TMS 9000 Series
Torque Measurement System

Lebow Products Inc.

DIGITAL TELEMETRY
DESIGNED FOR TODAY & TOMORROW

DESIGNED FOR TODAY'S APPLICATIONS...
AND TOMORROW'S TESTING

INNOVATIVE SOLUTIONS FOR ROTATING TORQUE MEASUREMENT

The New Force in Measurement

- **Standard or Custom set up**
- **Single or Multi-Channel**
- **For greater control**
- **More versatile applications**

The TMS9000 torque measurement system from Lebow represents an advanced generation of rotary transformer sensors designed to operate entirely in the digital domain for higher accuracy and greater versatility. The TMS9000 series physically integrates rotor electronics and telemetry into one element, with all set-up and output controlled through computer software. This digital wireless telemetry system supplies power to the rotating sensor, supports two-way communications and provides wide testing capabilities.

More than a stand-alone sensor, the specially designed TMS9000 is a complete torque measurement system, with standard analog, frequency and digital outputs. Fully software driven, the durable TMS9000 utilizes a custom 19-bit digital wireless telemetry system, which maximizes resolution and frequency response while also being able to provide excitation power across the wireless gap. Systems set-up can be changed "on-the-fly" without affecting calibration. The TMS9000 can be expanded for future market needs by using standard PC104 cards.

APPLICATIONS

- TRANSPORTATION & AUTOMOTIVE
- MANUFACTURING & PRODUCTION
- AEROSPACE & MILITARY
- MEDICAL
- DESIGN & ENGINEERING
- TESTING & QUALITY

MECHANICAL MATING CONFIGURATIONS

WHEN NOTHING BUT THE BEST WILL DO

When conditions are tough, Lebow torque sensors are tougher. For years sensor operators in varied applications have acknowledged the unequaled accuracy, durability and quality built into each Lebow sensor. Lebow sensors can be tailored to specific applications for even greater versatility with capacities up to 200,000 ft lbs.

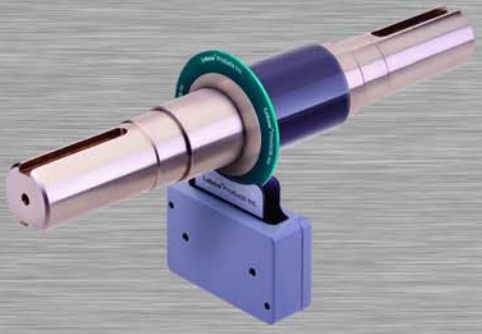
Mechanical Sensor Features

- **No hoop antenna**
- **System error < 0.05% FS**
- **High torsional stiffness**
- **High overload capability**
- **Low rotating inertia**
- **Variety of mating flange designs**

Custom Designs Available

SAE-DIN Drive Shaft Yokes

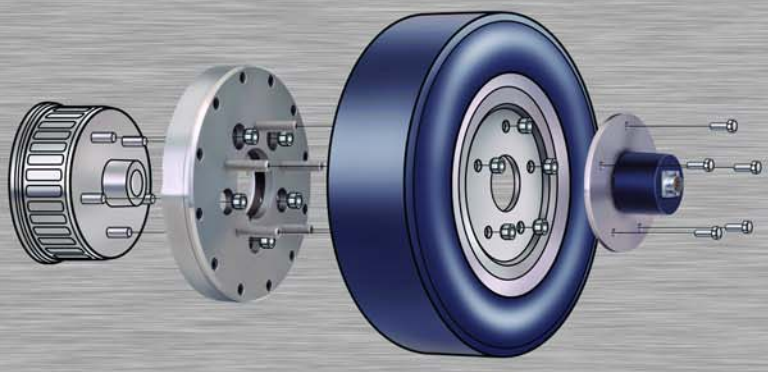
Integral Coupling



Floating Circular Keyed Shaft

Foot Mounted Circular Keyed Shafts

Sprocket-Pulley



Wheel Torque

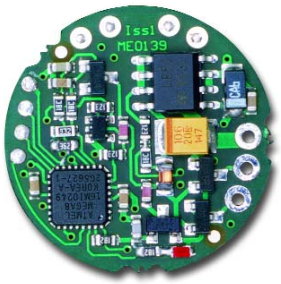
THE DYNAMICS OF THE TMS 9000

The rotor electronics module is encapsulated to maximize protection against vibration, G Force and chemicals.

