

AMTI MC6 SERIES FORCE/TORQUE SENSORS

6-Axis Load Cell Technical Datasheet

1. Description

The MC6 transducers resolve applied loads into orthogonal force and moment components. These precision sensors feature high stiffness, high sensitivity, low crosstalk, excellent repeatability, and long-term stability. They exhibit the inherent ruggedness of bonded strain gage transducers and incorporate special elastomeric O-ring seals to prevent water and oil contamination. Internal potting of the strain gages further ensures long life and consistent, reliable performance.

The MC6 transducer is available with one to six outputs corresponding to F_x , F_y , F_z , M_x , M_y , and M_z . Standard vertical load capacities are 1000, 2000, and 4000 pounds. Horizontal load capacities are half of the vertical rating. Models with custom capacities and layouts are available for special applications.

The instrument has a six-inch square top mounting surface equipped with threaded inserts. A high-strength aluminum alloy (7075-T6) is used throughout to withstand harsh manufacturing and testing environments. A durable anodized finish protects the exterior from corrosion.

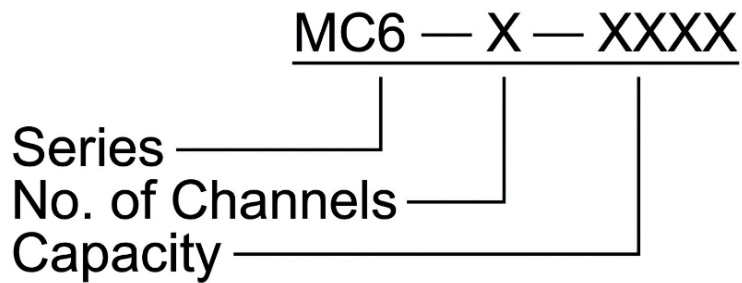


2. Amplification & Applications

Amplification: As with all conventional strain gage transducers, bridge excitation and signal amplification are required. AMTI's MCA series amplifiers are high-gain devices which provide excitation and amplification for multiple channels in one convenient package. These amplifiers process the signals from a transducer and provide outputs suitable for an A/D converter and digital computer or other recording instrument.

Applications: This instrument is particularly suitable for applications requiring simultaneous measurement of several forces and moments, or measurement of forces that change direction and position over time. Common applications include research and development in machining, robotics, ergonomics, biomechanics, and dynamics. These sensors are also well suited for monitoring production processes.

Order code

3. Specifications (English Units/ **Unit : lb,in*lb**)

Specification	MC6-X-1000	MC6-X-2000	MC6-X-4000	Unit
CAPACITY				
Fz	1000	2000	4000	lb
Fx, Fy	500	1000	2000	lb
Mz	1500	3000	6000	in-lb
Mx, My	3000	6000	12000	in-lb
TYPICAL SENSITIVITY				
Fz	0.76	0.38	0.19	μV^{**}
Fx, Fy	3.00	1.50	0.75	V-lb
Mz	1.50	0.75	0.37	μV^{**}
Mx, My	0.70	0.35	0.18	V-in-lb
STIFFNESS				
Fz	0.80	1.30	2.00	$\times 10^6$ lb/in
Fx, Fy	0.12	0.25	0.50	$\times 10^6$ lb/in
NON-LINEARITY				
Fx, Fy, Fz	0.20	0.20	0.20	$\pm$ %FSO ***
HYSTERESIS				
Fx, Fy, Fz	0.20	0.20	0.20	%FSO ***
RESONANT FREQUENCY				
Fz	620	875	1200	Hertz
Fx, Fy	550	800	1000	Hertz

