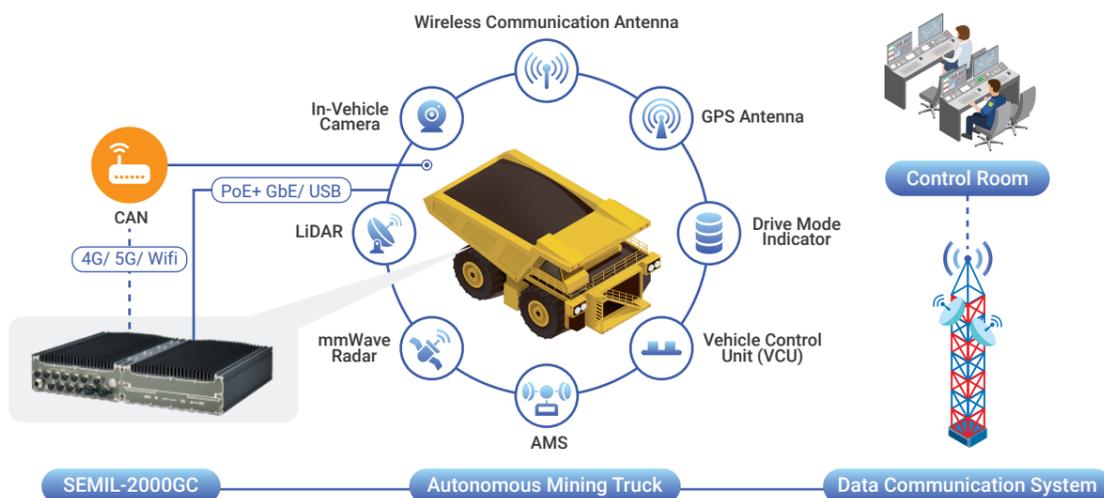
Real-time data processing power



CAN bus and wireless modules for communication

Solution

The computer on the truck must be durable in harsh environments, offer reliable performance, capable of real-time data processing, offer robust connectivity, and provide safety and efficiency through predictive maintenance. By supporting versatile interfaces for cameras, LiDAR, sensors, Radar, GPS network, and CAN bus, the computer ensures seamless communication and remote control functions.



Automation & Autonomous Agriculture Tractor



Farming has greatly improved with the development of heavy equipment, enabling farmers to cover more area and work more efficiently. However, this means **(1) The need for skilled farmworkers** for agricultural knowledge and operate heavy equipment; **(2) Pay attention to farmworker safety** as approximately 33% of farmworkers suffer non-fatal injuries every year; **(3) Lower costs** such as labor, seeds, soil, and **increase productivity** with automated machinery, which holds the most potential for overall productivity gain.

Requirements



Deploy in dusty fields, in rain, or hot sunny days



Withstand shock/ vibration conditions in the vehicle



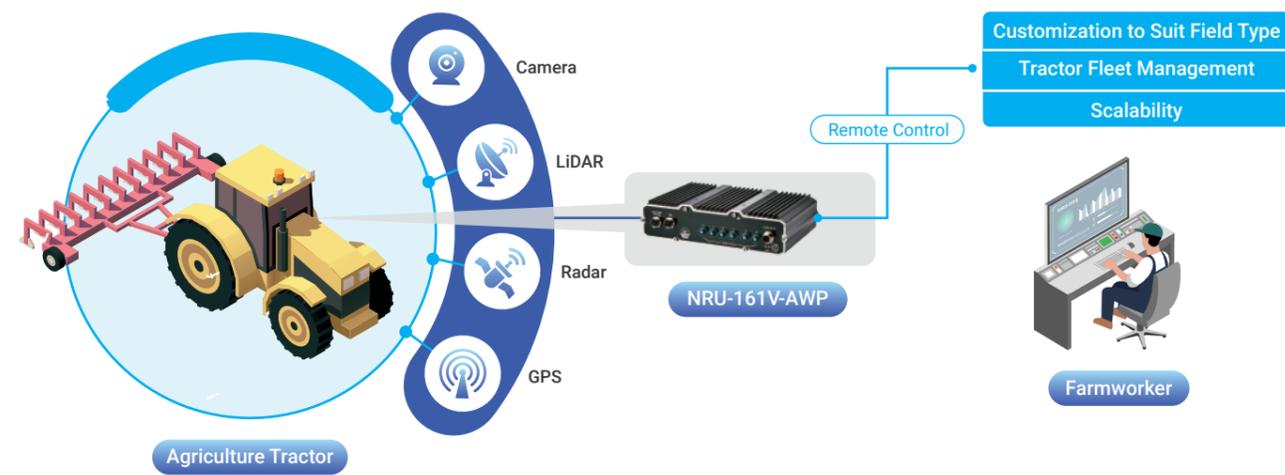
Sufficient camera ports for surround view on a tractor



