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**TOKNAV**  
[www.toknavgnss.com](http://www.toknavgnss.com)

# GNSS Receiver PRODUCT BROCHURE



- GNSS Receiver Manufacturer
- Professional OEM&ODM
- Over 15 years experience in R&D and manufacturing

# ABOUT US

## Company Introduction

Guangzhou Toksurvey Information Technology Co., Ltd. was founded in 2019 by a team of R&D engineers. The company team has nearly 15 years of R&D background. At present, the company has nearly 2,500 square meters of office and factory, complete set of research equipment and strong technical background.



Our company is committed to the R&D, production and sales of high-precision satellite positioning terminal products. More than 60% of the employees are engineers. Driven by technological innovation, the company maintains a steady growth rate of 60% every year.

At present, the company has successfully launched high-precision GNSS RTK (T5 series, T10 series, T20 series, T30 series, T40 series and T50 series), portable RTK receiver (P8 series), high-precision CORS station (NET660 series), data controller, GNSS antenna, precision agriculture, mechanical control, marking robot, USV and SLAM to the market. We not only provide trainings about our products, but also provide a series of relevant solutions.



TOKNAV

## Our Targets



Make positioning more precise and easier.

**Mission**



Working together to improve global surveying quality.

**Vision**



To become a leader in the global surveying and mapping service.

**Value**



Your reliable supplier in positioning!

**Slogan**

## Fields of Application

TOKNAV products can be widely used in precision surveying & mapping, mining operations, deformation monitoring, autonomous driving and other fields. We currently have a number of mature GNSS application solutions, such as deformation monitoring, CORS network, marking robots, precision agriculture, mechanical control and digital construction field. TOKNAV products have passed CE, FCC, KC, NGS, IGS and other certifications, and are exported to more than 100 countries and regions around the world. Our products are well received in the global market, and now we have become a system integration supplier in the global market.



**Construction**



**Monitoring**



**Mapping & GIS**



**Surveying**



**Agriculture**



**Marine**

## Certifications



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| PRODUCTS              |                           | T5Lite                                                                            | T5                                                                                                                      | T10Pro                                                                                                                                 | T20Pro                                                                                                                                                                 | tBase                                                                               | T30                                                                                 | T30Pro                                                                              |
|-----------------------|---------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| ITEM                  |                           |  |                                       |                                                     |                                                                                     |  |  |  |
| HARDWARE SYSTEM       |                           | ARM Cortex-A7 180Hz                                                               |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
| OS                    |                           | Linux                                                                             |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
| GNSS                  | GPS                       | L1C/A, L1C, L2P(Y), L2C, L5                                                       |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | GLONASS                   | L1, L2, L3                                                                        |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | GALILEO                   | E1, E5a, E5b, E6                                                                  |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | BDS                       | B1I, B2I, B3I, B1C, B2a, B2b                                                      |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | QZSS                      | L1, L2, L5                                                                        |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | SBAS                      | L1                                                                                |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | NavIC (IRNSS)             | L5                                                                                |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Channel                   | 1408                                                                              |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Data format               | NMEA-0183                                                                         |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Correction I / O Protocol | RTCM3.X                                                                           |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
| Data update frequency |                           | 5Hz(max)                                                                          |                                                                                                                         |                                                                                                                                        | 20Hz(max)                                                                                                                                                              |                                                                                     |                                                                                     |                                                                                     |
| SYSTEM                | Bluetooth                 | BR+EDR+BLE                                                                        |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | WIFI                      | 802.11 b/g/n                                                                      |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Network                   | LTE FDD: B1/2/3/5/8<br>GSM: 900/1800MHz                                           | LTE TDD: B38/39/40/41                                                                                                   | LTE FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28<br>LTE TDD: B38/39/40/41 WCDMA: B1/2/4/5/6/8/19 GSM: B2/3/5/8                          |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Data Radio                | Not support                                                                       | Receive Only<br>Frequency: 410~470MHz<br>Protocol: TRIMTALK, TRIMMK3, SOUTH, TRANSEOT<br>Air baud rate: 9600 / 19200bps | Frequency: 410~470MHz<br>Protocol: TRIMTALK, TRIMMK3, SOUTH, TRANSEOT<br>RF transmit power: 0.5W/15W<br>Air baud rate: 9600 / 19200bps | Integrated high-power transceiver.<br>Protocols: TRIMTALK, TRIMMK3, SOUTH, TRANSEOT<br>Frequency Range: 410~470MHz<br>Power: 1W/2W/5W<br>Air Baud Rate: 9600, 19200bps |                                                                                     |                                                                                     |                                                                                     |
|                       | Storage                   | 32GB                                                                              |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Tilt measurement          | IMU60°                                                                            |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Other                     | Not support                                                                       |                                                                                                                         |                                                                                                                                        | NFC                                                                                                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| ELECTRICAL            | Battery                   | 3.7V, 9600mAh                                                                     |                                                                                                                         |                                                                                                                                        | 7.4V, 6500mAh                                                                                                                                                          |                                                                                     | 7.2V, 13800mAh                                                                      |                                                                                     |
|                       | Work time                 | More than 18 hours (Rover)                                                        |                                                                                                                         |                                                                                                                                        | More than 18 hours (Rover)                                                                                                                                             |                                                                                     | More than 12 hours (5W Radio, Base)                                                 |                                                                                     |
|                       | Charge                    | MTK PE+11/2.0 8V/2AU5B PD 12V/1.25A, 5V/3A                                        |                                                                                                                         |                                                                                                                                        | USB PD 15V/2A, 5V/3A                                                                                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| ENVIRONMENTAL         | Work Temperature          | -20~+60                                                                           |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Storage Temperature       | -40~+85                                                                           |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Shock                     | Withstand 1.5M pole drop                                                          |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Protection                | IP65                                                                              |                                                                                                                         |                                                                                                                                        | IP68                                                                                                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| PHYSICAL              | Material                  | Magnesium alloy main body, ABS/PC top cover                                       |                                                                                                                         |                                                                                                                                        |                                                                                                                                                                        |                                                                                     |                                                                                     |                                                                                     |
|                       | Dimension                 | 100.5mm*100.5mm*69mm                                                              | 100.5mm*100.5mm*72mm                                                                                                    | Φ147.9mm*68mm                                                                                                                          | Φ143.5mm*90.7mm                                                                                                                                                        | Φ174.9mm*104.9mm                                                                    |                                                                                     |                                                                                     |
|                       | Weight                    | 600g                                                                              | 630g                                                                                                                    | 740g                                                                                                                                   | 900g                                                                                                                                                                   | 1500g                                                                               |                                                                                     |                                                                                     |

| PRODUCTS        |                           | T40                                                                                                                                                                   | T40Pro                                                                              | T50basic                                                                                                                                                                                  | T50                                                                                 | T50Pro                                                                              |
|-----------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| ITEM            |                           |                                                                                      |  |                                                                                                        |  |  |
| HARDWARE SYSTEM |                           | ARM Cortex-A7 18GHz                                                                                                                                                   |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
| OS              |                           | Linux                                                                                                                                                                 |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
| GNSS            | GPS                       | L1C/A, L1C, L2P(Y), L2C, L5                                                                                                                                           |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | GLONASS                   | L1, L2, L3                                                                                                                                                            |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | GALILEO                   | E1, E5a, E5b, E6                                                                                                                                                      |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | BDS                       | B1I, B2I, B3I, B1C, B2a, B2b                                                                                                                                          |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | QZSS                      | L1, L2, L5                                                                                                                                                            |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | SBAS                      | L1                                                                                                                                                                    |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | NavIC (IRNSS)             | L5                                                                                                                                                                    |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | Channel                   | 1408                                                                                                                                                                  |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | Data format               | NMEA-0183                                                                                                                                                             |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | Correction I / O Protocol | RTCM3.X                                                                                                                                                               |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | Data update frequency     | 20Hz(max)                                                                                                                                                             |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
| SYSTEM          | Bluetooth                 | BR+EDR+BLE                                                                                                                                                            |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | WIFI                      | 802.11 b/g/n                                                                                                                                                          |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | Network                   | LTE FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28<br>LTE TDD: B38/39/40/41    WCDMA: B1/2/4/5/6/8/19    GSM: B2/3/5/8                                                   |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | Data Radio                | Integrated high-power transceiver<br>Protocols: TRIMTALK, TRIMMK3, SOUTH, TRANSEOT<br>Frequency Range: 410-470MHz<br>Power: 1W/2W/5W<br>Air Baud Rate: 9600, 19200bps |                                                                                     | Integrated high-power transceiver<br>Protocols: TRIMTALK, TRIMMK3, SOUTH, TRANSEOT, SATEL, LDRA<br>Frequency Range: 410-470MHz<br>Power: 0.5W/1.5W<br>Air Baud Rate: 4800, 9600, 19200bps |                                                                                     |                                                                                     |
|                 | Storage                   | 64GB                                                                                                                                                                  |                                                                                     | 8GB                                                                                                                                                                                       |                                                                                     |                                                                                     |
|                 | Tilt measurement          | IMU60°                                                                                                                                                                |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | Other                     | NFC, AR Stakeout, Laser Measurement, Laser Camera                                                                                                                     | NFC, AR Stakeout, Photogrammetry                                                    | NFC, AR Stakeout                                                                                                                                                                          | NFC, AR Stakeout, Laser Measurement, Laser Camera                                   | NFC, AR Stakeout, Photogrammetry                                                    |
| ELECTRICAL      | Battery                   | 3.2V/3400mAh *2                                                                                                                                                       |                                                                                     | 7.4V, 6500mAh                                                                                                                                                                             |                                                                                     |                                                                                     |
|                 | Work time                 | More than 20 hours (Rover)                                                                                                                                            |                                                                                     | Over 16 hours (Typical, Rover, GSM)                                                                                                                                                       |                                                                                     |                                                                                     |
|                 | Charge                    | Dedicated charger, 9-24VDC                                                                                                                                            |                                                                                     | USB PD-15V/2A 5V/3A                                                                                                                                                                       |                                                                                     |                                                                                     |
| ENVIRONMENTAL   | Work Temperature          | -20°C~+60°C                                                                                                                                                           |                                                                                     | -30°C~+65°C                                                                                                                                                                               |                                                                                     |                                                                                     |
|                 | Storage Temperature       | -20°C~+70°C                                                                                                                                                           |                                                                                     | -40°C~+85°C                                                                                                                                                                               |                                                                                     |                                                                                     |
|                 | Shock                     | Withstand 15M pole drop                                                                                                                                               |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | Protection                | IP68                                                                                                                                                                  |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
| PHYSICAL        | Material                  | Magnesium alloy main body, ABS/PC top cover                                                                                                                           |                                                                                     |                                                                                                                                                                                           |                                                                                     |                                                                                     |
|                 | Dimension                 | Φ150mm*103mm                                                                                                                                                          |                                                                                     | Φ132 *83mm                                                                                                                                                                                |                                                                                     |                                                                                     |
|                 | Weight                    | 850g(without battery)                                                                                                                                                 |                                                                                     | 770g                                                                                                                                                                                      |                                                                                     |                                                                                     |

| PRODUCTS        |                       | NET660                                                                                                              | NET660i                                                                                                          | NET660i-H                                                                                                    | NET660i-1U                                                                                                       |
|-----------------|-----------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| ITEM            |                       |                                    |                               |                           |                               |
| HARDWARE SYSTEM |                       | ARM Cortex-A7 18GHz                                                                                                 |                                                                                                                  |                                                                                                              |                                                                                                                  |
| OS              |                       | Linux                                                                                                               |                                                                                                                  |                                                                                                              |                                                                                                                  |
| GNSS            | GPS                   | L1C/A, L2P(Y), L2C, L5                                                                                              | L1C/A, L1C, L2P(Y), L2C, L5                                                                                      | L1C/A, L2P, L2C, L5                                                                                          | L1C/A, L1C, L2, L5                                                                                               |
|                 | GLONASS               | L1, L2, L3                                                                                                          |                                                                                                                  | L1, L2                                                                                                       |                                                                                                                  |
|                 | BDS                   | B1I, B2I, B3I, B1C, B2a, B2b                                                                                        |                                                                                                                  | B1I, B2I, B3I, B1C, B2b                                                                                      |                                                                                                                  |
|                 | GALILEO               | E1, E5a, E5b                                                                                                        | E1, E5a, E5b, E6                                                                                                 | E1, E5a, E5b, E6                                                                                             |                                                                                                                  |
|                 | QZSS                  | L1C/A, L2C, L5                                                                                                      | L1, L2, L5                                                                                                       |                                                                                                              | L1, L2, L5, L6(CLAS)                                                                                             |
|                 | SBAS                  | L1C/A                                                                                                               | L1                                                                                                               | L1 C/A                                                                                                       |                                                                                                                  |
|                 | NavIC (IRNSS)         | L5                                                                                                                  |                                                                                                                  | Not support                                                                                                  |                                                                                                                  |
|                 | Channel               | /                                                                                                                   | 1408                                                                                                             |                                                                                                              | 1507                                                                                                             |
|                 | Differential Data     | RTCM 3.X                                                                                                            |                                                                                                                  |                                                                                                              |                                                                                                                  |
|                 | Position Data         | NMEA-0183                                                                                                           |                                                                                                                  |                                                                                                              |                                                                                                                  |
|                 | Frequency             | 1Hz, 2Hz, 5Hz, 10Hz, 20Hz                                                                                           |                                                                                                                  |                                                                                                              | 2Hz, 5Hz (Turn off Integrated Navigation)                                                                        |
|                 | Data format           | RINEX, Custom                                                                                                       |                                                                                                                  |                                                                                                              |                                                                                                                  |
|                 | IMU                   | Not support                                                                                                         |                                                                                                                  |                                                                                                              | Support                                                                                                          |
| SYSTEM          | Serial Port           | Standard RS232 interface with baud rates supporting 9600, 19200, 38400, 115200, and 230400 bps                      |                                                                                                                  |                                                                                                              |                                                                                                                  |
|                 | Network port          | Standard RJ45 interface, 10/100M adaptive                                                                           |                                                                                                                  |                                                                                                              |                                                                                                                  |
|                 | USB                   | Applying Type-C interface, Quick Charge and data transfer supported                                                 | Integrated on the 7-pin interface, support access to the computer to copy data directly                          |                                                                                                              |                                                                                                                  |
|                 | Network Communication | LTE FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: B2/3/5/8 |                                                                                                                  |                                                                                                              |                                                                                                                  |
|                 | Interface             | PWR*1: Power supply port DATA*1 COM*2 SIM*1 PPS*1 Ethernet*1 GNSS*1: Main antenna 4G*1: 4G antenna port             | PWE*1: Power supply port DATA*1 PPS*1 SIM*1: Nano SIM card Ethernet*1 GNSS*1: Main antenna 4G*1: 4G antenna port | PWE*1: Power supply port DATA*1 PPS*1 SIM*1: Nano SIM card Ethernet*1 GNSS*2: TNC port 4G*1: 4G antenna port | PWE*1: Power supply port DATA*1 PPS*1 SIM*1: Nano SIM card Ethernet*1 GNSS*1: Main antenna 4G*1: 4G antenna port |
|                 | Storage               | 32GB storage                                                                                                        |                                                                                                                  |                                                                                                              |                                                                                                                  |
| ENVIRONMENTAL   | Operating Temperature | -20~+60                                                                                                             | -40~+85                                                                                                          |                                                                                                              |                                                                                                                  |
|                 | Storage Temperature   | -20~+70                                                                                                             | -40~+85                                                                                                          |                                                                                                              |                                                                                                                  |
|                 | Protection Class      | IP68                                                                                                                |                                                                                                                  |                                                                                                              |                                                                                                                  |
| PHYSICAL        | Material              | Magnesium alloy main body                                                                                           |                                                                                                                  |                                                                                                              |                                                                                                                  |
|                 | Dimension             | 172*148*58mm                                                                                                        | 148.8*105*50.3mm                                                                                                 |                                                                                                              |                                                                                                                  |
|                 | Weight                | 1920g                                                                                                               | 490g                                                                                                             |                                                                                                              |                                                                                                                  |

## T5Lite GNSS Receiver



T5Lite is a mini portable multifunctional GNSS receiver, a new generation of measurement engine supporting tilt measurement, built-in 4G Modem, Bluetooth and WIFI. It adopts a new appearance design, magnesium alloy structure and Linux operating system. It is an economical and portable geodesic GNSS receiver.

