Smartgloves I Technical Specifications

Performance & accuracy specification

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Electrical characteristics

Ref	Parameter	Conditions	Min	Typ	Max	Unit
EL-01	Power consumption	All systems on		390		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.		60		
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

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			1.51		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[1]	fs=96 kHz, 576-sample window, worst sensor connector	70.7	70.8	100.0	uV rms
EF-03	Position noise, hub tracking[1]	On-axis @ 12 cm, stddev., worst channel (see fig. *Precision — hub tracking (finger)*)	0.94	0.94	1.33	mm

EMF characteristics - Arm sensor

The numbers in this table indicate performance before Sensor Fusion.

[1] min = shielded / typ = typical env / max = bad env

Ref	Parameter	Conditions	Min	Typ	Max	Unit
EA-01	Receiver sampling rate			96		kHz
EA-02	Receiver voltage amplitude noise[1]	fs=96 kHz, 576-sample window	14.0	14.5	72.1	uV rms
EA-03	Position noise, hub tracking[1]	On-axis @ 12 cm, stddev., worst channel (see fig. *Precision — hub tracking (arm)*)	0.06	0.07	0.33	mm
EA-04	Position noise, Coil Pro tracking[1]	On-axis @ 1 m, stddev. (see fig. *Precision — Coil Pro tracking*)	0.21	0.21	0.78	mm
EA-06	Position accuracy, Coil Pro tracking[2]	Per-meter error, mean across sphere (see fig. *Accuracy — Coil Pro tracking*)	2.22	12.65	23.08	mm/m
EA-07	Minimum range / saturation distance, Coil Pro[3]	Distance where the AC signal reaches the clipping amplitude	0.46		0.55	m
EA-08	Maximum range, Coil Pro tracking[4]	Distance where on-axis 1σ position noise reaches 20 mm (see fig. *Precision — Coil Pro tracking*)	2.25	3.11	3.13	m

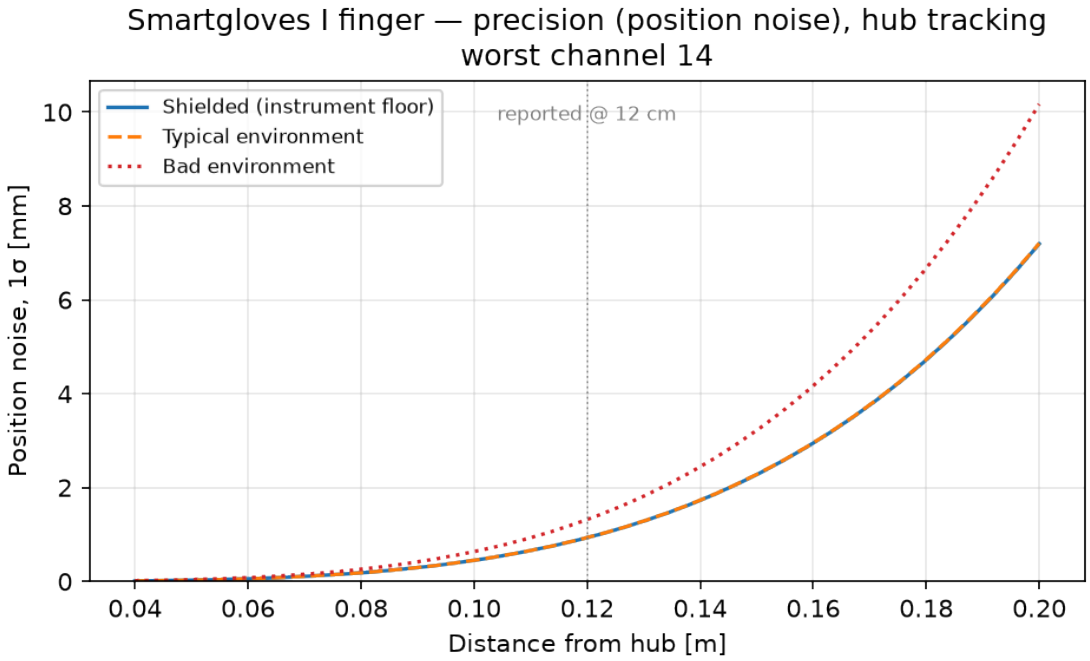
IMU characteristics

Ref	Parameter	Conditions	Min	Typ	Max	Unit
IM-01	Sampling rate			166.67		Hz

[2] typ = mean; min/max = ±3σ device-tolerance spread
[3] min = on-axis (best alignment); max = worst-case body-diagonal orientation
[4] max = shielded / typ = typical env / min = bad env

