RADIAN LASER TRACKER SERIES

A FOCUS ON AUTOMATION

API's industrial Laser Tracker legacy continues with the portable Radian Laser Tracker series, offering the smallest, lightest, and most accurate Laser Trackers on the market.

Radian's compact and rigid unibody innovation minimizes Abbe offset errors, while also housing laser source, optics, camera, and major head electronics in the center of the tracker body. Unibody centering of all heat sources offers innovative Air-Over Cooling, which provides increased temperature stability, faster start-up times, and further reduces instrument error. Competitive trackers, with side-mounted lasers, create unbalanced heat sources requiring complex and lengthy warm-up routines before accurate measurements can be performed.

Radian's integrated controller offers cableless and hazard-free operation in confined spaces. Onboard Wi-Fi reduces system setup for seamless operation.

Radian's wide-angle iVision™ fast auto-lock allows rapid recapture of lost laser beam for effortless usability of difficult to access line-of-sight measurements. Hot-swappable batteries provide unlimited operation.

FOR MORE THAN 30 YEARS API HAS PIONEERED LASER-BASED EQUIPMENT FOR MEASUREMENT AND CALIBRATION

A PASSION FOR PRECISION

Radian Core, Plus, and Pro provide large-scale portable coordinate metrology solutions for every customer application and budget. Hand-held tactile and laser scanning probes compliment Radian's capabilities, extending measurement reach.

Radian 6DoF Laser Trackers can perform dynamic calibration and tracking of industrial robots and machine tools, enhancing manufacturing processes by reducing process variation.

LASER TRACKER
1988

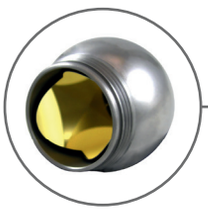
TRACKER 2
1999

TRACKER 2 PLUS
2002

TRACKER 3
2005

RADIAN
CURRENT

RADIAN MEASUREMENT AND ACCESSORIES



SMR MEASUREMENT

API's break-resistant Spherically Mounted Retro-reflectors (SMR), are constructed with a one-piece optic, eliminating risks associated with glass panels shifting, separating, or fracturing. API SMRs can track over 80m with optical centering accuracy down to ±2.5 microns for line-of-sight measurement.

HANDHELD PROBING

vProbe, a handheld, lightweight, wireless tactile probe with easy-hold grip, allows Radian to perform extended coordinate measurements on intricate features outside the Laser Tracker's line-of-sight providing fast and accurate measurements. vProbe offers more versatility than a portable arm CMM and is inherently more suitable for larger parts. Dual stylus locations, with LED indication, make measurement quick and convenient, inside, behind, or underneath a part. Dynamic scanning capability provides instant coordinate feedback. The included batteries allow six hours of measurement activity. Additional batteries can extend measurement time. Styli length up to 500mm can be accommodated.

HANDHELD SCANNING

Integrated with a Radian API 6DoF Laser Tracker, the innovative iScan3D hand-held blue laser line scanner offers a fast, accurate and more productive solution to generate component point-clouds. Digitizing rates of up to 200,000 points/second for scanning both reflective and dark surfaces, iScan3D features 360° yaw and roll for infinite sensor positioning. One-button operation provides effortless scanning and tactile probing providing even greater measuring flexibility.

RADIAN ACCESSORIES

	CORE	PLUS	PRO
SMR Measurement	✓	✓	✓
vProbe Hand-Held Probing		✓	✓
iScan3D Hand-Held Laser Scanner		✓	✓
Active Target	✓	✓	✓
SmartTrack Sensor		✓ *	✓

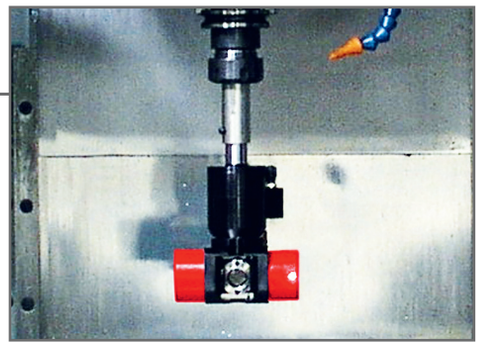
All accessories have a measuring range up to the maximum tracking distance of the respective Laser Tracker.
Built-in 6DoF sensor allows tracker accuracy to be maintained throughout its entire operating distance.
*Only with RMS

RADIAN AUTOMATION AND CALIBRATION

Radian integrates within robotic machining, inspection, and guidance cells providing real-time adaptive control, improved metrological performance, and improved quality.

