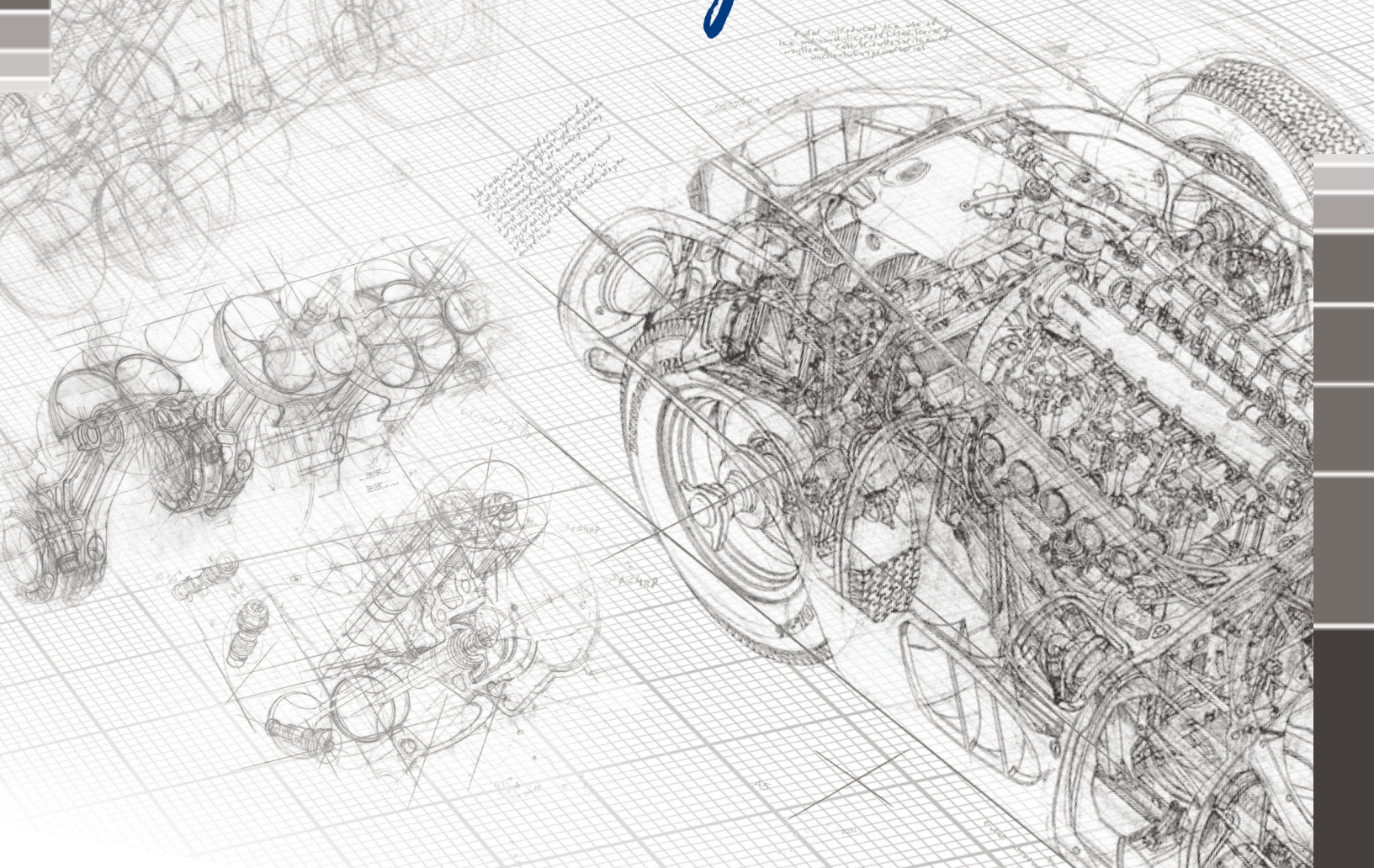




*Measure
the
competition*



ABSOLUTE ARM 6-AXIS



HEXAGON
MANUFACTURING INTELLIGENCE



▶ ABSOLUTE ARM COMPACT 10360-2 정밀도 및 기술제원

모델	MPE _p ⁸	MPE _e ⁹	측정범위
8312	0.008 mm	5+L/40<0.018 mm	1200mm
8512	0.006 mm	5+L/65<0.015 mm	1200mm

1) ⁸MPE_p 최대 허용 가능 오류, 프로빙 - ISO 10360-2에 따름
2) ⁹MPE_e 최대 허용 가능 오류, 길이 측정 - ISO 10360-2에 따름

▶ ABSOLUTE ARM COMPACT 기술사양

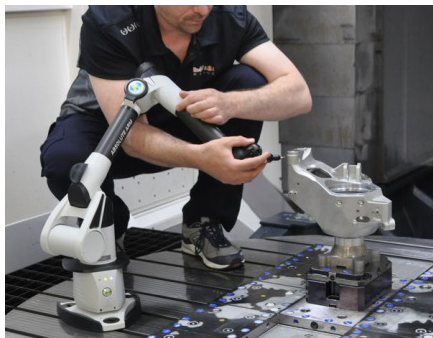
- 소형 제품을 위한 고정밀 접촉식 측정기
- 좁은 공간에서 측정 가능한 기상 측정기(머시닝 센터 위에서 측정 가능)
- 2가지 정확도 레벨(83 및 85) 제공

▶ ABSOLUTE ARM COMPACT 구성품

- TESA Probe kit including(Probe key TESA Probe 15mm TESA Probe 6mm TESA Probe 3mm)
- Certified sphere with inspection report RDS software and documentation
- Travel case with wheels Certified Length bar
- Dust cover

▶ ABSOLUTE ARM COMPACT Application

- Inspection of small moulds and dies
- Inspection of small components
- Inspection of medical components





ABSOLUTE ARM 6-축 정밀도 및 제원

	모델	E _{UNI} ¹	P _{SIZE} ²	L _{DIA} ³	P _{FORM} ⁴	무게 ⁶	최대범위
8 3 시리즈	8312-6	0.024 mm	0.010 mm	0.021 mm	0.018 mm	12.0 kg	1.49 m
	8320-6	0.040 mm	0.013 mm	0.042 mm	0.026 mm	7.8 kg	2.23 m
	8325-6	0.046 mm	0.020 mm	0.053 mm	0.038 mm	8.1 kg	2.73 m
	8330-6	0.067 mm	0.029 mm	0.071 mm	0.054 mm	8.4 kg	3.23 m
	8335-6	0.085 mm	0.038 mm	0.090 mm	0.063 mm	8.7 kg	3.73 m
	8340-6	0.100 mm	0.046 mm	0.105 mm	0.077 mm	9.0 kg	4.23 m
8 5 시리즈	8345-6	0.120 mm	0.052 mm	0.110 mm	0.086 mm	9.3 kg	4.73 m
	8512-6	0.019 mm	0.006 mm	0.016 mm	0.012 mm	12.2 kg	1.49 m
	8520-6	0.023 mm	0.008 mm	0.030 mm	0.017 mm	8.0 kg	2.23 m
	8525-6	0.028 mm	0.010 mm	0.035 mm	0.020 mm	8.3 kg	2.73 m
	8530-6	0.042 mm	0.015 mm	0.053 mm	0.030 mm	8.6 kg	3.23 m
	8535-6	0.055 mm	0.020 mm	0.069 mm	0.040 mm	8.9 kg	3.73 m
8 7 시리즈	8540-6	0.067 mm	0.024 mm	0.085 mm	0.045 mm	9.2 kg	4.23 m
	8545-6	0.080 mm	0.028 mm	0.102 mm	0.050 mm	9.5 kg	4.73 m
	8725-6	0.026 mm	0.009 mm	0.032 mm	0.018 mm	8.3 kg	2.73 m
	8730-6	0.039 mm	0.014 mm	0.048 mm	0.028 mm	8.6 kg	3.23 m
	8735-6	0.052 mm	0.018 mm	0.064 mm	0.037 mm	8.9 kg	3.73 m
	8740-6	0.063 mm	0.022 mm	0.079 mm	0.041 mm	9.2 kg	4.23 m
	8745-6	0.074 mm	0.026 mm	0.094 mm	0.046 mm	9.5 kg	4.73 m

ABSOLUTE ARM 기술 사양

- Absolute Encoder를 사용하여 온도 변화에 강한 구조를 가지고 있음
- 몸체는 온도 변화에 강한 이중구조 카본(carbon fiber) 튜브로 제작됨
- Warm-Up 시간이 필요 없으며 관절 초기화 작업을 할 필요가 없음
- “Probe kit” 교체 시 별도의 보정 작업 필요 없음
- Zero-G counter balance를 사용하여 작업자의 작업 부담감을 줄여줌

- 1) E_{UNI} 최대 허용 가능 길이 측정 오류 - ISO 10360-12:2016에 따름
- 2) P_{SIZE} 최대 허용 가능 프로브 편차, 크기 - ISO 10360-12:2016에 따름
- 3) P_{FORM} 최대 허용 가능 프로브 편차, 구 - ISO 10360-12:2016에 따름
- 4) L_{DIA} 최대 허용 가능 프로브 편차, 위치 - ISO 10360-12:2016에 따름
- 5) SSA 스캐닝 시스템 정밀도 : LDIA ISO 10360-8 부록 D에 따름
- 6) 무게 스캐너 제외 무게
- 7) 정확도 ISO 10360-8:2013에 따름
- 8) MPE_o 최대 허용 가능 오류, 프로브 - ISO 10360-2에 따름
- 9) MPE_e 최대 허용 가능 오류, 길이 측정 - ISO 10360-2에 따름

ABSOLUTE ARM 구성품

- TESA Probe kit including (Probe key TESA Probe 15mm TESA Probe 6mm TESA Probe 3mm)
- Certified sphere with inspection report RDS software and documentation
- Camera & Work light included in the wrist Magnetic Base
- Travel case with wheels Certified Length bar
- Mobility Pack (WIFI)
- Dust cover



ABSOLUTE ARM 6-AXIS



HEXAGON
MANUFACTURING INTELLIGENCE



ABSOLUTE ARM

▶ ARM Applications



▶ Tube Inspection

HEXAGON사에서 개발된 Tube Inspection System은 특화된 Tube 프로브를 Absolute Arm에 연동하여 튜브, 파이프 제품을 비접촉으로 측정하는 기술입니다. 튜브류 제품 분석에 특화된 측정 전용 소프트웨어 Tube Shaper를 통해 튜브의 LRA(길이, 회전, 각도) 및 Spring Back 값 등을 손쉽게 취득하여 제품 검수 뿐 아니라 제품 역설계 기능 제공합니다.

