Key Features

- Plug & Play
- All-in-One 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®
- Support for Staubli, UR+®, Mecademic®, Kinova®, KUKA®, and more

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	500 N	500 N	1200 N	15 Nm	15 Nm	12 Nm
Overload Limit*	2500 N	2500 N	4000 N	35 Nm	35 Nm	40 Nm
Serial NFR**	350 mN	350 mN	250 mN	7.2 mNm	7.2 mNm	3.0 mNm
EtherCAT NFR**	200 mN	200 mN	150 mN	4.0 mNm	4.0 mNm	2.0 mNm
Size (D x L)	48 mm x 32 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	113 grams	118 grams

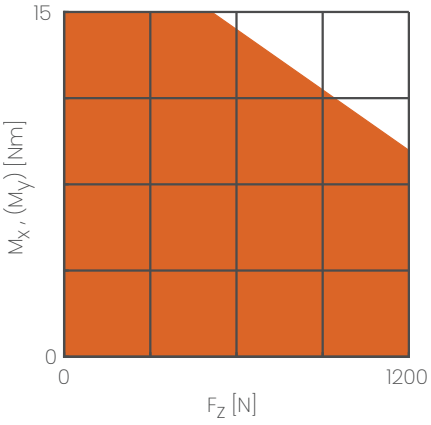
* Overload limit values are simulated using FEA methods. Real-life results may deviate from simulation results.
** NFR (noise-free resolution) refers to (6σ) peak-to-peak noise distribution of sensor signal at 100 Hz.

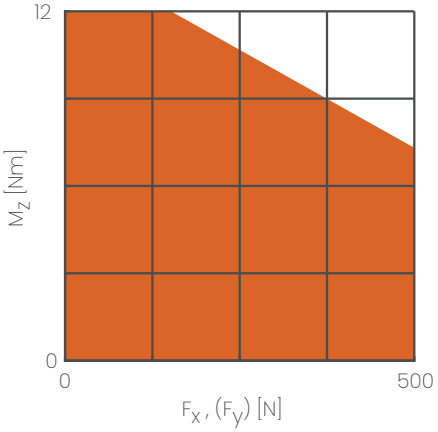
Combined Loading Graphs

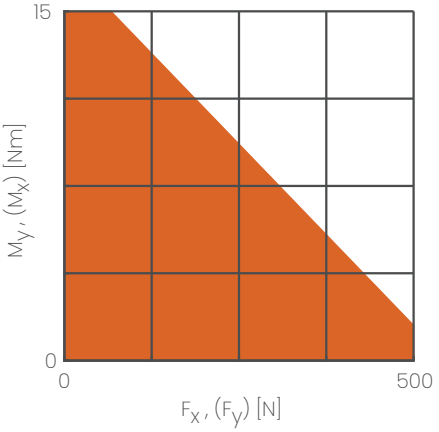
During single-axis loading, the sensor can operate up to its normal range. Above the sensor's normal range, the readings become inaccurate. The sensor should not work outside of its normal operating range.

When more than one axis is loaded, it becomes a combined loading, and the range of the sensor reduces.

The following graphs represent the combined loading scenarios, and the orange area represents the sensor's normal operating range.



