Expert™ Torque Analysis Systems

The expanding range of IR Expert Torque Analysis Systems provides the perfect complement for precision fastening tools. It now features the new ETA Series, incorporating the latest digital technology, and includes the proven Sensor I products, widely used throughout industry...and even the space program...where precise calibration is essential.

The Sensor I Expert wrench has proven itself as an invaluable asset for some of the world's leading auto racing teams. Randy Dorton, director of the engine development program at Hendrick Motorsports, utilizes the tool in building winning powerplants for their NASCAR Winston Cup and Busch Grand National Series teams.

Sensor I Expert Wrench

Ingersoll-Rand has created two indispensable tools for developing, meeting and verifying virtually any tightening specification for bolted assemblies in the laboratory or on the production line: The Sensor I Expert and Sensor I Expert Auditor electronic wrenches. Based on the highly regarded Sensor I wrench – the industry standard for portable tightening systems since 1983 – the new Expert and Expert Auditor are powerful, compact systems capable of:

- Performing advanced tightening strategies including torque control, angle control and yield control
- Ensuring quality torque auditing with the proprietary Dynamic Torque Audit feature
- Recording tightening data
- Displaying current SPC information for tightening operations

Typical Applications

- A laboratory device for developing fastening specifications for applications
- On-line quality auditing
- Low volume assembly
- SPC quality control and data collection

20 Custom Application Setups

- Stores custom fastening strategies for specific applications

Data Storage

- Stores up to 1000 final tightening values per application setup (up to 2500 maximum values)
- Stores up to ten tightening traces

Four Tightening Modes

- Torque control – For accurate torque tightening
- Torque plus angle control – For tightening to a specific angle beyond snug Improved clamp load consistency on more critical applications
- Yield control – For tightening to yield point of fastener. For obtaining maximum clamp load from fastener
- Dynamic torque audit – Quality assurance for fasteners exiting assembly line

Statistical Capability

- SPC calculations including mean, standard deviation, Cp, and Cpk, can be viewed on screen or sent to a PC

