

GPS-Aided Inertial Navigation Systems

**INS-FI** 









The **Inertial Labs GPS-Aided Inertial Navigation System (INS-FI)** is the newest Inertial Navigation System (INS) developed by Inertial Labs using Tactical-grade Fiber Optic Gyroscope technology. The INS-FI is the result of over 20 years of experience in developing and supplying INS solutions to land, marine and aerial platforms around the world.

The fully integrated INS-FI contains an Inertial Measurement Unit (IMU) combining Fiber Optic Gyroscopes and MEMS Accelerometers, along with all constellations (GPS, GLONASS, GALILEO, QZSS, BEIDOU and NAVIC) and multiple bands GNSS receiver. It determines horizontal and vertical positions, velocity, and absolute orientation (Heading, Pitch and Roll) for any device on which it is mounted. Horizontal and vertical Position, velocity, and orientation are determined with high accuracy for both motionless and dynamic applications.



Due to its high-performing FOG IMU, the **INS-FI** can measure GNSS-free Heading (True North) with less than 0.5 deg error, Horizontal & Vertical Positions with approximately 0.1% error of Distance Traveled for land applications, and 5 nautical miles per hour drift for aerospace (Unmanned Aerial Vehicles) applications without GNSS signal.

**INS-FI** is fully compatible with the Inertial Labs developed VINS (Visual Inertial Navigation Systems) and SAMC (Stand-Alone Magnetic Compass).

The **INS-FI** contains Inertial Labs' latest version of the on-board sensor fusion filter, state of the art navigation and guidance algorithms, and calibration software.

### **KEY FEATURES, BENEFITS & FUNCTIONALITY**

- Commercially exportable GPS-Aided Inertial Navigation System (ECCN 7A994)
- 3-in-1 strapdown system: IMU + AHRS + INS
- Fiber Optic Gyroscopes (FOG) & MEMS accelerometers Inertial Measurement Unit (IMU)
- NovAtel OEM7, u-blox ZED-F9P, or Septentrio mosaic-H High Precision GNSS receiver
- Embedded Anti-Jamming and Spoofing mitigation features
- L1/L2/L5 GPS, GLONASS, GALILEO, BEIDOU, QZSS, IRNSS
- SP, SBAS, DGPS, RTK and PPP for real time operation
- Sensor fusion algorithms with advanced extended Kalman Filter
- State-of-the-art algorithms for Land, Aerospace and Maritime applications
- Full temperature calibration of all sensing elements according to MIL-STD-810 standard
- MIL-STD-461 standard based EMC, EMI, and ERD protection
- Aiding data: Wind sensor, Air Speed Sensor, Doppler shift from locator (for long-term GPS denied), External
  position and External Heading
- Internal/External Air Data Computer (ADC) and External Stand-Alone Magnetic Compass (SAMC)
- Full integration with ArduPilot platform