Robust I/O connectors

Solution

The computer can offer constant connectivity, data collection and durable performance, providing a 360° view of the tractor's surroundings, location, speed and status. It can also provide fleet management, predictive maintenance, remote control, real-time monitoring, and seamless communication. By integrating into an existing farm management system, it can further enhance these capabilities, optimizing operations and improving productivity in agricultural settings.



Product Selection



- SEMIL-2000GC Series**
IP69K Waterproof GPU Computer
- Intel® 14th/13th-Gen Core™ CPU & NVIDIA® L4 GPU
 - 2x 10GbE, 1x GbE, 4x 2.5GbE PoE+ via M12 connectors



- SEMIL-1700GC Series**
IP67 Waterproof GPU Computer
- NVIDIA® RTX™ 2000 Ada/ L4 GPU
 - Up to 8x PoE+ GbE ports via M12 connectors



- NRU-230V-AWP**
IP66 Waterproof Jetson Computer
- NVIDIA® Jetson AGX Orin™
 - 8x GMSL2, 4x PoE+ GbE, 1x 10GbE ports



- SEMIL-2000 Series**
19"/2 Rack Mount IP69K Waterproof Computer
- Intel® 14th/13th-Gen Core™ CPU
 - -40°C to 70°C fanless operation



- NRU-161V-AWP**
IP66 Waterproof Jetson Computer
- NVIDIA® Jetson Orin™ NX/ Nano
 - 6x GMSL2, 1x CAN FD, 1x RS232 ports



- NRU-171V-PPC**
IP66 10.1" Waterproof Jetson AI Panel PC
- NVIDIA® Jetson Orin™ NX/ Nano
 - 6x GMSL2, 1x CAN FD, 1x RS232 ports

Unmanned Ground Vehicle



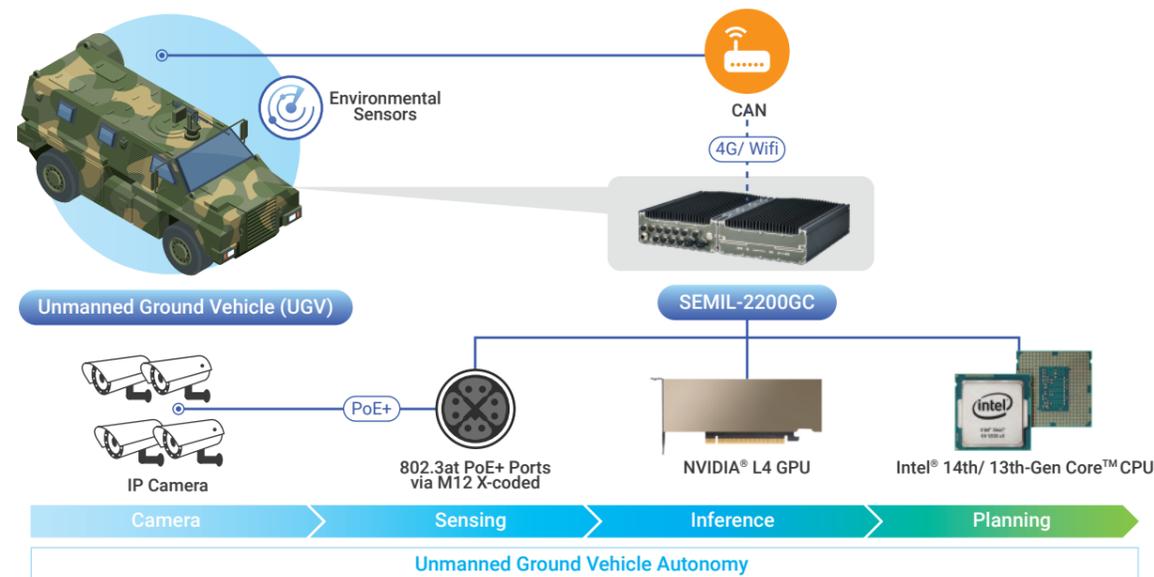
The integration of AI is bringing autonomy to defense applications, particularly in unmanned machines and robots. One of them is unmanned ground vehicles (UGVs) that can function with little to no human intervention in the battlefield or hazardous zone. The objectives are to (1) **Undertake multi-purpose tasks**, such as information gathering, load-carrying or terrain reconnaissance; (2) **Enhance performance and efficiency** with autonomy functions, and (3) **Ensure the safety of soldiers**, minimizing the need for deployment into hazardous zones.