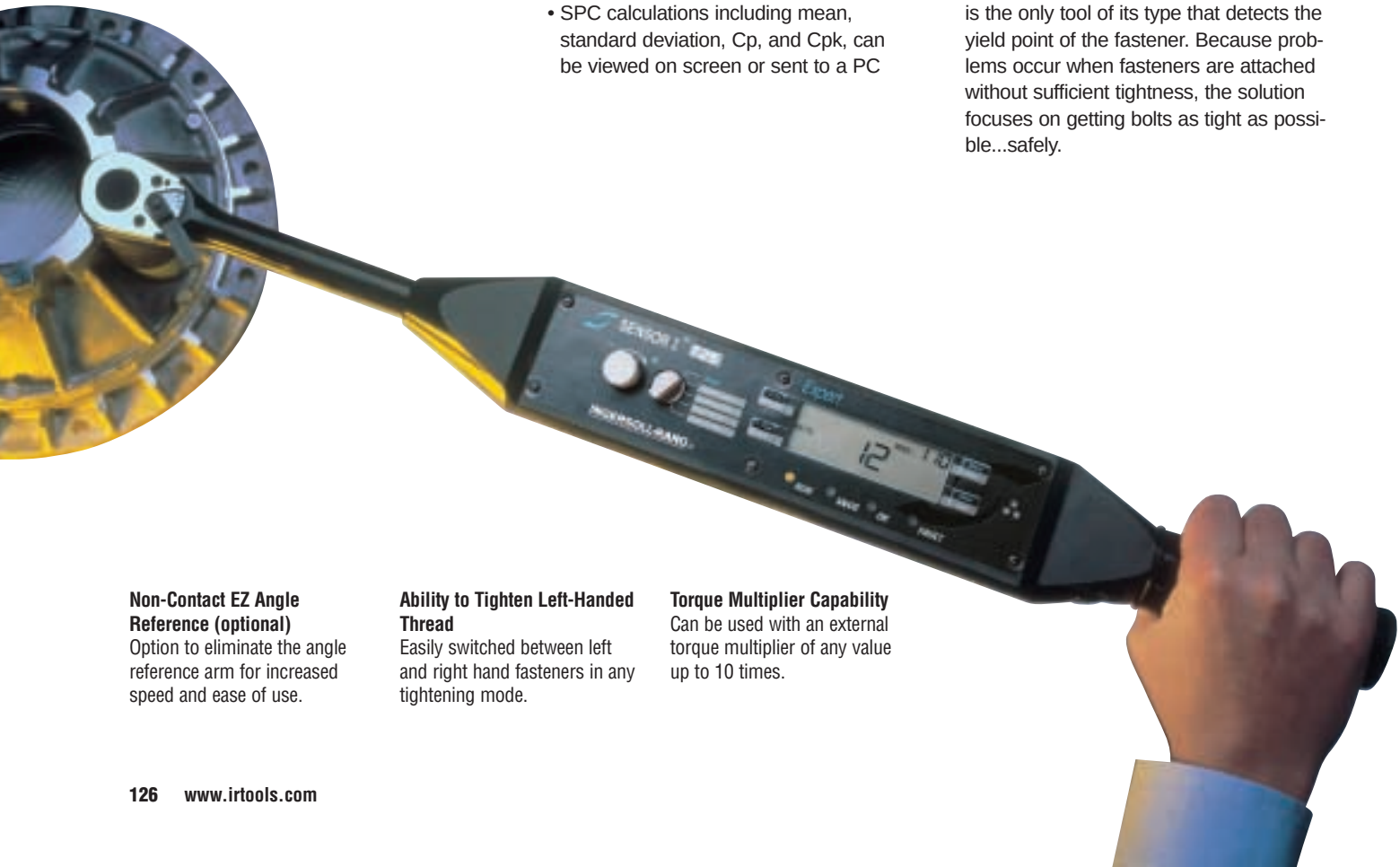
Direct Computer Interface

- Integral RS232 port allows for direct connection of tool to computer for downloading fastening data and traces.
- For additional functionality, it can be used in conjunction with the PC Companion software.

The features of the Expert Wrench significantly enhance the scope of information delivery, as well as accessibility and ease of use:

- Built-in non-contact angle measurement (optional)
- On-board storage of tightening data to eliminate the need for a local PC
- Quality control limits on tightening parameters give an instant picture of the fastening quality and help ensure a "good" tightening
- Serial interface for transmission and analysis of data

The Sensor I Expert Wrench is far more capable than operator-dependent hand torque wrenches, and is the perfect supplement to power tools, whether basic or advanced. It enables operators to gain control of fastening operations by setting standards, auditing performance, and monitoring repairs. The Sensor I Expert is the only tool of its type that detects the yield point of the fastener. Because problems occur when fasteners are attached without sufficient tightness, the solution focuses on getting bolts as tight as possible...safely.

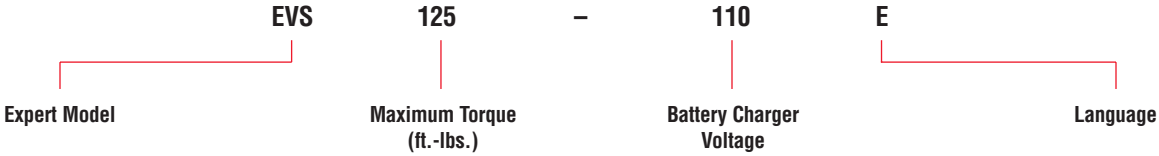


Non-Contact EZ Angle Reference (optional)
Option to eliminate the angle reference arm for increased speed and ease of use.

Ability to Tighten Left-Handed Thread
Easily switched between left and right hand fasteners in any tightening mode.

Torque Multiplier Capability
Can be used with an external torque multiplier of any value up to 10 times.

Product Information Guide



Model Numbers*

Model	Torque Range ft.-lbs.	Torque Range Nm	Charger	Language
E__125-110E	15 -125	20 - 170	110 VAC, 60 HZ	English
E__125-110G	15 -125	20 - 170	110 VAC, 60 HZ	German
E__125-110F	15 -125	20 - 170	110 VAC, 60 HZ	French
E__125-110S	15 -125	20 - 170	110 VAC, 60 HZ	Spanish
E__125-110I	15 -125	20 - 170	110 VAC, 60 HZ	Italian
E__125-220E	15 -125	20 - 170	220 VAC, 50 HZ	English
E__125-220G	15 -125	20 - 170	220 VAC, 50 HZ	German
E__125-220F	15 -125	20 - 170	220 VAC, 50 HZ	French
E__125-220S	15 -125	20 - 170	220 VAC, 50 HZ	Spanish
E__125-220I	15 -125	20 - 170	220 VAC, 50 HZ	Italian
E__250-110E	80 - 250	108 - 340	110 VAC, 60 HZ	English
E__250-110G	80 - 250	108 - 340	110 VAC, 60 HZ	German
E__250-110F	80 - 250	108 - 340	110 VAC, 60 HZ	French
E__250-110S	80 - 250	108 - 340	110 VAC, 60 HZ	Spanish
E__250-110I	80 - 250	108 - 340	110 VAC, 60 HZ	Italian
E__250-220E	80 - 250	108 - 340	220 VAC, 50 HZ	English
E__250-220G	80 - 250	108 - 340	220 VAC, 50 HZ	German
E__250-220F	80 - 250	108 - 340	220 VAC, 50 HZ	French
E__250-220S	80 - 250	108 - 340	220 VAC, 50 HZ	Spanish
E__250-220I	80 - 250	108 - 340	220 VAC, 50 HZ	Italian
E__400-110E	100 - 400	132 - 540	110 VAC, 60 HZ	English
E__400-110G	100 - 400	132 - 540	110 VAC, 60 HZ	German
E__400-110F	100 - 400	132 - 540	110 VAC, 60 HZ	French
E__400-110S	100 - 400	132 - 540	110 VAC, 60 HZ	Spanish
E__400-110I	100 - 400	132 - 540	110 VAC, 60 HZ	Italian
E__400-220E	100 - 400	132 - 540	220 VAC, 50 HZ	English
E__400-220G	100 - 400	132 - 540	220 VAC, 50 HZ	German
E__400-220F	100 - 400	132 - 540	220 VAC, 50 HZ	French
E__400-220S	100 - 400	132 - 540	220 VAC, 50 HZ	Spanish
E__400-220I	100 - 400	132 - 540	220 VAC, 50 HZ	Italian