# **SPECIFICATIONS**

	ECIFICATIONS									
	Parameter	Units								
	Input signals			al Air Data Computer (ADC), Wind sensor, Air Speed Sensor, Doppler shift from locator (for long-term GPS denied),						
യ് വ	Tiput signals		External position and External Heading aiding da							
Inputs & Outputs			IMU data: Accelerations, Angular rates, Magnetic field;  AHRS data: Heading, Pitch & Roll							
월집	Output cignals		MRU data: Heave, Surge, Sway							
로보	Output signals		INS data: Positions, Velocity, Delta Theta and D	Pelta Velocity, GNSS data, Time						
Inputs Output			External Air Data Computer data: Static Pres Calibrated Airspeed, True Airspeed, Mach-Numb				ressure Altitude,			
	Update rate	Hz	Calibrated Airspeed, True Airspeed, Placti-Numb	1 200 (INS & AHRS da	ta); up to 1000 (IMU data)	k, Rate of Cillib				
	Start-up time	sec			<1					
	Positions, Velocity, and Timestamps									
	Horizontal position accuracy (SP)	meters			.2					
듣	Horizontal position accuracy (SBAS) (1)	meters			1.6					
Navigation	Horizontal position accuracy (DGPS)  Horizontal position accuracy (PPP TerraStar-C PRO) (2)	meters meters			0.4					
ō	Horizontal position accuracy (RTK)	meters	0.025 0.01							
. <u>©</u> .	Vertical position accuracy (RTK)	meters								
2	Velocity accuracy (OEM7720, Mosaic H), RMS	m/sec								
ž	Velocity accuracy (uBlox F9P), RMS	m/sec								
	Horizontal Position accuracy (free inertial, land vehicles)  Horizontal Position accuracy (free inertial, aerial)	% DT meters	0.1							
	Heading	meters			5					
	Range	deg		0 to	360					
	Angular Resolution	deg	0.01							
_	Static & Dynamic Accuracy (4) (Dual antenna, 1 meter baseline)	deg			.15					
5	Static & Dynamic Accuracy (4) (Dual antenna, 2 meters baseline)	deg			.08					
Ť	Dynamic Accuracy (4) (Single antenna)  Post processing accuracy (3)	deg deg			.15 .01					
T	Free inertial	deg			1.5					
Ē	With External Stand-Alone Magnetic Compass (after calibration)	deg			1					
Orientation	Pitch and Roll									
Ö	Range Angular Resolution	deg			±180					
_	Angular Resolution Static Accuracy	deg deg			.01 .01					
	Dynamic Accuracy	deg			.01					
	Post processing accuracy (3)	deg			005					
	Gyroscopes									
	Technology				loop FOG					
	Measurement range	deg/sec			490					
	Bandwidth (-3dB) Data update rate	Hz Hz			00					
	Bias in-run stability (Allan Variance)	deg/hr			025					
	Bias repeatability (over temperature range)	deg/hr			1.5					
	SF accuracy (over temperature range)	ppm			00					
_	Noise. Angular Random Walk (ARW) <sup>(8)</sup>	deg/√hr			025					
IMU	Non-linearity Accelerometers	ppm			50					
Ħ	Technology			M	EMS					
	Measurement range	g	±8			±40				
	Bandwidth (-3dB)	Hz								
	Data update rate	Hz	0.005	000	0.03					
	Bias in-run stability (RMS, Allan Variance) Bias repeatability (over temperature range)	mg mg	0.005 0.5			0.02 1.2				
	SF accuracy (over temperature range)	ppm	150			500				
	Noise. Velocity Random Walk (VRW) <sup>(8)</sup>	m/sec/√hr	0.015	0.045						
	Non-linearity	ppm			50					
	Receiver			Septentrio mosaic-H	Septentrio mosaic-X5	u-blox ZED-F9P	u-blox ZED-F9P L5			
			NovAtel OEM7720 NovAtel OEM719				Single			
	Number of GNSS Antennas	-	Dual Single	Dual	Single	Dual Single	GPS L1C/A L5:			
		-	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1	Dual GPS L1C/A, L1C, L1PY, L2C	, L2P, L5; GLONASS L1CA,	GPS L1C/A, L2C; GLONASS L1OF,	GPS L1C/A, L5; GLONASS L1OF;			
	Number of GNSS Antennas	-	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B1I, B1C,	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beide	, L2P, L5; GLONASS L1CA, bu B1I, B1C, B2a, B2I, B3;	GPS L1C/A, L2C; GLONASS L1OF, L2OF;	GLONASS L1OF; Galileo E1B/C, E5a;			
			Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B1I, B1C, B2I, B2a, B3I; Gallieo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A,	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beidi Galileo E1, E5a, E5b, E5	, L2P, L5; GLONASS L1CA, pu B1I, B1C, B2a, B2I, B3; AltBoc, E6; QZSS L1C/A,	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b;	GLONASS L1OF; Galileo E1B/C, E5a; BeiDou B1I, B2a;			
S	Number of GNSS Antennas		Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BeiDou B1I, B1C, B2I, B2a, B3I; Galileo E1, E5 AltBOC, E5a,	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beide	, L2P, L5; GLONASS L1CA, pu B1I, B1C, B2a, B2I, B3; AltBoc, E6; QZSS L1C/A,	GPS L1C/A, L2C; GLONASS L1OF, L2OF;	GLONASS L1OF; Galileo E1B/C, E5a;			
SSI	Number of GNSS Antennas  GNSS Constellations		Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1. C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B22, B31; Gailleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5;	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beidi Galileo E1, E5a, E5b, E5	, L2P, L5; GLONASS L1CA, Du B1I, B1C, B2a, B2I, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NavIC L5; ; GAGAN; SBAS L1C/A;			
Z	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections	-	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B1I, B1C, B2I, B2A, B3I; Gallieo E1, E5 AltBOC, E5A, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beidi Gallieo E1, E5a, E5b, E5 L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B2I, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band	GPS L1C/A, L2C; GLONASS L10F, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS	GLONASS L1OF; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NavIC L5 ; GAGAN; SBAS L1C/A; S; RTK			
GNSS	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration <sup>(5)</sup>	- Channels	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B1I, B1C, B2I, B2a, B3I; Gallieo E1, E5 AtBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beidi Galileo E1, E5a, E5b, E5 L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G	, L2P, L5; GLONASS L1CA, DI B1I, B1C, B2a, B2I, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NavIC L5; GAGAN; SBAS L1C/A; S; RTK			
Z	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections	-	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gailleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar  555 5 / 20 / 100	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beidi Gallieo E1, E5a, E5b, E5 L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.	, L2P, L5; GLONASS L1CA, DI B1I, B1C, B2a, B2I, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B11, B21; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP	GLONASS L1OF; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NavIC L5 ; GAGAN; SBAS L1C/A; S; RTK			