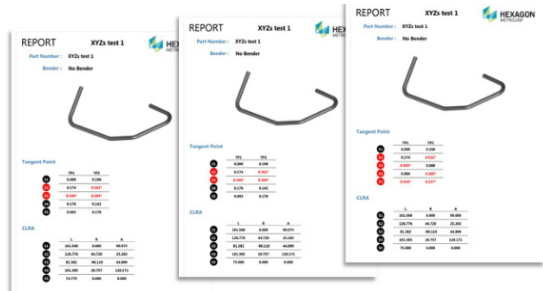
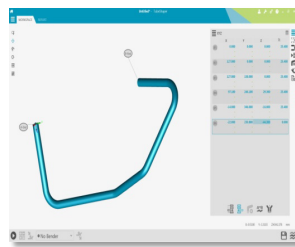
FEATURES

- 6mm부터 150mm 튜브까지 측정 가능한 다양한 프로브 사이즈
- 파워풀한 튜브측정 소프트웨어 제공 (Tube Shaper)
- 산출된 밴드값으로 밴딩머신에 적용하여 완벽한 제품 생산 가능
- 측정 데이터의 HTML, 엑셀 등 다양한 포맷으로 성적서 산출 가능
- 튜브에 부착된 Bracket 이나 flanges등의 측정이 용이함
- IGES CAD파일과의 비교 및 매우 간단하게 튜브류의 역설계 가능



<Tube Shaper>

▶ Absolute Arm



ABSOLUTE ARM 6-AXIS



▶ 외장형 HP-L-8.9 Laser Scanner

- 기존 6축 장비에 호환 가능
- 복잡하거나 섬세한 부품 스캔에 빠르고 정확
- 탄소섬유, 가죽 및 스틸과 같은 까다로운 제품을 측정 가능
- 보정 없이 스캐너와 접촉식 프로빙으로 전환 가능
- 스캐너 헤드는 스캔거리를 인식하여 사용시적 정거리 유지 간편



HP-L-8.9 Laser Scanner Specification

Accuracy	40 μ m 2 sigma
Point acquisition rate	45,000 points per second
Points per line	750
Line rate	60Hz
Line width(mid-field)	80mm
Stand-off distance	135mm+/-45mm
Minimum point spacing	0.08mm
Laser power adjustment	Semi-automatic

▶ 외장형 HP-L-20.8 Laser Scanner

HP-L-20.8 Laser Scanner Specification

Laser	Class2
Standoff	180±40mm
Line rate	max, 100Hz
Line width range min	176mm/104mm/51mm/40mm/20mm
mid	220mm/130mm/63mm/51mm/25mm
max	231mm/148mm/75mm/60mm/30mm
Date rate	max, 150,000 points per second
Minimum point spacing	0,013mm
Probing form error(1 σ)	9 μ m
Probing Dispersion value* P [Form,Sph,D95%:TrODS]	36 μ m
Operating Temperature	10°to42°C / 50°to108°F
Warmup Time	5minutes
Sensor IP Rating	64
Sensor Size LxWxH	137x76x85mm
Sensor Weight	410g(462g with silicon sleeve)
Storage temperature	-25°to-70° / -13°Cto-158°F
Relative humidity	10%to90%non-condensing
Operational elevation	0 to 2000m / 0 to 6600ft,



- 스캐너 탈부착 가능
- 고속 스캔 가능
- 자유형 표면 검사에 편리
- 역설계와 같은 광범위한 측정 응용에도 적용가능



ABSOLUTE ARM 7 AXIS



HEXAGON
MANUFACTURING INTELLIGENCE



ABSOLUTE ARM



ABSOLUTE ARM 7-축 정밀도 및 제원



	모델	E _{UNI} ¹	P _{SIZE} ²	L _{DIA} ³	P _{FORM} ⁴	SSA ⁵	무게 ⁶	최대범위
8 3 시리즈	8320-7	0.043 mm	0.016 mm	0.054 mm	0.033 mm	0.062 mm	8.8 kg	2.48 m
	8325-7	0.048 mm	0.023 mm	0.060 mm	0.043 mm	0.068 mm	9.1 kg	2.98 m
	8330-7	0.078 mm	0.034 mm	0.090 mm	0.058 mm	0.092 mm	9.4 kg	3.48 m
	8335-7	0.092 mm	0.042 mm	0.115 mm	0.067 mm	0.105 mm	9.7 kg	3.98 m
	8340-7	0.114 mm	0.051 mm	0.140 mm	0.084 mm	0.122 mm	10.0 kg	4.48 m
	8345-7	0.158 mm	0.078 mm	0.168 mm	0.106 mm	0.172 mm	10.3 kg	4.98 m
8 5 시리즈	8520-7	0.029 mm	0.010 mm	0.038 mm	0.021 mm	0.045 mm	9.0 kg	2.48 m
	8525-7	0.031 mm	0.012 mm	0.048 mm	0.025 mm	0.048 mm	9.3 kg	2.98 m
	8530-7	0.057 mm	0.020 mm	0.083 mm	0.038 mm	0.066 mm	9.6 kg	3.48 m
	8535-7	0.069 mm	0.024 mm	0.099 mm	0.045 mm	0.080 mm	9.9 kg	3.98 m
	8540-7	0.084 mm	0.030 mm	0.120 mm	0.050 mm	0.091 mm	10.2 kg	4.48 m
	8545-7	0.113 mm	0.048 mm	0.140 mm	0.065 mm	0.148 mm	10.5 kg	4.98 m
8 7 시리즈	8725-7	0.029 mm	0.011 mm	0.044 mm	0.023 mm	0.044 mm	9.3 kg	2.98 m
	8730-7	0.053 mm	0.018 mm	0.076 mm	0.035 mm	0.058 mm	9.6 kg	3.48 m
	8735-7	0.064 mm	0.022 mm	0.092 mm	0.041 mm	0.071 mm	9.9 kg	3.98 m
	8740-7	0.078 mm	0.028 mm	0.110 mm	0.046 mm	0.082 mm	10.2 kg	4.48 m
	8745-7	0.104 mm	0.044 mm	0.125 mm	0.060 mm	0.127 mm	10.5 kg	4.98 m

- 1) E_{UNI} 최대 허용 가능 길이 측정 오류 - ISO 10360-12:2016에 따름
- 2) P_{SIZE} 최대 허용 가능 프로브 편차, 크기 - ISO 10360-12:2016에 따름
- 3) P_{FORM} 최대 허용 가능 프로브 편차, 구 - ISO 10360-12:2016에 따름
- 4) L_{DIA} 최대 허용 가능 프로브 편차, 위치 - ISO 10360-12:2016에 따름
- 5) SSA 스캐닝 시스템 정밀도 : LDIA ISO 10360-8 부록 D에 따름
- 6) 무게 스캐너 제외 무게
- 7) 정확도 ISO 10360-8:2013에 따름
- 8) MPE, 최대 허용 가능 오류, 프로빙- ISO 10360-2에 따름
- 9) MPE, 최대 허용 가능 오류, 길이 측정 - ISO 10360-2에 따름

Absolute ARM 기술 사양

- Absolute Encoder를 사용하여 온도 변화에 강한 구조를 가지고 있음
- 몸체는 온도 변화에 강한 이종구조 카본(carbon fiber) 튜브로 제작됨
- Warm-Up 시간이 필요 없으며 관절 초기화 작업을 할 필요가 없음
- “Probe kit” 교체 시 별도의 보정 작업 필요 없음
- Zero-G counter balance를 사용하여 작업자의 작업 부담감을 줄여줌

Absolute ARM 구성품

- TESA Probe kit including
(Probe key TESA Probe 15mm TESA Probe 6mm TESA Probe 3mm)
- Certified sphere with inspection report RDS software and documentation
- Camera & Work light included in the wrist Magnetic Base
- Travel case with wheels Certified Length bar
- Mobility Pack (WIFI)
- Dust cover



ABSOLUTE ARM 7 AXIS



HEXAGON
MANUFACTURING INTELLIGENCE

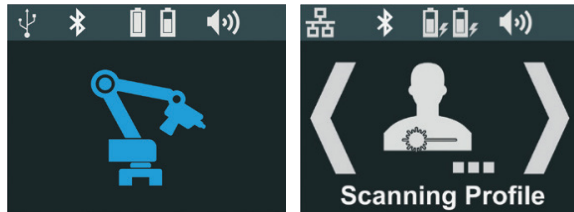
▶ 외장형 HP-L-8.9 Laser Scanner



RS5 레이저 스캐너 제원	
정밀도	0.028 mm (2σ) ⁷
포인트 획득 속도	752,000 포인트/초
라인당 포인트 수	최대 7,520
라인 속도	최대 100 Hz
라인 폭 (중간영역)	115 mm
Standoff	165 ± 50 mm
최소 포인트 간격	0.011 mm (라인)
시스템 스캐닝 인증여부	예
레이저 등급	2M
작동 온도	5 ~ 40°C
무게	0.4 kg

센서관절 LCD모니터

Absolute ARM의 새로운 특징으로 항상 유용하게 확인 가능 하도록 센서관절에 장착된 LCD화면 및 고속 접근 메뉴로 Absolute ARM의 유연성이 크게 개선되었습니다. 고속 접근 메뉴를 통하여 측정 즉시 유용한 정보를 가장 필요한 곳에서 정확하게 확인할 수 있습니다.



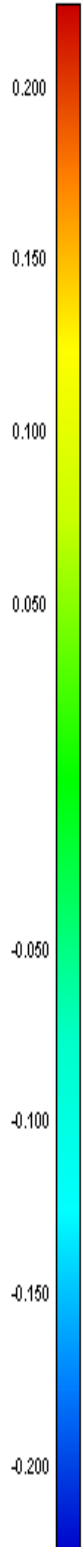
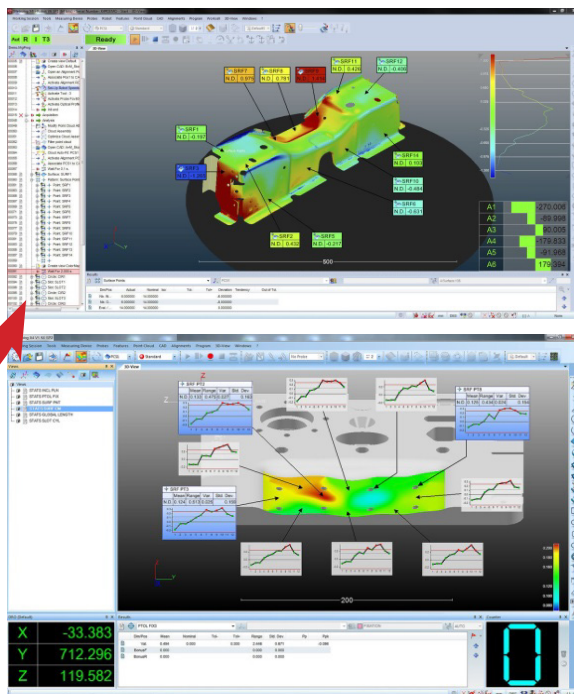
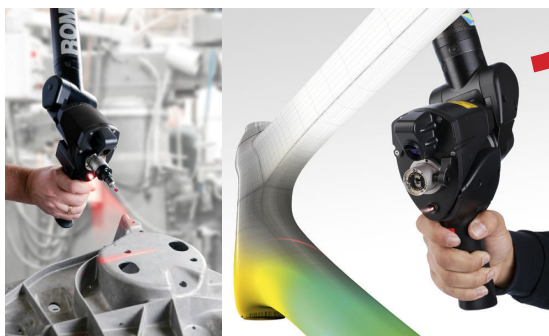
측정 결과 모니터링

실시간 측정 프로파일 변경

▶ RS5 Laser Scanner 기술 사양

- 7 Axis Absolute ARM 전용 스캐너
- 인체공학적 핸들 디자인
- 자동노출보정 기능으로 스프레이 필요 없음
- 스캐너 탈/부착 가능하며, 탈/부착시 Calibration 필요없음

▶ RS5 Laser Scanner Application

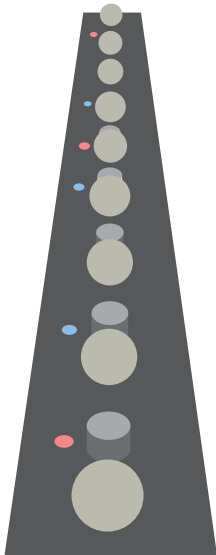


ABSOLUTE ARM

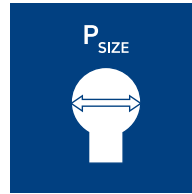
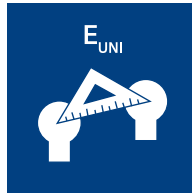


▶ 국내 검/교정 서비스 센터

- Hexagon Metrology는 전세계 60개 이상의 Romer/Cimcore 센터와 대리점을 보유하고 있으며 서비스를 제공하고 있습니다.
- (주)HIT Automotive와 한국핵사곤메트롤로지(유)는 Service Level 3의 최고등급의 엔지니어에 의한 검/교정 센터 안산과 용인 2개소를 운영하고 있습니다.
- 국내에 납품된 Absolute Arm은 국내에서 모든 검/교정 및 수리가 가능합니다.
- A/S 부품 보유에 의해 빠른 A/S 대응 가능. (3~5일 이내) 통상적으로 1~3일 이내 A/S완료.
- A/S 진단 후, 수리 일정에 따라 빠른 대체 장비를 지원 합니다.
- 최초 서비스 발생 시, 12시간 (조건에 따라 24시간) 이내 현장 방문 및 서비스 조치를 합니다.
- 숙련된 전문 서비스 지원 인력에 의해 빠른 대응이 가능합니다.