**Insert a "VS" at the __ in the model number to order the Expert or insert an "A" at the __ in the model number to order the Expert Auditor.*

ETA Series Expert Torque Analyzer

The new Ingersoll-Rand ETA Series Expert Torque Analyzer is designed for use with a broad new range of transducers to dynamically measure and record the torque output of all types of fastening tools, including pulse tools. The Expert Torque Analyzer has full statistical capability, and all data can be downloaded to a computer or printer via the RS232 port. The full line of joint kits facilitates testing of fastening tools in the tool crib, quality lab or on the line.

Bring your tool crib or quality check torque process up to date with the latest digital technology. The new Electronic Torque Analyzer System from Ingersoll-Rand offers you all the equipment required to test both your tools used on line and your torque wrenches used to monitor the quality of joints.

The ETA Series of products offers stationary transducers that mount to a table or cart, rotary transducers to use right on the job, and joint kits to simulate a variety of conditions from hard to soft joints.

The ETA2 torque analyzer will store up to 200 torque readings and provide CP/CPK and CM/CMK analysis of the data. Data may be transferred to a PC or printer via the RS232 port. The unit is capable of reading in four different modes to cover a variety of tools such as standard air tools, pulse tools, and click wrenches.

Any of six different languages (English, French, German, Italian, Spanish, Swedish) may be selected on the Expert Torque Analyzer. The charger is equipped with three different adapters to make it easy to use in most of the world. Nine different units of measure make it compatible with most standards used in the global market.

The ETA2 is portable and includes a neck strap. The bottom concave design makes it comfortable and easy to use. The powerful NiMh battery provides over 8 hours of use before requiring a charge. Utilizing the new materials and charging routines, the battery can be completely recharged in 2-1/2 hours without leaving a footprint on the battery's memory.

ETA2 Kit includes:

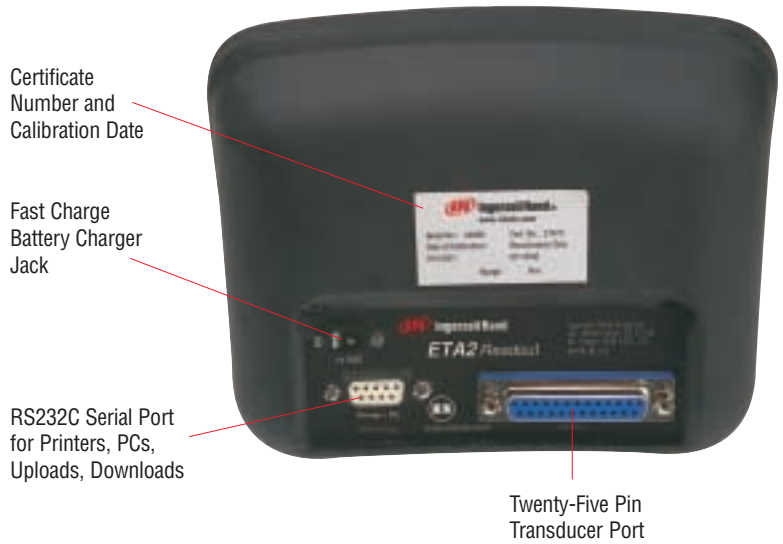
ETA2	Torque analyzer
ETA2-STRAP	Camera-type neck strap
ETA2-BC	Battery charger
ETA2-P525	Port saver
ETA2-PC99	PC connector cable
ETA2-P925	Printer cable
ETA2-CASE	Carrying case
7464	Operating manual

ETA2 Features

- Monitors torque, pulse count and first peak
- Memory holds 200 readings
- Range, mean and Sigma calculations
- CP, CPK, CM, CPM
- Nine units of measure
- Time and date stamped

Front View

Rear View



ETA Transducers and Joint Simulators

Ingersoll-Rand rotary and stationary transducers span the range of 1.5 to 1000Nm. They are designed to work with the ETA2 torque analyzer or other equipment that uses industry standard transducers. These transducers will work with pulse tools, nutrunners, screwdrivers, click wrenches, hand torque wrenches and direct drive tools and motors.

