

RX520

L1/L2 GNSS RECEIVER AND ANTENNA

Thank you for choosing TeeJet Technologies' RX520 as your GNSS receiver solution. This document provides instructions for mounting and operation of the RX520. Contact a local dealer for more information or visit www.teejet.com.

Integrated GNSS Design

The RX520 provides an integrated L1/L2 GPS+GLONASS receiver and antenna in a single compact enclosure. Designed to meet or exceed stringent MIL-STD-810G specifications, the RX520's rugged housing ensures high performance even in the most challenging work environments.

Multi-Constellation for Enhanced Positioning

Capable of tracking L1, L2 GPS+GLONASS and L-Band, the RX520 improves position availability in obstructed sky conditions. Dual-frequency tracking minimizes the impact of ionospheric disturbances further enhancing field productivity. Optional L-Band tracking improves positioning accuracy outside of L1 SBAS coverage areas.

Smooth, Pass-to-Pass Accuracy with ClearPath® Technology

ClearPath technology is integrated into every RX520 antenna. ClearPath uses very accurate carrier phase calculations to provide ultra smooth positions and excellent pass-to-pass accuracy for agricultural applications. ClearPath functions autonomously and with most available corrections services. It will also bridge through short periods of poor satellite availability. ClearPath's steady, smooth output is especially well suited for manual guidance and autosteer installations.



BENEFITS

- Scalable for current dual constellation and future GNSS systems
- Dual-frequency performance
- Smooth, consistent positions for pass-to-pass accuracy
- Rugged design for on-machine applications

FEATURES

- GPS and GLONASS satellite capability
- Built-in magnets for easy mounting
- Compatible with 12 V to 36 V vehicle power
- Ready to connect to any TeeJet Matrix, Matrix Pro, or Aeros system. Matrix and Matrix Pro systems will require the Power/CAN/Data cable [part number 45-05626 or 45-05845]

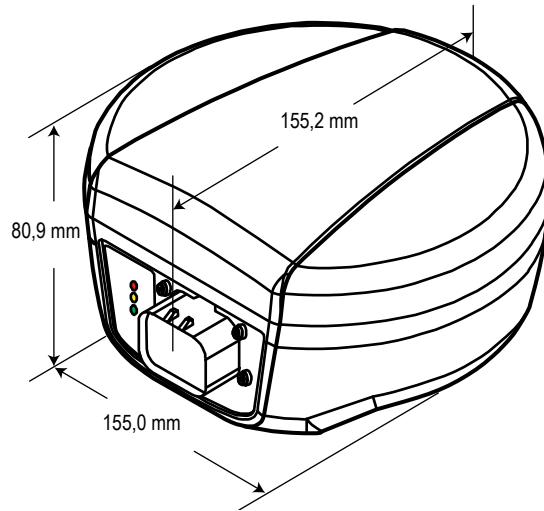
RX520 Options

Kit/Part Number	Description
90-02893	GNSS Receiver RX520, L1/L2, ClearPath, Autonomous [78-50207]. Includes Mounting Bracket [65-05243] and RX520 to Power & Serial Com1 Cable [45-05957].
90-02894	GNSS Receiver RX520, L1/L2, ClearPath, SBAS [78-50208]. Includes Mounting Bracket [65-05243] and RX520 to Power & Serial Com1 Cable [45-05957].
90-02895	GNSS Receiver RX520, L1/L2, ClearPath, SBAS, PPP [78-50209]. Includes Mounting Bracket [65-05243] and RX520 to Power & Serial Com1 Cable [45-05957].
90-02899	GNSS Receiver RX520, L1/L2, ClearPath, PPP [78-50206]. Includes Mounting Bracket [65-05243] and RX520 to Power & Serial Com1 Cable [45-05957].
65-05243	Mounting bracket
45-05957	Cable, RX520 to Power & Serial Com1

GETTING STARTED

This guide will assist in the set-up and operation of the RX520 GNSS receiver. The receiver will arrive ready to operate in the configuration that was ordered. No further configuration will be required by the user. When the receiver is properly mounted with a clear view of the sky, and with the connections for data and power completed, the unit will begin to provide positions. If using only GNSS (non L-band) solutions, position data will be output within a few minutes of power-up. Allow approximately 15 minutes for quality SBAS positions and 20 minutes for PPP positions to be available.

