

Smartgloves II Technical Specifications

Performance & accuracy specification

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Using this document. Each parameter has a **Ref** (left column), and this document has a version (shown on this page). If you have a question about any value — for support or otherwise — please quote its **Ref** and the document version so we can identify exactly which figure and revision you are referring to.

Electrical characteristics

Ref	Parameter	Conditions	Min	Typ	Max	Unit
EL-01	Power consumption ¹	All systems on	255	285		mA

Sensors & Tracking overview

Ref	Parameter	Conditions	Min	Typ	Max	Unit
TR-01	Tracked degrees of freedom	Device driver output. 6 dof per finger/arm sensor pose + 3 dof for hub orientation		39		
TR-02	Tracked degrees of freedom with Coil Pro	See TR-01 + 6 dof for Coil Pro tracking.		45		
TR-03	Total number of sensor axes	In raw sensor data.		63		
TR-04	Output data rate	From device to device service		83.33		Hz
TR-05	Latency (WiFi)	Motion to device-service output. From motion to output from the device service. On the WiFi there can be a lot of jitter, so the average value is provided. Note that we sample 83.3 Hz → every 12 ms. We define the motion to be in the middle of a sample, so with this sample rate we will always start with a latency of 6 ms. If we define the latency from measurement done, subtract 6 ms.		20		ms
TR-06	Latency (USB)	See conditions on TR-05. USB has much less jitter.		19		ms

EMF characteristics - Hub transmitter

The hub is the transmitter on the back of the hand. "Hub tracking" reports position relative to the hub; "Coil Pro tracking" relative to an external Coil Pro transmitter.

Ref	Parameter	Conditions	Min	Typ	Max	Unit
ET-01	Transmitter voltage			1.00		V rms

EMF characteristics - Finger sensor

The numbers in this table indicate performance before Sensor Fusion.

Ref	Parameter	Conditions	Min	Typ	Max	Unit
EF-01	Receiver sampling rate			96		kHz
EF-02	Receiver voltage amplitude noise ²	fs=96 kHz, 576-sample window, worst sensor connector	70.7	70.8	100.0	uV rms
EF-03	Position noise, hub tracking ²	On-axis @ 12 cm, stddev., worst channel (see fig. <i>Precision — hub tracking (finger)</i>)	1.22	1.23	1.73	mm

¹min = LED ring off / typ = white LED ring on

²min = shielded / typ = typical env / max = bad env

³typ = mean across channels; min/max = $\pm 3\sigma$ device-tolerance envelope over channels

Ref	Parameter	Conditions	Min	Typ	Max	Unit
EF-04	Position accuracy, hub tracking ³	Mean across sphere @ 12 cm, sim. based on measured tolerances (see fig. <i>Accuracy — hub tracking (finger)</i>)	0.00	1.60	3.54	mm

EMF characteristics - Arm sensor

The numbers in this table indicate performance before Sensor Fusion.

Ref	Parameter	Conditions	Min	Typ	Max	Unit
EA-01	Receiver sampling rate			96		kHz
EA-02	Receiver voltage amplitude noise ²	fs=96 kHz, 576-sample window	1.3	4.0	70.7	uV rms
EA-03	Position noise, hub tracking ²	On-axis @ 12 cm, stddev., worst channel (see fig. <i>Precision — hub tracking (arm)</i>)	0.00	0.01	0.23	mm
EA-04	Position noise, Coil Pro tracking ²	On-axis @ 1 m, stddev. (see fig. <i>Precision — Coil Pro tracking</i>)	0.01	0.04	0.66	mm
EA-05	Position accuracy, hub tracking ³	Mean across sphere @ 12 cm, sim. based on measured tolerances (see fig. <i>Accuracy — hub tracking (arm)</i>)	0.20	3.00	5.77	mm
EA-07	Minimum range / saturation distance, Coil Pro ⁴	Distance where the AC signal reaches the clipping amplitude	0.39		0.47	m
EA-08	Maximum range, Coil Pro tracking ⁵	Distance where on-axis 1 σ position noise reaches 20 mm (see fig. <i>Precision — Coil Pro tracking</i>)	2.35	4.81	6.41	m