## CHARACTERISTIC

### Linux intelligent system

ARM Cortex-A7 + Linux, the intelligent system platform, brings efficient computing and unlimited expansion of product functions to users.

### Multi constellation

With its 1408 channels, T5 provides an excellent on board real time navigation solution with high accuracy. All GNSS signals (GPS, GLONASS, BDS, GALILEO, QZSS, SBAS and IRNSS) are included.

### Tilt Measurement

T5Lite has the IMU module, Fast initialization and up to 60° inclination.

### Combined antenna

The new four in one antenna integrates GNSS, WIFI, Bluetooth and 4G, with smaller volume and better signal.

### 4G Modem

T5Lite has an internal 4G Modem that operates with more cellular network signals, a fast internet connection is guaranteed.

### Long Endurance

Built in high-capacity lithium battery ensures continuous working time of more than 16 hours under normal operation.

### IP65 Design

Industrial design, solid magnesium alloy shell, in line with IP65 design requirements, safe and reliable.

## SPECIFICATION

| SYSTEM                                                                                                                                                                |                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM                                                                                                                                                       | ARM Cortex-A7 1.8GHz                                                                                                                    |
| OS                                                                                                                                                                    | Linux                                                                                                                                   |
| GNSS                                                                                                                                                                  |                                                                                                                                         |
| GPS                                                                                                                                                                   | L1C/A, L1C, L2P(Y), L2C, L5                                                                                                             |
| GLONASS                                                                                                                                                               | L1, L2, L3                                                                                                                              |
| BDS                                                                                                                                                                   | B1I, B3I, B3II, B1C, B2a, B2b(PPP)                                                                                                      |
| GALILEO                                                                                                                                                               | E1, E5a, E5b, E6(PPP)                                                                                                                   |
| QZSS                                                                                                                                                                  | L1, L2, L5                                                                                                                              |
| SBAS                                                                                                                                                                  | L1(PPP)                                                                                                                                 |
| NavIC (IRNSS)                                                                                                                                                         | L5 (IRNSS support in future)                                                                                                            |
| Channel                                                                                                                                                               | 1408                                                                                                                                    |
| Standard Output                                                                                                                                                       | NMEA-0183                                                                                                                               |
| Correction I/O Protocol                                                                                                                                               | RTCM 3.X                                                                                                                                |
| Frequency                                                                                                                                                             | 5Hz(max)                                                                                                                                |
| Reacquisition Time                                                                                                                                                    | <1s                                                                                                                                     |
| Cold Start Time                                                                                                                                                       | <40s                                                                                                                                    |
| ACCURACY                                                                                                                                                              |                                                                                                                                         |
| SINGLE (RMS)                                                                                                                                                          | Horizontal: 1.5m / Vertical: 2.5m                                                                                                       |
| DGPS (RMS)                                                                                                                                                            | Horizontal: 0.4m / Vertical: 0.8m                                                                                                       |
| RTK (RMS)                                                                                                                                                             | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                                     |
| Timing Precision (RMS)                                                                                                                                                | 20ns                                                                                                                                    |
| Static Mode Precision (RMS)                                                                                                                                           | Horizontal: 2.5mm+1ppm<br>Vertical: 5mm +1ppm                                                                                           |
| Velocity Estimation (RMS)                                                                                                                                             | 0.03m/s                                                                                                                                 |
| Tilt Correction (Within 60°)                                                                                                                                          | ±2cm                                                                                                                                    |
| SYSTEM PLATFORM                                                                                                                                                       |                                                                                                                                         |
| Bluetooth                                                                                                                                                             | BR+EDR+BLE                                                                                                                              |
| WIFI                                                                                                                                                                  | 802.11 b/g/n                                                                                                                            |
| Network                                                                                                                                                               | LTE FDD: B1/2/3/5/8<br>LTE TDD: B38/39/40/41<br>GSM: 900/1800MHz                                                                        |
| Storage                                                                                                                                                               | 32GB Storage                                                                                                                            |
| Equipped with electronic fence system. Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details. |                                                                                                                                         |
| Manufacturer may update parameters at any time, please refer to the latest product information.                                                                       |                                                                                                                                         |
| INDICATOR                                                                                                                                                             |                                                                                                                                         |
| Bluetooth Indicator                                                                                                                                                   | Show Bluetooth status                                                                                                                   |
| Satellite Indicator                                                                                                                                                   | Show position status                                                                                                                    |
| Data link Indicator                                                                                                                                                   | Show differential signal status                                                                                                         |
| Power Indicator                                                                                                                                                       | Show power status                                                                                                                       |
| BATTERY                                                                                                                                                               |                                                                                                                                         |
| Battery                                                                                                                                                               | 3.7V, 9600mAh                                                                                                                           |
| Work time                                                                                                                                                             | More than 16 hours<br>(Typical Rover, GSM)<br>The static working mode supports continuous data collection for 24 hours.                 |
| Charge                                                                                                                                                                | MTK PE+11/2.0 9V/2A<br>USB PD 12V/1.25A 5V/3A<br>(Support fast charging adapter and adaptively and dynamically adjust charging current) |
| ENVIRONMENT                                                                                                                                                           |                                                                                                                                         |
| Work Temperature                                                                                                                                                      | -20°C~+60°C                                                                                                                             |
| Storage Temperature                                                                                                                                                   | -40°C~+85°C                                                                                                                             |
| Shock Resistance                                                                                                                                                      | Can withstand a 1.5m drop at normal temperatures                                                                                        |
| Protection Rating                                                                                                                                                     | IP65                                                                                                                                    |
| PHYSICAL                                                                                                                                                              |                                                                                                                                         |
| Materials                                                                                                                                                             | Magnesium alloy main body, ABS/PC top cover                                                                                             |
| Dimensions                                                                                                                                                            | 100.5mm*100.5mm*68mm                                                                                                                    |
| Weight                                                                                                                                                                | 600g                                                                                                                                    |
| ACCESSORIES                                                                                                                                                           |                                                                                                                                         |
| T5Lite Device                                                                                                                                                         | 1 SET                                                                                                                                   |
| USB power adapter                                                                                                                                                     | 1 PCS                                                                                                                                   |
| USB A To Type-C                                                                                                                                                       | 1 PCS                                                                                                                                   |
| CERTIFICATION                                                                                                                                                         |                                                                                                                                         |
| Regulatory Compliance                                                                                                                                                 | CE, RoHS                                                                                                                                |

## T5 GNSS Receiver



T5 is a mini portable multifunctional GNSS receiver, a new generation of measurement engine, supporting tilt measurement, built-in 4G Modem, radio, Bluetooth and WIFI. It adopts a new appearance design, magnesium alloy structure and Linux operating system. It is an extremely light-weight and portable geodesic GNSS receiver.

## CHARACTERISTIC

### Linux Intelligent System

ARM Cortex-A7 + Linux, the intelligent system platform, brings efficient computing and unlimited expansion of product functions to users.

### Multi Constellation

With its 1408 channels, T5 provides an excellent on board real time navigation solution with high accuracy. All GNSS signals (GPS, GLONASS, BDS, GALILEO, QZSS, SBAS and IRNSS) are included.

### Tilt Measurement

T5 has the IMU module. Fast initialization and up to 60° inclination.

### Combined Antenna

The new four in one antenna integrates GNSS, WIFI, Bluetooth and 4G, with smaller volume and better signal.

### 4G Modem

T5 has an internal 4G Modem that operates with more cellular network signals, a fast internet connection is guaranteed.

### Long Endurance

Built in high-capacity lithium battery ensures continuous working time of more than 16 hours under normal operation.

### IP65 Design

Industrial design, solid magnesium alloy shell, in line with IP65 design requirements, safe and reliable.

## SPECIFICATION

| SYSTEM                       |                                                                      |
|------------------------------|----------------------------------------------------------------------|
| HARDWARE SYSTEM              | ARM Cortex-A7 1.8GHz                                                 |
| OS                           | Linux                                                                |
| GNSS                         |                                                                      |
| GPS                          | L1C/A, L1C, L2P(Y), L2C, L5                                          |
| GLONASS                      | L1, L2, L3                                                           |
| BDS                          | B1I, B2I, B3I, B1C, B2a, B2b(PPP)                                    |
| GALILEO                      | E1, E5a, E5b, E6(PPP)                                                |
| QZSS                         | L1, L2, L5                                                           |
| SBAS                         | L1(PPP)                                                              |
| NavIC (IRNSS)                | L5 (IRNSS support in future)                                         |
| Channel                      | 1408                                                                 |
| Standard Output              | NMEA-0183                                                            |
| Correction I/O Protocol      | RTCM 3.X                                                             |
| Frequency                    | 5Hz(max)                                                             |
| Reacquisition Time           | <1s                                                                  |
| Cold Start Time              | <40s                                                                 |
| ACCURACY                     |                                                                      |
| SINGLE (RMS)                 | Horizontal: 1.5m / Vertical: 2.5m                                    |
| DGPS (RMS)                   | Horizontal: 0.4m / Vertical: 0.8m                                    |
| RTK (RMS)                    | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                  |
| Timing Precision (RMS)       | 20ns                                                                 |
| Static Mode Precision (RMS)  | Horizontal: 2.5mm+1ppm<br>Vertical: 5mm+1ppm                         |
| Velocity Estimation (RMS)    | 0.03m/s                                                              |
| Tilt Correction (Within 60°) | ±2cm                                                                 |
| SYSTEM PLATFORM              |                                                                      |
| Bluetooth                    | BR+EDR+BLE                                                           |
| WIFI                         | 802.11 b/g/n                                                         |
| Network                      | LTE FDD-B1/B2/B3/B5/B8<br>LTE TDD-B38/B39/B40/B41<br>GSM-900/1800MHz |
| Storage                      | 32GB Storage                                                         |

| Data Radio            | Receive-Only<br>Frequency: 410-470MHz<br>Protocol: TRIMTALK, TRIMMK3, SOUTH, TRANSEOT<br>Air baud rate: 9600 / 19200bps                                                              |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INDICATOR             |                                                                                                                                                                                      |
| Bluetooth Indicator   | Show Bluetooth status                                                                                                                                                                |
| Satellite Indicator   | Show position status                                                                                                                                                                 |
| Data link Indicator   | Show differential signal status                                                                                                                                                      |
| Power Indicator       | Show power status                                                                                                                                                                    |
| BATTERY               |                                                                                                                                                                                      |
| Battery               | 3.7V, 9600mAh                                                                                                                                                                        |
| Work time             | More than 16 hours<br>(Typical Rover, GSM)<br>The static working mode supports continuous data collection for 24 hours                                                               |
| Charge                | MTK PE+11/20 9V/2A<br>USB PD 12V/1.25A 5V/3A<br>(Support fast charging adapter and adaptively and dynamically adjust charging current)                                               |
| ENVIRONMENT           |                                                                                                                                                                                      |
| Work Temperature      | -20°C~+60°C                                                                                                                                                                          |
| Storage Temperature   | -40°C~+85°C                                                                                                                                                                          |
| Shock Resistance      | Can withstand a 1.5m drop at normal temperatures                                                                                                                                     |
| Protection Rating     | IP65                                                                                                                                                                                 |
| PHYSICAL              |                                                                                                                                                                                      |
| Materials             | Magnesium alloy main body, ABS/PC top cover                                                                                                                                          |
| Dimensions            | 100.5mm*100.5mm*72mm                                                                                                                                                                 |
| Weight                | 630g                                                                                                                                                                                 |
| ACCESSORIES           |                                                                                                                                                                                      |
| T5 Device             | 1 SET                                                                                                                                                                                |
| USB power adapter     | 1 PCS                                                                                                                                                                                |
| USB A To Type-C       | 1 PCS                                                                                                                                                                                |
| Radio Antenna         | 1 PCS                                                                                                                                                                                |
| CERTIFICATION         |                                                                                                                                                                                      |
| Regulatory Compliance | CE, NGS,   |

Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details.  
Manufacturers may update parameters at any time, please refer to the latest product information.

# T10Pro GNSS Receiver



T10Pro is a latest portable multifunctional GNSS receiver, a new generation of measurement engine, supporting tilt measurement, NFC, built-in 4G Modem, Bluetooth and WIFI. It adopts a new appearance design, magnesium alloy structure and Linux operating system. It is an extremely light-weight, fully functional and portable geodesic GNSS receiver.

## CHARACTERISTIC

### Linux Intelligent System

ARM Cortex-A7 + Linux, the intelligent system platform, brings efficient computing and unlimited expansion of product functions to users.

### Multi Constellation

With its 1408 channels, T10Pro provides an excellent on board real time navigation solution with high accuracy. All GNSS signals (GPS, GLONASS, BDS, GALILEO, QZSS, SBAS and IRNSS) are included.

### Tilt Measurement

T10Pro has the IMU module. Fast initialization and up to 60° inclination.