EUNI 값은 단 방향 길이 측정의 최대 허용 오차입니다. 따라서 대부분의 측정 요구를 가장 잘 충족하는 것입니다



PSIZE 값은 구의 직경 측정 시 최대 허용 오차입니다. 따라서 요소 측정의 정밀도를 의미합니다.

PFORM 값은 구 프로빙 폼에 어려 값입니다. 이는 다관절 측정기의 정밀도 분포를 정의하는 값입니다.



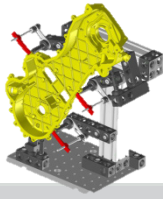
LDIZ 값은 관절 위치에 대한 최대 허용 오차입니다. 따라서 다관절 측정기의 반복 정밀도를 나타냅니다.

지역별 A/S 센터 운영 약속

	보	키	기본적으로 정상적인 작동 환경에서 기간 내 장비의 정도가 해당 정도 밖으로 벗어날 경우, 24시간 내 현장 출동 조치
	보	육	초기 계약 상 명기된 장비 현장 교육 이외, 고객 요청 시 HIT Automotive 교육실에서 추가 교육 실시
	교	정	Warranty 기간 내 연간 1회, 본사로 장비 이관 후, 전체적인 자체 장비 교정 실시
	유	지보수	장비 Upgrade/Update시 무상 지원 및 연간 4회 무상교육 지원



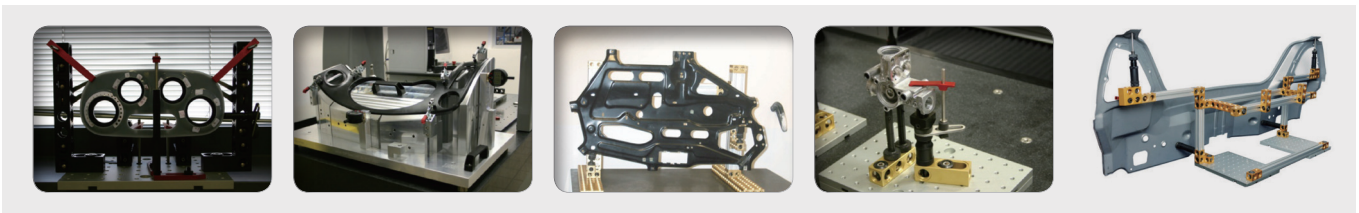
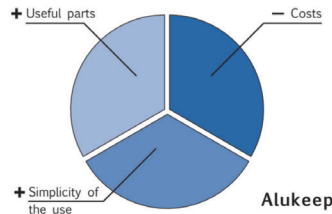
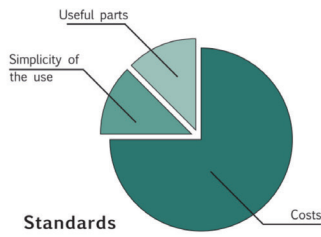
용인 서비스 센터 / 안산 서비스 센터 운영중입니다.



▶ 조립 Fixture 장점



- 비용 절감
- 시간 절약
- 장소 절약 & 안전 보관
- 간섭의 최소화
- 사이즈의 다양화

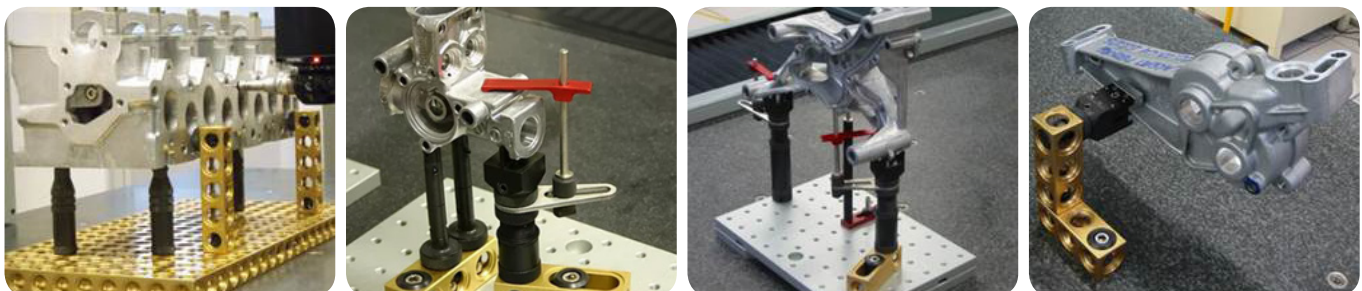
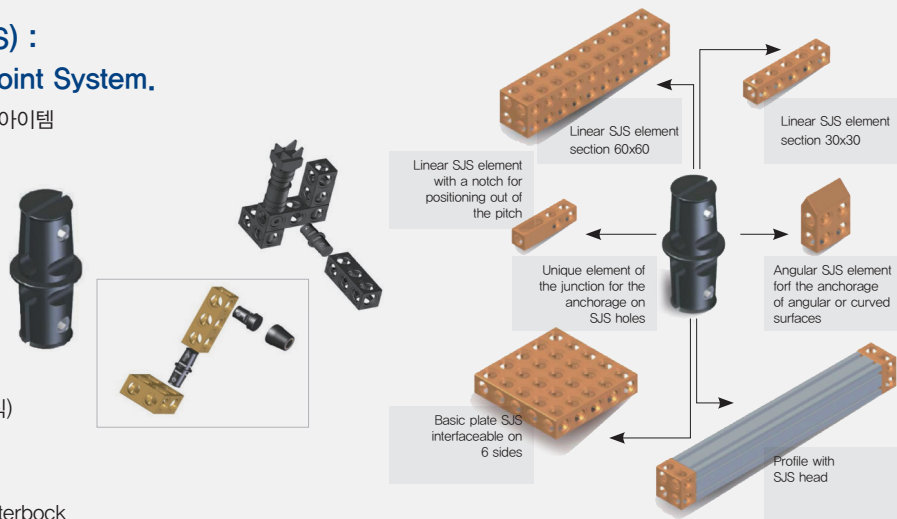


▶ Single Joint System(SJS) : Alukeep사에서 개발한 Joint System.

- 3 pieces의 기능을 하나로 만든 아이템

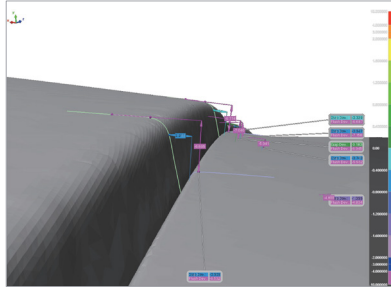
▶ Alukeep의 장점

- 간편한 사용법
- 빠른 설치
- 통일된 구성품 사이즈
- 자유로운 설치구조(슬라이드 방식)
- 호환성
- 일반 Tool 사용
- Flexible Fixture Concept – Meisterbock

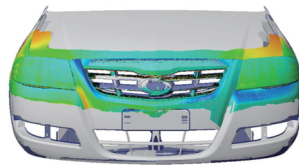


Measurement Application

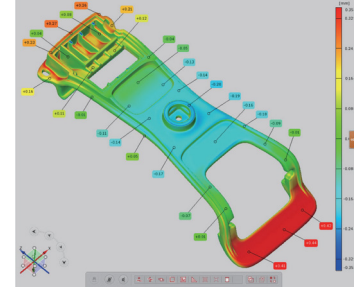
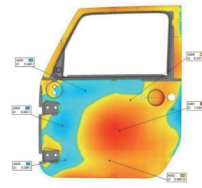
▶ Scanning Inspection



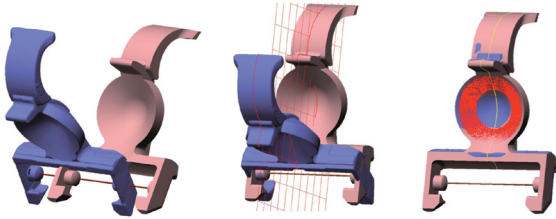
Flush & Gap 검사



Color Map



Surface 검사

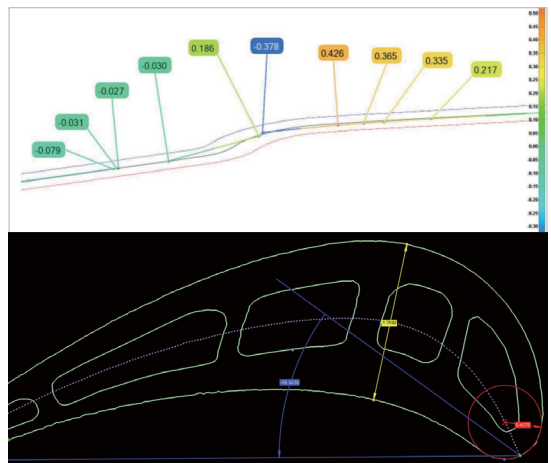
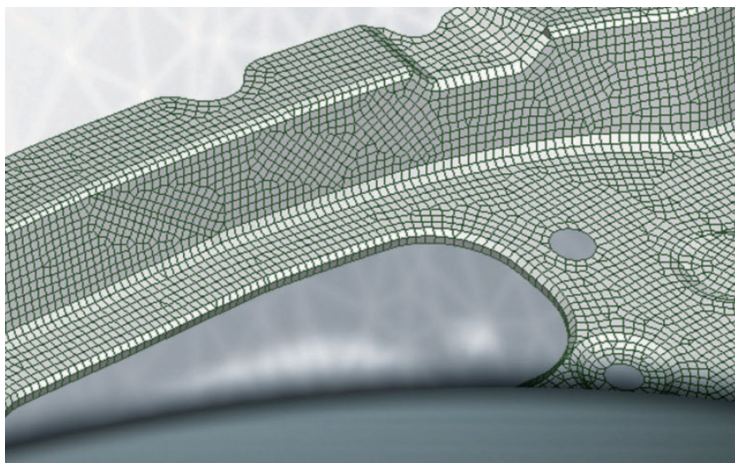


가상 조립 검사



Section 검사

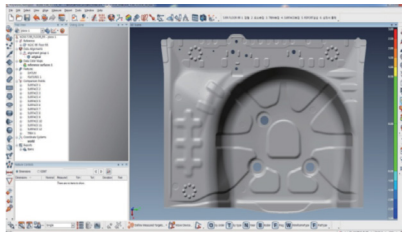
Quadrilateral Mesh 변환



▶ Report Management System

3차원 측정 결과 데이터를 빠르게 통합 관리해 주는 프로그램

◆ 제품 반복 측정



◆ 측정 데이터 산출 및 SPC

Table Type	Feature	Control	Nominal	Measured
0108XLU	CIRCLE	Diameter	12.00	12.20
0108XLU	CIRCLE	Radius	8.00	8.10
0108XLU	CIRCLE	?	3924.07	3924.58
0108XLU	CIRCLE	?	115.00	114.20
0108XLU	CIRCLE	3D Distance	991.52	990.73
0108XLU	CIRCLE	?	16.00	16.46
0108XLU	CIRCLE	Diameter	8.00	8.23
0108XLU	CIRCLE	Radius	130.00	129.50
0108XLU	CIRCLE	?	991.52	990.65
0110XLU	CIRCLE	3D Distance	12.00	12.34
0110XLU	CIRCLE	Radius	8.91	8.97
0110XLU	CIRCLE	?	72.00	72.44
0110XLU	CIRCLE	?	72.00	72.50
0111XLU	CIRCLE	3D Distance	12.00	12.52
0111XLU	CIRCLE	Radius	8.00	8.26
0111XLU	CIRCLE	?	4033.07	4033.19