- The rotating antenna is comprised of an annular printed circuit board, peripherally or centrally mounted on the rotor.
- Four layer construction ensures high strength with no exposed tracks in the outer region.
- IP65 caliper-style coupling module with die cast aluminum casing. Provides power transmission and signal recovery with BNC connector for co-axial cable.

ELECTRICAL FEATURES

- Rotor Electronics Module. This is embedded in the sensor and receives and conditions the input signal before transmitting it to the SPM.



Rotor Electronics

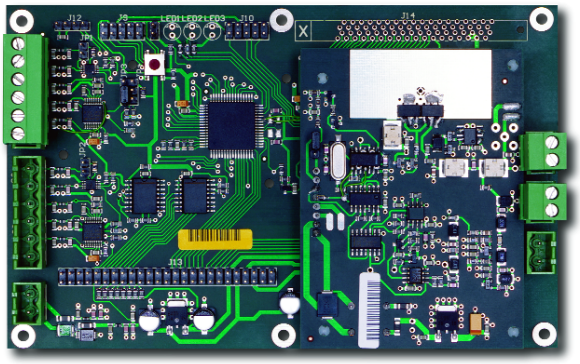
- Signal Processing Module (SPM). This device integrates two microprocessors to share data processing and communications. It recovers the signal from the rotor, provides scaling and filtering, and offers a variety of outputs, compatible with various data acquisition systems.
- PC104 expansion. This option allows the operator functionality beyond the hardware and software provided.

PERFORMANCE SPECIFICATIONS

Parameter	Minimum	Nominal	Maximum	Unit
Power supply (standard) non isolated	11.75	12	12.25	V DC
Voltage Output	-10	0	10	VDC
Current output	4	12	20	mA
Load impedance for current loop	-	-	500	Ohms
Frequency output or	5000 40000	10000 60000	15000 80000	Hz Hz
Digital Output	-	RS232/485	-	-
Sampling rate		17656		sps
Linearity (system)		0.05		% FS

LEBOW PRODUCTS, INC. 1728 MAPLELAWN RD.
TROY, MI 48084, 248-643-0220

EXCEEDING INDUSTRY STANDARDS FOR RUGGEDNESS, RELIABILITY AND DURABILITY



SPM Card

PC 104

TMS9000 SIGNAL PROCESSING MODULE (SPM)

The Heart of the System is Built for Accuracy

The SPM contains two separate microprocessors to share data processing and communications. Calibration is all digital, via RS232/485 link, eliminating potentiometers or dip switches. The durable unit has an external BNC connector for the RF coaxial cable, internal 2-part plug and socket connectors for output signals, digital communication and DC power. The SPM external housing also features a "SHUNT CAL' button and LED's to indicate "Power ON", "Rotor Active" and "SHUNT CAL Mode". Because of these enhanced technologies, the end result is a true advancement in telemetry-based torque systems

Parameter	Minimum	Nominal	Maximum	Unit
Resolution	0.01%	-	0.001%	% FS
Measurement Frequency Range	0		3000	Hz
Digital Filter	0.1		1k	Hz
Rotation Speed Range	0	-	30000	rpm
Offset Temperature Stability		0.005		+/- % FS/°C
Gain Temperature Stability		0.005		+/- % FS/°C
Operating Temperature Range	-40	-	85	°C
Compensated Temperature Range	-10°C		+70°C	

COMMUNICATIONS FOR COMPATIBILITY

TMS9000 SOFTWARE FEATURES

The software at the heart of the TMS9000 system is designed to offer flexibility and adaptability. The software puts the operator fully in control and can be tailored to the test conditions required at the time. Standard or custom set ups can be saved to parameter files and recalled at any time. Input scaling and output scaling is independent, providing a wider application advantage.

