Key Features

- Plug & Play
- Highest sensitivity in compact design
- Dust and water resistant
- Negligible temperature drift
- Up to 2000 Hz sampling rate
- Available with EtherCAT®, RS422 and USB
- Compatible with ROS®, TwinCAT®, LabVIEW®, MATLAB®, Python®
- Support for Mecademic®, Staubli®, KUKA®, and more

Configurations

Ordering number	Description
BFT-MIPS-SER-CG	MiniONE Pro 6-axis FT sensor with side Serial interface
BFT-MIPS-ECAT-CG	MiniONE Pro 6-axis FT sensor with side EtherCAT interface

Technical Specifications

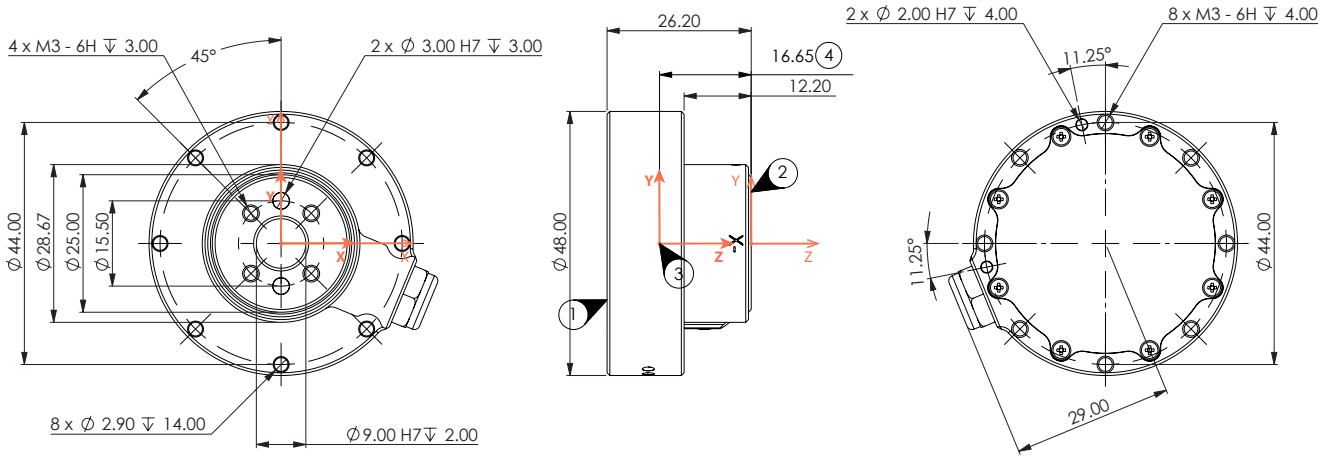
Please refer to the table for all sensor specifications. For additional information, feel free to consult our team of engineers at info@botasys.com.

		F_x	F_y	F_z	M_x	M_y	M_z
Range		50 N	50 N	50 N	1 Nm	1 Nm	1 Nm
Overload limit*		100 N	100 N	100 N	2 Nm	2 Nm	2 Nm
Serial NFR**	**BFT-MIPS-SER**	80 mN	80 mN	40 mN	0.7 mNm	0.7 mNm	0.5 mNm
EtherCAT NFR**	**BFT-MIPS-ECAT**	35 mN	35 mN	21 mN	0.4 mNm	0.4 mNm	0.3 mNm
Size (D x H)		48 mm x 26.2 mm					
Ingress protection		Dust and water resistant					
Operating temperature		0°C – 55°C					

	Serial	EtherCAT
Communication	USB, RS422	CANopen over EtherCAT
Maximum sampling rate	800 Hz	2000 Hz
IMU	-	6 DoF IMU
Acceleration	-	±2g, 4g, 8g, 16g
Gyroscope	-	±250°/sec, ±500°/sec, ±1000°/sec, ±2000°/sec
Power supply	5 V, 1.0 W	9 – 48 V, 1.5 W
Weight	57 grams	62 grams

* Overload limit values are simulated using FEA methods. Real-life results may deviate from simulation results.
* * NFR (noise-free resolution) refers to (6σ) peak-to-peak noise distribution of sensor signal at 100 Hz.

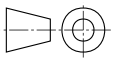
Mechanical Dimensions



MiniONE Pro Side by Bota Systems AG

1. Robot mounting side
2. Tool mounting side
3. 6-DoF IMU location
4. Distance between IMU and F/T sensor coordinate systems

BFT-MIPS-SER-CG
BFT-MIPS-ECAT-CG



Crosstalk

Crosstalk in multi-axis force-torque sensors refers to the measurements in other axes when the sensor is excided only in a single axis. Crosstalk is reported as the percentile deviation from reference with respect to the full scale of that axis. Bota Systems provides a crosstalk certificate for your sensor tested according to ISO 21612:2021 standard upon request. An exemplary crosstalk table is provided below as a reference.

Affected axis	F_x	F_y	F_z	M_x	M_y	M_z
F_x (%)	-	0.00	0.05	0.02	1.17	0.18
F_y (%)	0.01	-	0.07	1.40	0.12	2.08
F_z (%)	0.08	0.03	-	1.66	0.32	0.01
M_x (%)	0.03	0.67	0.09	-	0.03	0.13
M_y (%)	0.13	0.36	0.22	0.85	-	0.07
M_z (%)	0.23	0.06	0.03	0.67	0.68	-

Signal Noise

Signal noise is any unwanted modification that may arise during capture, storage, transmission, processing, or conversion of a communication signal. The upper limits for the standard deviation of noise distribution are reported in the following tables.

Sampling rate		F_x	F_y	F_z	M_x	M_y	M_z
100 Hz	BFT-MIPS-SER-CG	14 mN	14 mN	7 mN	0.01 mNm	0.01 mNm	0.01 mNm
	BFT-MIPS-ECAT-CG	6 mN	6 mN	4 mN	0.01 mNm	0.01 mNm	0.01 mNm
200 Hz	BFT-MIPS-SER-CG	18 mN	18 mN	10 mN	0.02 mNm	0.02 mNm	0.01 mNm
	BFT-MIPS-ECAT-CG	8 mN	8 mN	5 mN	0.01 mNm	0.01 mNm	0.01 mNm
400 Hz	BFT-MIPS-SER-CG	30 mN	30 mN	15 mN	0.03 mNm	0.03 mNm	0.02 mNm
	BFT-MIPS-ECAT-CG	10 mN	10 mN	8 mN	0.01 mNm	0.01 mNm	0.01 mNm
600 Hz	BFT-MIPS-SER-CG	38 mN	38 mN	20 mN	0.04 mNm	0.04 mNm	0.02 mNm
800 Hz	BFT-MIPS-ECAT-CG	13 mN	13 mN	10 mN	0.01 mNm	0.01 mNm	0.01 mNm
1000 Hz	BFT-MIPS-ECAT-CG	16 mN	16 mN	12 mN	0.02 mNm	0.02 mNm	0.01 mNm

For more information, please refer to the user manual.