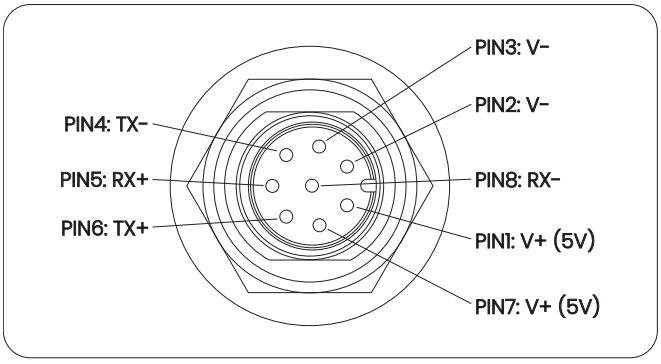




Connector Pinout

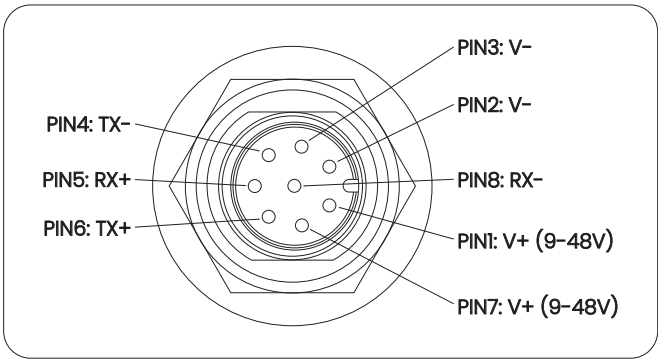
Serial

IP67 M8 Connector Pinout



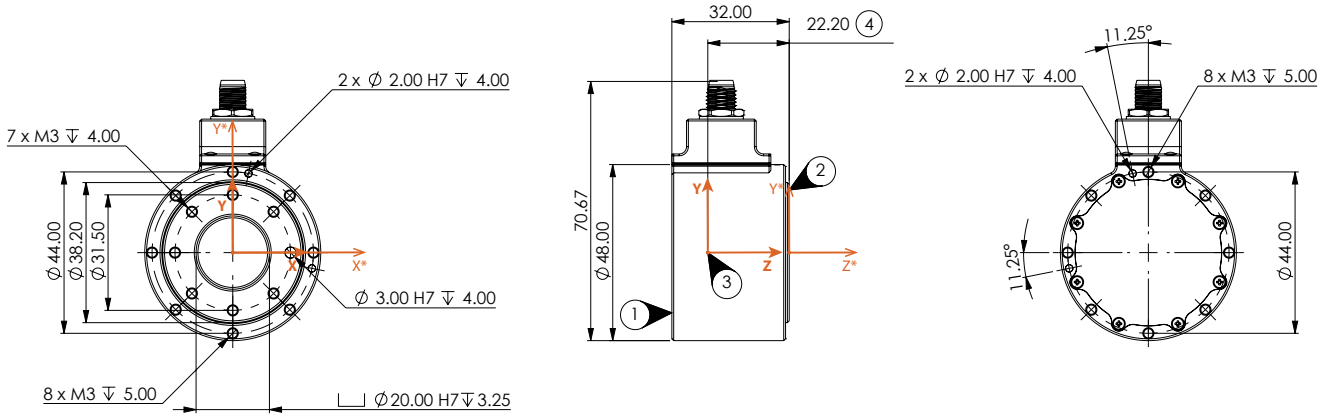
EtherCAT

IP67 M8 Connector Pinout



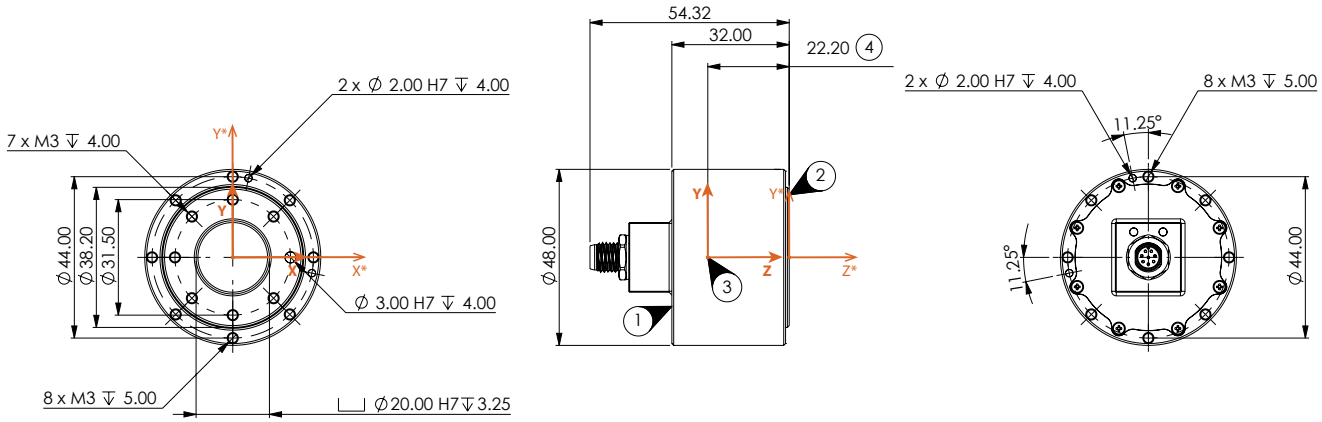
Mechanical Dimensions

Side Connector Configuration



Rokubi 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-ROKS-XXX-M8

Axial Connector Configuration



Rokubi Axial 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-ROKA-XXX-M8

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 (1σ) of peak-to-peak noise distribution are reported in the following tables.

Serial Interface

Sampling Rate	F_x	F_y	F_z	M_x	M_y	M_z
100 Hz	55 mN	55 mN	40 mN	1.2 mNm	1.2 mNm	0.5 mNm
200 Hz	80 mN	80 mN	50 mN	1.5 mNm	1.5 mNm	0.5 mNm
400 Hz	110 mN	110 mN	85 mN	2.0 mNm	2.0 mNm	0.8 mNm
600 Hz	160 mN	160 mN	110 mN	3.0 mNm	3.0 mNm	1.1 mNm

EtherCAT Interface

Sampling Rate	F_x	F_y	F_z	M_x	M_y	M_z
100 Hz	26 mN	26 mN	20 mN	0.7 mNm	0.7 mNm	0.2 mNm
200 Hz	31 mN	31 mN	27 mN	0.7 mNm	0.7 mNm	0.2 mNm
400 Hz	43 mN	43 mN	35 mN	0.8 mNm	0.8 mNm	0.3 mNm
800 Hz	61 mN	61 mN	48 mN	1.2 mNm	1.2 mNm	0.4 mNm
1000 Hz	65 mN	65 mN	54 mN	1.3 mNm	1.3 mNm	0.4 mNm

For more information, please refer to the user manual.