The software-driven SPM (Signal Processing Module) is offered with five standard interfaces, but will also adapt to other interfaces such as: CAN-open, Ethernet and USB, as well as PC104 expansion cards. The software flexibility allows single or multiple sensors to share the same wireless telemetry link, with digital output as standard, or with multi-channel digital-to-analog available as an option.

Toolkit Features

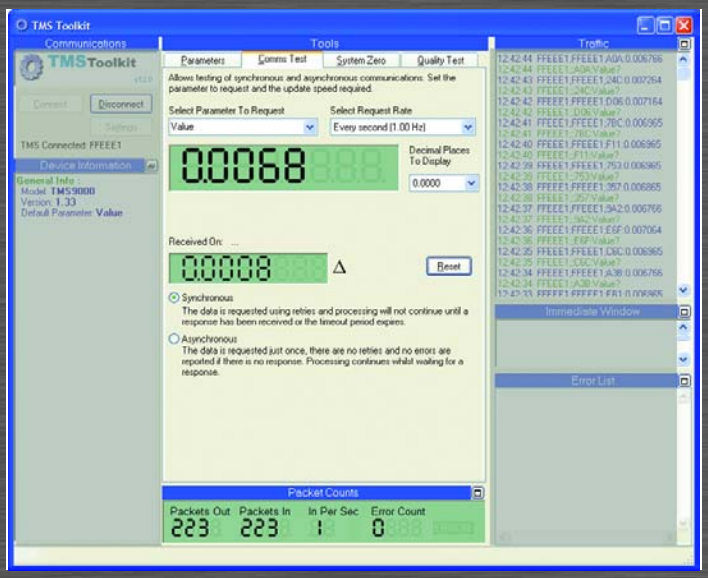
- **Full Software Set Up**
- **No Potentiometers or Dip Switches**
- **Scalable Output "On-The-Fly"**
- **Nine Point Linearization Feature**
- **Multi-Digital Filter Feature**
- **Simple ASCII Communications Protocol**

Additional Features

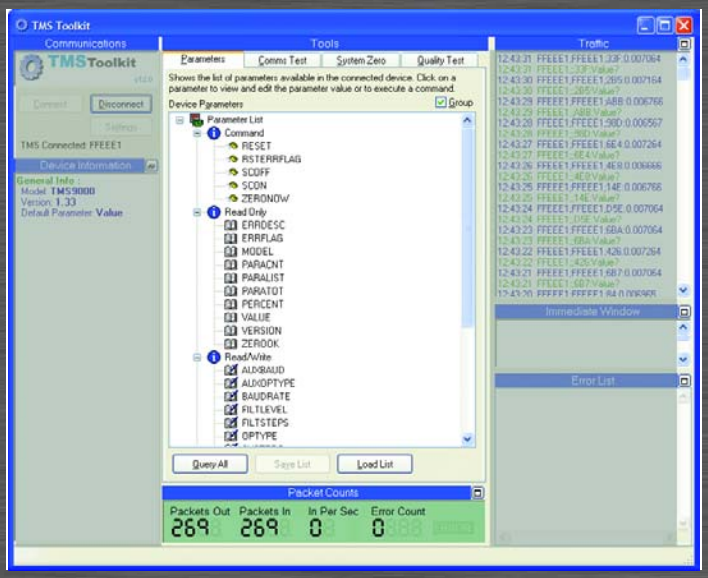
- **Multiple Channels**
- **Multiplexing**
- **Custom Designs Available**