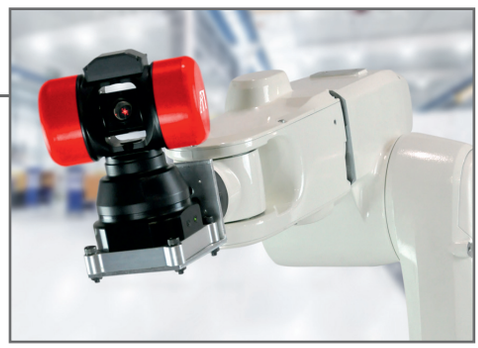
Active Target™

Active Target is a battery-powered, self-orientating motorized 360° rotation SMR that locks onto the Laser Tracker and automatically orientates to the laser beam for automated tracking measurement and calibration of machine tools or industrial robots, where a standard SMR cannot perform.



SmartTrack™ Sensor

STS provides automatic 6DoF measurement for dynamic accuracy application by determining the position (x, y, z) and angular orientation (pitch, roll, yaw) of a tracked point in real-time. STS reveals true position and orientation of a moving target, such as a robotic end-effecter. Applications include machine tool and robot calibration and dynamic robot accuracy enhancement.

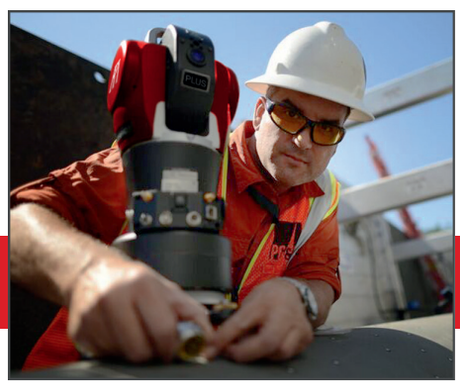


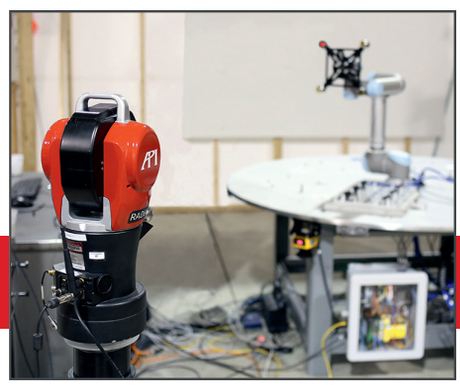
LASER TRACKER APPLICATIONS

Each manufacturing industry sector has unique metrology requirements. Radian Laser Trackers offer highly flexible, portable coordinate measuring solutions with applications across all industries. API has customers globally in all sectors and has a wealth of application experience in aerospace, automotive, energy, heavy machinery, agricultural equipment, military & defense, machine tools, automation, and tooling.

Radian excels at high-definition surface scanning with feature extraction to automation and machine control; from hidden-point probing to traditional reflector measurement, Radian is the first-choice Laser Tracker in a wide range of industries for:

- Alignment & Calibration
- Part Measurement
- Jigs, Fixture & Tooling Inspection
- Reverse Engineering
- Adaptive Control
- Robot Tracking





LASER TRACKER SUSTAINABILITY

Manufactured in the USA, all Radian Laser Trackers are supplied with the standard 2 year parts and labor warranty. API offers all-inclusive tracker calibration and maintenance contracts that also include loaner tracker support and advance reservation calibration program.

