

# NRU-230V-AWP/ NRU-240S-AWP Series

IP66 Waterproof AGX Orin Computer with 8x GMSL2, 4x PoE+ GbE, and 1x 10GbE Ports



## Key Features

- Powered by NVIDIA® Jetson AGX Orin™ SoM
- Powered by NVIDIA® Jetson AGX Orin™ Industrial
- Rugged -25°C to 70°C fanless operation (JAO32/ JAO64)
  - No throttling at 55°C with JAO64 MAXN Mode
- Rugged -40°C to 75°C fanless operation (JAOi)
  - No throttling at 50°C with JAOi MAXN Mode
- IP66 waterproof and dustproof
- Support 8x GMSL2 automotive cameras via FAKRA Z connectors (NRU-230V-AWP)
- 4x PoE+ GbE and 1x 10GBASE-T via M12 X-coded connectors
- 2x isolated CAN 2.0, 1x RS232, and 1x isolated RS485 via M12 A-coded connectors
- 1x system monitoring port by automotive-grade MCU
- 8V to 48V wide-range DC input with built-in ignition power control

## Introduction

NRU-230V-AWP is a rugged, IP66 waterproof NVIDIA® Jetson AGX Orin computer targeting edge AI applications for harsh environments, ranging from roadside, food & chemical factories, mining, construction, agriculture, or harbor. It aims to redefine rugged Edge AI with waterproof features at an affordable cost through its streamlined mechanical design, standardized cable kit, and carefully selected waterproof connectors.

Powered by NVIDIA® Jetson AGX Orin, NRU-230V-AWP offers up to 275 sparse TOPS (INT8) AI inference and can transcode up to twenty-two 1080P video streams simultaneously. To meet versatile camera requirements for vision-based AI applications, NRU-230V-AWP not only offers 4x waterproof M12 PoE+ GbE ports for industrial GigE cameras or IP cameras, but it also provides 8x waterproof GMSL2 FAKRA ports for automotive cameras or industrial stereo cameras. Additionally, the waterproof Type-C connector provides 4K DisplayPort output for ADAS applications involving real-time surround-view awareness. A waterproof 10GbE port is also provided for high-speed data communication.

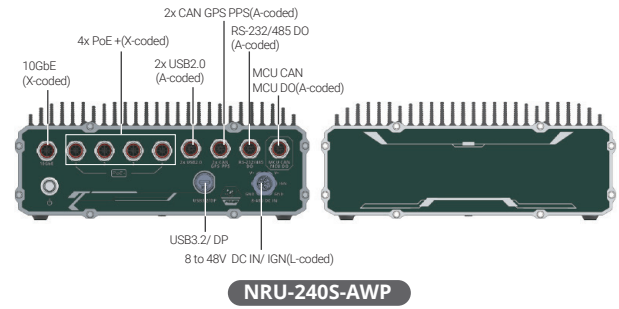
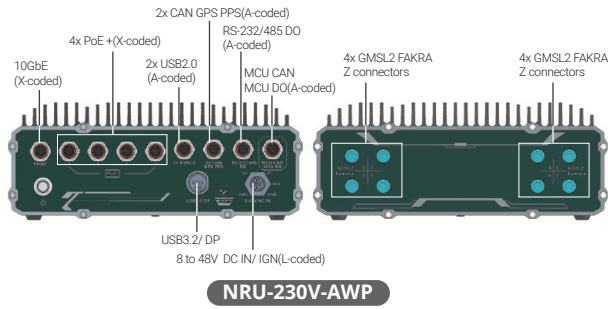
For in-vehicle deployment, NRU-230V-AWP is equipped with an 8V to 48V wide DC input range, ignition power control, 2x isolated CAN bus ports, 1x RS232 port, and 1x isolated RS485 port. It also features two mini-PCIe sockets for CAN/ COM/ WiFi modules and one M.2 B-key socket for 4G LTE/ 5G NR mobile communication module. In terms of storage, NRU-230V-AWP comes with 64GB eMMC on the Orin module and an M.2 2280 NVMe socket for fast SSD read/write speeds, along with two internal 2.5" SSD slots for storage expansion. Lastly, NRU-230V-AWP comes with a system monitoring port to report the latest power, thermal, and Jetson status via an onboard automotive-grade MCU for potential functional safety system design.

The integration of IP66 waterproof capability, AGX Orin AI performance, and rich onboard IO strikes a sweet spot between ruggedness, performance, and cost. It is an ideal waterproof edge AI platform for industrial vehicles, outdoor AMR, edge inspection, and roadside.