** μV = microvolts, *** %FSO = % Full Scale Output

3. Specifications (Metric Units / Unit : N,Nm)

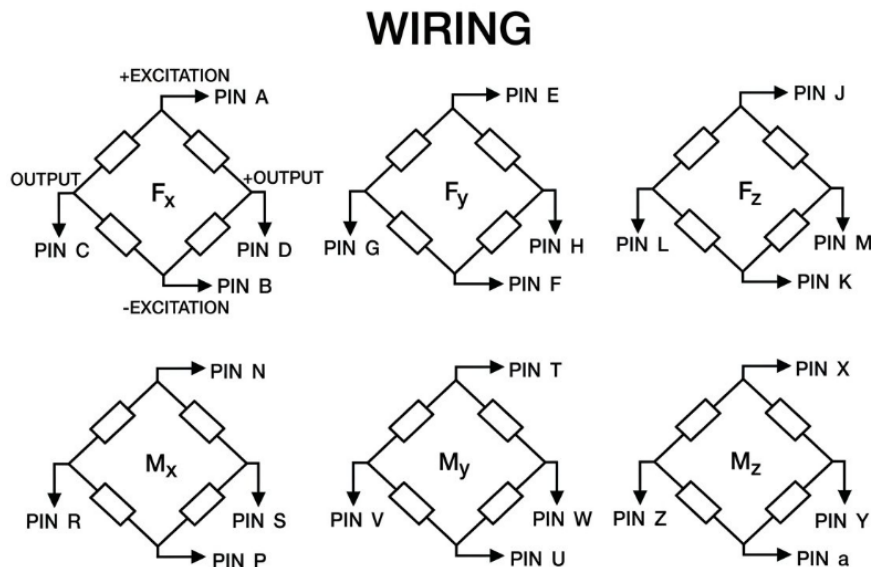
Specification	MC6-X-1000	MC6-X-1000	MC6-X-1000	Unit
CAPACITY				
Fz	4500	9000	18000	N
Fx, Fy	2250	4500	9000	N
Mz	170	340	680	N-m
Mx, My	340	680	1360	N-m
TYPICAL SENSITIVITY				
Fz	0.17	0.08	0.04	$\mu\text{V} / \text{V-N}$
Fx, Fy	0.67	0.33	0.17	$\mu\text{V} / \text{V-N}$
Mz	13.27	6.63	3.32	$\mu\text{V} / \text{V-N-m}$
Mx, My	6.20	3.10	1.55	$\mu\text{V} / \text{V-N-m}$
STIFFNESS				
Fz	14	23	35	$\times 10^7 \text{ N/m}$
Fx, Fy	2.1	4.4	8.8	$\times 10^7 \text{ N/m}$
NON-LINEARITY				
Fx, Fy, Fz	0.20	0.20	0.20	$\pm \% \text{FSO}^{***}$
HYSTERESIS				
Fx, Fy, Fz	0.20	0.20	0.20	$\% \text{FSO}^{***}$
RESONANT FREQUENCY				
Fz	620	875	1200	Hertz
Fx, Fy	550	800	1000	Hertz

** μV = microvolts, *** %FSO = % Full Scale Output

General Specifications

- **Excitation:** 10 V
- **Non-Linearity:** F_x , F_y , F_z : 0.20 %FSO
- **Hysteresis:** F_x , F_y , F_z : 0.20 %FSO
- **Crosstalk:** Less than 2% on all channels
- **Temperature Range:** 0 to 125 deg F (-17 to 52 deg C)
- **Sensitivity Change with Temperature:** 0.02%/deg F (0.01%/deg C)
- **Weight:** 13 lb (6 kg)
- **Connector Type:** Burndy BTO2E16-26P
- **U.S. Patent:** #4493220

4. Wiring Pin-Out (Wheatstone Bridge Channels)



Connector Type: Burndy BTO2E16-26P

5. Dimensions & Mounting

- **Total Height (Side View):** 3.12 inches (7.92 cm)
- **Top Mounting Surface (Top View):** 6.00 x 6.00 inches (15.24 x 15.24 cm)
- **Base Width:** 9.00 inches (22.86 cm)
- **Hold-down Inserts:** 3/8-16 thread, 9 holes on 2.37 inch (6.01 cm) centers. Metric options available.
- **Mounting Slots:** Six 0.56 inch (1.42 cm) mounting slots on 2.0 by 7.5 inch (5.1 by 19.0 cm) centers.