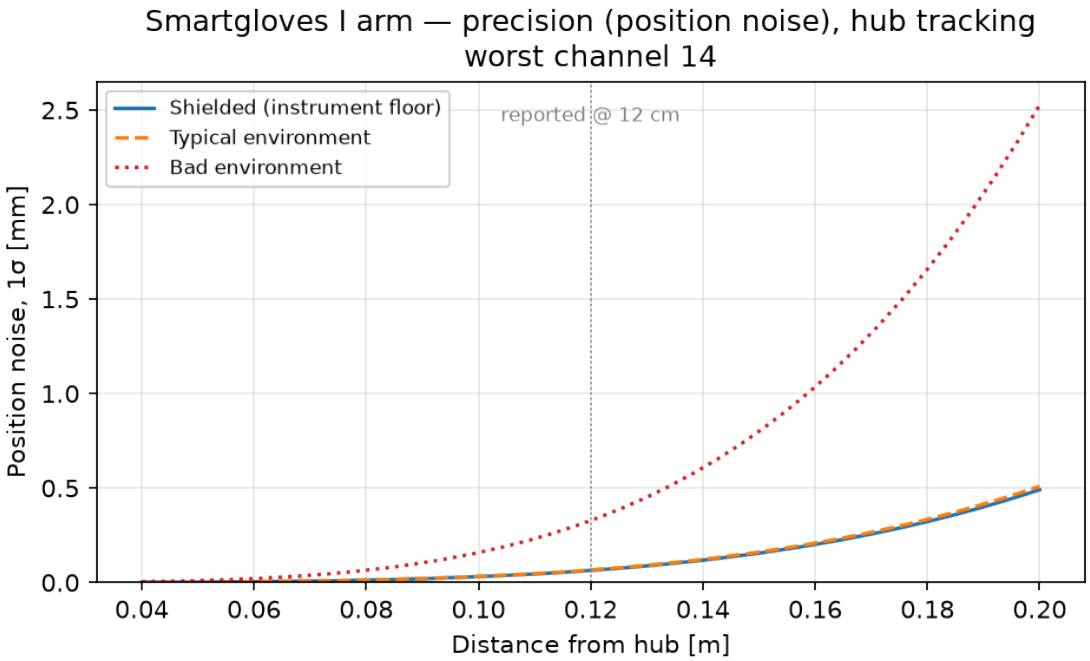
Performance figures

Precision — hub tracking (finger)