Z	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration <sup>(5)</sup> GNSS Data Rate <sup>(6)</sup> RTIK Corrections  Velocity Accuracy	- Channels Hz - m/s	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1. C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555  5/20/100  RTC	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CMM; Beld Galileo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.  44 100 ( M 2, RTCM 3 0.03	, L2P, L5; GLONASS L1CA, bu B1I, B1C, B2a, B2I, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK -8 max)	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B11, B21; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 10 RT	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; ; GAGAN; SBAS L1C/A; 5; R4 , 20 CM 3			
Z	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration <sup>(5)</sup> GNSS Data Rate <sup>(6)</sup> RTK Corrections  Velocity Accuracy Initialization Time	- Channels Hz - m/s S	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gailleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar  555 5 / 20 / 100	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beid, Galileo E1, E5a, E5b, E5 L1C, L2C, L5, L6; WAAS; EGNOS; MSAS; G  44 100 ( M 2, RTCM 3 0.03  <45 (cold start);	, L2P, L5; GLONASS L1CA, bu B1I, B1C, B2a, B2I, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK -8 max)	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Gallieo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 10 RT 0 <30 (cold start)	GLONASS L10F; Galileo E1B/C, E5a; BeilDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; ; GAGAN; SBAS L1C/A; ;; RTK 20 M 3 .05 , <10 (hot start)			
Z	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (5)  GNSS Data Rate (6)  RTK Corrections  Velocity Accuracy  Initialization Time  Time Accuracy (clock drift) (7)	- Channels Hz - m/s	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B1I, B1C, B2I, B2A, B3I; Galliec B1, E5 AtBOC, E5A, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC  <39 (cold start), <20 (hot start)	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beid Galileo E1, E5a, E5b, E5 L1C, L2C, L5, L6; WAAS; EGNOS; MSAS; G.  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 8 max)	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Gallieo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start)	GLONASS L10F; Gallieo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; (GAGAN; SBAS L1C/A; S; RTK 84 , 20			
Z	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration <sup>(5)</sup> GNSS Data Rate <sup>(6)</sup> RTIK Corrections  Velocity Accuracy  Initialization Time  Time Accuracy (clock drift) <sup>(7)</sup> Air Data Computer	Channels Hz - m/s S Nano sec	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC  <39 (cold start), <20 (hot start)	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CMM; Beld Galileo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20	, L2P, L5; GLONASS L1CA, bu B1I, B1C, B2a, B2I, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 8 max)  <20 (hot start)	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B11, B21; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 10 RT 0 <30 (cold start	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK 84 , 20 CM 3 .05 ., <10 (hot start) 30 MAX			
Z	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (3) GNSS Data Rate (6) RTK Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer	- Channels Hz - m/s S Nano sec	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B1I, B1C, B2I, B2A, B3I; Galliec B1, E5 AtBOC, E5A, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC  <39 (cold start), <20 (hot start)	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beid, Galileo E1, E5a, E5b, E5 L1C, L2C, L5, L6; WAAS; EGNOS; MSAS; G  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20 2PE ±6	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; Q2SS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 8 max) <20 (hot start)	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B11, B21; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 10 RT 0 <30 (cold start	GLONASS L10F; Gallieo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; (GAGAN; SBAS L1C/A; S; RTK 84 , 20			
N U	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration <sup>(5)</sup> GNSS Data Rate <sup>(6)</sup> RTIK Corrections  Velocity Accuracy  Initialization Time  Time Accuracy (clock drift) <sup>(7)</sup> Air Data Computer	Channels Hz - m/s S Nano sec	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC  <39 (cold start), <20 (hot start)	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beidd Galileo E1, E5a, E5b, E5 L1C, L2C, L5, L6; WAAS; EGNOS; MSAS; G.  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20 2PE ±66 300 t	, L2P, L5; GLONASS L1CA, bu B1I, B1C, B2a, B2I, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 8 max)  <20 (hot start)	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B11, B21; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 10 RT 0 <30 (cold start	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTKN 84 , 20 CM 3 .05 ., <10 (hot start) 30 MAX			
N U	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (5) GNSS Data Rate (6) RTK Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Accuracy Dynamic Pressure Range	Channels Hz	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC  <39 (cold start), <20 (hot start)	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beid Gallieo E1, E5a, E5b, E5 L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20 2PE	, L2P, L5; GLONASS L1CA, Du B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK  8 max)  <20 (hot start)  XT  00 0 1100 0.11 0 600	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B11, B21; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 10 RT 0 <30 (cold start	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B11, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; GAGAN; SBAS L1C/A; S, TA O O O O MAX			