IMU characteristics

Ref	Parameter	Conditions	Min	Typ	Max	Unit
IM-01	Sampling rate			250.00		Hz

Magnetometer characteristics

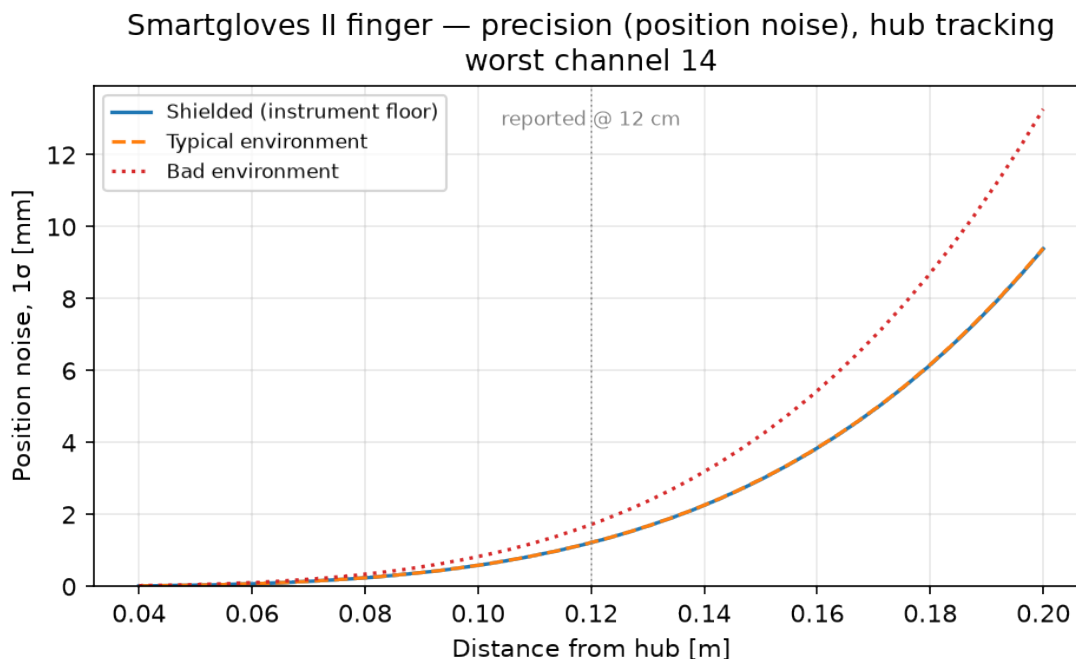
Ref	Parameter	Conditions	Min	Typ	Max	Unit
MG-01	Sampling rate			83.33		Hz