◆ Web 게시 기능

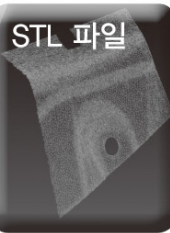


▶ Reverse Engineering



Scanning

STEP 1



STL 파일

STEP 2

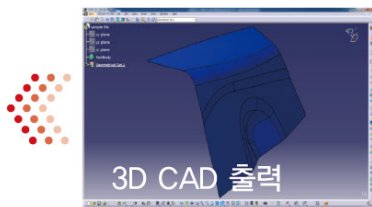


Polygon 편집

STEP 3

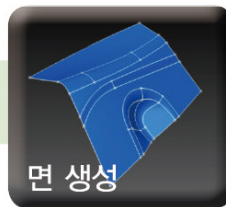
3차원 측정기를 이용한 측정

Reverse Engineering



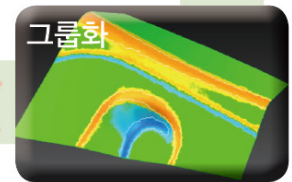
3D CAD 출력

STEP 5



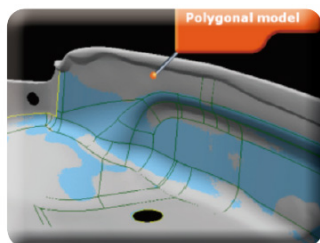
면 생성

STEP 4

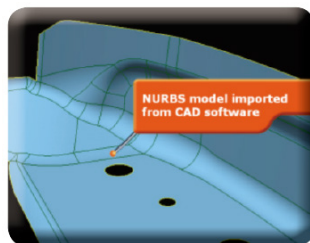


그룹화

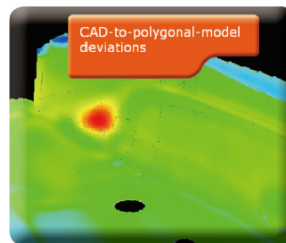
Reconstruction of CAD Surfaces 기능



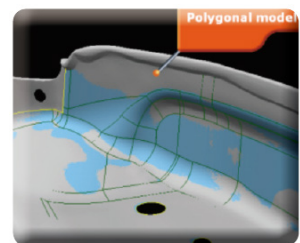
Scan Data



CAD Data



비교



CAD Date 부분 수정

Absolute Tracker AT 403



Absolute Tracker AT 403



► Accuracy

Reflector*	$U(x,y,z) = \pm 15 \mu\text{m} + 6 \mu\text{m}/\text{m}$ ($\pm 0.0006'' + 0.000072''/\text{ft}$)
Leica B-Probe*	$U(x,y,z) = \pm 0.2\text{mm}$ ($\pm 0.008''$)
*All accuracies specified as Maximum Permissible Errors (MPE) and calculated per ASME B89.4.19-2006 and ISO10360-10:2016 using precision Leica 1.5" Red Ring Reflectors unless otherwise noted.	
Absolute Distance Performance	$\pm 10 \mu\text{m}$ ($\pm 0.00039''$)
Absolute Angular Performance (including Orient-to-Gravity)	$\pm 15 \mu\text{m} + 6 \mu\text{m}/\text{m}$ ($\pm 0.0006'' + 0.000072''/\text{ft}$)

► Environmental

Dust/Water	IP54 (IEC 60529)
Operating Temperature	-15°C to +45°C
Relative Humidity	max. 95% (non-condensing)
Environmental Monitor	Temperature, pressure and humidity

► Laser Safety

Class 2 Laser Product in accordance with the IEC 60825-1 Second Edition (2014-05)

► Range

Typical Reflector Measurement Volume (ø)	320 m
Minimum Reflector Measurement Distance	< 0.8 m

► Interface

Cable	TCP/IP (Cat5)
Wireless	WLAN (IEEE 802.11n)

► Power Management

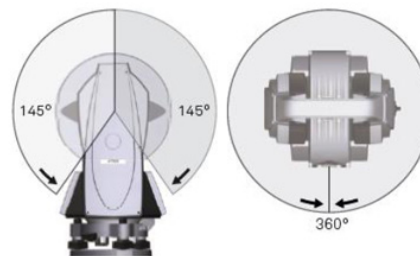
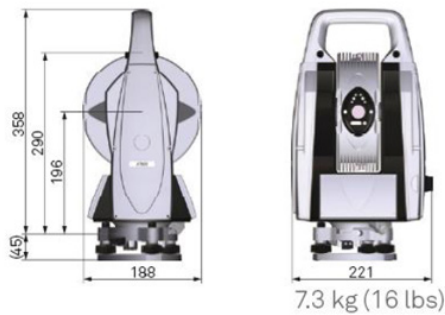
Internal	Lithium-ion battery with 8-hour typical runtime
External	AC power supply
Optional	Power over Ethernet (PoE+)

► General Information

Overview Camera	4:3 IR enhanced Image $\approx 10^\circ$ FOV
Remote Control	4-button infra-red, Leica B-Probe

► Leica B-Probe

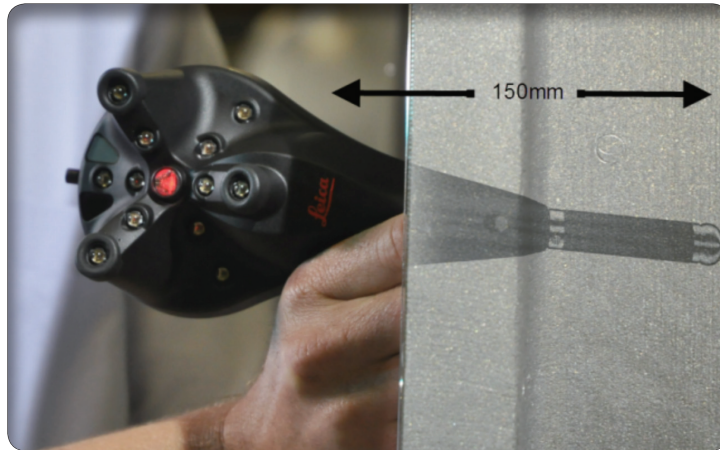
Measurement Volume (ø)	20 m
Relocation Volume (ø)	up to 320 m
Minimum Measurement Distance	2.5 m
Dust/Water	IP50





▶ 6자유도 접촉식 측정 시스템

B-Probe 숨어 있는 측정 영역을 간편히 측정 할 수있는 이동식 프로브



• 측정 거리 : 20m

• 정밀도(MPE) : +/- 0.2mm

• 깊이 영역 : 150mm

• 배터리 : 6시간 사용 가능

▶ AT403 Key Feature



▶ PowerLock

Leica Geosystems introduced the world to PowerLock in 2009. This vision technology detects a reflector and automatically locks the laserbeam onto it, even when the target is moving. The laser beam moves to the user, not the other way around. In the past operating a laser tracker was almost a "black art" . It took time and experience for an operator to learn how to efficiently use the sensor without breaking the beam. PowerLock changed this completely and makes the handling of a laser tracker much easier.



▶ Cable-less operation

With two identical batteries - one in the sensor, one in the controller- the Leica Absolute Tracker AT401 can run for a work day.

When power approaches a critical level, the batteries can be either replaced or hot swapped. The laser tracker continues running as if nothing had happened. With the built in WiFi connection the Leica Absolute Tracker AT401 becomes a completely wireless portable CMM free from any external data or power cable requirements. Optionally the Leica Absolute Tracker AT401 is ready for Power over Ethernet. With this technology, a regular LAN cable supplies the sensor with both data and power.

▶ Ready for any environment

Utilizing a completely sealed design that is independently IP54 (IEC 60529) certified means this sensor can be installed in the most unforgiving environments. Spraying coolant, dust, weld splash, nothing is too harsh for this sensor. The Leica Absolute Tracker AT401 is the first laser tracker certified for outdoor use, even in the rain.



▶ Complete system integration

The Leica Absolute Tracker AT401 is ready for any measurement task that comes its way. All accessories such as remote control, environmental monitor or level sensor are already built in.



▶ Ultra Large Volume Measurements

With endless telescope rotation the sensor can measure a full 360° horizon and a 290° vertical dome. Pair this with a typical radial volume of 320 meters and you have the worlds largest volume precision CMM.

Absolute Tracker AT 930/960

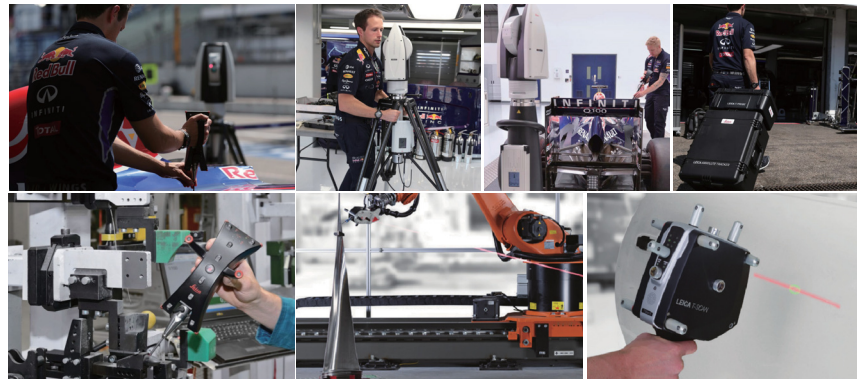
Leica
Geosystems



Absolute Tracker AT930/960



Leica Laser Tracker	AT 930	AT 960-MR	AT 960-LR
Accuracy shown is the maximum permissible error (MPE). Typical results are half the MPE.			
► Compatibility			
Compatible with Leica T-Probe	No	Yes	Yes
Compatible with Leica T-Scan	No	Yes	Yes
Compatible with Leica T-Mac	No	Yes	Yes
► Measurement Volume			
Typical Volume (Ø)	120 m	40 m	160 m
Horizontal	360°	360°	360°
Vertical	±145° *	±145° *	±145° *
(* in horizontal setup)			
► Measuring and tracking performance			
Measuring rate	3,000 points per second		
Measuring rate output	1,000 points per second		
Tracking speed lateral	> 4 m/s (13 ft/s)		
Tracking speed radial	> 6 m/s (19 ft/s)		
Acceleration lateral	> 2 g		
Acceleration radial	unlimited		
► Laser Interferometer sensor IFM			
Principle technology	Heterodyne, single-beam		
Wavelength	633 nm (visible)		
Laser tube	MTBF 50,000 hrs		
Warm-up time, cold start	8 min		
Warm-up time, warm start	5 min		
Beam diameter	4,0 mm		
Distance resolution	0,32 µ m		
Distance accuracy	± 0,5 µ m/m		
► Integrated Absolute Interferometer			
	Yes	Yes	Yes
Typical ADM distance	1,0 – 60,0 m	1,0 – 20,0 m	1,0 – 60,0 m
Underlying operational principle	Modulation of polarization		
Wavelength	795 nm (infrared)		
Beam diameter	2,5 mm		
Distance resolution	0,1 µ m		
Distance accuracy	± 10 µ m		
► Automated Lock-On			
when beam broken	Yes	Yes	Yes
► Laser Safety			
IEC 60825-1 (2014-05) "레이저 제품의 안전" EN 60825-1 (2007-10) "레이저 제품의 안전"			
The Laser Tracking System is a Class 2 Laser Product			
► Accuracy information			
	AT930, AT960-MR, AT960-LR		
Angular resolution	0,14 arc sec		
Angular repeatability, full range and in 2,5 x 5 x 10 m volume	± 7,5 µ m + 3 µ m/m		
Angle accuracy, full range	± 15 µ m + 6 µ m/m		
Angle accuracy in 2,5 x 5 x 10 m volume	± 10 µ m + 5 µ m/m		
► Size and weight			
	477 / 221 / 230 mm		
Sensor size	13,8kg		
Sensor weight	249 / 148 / 59 mm		
Controller size	1,65kg		
Controller weight			



