# *Inductive, Non-Contact, Digital Flexplate Torque Sensing System*

In-Vehicle Engine Output Torque Measurement

FEATURES

➤ Non-Contact Digital Telemetry data link Transmits Sensor Signals via Radio Transmitter to a Stationary Receiver.

➤ Extremely rugged and reliable. Can withstand the harshest of conditions and up to 10,000 RPM.

➤ Stock flexplate is replicated by a custom Stainless Steel sensor.

➤ Requires Minimal Modifications to vehicle. Flexplate installs as usual.

➤ High precision permits analysis of piston firing pulses in great detail.

➤ Immune to thrust loading from torque converter. High Torsional Stiffness.

➤ Eliminates Slip Ring Noise, Cumbersome Installation and Maintenance.

➤ Available for any size Flexplate. Most any torque range is available.

➤ Superior Digital RF Technology provides clean data free of drop-outs.
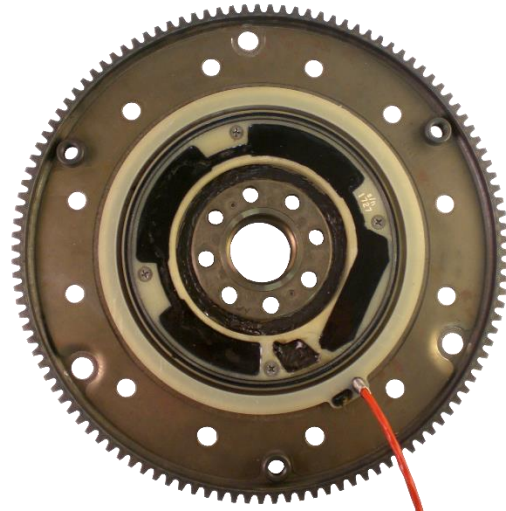
Flexplate Sensor with Stationary Loop Antenna

Model 2125i-HT Digital

System Converts Stock Flexplate into Torque Sensor

ATi's 2100 Series Digital Telemetry Systems are ideal for transmitting signals from sensors mounted on rotating shafts or moving machinery to a stationary Digital Receiver.

ATi's Flexplate Torque Sensing Systems permit in-vehicle Engine Output torque measurements. A customer-supplied flex-plate is supplied to ATi for measurements. The ring gear is extracted from the stock unit, and welded to a high strength Stainless Steel sensor that replicates the original flex-plate. This configuration provides a much higher degree of accuracy when compared to instrumenting stock flex-plates or even replicas of stock flex-plates.

Digital RF Telemetry is used for data transfer while Induction Power is used to transfer power to the rotating sensor. These technologies permit excessive movement between the rotating sensor and stationary loop antenna with no effect on the signal quality – minimal alignment between the stationary and rotating components is required.

The Digital RF Telemetry and Induction Power links are also immune to dust and oil build-up, unlike Infrared Torque Sensors which are sensitive to not only dirt build-up but shaft movements as well. The sensing element is designed to be immune to thrust loading which occurs when the torque converter heats up. All components are designed to withstand the harshest shock

Alternately, difficult to replicate parts such as dual mass flywheels can be instrumented directly with strain gages and telemetry equipment.

Installation could not be easier as the flex-plate sensor installs just like a stock unit. Virtually no vehicle modifications are required.
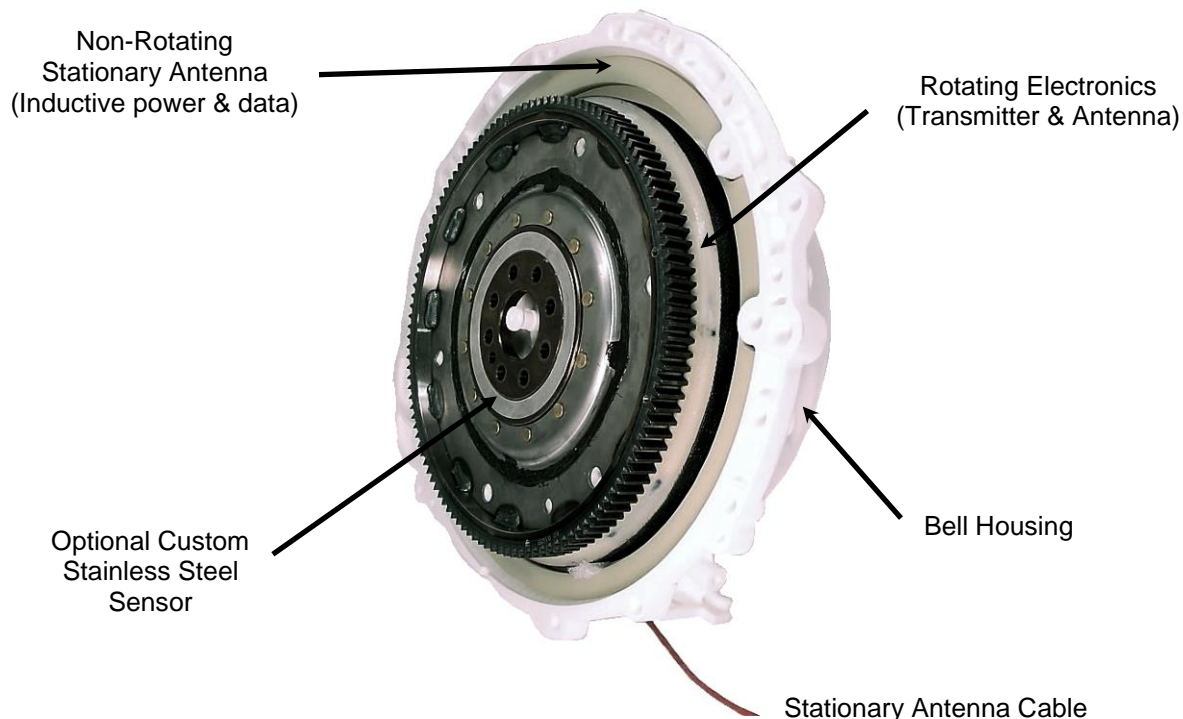
The flexplate is instrumented for an accurate and dependable in-vehicle torque measurement that is independent of thrust loading, temperature or other environmental factors. And

vibration conditions in addition to 150° C operation.