Requirements

-  AI processing for vehicle autonomy
-  Operate in extreme conditions
-  Wide-range DC input for vehicle deployment
-  Optimized SWaP (Size, weight and power)

Solution

The rugged computer integrates environmental sensors and IP cameras connected via PoE ports to collect data and imagery around the vehicle. The GPU enables object detection with AI inference computation, while the CPU handles route planning, achieving autonomy for the UGV. The computer is IP-rated waterproof and MIL-STD certified for extreme environment deployments.



Product Selection



SEMIL-2200GC

Mission Critical GPU Computer

- Intel® 14th/ 13th-Gen Core™ CPU & NVIDIA® L4 GPU
- MIL-STD-461G, MIL-STD-1275D, MIL-STD-810H compliant



NRU-240S-AWP

IP66 Waterproof Jetson Computer

- NVIDIA® Jetson AGX Orin™
- 4x PoE+ GbE, 1x 10GbE via M12 connectors



POC-465AWP

IP66 Waterproof Compact Computer

- Intel® Elkhart Lake Atom® x6425E CPU
- 2x 2.5GbE, USB2.0 ports via M12 connectors

Food Processing Production Line



AI automation is transforming food and waste processing by (1) **Improving efficiency and quality control** while providing (2) **Predictive maintenance and process optimization**. Offering reliable operation in harsh, wet environments, waterproof computers can withstand spills, cleaning, and high humidity, hence reducing downtime and maintenance costs. Most importantly, by enhancing process automation, data accuracy, and compliance with hygiene standards, they also help improve (3) **Product food safety**, making them an indispensable tool for modern food manufacturing.

Requirements

-  Water and corrosion resistance
-  Hygiene and cleanability
-  Real-time AI processing for inspection
-  24/7 operation on the production line

Solution

The AI-powered waterproof computers offer IP66-rated protection, corrosion-resistant housings, wide temperature tolerance, and shock resistance. Equipped with AI and powerful processors, the computer can enable image recognition and machine learning to inspect products on the production line. They enhance real-time quality control and process optimization while ensuring 24/7 reliability in food or waste processing environments.



Product Selection



NRU-172S-PPC

IP66 10.1" Waterproof Jetson AI Panel PC

- NVIDIA® Jetson Orin™ NX/ Nano
- 4x PoE+ GbE via M12 connectors



NRU-162S-AWP

IP66 Waterproof Jetson Computer

- NVIDIA® Jetson Orin™ NX/ Nano
- 4x PoE+ GbE via M12 connectors



Nuvo-9650AWP

Affordable IP66 Waterproof Computer

- Intel® 14th/13th-Gen Core™ CPU
- 3x 2.5GbE, 1x GbE with PoE+ via M12 connectors