LEICA T-Products

Leica
Geosystems



T-Mac



Leica T-Mac	AT 960-MR	AT 960-LR
Accuracy shown is the maximum permissible error (MPE). Typical results are half the MPE.		
▶ Measurement volume		
Maximal volume	20m	40m
Horizontal	360°	
Vertical	± 45°	
▶ Acceptance angle (Freedom to rotate)		
Pitch angle	± 45°	
Jaw angle	± 45°	
Roll angle	360°, unlimited	
▶ Measuring and tracking performance		
Measuring rate output	1,000 points per second	
Tracking speed all directions	> 1 m/s	
Acceleration all directions	1g	
▶ Accuracy		
Accuracy of rotation angles	0,01° = 18 µm/100mm	
Accuracy of time stamp	< 5 µs	
Positional accuracy	± 15 µm + 6 µm/m	
▶ Weight		
Leica T-Mac	1,480 g	
▶ Positioning accuracy for typical robotic drilling applications 50 µm		

T-Scan



Leica T-Scan	AT 960-MR	AT 960-LR
Accuracy shown is the maximum permissible error (MPE). Typical results are half the MPE.		
▶ Measurement volume		
Maximal volume (∅)	20m	40m
Horizontal	360°	
Vertical	± 45°	
▶ Acceptance angle (Freedom to rotate)		
Pitch angle	± 45°	
Jaw angle	± 45°	
Roll angle	360°, unlimited	
▶ Measuring and tracking performance		
Tracking speed all directions	> 1 m/s	
Acceleration all directions	1g	
▶ Leica T-Scan sensor		
Measuring depth	up to 200mm	
Mean scan width	100mm	
Line frequency	up to 320 lines/second	
Measurement sampling rate	up to 210,000 points per sec	
Point density	0,075mm	
Lasere Safety	IES 60825-1(2007-03) EN 60825-1(2007-10)	
Accuracy	+/-20µm	
▶ Laser Safety IEC 60825-1; 1993+A1 1997 + A2: 2001, class 2		
Working temperature	+16°C to +24°C	
Storage temperature	-10°C to +60°C	
Relative humidity	10 – 90% non-condensing	
▶ Weight		
Leica T-Scan 5	1,080g(2,38 lbs)	
▶ Measurement uncertainty of spatial length (MPE)		
UL = ±60µm if under 8,5m		
UL = ±26µm + 4µm/m if greater than 8,5m		
▶ Measurement uncertainty of sphere radius (MPE)		
UL = ±50µm if under 8,5m		
UL = ±16µm + 4µm/m if greater than 8,5m		
UL = ±85µm + 1,5µm/m		
▶ Measurement uncertainty of plane surface (MPE)		
UL = ±80µm + 3µm/m		

T-Probe



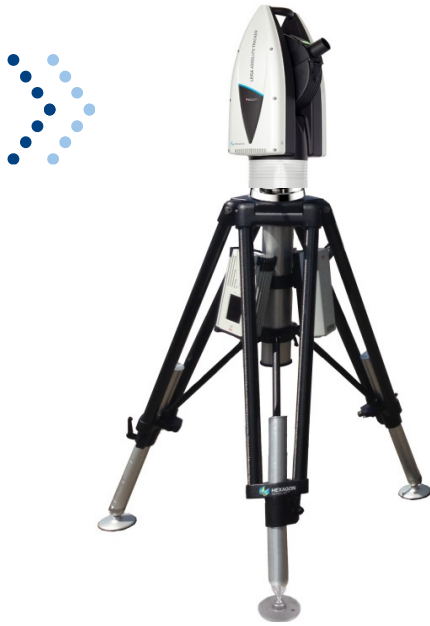
Leica T-Probe	T 960-MR	AT 960-LR
Accuracy shown is the maximum permissible error (MPE). Typical results are half the MPE.		
▶ Measurement volume		
Maximal volume (∅)	20m	40m
Horizontal	360°	
Vertical	± 45°	
▶ Acceptance angle (Freedom to rotate)		
Pitch angle	± 45°	
Jaw angle	± 45°	
Roll angle	360°, unlimited	
▶ Measuring and tracking performance		
Measuring rate output	1,000 points per second	
Tracking speed all directions	> 1 m/s	
Acceleration, all directions	1 g	
▶ Weight		
Leica T-Probe with standard tip and battery	670 g	
Leica T-Probe with standard tip and without battery	570 g	
Leica T-Cam MR and LR	4,7 kg	
▶ Measurement uncertainty of 3D Point (MPE)		
U3d = 100 µ m if under 7 m		
U3d = 30 µ m + 10 µ m/m if greater than 7 m		
▶ Measurement uncertainty of spatial length (MPE)		
UL = ± 60 µ m if under 8,5 m		
UL = ± 7 µ m/m if greater than 8,5 m		
▶ Measurement uncertainty of sphere radius (MPE)		
Ur = ± 20 µ m + 2 µ m/m		

LEICA T-Products

Absolute Tracker ATS600



▶ Worlds First Scanning Laser Tracker



ATS600 정밀도 및 제원	
Sensor Size (Weight)	249 / 168 / 62 (18kg)
Accuracy (MPE)	15 μ m + 6 μ m/m
Scanning Accuracy	Max 0.3mm Scan Range Noise of within 80 μ m (1 σ)
Measuring Volume	최대 160m
Scanning Volume	최대 120m
Laser Class	Class II Laser Product
Scanning Rate	Up to 1kHz
Scanning Speed	Up to 10sec / m ² in Fast Mode

※ 접촉식 측정 사양은 AT960-LR Model 과 동일

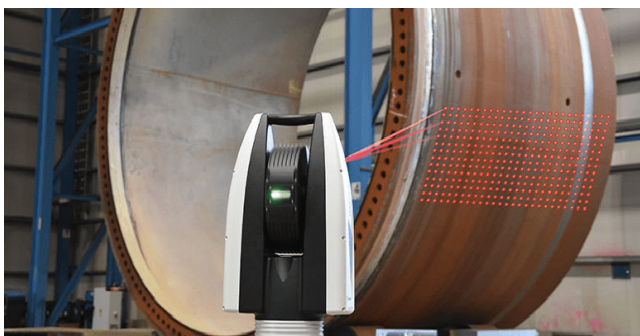
▶ Scanning Laser Tracker ATS600 기술 사양

- 최고의 정밀도로 대형 제품 스캔 운영
- 쉽고 간단한 사용법
- 자동 스캐닝 경로 설정
- 효율적인 측정 운영 가능
- 접촉식 측정 / 비접촉식 측정 동시 운영 가능

▶ Scanning Laser Tracker ATS600 Application

- 대형 제품 스캐닝에 탁월
- Heavy Industrial
- Large Steel Construction
- Power Plant / Energy
- Aero Space
- Transportation

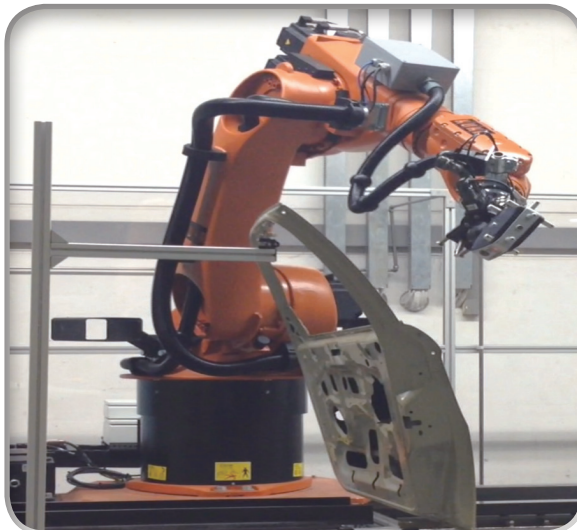
▶ ATS 600 Key Feature



Laser Tracker Applications

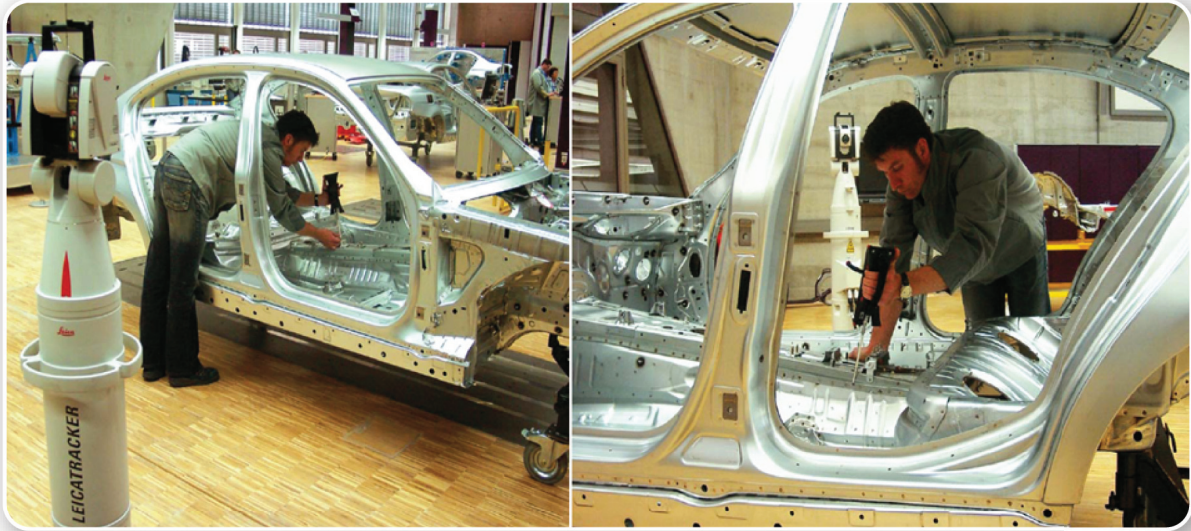
Metrolog X⁴ i-Robot
 Inline Robotic Inspection Solution

Automation System With ROBOT



Track to SP	Robot SP	Dimension	Setup	Final Deviation
TRK001	PR0101	Dimension	Setup	
Measure End - stop edge				Measure End - value
Position Wing				
Product Program 03 updated: 100				
Product Program P03 updated: 100				
1843 720 - 1305 981 999 133 - 00 053 - 00 440 - 02 839				
P03 not vector saved				
ID: 8.913				
Y: 02.335				
Z: 8.302				
Final Movement				
				dX = 0.005 mm
				dY = 0.021 mm
				dZ = -0.017 mm
				dRotX = 0.000 deg
				dRotY = -0.002 deg
				dRotZ = -0.007 deg

Laser Tracker Applications



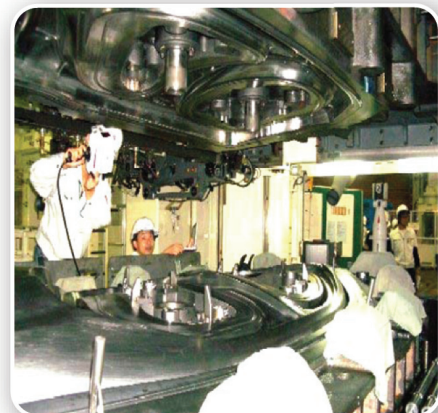
Periodic inspection of body in white for trend monitoring



Final geometry checks for trend monitoring.
Detected deviation trends are corrected in the production and assembly lines.



Random inspection of control points of a body in white for statistical purposes and trend monitoring.
T-Probe and T-San are used for this task.
Automated analysis including reporting is achieved by using macros.

