Michigan Scientific Corporation

Wheel Force Transducers

LIGHT AND MEDIUM DUTY TRANSDUCER SPECIFICATIONS

	LW25	LW9.5	LW12.8-30	LW12.8-50	LW12.8-50-TEL	LW60	LW65	LW9.5-HS	LW-2T-20K
Application	Motorcycle, ATV, & Small Vehicle	ATV & Small Vehicle	Light Car	Passenger Car, SUV, & Light Duty Truck				Forklift & Construction Equipment	Pick-up Truck & Heavy SUV
Rim Size	≥ 8 in (203 mm)	≥ 10 in (254 mm)	≥ 12 in 330 mm)	≥ 12 in (305 mm)	≥ 14 in (356 mm)	≥ 12 in (305 mm)	≥ 12 in (305 mm)	≥ 10 in (254 mm)	≥ 16 in (406 mm)
Force Nonlinearity [1] (% of Full Scale)	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.50	≤ 0.50	≤ 0.25	≤ 0.25	≤ 0.40	≤ 0.50
Weight	3.2 lb (1.5 kg)	8.0 lb (3.6 kg)	6.6 lb (3.0 kg)	10.3 lb (4.7 kg)	10.3 lb (4.7 kg)	12.5 lb (5.7 kg)	17.5 lb (7.9 kg)	8.5 lb (3.9 kg)	23.4 lb (10.6 kg)
Maximum Static Weight (Fz)	1,200 lb (550 kg)	1,600 lb (725 kg)	1,350 lb (620 kg)	2,250 lb (1,020 kg)	2,250 lb (1,020 kg)	2,700 lb (1,225 kg)	2,900 lb (1,320 kg)	4,200 lb (1,900 kg)	4,000 lb (1,815 kg)
Fx, Fz Load Capacity	5,600 lbf (25 kN)	8,000 lbf (35 kN)	6,750 lbf (30 kN)	11,200 lbf (50 kN)	11,200 lbf (50 kN)	13,400 lbf (60 kN)	14,500 lbf (65 kN)	21,000 lbf (93 kN)	20,000 lbf (90 kN)
Fy Load Capacity	2,000 lbf (8.9 kN)	4,000 lbf (17.8 kN)	3,350 lbf (14.9 kN)	5,600 lbf (25 kN)	5,600 lbf (25 kN)	7,850 lbf (35 kN)	7,850 lbf (35 kN)	10,000 lbf (44 kN)	10,000 lbf (44 kN)
Mx, Mz Load Capacity	1,500 lbf·ft (2 kN·m)	4,000 lbf·ft (5.4 kN·m)	3,000 lbf·ft (4.0 kN·m)	4,800 lbf·ft (6.5 kN·m)	4,800 lbf·ft (6.5 kN·m)	5,900 lbf·ft (8.0 kN·m)	7,700 lbf·ft (10.5 kN·m)	7,000 lbf·ft (9.5 kN·m)	11,000 lbf·ft (14.9 kN·m)
My Load Capacity	2,500 lbf·ft (3.4 kN·m)	4,000 lbf·ft (5.4 kN·m)	3,000 lbf·ft (4.0 kN·m)	4,800 lbf·ft (6.5 kN·m)	4,800 lbf·ft (6.5 kN·m)	6,650 lbf·ft (9.0 kN·m)	7,700 lbf·ft (10.5 kN·m)	7,000 lbf·ft (9.5 kN·m)	15,000 lbf·ft (20 kN·m)
Version	Slip Ring and Telemetry	Slip Ring	Slip Ring or Telemetry	Slip Ring	Telemetry	Slip Ring and Telemetry	Slip Ring and Telemetry	Slip Ring	Slip Ring and Telemetry

