

NRU-170-PPC Series

IP66 Waterproof 10.1" AI Panel PC Powered by Jetson Orin™ NX/ Nano with 6x GMSL2 or 4x PoE+ GbE Ports



CE FC

NRU-172S-PPC

Key Features

- Powered by NVIDIA® Orin™ NX or Orin™ Nano SoM bundled with JetPack
- IP66 waterproof and dustproof
- 10.1" touchscreen with 1920 x 1200 resolution, 1000 cd/m2 brightness, 1000:1 high contrast ratio
- 25°C to 60°C fanless operation (No throttling at 60°C with MAXN TDP Mode)
- 6x GMSL2 automotive cameras via FAKRA Z connectors (NRU-171V-PPC)
- 4x PoE+ GbE via M12 X-coded connectors (NRU-172S-PPC)
- 1x CAN FD and 1x RS232 via M12 A-coded connectors
- 8V to 35V wide-range DC input with built-in ignition power control

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Introduction

The NRU-170-PPC series is an IP66-rated, 10.1" AI panel PC, powered by NVIDIA® Jetson Orin™ NX or Orin™ Nano, delivering up to 100 TOPS of AI processing capability. This series is tailored for edge AI applications that demand water resistance and human-machine interaction, including ADAS for off-highway vehicles, autonomous marine vessels, AI-driven inspection in food processing, smart livestock management, and precision agriculture.

Leveraging the NVIDIA® Jetson Orin™ NX, the NRU-170-PPC achieves superior AI inference, offering up to 100 sparse TOPS (INT8) and the ability to transcode up to 18 simultaneous 1080P video streams. The series also incorporates waterproof features at a competitive price point, accomplished through a refined mechanical design, the use of carefully selected waterproof connectors, and standardized cable kits. For adaptability in various semi-outdoor environments, the unit is equipped with a 10.1" touch panel boasting 1000 cd/m² brightness and a 1000:1 contrast ratio, with the added functionality of single-finger touch sensitivity in wet conditions.

The NRU-170-PPC series includes two models: the NRU-171V-PPC, supporting up to six GMSL2 automotive cameras with pre-integrated drivers for select cameras utilizing IMX390, ISX031, and IMX490 CMOS sensors; and the NRU-172S-PPC, which offers four PoE+ GbE ports for IP or industrial GigE cameras. Additionally, a waterproof GbE port is provided for interfacing with external computers or LiDAR. The NRU-170-PPC is designed as a compact, all-in-one edge AI platform that simplifies in-vehicle cabling. It supports an 8V to 35V wide-range DC input, ignition power control, a CAN FD bus port, and an RS232 port. Expansion options include a mini-PCIe socket for CAN/ COM/ WiFi modules and an M.2 B-key socket for 4G LTE/ 5G NR communication modules.

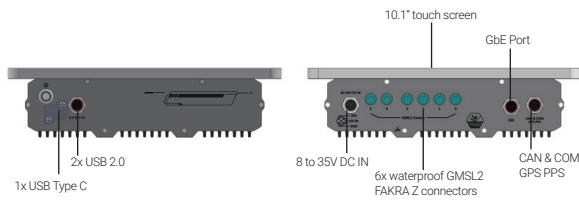
By integrating a 10.1" touch panel, IP66 rating, Orin NX AI performance, and comprehensive onboard camera connectivity, the NRU-170-PPC strikes an optimal balance between ruggedness, performance, cost efficiency, and ease of deployment. It represents a cutting-edge edge AI solution for applications in smart agriculture, mining, construction, smart animal husbandry, edge inspection, and outdoor autonomous mobile robots (AMRs).

Specifications

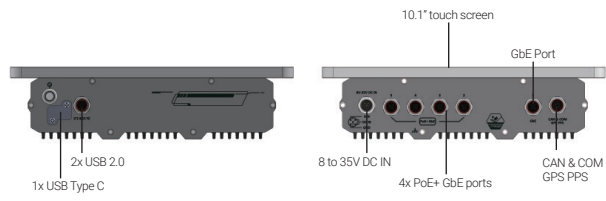
| System Core | | Internal I/O Interface | |
|---------------------|--|------------------------|--|
| Processor | NVIDIA® Jetson Orin™ NX system-on-module (SOM), comprising NVIDIA® Ampere GPU and ARM Cortex CPU | Mini PCI Express | 1x full-size mini PCI Express socket (PCIe + USB 2.0) |
| | NVIDIA® Jetson Orin™ Nano system-on-module (SOM), comprising NVIDIA® Ampere GPU and ARM Cortex CPU | M.2 | 1x M.2 3042/3052 B key (USB 3.2 Gen 1 + USB 2.0) for LTE/5G module with dual micro SIM support |
| Memory | 16GB/ 8GB LPDDR5 @ 3200 MHz on SOM | Storage | |
| eMMC | N/A | M.2 NVMe | 1x M.2 2242 M key socket (PCIe Gen 3x1) for NVMe SSD |
| Touch Panel | | Power Supply | |
| Panel | 10.1" screen with a 1920x1200 resolution, 1000 cd/m ² brightness, and a high 1000:1 contrast ratio | DC Input | 8V to 35V DC input and ignition power control via M12 A-coded, 5-pin connector (IGN/ GND/ V+) ^[1] |
| Touch | Single-finger touch functionality when the screen is wet, with optical bonding, AG (Anti-Glare) and AF (Anti-Fingerprint) glass treatment | Mechanical | |
| Panel I/O Interface | | Dimension | 257 mm (W) x 65 mm (D) x 176 mm (H) |
| GMSL2 | NRU-171V-PPC | Weight | 3.8 kg |
| | 6x waterproof GMSL2 FAKRA Z connectors, supporting multiple configurations: Configuration A. 6x AC-IMX390 (2MP@30FPS) Configuration B. 6x AC-ISX031 (3MP@30FPS) Configuration C. 4x AC-IMX490 (5MP@30FPS) | Mounting | VESA 75 mount (standard) |
| Ethernet Port | NRU-171V-PPC | Environmental | |
| | 1x Gigabit Ethernet port via M12 X-coded 8-pin connector | Operating Temperature | -25°C to 60°C with passive cooling (MAXN TDP mode) ^[2] With full CPU+GPU stressing: NRU-170-PPC non-throttling at 60°C with 25W TDP mode (Orin NX MAXN) |
| PoE+ | NRU-172S-PPC | Storage Temperature | -40°C to 85°C |
| | IEEE 802.3at PoE+ PSE for Port 1 to Port 4 with 50W total power budget | Humidity | 10% to 90%, non-condensing |
| USB | 2x USB 2.0 ports via M12 A-coded 8-pin connector 1x USB Type C port (for system flashing and OTG, under service door) | Vibration | MIL-STD-810H, Method 514.8, Category 4 |
| Serial Port | 1x RS-232 port via M12 A-coded 8-pin connector | Shock | MIL-STD-810H, Method 516.8, Procedure I |
| CAN bus | 1x CAN FD port via M12 A-coded 8-pin connector | EMC | CE/ FCC Class A, according to EN 55032 & EN 55035 EN 50121-3 (EN 50155:2017, Clause 13.4.8) (NRU-172S-PPC only) |
| Isolated DIO | 1x isolated GPS PPS input via M12 A-coded 8-pin connector | | |