N U	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (5) GNSS Data Rate (6) RTK Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Range Static Pressure Accuracy Dynamic Pressure Angue Dynamic Pressure Accuracy	Channels Hz - m/s s Nano sec mbar hPa, % FS % FSS hPa % FSS	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beld Gallieo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20 2PE ±6 300t ± 0.15 t	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK  8 max)  <20 (hot start)  XT 00 0 1100 0.1 0 6000 0.255	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B11, B21; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 10 RT 0 <30 (cold start	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; GAGAN; SBAS L1C/A; S; CM 3 0.5 0, <10 (hot start) 00 MAX			
N U	Number of GNSS Antennas  GNSS Constellations  GNSS Constellations  Channel Configuration (5) GNSS Data Rate (6) RTIK Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Accuracy Static Pressure Accuracy Dynamic Pressure Accuracy Dynamic Pressure Accuracy Pressure Accuracy Pressure Accuracy Pressure Accuracy Pressure Accuracy	Channels Hz - m/s s Nano sec mbar hPa, % FS hPa % FSS m	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CMM; Beld Galileo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.  44  100 ( M 2, RTCM 3  0.03  <45 (cold start); 20  20  46 300t ± 0.15t ± 10 -500	, L2P, L5; GLONASS L1CA, Du B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK  8 max)  <20 (hot start)  XT 00 0 1100 0.1 0 600 0.25 0.9000	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B11, B21; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 10 RT 0 <30 (cold start	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; GAGAN; SBAS L1C/A; S; CM 3 0.5 0, <10 (hot start) 00 MAX			
N U	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (5)  GNSS Data Rate (6)  RTK Corrections  Velocity Accuracy  Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Accuracy  Dynamic Pressure Accuracy  Dynamic Pressure Accuracy  Pressure Altitude Range  Pressure Altitude Range  Pressure Altitude Range  Pressure Altitude Accuracy	Channels Hz - m/s s Nano sec  mbar hPa, % FS % FSS hPa % FSS m m	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B1I, B1C, B2I, B2A, B3I; Galileo E1, E5 AltB0C, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC <a href="mailto:specifical-red">RTC</a> <a href="mailto:specifical-red">ATC</a> <a href="mailto:specifical-red">2P</a> ±25  0.15 to 25	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beid Galileo E1, E5a, E5b, E5 L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20 2PE	, L2P, L5; GLONASS L1CA, Du B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK  8 max)  <20 (hot start)  EXT  00 0 1100 0.1 0.600 0.255 0.9000	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Gallieo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10: RT 0 <30 (cold start	GLONASS L10F; Gallieo Elb/C, Esa; BeiDou BII, B2a; Q2SS L1C/A L1S L5; NavIC L5; SAGAN; SBAS L1C/A; S; RTK 84 20 20 20 30 30 30 30 30 4000			
N U	Number of GNSS Antennas  GNSS Constellations  GNSS Constellations  Channel Configuration (5) GNSS Data Rate (6) RTIK Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Accuracy Static Pressure Accuracy Dynamic Pressure Accuracy Dynamic Pressure Accuracy Pressure Accuracy Pressure Accuracy Pressure Accuracy Pressure Accuracy	Channels Hz - m/s s Nano sec mbar hPa, % FS hPa % FSS m	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CMM; Beld Gallieo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20 2pc ±6 300 t ± 0.15 t -500 i 5 to	, L2P, L5; GLONASS L1CA, Du B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK  8 max)  <20 (hot start)  EXT  00 0 1100 0.1 0.600 0.255 0.9000	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Gallieo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10: RT 0 <30 (cold start	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; GAGAN; SBAS L1C/A; S; CM 3 0.5 0, <10 (hot start) 00 MAX			
N U	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (5)  GNSS Data Rate (6)  RTK Corrections  Velocity Accuracy  Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Accuracy  Dynamic Pressure Accuracy  Dynamic Pressure Accuracy  Pressure Altitude Range Pressure Altitude Accuracy  Airspeed Accuracy  Airspeed Accuracy  Mach Number Range  Airspeed Accuracy  Mach Number Range	Channels Hz - m/s s Nano sec  mbar hPa, % FS % FSS hPa % FSS m m/sec m/sec M M	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BeBOU B11, B1C, B21, B2A, B31; Galileo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beid Gallieo E1, E5a, E5b, E5 L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20 2PE	, L2P, L5; GLONASS L1CA, Du B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK  8 max)  <20 (hot start)  CXT  00 0 1100 0.1 0 600 0.25 0 9000 1 310 0.1 0.5 0.999	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Gallieo E1B/C, E5b; BelDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP  1 10 RT 0 <30 (cold start 2P ±4	GLONASS L1OF; Gallieo E1B/C, E5a; BeiDou B1I, B2a; Q2SS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK 84 4, 20 20 20 30, <10 (hot start) 30 MAX 0000			
N U	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (5)  GNSS Data Rate (6)  RTIK Corrections  Velocity Accuracy  Initialization Time  Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range  Static Pressure Range  Static Pressure Accuracy  Dynamic Pressure Accuracy  Dynamic Pressure Accuracy  Pressure Altitude Accuracy  Airspeed Ancaracy  Airspeed Ancaracy  Airspeed Accuracy  Airspeed Accuracy  Mach Number Range  Mach Number Range	Channels Hz - m/s s Nano sec  mbar hPa, % FS hPa % FSS m m m/sec m/sec	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5/20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2 0.001	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CMA'; Beld Galileo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.  44 100 ( M 2, RTCM 3 0.03 <45 (cold start); 20 20 46 300t ± 6 300t 5 5 to 0.01t 0.0	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK  8 max)  <20 (hot start)  XT 00 0 1100 0.1 0 600 0.25 0 9000 1 1 310 0.5 0 0.99 0 0.99 0 0.99	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK B4 , 20 M3 000 MAX 000  to 2.5			