ATi was the first in the industry to successfully measure Indy Car engine output torque in-vehicle, using the same technology.

The 2100 Series Digital Telemetry Receiver acquires the signal from the Transmitter and converts it to a ±2V, ±5V, or ±10V analog output. 0-20 and 4-20mA formats are optional. The analog output can be recorded directly by a DAQ device or used for process controls.

The 2100 Series Miniature Digital Telemetry Transmitters incorporate a stable crystal oscillator that is tuned to a specific frequency eliminating the need for tuning by the end user. Transmitter frequencies can be staggered allowing multiple transmitters to be operated in close proximity with no interference. Multi-channel receivers are also available.

Non-Rotating
Stationary Antenna
(Inductive power & data)

Rotating Electronics
(Transmitter & Antenna)

Optional Custom
Stainless Steel
Sensor

Bell Housing

Stationary Antenna Cable

Example of Instrumented Flexplate with Electronics

Features and Specifications

SYSTEM

1 Channel ....4200 samples/second
Resolution .... 14 bits
            (other configurations are available)
Integral Non-Linearity.................±0.10% Full Scale
Repeatability... ±0.025%
Maximum Error..........................<0.15% Full Scale

RECEIVER: MODEL 2125iHT

Power ....12VDC / 110VAC
Output ....0-2, 5, 10; ± 2, 5, 10 VDC
            (0-20, 4-20 mA Optional)
Output Ripple .... < 2 mV
Display.............Multi-functional Digital Backlit LCD
Size ....8.0"L x 5.0"W x 3.48"H

TRANSMITTER

Power .... Induction Power
Zero Drift ....0.02% per °C
Span Drift .... 0.02% per °C
Operating Temperature Range ....-40 to 85°C
Size .... Various Sizes and Shapes Available

OPTIONAL FLEXPLATE SENSOR

Standard Ranges .... 1000, 2000 FT-LBS
                        (most any range available)
Maximum RPM....................................up to 30,000
Usable Temperature Range...............-40 to 140° C
Compensated Region ....50 to 130° C

Model 2125i-2HT Two Channel Receiver
with Torque and Optional Thrust

Temp Effect on Zero ....±0.01% per °C
Temp Effect on Span ....±0.01% per °C
Safe Overload Capacity 5:1
Fatigue Life (alternating, >100% FS).. >50M cycles

Miniature Digital Telemetry Transmitter

Transmitter Model	Sensor Type	Input	Excitation	Available Options:			
				AT	RC	RT	ST
2140iHT	Strain Gage	4 arm Wheatstone Bridge (>120 ohms)	2.5 Volts DC	N/A	Opt.	N/A	N/A

AT= Automatic Turn On/Off Function – Senses rotation or vibration to turn transmitter on. Automatically turns off transmitter during periods of inactivity to save battery power.
RC = Remote Calibration Function – Provides shunt calibration (strain gage, voltage) or reference voltage injection (accelerometer). Operated from the receiver front panel.
RT = Remote Turn On/Sleep function – Allows operator to set transmitter mode to "On" or "Sleep" from receiver front panel.
ST = Status Updates Function – Transmitter can report battery level, transmitter temperature, or other select parameters back to the receiver.
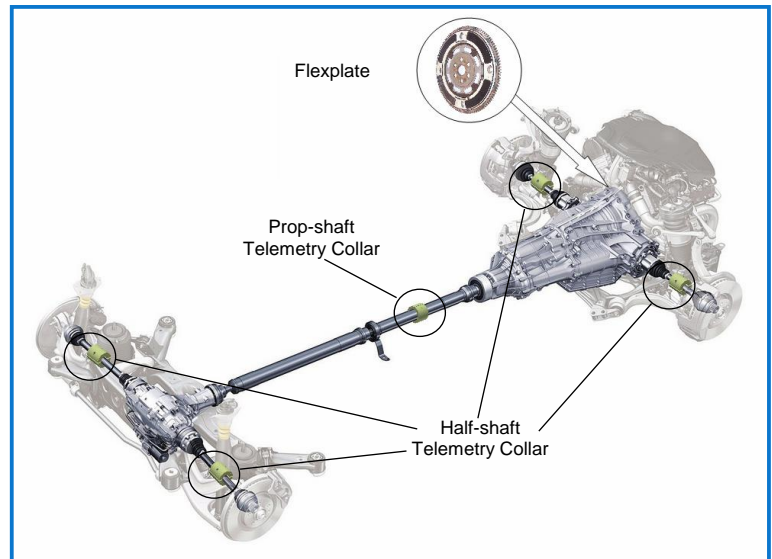
Applications

To the right is a graphical illustration of a typical automotive drive train outfitted with an ATi Flexplate torque sensor, four Half-shaft collars and one Model Prop-shaft torque sensors.

Flexplate

Prop-shaft
Telemetry Collar

Half-shaft
Telemetry Collar

To the left is a photo of an ATi Flexplate sensor mounted to an automotive engine.

ATi Serves Almost Every Industry Around the Globe!

While viewing this PDF document, click on these hyperlinks to go direct to ATi's associated website pages.

Solve your telemetry problems today. Have ATi build a standard or custom Telemetry System for your application.