Figure 1: RX520 dimensions



RX520 LEDs

LEDs on the front of the RX520 provide basic receiver status information. The operation of the LEDs on the RX520 is summarized in the following table:

Icon	LED Color	State	Description
✓	Green	Position Valid	Indicates a valid GNSS position solution is available
⚠	Yellow	Error	Receiver is in the error state and tracking is disabled <i>NOTE: Error status remains until the cause of error is corrected and receiver is reset.</i>
🔋	Red	Power	Power is on

L-BAND SUBSCRIPTION

To subscribe to the TerraStar subscription L-band service:

1. Note the serial number of your RX520, the part number of the subscription that you intend to purchase, and the date that you want your subscription to be activated.
2. Ask your dealer to contact TeeJet customer support for the TerraStar Subscription bulletin [98-01494] and provide this information. Your dealer will send the order to TeeJet, and your financial transaction will take place between you and your dealer.

NOTE: The minimum lead time for activation is 72 hours.

Your receiver does NOT need to be powered on at the time the subscription becomes active. The first time you power your receiver on after the specified activation date, it will become active on the subscription you have requested within several hours. During subsequent operation of your receiver, it will typically require 15 minutes of operation with a clear view of the sky to fully process the L-band correction data and provide a GGA quality indicator value of "5".

MOUNTING INSTRUCTIONS

The RX520 is equipped with four (4) built-in magnets for attaching to the included mounting bracket. The mounting bracket can be secured to the base surface using traditional fasteners.

Intermediate Mounting Plate Template

A template for the intermediate mounting plate has been drawn in the background of this user guide.

- Red lines indicate holes where attachment will occur.
- Green lines indicate the outline of the mount and other holes for attaching the release plate.

Mounting Considerations

- Choose a location that has a clear view of the sky so that each satellite above the horizon can be tracked without obstruction.
- When mounting the RX520 Receiver, a space of at least 15 cm between the receiver and any bend in the cable is required. Any length shorter than 15 cm puts undue stress on the cable and the enclosure for the RX520.
- The receiver should not be mounted where water can pool around it. The receiver housing is designed to withstand rain and splashing, but not submersion in liquids for sustained periods of time.
- Mount the receiver above all other metal objects to avoid multipath. Satellite signals received by the GNSS receiver by a reflection from an object can decrease positioning accuracy. For example, roof racks, large headlight enclosures, etc., can cause multipath that may result in a jump in GNSS position.