AND VERSATILITY

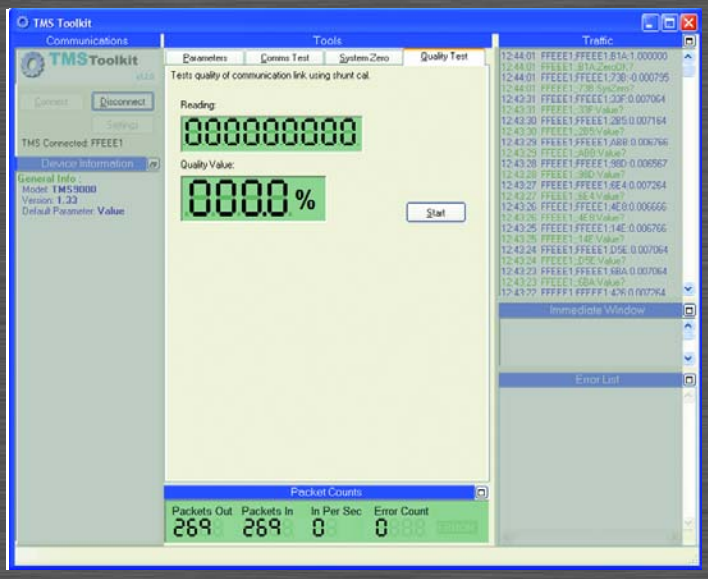
TMS 9000 SOFTWARE TOOLKIT



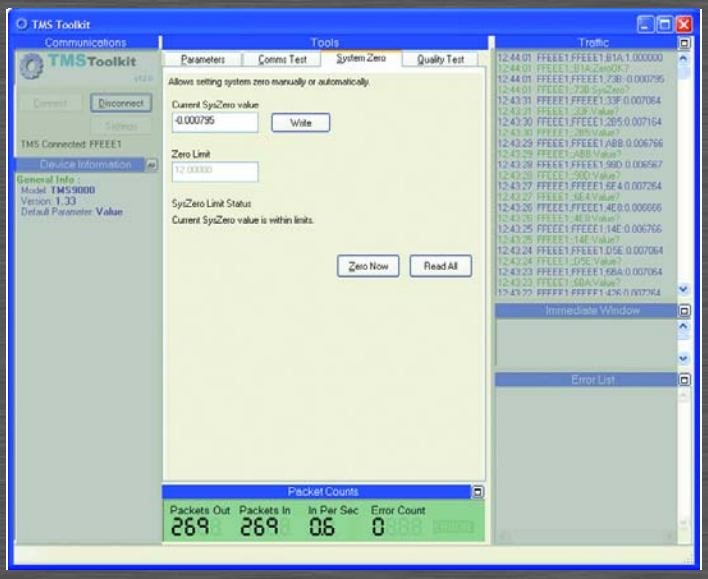
Test Communications



Parameters/System Set-Up



Systems Quality/Test



Systems Zero/Tare

Lebow Products Inc.

A Dynamic Force in Measurement Solutions

Lebow Products has manufactured torque and force sensors in diverse market applications for over fifty years. Lebow's force and torque sensors are designed for controlled or harsh environment test measurement, and have been successfully integrated into manufacturing operations to control or monitor process information. Lebow's headquarters in Troy, Michigan offers full sales, service and manufacturing operation, including a valuable 8,000-sensor design library for researching custom process-to-product solutions.

Products and Services

- Custom torque and force sensor design
- Application and wiring of strain gauges
- Torque and force calibration–NIST traceable
  - Force to 600,000 pounds
  - Torque to 1,500,000 inch-lbs.
- Application Engineering

Accreditations

- A2LA
- ISO-17025
- ANSI-Z-540
- ISO-9001:2000
- CE

CERTIFIED QUALITY SYSTEM ISO 9001 Lebow TROY, MICHIGAN

INTERTECHNOLOGY INC.
1-800-465-1600
1 Scarsdale Rd., Don Mills, ON M3B 2R2
Tel: 416-445-5500, Fax: 416-445-1170
E-Mail: sales@intertechnology.ca

Force Sensors

- Fatigue-resistant
- General purpose
- Automotive
- Multi-Axis
- Compression
- Hollow
- Calibration Standard

OEM Transducers

- Control rod transducers
- Cable tension transducers
- Process control transducers
- Custom force transducers

Torque Sensors

Rotary
- Telemetry
- Rotary transformer
- Slip Ring

Mounting styles
- Circular keyed shaft drive
- Flange drive
- Spline drive

Special purpose
- Multi-Axis sensors
- Pulley
- Wheel
- Dynamometer

Reaction
- Shaft drive
- Flange drive
- Hollow
- Torque and thrust