Extreme-Rugged Waterproof Embedded Computers



Model Name	SEMIL-2047GC/ SEMIL-2247GC	SEMIL-2007/ SEMIL-2207	SEMIL-1748GC	SEMIL-1704	POC-766AWP
Chassis					
Dimensions (W x D x H)	440 x 310 x 90.5 mm	220 x 310 x 90.5 mm	440 x 310 x 90.5 mm	220 x 310 x 90.5 mm	161.5 mm x 169 mm x 52.7 mm
Weight	12 kg (SEMIL-2047GC) 12.2 kg (SEMIL-2247GC)	6 kg (SEMIL-2007) 6.2 kg (SEMIL-2207)	12.2 kg	5.8 kg	1.8 kg
Chassis Construction	Aluminum alloy with stainless steel/ waterproof	Aluminum alloy with stainless steel/ waterproof	Aluminum alloy with stainless steel/ waterproof	Aluminum alloy with stainless steel	Aluminum alloy with stainless steel
IP Rating	IP69K	IP69K	IP67	IP67	IP67
System					
Processor	Intel® 14th-Gen Core™ CPU Intel® 13th-Gen Core™ CPU Intel® 12th-Gen Core™, Pentium®, Celeron® CPU	Intel® 14th-Gen Core™ CPU Intel® 13th-Gen Core™ CPU Intel® 12th-Gen Core™, Pentium®, Celeron® CPU	Intel® Xeon® E-2176G/ E-2278GE/ E-2278GEL Intel® Core™ i7-9700E/ i7-9700T/ i7-8700/ i7-8700T Intel® Core™ i5-9500E/ i5-9500T/ i5-8500/ i5-8500T Intel® Core™ i3-9100E/ i3-9100T/ i3-8100/ i3-8100T	Intel® Xeon® E-2176G/ E-2278GE/ E-2278GEL Intel® Core™ i7-9700E/ i7-9700T/ i7-8700/ i7-8700T Intel® Core™ i5-9500E/ i5-9500T/ i5-8500/ i5-8500T Intel® Core™ i3-9100E/ i3-9100T/ i3-8100/ i3-8100T	Intel® Alder Lake Core™ i3-N305
Acceleration GPU	NVIDIA® L4	-	NVIDIA® L4	-	-
Chipset	Intel® Q670E (SEMIL-2047GC) Intel® R680E (SEMIL-2247GC)	Intel® Q670E (SEMIL-2007) Intel® R680E (SEMIL-2207)	Intel® C246	Intel® C246	-
Graphics	Intel® UHD Graphics 770	Intel® UHD Graphics 770	Intel® UHD Graphics 630	Intel® UHD Graphics 630	Intel® UHD Graphics
Memory	Up to 64 GB DDR5 4800	Up to 64 GB DDR5 4800	Up to 64 GB DDR4-2666/ 2400	Up to 64 GB DDR4-2666/ 2400	Up to 16 GB DDR5-4800
I/O Interface					
Ethernet	4x 2.5GbE IEEE 802.3at (25.5W) by Intel® I226-IT (M12 X-coded) 1x GbE by Intel® I219-LM (M12 X-coded)	4x 2.5GbE IEEE 802.3at (25.5W) by Intel® I226-IT (M12 X-coded) 1x GbE by Intel® I219-LM (M12 X-coded)	1x IEEE 802.3at (25.5W) by Intel® I219 (M12 X-coded) 7x IEEE 802.3at (25.5W) by Intel® I210 (M12 X-coded)	1x IEEE 802.3at (25.5W) by Intel® I219 (M12 X-coded) 3x IEEE 802.3at (25.5W) by Intel® I210 (M12 X-coded)	2x 2.5GbE by Intel® I226-IT (M12 X-coded)
10GbE Port	2x 10GbE by X550-AT2 (M12 X-coded)	2x 10GbE by X550-AT2 (M12 X-coded)	Optional 1x 10G port (M12 X-coded)	Optional 1x 10G port (M12 X-coded)	-
CAN bus	2x isolated CAN bus 2.0 port	2x isolated CAN bus 2.0 port	-	-	2x isolated CAN 2.0 port