N U	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (3) GNSS Data Rate (6) GNSS Data Rate (7) GNSS Data Rate (7) GNSS Data Rate (7) ATT Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Accuracy Dynamic Pressure Accuracy Dynamic Pressure Range Dynamic Pressure Accuracy Pressure Atlitude Range Pressure Altitude Range Pressure Altitude Range Airspeed Accuracy Airspeed Accuracy Mach Number Range Mach Pressure Ver Total Pressure Range Pressure Over Total Pressure Range	Channels Hz . m/s s Nano sec  mbar hPa, % FS hPa % FSS hPa m m m m/sec M/sec M M	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BeBOU B11, B1C, B21, B2A, B31; Galileo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; Q2SS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5 / 20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beld Galileo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G  44  1000 M 2, RTCM 3 0.03  <45 (cold start); 20  2PE	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; Q2SS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK  8 max)  <20 (hot start)  XT  00  0 1100  0.1  0 600  0.25  0 9000  1  310  155  0 0.99  022  to 1	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAVIC L5; SAVIC L5; CM 3 CM 4 CM 4 CM 4 CM 4 CM 5 CM 5 CM 5 CM 6 CM 6 CM 6 CM 7 CM			
N U	Number of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (5)  GNSS Data Rate (6)  RTK Corrections  Velocity Accuracy  Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Accuracy  Dynamic Pressure Range Static Pressure Accuracy  Dynamic Pressure Accuracy  Pressure Altitude Range  Pressure Altitude Range  Pressure Altitude Accuracy  Airspeed Range  Airspeed Ange  Airspeed Accuracy  Mach Number Accuracy  Mach Number Accuracy  Static Pressure Over Total Pressure Range  Static Pressure Over Total Pressure Range	Channels Hz - m/s s Nano sec  mbar hPa, % FS % FSS hPa % FSS m m/sec m/sec M M m ppm	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5/20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2 0.001	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beid Galileo E1, E5a, E5b, E5 L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20  2PE	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 88 max)  <20 (hot start)  2XT 00 0 1 0 10 0 10 0 12 0 11 0 10 0 10 0	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SGAGAN; SBAS L1C/A; S; RTK B4 , 20 M3 005 MAX 000  MAX 000  to 2.5			
N U	Ronger Grant Control of Grant Pressure Range  Grantic Pressure Accuracy  Dynamic Pressure Accuracy  Pressure Activacy  Dynamic Pressure Accuracy  Pressure Activacy  Air Data Computer  Fressure Range  Static Pressure Accuracy  Dynamic Pressure Range  Static Pressure Accuracy  Dynamic Pressure Accuracy  Pressure Altitude Accuracy  Air Speed Accuracy  Air Speed Accuracy  Air Speed Accuracy  Air Speed Accuracy  Static Pressure Altitude Range  Air Speed Accuracy  Air Speed Accuracy  Static Pressure Call Pressure Range  Air Speed Range  Air Speed Range  Static Pressure Over Total Pressure Range	Channels Hz - m/s s Nano sec mbar hPa, % FSS hPa % FSS m m m m mysec m/sec M M ppm kg/m3	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5/20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2 0.001	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beld Galileo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.  44  100 ( M 2, RTCM 3 0.03  <45 (cold start); 20  20  20  46 300t ± -500  5 to 0.01 0.03  0.03  0.03	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; Q2SS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK  88 max)  <20 (hot start)  XT 00 0 1100 0 1100 0 1100 0 100	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK B4 , 20 M3 000 MAX 000  to 2.5			
Z	RITE Corrections  GNSS Constellations  GNSS Constellations  GNSS Constellations  Channel Configuration (5) GNSS Data Rate (6) RTIK Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Raccuracy Dynamic Pressure Raccuracy Dynamic Pressure Accuracy Dynamic Pressure Accuracy Pressure Altitude Range Pressure Altitude Range Pressure Altitude Accuracy Airspeed Accuracy Airspeed Ancuracy Static Pressure Over Total Pressure Range Mach Number Accuracy Static Pressure Over Total Pressure Resolution Air Density Range Air Density Range Air Density Accuracy Air Density Accuracy Outside Air Temperature (OAT) Range	Channels Hz - m/s s Nano sec  mbar hPa, % FS % FSS hPa m m/sec m/sec M M M ppm kg/m3 kg/m3 deg C	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5/20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2 0.001	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beld Gallieo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20  2PI	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 88 max)  <20 (hot start)  ext  oo  o 1100  ol  o 200  ol  ol  ol  ol  ol  ol  ol  ol  ol	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK B4 , 20 M3 000 MAX 000  to 2.5			
N U	RITE Corrections  GNSS Constellations  GNSS Corrections  Channel Configuration (3) GNSS Data Rate (8) RTK Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Accuracy Dynamic Pressure Accuracy Dynamic Pressure Accuracy Pressure Atlitude Range Pressure Altitude Range Pressure Altitude Range Airspeed Range Airspeed Accuracy Mach Number Range Static Pressure Rosolution Air Density Range Static Pressure Resolution Air Density Range Static Pressure Resolution Air Density Range	Channels Hz	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5/20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2 0.001	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beld Gallieo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20  2PI	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 8 max)  <20 (hot start)  XT 00 0 1100 0.1 0 600 0.25 0.09000 1 310 0.15 0 0.9000 1 1 0 1 0.0000 0 1 1 0.00000 0 1 1 0.0000000000	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK B4 , 20 M3 000 MAX 000  to 2.5			
N U	RINGS Constellations  GNSS Constellations  GNSS Corrections  Channel Configuration (3) GNSS Data Rate (6) RTK Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Range Static Pressure Accuracy Dynamic Pressure Range Static Pressure Accuracy Dynamic Pressure Range Dynamic Pressure Accuracy Pressure Atlitude Range Pressure Altitude Accuracy Airspeed Range Airspeed Accuracy Mach Number Range Mach Number Range Static Pressure Royer Total Pressure Range Static Pressure Over Total Pressure Range Static Pressure Over Total Pressure Range Air Density Range Static Pressure Over Total Pressure Range Static Pressure Range Static Pressure Range Static Pressure Range Outside Air Temperature (OAT) Range Outside Air Temperature (OAT) Range	Channels Hz	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5/20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2 0.001	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beld Galileo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G  44  100 ( M 2, RTCM 3 0.03  <45 (cold start); 20  2PE  ±6 300t ± 0.15 t  (0.01 t 0.03  0.03  0.03  0.03  0.03  0.03  0.03  0.03  0.04 0.06	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 88 max)  <20 (hot start)  XT 00 0 1100 0.11 0 600 1.25 0 9000 1 310 310 310 310 310 35 0 0.99 002 0 to 1.6 009 000 0 1 100 0 0.99 000 0 0 0.99 000 0 0 0.99 000 0 0 0.99 000 0 0 0.99 000 0 0 0.99 000 0 0 0.99 000 0 0.99 000 0 0.99 000 0 0.99 000 0 0.99 000 0 0.99 000 0 0.99 000 0 0.99 000 0 0 0.99 000 0 0 0.99 000 0 0 0.99 000 0 0 0.99 000 0 0 0 0.99 000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK B4 , 20 M3 000 MAX 000  to 2.5			