Figure 2: Mounting Plate

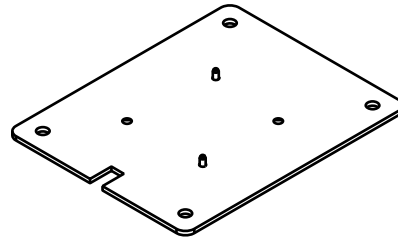
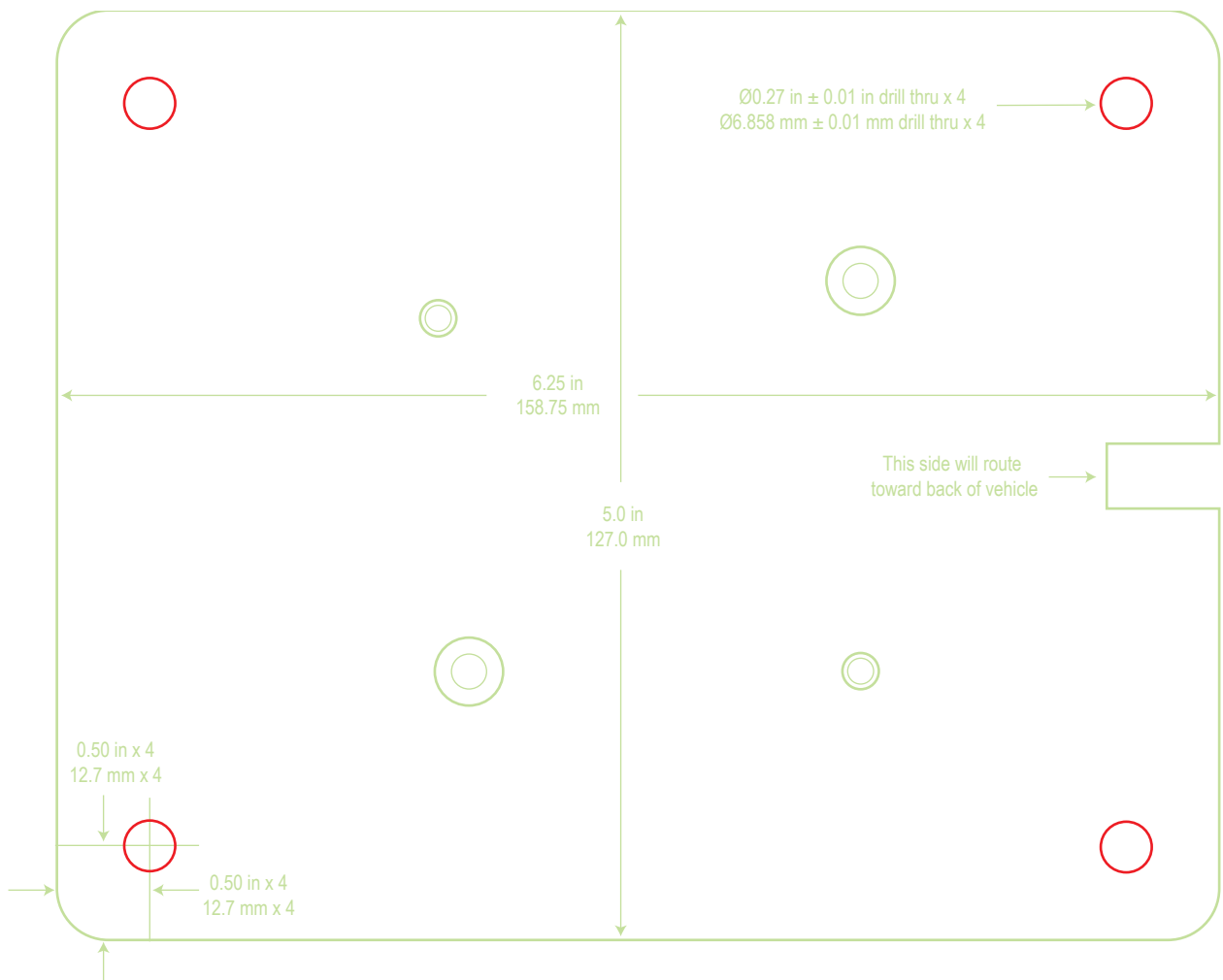
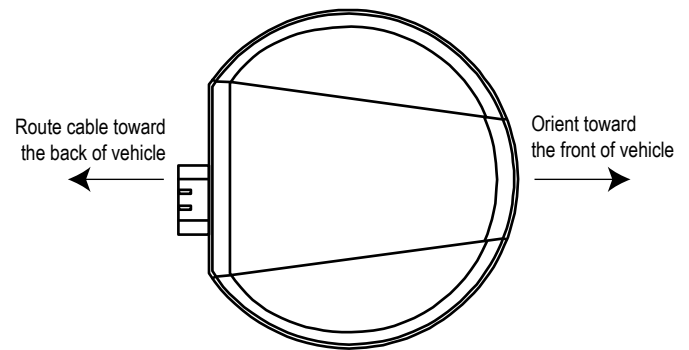


Figure 3: Orientation Example



SPECIFICATIONS

Performance¹

Channel Configuration	120 channels ²
Signal Tracking	
GPS	L1, L2, L2C
GLONASS	L1, L2
Galileo	E1
BeiDou	B1
SBAS ³	
L-Band	
Horizontal Position Accuracy (RMS)	
Single Point L1	1.5 m
Single Point L1/L2	1.2 m
SBAS	0.6 m
DGPS	0.4 m
NovAtel CORRECT™	
TERRASTAR-D ⁴	0.6 cm
RT-2 [®]	1 cm + 1 ppm