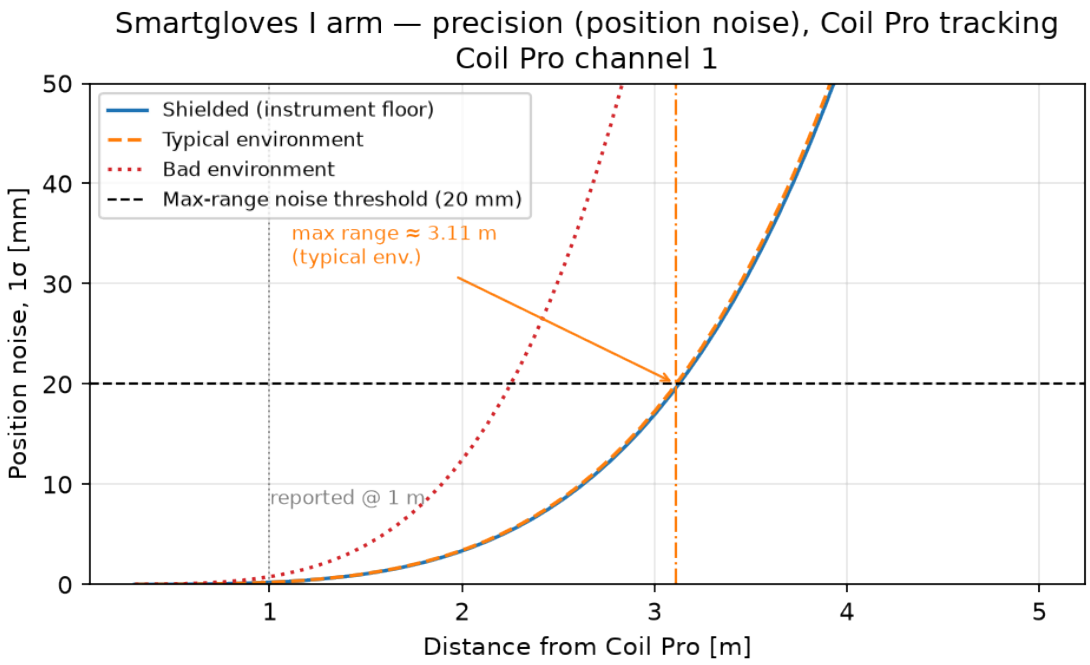
Worst-channel 1σ position noise vs distance from the hub for the finger sensor, for the shielded / typical / bad environments. The reported value is taken at the hub evaluation distance.

Precision — hub tracking (arm)



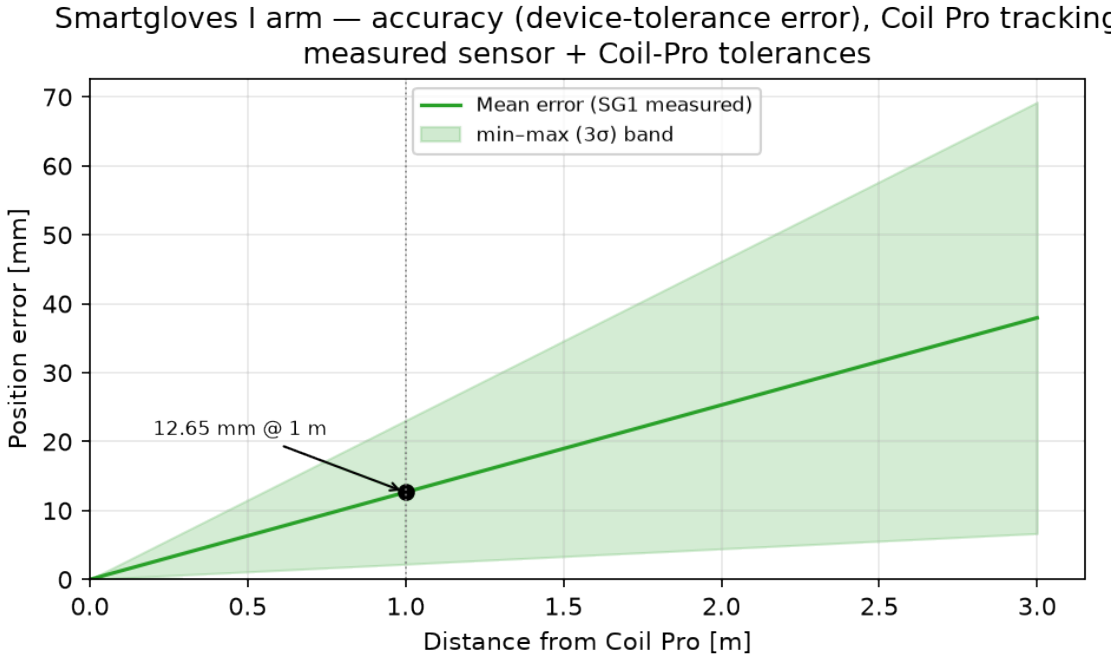
Worst-channel 1σ position noise vs distance from the hub for the arm sensor, for the shielded / typical / bad environments. The reported value is taken at the hub evaluation distance.

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 — Coil Pro tracking



Device-tolerance position error vs distance for Coil Pro tracking (measured sensor + Coil-Pro tolerances), with the ±3σ band. Annotated at the Coil Pro evaluation distance.