N U	RINGS Constellations  GNSS Constellations  GNSS Constellations  GNSS Constellations  Channel Configuration (5) GNSS Data Rate (6) RTK Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Racuracy Dynamic Pressure Accuracy Dynamic Pressure Accuracy Dynamic Pressure Accuracy Dynamic Pressure Accuracy Pressure Altitude Accuracy Pressure Altitude Accuracy Airspeed Ange Airspeed Acquracy Mach Number Range Mach Number Range Static Pressure Over Total Pressure Resolution Static Pressure Over Total Pressure Resolution Air Density Range Air Density Range Air Density Accuracy Outside Air Temperature (OAT) Range Outside Air Temperature (OAT) Resolution  Environment Operational and Storage Temperature	Channels Hz - m/s s Nano sec  mbar hPa, % FS % FSS hPa m m/sec m/sec M M M ppm kg/m3 kg/m3 deg C	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5/20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2 0.001	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beld Gallieo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G  44 100 ( M 2, RTCM 3 0.03  <45 (cold start); 20  2Pi	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 88 max)  <20 (hot start)  ext  oo  oo  1100  oo  100  oo  1100  oo  1100  oo  1100  oo  1100  oo  1100  oo  1100  oo  oo	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK B4 , 20 M3 000 MAX 000  to 2.5			
N U	Ronger of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (5) GNSS Data Rate (6) RTIX Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Accuracy Dynamic Pressure Accuracy Dynamic Pressure Accuracy Pressure Altitude Range Pressure Altitude Range Pressure Altitude Range Airspeed Ancuracy Airspeed Range Airspeed Accuracy Static Pressure Pressure Range Pressure Static Pressure Rottland Air Data Computer  Outside Air Temperature (OAT) Resolution Environment Operational and Storage Temperature Environment  Operational and Storage Temperature EMC/EMI	Channels Hz	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5/20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2 0.001	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beld Galileo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G.  44  100 ( M 2, RTCM 3 0.03  <45 (cold start); 20  20  20  46 300t ± -500 0.15t -500 0.01 0.03 0.03 0.03 0.04 0.04 0.05	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B2I, B3; AltBoc, E6; Q2SS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 88 max)  <20 (hot start)  XT  00 0 1100 0.11 0 600 0.25 0 0000 1 1 1 0 1000 0 1100	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L1OF; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK B4 , 20 M3 000 MAX 000  to 2.5			
N <sub>D</sub>	RITE Corrections  GNSS Constellations  GNSS Corrections  Channel Configuration (3) GNSS Data Rate (9) RTK Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Range Static Pressure Accuracy Dynamic Pressure Range Static Pressure Accuracy Pressure Accuracy Dynamic Pressure Accuracy Pressure Altitude Range Pressure Altitude Range Airspeed Range Airspeed Accuracy Mach Number Range Mach Number Range Static Pressure Resolution Air Density Range Static Pressure Over Total Pressure Resolution Air Density Range Outside Air Temperature (OAT) Range Outside Air Temperature (OAT) Range Outside Air Temperature (DAT) Resolution  Environment  Operational and Storage Temperature ENC/EMI Altitude	Channels Hz	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5/20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2 0.001	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CDMA; Beidd Galileo E1, E5a, E5b, E5 L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G  44 1000 M 2, RTCM 3 0.03  <45 (cold start); 20  2P	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B21, B3; AltBoc, E6; QZSS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 8 max)  <20 (hot start)  CXT  00 0 1100 0.1 0 600 0.25 0 9000 1 1310 1 10 0.1 1 0 0.00 1 10 0.1 1 0 0.00 1 0 0.00 1 0 0.00 1 0 0.00 1 0 0.000 1 0 0.000 1 0 0.000 1 0 0.0000 1 0 0.0000 1 0 0.0000 1 0 0.0000 1 0 0.0000 1 0 0.00000 1 0 0.00000 1 0 0.00000 1 0 0.000000 1 0 0.0000000000	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK 84 , 20 M3 000 MAX 000  to 2.5			
N U	Ronger of GNSS Antennas  GNSS Constellations  GNSS Corrections  Channel Configuration (5) GNSS Data Rate (6) RTIX Corrections Velocity Accuracy Initialization Time Time Accuracy (clock drift) (7)  Air Data Computer  Pressure Sensor Range Static Pressure Accuracy Dynamic Pressure Accuracy Dynamic Pressure Accuracy Pressure Altitude Range Pressure Altitude Range Pressure Altitude Range Airspeed Ancuracy Airspeed Range Airspeed Accuracy Static Pressure Pressure Range Pressure Static Pressure Rottland Air Data Computer  Outside Air Temperature (OAT) Resolution Environment Operational and Storage Temperature Environment  Operational and Storage Temperature EMC/EMI	Channels Hz	Dual Single  GPS L1 C/A, L1C, L2C, L2P, L5; GLONASS L1 C/A, L2 C/A, L2P, L3, L5; BelDou B11, B1C, B21, B2A, B31; Gallleo E1, E5 AltBOC, E5a, E5b, E6; NavIC (IRNSS) L5; QZSS L1 C/A, L1C, L2C, L5, L6; L-Band  WAAS; EGNOS; MSAS; GAGAN; SBAS L1, L5; DGPS; RTK; PPP Terrastar 555 5/20 / 100  RTC  <39 (cold start), <20 (hot start)  2P ±25  0.15 to 25  5 to 64  0.01 to 0.2 0.001	Dual  GPS L1C/A, L1C, L1PY, L2C L2CA, L2P, L3 CMM; Beld Gallieo E1, E5a, E5b, L1C, L2C, L5, L6;  WAAS; EGNOS; MSAS; G  44  100 ( M 2, RTCM 3  0.03  <45 (cold start); 20  2Pi	, L2P, L5; GLONASS L1CA, bu B11, B1C, B2a, B2I, B3; AltBoc, E6; Q2SS L1C/A, Navic L5; L-band AGAN; SBAS; DGPS; RTK 88 max)  <20 (hot start)  XT  00 0 1100 0.11 0 600 0.25 0 0000 1 1 1 0 1000 0 1100	GPS L1C/A, L2C; GLONASS L1OF, L2OF; Galileo E1B/C, E5b; BeiDou B1I, B2I; QZSS L1C/A, L2C WAAS; EGNOS; MSAS DGP 1 10 RT 0 <30 (cold start 2P ±4  0.15	GLONASS L10F; Galileo E1B/C, E5a; BeiDou B1I, B2a; QZSS L1C/A L1S L5; NaviC L5; SAGAN; SBAS L1C/A; S; RTK 84 , 20 M3 000 MAX 000  to 2.5			