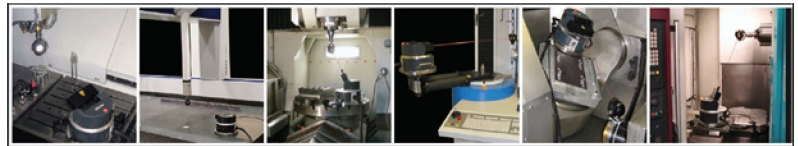


Inspection of strapping tools the manufacturing line

▶ Scanning Inspection

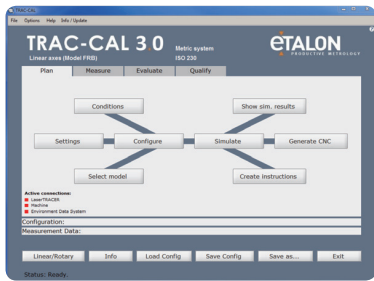


$$U = 0.2 \mu\text{m} + 0.3 \mu\text{m}/\text{m}$$



Check. Calibrate Compensate
Fast. Accurate.

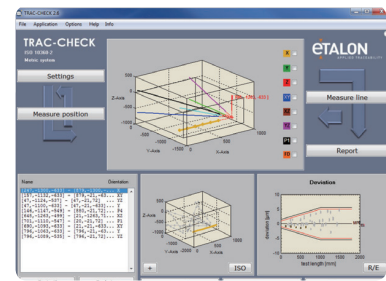
TRAC-CAL®



LaserTRACER®

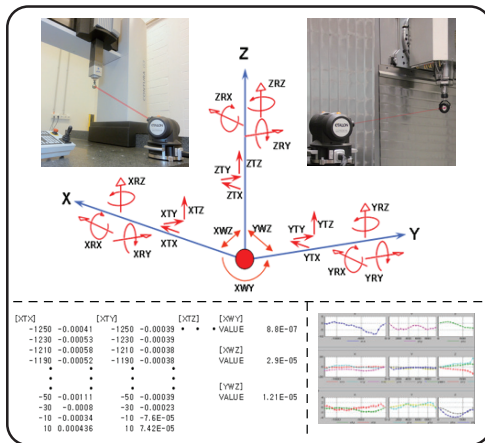


TRAC_CHECK®

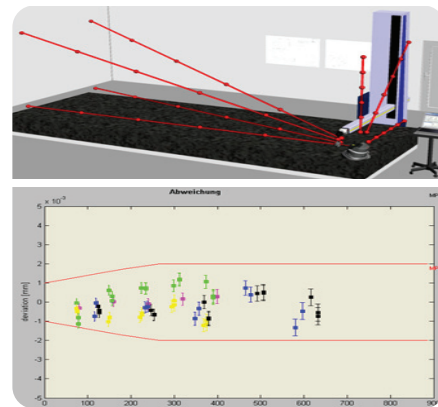


Error Map 추출 및 보상
3축 가공기 : 2~3시간 소요
3축 측정기 : 3~4시간 소요

검사 및 평가
가공기, 측정기 : 30분 소요



기본 21개의 DOF값 추출/ 외팔보 형식 2개 DOF추가/ 다축 가공 DOF 추가



기본 축 및 대각선 방향의 거리/반복 정밀도 측정 결과

▶ SPECIFICATION

- Tracer Weight : Appx. 8.5kg
- Controller Weight : Appx. 10kg
- Tracer Height : 230mm
- Angular Range : elevation -35° to +85°
- Azimuth -225° to +225°
- Measuring Range : 0.2m to 20m
- Frequency Stability laser 24h : 2*10-8
- Stability of Reference Sphere : +/- 0.1μm
- Resolution : 0.1μm nm
- Uncertainty (k=2,U95) : 0.2 μm+0.3 μm/m

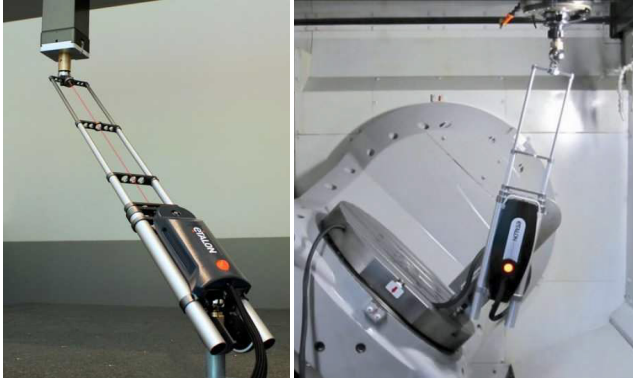
▶ FEATURES

- 독일 PTB와 개발한 정밀 3차원 CMM, CNC 검교정용 측정기
- 미국표준측정기관 NIST 및 ASME, ISO등 인증
- 기계적인 오차 및 인코더 정도를 극복한 정밀 보정 전용 장비
- CMM, CNC 검교정기 중 가장 불확실성이 작은 장비
- 독자적인 특허기술로 3차원의 교정용 Error Map 생성
- ISO 규정에 부합한 검정결과를 30분내에 추출

ETALON Laser TRACER

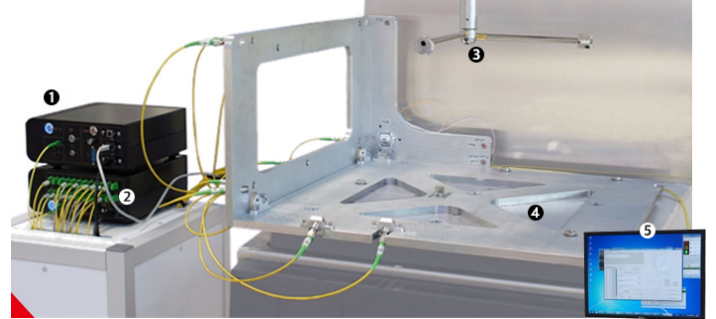


▶ Laser TRACER MT(Mechanical Tracer)



- 측정거리 : 300 ~ 1000Mm, 최대 2000M 측정,
 - 정밀도 : 1 MicroMeter
- Laser TRACER의 Active Tracing이 아닌 Mechanical Tracing 방식 사용으로 공간 및 각도의 제한이 없는 모델.
- ETALON Trac-Cal, Trac-Check 등의 모든 소프트웨어와 호환가능하며 Laser TRACER와 동일하게 아래의 작업에 사용.
- ISO 230-2,4,6에 의한 검정, 1축 정밀도, Circular Tact, 대각선 정밀도
 - Cartesian Machine Calibration.
 - Rotary Axis Calibration.

▶ LineCAL



시스템구성 ①인터페로미터 ②스위칭모듈 ③구동부 장착된 반사구 트리 ④MAX 24개의 인터페로미터 채널이 장착된 측정 프레임 ⑤LineCAL 소프트웨어 : 구동제어, 데이터 취득, 분석/교정/검정 데이터 취득

- 장비의 개발 시 보다는 양산시에 적용효과가 크며, 최대 30분의 측정시간이면 교정을 위한 Error Map 생성이 됩니다.
- Error Map의 적용 후 ISO 규정에 따른 검정까지 가능하며, 교정부 터 검정까지 모든 솔루션을 제공하는 통합 검교정 장비입니다.

Specification			
Working Range		Accuracy	
측정거리	0.01m - 5m	해상도	0.001Mm
최대측정속도	2m/s	측정불확도	U(K2)=0.05m+0.3µm/m
사용온도	15~35℃	Power Supply	
사용압력	800~1150Hpa	전압/전력	200/100/<20W
사용습도	1~99%	Size and Weight	
Re-Calibration		인터페로미터	24x25x10cm, 2kg
환경센서	2년	스위칭유닛	24x25x10cm, 2kg
레이저소스	5년	채널수	24
		레이저등급	I
측정 가능 에러 (ISO 230-1 명칭 기준)			

▶ Volumetric Compensation Applicable Controllers

Fanuc 3D Error Compensation

15 ModelB(15-MB), 15i/150i ModelA (15i/150i-MA), 15i/150 iModelB (15i/150i-MB)
30i/300i ModelA, 31i-A5/310i-A5 ModelA, 31i/310i ModelA,

Siemens VCS

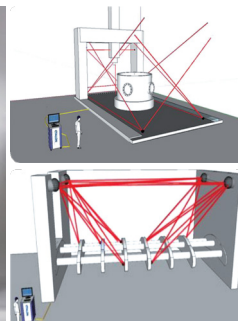
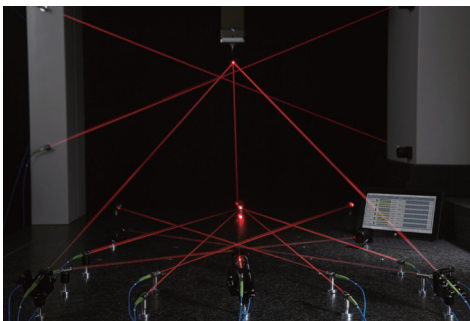
Sinumerik840D sl

Heidenhain Kinematics Comp

iTNC530

이 외의 구형 컨트롤러를 사용하는 장비는 총 21개의 에러중 X, Y, Z Linearity 혹은 Linearity를 포함하여 Straightness까지만 보상을 할 수 있습니다.

▶ Absolute Multiline



Specifications

- Measurement uncertainty U(95%)=0.5ppm
- Measurement range= up to 20 m
- number of channels 8-100
- Laser class = II m, eye safe
- Traceability= calibrated gas spectrum
- Compensation= Temperature, Pressure, Humidity

V - Optics 사의 다양한 솔루션은 기존의 감각에 의존한 표면 품질 검사를 더욱 정밀하게 디지털로 구현한 기술입니다. 이미 많은 선진업체에서 사용하고있는 기술로서 자동차, 항공, 의료, 전자, 액세서리 등의 모든 분야에서 각광 받고 있습니다.



White Glove Inspection

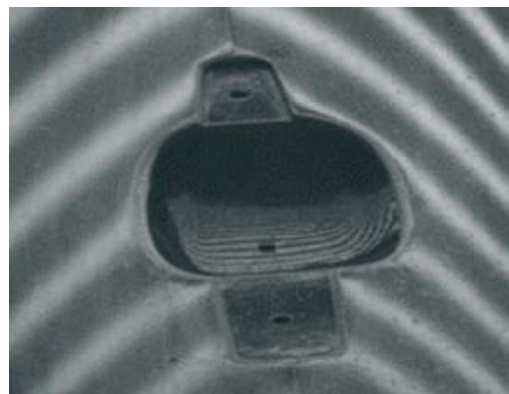
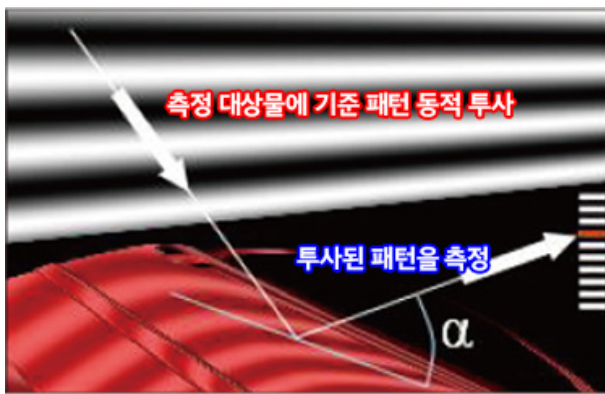
Stoning the Panel

Highlight Booth Inspection

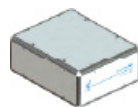
Manual Documentation

Phase Shifting Deflectometry 기법을 사용하여 제품 표면의 결함 (scratch, waviness, welding mark, roughness, etc)을 검수 합니다.

▶ Phase Shifting Deflectometry 란?

