

# MC5

## Force and Torque Transducer

### DESCRIPTION

The MC5 force and torque transducer measures loads in the range between the capacities of AMTI's popular MC3 and MC8 transducers. It's available with vertical force capacities of 5,560N to 45,000N (1,250lb to 10,000lb) and corresponding horizontal force and moment capacities. These sensors are available with one to six outputs corresponding to Fx, Fy, Fz, Mx, My & Mz. Models with custom capacities and layouts are available for special applications.

### Applications.

The MC5 force and torque transducer is particularly suitable for applications requiring simultaneous measurement of several forces and moments, or measurement of forces that change direction and position over time. Applications for this transducer include research and development in machining, robotics ocean engineering and aerospace. It's commonly used in test frames and orthopaedic simulators.



### AMPLIFICATION

The MC5 force and torque sensor incorporates strain gauges mounted on four precision strain elements in a patented design to measure forces and moments. As with most conventional strain gauge transducers, bridge excitation and signal amplification is required.

AMTI's product line includes one analogue strain gauge amplifier, the MSA-6. There is also digital signal amplifier, the Gen 5. All these amplifiers are high gain devices which provide excitation and amplification for multiple channels in one convenient package

### Calibration

Each platform is inspected and tested in AMTI's calibration facility. The calibration procedure provides a detailed sensitivity matrix and a complete test of all systems components, including the amplifier and connecting cable.

### Custom

AMTI also offers special multi-axis transducers to meet your specific requirements. Units are available that are water proof, pressure compensated, non-magnetic, non-conductive and transparent. Capacities from 1lb (4.5N) to 3 million lbs (13.3Mn) can be made.

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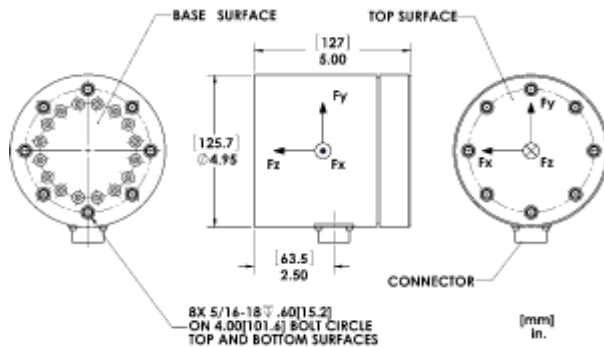
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## Specifications

MC5 SERIES SPECIFICATIONS	1250	2500	5000	10000
Fx, Fy Capacity, lb, (kN)	625 (2.76)	1250 (5.56)	2500 (11.12)	5000 (22.2)
Fz Capacity, lb, (kN)	1250 (5.56)	2500 (11.11)	5000 (22.2)	10000 (44.5)
Mx, My Capacity, in*lb, (Nm)	1800 (203)	3600 (407)	7200 (813)	14401 (1626)
Mz Capacity <sup>2</sup> , in*lb, (Nm)	1250 (141)	2500 (282)	5000 (565)	10000 (1129)
Fx, Fy Sensitivity, $\mu\text{V}/[\text{V}*\text{lb}]$ , ( $\mu\text{V}/[\text{V}*\text{N}]$ )	4.0 (0.81)	2.0 (0.45)	1.00 (0.225)	0.5 (0.11)
Fz Sensitivity, $\mu\text{V}/[\text{V}*\text{lb}]$ , ( $\mu\text{V}/[\text{V}*\text{N}]$ )	1.0 (0.225)	0.5 (0.11)	0.25 (0.056)	0.12 (0.03)
Mx, My Sensitivity, $\mu\text{V}/[\text{V}*\text{in}*\text{lb}]$ , ( $\mu\text{V}/[\text{V}*\text{Nm}]$ )	2.3 (20.37)	1.15 (10.18)	0.575 (5.09)	0.287 (2.55)
Mz Sensitivity, $\mu\text{V}/[\text{V}*\text{in}*\text{lb}]$ , ( $\mu\text{V}/[\text{V}*\text{Nm}]$ )	1.4 (12.4)	0.7 (6.2)	0.35 (3.10)	0.175 (1.55)
Fz Stiffness $\times 10^5$ lb/in ( $\times 10^5$ N/m)	6.0 (1052)	12 (2104)	0.25 (4208)	48 (8416)
Fx, Fy Stiffness $\times 10^5$ in-lb/rad ( $\times 10^5$ Nm/rad)	1.2 (210)	2.4 (421)	1.00 (842)	9.6 (1683)
Mz Stiffness $\times 10^5$ in-lb/rad ( $\times 10^5$ Nm/rad)	5.0 (0.565)	1.0 (1.13)	20 (2.26)	40 (4.52)
Mx, My Stiffness $\times 10^5$ in-lb/rad ( $10^5$ Nm/rad)	7.5 (0.0847)	1.5 (1.69)	30 (3.39)	60 (6.78)
Lowest Resonant Frequency, Hz (Mx & My)	440	625	880	1250

Fx, Fy & Fz capacities can be exceeded by a factor of 3 as long as the Mx, My & Mz capacities are not exceeded

<sup>2</sup> Reference to transducer origin located 2.37in (6cm) below top surface.



### GENERAL SPECIFICATIONS

- Total weight 7lb (3kg)
- Safety Factor: 50% above capacity;
- Crosstalk: Less than 2% on all channels:
- Excitation, recommended; 10V or less
- Temperature Range: 0 to 125°F, (-17 to 52°C)
- Fx, Fy, Fz hysteresis:  $\pm 0.2\%$
- Full: Scale Output: Fx, Fy, Fz non-linearity:  $\pm 0.2\%$  Full Scale Output.

### Wiring

- Bridge Fz = 700 ohms
- Bridges Fx; Fy; Mx; My; Mz = 350 ohms
- Connector Type: Souriau 851-0216-26P50 44