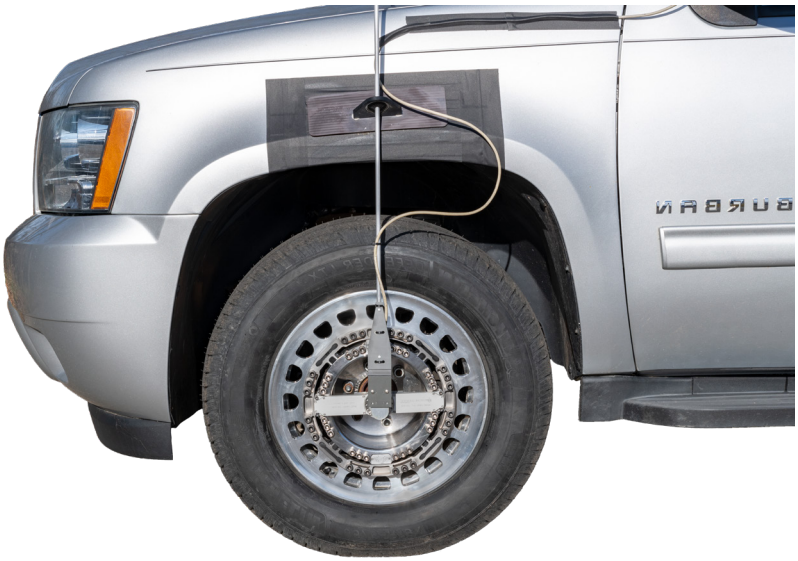
HEAVY DUTY TRANSDUCER SPECIFICATIONS

	LW-2T-30K	LW150	LW-2T-40K	LW-2T-50K	LW-2T-60K-S	LW-2T-100K-S	LW-2T-100K	LW700
Application	Medium Duty Truck & Bus, Skid Steer	Truck & Bus	Forklift, Truck, & Bus	Class 8 Truck, Agricultural & Construction Equipment				
Rim Size	≥ 15 in (381 mm)	≥ 22.5 in (495 mm)	≥ 15 in (381 mm)	≥ 19.5 in (495 mm)	≥ 20 in (508 mm)		≥ 22.5 in (572 mm)	≥ 24 in (610 mm)
Hub Size (PCD) [2]	≤ 10.4 in (265 mm)	≤ 13 in (335 mm)	≤ 10.4 in (265 mm)	≤ 11.2 in (285 mm)	≤ 13 in (335 mm)		≤ 13 in (335 mm)	≤ 16.7 in (425 mm)
Force Nonlinearity [1] (% of Full Scale)	≤ 0.50			≤ 1.00	≤ 1.00			
Weight	22.0 lb (10.0 kg)	46.0 lb (20.9 kg)	23.0 lb (10.4 kg)	38.5 lb (17.5 kg)	62.5 lb (28.4 kg)	66.0 lb (29.9 kg)	62.0 lb (28.0 kg)	142.0 lb (64.4 kg)
Maximum Static Weight (Fz)	6,000 lb (2,720 kg)	9,675 lb (4,400 kg)	8,000 lb (3,630 kg)	10,000 lb (4,540 kg)	13,500 lb (6,125 kg)	20,000 lb (9,070 kg)	20,000 lb (9,070 kg)	52,360 lb (23,750 kg)
Fx, Fz Load Capacity	30,000 lbf (133 kN)	33,700 lbf (150 kN)	40,000 lbf (178 kN)	50,000 lbf (222 kN)	67,400 lbf (300 kN)	100,000 lbf (445 kN)		157,360 lbf (700 kN)
Fy Load Capacity	15,000 lbf (66 kN)	16,850 lb (75 kN)	20,000 lbf (89 kN)	25,000 lbf (111 kN)	33,700 lbf (150 kN)	50,000 lbf (222 kN)		157,360 lbf (700 kN)
Mx, Mz Load Capacity	22,000 lbf·ft (30 kN·m)	29,500 lbf·ft (40 kN·m)	30,000 lbf·ft (41 kN·m)	50,000 lbf·ft (68 kN·m)	60,000 lbf·ft (81 kN·m)	80,000 lbf·ft (108 kN·m)	100,000 lbf·ft (135 kN·m)	202,830 lbf·ft (275 kN·m)
My Load Capacity	22,000 lbf·ft (30 kN·m)	29,500 lbf·ft (40 kN·m)	30,000 lbf·ft (41 kN·m)	50,000 lbf·ft (68 kN·m)	60,000 lbf·ft (81 kN·m)	80,000 lbf·ft (108 kN·m)	100,000 lbf·ft (135 kN·m)	202,830 lbf·ft (275 kN·m)
Version	Slip Ring and Telemetry			Slip Ring or Telemetry	Slip Ring and Telemetry		Slip Ring or Telemetry	Slip Ring and Telemetry

[1] Nonlinearity may vary among data channels. See product datasheet for specification of each channel.
[2] Larger Hub PCDs can be accommodated by using two-piece Hub Adapters.