[1]The required DC input range is 8V to 35V when the system load is under 60W. The required DC input range is 12V to 35V when the system load is between 60W to 96W. The required DC input range is 20V to 35V when the system load is between 96W to 160W.
[2] For sub-zero and over 60°C operating temperature, a wide temperature HDD or Solid State Disk (SSD) is required.

Appearance

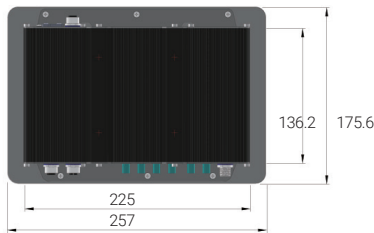


NRU-171V-PPC

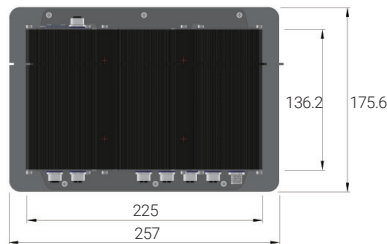


NRU-172S-PPC

Dimensions



NRU-171V-PPC



NRU-172S-PPC

Unit : mm

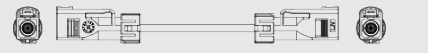
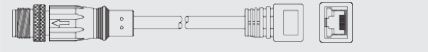

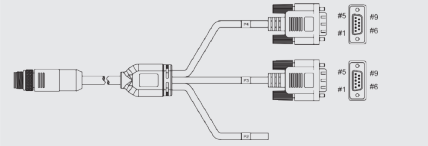
Ordering Information

| Model No. | Product Description |
|-----------------------------|---|
| NRU-171V-PPC | 10.1" AI Panel PC Powered by Jetson Orin™ NX/ Nano with 6x GMSL2 Ports |
| NRU-172S-PPC | 10.1" AI Panel PC Powered by Jetson Orin™ NX/ Nano with 4x PoE+ GbE Ports |
| Jetson Module Option | Options for Different Jetson Orin™ NX and Jetson Orin™ Nano SKUs |
| NVMe Option | Options for Different Capacities of M.2 2242 NVMe Storage |

Optional Accessories

| | |
|-----------------------|--|
| PA-60W-OW | 60W AC/ DC power adapter 12V/ 5A; cord end terminals for terminal block, operating temperature: -30 to 60°C |
| PA-160W-OW | 160W AC/ DC power adapter 20V/ 8A; 18AWG/ 120cm; cord end terminals for terminal block, operating temperature: -30 to 70°C |
| AC-ISX031-H60 | 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 |
| AC-ISX031-H120 | 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 |
| AC-ISX031-H190 | 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 |
| AC-IMX390-H60 | 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 |
| AC-IMX390-H120 | 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 |
| AC-IMX390-H190 | 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 |
| AC-IMX490-H30 | 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 |
| AC-IMX490-H60 | 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 |
| AC-IMX490-H120 | 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-170-PPC Series

| Type | Model Name | Description |
|---|-----------------------------|---|
|  | Cbl-FAKRA-ZFM-ZFM-12M | Waterproof FAKRA Z-code Female to Waterproof FAKRA Z-code Female, Length: 12M |
|  | Cbl-M12X8M-RJ45F-100CM | Waterproof M12 (8-pole-X-coded) to RJ45 Female, CAT6A, Length: 100CM |
|  | 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 | M12 A-Code Male 8P to x2 DB9 Male+2P, Length: 180CM |

Cable Kit

| NRU-170-PPC Series cable kit | | |
|------------------------------|-------------------------------|-------------------------------|
| Cblkit-NRU-171V-PPC | 6xCbl-FAKRA-ZFM-ZFM-12M | 1xCbl-M12X8M-RJ45F-100CM |
| | 1xCbl-M12A8M-2U2TA-180CM1 | 1xCbl-M12A8M-2DB9M_OW2-180CM1 |
| Cblkit-NRU-172S-PPC | 5xCbl-M12X8M-RJ45F-100CM | 1xCbl-M12A8M-2U2TA-180CM1 |
| | 1xCbl-M12A8M-2DB9M_OW2-180CM1 | |