Supported globally through subsidiary offices in Europe, China, India, and master reseller partnerships, API offers global support to our customers. We are where you are.

TECHNICAL SPECIFICATIONS

	CORE	PLUS	PRO
Laser Technology	ADM - 3D	ADM - 3D/6D	ADM/IFM – 3D/6D
Maximum Distance Range (Radial)	50m / 80m*	50m / 80m*	20m / 50m / 80m*
Horizontal	±320° (640°)	±320° (640°)	±320° (640°)
Vertical	-59° - +79° (138°)	-59° - +79° (138°)	-59° - +79° (138°)
Data Output Rate	1000 points/sec.	1000 points/sec.	1000 points/sec.
Distance Measurement Performance			
Resolution	0.5 µm	0.5 µm	0.5 µm
Accuracy (MPE)	15µm or 0.7µm/m**	15µm or 0.7µm/m**	15µm or 0.7µm/m**
IFM Accuracy	Not applicable	Not applicable	0.5µm/m
Measurement Performance			
Volumetric Accuracy (MPE)	15µm + 5µm/m	15µm + 5µm/m	10µm + 5µm/m
Precision Level Accuracy	±2 arc seconds	±2 arc seconds	±2 arc seconds
Maximum Radial Velocity	180°/sec	180°/sec	180°/sec
Maximum Radial Acceleration	180°/sec²	180°/sec²	180°/sec²
Auto-Lock Performance			
iVision Field of View	30° (diagonal)	30° (diagonal)	30° (diagonal)
Acquisition Range	2m – 40m	2m – 40m	2m – 40m
Attributes			
Tracker Size	198mm² x 430mm	198mm² x 430mm	177mm² x 355mm
Tracker Weight	10.9 Kg	10.9 kg	9.0 Kg
Controller Size	Integrated	Integrated	110 x 177 x 355mm
Controller Weight	Integrated	Integrated	12.2 Kg
Transport Case	559 x 406 x 254mm	559x406x254mm	610 x 508 x 290mm
Total Transport Weight	22.7 Kg	22.7 kg	28.2 Kg
WiFi	✓	✓	
Ethernet	✓	✓	✓
Laser Emission	Class II IEC60825-1	Class II IEC60825-1	Class II IEC60825-1
Warm-up Time	5 Minutes	5 Minutes	15 Minutes
Power Specifications			
Power Supply Voltage	110/230V ±10%	110/230V ±10%	110/230V ±10%
Power Consumption	60W	60W	100W
Continuous Operation Battery Life	10 Hours***	10 Hours***	
Environmental			
Operating Temperature	-10°C to 45°C	-10°C to 45°C	-10°C to 45°C
Relative Humidity	10–95%****	10–95%****	10–95%****
Altitude	-700m to 3000m	-700m to 3000m	-700m to 3000m
Protection Level	IP52	IP52	