### Combined Antenna

The new four in one antenna integrates GNSS, WIFI, Bluetooth and 4G, with smaller volume and better signal.

### 4G Modem

T10Pro has an internal 4G Modem that operates with more cellular network signals, a fast internet connection is guaranteed.

### Long Endurance

Built in high-capacity lithium battery ensures continuous working time of more than 16 hours under normal operation.

## SPECIFICATION

| SYSTEM                                 |                                                                                                                         |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM                        | ARM Cortex-A7 1.8GHz                                                                                                    |
| OS                                     | Linux                                                                                                                   |
| GNSS                                   |                                                                                                                         |
| GPS                                    | L1C/A, L1C, L2P(Y), L2C, L5                                                                                             |
| GLONASS                                | L1, L2, L3                                                                                                              |
| BDS                                    | B1I, B2I, B3I, B1C, B2a, B2b(PPP)                                                                                       |
| GALILEO                                | E1, E5a, E5b, E6(PPP)                                                                                                   |
| QZSS                                   | L1, L2, L5                                                                                                              |
| SBAS                                   | L1(PPP)                                                                                                                 |
| NavIC (IRNSS)                          | L5 (IRNSS support in future)                                                                                            |
| Channel                                | 1408                                                                                                                    |
| Data format                            | NMEA-0183                                                                                                               |
| Correction / O Protocol                | RTCM 2.X, RTCM 3.X                                                                                                      |
| Data update frequency                  | 5 Hz (typical) 20 Hz (max.)                                                                                             |
| Recapture Time                         | <1s                                                                                                                     |
| Cold Boot                              | <30s                                                                                                                    |
| POSITIONING ACCURACY                   |                                                                                                                         |
| Single (RMS)                           | Horizontal: 15m / Vertical: 2.5m                                                                                        |
| DGPS (RMS)                             | Horizontal: 0.4m / Vertical: 0.8m                                                                                       |
| RTK (RMS)                              | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                     |
| Time Accuracy (RMS)                    | 20ns                                                                                                                    |
| Static Accuracy (RMS)                  | Horizontal: 0.5mm+0.5ppm<br>Vertical: (5mm+0.5ppm)                                                                      |
| Speed Accuracy (RMS)                   | 0.03m/s                                                                                                                 |
| Tilt compensation Accuracy(within 60°) | ±2cm                                                                                                                    |
| SYSTEM                                 |                                                                                                                         |
| Bluetooth                              | BR+EDR+BLE                                                                                                              |
| WIFI                                   | 802.11 b/g/n                                                                                                            |
| Network                                | LTE FDD: B1/2/3/4/5/7/8/12/13/<br>18/19/20/25/26/28<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: B2/3/5/8 |
| Storage                                | 32GB Almacenamiento                                                                                                     |

| Data Radio                                                                                                                                                                                                                                                                                                                                                                                        | Frecuencia: 410-470MHz<br>Protocolo: TRIMALK, TRIMAK3, SOUTH, TRANSEOT<br>Potencia de transmisión por radiofrecuencia: 0.5W/15W<br>Velocidad en baudios del aire: 9600 / 19200bps |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INDICATOR                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                   |
| Power Indicator                                                                                                                                                                                                                                                                                                                                                                                   | Show power status                                                                                                                                                                 |
| Satellite Indicator                                                                                                                                                                                                                                                                                                                                                                               | Show position status                                                                                                                                                              |
| Data link Indicator                                                                                                                                                                                                                                                                                                                                                                               | Show differential signal status                                                                                                                                                   |
| BATTERY                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                   |
| Battery                                                                                                                                                                                                                                                                                                                                                                                           | 3.7V, 9600mAh                                                                                                                                                                     |
| Work time                                                                                                                                                                                                                                                                                                                                                                                         | More than 16 hours<br>(Typical Rover, GSM)<br>The static working mode supports continuous data collection for 24 hours under full power                                           |
| Charge                                                                                                                                                                                                                                                                                                                                                                                            | MTK-PE-112.0 9V/2A<br>USB PD 12V/1.25A 5V/3A<br>Support fast charging adapter and adaptively and dynamically adjust charging current                                              |
| ENVIRONMENTAL                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                   |
| Work Temperature                                                                                                                                                                                                                                                                                                                                                                                  | -20°C~+60°C                                                                                                                                                                       |
| Storage Temperature                                                                                                                                                                                                                                                                                                                                                                               | -40°C~+85°C                                                                                                                                                                       |
| Shock                                                                                                                                                                                                                                                                                                                                                                                             | Soporta caídas desde postes de 1.5M                                                                                                                                               |
| Protection                                                                                                                                                                                                                                                                                                                                                                                        | IP68                                                                                                                                                                              |
| PHYSICAL                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                   |
| Material                                                                                                                                                                                                                                                                                                                                                                                          | Magnesium alloy main body, ABS/PC top cover                                                                                                                                       |
| Dimension                                                                                                                                                                                                                                                                                                                                                                                         | Ø147.9mm*68mm                                                                                                                                                                     |
| Weight                                                                                                                                                                                                                                                                                                                                                                                            | 740g                                                                                                                                                                              |
| A FULL SET                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                   |
| T10Pro Device                                                                                                                                                                                                                                                                                                                                                                                     | 1 SET                                                                                                                                                                             |
| USB power adapter                                                                                                                                                                                                                                                                                                                                                                                 | 1 PCS                                                                                                                                                                             |
| USB A To Type-C                                                                                                                                                                                                                                                                                                                                                                                   | 1 PCS                                                                                                                                                                             |
| Radio Antenna                                                                                                                                                                                                                                                                                                                                                                                     | 1 PCS                                                                                                                                                                             |
| CERTIFICATION                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                   |
| Cumplimiento normativo: NGS, CE, FCC, KC,     |                                                                                                                                                                                   |

Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details.

Manufacturers may update parameters at any time, please refer to the latest product information.

## T20Pro GNSS Receiver



T20Pro is a high-performance GNSS receiver that provides an easy-to-use solution for users. TOKNAV T20Pro supports the original tilt compensating GNSS solution. Multi constellation and frequency tracking always guarantee a fixed solution for your job. LCD display screen can make your operation faster and easier. T20Pro built-in 5W radio allows users to have a longer working distance, up to 16km in open areas. The durable IP68 design makes it possible to work in extreme environments.

## CHARACTERISTIC

### Linux Intelligent System

ARM Cortex-A7 + Linux, the intelligent system platform, brings efficient computing and unlimited expansion of product functions to users.

### Multi Constellation

With its 1408 channels, T20Pro provides an excellent on board real time navigation solution with high accuracy. All GNSS signals (GPS, GLONASS, BDS, GALILEO, QZSS and SBAS) are included.

### Adjustable Power

T20Pro has internal radio of adjustable power of 1W/2W/5W, and works as base station at 5W power. The transmission distance can reach to maximum 16km when working in the open area.

### Combined Antenna

The new four in one antenna integrates GNSS, WIFI, Bluetooth and 4G, with smaller volume and better signal.

### 4G Modem

T20Pro has an internal 4G Modem that operates with more cellular network signals. A fast internet connection is guaranteed.

### Long Endurance

Built in high-capacity lithium battery ensures continuous working time of more than 18 hours under normal operation.

## SPECIFICATION

| SYSTEM                                                                                                                                                                |                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM                                                                                                                                                       | ARM Cortex-A7 1.8GHz                                                                                                |
| OS                                                                                                                                                                    | Linux                                                                                                               |
| GNSS                                                                                                                                                                  |                                                                                                                     |
| GPS                                                                                                                                                                   | L1 C/A, L1C, L2P(Y), L2C, L5                                                                                        |
| GLONASS                                                                                                                                                               | L1, L2, L3                                                                                                          |
| BDS                                                                                                                                                                   | B1I, B2I, B3I, B1C, B2a, B2b(PPP)                                                                                   |
| GALILEO                                                                                                                                                               | E1, E5a, E5b, E6(PPP)                                                                                               |
| QZSS                                                                                                                                                                  | L1, L2, L5                                                                                                          |
| SBAS                                                                                                                                                                  | L1(PPP)                                                                                                             |
| NavIC (IRNSS)                                                                                                                                                         | L5(Requires firmware support)                                                                                       |
| Channel                                                                                                                                                               | 1408                                                                                                                |
| Standard Output                                                                                                                                                       | NMEA-0183                                                                                                           |
| Correction I/O Protocol                                                                                                                                               | RTCM 3.x                                                                                                            |
| Frequency                                                                                                                                                             | 20Hz(max)                                                                                                           |
| Reacquisition Time                                                                                                                                                    | <1s                                                                                                                 |
| Cold Start Time                                                                                                                                                       | <40s                                                                                                                |
| ACCURACY                                                                                                                                                              |                                                                                                                     |
| SINGLE (RMS)                                                                                                                                                          | Horizontal: 15m / Vertical: 2.5m                                                                                    |
| DGPS (RMS)                                                                                                                                                            | Horizontal: 0.4m / Vertical: 0.8m                                                                                   |
| RTK (RMS)                                                                                                                                                             | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                 |
| Timing Precision (RMS)                                                                                                                                                | 20ns                                                                                                                |
| Static Mode Precision (RMS)                                                                                                                                           | Horizontal: ± (2.5mm+0.5ppm)<br>Vertical: ± (5mm+0.5ppm)                                                            |
| Velocity Estimation (RMS)                                                                                                                                             | 0.03m/s                                                                                                             |
| Tilt Correction (Within 60°)                                                                                                                                          | ±2cm                                                                                                                |
| SYSTEM PLATFORM                                                                                                                                                       |                                                                                                                     |
| Bluetooth                                                                                                                                                             | BR+EDR+BLE                                                                                                          |
| WIFI                                                                                                                                                                  | 802.11 b/g/n                                                                                                        |
| Network                                                                                                                                                               | LTE FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: B2/3/5/8 |
| Radio                                                                                                                                                                 | Frequency: 410-470MHz<br>Protocols: TRIMTALK, TRIMMK3, SOUTH, TRANSEOT                                              |
| Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details. |                                                                                                                     |
| Manufacturers may update parameters at any time, please refer to the latest product information.                                                                      |                                                                                                                     |

Radio RF transmit power: 1W/2W/5W  
Air Baud Rate: 9600, 19200bps

Storage 32GB storage

### DISPLAY

LCD Screen size: 3.3inch  
Display mode: TFT  
Display format: 240\*RGB\*240  
View Angle: FULL

### BATTERY

Battery 7.4V, 6500mAh  
Work time More than 18 hours (Typical, Rover, GSM)  
The static working mode supports continuous data collection for 26 hours

Charge USB PD 15V/2A  
5V/3A  
(Support fast charging adapter and adaptively and dynamically adjust charging current)

### ENVIRONMENT

Work Temperature -20°C~+60°C  
Storage Temperature -40°C~+85°C  
Shock Withstand a 15m pole drop  
Protection IP68

### PHYSICAL

Materials Magnesium alloy casing with ABS/PC plastic top cover  
Dimensions 61x43.5\*30.7mm  
Weight 900g

### ACCESSORIES

T20Pro 1 Unit  
USB power adapter 1 PCS  
Type-C To Type-C 1 PCS  
Radio Antenna 1 PCS

### CERTIFICATION

Regulatory Compliance NGS, CE, FCC  
CE, FCC

## tBase GNSS Receiver



tBase is designed and developed specifically for professional base station applications. It features a high-precision positioning module, supporting full-system, multi-frequency satellite signal tracking. Equipped with 4G, Bluetooth, WiFi, a 5W radio, and a large-capacity battery, it meets the demands for concurrent data links at base stations and alleviates the endurance concerns typical of built-in radio work modes, making measurements more convenient and efficient.

## CHARACTERISTIC

### Linux Intelligent System

ARM Cortex-A7+Linux, the intelligent system platform, brings efficient computing and unlimited expansion of product functions to users.

### Full System GNSS Reception

The receiver integrates a high-precision positioning module, utilizing 1408 channels to support a comprehensive range of signals including BDS B1I/B2I/B3I/B1C/B2a/B2b(PPP), GPS L1/L2/L5, GLONASS L1/L2/L3, Galileo E1/E5a/E5b/E6(PPP) and QZSS L1/L2/L5.

### Extended Range and Battery Life

Features a built-in radio capable of 5W transmission and a 13800mAh battery, ensuring operational distances over 16km and continuous operation up to 12 hours.

### Concurrent Data links

The integrated 4G and 5W radio enables simultaneous network and radio differential transmission, streamlining operations by eliminating the need to choose between radio and network.

### Remote VPN Management

With an integrated VPN, the device allows remote configuration of various functions without the need to return to the base station setup point, facilitating flexible adjustment of work requirements in complex environments.