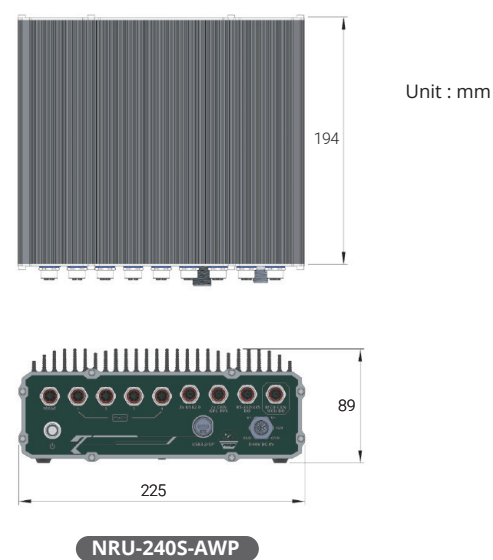
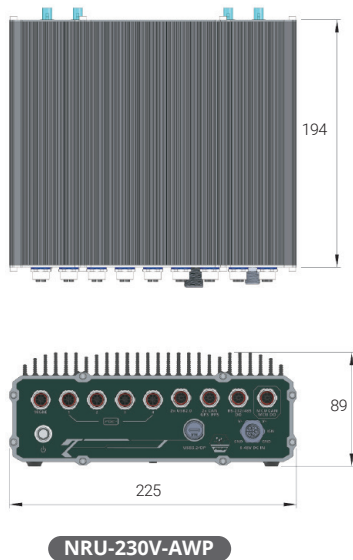
## Specifications

|                        | NRU-230V-AWP |                                                                                                                                                                         | NRU-240S-AWP |                                                                                                                                                                 | NRU-230V-AWP |                                                                                                                         | NRU-240S-AWP |
|------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------|--------------|
| System Core            |              |                                                                                                                                                                         |              | Power Supply                                                                                                                                                    |              |                                                                                                                         |              |
| Processor              |              | NVIDIA® Jetson AGX Orin™ system-on-module (SOM), comprising NVIDIA® Ampere GPU and Arm Cortex-A78AE CPU                                                                 |              | DC Input                                                                                                                                                        |              | 8V to 48V DC input and ignition power control via M12 L-coded, 5-pin connector <sup>[1]</sup>                           |              |
| Memory                 |              | 32GB/ 64GB LPDDR5 (JAO 32GB/ JAO 64GB) @ 3200 MHz on SOM                                                                                                                |              | Mechanical                                                                                                                                                      |              |                                                                                                                         |              |
| eMMC                   |              | 64GB eMMC 5.1 on SOM                                                                                                                                                    |              | Dimension                                                                                                                                                       |              | 225 mm (W) x 194 mm (D) x 88.5 mm (H) (without rubber feet)<br>225 mm (W) x 194 mm (D) x 89.5 mm (H) (with rubber feet) |              |
| Panel I/O Interface    |              |                                                                                                                                                                         |              | Weight                                                                                                                                                          |              | 4.4kg (excluding wall-mount bracket)                                                                                    |              |
| GMSL Camera            |              | 8x GMSL2 FAKRA Z connectors<br>Configuration A. 8x AC-IMX390 (2MP@30FPS)<br>Configuration B. 8x AC-ISX031 (3MP@30FPS)<br>Configuration C. 8x AC-IMX490 (5MP@30FPS)      |              | Mounting                                                                                                                                                        |              | Wall-mount bracket (standard)                                                                                           |              |
| Ethernet Port          |              | Port 1 to Port 4:<br>4x Gigabit Ethernet ports by Intel® I350 via M12 X-coded 8-pin connector<br>Port 5:<br>1x 10 Gigabit Ethernet port via M12 X-coded 8-pin connector |              | Environmental                                                                                                                                                   |              |                                                                                                                         |              |
| PoE Capability         |              | IEEE 802.3at PoE+ PSE for Port 1 to Port 4, 100 W total power budget                                                                                                    |              | Operating Temperature                                                                                                                                           |              | Operating Temperature                                                                                                   |              |
| USB 2.0                |              | 2x USB 2.0 ports via M12 A-coded 8-pin connector                                                                                                                        |              |                                                                                                                                                                 |              | -25°C to 70°C<br>(JAO32 or JAO64 30W TDP mode, without 10GbE transmission and PoE Load) <sup>[2]</sup>                  |              |
| USB 3.2 + Video Port   |              | 1x waterproof USB Type C (USB 3.2 Gen1 and 1x DisplayPort, supporting 3840x2160 at 60Hz)                                                                                |              |                                                                                                                                                                 |              | -25°C to 60°C<br>(JAO32 or JAO64 30W TDP mode, with full function)                                                      |              |
| Serial Port + DO       |              | 1x isolated RS-485, 1x RS-232, and 1x isolated DO via M12 A-coded 8-pin connector                                                                                       |              |                                                                                                                                                                 |              | -40°C to 70°C<br>(JAOi 35W TDP mode, without 10GbE transmission and PoE Load) <sup>[2]</sup>                            |              |
| CAN Bus + DI           |              | 2x isolated CAN 2.0, and 1x isolated DI (GPS PPS input) via M12 A-coded 8-pin connector                                                                                 |              | Operating Temperature                                                                                                                                           |              | -40°C to 60°C<br>(JAOi 35W TDP mode, with full function)                                                                |              |
| System Monitoring      |              | 1x isolated CAN 2.0 port and 1x isolated DO via M12 A-coded 8-pin connector by automotive-grade MCU                                                                     |              | Storage Temperature                                                                                                                                             |              | With full CPU+GPU stressing:                                                                                            |              |
| Internal I/O Interface |              |                                                                                                                                                                         |              |                                                                                                                                                                 |              | 1. NRU-230V-AWP non-throttling at 65C with 30W TDP mode                                                                 |              |
| Mini PCI Express       |              | 1x full-size mini PCI Express socket (PCIe + USB 2.0) for WiFi 6 or CAN<br>1x full-size mini PCI Express socket (USB 2.0) for GNSS or 4G LTE                            |              |                                                                                                                                                                 |              | 2. NRU-230V-AWP non-throttling at 55C with 60W TDP mode (JAO64 MAXN)                                                    |              |
| M.2                    |              | 1x M.2 3042/ 3052 B key (USB 3.1 Gen 1 + USB 2.0) for LTE/ 5G module with dual micro SIM support                                                                        |              |                                                                                                                                                                 |              | 3. NRU-230V-AWP non-throttling at 50C with 75W TDP mode (JAOi MAXN)                                                     |              |
| Internal I/O Interface |              |                                                                                                                                                                         |              | Humidity                                                                                                                                                        |              | -40°C to 85°C                                                                                                           |              |
| SATA HDD               |              | 2x internal SATA ports for 2.5" SSD installation                                                                                                                        |              | Humidity                                                                                                                                                        |              | 10% to 90%, non-condensing                                                                                              |              |
| M.2 NVMe               |              | 1x M.2 2280 M key NVMe socket (PCIe Gen4x2) for NVMe SSD                                                                                                                |              | Vibration                                                                                                                                                       |              | MIL-STD-810H, Method 514.8, Category 4                                                                                  |              |
|                        |              |                                                                                                                                                                         |              | Shock                                                                                                                                                           |              | MIL-STD-810H, Method 516.8, Procedure I                                                                                 |              |
|                        |              |                                                                                                                                                                         |              | EMC                                                                                                                                                             |              | CE/ FCC Class A, according to EN 55032 & EN 55035                                                                       |              |
|                        |              |                                                                                                                                                                         |              | * The maximum current of each pin is 16A.<br>** For sub-zero and over 60°C operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required. |              |                                                                                                                         |              |