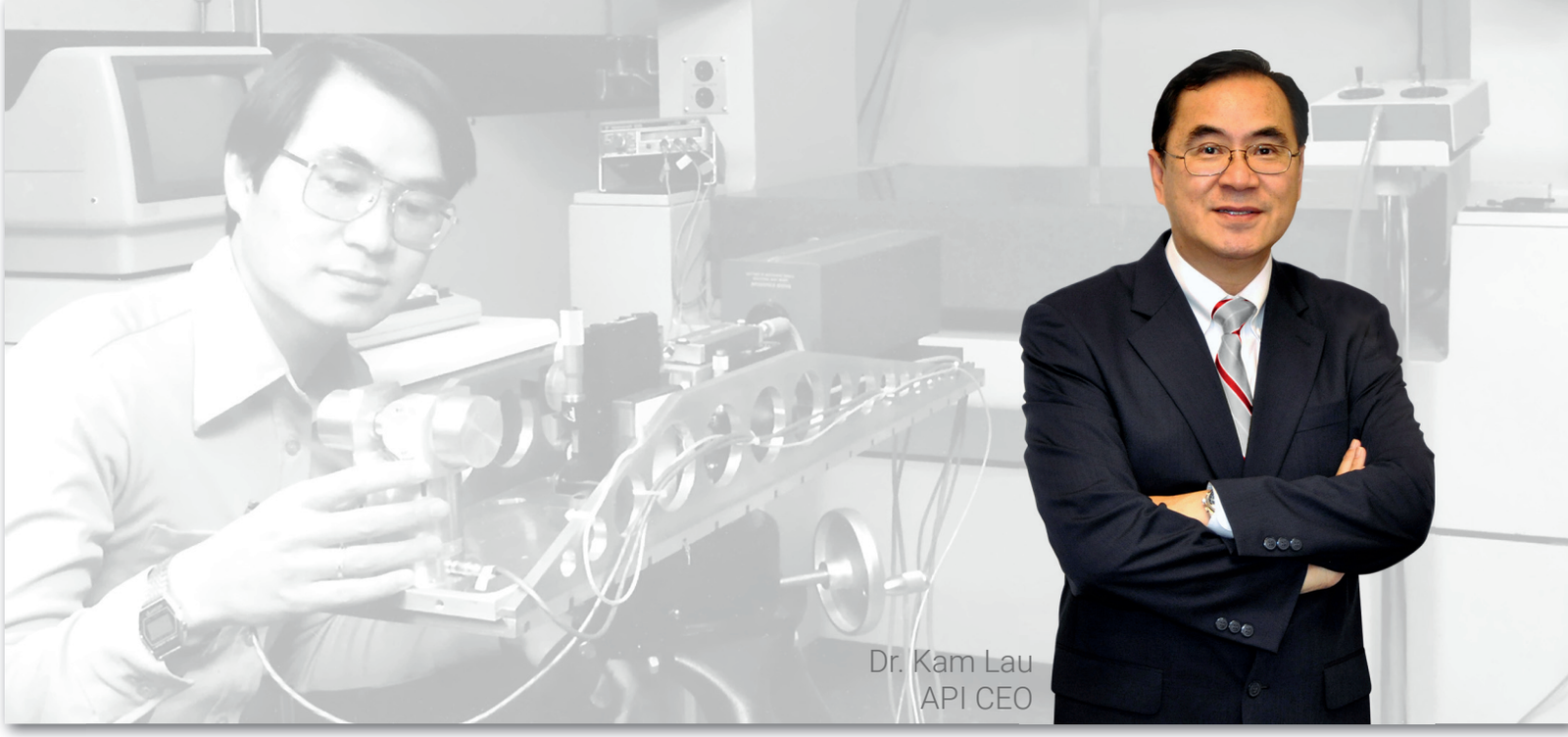
*optional **Whichever is greater ***Hot Swappable ****Non-condensating

RADIAN LASER TRACKER TECHNICAL FEATURES

*If Required

2 YEAR WARRANTY

API 2 Year Warranty – API offers the industry benchmark warranty on its Radian Laser Trackers and accessories for a period of 24 months on parts and labor. Upgrades to our 5 year, zero cost of ownership available. Full terms and conditions available upon request.



Dr. Kam Lau
API CEO

A VISION FOR INNOVATION

For more than 30 years, API has pioneered laser-based measurement and calibration equipment. API Founder and CEO, Dr. Kam Lau invented the Laser Tracker while working at USA's National Institute of Standards and Technology (NIST) to measure industrial robot accuracies. API shipped the world's first 6DoF industrial Laser Tracker in 1989. API licensed the technology to Wild/Kern (now Leica) in 1989, allowing API to concentrate on 5/6D Laser Tracker solutions for industrial manufacturing applications.

A global company, API's Laser Trackers are the benchmark for metrology Automation, Precision, and Innovation. API measurement and calibration products ensure product quality and performance at manufacturing organizations world-wide.

