

Topcon XR-1

GNSS Receiver and Steering Controller Positioning, Guidance and Autosteering



Compatible with many agricultural machines, the Topcon XR-1 receiver and steering controller provides reliable positioning data and autosteering in an economical yet durable form. Integrated independently or synergistically with Topcon Value Line Steering solutions, the XR-1 is designed modular for the variable needs of commercial agriculture.

- » Expanded satellite constellation tracking (Dual Frequency)
- » Scalable accuracy (SBAS, DGPS, PPP, RTK)
- » Access to all Topnet Live correction services (Satellite and Cellular)
- » High durability (IP67, IP69K)
- » Modular design (Standalone or part of Value Line Steering solution)

Electrical

Supply Voltage	9-36V DC
Supply Current	Approximately 600mA
Power consumption	<6W
Communications Ports	2x CAN (J1939) 2x RS232 1x Automotive Ethernet 802.3bw (100Base-T1)
Comms Port protection	Protected to 36V
EMC/EMI	ISO 14982 ECE Reg 10 CISPR23, FCC Part 15
E-field susceptibility	ASAE EP455 (R2012)
ESD	ISO 10605 (2008)

Environmental

Operating temperature	-40°C to +70°C
Storage temperature	-40°C to +85°C
Ingress protection	IP67, IP69K
Vibration (sinusoidal)	IEC 60068-2.6 (Ed7.0)
Vibration (random)	ISO 15003 (2008)
Drop test	IEC 60068-2.31/2.32 ISO 2248 (Ed 2.0)
Damp heat cyclic	IEC 60068-2.30
Chemical brush	ISO 15003-5.10 (2006)
Wash	ASAE EP455-5.6 (R2012)
Certifications	CE, FCC, RED, UKCA, RCM, E Mark

Inputs/Outputs

Input	Receiver power enable
Output	One pulse per second

Protocols

RS-232	Topcon GRIL/NMEA0183
CAN	NMEA2000 (Decimal PGNs: 129026, 129027, 129029, 129033, 129283)

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GNSS

Tracking Specifications	
Tracked Signals	GPS: L1C/A, L1C*, L2C GLONASS: L1C/A, L2C/A GALILEO: E1, E5b BeiDou: B1, B2 QZSS: L1C/A, L1C, L1-SAIF, L2C SBAS: WAAS, EGNOS, MSAS, GAGAN, SDCM*, AUSBAS* L Band
Time to First Fix (50%)	Hot (almanac and recent ephemeris and approx. position) < 2 sec Cold (no almanac or ephemeris, no approx. position or time) < 25 sec
Data Features	
Data Format	Proprietary (TPS) data format RTCM SC104 version 3.x CMR and CMR+ (public version) ¹
ASCII Output	NMEA 0183 version v4.x
Position and velocity Features	
DION™	Active filter reduces disturbances in positional results, leading to smoother, more consistent output in static and dynamic applications; also allows seamless transition between positioning modes.
Geometric Attitude Filter	A novel algorithm robustly combines GNSS, inertial and odometer measurements to provide accurate 3D orientation in all conditions.
Velocity Filter	Adaptively reduces noise errors while correcting dynamic errors in raw velocity estimates.
Antijamming and Anti-spoofing	Resisting for jamming and detects spoofing presence. Integrated spectrum analyser provides clear picture of the external environment to the user.
Horizontal Position Accuracy** (RMS)	
Standalone	Position (95%) = 1.5m Pass-to-pass (15 min) = 35cm
SBAS	Position (95%) = 70cm Pass-to-pass (15 min) = 30cm
Topnet Live PPP services	
Topnet Live Starpoint	Position (95%) = 40cm Pass-to-pass (15 min) = 15cm
Topnet Live Starpoint Pro	Position (95%) = 2.5cm Pass-to-pass (15 min) = 2.5cm
Topnet Live Skybridge	Supplements RTK positioning during temporary radio or cellular link outage
RTK	1cm + 1ppm
Velocity Accuracy	0.05m/sec

¹ CMR/CMR+ is a third-party proprietary format. Use of this format is not recommended and performance cannot be guaranteed. Use of industry standard RTCM 3.x is always recommended for optimal performance.