## Appearance



## Dimensions



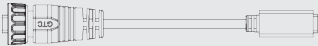
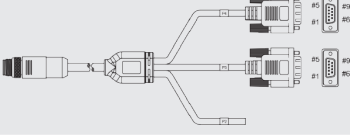
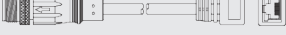
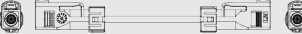
## Ordering Information

| Model No.                 | Product Description                                                                   |
|---------------------------|---------------------------------------------------------------------------------------|
| <b>NRU-230V-AWP-JAO32</b> | IP66 Waterproof Jetson AGX Orin™ (32GB) Computer with 8x GMSL2, 4x PoE+ GbE ports     |
| <b>NRU-230V-AWP-JAO64</b> | IP66 Waterproof Jetson AGX Orin™ (64GB) Computer with 8x GMSL2, 4x PoE+ GbE ports     |
| <b>NRU-230V-AWP-JAOi</b>  | IP66 Waterproof Jetson AGX Orin™ Industrial Computer with 8x GMSL2, 4x PoE+ GbE ports |
| <b>NRU-240S-AWP-JAO32</b> | IP66 Waterproof Jetson AGX Orin™ (32GB) Computer with 4x PoE+ GbE ports               |
| <b>NRU-240S-AWP-JAO64</b> | IP66 Waterproof Jetson AGX Orin™ (64GB) Computer with 4x PoE+ GbE ports               |
| <b>NRU-240S-AWP-JAOi</b>  | IP66 Waterproof Jetson AGX Orin™ Industrial Computer with 4x PoE+ GbE ports           |