## SPECIFICATION

| SYSTEM                                                                                                                                                                |                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM                                                                                                                                                       | ARM Cortex-A7 1.8GHz                                                                                                                                                  |
| OS                                                                                                                                                                    | Linux                                                                                                                                                                 |
| GNSS                                                                                                                                                                  |                                                                                                                                                                       |
| GPS                                                                                                                                                                   | L1 C/A, L2C, L2P(Y), L2C, L5                                                                                                                                          |
| GLONASS                                                                                                                                                               | L1, L2, L3                                                                                                                                                            |
| BDS                                                                                                                                                                   | B1I, B2I, B3I, B1C, B2a, B2b(PPP)                                                                                                                                     |
| GALILEO                                                                                                                                                               | E1, E5a, E5b, E6(PPP)                                                                                                                                                 |
| QZSS                                                                                                                                                                  | L1, L2, L5                                                                                                                                                            |
| SBAS                                                                                                                                                                  | L1(PPP)                                                                                                                                                               |
| NavIC (IRNSS)                                                                                                                                                         | L5(IRNSS support in future)                                                                                                                                           |
| Channel                                                                                                                                                               | 1408                                                                                                                                                                  |
| Standard Output                                                                                                                                                       | NMEA-0183                                                                                                                                                             |
| Correction I/O Protocol                                                                                                                                               | RTCM 3.X                                                                                                                                                              |
| Frequency                                                                                                                                                             | 20Hz(max)                                                                                                                                                             |
| Reacquisition Time                                                                                                                                                    | <1s                                                                                                                                                                   |
| Cold Start Time                                                                                                                                                       | <40s                                                                                                                                                                  |
| ACCURACY                                                                                                                                                              |                                                                                                                                                                       |
| SINGLE (RMS)                                                                                                                                                          | Horizontal: 15m / Vertical: 2.5m                                                                                                                                      |
| DGPS (RMS)                                                                                                                                                            | Horizontal: 0.4m / Vertical: 0.8m                                                                                                                                     |
| RTK (RMS)                                                                                                                                                             | Horizontal: $\pm (8\text{mm}+1\text{ppm})$<br>Vertical: $\pm (15\text{mm}+1\text{ppm})$                                                                               |
| Timing Precision (RMS)                                                                                                                                                | 20ns                                                                                                                                                                  |
| Static Mode Precision (RMS)                                                                                                                                           | Horizontal: $\pm (2.5\text{mm}+1\text{ppm})$<br>Vertical: $\pm (5\text{mm}+1\text{ppm})$                                                                              |
| Velocity Estimation (RMS)                                                                                                                                             | 0.03m/s                                                                                                                                                               |
| Tilt Correction (Within 60°)                                                                                                                                          | $\pm 2\text{cm}$                                                                                                                                                      |
| SYSTEM PLATFORM                                                                                                                                                       |                                                                                                                                                                       |
| Bluetooth                                                                                                                                                             | BR+EDR+BLE                                                                                                                                                            |
| WIFI                                                                                                                                                                  | 802.11 b/g/n                                                                                                                                                          |
| Network                                                                                                                                                               | LTE FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: 82/93/5/8                                                  |
| Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details. |                                                                                                                                                                       |
| Manufacturers may update parameters at any time, please refer to the latest product information.                                                                      |                                                                                                                                                                       |
| Storage                                                                                                                                                               | 32GB storage                                                                                                                                                          |
| Radio                                                                                                                                                                 | Integrated high-power transceiver<br>Frequency Range: 410-470MHz<br>Power: 1W/2W/5W<br>Protocols: TRIMTALK, TRIMMKL, SOUTH, TRANSEOT<br>Air Baud Rate: 9600, 19200bps |
| INDICATOR                                                                                                                                                             |                                                                                                                                                                       |
| Power Indicator                                                                                                                                                       | Indicates power and charging status                                                                                                                                   |
| Differential Signal Indicator                                                                                                                                         | Indicates differential signal transmission status                                                                                                                     |
| Satellite Indicator                                                                                                                                                   | Indicates satellite reception status                                                                                                                                  |
| Bluetooth Indicator                                                                                                                                                   | Indicates Bluetooth connection status                                                                                                                                 |
| BATTERY / CHARGE                                                                                                                                                      |                                                                                                                                                                       |
| Capacity                                                                                                                                                              | 7.2V, 13800mAh                                                                                                                                                        |
| Endurance                                                                                                                                                             | Over 12 hours(5W Radio Base)                                                                                                                                          |
| Charging                                                                                                                                                              | Supports USB PD 15V/2A and 5V/3A(With adaptive dynamic current adjustment)                                                                                            |
| ENVIRONMENT                                                                                                                                                           |                                                                                                                                                                       |
| Operating Temperature                                                                                                                                                 | -20°C~+60°C                                                                                                                                                           |
| Storage Temperature                                                                                                                                                   | -40°C~+85°C                                                                                                                                                           |
| Shock Resistance                                                                                                                                                      | Can withstand a 1.5m drop at normal temperatures                                                                                                                      |
| Protection Rating                                                                                                                                                     | IP68                                                                                                                                                                  |
| PHYSICAL                                                                                                                                                              |                                                                                                                                                                       |
| Materials                                                                                                                                                             | Magnesium alloy casing with ABS/PC plastic top cover                                                                                                                  |
| Dimensions                                                                                                                                                            | Ø174.9 * 104.9mm                                                                                                                                                      |
| Weight                                                                                                                                                                | 1500g                                                                                                                                                                 |
| ACCESSORIES                                                                                                                                                           |                                                                                                                                                                       |
| tBase                                                                                                                                                                 | 1 Unit                                                                                                                                                                |
| Power adapter                                                                                                                                                         | 1 PCS                                                                                                                                                                 |
| Type-C To Type-C                                                                                                                                                      | 1 PCS                                                                                                                                                                 |
| Radio Antenna                                                                                                                                                         | 1 PCS                                                                                                                                                                 |

## T30 GNSS Receiver



T30 is a full-featured GNSS receiver designed for long battery life and high precision. It includes an advanced positioning module supporting full-system and multi-frequency satellite signal tracking. Equipped with 4G universal connectivity, Bluetooth, WiFi, a SW data radio, and a large-capacity battery, it can operate continuously for up to two days on a single charge. The device integrates a high-precision inertial navigation system combined with AR and laser camera technology for AR stakeout and laser measurement, and augmented reality plotting, making surveying tasks more efficient and convenient.

## CHARACTERISTIC

### Linux Intelligent System

Linux+ARM Cortex-A7, the intelligent system platform, brings efficient computing and unlimited expansion of product functions to users.

### Full System GNSS Reception

The receiver integrates a high-precision positioning module, utilizing 1408 channels to support a comprehensive range of signals including BDS B1I/B2I/B3I/B1C/B2a/B2b(PPP), GPS L1/L2/L5, GLONASS L1/L2/L3, Galileo E1/E5a/E5b/E6(PPP), QZSS L1/L2/L5.

### Full Netcom 4G Communication

Based on the Linux platform, this full netcom 4G solution supports mobile, Unicom, Telecom 2/3/4G networks for better compatibility and stronger, more stable connections.

### Visualized Laser Measurement

Featuring a high-precision, millimeter-grade laser ranging module and a high-definition camera, the receiver enables precise point-and-measure functionality. The combination of high-accuracy inertial navigation and the camera's HD visuals ensures seamless operation even in complex environments.

### AR Real-Time Stakeout

Utilizes a professional ultra-wide-angle camera to provide high-definition real-time plotting functionality, making layout tasks more accurate and convenient.

## SPECIFICATION

| SYSTEM                                                                                                                                                                |                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM                                                                                                                                                       | ARM Cortex-A7 1.8GHz                                                                                                                                               |
| OS                                                                                                                                                                    | Linux                                                                                                                                                              |
| GNSS                                                                                                                                                                  |                                                                                                                                                                    |
| GPS                                                                                                                                                                   | L1 C/A, L1C, L2P(Y), L2C, L5                                                                                                                                       |
| GLONASS                                                                                                                                                               | L1, L2, L3                                                                                                                                                         |
| BDS                                                                                                                                                                   | B1I, B2I, B3I, B1C, B2a, B2b(PPP)                                                                                                                                  |
| GALILEO                                                                                                                                                               | E1, E5a, E5b, E6(PPP)                                                                                                                                              |
| QZSS                                                                                                                                                                  | L1, L2, L5                                                                                                                                                         |
| SBAS                                                                                                                                                                  | L1(PPP)                                                                                                                                                            |
| NavIC (IRNSS)                                                                                                                                                         | L5(Requires firmware support)                                                                                                                                      |
| Channel                                                                                                                                                               | 1408                                                                                                                                                               |
| Standard Output                                                                                                                                                       | NMEA-0183                                                                                                                                                          |
| Correction I/O Protocol                                                                                                                                               | RTCM 3.x                                                                                                                                                           |
| Frequency                                                                                                                                                             | 20Hz(max)                                                                                                                                                          |
| Reacquisition Time                                                                                                                                                    | <1s                                                                                                                                                                |
| Cold Start Time                                                                                                                                                       | <40s                                                                                                                                                               |
| ACCURACY                                                                                                                                                              |                                                                                                                                                                    |
| SINGLE (RMS)                                                                                                                                                          | Horizontal: 15m / Vertical: 2.5m                                                                                                                                   |
| DGPS (RMS)                                                                                                                                                            | Horizontal: 0.4m / Vertical: 0.8m                                                                                                                                  |
| RTK (RMS)                                                                                                                                                             | Horizontal: $\pm (8mm+1ppm)$<br>Vertical: $\pm (15mm+1ppm)$                                                                                                        |
| Timing Precision (RMS)                                                                                                                                                | 20ns                                                                                                                                                               |
| Static Mode Precision (RMS)                                                                                                                                           | Horizontal: $\pm 2.5mm+1ppm$<br>Vertical: $\pm 5mm+3ppm$                                                                                                           |
| Velocity Estimation (RMS)                                                                                                                                             | 0.03m/s                                                                                                                                                            |
| Tilt Correction (Within 90°)                                                                                                                                          | <2cm                                                                                                                                                               |
| Laser Measurement                                                                                                                                                     | The three-dimensional accuracy of laser tilt measurement within 5m; no more than 2.5cm                                                                             |
| SYSTEM PLATFORM                                                                                                                                                       |                                                                                                                                                                    |
| Network                                                                                                                                                               | LTE FDD: B1/2/3/4/5/7/8/12/13/<br>18/19/20/25/26/28<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/9/19<br>GSM: B2/3/5/8                                            |
| Radio                                                                                                                                                                 | Integrated high-power transceiver<br>Frequency Range: 410~470MHz<br>Power: 5W<br>Protocols: TRIMTALK, TRIMMKE,<br>SOUTH, TRANSBOT<br>Air Baud Rate: 9600, 19200bps |
| Bluetooth                                                                                                                                                             | BR+EDR+BLE                                                                                                                                                         |
| WiFi                                                                                                                                                                  | 802.11 b/g/n                                                                                                                                                       |
| Storage                                                                                                                                                               | 32GB storage                                                                                                                                                       |
| Laser Camera                                                                                                                                                          | Sensor size: 1/3.06 inch<br>Aperture: f/2.9<br>Resolution: 4224*3200<br>Field of view: D44°H35°V26.5°<br>Distortion: 1%                                            |
| AR Camera                                                                                                                                                             | AR real-time stakeout supported<br>Sensor size: 1/2.8 inch<br>Aperture: f/2.5<br>Resolution: 1920*1080<br>Field of view: D70.3°H62.7°V38.8°<br>Distortion: 0.38%   |
| INDICATOR                                                                                                                                                             |                                                                                                                                                                    |
| Power Indicator                                                                                                                                                       | Indicates power and charging status                                                                                                                                |
| Differential Signal Indicator                                                                                                                                         | Indicates differential signal transmission status                                                                                                                  |
| Satellite Indicator                                                                                                                                                   | Indicates satellite reception status                                                                                                                               |
| Bluetooth Indicator                                                                                                                                                   | Indicates Bluetooth connection status                                                                                                                              |
| BATTERY / CHARGE                                                                                                                                                      |                                                                                                                                                                    |
| Capacity                                                                                                                                                              | 7.2V, 13800mAh                                                                                                                                                     |
| Endurance                                                                                                                                                             | Over 48 hours(when applying controller network mode)                                                                                                               |
| Charging                                                                                                                                                              | Supports USB PD 15V/2A and 5V/3A (With adaptive dynamic current adjustment)                                                                                        |
| ENVIRONMENT                                                                                                                                                           |                                                                                                                                                                    |
| Operating Temperature                                                                                                                                                 | -20°C~+60°C                                                                                                                                                        |
| Storage Temperature                                                                                                                                                   | -40°C~+85°C                                                                                                                                                        |
| Shock Resistance                                                                                                                                                      | Can withstand a 15m drop at normal temperatures                                                                                                                    |
| Protection Rating                                                                                                                                                     | IP68                                                                                                                                                               |
| PHYSICAL                                                                                                                                                              |                                                                                                                                                                    |
| Materials                                                                                                                                                             | Magnesium alloy casing with ABS/PC plastic top cover                                                                                                               |
| Dimensions                                                                                                                                                            | Φ174.9 * 104.9mm                                                                                                                                                   |
| Weight                                                                                                                                                                | 1500g                                                                                                                                                              |
| ACCESSORIES                                                                                                                                                           |                                                                                                                                                                    |
| T30                                                                                                                                                                   | 1 Unit                                                                                                                                                             |
| Power adapter                                                                                                                                                         | 1 PCS                                                                                                                                                              |
| Type-C To Type-C                                                                                                                                                      | 1 PCS                                                                                                                                                              |
| Radio Antenna                                                                                                                                                         | 1 PCS                                                                                                                                                              |
| Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details. |                                                                                                                                                                    |
| Manufacturers may update parameters at any time, please refer to the latest product information.                                                                      |                                                                                                                                                                    |

## T30Pro GNSS Receiver



The T30Pro is a long-life battery GNSS receiver integrates AR and Photogrammetry. It has a built-in high-precision positioning module that supports tracking satellite signals from all systems and frequency bands. It is equipped with 4G full Netcom, Bluetooth, Wi-Fi, a 5W data transmission radio. With a 7.2V, 13800mAh battery, it supports two days of operation after a single charge. The receiver also features a high-precision IMU module, Photogrammetry, and AR stakeout, further expanding the boundaries of RTK survey.

## CHARACTERISTIC

### Linux Intelligent System

Linux+ARM Cortex-A7 intelligent system platform offers efficient computation and unlimited product functionality expansion.

### Full System GNSS Reception

The receiver integrates a high-precision positioning module with 1408 high-speed channels. It supports BDS B1I/B2I/B3I/B1C/B2a/B2b(PPP), GPS L1/L2/L5, GLONASS L1/L2/L3, Galileo E1/E5a/E5b/E6(PPP), QZSS L1/L2/L5 signals reception and calculation.

### Photogrammetry

Equipped with a 1/2.6-inch large base high-definition wide-angle camera, it integrates high-precision inertial navigation algorithms and works with high-performance Android handheld devices for high-precision image measurement.

### AR Real-Time Stakeout

Utilizes a professional ultra-wide-angle camera to provide high-definition real-time plotting functionality, making layout tasks more accurate and convenient.

### 4G Full NetCom

The 4G NetCom solution based on the Linux platform fully supports 2/3/4G networks of China Mobile/China Unicom/China Telecom, offering better compatibility, stronger signals, and more stable connections.