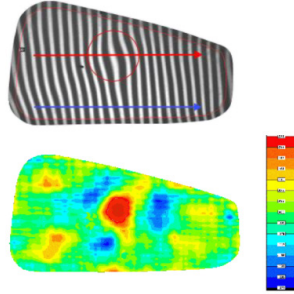


▶ QualiSENSOR range according performances

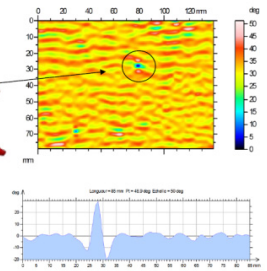


	QualiSENSOR® COMPACT	QualiSENSOR® MONITOR	QualiSENSOR® LED C
Used technology	Phase shifting deflectometry		
Typical usage	Sorting/Grading according surface quality and defects (scratches, inclusions, material lacks ...) Flatness / Waviness / Roughness control		
Measurement field	Up to 190 x 160 mm	Up to 800 x 500 mm	Up to 1000 x 1000 mm
Spatial resolution (x - y)	± 80 μm	± 80 μm (FoV 190 x 160 mm) ± 200 μm (FoV 800 x 500 mm)	± 200 μm (FoV 800 x 500 mm) ± 250 μm (FoV 1000 x 1000 mm)
Precision - Accuracy (z)	< 5 μm		
Repeatability z (m-1 - μm)	3 m-1 - 0,8 μm	3 m-1 - 0,8 μm	3 m-1 - 0,8 μm
Measurement cycle	< 10 seconds		
Dimensions (W x D x H)	500 x 500 x 200 mm	1800 x 2000 x 2000 mm	2400 x 2400 x 2700 mm
Weight	7 kg	70 kg	350 kg
Power	230/110 V - 50/60 Hz - 16 A	230/110 V - 50/60 Hz - 16 A	230/110 V - 50/60 Hz - 32 A
Processing hardware	PC based - Windows 10 Pro		
Documentation	CE/UL certificate - user, service manuals		
Output data	Image data (.JPG, .RES), measurements (.CSV), reports (.PDF)		
Software tools	Compatible DigitalSurf MountainsMap® for any type of data exploitation (R&D)		
Options	Mechanical and electrical interfaces, desktop software tools, barcode reader interface, ...		
Service offer	Hotline, training, maintenance contracts, consulting. Custom developments and special setups ...		

▶ 유리 외관 굴곡 측정



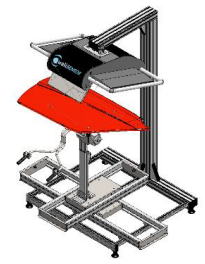
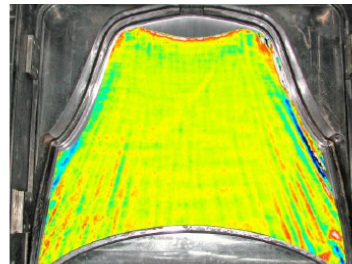
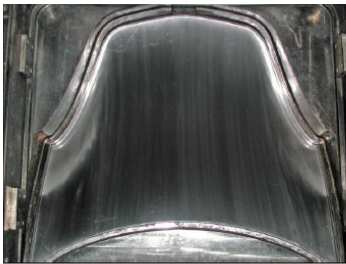
▶ 도장 품질 검수



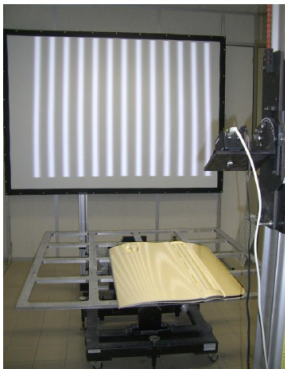
Paint quality control

Dust inclusion detection

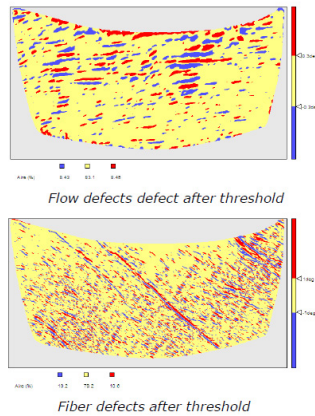
▶ 금형 폴리쉬 상태 검수



▶ 복합 소재 소형 굴곡 및 파이버 자국 검수



Setup example for SMC door panels

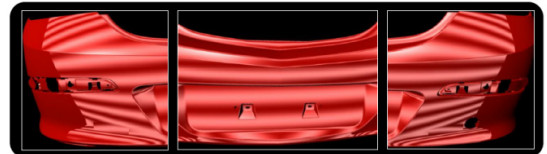


▶ 플라스틱 사출품 외관 굴곡 검수



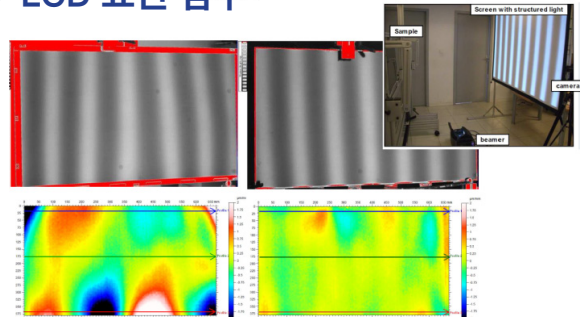
STOP with subjectivity

PLASTIC INJECTION PROCESS



Defectometry images reflected by the bumper surface

▶ LCD 표면 검수



INNOVATIVE SURFACE CONTROL

By Reflection (Composite, plastic, metal ...) & by Transmission (Glass, Windshield, lens...)

CMM BRIDGE



► BENCHMARK – The Small Budget CMM

The COORD3 Benchmark small measuring volume bridge manual & DCC CMM offers high performance with a small machine footprint. A COORD3 BENCHMARK CMM can be equipped with Renishaw touch probing systems including the infinite positioning PH20.

The following BENCHMARK CMM models sizes available are: 5,4 | 6,4

Models	Maximum Permissible Error ISO 10360-2, ASME B89.4.1							
	PH10T/M-TP2/20							
	2,5 + 2,5 L/333 μm							
	Measuring Strokes (mm)			Overall Dimensions (mm)			Weights (kg)	
	X	Y	Z	X	Y	Z	Max. Part	Machine
05.04.04	500	400	440	915	876	2400	300	300
06.05.04	600	500	440	1045	1006	2400	300	390



► ARES – The Value CMM

The COORD3 ARES series of small and medium measuring volume bridge DCC air bearing CMM's offer high performance measuring platforms for general purpose metrology applications. A COORD3 ARES CMM can be equipped with Renishaw touch or scanning probes and are suitable for all applicable manufacturing measuring applications.

Available with a CMM bridge widths of 500mm and 700mm the ARES is the ideal job shop CMM.

The following ARES CMM models sizes are available: 5.5 | 7.5 | 7.7 | 9.7

Models	Maximum Permissible Error ISO 10360-2, 10360-4 ASME B89.4.1							
	PH10T/M/PH20-TP20		PH10T/M-TP200		PH6M-SP25			
	2,0 + 3,0L/1000 μm		1,8 + 3,0L/1000 μm		1,8 + 3,0L/1000 μm 3,9/120			
	Measuring Strokes (mm)			Overall Dimensions (mm)			Weights (kg)	
	X	Y	Z	X	Y	Z	Max. Part	Machine
07.07.05	700	650	500	1380	1160	2525	650	775
10.07.05	1000	650	500	1680	1160	2525	700	925
12.07.05	1200	650	500	1880	1160	2525	700	990



► UNIVERSAL – High Performance CMM

The COORD3 UNIVERSAL represents the ultimate CMM. A high accuracy machine with lightning fast dynamics. Ranging from 900mm in bridge width to 1500mm the machine offers an excellent platform for the 5 axis REVO probe head. UNIVERSAL represents the very best CMM technology available and was designed by the COORD3 Italy design studio using renowned engineers with more than 3 generations of CMM design expertise and internationally recognized accomplishments.

The following UNIVERSAL CMM models sizes are available:

7,7 | 9,8 | 10,8 | 10,9 | 10,10 | 12,10 | 15,10 | 15,13

Models	Maximum Permissible Error ISO 10360-2, 10360-4							
	PH10M/MQ/PH20-TP20		PH10MQ-TP200		PH10MQ-SP25M REVO			
	2,0 + 1,9L/333 μm		1,8 + 1,8L/333 μm		1,5 + 1,5L/333 μm 3,0/90			
	Measuring Strokes (mm)			Overall Dimensions (mm)			Weights (kg)	
	X	Y	Z	X	Y	Z	Max. Part	Machine
12.09.08	1200	900	800	2352	1524	3073	1300	2125
20.09.08	2000	900	800	3152	1524	3073	1800	2860
15.10.08	1500	1000	800	2652	1624	3073	1600	2570
20.10.08	2000	1000	800	3152	1624	3073	1900	3070



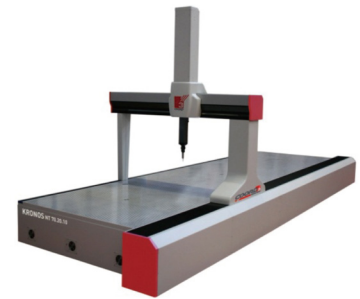
CMM BRIDGE



► KRONOS - The Large Volume Bridge CMM

The COORD3 KRONOS series of large measuring volume bridge DCC air bearing configuration CMM's offer advanced measuring platforms with integral dovetail X axis machined directly into the granite plate providing the ultimate in stable metrology performance. A COORD3 KRONOS CMM can be equipped with Renishaw touch or scanning probes and are suitable for all applicable manufacturing measuring applications. Available in CMM bridge widths of 1500 and 2000mm the KRONOS bridge range offers a comprehensive series of large CMM models sizes to accommodate your specific measurement requirement. The following KRONOS CMM models sizes are available: 15.15 | 20.15

Models	Maximum Permissible Error ISO 10360-2, 10360-4							
	PH10M-TP20		PH10MQ-TP200		PH10MQ-SP25M			
	3,0 + 3,0L/285 μm		2,8 + 2,8L/285 μm		2,5 + 2,5L/285 μm		5,0/120	
	Measuring Strokes (mm)			Overall Dimensions (mm)			Weights (kg)	
X	Y	Z	X	Y	Z	Max. Part	Machine	
20.13.10	2000	1500	1000	3630	2154	3560	4000	4200
20.15.13	2000	1500	1300	3630	2354	4160	4500	4770
25.15.13	2500	1500	1300	4130	2354	4160	5000	5550
30.15.13	3000	1500	1300	4630	2354	4160	5000	7550



► SWAN SI - Horizontal Type CMM

Horizontal arm CMM's are the ideal solution to measure thin walled components, such as sheet metal car bodies, car panels, car doors, vehicle glass, dashboards and for the inspection of mechanical parts such as engine blocks and transmission castings, and aeronautical and automotive components. Horizontal arm systems are available both in single and dual arm versions. The table support system is so designed to minimise the requirement for a machine foundation system. Machines can be equipped with touch, scanning or optical sensors.