	Electrical					
=	Input power protection	1	Standard			
<u>re</u>	Supply voltage	V DC	9 to 36 (27±10 for MIL-STD-1275 protection)			
₫	Output data format	1	Binary, NMEA 0183 ASCII characters			
Gen	1 PPS level	V DC TTL	3.3 / 5 / differential			
	Physical					
	Size	mm	D88.9 x H129			
	Weight	gram	950			

Specifications subject to change without notice

(1) GPS only. (2) For Novatel OEM7720 GNSS receiver only. Requires a subscription to a TerraStar data service. (3) RMS, incremental error growth from steady state accuracy. Post-processing results using third party software. (4) Dynamic accuracy may depend on the type of motion. (5) Tracks up to 60 L1/L2 satellites. (6) If tracking GPS Only. (7) Time accuracy does not include biases due to RF or antenna delay. (8) Typical result value.

## **Product Code Structure**

Model	Gyro	Accel	Calibration	Connector	Encoder	Pressure Ports	Color	External Compass	Data Logger	GNSS receiver	Version	Interface
INS-FI	G490	A8	TGA	C18	E	0P	S	SAMC	S64	0719	V9	124
		A40		C19		2P				07720	VD9	145
			=		•	2PEXT				DMH		1234
						2PMAX				SMX5		1245
										ZF9P		
										ZD9P		
										ZF9P-L5		

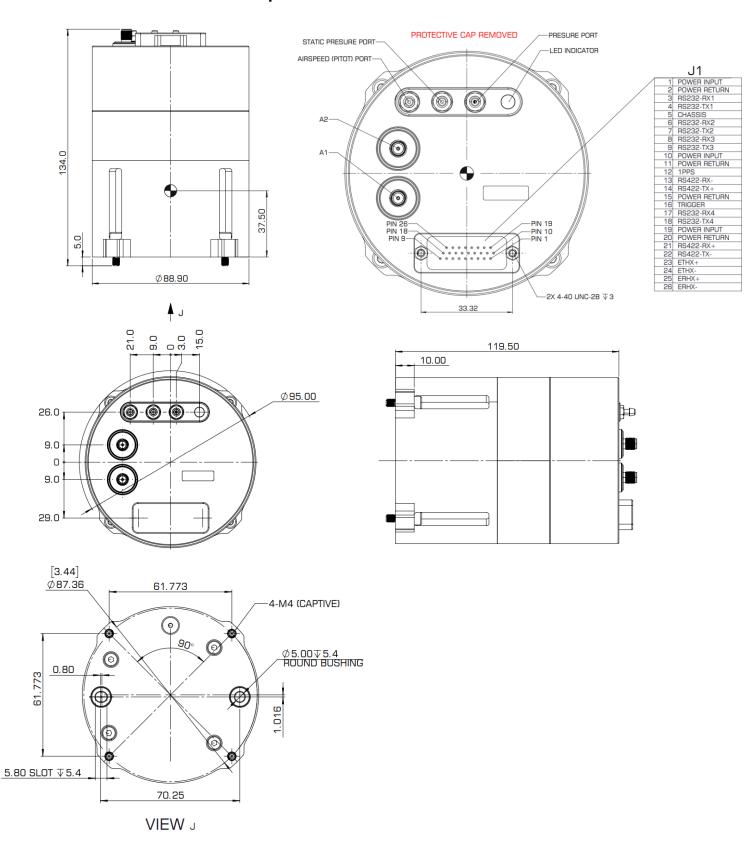
Example: INS-FI-G490-A40-TGA-C18-2P-S-SAMC-S64-ZD9P-VD9.12345