## SPECIFICATION

| SYSTEM                       |                                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM              | ARM Cortex-A7 1.8GHz                                                                                                                                             |
| OS                           | Linux                                                                                                                                                            |
| GNSS                         |                                                                                                                                                                  |
| GPS                          | L1 C/A, L1C, L2P(Y), L2C, L5                                                                                                                                     |
| GLONASS                      | L1, L2, L3                                                                                                                                                       |
| BDS                          | B1I, B2I, B3I, B1C, B2a, B2b(PPP)                                                                                                                                |
| GALILEO                      | E1, E5a, E5b, E6(PPP)                                                                                                                                            |
| QZSS                         | L1, L2, L5                                                                                                                                                       |
| SBAS                         | L1(PPP)                                                                                                                                                          |
| NavIC (IRNSS)                | L5(IRNSS support in future)                                                                                                                                      |
| Channel                      | 1408                                                                                                                                                             |
| Standard Output              | NMEA-0183                                                                                                                                                        |
| Correction I/O Protocol      | RTCM 3.X                                                                                                                                                         |
| Frequency                    | 20Hz(max)                                                                                                                                                        |
| Reacquisition Time           | <1s                                                                                                                                                              |
| Cold Start Time              | <40s                                                                                                                                                             |
| ACCURACY                     |                                                                                                                                                                  |
| SINGLE (RMS)                 | Horizontal: 15m / Vertical: 2.5m                                                                                                                                 |
| DGPS (RMS)                   | Horizontal: 0.4m / Vertical: 0.8m                                                                                                                                |
| RTK (RMS)                    | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                                                              |
| Timing Precision (RMS)       | 20ns                                                                                                                                                             |
| Static Mode Precision (RMS)  | Horizontal: 2.5mm+1ppm<br>Vertical: 5mm+1ppm                                                                                                                     |
| Velocity Estimation (RMS)    | 0.03m/s                                                                                                                                                          |
| Tilt Correction (Within 60°) | ±2cm                                                                                                                                                             |
| SYSTEM PLATFORM              |                                                                                                                                                                  |
| Bluetooth                    | BR+EDR+BLE                                                                                                                                                       |
| WIFI                         | 802.11 b/g/n                                                                                                                                                     |
| Network                      | LTE FDD: B7/2/3/4/5/7/8/12/13/18/19/20/25/26/28<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: 82/3/5/8                                              |
| Radio                        | Integrated receiver/transmitter<br>Frequency Range: 410-470MHz<br>Power: 1W/2W/5W<br>Protocols: TRIMTALK, TRIMMK3, SOUTH, TRANSEOT<br>Air Baud Rate: 9600, 19200 |

Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details.

Manufacturers may update parameters at any time, please refer to the latest product information.

| Storage                       | 32GB storage                                                                                                                                                               |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IS Camera                     | Supports image survey<br>Sensor size: 1/2.8 inch<br>Focal length: 6mm<br>Aperture: f/2.8<br>Resolution: 1920*1080<br>Field of view: D51.8°H42.4°V32.4°<br>Distortion: 0.2% |
| AR Camera                     | Supports AR real scene stakeout<br>Sensor size: 1/2.8 inch<br>Aperture: f/2.5<br>Resolution: 1920*1080<br>Field of view: D70.3°H62.7°V38.6°<br>Distortion: 0.38%           |
| INDICATOR                     |                                                                                                                                                                            |
| Power Indicator               | Indicates power and charging status                                                                                                                                        |
| Differential Signal Indicator | Indicates differential signal transmission status                                                                                                                          |
| Satellite Indicator           | Indicates satellite reception status                                                                                                                                       |
| Bluetooth Indicator           | Indicates Bluetooth connection status                                                                                                                                      |
| BATTERY / CHARGE              |                                                                                                                                                                            |
| Capacity                      | 7.2V, 13800mAh                                                                                                                                                             |
| Endurance                     | Over 48 hours(when applying controller network mode)                                                                                                                       |
| Charging                      | Supports USB PD 15W/2A and 5V/3A                                                                                                                                           |
| ENVIRONMENT                   |                                                                                                                                                                            |
| Operating Temperature         | -20°C~+60°C                                                                                                                                                                |
| Storage Temperature           | -40°C~+85°C                                                                                                                                                                |
| Shock Resistance              | Can withstand a 1.5m drop at normal temperatures                                                                                                                           |
| Protection Rating             | IP68                                                                                                                                                                       |
| PHYSICAL                      |                                                                                                                                                                            |
| Materials                     | Magnesium alloy casing with ABS/PC plastic top cover                                                                                                                       |
| Dimensions                    | Ø174.9 * 104.9mm                                                                                                                                                           |
| Weight                        | 1500g                                                                                                                                                                      |
| ACCESSORIES                   |                                                                                                                                                                            |
| T30Pro                        | 1 Unit                                                                                                                                                                     |
| Power adapter                 | 1 PCS                                                                                                                                                                      |
| Type-C To Type-C              | 1 PCS                                                                                                                                                                      |
| Radio Antenna                 | 1 PCS                                                                                                                                                                      |
| 7-Pin Data Cable              | 1 PCS                                                                                                                                                                      |

## T40 GNSS Receiver



T40 is a versatile GNSS receiver equipped with dual-laser cameras. It integrates a high-precision positioning module, IMU, AR, laser technology, and laser visualization to enable high-precision positioning, tilt measurement, AR real-world staking, and visualized laser point measurement. It boasts a maximum testing radius of up to 30 meters. The receiver features a robust magnesium-aluminum alloy design, offering durability and reliability. It supports hot-swappable batteries, allowing quick recharging without power interruption, thereby extending operational time.

## CHARACTERISTIC

### Full-System, Multi-Frequency GNSS Receiver

The receiver integrates a high-precision positioning module with 1,408 high-speed channels. It supports full-system and multi-frequency signal reception and processing, including: BDS: B1I, B2I, B3I, B1C, B2a, B2b, GPS: L1 C/A, L1C, L2C, L5, GLONASS: L1, L2, L3, Galileo: E1, E5a, E5b, E6, QZSS: L1, L2, L5, SBAS and NavIC systems.

### Tilt Measurement

Equipped with an intelligent high-precision inertial navigation (IMU) module, the device offers real-time tilt compensation, eliminating the issue of "floating points" in RTK surveys.

### AR Stake Out

A professional ultra-wide-angle camera provides HD real-world stake out capabilities. Its user-friendly AR stake out application ensures precise, one-shot staking performance.

### Visualized Laser Measurement

Featuring a high-precision, millimeter-grade laser ranging module and a high-definition camera, the receiver enables precise point-and-measure functionality. The combination of high-accuracy inertial navigation and the camera's HD visuals ensures seamless operation even in complex environments.

### Extended Battery Life

The receiver supports two detachable batteries that allow hot-swapping without power interruption. This enables quick battery replacement, significantly extending operational endurance.

## SPECIFICATION

| SYSTEM                                                                                                                                                                |                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM                                                                                                                                                       | ARM Cortex-A7 1.8GHz                                                                                               |
| OS                                                                                                                                                                    | Linux                                                                                                              |
| GNSS                                                                                                                                                                  |                                                                                                                    |
| GPS                                                                                                                                                                   | L1C/A, L1C, L2P(Y), L2C, L5                                                                                        |
| GLONASS                                                                                                                                                               | L1, L2, L3                                                                                                         |
| BDS                                                                                                                                                                   | B1I, B2I, B3I, B1C, B2a, B2b(PPP)                                                                                  |
| GALILEO                                                                                                                                                               | E1, E5a, E5b, E6(PPP)                                                                                              |
| QZSS                                                                                                                                                                  | L1, L2, L5                                                                                                         |
| SBAS                                                                                                                                                                  | L(PPP)                                                                                                             |
| NavIC (IRNSS)                                                                                                                                                         | L5(Requires firmware support)                                                                                      |
| Channel                                                                                                                                                               | 1408                                                                                                               |
| Standard Output                                                                                                                                                       | NMEA-0183                                                                                                          |
| Correction I/O Protocol                                                                                                                                               | RTCM 3.X                                                                                                           |
| Frequency                                                                                                                                                             | 20Hz max                                                                                                           |
| Reacquisition Time                                                                                                                                                    | <1s                                                                                                                |
| Cold Start Time                                                                                                                                                       | <40s                                                                                                               |
| ACCURACY                                                                                                                                                              |                                                                                                                    |
| SINGLE (RMS)                                                                                                                                                          | Horizontal: 15m / Vertical: 2.5m                                                                                   |
| DGPS (RMS)                                                                                                                                                            | Horizontal: 0.4m / Vertical: 0.8m                                                                                  |
| RTK (RMS)                                                                                                                                                             | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                |
| Time Accuracy(RMS)                                                                                                                                                    | 20ns                                                                                                               |
| Static(RMS)                                                                                                                                                           | Horizontal: ± 2.5mm+0.5ppm<br>Vertical: ± 5mm+0.5ppm                                                               |
| Speed Accuracy(RMS)                                                                                                                                                   | 0.03m/s                                                                                                            |
| Tilt Compensation (60°)                                                                                                                                               | ±2cm                                                                                                               |
| AR Stake Out Accuracy                                                                                                                                                 | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                |
| Laser Measurement                                                                                                                                                     | 2.5cm 3D error within 5m range                                                                                     |
| SYSTEM PLATFORM                                                                                                                                                       |                                                                                                                    |
| Bluetooth                                                                                                                                                             | BR+EDR+BLE                                                                                                         |
| WiFi                                                                                                                                                                  | 802.11 b/g/n                                                                                                       |
| Network                                                                                                                                                               | LTE FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28<br>LTE TDD: B36/39/40/41<br>WCDMA: B1/2/4/5/6/8/9<br>GSM: B2/3/5/8 |
| Storage                                                                                                                                                               | 64GB storage                                                                                                       |
| Radio                                                                                                                                                                 | Integrated high-power transceiver<br>Frequency Range: 410-470MHz<br>Power: 1W/2W/5W                                |
| Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details. |                                                                                                                    |
| Manufacturers may update parameters at any time, please refer to the latest product information.                                                                      |                                                                                                                    |

| Radio                   | Protocols: TRIMALK, TRIMMCL, SOUTH, TRANSEOT<br>Air Baud Rate: 9600, 19200bps                                                          |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Laser Module            | Type: Class 3R<br>Range: 30m<br>Precision: ±5mm±100°10'-6°D<br>(D: Measurement Distance)<br>Wavelength: 520-20nm<br>Power: 3.8mW       |
| Laser Assist Camera     | Sensor: 1/3.06 inch<br>Resolution: 4224x3200<br>FOV: D44°H35°V26.5°<br>Distortion: 1%                                                  |
| AR Camera               | AR Stakeout Supported<br>Sensor: 1/2.8 inch<br>Aperture: f/2.5<br>Resolution: 1920*1080<br>FOV: 70.3°H62.7°V38.6°<br>Distortion: 0.38% |
| DISPLAY                 |                                                                                                                                        |
| LCD Panel               | Sensor: 1.3 inch<br>Resolution: 240*RGB*240                                                                                            |
| BATTERY / CHARGE        |                                                                                                                                        |
| Capacity                | 7.2V, 3400mAh*2<br>(Removable, dedicated charger)                                                                                      |
| Endurance               | Over 20 hours(when applying controller network mode)                                                                                   |
| Charging                | 9-24VDC                                                                                                                                |
| ENVIRONMENT             |                                                                                                                                        |
| Operating Temperature   | -20°C~+60°C                                                                                                                            |
| Storage Temperature     | -20°C~+70°C                                                                                                                            |
| Shock Resistance        | Can withstand a 15m drop at normal temperatures                                                                                        |
| Protection Rating       | IP68                                                                                                                                   |
| PHYSICAL                |                                                                                                                                        |
| Materials               | Magnesium alloy casing with ABS/PC plastic top cover                                                                                   |
| Dimensions              | Φ160 * 103mm                                                                                                                           |
| Weight                  | 850g(without battery)                                                                                                                  |
| ACCESSORIES             |                                                                                                                                        |
| T40                     | 1 Unit                                                                                                                                 |
| External Battery        | 2 PCS                                                                                                                                  |
| Battery Charging Cradle | 1 PCS                                                                                                                                  |
| Radio Antenna           | 1 PCS                                                                                                                                  |

## T40Pro GNSS Receiver



The T40Pro is a versatile GNSS receiver equipped with photogrammetry technology. It integrates a high-precision positioning module, IMU, AR, and a high-definition imaging camera, combining precise inertial navigation and positioning data. It enables tilt measurement, AR real-time staking, and image-based survey, allowing for efficient extraction of high-precision coordinates from real-world images. The receiver features a robust magnesium-aluminum alloy design, offering durability and reliability. It supports hot-swappable batteries, allowing quick recharging without power interruption, thereby extending operational time.

## CHARACTERISTIC

### Linux Intelligent System

The Linux + ARM Cortex-A7 intelligent system platform provides users with efficient computing power and unlimited expansion of product features.

### Tilt Measurement

Equipped with an intelligent high-precision inertial navigation (IMU) module, the device offers real-time tilt compensation, eliminating the issue of "floating points" in RTK surveys.

### AR Stake Out

A professional ultra-wide-angle camera provides HD real-world-stake out capabilities. Its user-friendly AR stake out application ensures precise, one-shot staking performance.

### Photogrammetry

The receiver is equipped with a high-definition wide-angle camera with a large 1/2.8-inch sensor, integrating high-precision inertial navigation algorithms. Coupled with a high-performance Android controller, it achieves high-precision image survey.

### Extended Battery Life

The receiver supports two detachable batteries that allow hot-swapping without power interruption. This enables quick battery replacement, significantly extending operational endurance.

## SPECIFICATION

| SYSTEM                       |                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM              | ARM Cortex-A7                                                                                                       |
| OS                           | Linux                                                                                                               |
| GNSS                         |                                                                                                                     |
| GPS                          | L1C/A, L1C, L2P(Y), L2C, L5                                                                                         |
| GLONASS                      | L1, L2, L3                                                                                                          |
| BDS                          | B1I, B3I, B3II, B1C, B2a, B2b(PPP)                                                                                  |
| GALILEO                      | E1, E5a, E5b, E6(PPP)                                                                                               |
| QZSS                         | L1, L2, L5                                                                                                          |
| SBAS                         | L1(PPP)                                                                                                             |
| NavIC (IRNSS)                | L5(Requires firmware support)                                                                                       |
| Channel                      | 3408                                                                                                                |
| Standard Output              | NMEA-0183                                                                                                           |
| Correction I/O Protocol      | RTCM 3.X                                                                                                            |
| Frequency                    | 20Hz max                                                                                                            |
| Reacquisition Time           | <1s                                                                                                                 |
| Cold Start Time              | <40s                                                                                                                |
| ACCURACY                     |                                                                                                                     |
| SINGLE (RMS)                 | Horizontal: 15m / Vertical: 2.5m                                                                                    |
| DGPS (RMS)                   | Horizontal: 0.4m / Vertical: 0.8m                                                                                   |
| RTK (RMS)                    | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                 |
| Time Accuracy(RMS)           | 20ns                                                                                                                |
| Static(RMS)                  | Horizontal: 2.5mm+1ppm<br>Vertical: 5mm+1ppm                                                                        |
| Speed Accuracy(RMS)          | 0.03m/s                                                                                                             |
| Tilt Correction (Within 60°) | <2cm                                                                                                                |
| AR Stakeout Accuracy         | Horizontal(8mm+1ppm)<br>Vertical(15mm+1ppm)                                                                         |
| Photogrammetry Accuracy      | Error of 2-4 cm within 2-15 meters                                                                                  |
| SYSTEM PLATFORM              |                                                                                                                     |
| Bluetooth                    | BR+EDR+BLE                                                                                                          |
| WIFI                         | 802.11 b/g/n                                                                                                        |
| Network                      | LTE FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/38<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: 82/3/5/8 |
| Storage                      | 64GB Storage                                                                                                        |

Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details.

