

## 2.3 | GNSS Receiver & IMU Compatibility

The requirements below outline the important components and considerations for using a GNSS receiver with **Level COMMAND**.

- StarFire RTK, NMEA 0183 Fixed RTK over RS232 serial, or NMEA 2000 Fixed RTK output over ISOBUS/CANBUS.
- Suitable adapters are available to connect RS232 or CANBUS and 12V external power to the **COMMAND** harnessing system.
- Ruggedised and suitable for earthmoving machine control applications.

Receivers being used with **COMMAND** must be capable of RTK positioning calculations. Differential GNSS or SF corrected signals e.g. SF3 are **NOT** considered suitable for implement position feedback as position accuracy and repeatability are insufficient.



### John Deere StarFire™

**COMMAND** is able to interface with all modern StarFire receivers over ISOBUS/CANBUS for position feedback, including StarFire 3000, 6000, 7000 & 7500 models.

### NMEA 2000 (CANBUS)



**COMMAND** is able to interface with GNSS receivers supporting NMEA 2000 standard output over ISOBUS/CANBUS for position feedback including but not limited to Case Vector Pro, New Holland PLM Cygnus & Trimble NAV 900 receivers.

## Supported NMEA 2000 PGNs

- **129029** - GNSS Position Data
- **129539** - GNSS DOPs
- **129025** - Position, Rapid Update
- **129026** - COG & SOG, Rapid Update
- **129028** - Altitude Delta, Rapid Update

## Position Update Rate

A minimum position update rate of 5 Hz is required. **10 Hz is recommended.**



## NMEA 0183 (RS232 Serial)

**COMMAND** is able to interface with any receiver capable of providing NMEA 0183 standard sentences over RS232 serial for position feedback. The sentences below are required at a minimum for usage with **Level COMMAND**.

## Required Sentences

- **GGA** - Time, position, and fix related data
- **GSA** - GNSS DOP and active satellites
- **VTG** - Actual track made good and speed over ground

## Optional Sentences

- **RMC** - Position, Velocity, and Time
- **ZDA** - UTC day, month, and year, and local time zone offset

## Position Update Rate

A minimum message rate of 5 Hz is required. **10 Hz** is recommended.

## RS232 Baud Rate

The RS232 baud rate can be selected in **Level COMMAND** as 19200, 38400, 57600, and 115200 bps. A baud rate of **38400** is recommended.

## Compatible Cross-slope / Roll / Tilt Sensors

For users making use of Cross-slope control using the **COMMAND** ECU's second output function, we recommend the use of the **T3H-E003** COMMAND Inclination Sensor – TARS-B to ensure that the angle sensor being used is robust and accurate for automatic implement control.



## StarFire™ TCM (Terrain Compensation Module)

**COMMAND** can make use of the in-built StarFire TCM, which provides feedback on pitch and roll angle of the receiver. The StarFire TCM can be selected as a Cross-slope / Tilt sensor but we cannot guarantee the accuracy / bias drift of the sensor and generally recommend the use of **T3H-E003** shown below.



## T3H-E003 - **COMMAND** Inclination Sensor

A TARS-B inertial measurement unit configured by T3RRA can be used to provide reliable feedback on the pitch and roll angle of the implement and can be mounted on the scraper for automatic Cross-slope control when using receivers such as Case IH Vector Pro or Trimble NAV 900.

---