RADIAN

	 CORE	 PLUS	 PRO
Laser Technology	ADM - 3D	ADM - 3D/6D	ADM/IFM - 3D/6D
Maximum Distance Range (Radial)	50m / 80m*	50m / 80m*	20m* / 50m / 80m*
Wireless Operation	✓	✓	Ethernet
Hand-Held Probing (vProbe)		✓	✓
Hand-Held Scanning (iScan3D)		✓	✓
Live Camera View			✓
Integrated Controller	✓	✓	
Vertical, Horizontal, Inverted Operation	✓	✓	✓
Wide Angle iVision/Auto-Lock	✓	✓	✓
Battery Operation	10 Hours*	10 Hours*	
Warranty	2 Years**	2 Years**	2 Years**

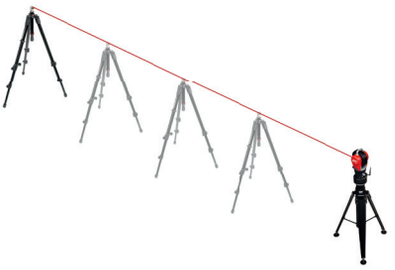
*Optional **Optional 5 Year warranty

TECHNICAL PERFORMANCE

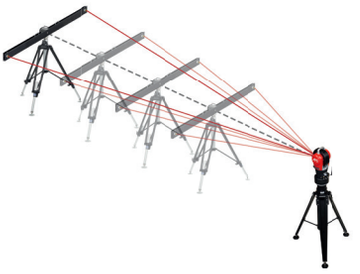
All specifications are calculated per the ASME B89.4.19 standard. Variation in air temperature is not included. Quoted values represent Maximum Permissible Error (MPE).

The typical accuracy values represent expected measuring performance.

In-Line Distance Measurement



Horizontal Scale Bar Measurement



In-Line Distance Measurement

	CORE		PLUS		PRO			
Range	MPE	Typical	MPE	Typical	MPE (ADM)	Typical	MPE (IFM)	Typical
2-5m	15µm	8µm	15µm	8µm	10µm	5µm	2.5µm	1.5µm
2-10m	15µm	8µm	15µm	8µm	10µm	5µm	5µm	3µm
2-20m	15µm	8µm	15µm	8µm	14µm	7µm	10µm	5µm
2-25m	18µm	9µm	18µm	9µm	18µm	9µm	12.5µm	7µm
2-30m	21µm	11µm	21µm	11µm	21µm	11µm	15µm	8µm
2-35m	25µm	13µm	25µm	13µm	25µm	13µm	17.5µm	9µm
2-40m	28µm	14µm	28µm	14µm	28µm	14µm	20µm	10µm
2-50m	35µm	18µm	35µm	18µm	35µm	18µm	25µm	13µm
*2-60m	42µm	21µm	42µm	21µm	42µm	21µm	30µm	15µm
*2-80m	55µm	28µm	55µm	28µm	55µm	28µm	40µm	20µm

Horizontal Scale Bar Accuracy**

	CORE		PLUS		PRO			
Range	MPE	Typical	MPE	Typical	MPE (ADM)	Typical	MPE (IFM)	Typical
2m	35µm	18µm	35µm	18µm	28µm	14µm	28µm	14µm
5m	57µm	29µm	57µm	29µm	49µm	25µm	49µm	25µm
10m	92µm	49µm	92µm	49µm	85µm	43µm	85µm	43µm
20m	163µm	82µm	163µm	82µm	156µm	78µm	156µm	78µm
25m	198µm	99µm	198µm	99µm	191µm	96µm	191µm	96µm
30m	233µm	117µm	233µm	117µm	226µm	113µm	226µm	113µm
35m	269µm	135µm	269µm	135µm	262µm	131µm	262µm	131µm
40m	304µm	152µm	304µm	152µm	297µm	149µm	297µm	149µm
50m	375µm	188µm	375µm	188µm	368µm	184µm	368µm	184µm
*60m	445µm	223µm	445µm	223µm	438µm	219µm	438µm	219µm
*80m	587µm	294µm	587µm	294µm	580µm	290µm	580µm	290µm

*Requires 80m range option **2.3m Scale Bar Length