The joint simulators have a range up to 1000Nm. Their joint rate can be changed to emulate different joint conditions from hard to soft. They are useful in tool cribs to preset tools for production and test capability under controlled joint rates. The joint kits are available as separate items or as a kit with a stationary transducer.

Transducer Technical Data

Bridge Resistance:	350 Ohm
Overload Capacity:	125% of rated max capacity
Static Accuracy:	0.3%
Zero Offset Stability:	0.1% of capacity per C
Operating Temperature:	13-104°F

Calibration Service

For calibration of torque transducers, send to:
Ingersoll-Rand Company
Attention: ETA Department
510 Hester Drive
White House, TN 37188

Stationary Transducers

Drive Size	Transducer Range Nm	Transducer Range ft.-lb.	Stationary Transducer	Model No. Joint Simulator	Joint Capacity Nm	Model No. Joint and Transducer Kit
¼" Square	1.5 to 30	1.1 to 22	TS30S4	JKS30	30	JKST30
⅜" Square	7.5 to 150	5.5 to 110	TS150S6	JKS150	150	JKST150
½" Square	15.0 to 300	11 to 221	TS300S8	JKS300	300	JKST300
¾" Square	50.0 to 1000	37 to 738	TS1000S12	JKS1000	1000	JKST1000

Rotary Transducers

Drive Size	Transducer Range Nm	Transducer Range in.-lb.	Transducer Range ft.-lb.	Rotary Transducer
¼" Hex	.10 to 2	1.0 to 18		TR2H4
¼" Hex	.25 to 5	2.2 to 44		TR5H4
¼" Hex	1.0 to 20	9.0 to 180		TR20H4
¼" Square	1.0 to 20	9.0 to 180		TR20S4
⅜" Square	3.8 to 75		2.8 to 55	TR75S6
½" Square	9.0 to 180		6.7 to 133	TR180S8
¾" Square	12.5 to 250		9.2 to 185	TR250S12
¾" Square	25.0 to 500		18.5 to 370	TR500S12

Bench Top Joint Simulators for Rotary Transducers

Drive Size	Joint Capacity	Joint Simulator
¼" Square	20	JKR20
⅜" Square	75	JKR75
½" Square	180	JKR180
¾" Square	500	JKR500

Torque Testers

ST9100 Electronic Torque Tester

Features

- Internal transducer has a range of 0-100 in.-lb., 0-113 cNm, and 0-115 kgf-cm.
- Certified to NBS/NIST standards
- Recommended for use with power and hand tools
- External Ports: 1) RS-232 serial port, 1) transducer port
- Built-in printer
- Real time clock and calendar with battery backup
- Manual and auto zero reset functions
- Peak and first peak detection capability (for cushion clutch tools)
- Memory partitioning capability – up to 10,000 readings

ST9100

- Memory downloading function for internal or external printing or downloading to serial device via RS-232 compatible port.
- Cable with serial and parallel adapter (9 pin and 24 pin)
- Fast charging NiCad battery system with LOW BATTERY indicator
- CCW dynamic measurement available

ST9100 Standard Equipment

- ST9100-800 Rundown adapter spring assembly (Includes two springs)
- ST9100-812 Wall mounting bracket
- ST9100-803 120V battery charger
- ST9100-810 Data acquisition disks (WIN 95)
- Custom carrying case

Model	Accuracy	Weight	Dimensions
ST9100	5-10 ± 1% 10-20 ± 0.5% 20-100 ± 0.25%	10¼ lb.	12¼" x 7.88" x 2.88"

ST102 Electronic Torque Tester

Features

- Ideal for testing output torque of assembly tools in the calibration lab, repair crib, or on the production line
- Automatic zero function
- Internal transducer has a range of 0 -100 in.-lb. (0 -11.3 Nm) (clockwise and counterclockwise)
- Internal battery provides 30 hours of continuous testing
- Certified to NBS/NIST standards

- Exclusive external transducer connection for monitoring on line fastening operations
- External connection for adapting visual displays such as plotter or digital storage oscilloscope
- Metric and English capabilities

ST102 Standard Equipment

- ST100-800 Rundown adapter spring assembly (Includes both springs)
- ST100-805 Battery pack (internal)
- ST102-803 Battery charger (120 Volts)
- ST102-804 Custom carrying case

ST102 Accessories

- ST100-801 Hard draw spring
- ST100-802 Soft draw spring
- ST102-808 Battery charger (240 Volts)

Model	Accuracy	Weight	Dimensions
ST102	5-10 ± 2% 10-20 ± 1% 20-100 ± 0.5%	6⅝ lb.	10³⁄₁₆" x 8" x 3½