Manufacturers may update parameters at any time, please refer to the latest product information.

| Data Radio              | Integrated receiver/transmitter<br>Frequency Range: 410-470MHz<br>Power: 1W/2W/5W<br>Protocols: TRIMTALK, TRIMMOL, SOUTH, TRANSEOT<br>Air Baud Rate: 9600, 19200                 |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IS Camera               | Supports Photogrammetry<br>Sensor size: 1/2.8 inch<br>Focal length: 6mm<br>Aperture: f/2.8<br>Resolution: 1920*1080<br>Field of view: D51.8° H42.4° V32.4°<br>Distortion: < 0.5% |
| AR Camera               | AR Stakeout Supported<br>Sensor: 1/2.8 inch<br>Aperture: f/2.5<br>Resolution: 1920*1080<br>FOV: 70.3°H62.7°V38.8°<br>Distortion: 0.38%                                           |
| DISPLAY                 |                                                                                                                                                                                  |
| LCD Panel               | Sensor: 13 inch<br>Resolution: 240*RGB*240                                                                                                                                       |
| BATTERY                 |                                                                                                                                                                                  |
| Battery                 | 7.2V3400mAh *2 (Removable battery, dedicated charger)                                                                                                                            |
| Work time               | Over 20 hours (when applying controller network mode)                                                                                                                            |
| External power          | 9-24VDC                                                                                                                                                                          |
| ENVIRONMENT             |                                                                                                                                                                                  |
| Work Temperature        | -20°C~+60°C                                                                                                                                                                      |
| Storage Temperature     | -20°C~+70°C                                                                                                                                                                      |
| Shock Resistance        | Can withstand a 1.5m drop at normal temperatures                                                                                                                                 |
| Protection Rating       | IP68                                                                                                                                                                             |
| PHYSICAL                |                                                                                                                                                                                  |
| Materials               | Magnesium alloy main body, ABS/PC top cover                                                                                                                                      |
| Dimensions              | Ø160mm*103mm                                                                                                                                                                     |
| Weight                  | 850g(without battery)                                                                                                                                                            |
| ACCESSORIES             |                                                                                                                                                                                  |
| T40Pro                  | 1 Unit                                                                                                                                                                           |
| External Battery        | 2 PCS                                                                                                                                                                            |
| Battery Charging Cradle | 1 PCS                                                                                                                                                                            |
| Radio Antenna           | 1 PCS                                                                                                                                                                            |



## T50basic GNSS Receiver

T50basic is a portable multi-functional GNSS. It has a built-in high-precision positioning module that supports tracking satellite signals from all systems and frequency bands. It is equipped with 4G full network access, bluetooth, WIFI and built-in data transmission radio. The high-precision IMU integrates AR to achieve tilt measurement, tilt measurement and AR real-time Stakeout, making the measurement work more convenient and efficient.

## CHARACTERISTIC

### Linux Intelligent System

Linux+ARM Cortex-A7 intelligent system platform offers efficient computation and unlimited product functionality expansion.

### Full System GNSS Reception

The receiver integrates a high-precision positioning module, utilizing 1408 channels to support a comprehensive range of signals including BDS (B1/B2/B3/B1C/B2a/B2b), GPS (L1/L2/L5), GLONASS (L1/L2/L3), Galileo (E1/E5a/E5b/E6), QZSS (L1/L2/L5), SBAS and NavIC.

### Tilt Measurement

Built-in intelligent high-precision inertial navigation module for real-time tilt compensation, eliminating "fly points" in RTK measurement.

### AR Real-Time Stakeout

Utilizes a professional ultra-wide-angle camera to provide high-definition real-time plotting functionality, making stakeout tasks more accurate and convenient.

### 4G Full NetCom

The 4G NetCom solution based on the Linux platform fully supports 2/3/4G networks, offering better compatibility, stronger signals, and more stable connections.

### Long Endurance

Industrial design, solid magnesium alloy shell, in line with IP68 design requirements, safe and reliable.

## SPECIFICATION

| SYSTEM                                                                                                                                                                |                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM                                                                                                                                                       | ARM Cortex-A7 1.8GHz                                                                                               |
| OS                                                                                                                                                                    | Linux                                                                                                              |
| GNSS                                                                                                                                                                  |                                                                                                                    |
| GPS                                                                                                                                                                   | L1 C/A, L1C, L2P(Y), L2C, L5                                                                                       |
| GLONASS                                                                                                                                                               | L1, L2, L3                                                                                                         |
| BDS                                                                                                                                                                   | B1, B2, B3, B1C, B2a, B2b(PPP)                                                                                     |
| GALILEO                                                                                                                                                               | E1, E5a, E5b, E6(PPP)                                                                                              |
| QZSS                                                                                                                                                                  | L1, L2, L5                                                                                                         |
| SBAS                                                                                                                                                                  | L1(PPP)                                                                                                            |
| NavIC (IRNSS)                                                                                                                                                         | L5(IRNSS support in future)                                                                                        |
| Channel                                                                                                                                                               | 1408                                                                                                               |
| Standard Output                                                                                                                                                       | NMEA-0183                                                                                                          |
| Correction I/O Protocol                                                                                                                                               | RTCM 3.X                                                                                                           |
| Frequency                                                                                                                                                             | 20Hz(max)                                                                                                          |
| Reacquisition Time                                                                                                                                                    | <1s                                                                                                                |
| Cold Start Time                                                                                                                                                       | <40s                                                                                                               |
| ACCURACY                                                                                                                                                              |                                                                                                                    |
| SINGLE (RMS)                                                                                                                                                          | Horizontal: 15m / Vertical: 25m                                                                                    |
| DGPS (RMS)                                                                                                                                                            | Horizontal: 0.4m / Vertical: 0.8m                                                                                  |
| RTK (RMS)                                                                                                                                                             | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                |
| Timing Precision (RMS)                                                                                                                                                | 20ns                                                                                                               |
| Static Mode Precision (RMS)                                                                                                                                           | Horizontal: ± (2.5mm+1ppm)<br>Vertical: ± (5mm+1ppm)                                                               |
| Velocity Estimation (RMS)                                                                                                                                             | 0.03m/s                                                                                                            |
| Tilt Correction (Within 90°)                                                                                                                                          | ±2cm                                                                                                               |
| AR Stakeout                                                                                                                                                           | Horizontal: (8mm+1ppm)<br>Vertical: (15mm+1ppm)                                                                    |
| SYSTEM PLATFORM                                                                                                                                                       |                                                                                                                    |
| Bluetooth                                                                                                                                                             | BR+EDR+BLE                                                                                                         |
| WIFI                                                                                                                                                                  | 802.11 b/g/n                                                                                                       |
| Network                                                                                                                                                               | LTE FDD: B1/2/3/4/5/7/8/12/13/16/19/20/25/28/29<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: B2/21/8 |
| Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details. |                                                                                                                    |
| Manufacturers may update parameters at any time, please refer to the latest product information.                                                                      |                                                                                                                    |

| Storage               | 8GB storage                                                                                                                                                                      |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Radio                 | Integrated transceiver radio<br>Frequency Range: 410~470MHz<br>Power: 0.5W/1.5W<br>Protocols: TRIMBLE, TRIMBLE, SOUTH, TRANSEOT, SATEL, LORA<br>Air Baud Rate: 4800, 9600, 19200 |
| AR Camera             | Supports AR real scene stakeout<br>Sensor size: 1/2.8 inch<br>Aperture: f/2.5<br>Resolution: 1920*1080<br>Field of view: 69.3°<br>Distortion: 0.38%                              |
| BATTERY / CHARGE      |                                                                                                                                                                                  |
| Capacity              | 74V 6500mAh                                                                                                                                                                      |
| Endurance             | Over 16 hours (Typical, Power: 0.5W)                                                                                                                                             |
| Charging              | USB PD 15V/2A, 5V/3A                                                                                                                                                             |
| ENVIRONMENT           |                                                                                                                                                                                  |
| Operating Temperature | -30°C~+65°C                                                                                                                                                                      |
| Storage Temperature   | -40°C~+85°C                                                                                                                                                                      |
| Shock Resistance      | Can withstand a 1.5m drop at normal temperatures                                                                                                                                 |
| Protection Rating     | IP68                                                                                                                                                                             |
| PHYSICAL              |                                                                                                                                                                                  |
| Materials             | Magnesium alloy casing with ABS/PC plastic top cover                                                                                                                             |
| Dimensions            | Ø132 * 83mm                                                                                                                                                                      |
| Weight                | 770g                                                                                                                                                                             |
| ACCESSORIES           |                                                                                                                                                                                  |
| T50basic              | 1 Unit                                                                                                                                                                           |
| Type-C power adapter  | 1 PCS                                                                                                                                                                            |
| Type-C To Type-C      | 1 PCS                                                                                                                                                                            |
| Radio Antenna         | 1 PCS                                                                                                                                                                            |

## T50 GNSS Receiver



T50 is a portable multi-functional GNSS. It has a built-in high-precision positioning module that supports tracking satellite signals from all systems and frequency bands. It is equipped with 4G full network access, bluetooth, WIFI and built-in data transmission radio. The high-precision IMU integrates AR and Laser to achieve tilt measurement, Laser measurement and AR real-time Stakeout, making the measurement work more convenient and efficient.

## CHARACTERISTIC

### Linux Smart System

Linux+ARM Cortex-A7 intelligent system platform offers efficient computation and unlimited product functionality expansion.

### Full System GNSS Reception

The receiver integrates a high-precision positioning module, utilizing 1408 channels to support a comprehensive range of signals including BDS (B1I/B2I/B3I/B1C/B2a/B2b), GPS (L1/L2/L5), GLONASS (L1/L2/L3), Galileo (E1/E5a/E5b/E6), QZSS (L1/L2/L5), SBAS and NavIC.

### Tilt Measurement

Built-in intelligent high-precision inertial navigation module for real-time tilt compensation, eliminating "fly points" in RTK measurement.

### AR Real-Time Stakeout

Utilizes a professional ultra-wide-angle camera to provide high-definition real-time plotting functionality, making stakeout tasks more accurate and convenient.

### 4G Full NetCom

The 4G NetCom solution based on the Linux platform fully supports 2/3/4G networks, offering better compatibility, stronger signals, and more stable connections.

### Laser Measurement

Equipped with a high-precision millimeter-level laser ranging module, combined with high-precision inertial navigation for accurate laser targeting in complex environments.

## SPECIFICATION

| SYSTEM                  |                                                                                                                         |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM         | ARM Cortex-A7 1.8GHz                                                                                                    |
| OS                      | Linux                                                                                                                   |
| GNSS                    |                                                                                                                         |
| GPS                     | L1C/A, L1C, L2P(Y), L2C, L5                                                                                             |
| GLONASS                 | L1, L2, L3                                                                                                              |
| BDS                     | B1I, B2I, B3I, B1C, B2a, B2b(PPP)                                                                                       |
| GALILEO                 | E1, E5a, E5b, E6(PPP)                                                                                                   |
| QZSS                    | L1, L2, L5                                                                                                              |
| SBAS                    | L1(PPP)                                                                                                                 |
| NavIC (IRNSS)           | L5(Requires firmware support)                                                                                           |
| Channel                 | 1408                                                                                                                    |
| Standard Output         | NMEA-0183                                                                                                               |
| Correction I/O Protocol | RTCM 3.X                                                                                                                |
| Frequency               | 20Hz max                                                                                                                |
| Reacquisition Time      | <1s                                                                                                                     |
| Cold Start Time         | <40s                                                                                                                    |
| ACCURACY                |                                                                                                                         |
| SINGLE (RMS)            | Horizontal: 15m / Vertical: 2.5m                                                                                        |
| DGPS (RMS)              | Horizontal: 0.4m / Vertical: 0.8m                                                                                       |
| RTK (RMS)               | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                     |
| Time Accuracy(RMS)      | 20ns                                                                                                                    |
| Static(RMS)             | Horizontal: ± 2.5mm+1ppm<br>Vertical: ± 5mm+1ppm                                                                        |
| Speed Accuracy(RMS)     | 0.03m/s                                                                                                                 |
| Tilt Compensation (60°) | <2cm                                                                                                                    |
| AR Stake Out Accuracy   | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                     |
| Laser Measurement       | 2.5cm 3D error within 5m range                                                                                          |
| SYSTEM PLATFORM         |                                                                                                                         |
| Bluetooth               | BR+EDR+BLE                                                                                                              |
| WIFI                    | 802.11 b/g/n                                                                                                            |
| Network                 | LTE FDD: B1/2/3/4/5/7/8/12/13/<br>18/19/20/25/26/28<br>LTE TDD: B36/38/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: B2/3/5/8 |
| Storage                 | 8GB storage                                                                                                             |

|                     |                                                                                                                                                                                          |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Radio               | Integrated high-power transceiver<br>Frequency Range: 410~470MHz<br>Power: 0.5W/15W<br>Protocols: TRIMTALK, TRIMMK3,<br>SOUTH, TRANSECT, SATEL, LORA<br>Air Baud Rate: 4800, 9600, 19200 |
| Laser Module        | Type: Class 3R<br>Range: 100m<br>Precision: ±5mm±100°10'-6"D<br>(D: Measurement Distance)<br>Wavelength: 650±20nm<br>Power: 3.8mW                                                        |
| Laser Assist Camera | Sensor: 1/3.06 inch<br>Resolution: 4224x3200<br>FOV: D44°H35°V28.5°<br>Distortion: 1%                                                                                                    |
| AR Camera           | AR Stakeout Supported<br>Sensor: 1/2.8 inch<br>Aperture: f/2.5<br>Resolution: 1920°1080<br>FOV: 88.3°<br>Distortion: 0.38%                                                               |

### BATTERY / CHARGE

|           |                                                         |
|-----------|---------------------------------------------------------|
| Capacity  | 7.4V, 8500mAh                                           |
| Endurance | Over 16 hours(when applying<br>controller network mode) |
| Charging  | USB PD 15V/2A 5V/3A                                     |

### ENVIRONMENT

|                       |                                                    |
|-----------------------|----------------------------------------------------|
| Operating Temperature | -30°C~+65°C                                        |
| Storage Temperature   | -40°C~+85°C                                        |
| Shock Resistance      | Can withstand a 15m drop at<br>normal temperatures |
| Protection Rating     | IP68                                               |

### PHYSICAL

|            |                                                         |
|------------|---------------------------------------------------------|
| Materials  | Magnesium alloy casing with<br>ABS/PC plastic top cover |
| Dimensions | Φ132 * 83mm                                             |
| Weight     | 770g                                                    |

### ACCESSORIES

|                      |        |
|----------------------|--------|
| T50                  | 1 Unit |
| Type-C power adapter | 2 PCS  |
| Type-C To Type-C     | 1 PCS  |
| Radio Antenna        | 1 PCS  |

Equipped with electronic fence system, Toknav's product have area code restrictions.  
Any issue please contact Toknav or local dealers to verify the specific details.