## Optional Accessories

|                        |                                                                                                                                                                                    |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PA-160W-OW</b>      | 160W AC-DC power adapter 20V/8A; 18AWG/120cm; cord end terminals for terminal block, operating temperature: -30 to 70°C.                                                           |
| <b>PA-280W-CW6P-2P</b> | 280W AC-DC power adapter 24V 11.67A, 85~264VAC, -30~+70°C w/ Wafer FML6P to 2P End Terminal cable for AWP/ SEMIL                                                                   |
| <b>AC-IMX390-H60</b>   | Sony IMX390 CMOS sensor camera; 1920x1080 @30fps; LFM; HFOV 63.9°; IP67+IP69K; -40°C to 85°C operating temperature; male FAKRA connector; active alignment; without lens cap       |
| <b>AC-IMX390-H120</b>  | Sony IMX390 CMOS sensor camera; 1920x1080 @30fps; LFM; HFOV 120.6°; IP67+IP69K; -40°C to 85°C operating temperature; male FAKRA connector; active alignment; without lens cap      |
| <b>AC-IMX390-H190</b>  | Sony IMX390 CMOS sensor camera; 1920x1080 @30fps; LFM; HFOV 186°; IP67+IP69K; -40°C to 85°C operating temperature; male FAKRA connector; active alignment; without lens cap        |
| <b>AC-ISX031-H60</b>   | Sony ISX031 CMOS sensor w/ built-in ISP; 1920x1536 @30fps, HFOV H63.9°; IP67+IP69K; -40°C to 85°C operating temperature; male FAKRA connector; active alignment; without lens cap  |
| <b>AC-ISX031-H120</b>  | Sony ISX031 CMOS sensor w/ built-in ISP; 1920x1536 @30fps, HFOV H120.6°; IP67+IP69K; -40°C to 85°C operating temperature; male FAKRA connector; active alignment; without lens cap |
| <b>AC-ISX031-H190</b>  | Sony ISX031 CMOS sensor w/ built-in ISP; 1920x1536 @30fps, HFOV H195.9°; IP67+IP69K; -40°C to 85°C operating temperature; male FAKRA connector; active alignment; without lens cap |
| <b>AC-IMX490-H30</b>   | Sony IMX490 CMOS sensor camera; 2880x1860 @30fps; LFM; HFOV 30.0°; IP67+IP69K; -40°C to 85°C operating temperature; male FAKRA connector; active alignment; without lens cap       |
| <b>AC-IMX490-H60</b>   | Sony IMX490 CMOS sensor camera; 2880x1860 @30fps; LFM; HFOV 62.5°; IP67+IP69K; -40°C to 85°C operating temperature; male FAKRA connector; active alignment; without lens cap       |
| <b>AC-IMX490-H120</b>  | Sony IMX490 CMOS sensor camera; 2880x1860 @30fps; LFM; HFOV 120°; IP67+IP69K; -40°C to 85°C operating temperature; male FAKRA connector; active alignment; without lens cap        |

# NRU-230V-AWP/ NRU-240S-AWP

| Type                                                                              | Model Name                  | Description                                                                   |
|-----------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------|
|  | Cbl-TpCPlug-UTpCF-50CM      | Waterproof TypeC Male Plug to USB Type-C FML Cable, Length: 50cm              |
|  | Cbl-M12A8M-2U2TA-180CM1     | Waterproof M12 (8-pole-A-coded) to 2x USB 2.0 type A (female), Length: 180CM  |
|  | Cbl-M12A8M-2DB9M_OW2-180CM1 | Cable 180cm, Waterproof M12 A-Code Male 8P to x2 DB9 Male+2P                  |
|  | Cbl-M12X8M-RJ45F-100CM      | Waterproof M12 (8-pole-X-coded) to RJ45 Female, CAT6A, Length: 100CM          |
|  | Cbl-FAKRA-ZFM-ZFM-12M       | Waterproof FAKRA Z-code Female to Waterproof FAKRA Z-code Female, Length: 12M |

## Cable Kit

| NRU-230V-AWP or NRU-240S-AWP front panel cable kit |                                |                            |
|----------------------------------------------------|--------------------------------|----------------------------|
| Cblkit-FP-NRU-230V-AWP_NRU-240S-AWP                | 1x Cbl-TpCPlug-UTpCF-50CM      | 1x Cbl-M12A8M-2U2TA-180CM1 |
|                                                    | 3x Cbl-M12A8M-2DB9M_OW2-180CM1 | 5x Cbl-M12X8M-RJ45F-100CM  |
| NRU-230V-AWP back panel cable kit                  |                                |                            |
| Cblkit-BP-NRU-230V-AWP                             | 8x Cbl-FAKRA-ZFM-ZFM-12M       |                            |