#### Product code details:

- INS-FI: Dual Antenna GPS-Aided Inertial Navigation System
- FI: FOG IMU-FI-200T
- G490: Gyroscopes measurement range = ±490 deg/sec
- A8: Accelerometers measurement range ±8 g
- A40: Accelerometers measurement range ±40 g
- TGA: Calibration of IMU (Gyroscopes and Accelerometers) in operational temperature range
- C18: 26-pin male, D-sub connector
- C19: C18 with MIL-STD-1275 protection
- E: Encoder support (optional)
- OP: Zero Airspeed Pressure Ports (Total/Static)
- 2P: Two Airspeed Pressure Ports with Standard Range (Total/Static, Honeywell 025MD)
- 2PEXT: Two Airspeed Pressure Ports with Extended Range (Total/Static, Honeywell 600MD)
- 2PMAX: Two Airspeed Pressure Ports with Extended Range (Total/Static, Honeywell 004BD)
- S: Silver Color of enclosure (default)
- SAMC: External Stand-Alone Magnetic Compass (optional)
- S64: 64GB embedded Data Logger (optional)
- O719: NovAtel OEM719: GPS+GLO+GAL+BDS+QZSS, L1/L2/L5/L6/E1/E5a/E5b/AltBOC/E6/B1/B2I/B2b/B2a/B3, NavIC L5, SBAS L1/L5, RTK+PPP+Single Point+DGPS PNT, 20 Hz Data Output Rate, Base Station Corrections + Measurements, GRIT Interference Mitigation and Spoofing Detection Includes GLIDE & RAIM
- O7720: NovAtel OEM7720: GPS+GAL+BDS+QZSS, L1/L2/L5/E1/E5a/E5b/AltBOC/B1/B2I/B2a/B2b, NavIC L5, SBAS L1/L5 Dual Antenna Activation, RTK+PPP+Single Point+DGPS PNT, ALIGN Heading, 20 Hz Data Output Rate, Base Station Corrections + Measurements, GRIT Interference Mitigation and Spoofing Detection Includes GLIDE & RAIM
- SMX5: Septentrio mosaic-X5: GPS+GLO+BDS+GAL+QZSS, L1C/A/L1PY/L2C/L2P(Y)/L5/L1CA/L2CA/L2P/L3 CDMA/B1I/B1C/B2a/B2I/B2b/B3I/E1/E5a/E5b/ E5 AltBoc/E6, SBAS, L-band, RTK, AIM+ anti-jamming, anti-spoofing Advanced Interference Monitoring and Mitigation
- DMH: Septentrio mosaic-H: GPS+GLO+BDS+GAL+QZSS, L1C/A/L2P(Y)/L2C/L1CA/L2CA/B1I/B2I/B3I/E1/E5b/L1C/A/L1C/B/L2C, SBAS, RTK, Dual Antenna GNSS Heading, AIM+ anti-jamming, anti-spoofing Advanced Interference Monitoring and Mitigation
- ZF9P: u-blox ZED-F9P-02B: GPS+GLO+GAL+BDS+QZSS, L1C/A/L2C/L10F/L2OF/E1B/C/E5b/B1I/B2I/L1C/A/L1S/L2C/L5, SBAS, RTK, Active CW detection and removal, Onboard bandpass filter, Advanced anti-spoofing algorithms
- ZF9P-L5: u-blox ZED-F9P-15B: GPS+GLO+GAL+BDS+QZSS, L1C/A/L5/L10F/E1B/C/E5a/B1I/B2a/L1C/A/L1S/L5/, NavIC L5, SBAS, RTK, Active CW detection and removal, Onboard bandpass filter, Advanced anti-spoofing algorithms
- ZD9P: Dual u-blox ZED-F9P-02B: GPS+GLO+GAL+BDS+OZSS, L1C/A/L2C/L10F/L2OF/E1B/C/E5b/B1I/B2I/L1C/A/L1S/L2C/L5, SBAS, RTK, Dual Antenna GNSS Heading, Active CW detection and removal, Onboard bandpass filter, Advanced anti-spoofing algorithms
- V9: Single Antenna GNSS Receiver
- VD9: Dual Antenna GNSS Receiver
- .124: RS-232, RS-422 and CAN interface
- .145: RS-232, CAN and Ethernet interface (w/ Encoder support)
- .1234: RS-232, RS-422, RS-485 (to be used when connecting to a Stand-alone Magnetic Compass), and CAN interface
- .1245: RS-232, RS-422, CAN and Ethernet interface



# **INS-FI Mechanical Interfaces Description**



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