⁴min = on-axis (best alignment); max = worst-case body-diagonal orientation

⁵max = shielded / typ = typical env / min = bad env

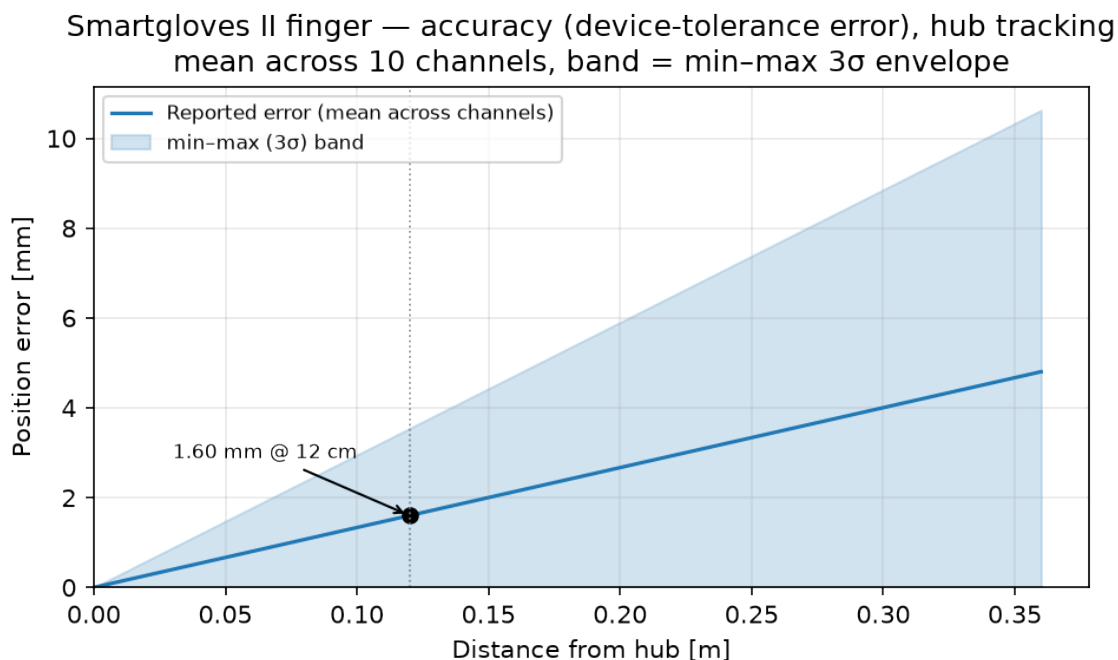
Performance figures

Precision — hub tracking (finger)



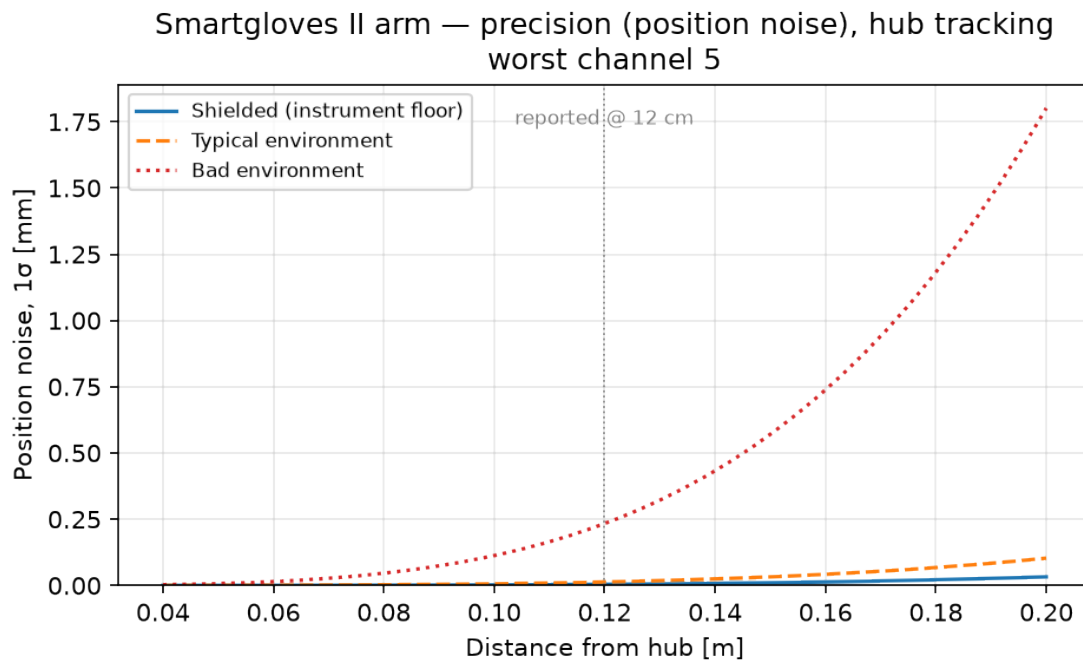
Worst-channel 1σ position noise vs distance from the hub for the finger sensor, for the shielded / typical / bad environments. The reported value is taken at the hub evaluation distance.

Accuracy — hub tracking (finger)