Precision Wheel Force Transducers

In addition to traditional Wheel Force Transducer (WFT) systems, Michigan Scientific Corporation (MSC) offers a line of Precision Wheel Force Transducers.

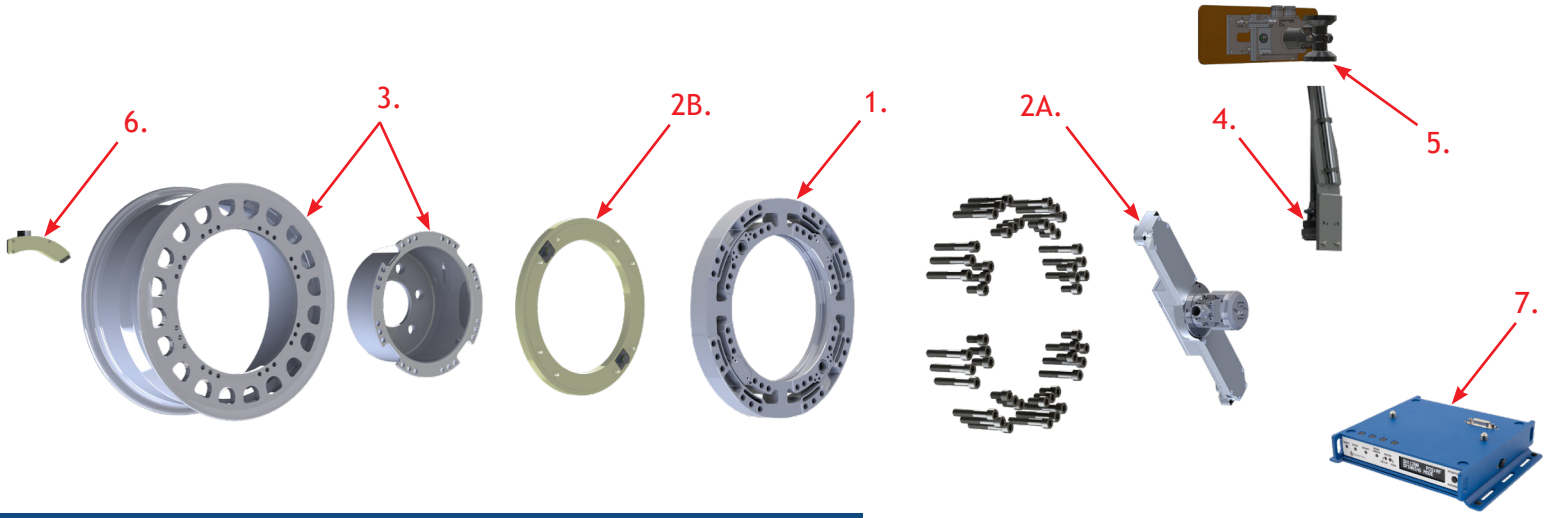


The unique design of MSC's Precision Wheel Force Transducers allow for compatibility with both a high quality MSC outboard Slip Ring Assembly and an inboard Wireless Telemetry data transmission system.

For a fast installation and set-up, the outboard Slip Ring Assembly is ideal, while public road testing and extreme off-road testing applications utilize the inboard Wireless Telemetry Package.

Because MSC's Precision Wheel Force Transducers are stronger than standard MSC WFTs of the same size, they can handle the increased weight of electric vehicles.

All of MSC's Precision Wheel Force Transducers are equipped with a robust IP67 design, ideal for the harshest track and off-road measurements, as well as non-spinning applications to monitor and control laboratory test rings.