Measurement Precision (RMS)

Fully independent code and carrier measurements		
	GPS	GLONASS
L1 C/A Codes	4 cm	15 cm
L1 Carrier Phase	0.5 mm	1.5 mm
L2 P(Y) Code ⁵	8 cm	8 cm
L2 Carrier Phase ⁵	1.0 mm	1.5 mm
L2C Code ⁶	8 cm	8 cm
L2C Carrier Phase ⁶	1.0 mm	1.5 mm

Maximum Data Rate⁷

Measurements	Up to 50 Hz
Position	Up to 50 Hz

Time to First Fix

Cold Start ⁸	<50 s (typical)
Hot Start ⁹	<35 s (typical)

Signal Reacquisition

L1	0.5 s (typical)
L2	<1.0 s (typical)

Velocity Accuracy¹⁰ 0.03 m/s RMS

Time Accuracy¹¹ 20 ns RMS

- Typical values. Performance specifications subject to GNSS system characteristics, US DOD operational degradation, ionospheric and tropospheric conditions, satellite geometry, baseline length, multipath effects and the presence of intentional or unintentional interference sources.
- Tracks up to 60 L1/L2 satellites.
- GPS only.

Physical and Electrical

Dimensions	155 mm diameter
	80.9 mm height
Weight	<550 g
Connector	14-pin Tyco Ampseal
Mounting	2 x magnetic mount,
	4 x M4 screw inserts,
	Optional mounting plate

Power

Input Voltage Range	+8 to +36 VDC
Power Consumption	2.9 W (typical) ¹²

Status LEDs Power, Error, Position Valid

Power Input and I/O Protection

	ISO 7637-2:2004
	ISO 15003

Emissions and Immunity

..... ISO 14982: EMC for Agriculture machinery

Environmental

Temperature

Operating	-40°C to 75°C
Storage	-55°C to 90°C

Humidity MIL-STD-810G Method 507.5

Immersion MIL-STD-810G Method 512.5

Shock MIL-STD-810G Method 516.6

Solar Radiation EN60950-22 8.2
..... MIL-STD-810G Method 505.5

Salt Fog MIL-STD-810G Method 509.5

Sand and Dust MIL-STD-810G Method 510.5

Vibration

Random	MIL-STD-810G, Method 514.6E-1
Sinusoidal	ASAE EP455, 5.15.2 Level 1 & 2

Compliance FCC, IC, CE

Ingress Protection Rating IP67

- TERRASTAR-D subscriptions are available from TeeJet.
- L2 P for GLONASS.
- L2 C/A for GLONASS.
- 50 Hz while tracking up to 20 satellites.
- Typical value. No almanac or ephemerides and no approximate position or time.

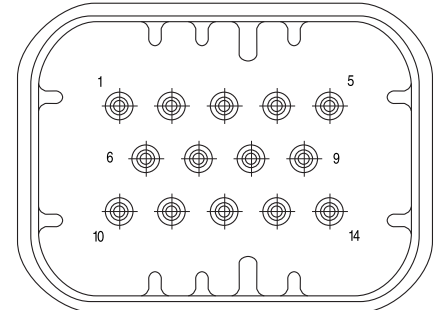
Warranty

1 year from Date of Purchase

Electrical Connection

Connector Pin-outs

Figure 4: Connector Pin-outs



Pin	Use
1	COM1TxD
2	COM1RxD
3	COM2TxD
4	COM2RxD
5	Signal Ground (COM/MKI/PPS)
6	CAN+
7	CAN-
8	COM3TxD
9	Power Negative/Return
10	Reserved
11	MKI (Mark Input)
12	PPS (Pulse Per Second) Output
13	COM3RxD
14	Power Positive/Source

- Typical value. Almanac and recent ephemerides saved and approximate position and time entered.
- Export licensing restricts operation to a maximum of 515 meters per second.
- Time accuracy does not include biases due to RF or antenna delay.
- Power consumption values for GPS L1/L2.