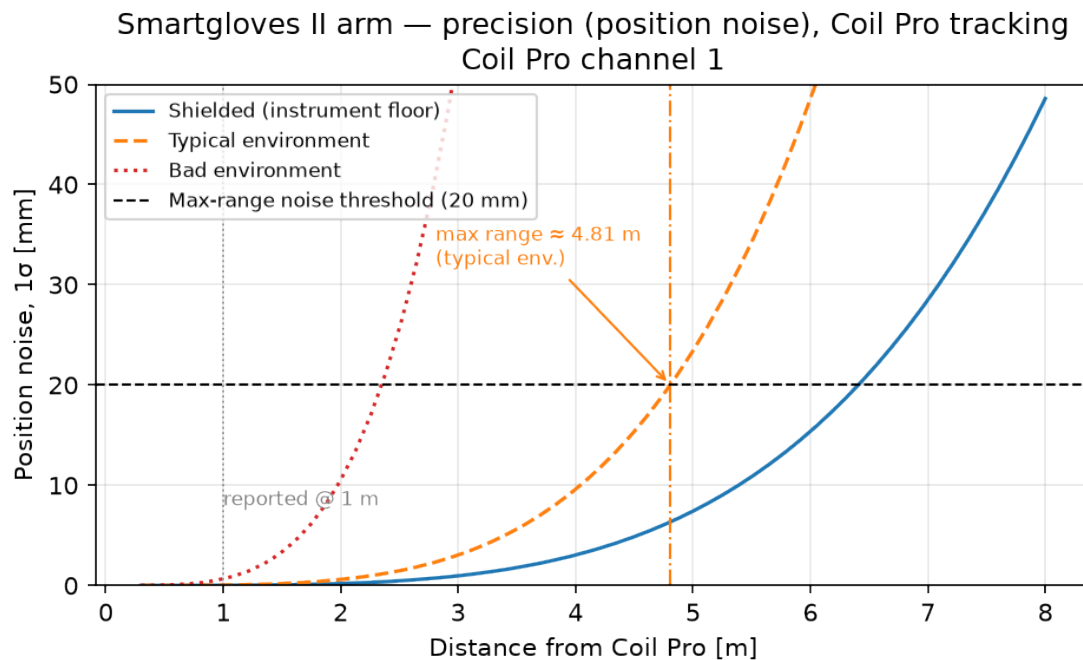
Device-tolerance position error vs distance (linear through the origin) for the finger sensor. The reported error is the mean across channels; the band is the min-max 3σ device-tolerance envelope across channels. Annotated at the hub evaluation distance.

Precision — hub tracking (arm)



Worst-channel 1σ position noise vs distance from the hub for the arm sensor, for the shielded / typical / bad environments. The reported value is taken at the hub evaluation distance.

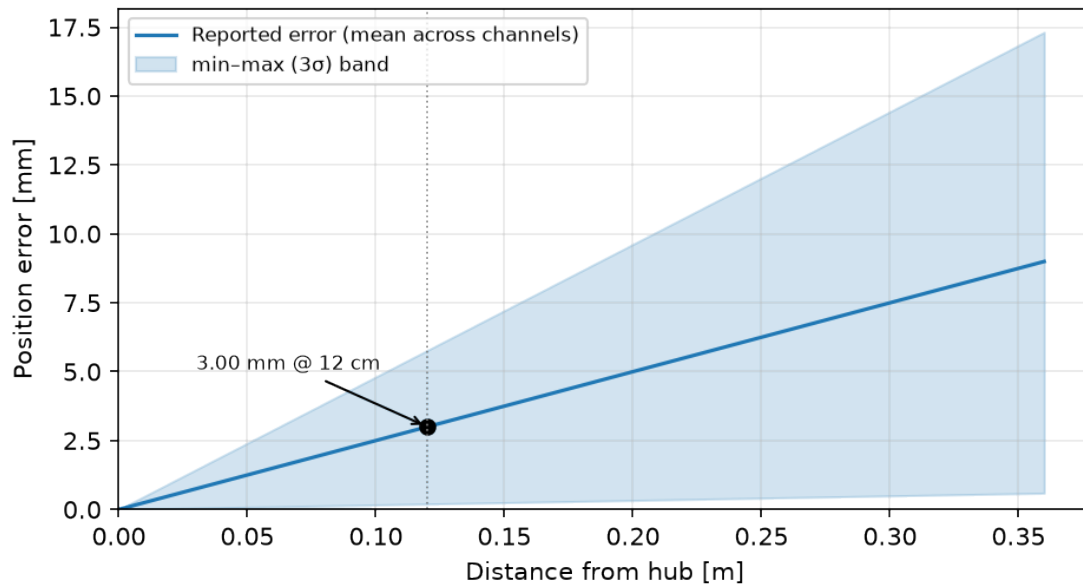
Precision — Coil Pro tracking



1σ position noise vs distance from the Coil Pro transmitter, per environment. The typical-environment curve crosses the noise threshold at the maximum tracking range (marked).

Accuracy — hub tracking (arm)

Smartgloves II arm — accuracy (device-tolerance error), hub tracking
mean across 10 channels, band = min-max 3σ envelope



Device-tolerance position error vs distance (linear through the origin) for the arm sensor. The reported error is the mean across channels; the band is the min-max 3σ device-tolerance envelope across channels. Annotated at the hub evaluation distance.