1. WHEEL FORCE TRANSDUCER (WFT)

Measures: longitudinal (Fx), lateral (Fy), and vertical (Fz) forces, camber (Mx), torque (My), and steer (Mz) moments

2. SIGNAL CONDITIONING

A) Integrated Slip Ring & Amplifier Subassembly

Spinning amplifier package digitizes all signals before being transmitted through a slip ring assembly, reducing noise and allowing for a small, flexible signal cable

Assembly contains a high resolution encoder

OR

B) Wireless Telemetry Transmitter Subassembly

Compact, inductively powered transmitter digitizes and transmits signals via radio frequency to the telemetry stator

Assembly contains high resolution magnetic encoder

3. CUSTOM HUB & WHEEL ADAPTERS

Lightweight rim adapters are made from aluminum and hub adapters are made from titanium

4. STATOR RESTRAINING ROD

Prevents rotation of the slip ring stator

5. STATOR ANGLE CORRECTOR

Internal high resolution absolute encoder measures the angle of the Stator Restraining Rod

6. TELEMETRY STATOR RESTRAINT AND BRACKET

Receives telemetry signal, contains magnetic encoder pick-ups, and induction primary coil

7. CT3 TRANSDUCER INTERFACE BOX

Performs real-time coordinate transformations and crosstalk compensation with quick system set-up to provide analog, CAN, or Ethernet signal outputs for data acquisition

Applications

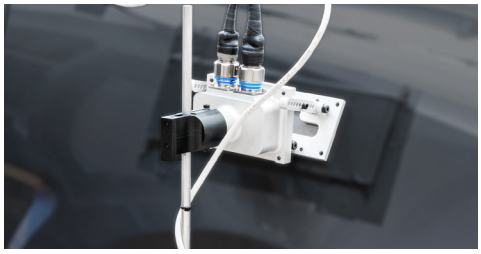
- Durability Testing
- Computer Model Validation
- Vehicle Dynamics
- Brake Development
- Traction Studies
- Coefficient of Friction Measurements
- High Speed Course Testing
- Off-Road Driving

Michigan Scientific Corporation Wheel Force Transducers output three forces, three moments, two accelerations, wheel speed, and wheel position signals to provide complete spindle load data with extreme accuracy. Every system combines a high strength, lightweight transducer with weatherproofed protective coatings for superior reliability and durability in a variety of driving conditions. A dedicated and knowledgeable customer support system makes installation quick and easy. The transducer system is backed by a three year warranty on the transducer, amplifier, and user interface box.

Related Products

STATOR ANGLE CORRECTION DEVICE

The Michigan Scientific Stator Angle Corrector (SAC) device is compatible with any of MSC's slip ring-based Wheel Force Transducers. The SAC device enables WFT set-up to be even faster and easier, and eliminates the need for over-the-wheel brackets on front-steered vehicle wheels. It adapts to many vehicle types, from small cars to heavy trucks. The SAC reduces steered-wheel errors and provides greater position for reference accuracy.



TRUESLIP SLIP ANGLE SENSOR

TrueSlip makes slip angle measurements with high accuracy. The sensor optically measures the longitudinal and lateral velocities of the surface below it. TrueSlip measurements include the true SAE defined slip angle. The TrueSlip sensor is compatible with Michigan Scientific Wheel Force Transducers, providing comprehensive information on the relationship between a vehicle tire and the surface of a road.

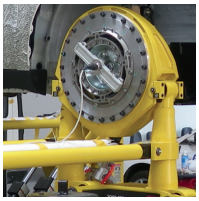
Calibration and Accreditation Information

Calibration

All MSC Wheel Force Transducers are calibrated on unique, patented transducer calibration machines. It is recommended that customers send their transducers to MSC for recalibration after first year of use, and every two years afterwards. MSC provides fast, in-house recalibration services for all of a transducer products.

Accreditation and Certification

The design, manufacturing, and calibration process of the Michigan Scientific Corporation WFTs are ISO 9001:2015 certified. The WFT calibrations are ISO/IEC 17025:2017 accredited and all reference measurement equipment is traceable to the National Institute of Standards and Technology (NIST).



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