Models	Maximum Permissible Error ISO 10360-2, 10360-4							
	PH10M-TP20		PH10M/MQ-TP200		PH10M/MQ-SP25			
	From 10+15L/1000 $\mu\text{m} \leq 45$		NA		NA			
	Measuring Strokes (mm)			Overall Dimensions (mm)			Weights (kg)	
X	Y	Z	X	Y	Z	Max. Part	Machine	
XX.10.18	XX	1000	1800	XX+1000	1960	2755	NA	NA
XX.12.18	XX	1200	1800	XX+1000	2160	2755	NA	NA
XX.15.20	XX	1500	2000	XX+1000	2460	2955	NA	NA
XX.16.20	XX	1600	2000	XX+1000	2560	2955	NA	NA



► MCT NT - Gantry Type CMM

The COORD3 MCT series of gantry offers the entry level gantry size CMM measuring system to accommodate the average large part inspection requirements. The MCT is characterized by supreme mechanical design and stability ensuring long term accuracy. MCT is a blend of the most advanced technology, design (FEM analysis), material selection and experience gained from pioneering the dimensional inspection of large parts and combined to provide outstanding customer price/performance ratio. The MCT can be equipped with all Renishaw touch probe and scanning systems including the REVO 5 axis scanning head. Available with a Gantry bridge widths of 2000mm and 2500mm the MCT is the ideal production shop CMM and is available in two accuracy classes. The following MCT Gantry CMM models sizes are available: 20.10 | 20.15 | 25.15 | 25.18

Models	Maximum Permissible Error ISO 10360-2, 10360-4							
	PH10M/MQ-TP2/TP20		PH10MQ-TP200		PH10MQ-SP25			
	4,8 + 4,0L/1000 μm		4,5 + 4,0L/1000 μm		4,3 + 4,0L/1000 μm		6,0/100	
	Measuring Strokes (mm)			Overall Dimensions (mm)			Weights (kg)	
X	Y	Z	X	Y	Z	Max. Part	Machine	
30.20.10	3000	2000	1000	4600	3690	3683	8000	3600
40.20.15	4000	2000	1500	5600	3690	4183	8000	4100
50.25.15	5000	2500	1500	6600	4190	4183	10000	4700
60.25.18	6000	2500	1800	7600	4190	4783	10000	5300



Scanner For CMM



► Supports up to 3-Axis

- CMMs
- CNC Machines
- Layout Machines

► Configurable with

- Bridge Machines
- Gantry Machines
- Horizontal Machines

► Real-time integration for

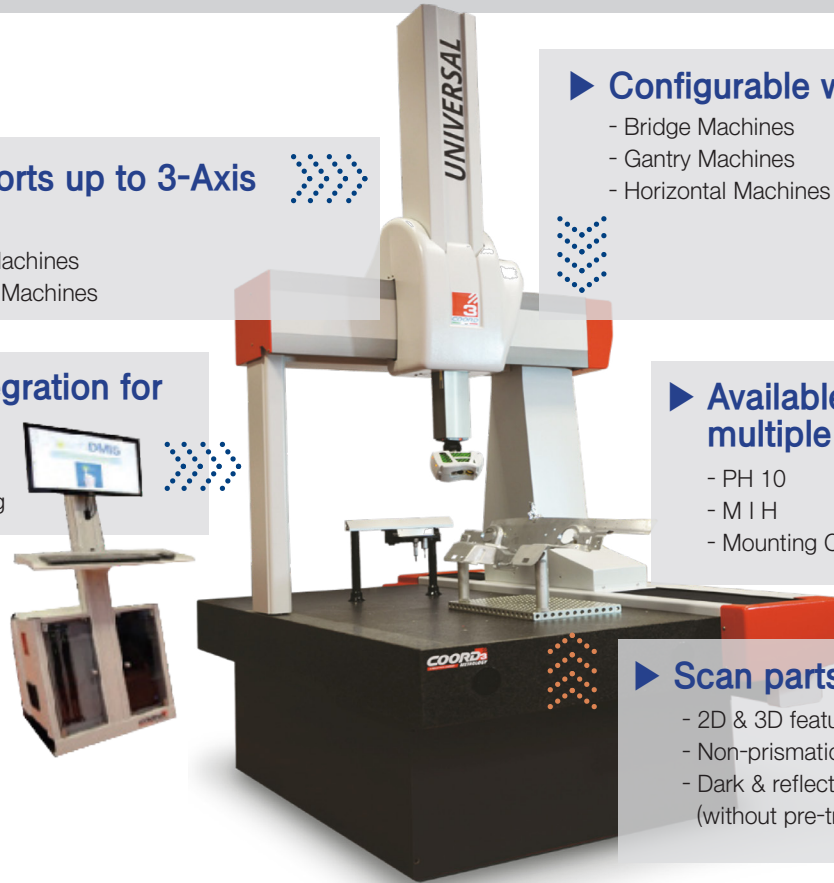
- Inspection
- Analysis
- Reverse Engineering

► Available with multiple adaptors

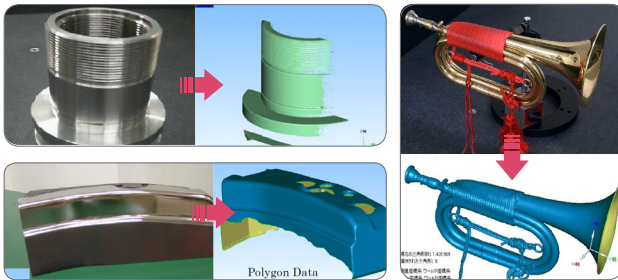
- PH 10
- M I H
- Mounting Cube

► Scan parts with

- 2D & 3D features
- Non-prismatic surfaces
- Dark & reflective finishes (without pre-treatment)



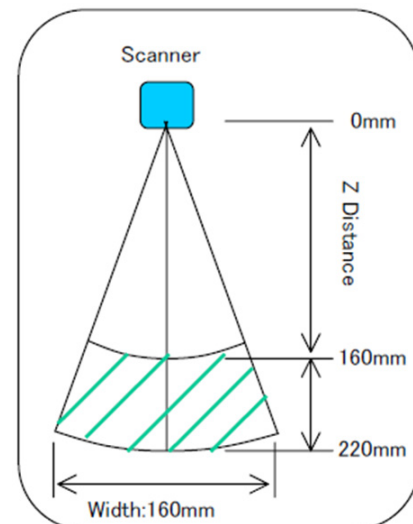
► Shiny Part Scanning without Spray



► Specification(Scanner alone)

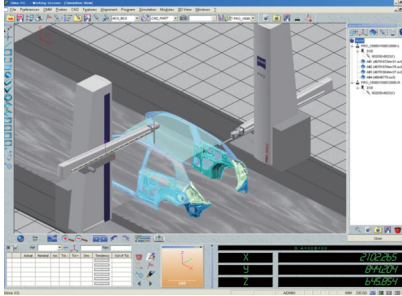
- 제조사 : PULSTEC by Japan
- 모델명 : TDS-1622H
- 정밀정확도 (Accuracy) : 20 μ m
- 측정속도 : 90 lines/sec (최대)
- 측정폭 : 160 mm (최대)
- 측정깊이 : 스캐너에서 160~220mm 구간

► Various colors part

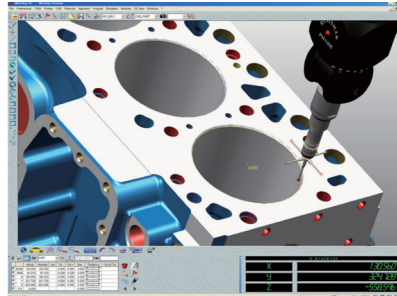




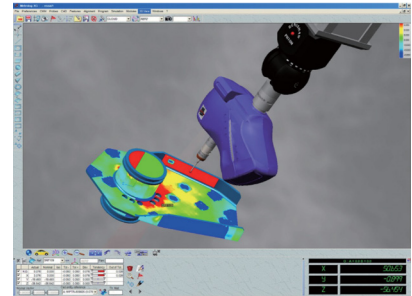
▶ CNC



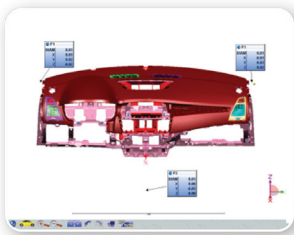
In-line 검사



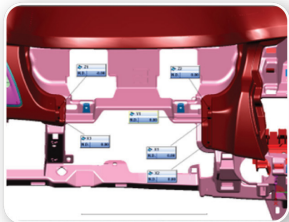
Auto Programming 측정



Probing & Scanning 동시 분석



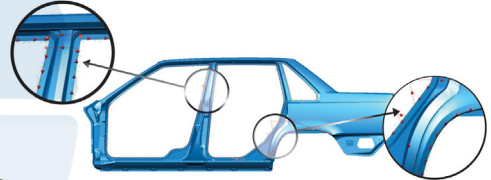
Local Alignment



Part Sub Alignment

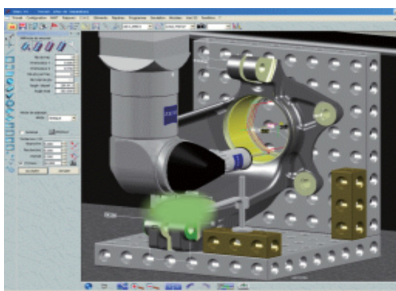


Path Optimization

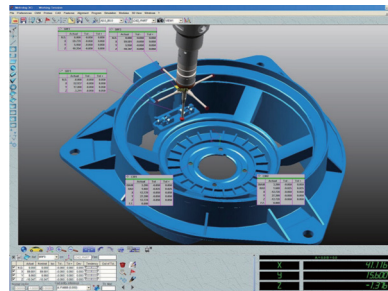


Collision Avoidance

Simulation Programming



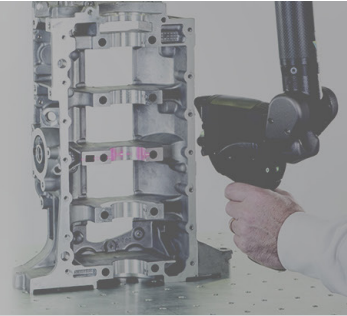
정밀한 Geometric 검사



자동 프로브 교체



측정서비스

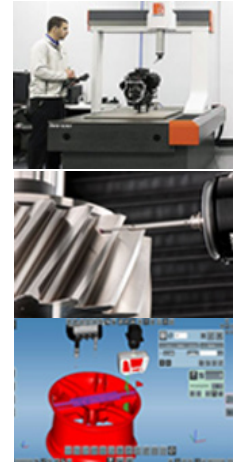


초정밀 3차원 측정기부터 이동식 3차원 측정기보유

▶ 초정밀 부품 측정

소형 제품 부터 대형 제품까지 초정밀 부품 측정에 적합합니다.

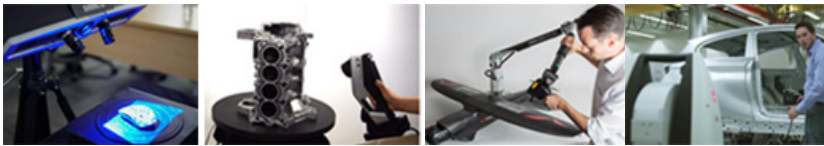
- 보유장비 : UNIVERSAL by COORD3 ITALY
- 측정 범위 : X 2000mm , Y 1200mm , Z 1000mm
- 정확도 : $2.5\mu\text{m}+L/333$
- 측정 범위 : 접촉식 측정 , 비접촉식 측정



▶ 3D Scanner 운용

전문 엔지니어가 직접 현장을 방문하여 고객 맞춤형 스캔 측정 서비스를 제공합니다. 다양한 방식의 스캐너를 통해 신뢰성 있는 데이터를 제공합니다.

- 스캐너 보유 장비 :
Leica Tracker Scanner by SWISS LEICA
Absolute ARM scanner by HEXAGON
Optical Scanner by SHINNING 3D



▶ 3D산업분야

항공, 자동차 생산라인, 철도차량, 대형 구조물, Plant 파트 측정에 고정밀 이동형 측정기를 보유하여 언제, 어디서든 측정이 가능합니다.

- 보유장비 : Laser Tracker by SWISS Leica
Absolute ARM by HEXAGON
- 측정범위 : 2.5M~160M



▶ 측정사례

프로빙 이용한 자동차 분야 측정

자동차 검사 및 판넬 측정

자동차 구조 측정 및 분석

자동차 스캔 외관 품질 비교

트래커 이용한 지그 및 구조물 측정

공작 기계 에러 보정

대형 기어 제품 측정

MEMO

Leica
Geosystems

 **HEXAGON**
MANUFACTURING INTELLIGENCE


VISUOL

 **ETALON**
APPLIED TRACEABILITY

 **COORD 3**
A PERCEPTION COMPANY METROLOGY

 **Alukeep**



H.I.T AUTOMOTIVE (주)에이치아이티오토모티브

본 사 경기도 안산시 단원구 엠티브이 1로 146(15658)

Tel. 070-5034-5900

Fax. 070-5034-5930

부산지사 부산광역시 강서구 대저중앙로 237번길 43(46701)

Tel. 070-4400-7544

Team Webpage <http://www.hit-metrology.com>

Company Webpage <http://www.hitautomotive.com>