Video Port	2x Type-C USB supporting DP	2x Type-C USB supporting DP	1x VGA (M12 A-coded)	1x VGA (M12 A-coded)	1x HDMI™
Serial Port	2x 3-wire RS-232 ports 1x 3-wire RS-232 ports 1x RS-422/485	2x 3-wire RS-232 ports 1x 3-wire RS-232 ports 1x RS-422/485	2x RS-232 ports (M12 A-coded)	2x RS-232 ports (M12 A-coded)	1x isolated RS-232 port and 1x isolated RS-422/485 ports (M12 A-coded)
USB 2.0	2x USB 2.0 (M12 A-coded)	2x USB 2.0 (M12 A-coded)	4x USB 2.0 (M12 A-coded) 1x USB 2.0 (internal)	2x USB 2.0 (M12 A-coded) 1x USB 2.0 (internal)	-
USB 3.2/ USB 3.1	2x Type-C USB 3.2 Gen1	2x Type-C USB 3.2 Gen1	-	-	2x Type-A USB 3.2 Gen1
Audio	-	-	1x mic-in and speaker-out (M12 A-coded)	-	-
Digital I/O	-	-	-	-	1-CH isolated DI and 2-CH isolated DO via M12 A-coded, 8-pin
Storage Interface					
SATA HDD	2x 2.5 HDD/SSD	2x 2.5 HDD/SSD	2x 2.5 HDD/SSD	2x 2.5 HDD/SSD	-
mSATA	2	2	2	2	-
M.2 (M-key)	1(Gen4 x4)	1(Gen4 x4)	1(Gen3 x4)	1(Gen3 x4)	1(Gen3 x4)
Mini PCI-E	3	3	4 (mux with mSATA)	25 (mux with mSATA)	1
Expansion					
M.2 (B-key/ E-Key)	1x M.2 B-key 1x M.2 E-key	1x M.2 B-key 1x M.2 E-key	-	-	-
SIM	5	5	2	2	1
MezIO®	-	-	-	-	-
PCI/PCI Express	1x PCIe with NVIDIA® L4 pre-installed	-	1x PCIe with NVIDIA® L4 pre-installed	-	-
Power Supply					
DC Input	8V to 48V DC input via M12 L-coded (SEMIL-2047GC) 9V to 36V DC input M12 L-coded (SEMIL-2247GC)	8V to 48V DC input via M12 L-coded (SEMIL-2007) 9V to 36V DC input M12 L-coded (SEMIL-2207)	8V to 48V DC input via M12 S-coded	8V to 48V DC input via M12 S-coded	8V to 35V DC input via M12 A-coded
Ignition Control	Built-in	Built-in	Built-in	Built-in	Built-in
Environmental					
Operating Temperature	with 35W CPU -40°C to 70°C with >= 65W CPU -40°C to 70°C (configured as 35W TDP mode) -40°C to 60°C (configured as 65W TDP mode)	with 35W CPU -40°C to 70°C with >= 65W CPU -40°C to 70°C (configured as 35W TDP mode) -40°C to 60°C (configured as 65W TDP mode)	with 35W CPU -40°C to 70°C with >= 65W CPU -25°C to 70°C (configured as 35W TDP mode) -25°C to 50°C (configured as 65W TDP mode)	with 35W CPU -40°C to 70°C with >= 65W CPU -40°C to 70°C (configured as 35W TDP mode) -40°C to 50°C (configured as 65W TDP mode)	-25°C to 70°C
Certification	CE/ FCC, MIL-STD-810H, MIL-STD-461G, MIL-STD-1275D (SEMIL-2247GC)	CE/ FCC, MIL-STD-810H, MIL-STD-461G, MIL-STD-1275D (SEMIL-2207)	EN 50155, CE/ FCC, MIL-STD-810G	EN 50155, CE/ FCC, MIL-STD-810G	EN 55032, EN 55035, CE/ FCC, MIL-STD-810H, UL 62368-1