* HW ready, signals, services and features will be available for usage after system release/ FW update, etc.

** These specifications will vary depending on the number of satellites used, obstructions, satellite geometry (PDOP), occupation time, multipath effects, and atmospheric conditions. Performance may be degraded in conditions with high ionospheric activity, extreme multipath, or under dense foliage. For maximum system accuracy, always follow best practices for GNSS data collections.

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GNSS

Sensor Fusion

Integrated Inertial Unit	3-Axis accelerometer, 3-Axis gyroscope and 3-Axis magnetometer (compass)
ISOBUS Sensor Support	Wheel angle sensor, odometer
Accuracy (RMS)	Pitch & roll = 0.2deg. Heading = 0.5deg.

Steering Control

Electric	XW-1
Vehicle Platforms (steering)	Front-steered

Path Planning

Waylines	Parallel AB, parallel A+heading, center pivot, identical curve, headland turns, guidelock, steer to boundary, multiple AB lines.
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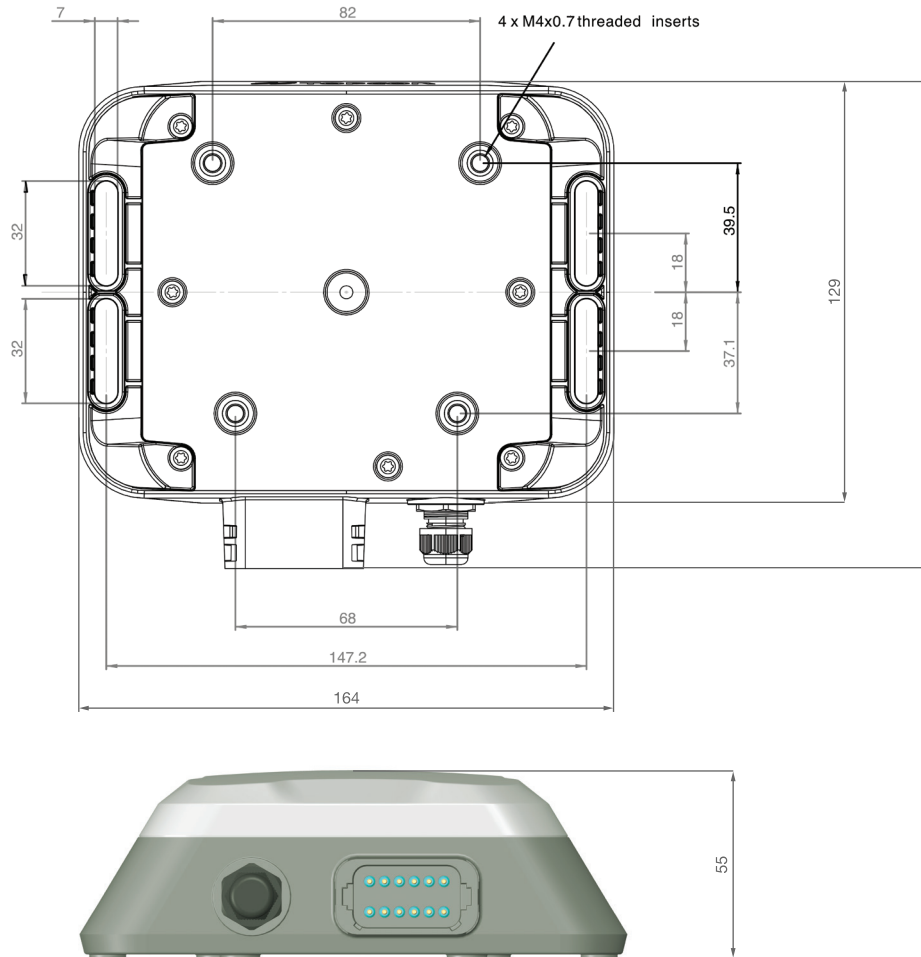
Physical

Housing	Plastic UV protected enclosure. See "Dimensions" section
Connectors	1x 12 Pin Deutsch DT (Power/Communications), 1x 5 pin M12 (Communications)
LEDs	1x RGB
Weight	Approx. 440g

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Dimensions



Note: dimensions are in millimeters (mm)