Manufacturers may update parameters at any time, please refer to the latest product information.

## T50Pro GNSS Receiver



T50Pro is a portable multi-functional GNSS. It has a built-in high-precision positioning module that supports tracking satellite signals from all systems and frequency bands. It is equipped with 4G full network access, bluetooth, WIFI and built-in data transmission radio. The high-precision IMU integrates AR and Photogrammetry to achieve tilt measurement. Photogrammetry and AR real-time Stakeout, making the measurement work more convenient and efficient.

## CHARACTERISTIC

### Linux Intelligent System

Linux+ARM Cortex-A7 intelligent system platform offers efficient computation and unlimited product functionality expansion.

### Full System GNSS Reception

The receiver integrates a high-precision positioning module, utilizing 1408 channels to support a comprehensive range of signals including BDS (B1I/B2I/B3I/B1C/B2a/B2b), GPS (L1/L2/L5), GLONASS (L1/L2/L3), Galileo (E1/E5a/E5b/E6), QZSS (L1/L2/L5), SBAS and NavIC.

### Tilt Measurement

Built-in intelligent high-precision inertial navigation module for real-time tilt compensation, eliminating "fly points" in RTK measurement.

### Photogrammetry

Equipped with a 1/2.6-inch large base high-definition wide-angle camera, it integrates high-precision inertial navigation algorithms and works with high-performance Android handheld devices for high-precision Photogrammetry.

### AR Real-Time Stakeout

Utilizes a professional ultra-wide-angle camera to provide high-definition real-time plotting functionality, making stakeout tasks more accurate and convenient.

### IP68 Design

Industrial design, solid magnesium alloy shell, in line with IP68 design requirements, safe and reliable.

## SPECIFICATION

| SYSTEM                       |                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM              | ARM Cortex-A7                                                                                                       |
| OS                           | Linux                                                                                                               |
| GNSS                         |                                                                                                                     |
| GPS                          | L1C/A, L1C/L2P(Y), L2C, L5                                                                                          |
| GLONASS                      | L1, L2, L3                                                                                                          |
| BDS                          | B1I, B2I, B3I, B1C, B2a, B2b (PPP)                                                                                  |
| GALILEO                      | E1, E5a, E5b, E6 (PPP)                                                                                              |
| QZSS                         | L1, L2, L5                                                                                                          |
| SBAS                         | L1 (PPP)                                                                                                            |
| NavIC (IRNSS)                | L5 (Requires firmware support)                                                                                      |
| Channel                      | 1408                                                                                                                |
| Standard Output              | NMEA-0183                                                                                                           |
| Correction I/O Protocol      | RTCM 3.x                                                                                                            |
| Frequency                    | 20Hz max                                                                                                            |
| Reacquisition Time           | <1s                                                                                                                 |
| Cold Start Time              | <40s                                                                                                                |
| ACCURACY                     |                                                                                                                     |
| SINGLE (RMS)                 | Horizontal: 15m / Vertical: 2.5m                                                                                    |
| DGPS (RMS)                   | Horizontal: 0.4m / Vertical: 0.8m                                                                                   |
| RTK (RMS)                    | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                 |
| Time Accuracy(RMS)           | 20ns                                                                                                                |
| Static(RMS)                  | Horizontal: 2.5mm+1ppm<br>Vertical: 5mm+1ppm                                                                        |
| Speed Accuracy(RMS)          | 0.03m/s                                                                                                             |
| Tilt Correction (Within 60°) | <2cm                                                                                                                |
| AR Stakeout Accuracy         | Horizontal(8mm+1ppm)<br>Vertical(15mm+1ppm)                                                                         |
| Photogrammetry Accuracy      | Error of 2-4 cm within 2-15 meters                                                                                  |
| SYSTEM PLATFORM              |                                                                                                                     |
| Bluetooth                    | BR+EDR+BLE                                                                                                          |
| WIFI                         | 802.11 b/g/n                                                                                                        |
| Network                      | LTE FDD:B1/2/3/4/5/7/8/12/13/<br>18/19/20/25/26/28<br>LTE TDD:B38/39/40/41<br>WCDMA:B1/2/4/5/6/8/19<br>GSM:B2/3/5/8 |
| Storage                      | 8GB Storage                                                                                                         |

Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details.

Manufacturers may update parameters at any time, please refer to the latest product information.

| Data Radio           | Integrated receiver/transmitter<br>Frequency Range: 410-470MHz<br>Power: 0.5W/15W<br>Protocol: TRIMTALK, TRIMMOL, SOUTH, TRANSECT, SATEL, LORA<br>Air Baud Rate: 4800/9600, 19200 |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IS Camera            | Supports Photogrammetry<br>Sensor size: 1/2.6 inch<br>Focal length: 3.27mm<br>Aperture: f/2.8<br>Resolution: 1920*1080<br>Field of view: 83°x72°x51°<br>Distortion: < 0.5%        |
| AR Camera            | AR Stakeout Supported<br>Sensor: 1/2.8 inch<br>Aperture: f/2.5<br>Resolution: 1920*1080<br>FOV: 69.3°<br>Distortion: 0.38%                                                        |
| BATTERY              |                                                                                                                                                                                   |
| Battery              | 3.4V, 6500mAh                                                                                                                                                                     |
| Work time            | Over 10 hours (when applying controller network mode)                                                                                                                             |
| Charge               | USB PD 15V/2A, 5V/3A                                                                                                                                                              |
| ENVIRONMENT          |                                                                                                                                                                                   |
| Work Temperature     | -30°C~+65°C                                                                                                                                                                       |
| Storage Temperature  | -40°C~+85°C                                                                                                                                                                       |
| Shock Resistance     | Can withstand a 1.5m drop at normal temperatures                                                                                                                                  |
| Protection Rating    | IP68                                                                                                                                                                              |
| PHYSICAL             |                                                                                                                                                                                   |
| Materials            | Magnesium alloy main body, ABS/PC top cover                                                                                                                                       |
| Dimensions           | Ø132mm*83mm                                                                                                                                                                       |
| Weight               | 770g                                                                                                                                                                              |
| ACCESSORIES          |                                                                                                                                                                                   |
| T50Pro               | 1 Unit                                                                                                                                                                            |
| Type-C power adapter | 1 PCS                                                                                                                                                                             |
| Type-C To Type-C     | 1 PCS                                                                                                                                                                             |
| Radio Antenna        | 1 PCS                                                                                                                                                                             |

## NET660 GNSS Receiver



NET660 GNSS receiver is a high-performance device engineered specifically for the construction of ground-based enhancement systems, such as those used with the Beidou navigation satellite system. It boasts an built-in Linux operating system and fully independent intellectual property rights. Its diverse interfaces and communication methods, along with support for event inputs, PPS outputs, and substantial data storage, make it an ideal choice for foundational system construction.

## CHARACTERISTIC

### Linux Intelligent System

Utilizing a Linux + ARM Cortex-A7 system platform, the NET660 offers efficient computation and endless possibilities for product function expansion.

### Comprehensive GNSS Receiver

The device integrates a high-precision positioning module capable of receiving and processing signals from a full array of systems and frequencies, including BDS (B1I/B2I/B3I, B1C/B2a/B2b), GPS (L1C/A/L2P/L2C/L5), GLONASS (G1/G2), Galileo (E1/E5a/E5b), QZSS, SBAS, and IRNSS, providing complete system and full-frequency signal reception and solution.

### Advanced Positioning Capabilities

Features narrowband interference resistance and continuous wave interference suppression, enabling rapid initial positioning and fast satellite signal lock for quick and precise data acquisition necessary for subsequent processing.

### Versatile Connectivity Options

Offers Ethernet, WiFi, serial ports, Bluetooth, and mobile network interfaces, allowing for flexible connectivity solutions.

### Protocol Compatibility

Supports a variety of protocols including Ntrip Client/Server/Caster, TCP Client/Server, FTP for file transfers, and HTTP/HTTPS for secure communications over protected networks.

## SPECIFICATION

| SYSTEM                      |                                                                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM             | ARM Cortex-A7 1.8GHz                                                                                                                      |
| OS                          | Linux                                                                                                                                     |
| GNSS                        |                                                                                                                                           |
| GPS                         | L1 C/A, L2P(Y), L2C, L5                                                                                                                   |
| GLONASS                     | L1, L2, L3                                                                                                                                |
| BDS                         | B1I, B2I, B3I, B1C, B2a, B2b                                                                                                              |
| GALILEO                     | E1, E5a, E5b                                                                                                                              |
| QZSS                        | L1C/A, L2C, L5                                                                                                                            |
| SBAS                        | L1C/A                                                                                                                                     |
| NavIC(IRNSS)*               | L5*(Requires firmware support)                                                                                                            |
| L-band                      |                                                                                                                                           |
| Standard Output             | NMEA-0183                                                                                                                                 |
| Correction I/O Protocol     | RTCM 3.X                                                                                                                                  |
| Frequency                   | 1Hz, 2Hz, 5Hz, 10Hz, 20Hz max                                                                                                             |
| Reacquisition Time          | <1s                                                                                                                                       |
| Cold Start Time             | <40s                                                                                                                                      |
| ACCURACY                    |                                                                                                                                           |
| Single(RMS)                 | Horizontal: 1.5m / Vertical: 2.5m                                                                                                         |
| DGPS(RMS)                   | Horizontal: 0.4m / Vertical: 0.8m                                                                                                         |
| RTK(RMS)                    | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                                       |
| Timing Accuracy (RMS)       | 20ns                                                                                                                                      |
| Static Mode Precision (RMS) | Horizontal: ± (2.5mm+1ppm)<br>Vertical: ± (5mm+1ppm)                                                                                      |
| Data Availability           | 98%<br>(Data available/Data collected)                                                                                                    |
| Data Completeness           | 98%(Data collected/<br>Expected data to be collected)                                                                                     |
| INTERFACE                   |                                                                                                                                           |
| Bluetooth                   | BR+EDR+BLE                                                                                                                                |
| WiFi                        | 802.11b/g/n                                                                                                                               |
| Network                     | Full frequency<br>LTE FDD: B1/2/3/4/5/7/8/12/13/<br>18/19/20/25/26/28<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/H/8/19<br>GSM: B2/3/5/8 |

| Ethernet Port                 | Standard RJ45 interface,<br>10/100Mbps network adaptive                                                                          |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Serial Port                   | Two 5-pin connectors;<br>standard RS232 interface with<br>baud rates supporting 9600,<br>19200, 38400, 115200,<br>and 230400 bps |
| Storage                       | 32GB storage                                                                                                                     |
| INDICATOR                     |                                                                                                                                  |
| LCD Display                   | Size: 1.3inch<br>Resolution: 240*96*240                                                                                          |
| Power Indicator               | Indicates power and charging<br>status                                                                                           |
| Differential Signal Indicator | Indicates the status of<br>network connection                                                                                    |
| Satellite Indicator           | Indicates satellite reception status                                                                                             |
| Bluetooth Indicator           | Indicates Bluetooth connection<br>status                                                                                         |

| BATTERY / CHARGE |                                                                                        |
|------------------|----------------------------------------------------------------------------------------|
| Capacity         | 7.2V, 13800mAh                                                                         |
| Endurance        | Over 24 hours(Supports<br>continuous data collection for<br>26 hours on a full charge) |
| Charging         | TYPE-C - USB PD 15V/2A 5V/3A<br>LEMO - 12V/2A DC<br>Input supported                    |

| ENVIRONMENT           |             |
|-----------------------|-------------|
| Operating Temperature | -30°C~+60°C |
| Storage Temperature   | -20°C~+70°C |
| Shock Resistance      | GB/T2423    |
| Protection Rating     | IP68        |

| PHYSICAL  |                           |
|-----------|---------------------------|
| Material  | Magnesium alloy main body |
| Dimension | 172mm*148mm*58mm          |
| Weight    | 1920g                     |

| ACCESSORIES   |        |
|---------------|--------|
| NET660        | 1 Unit |
| Power adapter | 1 PCS  |
| Serial Port   | 2 PCS  |
| WiFi Antenna  | 1 PCS  |
| 4G Antenna    | 1 PCS  |

Equipped with electronic fence system, Toknav's product have area code restrictions.  
Any issue please contact Toknav or local dealers to verify the specific details.

Manufacturers may update parameters at any time, please refer to the latest product information.

## NET660i GNSS Receiver



NET660i is a cost-effective and miniaturized GNSS receiver designed for the construction of Beidou ground-based augmentation system. It has built-in Linux operating system, completely independent intellectual property development, rich interface types, diverse communication methods, and supports large-capacity data storage. It is the best choice for the construction of the Beidou ground-based augmentation system.

## CHARACTERISTIC

### Multi Constellation

With its 1408 channels, NET660i provides an excellent on board real time navigation solution with high accuracy. All GNSS signals (GPS, GLONASS, BDS, GALILEO, QZSS and SBAS) are included.

### Rich Interfaces & Various Communication Methods

NET660i provides Ethernet/serial and mobile network interfaces for customers to choose.

### Compatible with Multiple Protocols

NET660i supports Ntrip Client/Server/Caster, TCP Client/Server connection, FTP protocol file transfer, HTTP/HTTPS protocol, private network transfer function with protection policy.

### Cloud Service Function

NET660i can regularly report the device status such as device location, network status, signal strength, satellite reception status, etc., and supports cloud platform to restart, reset, and upgrade the remote device.

### Support Front-end Solution

NET660i supports the front-end calculation function which can complete the static data calculation on the device inside and upload the results to the cloud, which greatly reduces the requirements for the computing power of the cloud server.