Model Name	Nuvo-9650AWP	POC-465AWP	NRU-230V-AWP/ NRU-240S-AWP	NRU-161V-AWP/ NRU-162S-AWP	NRU-171V-PPC/ NRU-172S-PPC
Chassis					
Dimensions (W x D x H)	225 x 286 x 90 mm	106 x 160 x 79 mm	225 x 195 x 89 mm	225 x 136 x 55 mm	257 x 65 x 176 mm
Weight	5.25 kg	1.45 kg	4.4 kg	3.0 kg	3.8 kg
Chassis Construction	Aluminum alloy with stainless steel	Aluminum alloy with stainless steel	Aluminum alloy with stainless steel	Aluminum alloy with stainless steel	Aluminum alloy with stainless steel
IP Rating	IP66	IP66	IP66	IP66	IP66
System					
Processor	Intel® 14th-Gen Core™ CPU Intel® 13th-Gen Core™ CPU Intel® 12th-Gen Core™, Pentium®, Celeron® CPU	Intel® Atom® x6425E	NVIDIA® Jetson AGX Orin™	NVIDIA® Jetson Orin™ NX/ NVIDIA® Jetson Orin™ Nano	NVIDIA® Jetson Orin™ NX/ NVIDIA® Jetson Orin™ Nano
Acceleration GPU	-	-	-	-	-
Chipset	Intel® H610E	-	-	Intel® C246	-
Graphics	Intel® UHD Graphics 770/ 730	Intel® UHD Graphics	-	Intel® UHD Graphics 630	-
Memory	Up to 96 GB DDR5 4800	Up to 32GB DDR4-3200	32GB/ 64GB LPDDR5 @ 3200 MHz	16GB/ 8GB LPDDR5 @ 3200 MHz 8GB/ 4GB LPDDR5 @ 2133 MHz	16GB/ 8GB LPDDR5 @ 3200 MHz 8GB/ 4GB LPDDR5 @ 2133 MHz
Panel					
Size	-	-	-	-	10.1" screen, AG (Anti-Glare) and AF (Anti-Fingerprint)
Touch	-	-	-	-	Single-finger touch functionality when the screen is wet
I/O Interface					
PoE/ GMSL/ GMSL2	1x GbE by Intel® I219-LM (M12 X-coded) 3x 2.5GbE by Intel® I226-IT (M12 X-coded)	2x 2.5GbE by Intel® I226-IT (M12 X-coded)	4x GbE IEEE 802.3at (25.5W) GbE PoE+ ports 8x GMSL2 ports (NRU-230V-AWP only)	1x GbE Ethernet via M12 X-coded 6x waterproof GMSL2 (NRU-161V-PPC) 4x GbE by Intel® I350-AM4 via M12 X-coded (NRU-162S-PPC)	1x GbE Ethernet via M12 X-coded 6x waterproof GMSL2 (NRU-171V-PPC) 4x GbE by Intel® I350-AM4 via M12 X-coded (NRU-172S-PPC)
10GbE Port	-	-	1x 10GBASE-T via M12 X-coded	-	-
CAN bus	-	-	2x isolated CAN 2.0 port and 1x isolated DI via M12 A-coded	1x CAN FD port via M12 A-coded	1x CAN FD port via M12 A-coded
Video Port	1x VGA 1x DisplayPort in Type-C 1x reserved DisplayPort	1x VGA via M12	1x DisplayPort via USB Type-C	1x VGA (M12 A-coded)	-
Serial Port	1x isolated RS-232/422/485, 1x isolated RS-422/485 via M12 A-coded	1x isolated RS-232 via M12, 1x isolated RS-422/485 via M12	1x isolated RS-485, 1x isolated RS-232 and 1x isolated DO via M12 A-coded	1x RS-232 port via M12 A-coded	1x RS-232 port via M12 A-coded
USB 2.0	3	2 via M12 A-coded	2 via M12 A-coded	2 via M12 A-coded	2 via M12 A-coded
USB 3.2/ USB 3.1	2	-	1x waterproof USB Type-C	1x waterproof USB Type-C	1x waterproof USB Type-C
Audio	-	-	-	-	-
Digital I/O	-	-	1x isolated DI via M12 A-coded 1x isolated DO via M12 A-coded	1x isolated GPS PPS input via M12 A-coded	1x isolated GPS PPS input via M12 A-coded
Storage Interface					
SATA HDD	2x internal SATA port for 2.5" HDD/SSD	-	2x 2.5" SSD	-	-
mSATA	-	-	-	-	-
M.2 (M-key)	1(Gen4 x4)	1	1	1	1
Mini PCI-E	2	1	2	1	1
Expansion					
M.2 (B-key/ E-Key)	1x M.2 B-key	-	1x M.2 B-key	1x M.2 B-key	1x M.2 B-key
SIM	2	1	3	2	2
MezIO®	-	-	-	-	-
PCI/PCI Express	-	-	-	-	-
Power Supply					
DC Input	8V to 48V DC (Nuvo-9650AWP: M12 A-code / Nuvo-9650AWP-PoE: M12 L-coded)	8V to 35V DC input via M12 A-coded	8V to 48V DC via M12 L-coded	8V to 35V DC via M12 A-coded	8V to 35V DC via M12 A-coded
Ignition Control	Built-in	Built-in	Built-in	Built-in	Built-in
Environmental					
Operating Temperature	with 35W CPU -25°C to 70°C with >= 65W CPU -25°C to 70°C (configured as 35W TDP mode) -25°C to 50°C (configured as 65W TDP mode)	-25°C to 70°C	-25°C to 70°C (30W TDP mode, without 10GbE) -25°C to 60°C (30W TDP mode)	-25°C to 70°C (MAXN TDP mode)	-25°C to 60°C (MAXN TDP mode)
Certification	CE/ FCC	CE/ FCC	CE/ FCC	CE/ FCC, EN 50121-3 (NRU-162S-AWP only)	CE/ FCC, EN 50121-3 (NRU-172S-PPC only)