## SPECIFICATION

| SYSTEM                                    |                                                          |
|-------------------------------------------|----------------------------------------------------------|
| HARDWARE SYSTEM                           | ARM Cortex-A7 180MHz                                     |
| OS                                        | Linux                                                    |
| GNSS                                      |                                                          |
| GPS                                       | L1 C/A, L1C, L2P(Y), L2C, L5                             |
| GLONASS                                   | L1, L2, L3                                               |
| BDS                                       | B1I, B2I, B3I, B1C, B2a, B2b(PPP)                        |
| GALILEO                                   | E1, E5a, E5b, E6(PPP)                                    |
| QZSS                                      | L1, L2, L5                                               |
| SBAS                                      | L1(PPP)                                                  |
| NavIC (IRNSS)                             | L5(IRNSS support in future)                              |
| Channel                                   | 1408                                                     |
| Differential Observation Accuracy(RMS)    | 10.0cm                                                   |
| Kinematic Phase Observation Accuracy(RMS) | 1.0cm                                                    |
| Data Format                               | RINEX, Custom                                            |
| Position Data                             | NMEA-0183                                                |
| Differential Data                         | RTCM 3.X                                                 |
| Data update frequency                     | 1Hz, 2Hz, 5Hz, 10Hz, 20Hz                                |
| Receive Data Availability                 | 98%<br>(Data available/Data collected)                   |
| Data Integrity                            | 98%<br>(Data collected/<br>Data should be collected)     |
| Single (RMS)                              | Horizontal: 15mm / Vertical: 25mm                        |
| RTK (RMS)                                 | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)      |
| Static Accuracy (RMS)                     | Horizontal: ± (2.5mm+0.5ppm)<br>Vertical: ± (5mm+0.5ppm) |
| Timing Precision (RMS)                    | 20ns                                                     |

Equipped with electronic fence system, Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details.

Manufacturers may update parameters at any time, please refer to the latest product information.

| SYSTEM                              |                                                                                                                                |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Serial Port                         | Standard RS232 interface, Baud rate supports 1200, 2400, 4800, 9600, 19200, 38400, 115200, 230400bps                           |
| USB                                 | Integrated on the 7-pin interface, support access to the computer to copy data directly                                        |
| Network port                        | Standard RJ45 interface, 10/100Mbps network adaptive                                                                           |
| Network Communication (Full Netcom) | LTE FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: B2/3/5/8            |
| Interface                           | PWE*1: Power supply port<br>DATA*1: PPS*1<br>SIM*1: Nano SIM card<br>Ethernet*1: GNSS*1: Main antenna<br>4G*1: 4G antenna port |
| Storage                             | 32GB storage, circular storage, support multi-channel storage                                                                  |

### ELECTRICAL CHARACTERISTIC

|                   |                       |
|-------------------|-----------------------|
| Voltage Input     | 8-24V DC(12V typical) |
| Power Dissipation | 1.8W(typ)             |

### ENVIRONMENT

|                       |             |
|-----------------------|-------------|
| Operating Temperature | -40°C~+85°C |
| Storage Temperature   | -40°C~+85°C |
| Protection Class      | IP68        |

### PHYSICAL

|           |                           |
|-----------|---------------------------|
| Material  | Magnesium alloy main body |
| Dimension | 148.8mm*105mm*50.3mm      |
| Weight    | 480g                      |

## NET660i-H GNSS Receiver



NET660i-H is a cost-effective and miniaturized GNSS receiver designed for the construction of Beidou ground-based augmentation system. It has built-in Linux operating system, completely independent intellectual property development, rich interface types, diverse communication methods, and supports large-capacity data storage. NET660i-H supports full system and frequency, and dual-antenna directed positioning solution with dual-antenna independent differential output capability. It is the best choice for the construction of the mechanical intelligent control system.

## CHARACTERISTIC

### Multi Constellation

With its 1408 channels, NET660i-H provides an excellent on board real time navigation solution with high accuracy. All GNSS signals (GPS, GLONASS, BDS, GALILEO and QZSS) are included.

### Rich Interfaces & Various Communication Methods

NET660i-H provides Ethernet, serial and mobile network interfaces for customers to choose.

### Compatible with Multiple Protocols

NET660i-H supports Ntrip Client/Server/Caster, TCP Client/Server connection, FTP protocol file transfer, HTTP/HTTPS protocol, private network transfer function with protection policy.

### Cloud Service Function

NET660i-H can regularly report the device status such as device location, network status, signal strength, satellite reception status, etc., and supports cloud platform to restart, reset, and upgrade the remote device.

### Support Front-end Solution

NET660i-H supports the front-end calculation function, which can complete the static data calculation on the device inside and upload the results to the cloud, which greatly reduces the requirements for the computing power of the cloud server.

## SPECIFICATION

| SYSTEM                                    |                                                          |
|-------------------------------------------|----------------------------------------------------------|
| HARDWARE SYSTEM                           | ARM Cortex-A7 1.8GHz                                     |
| OS                                        | Linux                                                    |
| GNSS                                      |                                                          |
| GPS                                       | L1C/A, L2P/L2C, L5                                       |
| GLONASS                                   | L1, L2                                                   |
| BDS                                       | B1I, B2I, B3I, B1C*, B2b(PPP)                            |
| GALILEO                                   | E1, E5a, E5b, E6(PPP)                                    |
| QZSS                                      | L1, L2, L5                                               |
| SBAS                                      | L1C/A                                                    |
| Channel                                   | 1408                                                     |
| Differential Observation Accuracy(RMS)    | 10.0cm                                                   |
| Kinematic Phase Observation Accuracy(RMS) | 1.0cm                                                    |
| Data Format                               | RINEX, Custom                                            |
| Position Data                             | NMEA-0183                                                |
| Differential Data                         | RTCM 3.X                                                 |
| Data update frequency                     | 1Hz, 2Hz, 5Hz, 10Hz, 20Hz                                |
| Receive Data Availability                 | 98%<br>(Data available/Data collected)                   |
| Data Integrity                            | 98% (Data collected/<br>Data should be collected)        |
| Single (RMS)                              | Horizontal: 1.5m / Vertical: 2.5m                        |
| RTK (RMS)                                 | Horizontal: ± (8mm+1ppm)<br>Vertical: ± (15mm+1ppm)      |
| Static Accuracy (RMS)                     | Horizontal: ± (2.5mm+0.5ppm)<br>Vertical: ± (5mm+0.5ppm) |
| Timing Accuracy (RMS)                     | 20ns                                                     |
| Heading Accuracy(RMS)                     | 0.2°/m                                                   |

Equipped with electronic fence system, Toknav's product have area code restrictions.  
Any issue please contact Toknav or local dealers to verify the specific details.

Manufacturers may update parameters at any time, please refer to the latest product information.

| SYSTEM                              |                                                                                                                            |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Serial Port                         | Standard RS232 interface,<br>Baud rate supports 1200, 2400,<br>4800, 9600, 19200, 38400,<br>115200, 230400bps              |
| USB                                 | Integrated on the 7-pin interface,<br>support access to the computer<br>to copy data directly                              |
| Network port                        | Standard RJ45 interface,<br>10/100Mbps network adaptive                                                                    |
| Network Communication (Full Netcom) | LTE FDD: B1/2/3/4/5/7/8/12/13/<br>18/19/20/25/26/28<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: B2/3/5/8    |
| Interface                           | PWE*1: Power supply port<br>DATA*1: PPS*1<br>SIM*1: Nano SIM card<br>Ethernet*1: GNSS*2: TCN port<br>4G*1: 4G antenna port |
| Storage                             | 32GB, circular storage<br>support multi-channel storage                                                                    |

### ELECTRICAL CHARACTERISTIC

|                   |                       |
|-------------------|-----------------------|
| Voltage Input     | 8-24V DC(12V typical) |
| Power Dissipation | 2W(typ)               |

### ENVIRONMENT

|                       |             |
|-----------------------|-------------|
| Operating Temperature | -40°C~+85°C |
| Storage Temperature   | -40°C~+85°C |
| Protection Class      | IP68        |

### PHYSICAL

|           |                           |
|-----------|---------------------------|
| Material  | Magnesium alloy main body |
| Dimension | 148.8mm*105mm*50.3mm      |
| Weight    | 490g                      |

## NET660i-1U GNSS Receiver



NET660i-1U is a high-performance, compact GNSS receiver designed for unmanned vehicles. It features the latest high-performance automotive-grade positioning chip, an integrated MEMS inertial measurement unit, and a functional safety processor. The receiver supports high-performance RTK positioning and deeply coupled navigation algorithms, effectively addressing challenges such as satellite signal interference, blockage, and multipath effects. It provides continuous, real-time, and reliable high-precision position and posture information, suitable for applications in intelligent driving, precision agriculture, and intelligent robotics.

## CHARACTERISTIC

### Linux Intelligent System

ARM Cortex-A7 + Linux, the intelligent system platform, brings efficient computing and unlimited expansion of product functions to users.

### All-system Dual-frequency GNSS Receiver

Integrated high-precision positioning module with fully independent intellectual property rights, supporting: BDS B1I, B2I, B3I, B1C\*, B2a, B2b\*(PPP), GPS L1C/A, L1C\*, L2, L5GLONASS L1, L2, Galileo E1, E5a, E5b, E6\*, SBAS L1C/A, QZSS L1C/A, L2, L5, L6(CLAS\*) .

### Compatibility with Multiple Protocols

NET660i-1U supports Ntrip Client/Server/Caster, TCP Client/Server connections, FTP file transfer, HTTP/HTTPS, and MQTT transmission.

### Built-in Deeply Coupled Navigation Algorithm

Integrated MEMS inertial measurement unit enables dead reckoning, providing continuous high-precision position and speed information even during short-term obstructions. The deeply coupled navigation algorithm improves GNSS signal quality, enhancing positioning accuracy in urban canyons by 2-5 times compared to loosely coupled algorithms.

### Cloud Service Functionality

The device can regularly report the device status such as device location, network status, signal strength, satellite reception status, etc., and support cloud platform to restart, reset, and upgrade the remote device.

## SPECIFICATION

| SYSTEM                                                                                                                                                                                                                                                                    |                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| HARDWARE SYSTEM                                                                                                                                                                                                                                                           | ARM Cortex-A7 180Hz                                                                                                                        |
| OS                                                                                                                                                                                                                                                                        | Linux                                                                                                                                      |
| GNSS                                                                                                                                                                                                                                                                      |                                                                                                                                            |
| GPS                                                                                                                                                                                                                                                                       | L1 C/A, L1C*, L2, L5                                                                                                                       |
| GLONASS                                                                                                                                                                                                                                                                   | L1, L2                                                                                                                                     |
| BDS                                                                                                                                                                                                                                                                       | B1I, B2I, B3I, B1C*, B2a, B2b*(PPP)                                                                                                        |
| GALILEO                                                                                                                                                                                                                                                                   | E1, E5a, E5b, E6*(PPP)                                                                                                                     |
| QZSS                                                                                                                                                                                                                                                                      | L1C/A, L2, L5, L6(CLAS*)                                                                                                                   |
| SBAS*                                                                                                                                                                                                                                                                     | L1C/A                                                                                                                                      |
| NavIC(IRNSS)*                                                                                                                                                                                                                                                             | L5*                                                                                                                                        |
| Marked * indicates firmware support is required                                                                                                                                                                                                                           |                                                                                                                                            |
| Channel                                                                                                                                                                                                                                                                   | 1507                                                                                                                                       |
| Pseudorange Observation Accuracy                                                                                                                                                                                                                                          | 10.0cm                                                                                                                                     |
| Carrier Phase Observation Accuracy                                                                                                                                                                                                                                        | 1.0cm                                                                                                                                      |
| Single Accuracy(RMS)                                                                                                                                                                                                                                                      | Horizontal: 1.5m / Vertical: 2.5m                                                                                                          |
| RTK Accuracy(RMS)                                                                                                                                                                                                                                                         | Horizontal: ± (10mm+1ppm)<br>Vertical: ± (15mm+1ppm)                                                                                       |
| Static Accuracy (RMS)                                                                                                                                                                                                                                                     | Horizontal: ± (2.5mm+1ppm)<br>Vertical: ± (5mm+1ppm)                                                                                       |
| Time Accuracy (RMS)                                                                                                                                                                                                                                                       | 20ns(it does not include delays caused by RF cables or antennas)                                                                           |
| Position Data                                                                                                                                                                                                                                                             | NMEA-0183                                                                                                                                  |
| Differential Data                                                                                                                                                                                                                                                         | RTCM 3.X                                                                                                                                   |
| Data Format                                                                                                                                                                                                                                                               | RINEX, Custom                                                                                                                              |
| Data update frequency                                                                                                                                                                                                                                                     | 2Hz, 5Hz(Turn off integrated Navigation)<br>IMU: 50/100Hz                                                                                  |
| IMU                                                                                                                                                                                                                                                                       |                                                                                                                                            |
| IMU parameters                                                                                                                                                                                                                                                            | Gyroscope Range: ±300°/s<br>Full temperature zero deviation: 0.3°/s<br>Scale error: 4%<br>Three-axis orthogonal coupling error: 17% (0.1°) |
| Equipped with electronic fence system. Toknav's product have area code restrictions. Any issue please contact Toknav or local dealers to verify the specific details.<br>Manufacturers may update parameters at any time, please refer to the latest product information. |                                                                                                                                            |

| Accelerometer             | Measuring range: ±16g<br>Full temperature zero deviation: 5mg<br>Scale error: 2%<br>Three-axis orthogonal coupling error: 0.8% (0.05°) |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| SYSTEM                    |                                                                                                                                        |
| Serial Port               | Standard RS232 interface.<br>Baud rate supports 1200, 2400, 4800, 9600, 19200, 38400, 115200, 230400bps                                |
| USB                       | Integrated on the 7-pin interface, support access to the computer to copy data directly                                                |
| Network port              | Standard RJ45 interface.<br>10/100Mbps network adaptive                                                                                |
| Network Communication     | LTE FDD: B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28<br>LTE TDD: B38/39/40/41<br>WCDMA: B1/2/4/5/6/8/19<br>GSM: B2/3/5/8                    |
| Interface                 | PWE*1: Power supply port<br>DATA*1: PP5*1<br>SIM*1: Nano SIM card<br>Ethernet*1: GNSS*1: Main antenna<br>4G*1: 4G antenna port         |
| Storage                   | 32GB, circular storage<br>support multi-channel storage                                                                                |
| ELECTRICAL CHARACTERISTIC |                                                                                                                                        |
| Voltage Input             | 9-24V DC(12V typical)                                                                                                                  |
| Power Dissipation         | 1.8W                                                                                                                                   |
| ENVIRONMENT               |                                                                                                                                        |
| Operating Temperature     | -40°C~+85°C                                                                                                                            |
| Storage Temperature       | -40°C~+85°C                                                                                                                            |
| Protection Class          | IP68                                                                                                                                   |
| PHYSICAL                  |                                                                                                                                        |
| Material                  | Magnesium alloy main body                                                                                                              |
| Dimension                 | 148.8mm*105mm*50.3mm                                                                                                                   |
| Weight                    | 490g                                                                                                                                   |