Datasheet

FREEDOM ARM

7-axis portable CMM for touch probes and laser scanners

7-axis portable arm includes:
- laser scanner adaptor kit
- mounting ring with base plate
- protective dust cover
- transit storage case
- calibration bar (SELECT models only)
- ISO 10360-12 calibration certificate
- 15 months warranty
- USB interface for tactile probes
- wireless interface for tactile probes
- wired laser scanner interface
- rechargeable battery
- accessory kit includes:
  - ⌀3, 5, 15mm tactile probes
  - calibration sphere
  - accessory case

Model shown:
FREEDOM select scan

TECHNICAL DATA | Portable Arm

	Max. Reach	Weight[3]	SCANNING ACCURACY[1]			TOUCH PROBE ACCURACY[2]			
			H120 L DIA	MMDx100 L DIA	MMDx200 L DIA	Length E UNI	Size P SIZE	Position L DIA	Form P FORM
FREEDOM classic scan 20	2.48 (97.6)	8.8 [19.4]	0.036 (0.0014)	0.056 (0.0022)	0.074 (0.0029)	0.043 (0.0017)	0.016 (0.0006)	0.054 (0.0021)	0.033 (0.0013)
FREEDOM classic scan 25	2.98 (117.3)	9.1 [20.1]	0.040 (0.0016)	0.062 (0.0024)	0.078 (0.0031)	0.048 (0.0019)	0.023 (0.0009)	0.060 (0.0024)	0.043 (0.0017)
FREEDOM classic scan 30	3.48 (137.0)	9.4 [20.7]	0.052 (0.0020)	0.082 (0.0032)	0.100 (0.0039)	0.078 (0.0031)	0.034 (0.0013)	0.090 (0.0035)	0.058 (0.0023)
FREEDOM classic scan 35	3.98 (156.7)	9.7 [21.4]	0.070 (0.0028)	0.106 (0.0042)	0.128 (0.0050)	0.092 (0.0036)	0.042 (0.0017)	0.115 (0.0045)	0.067 (0.0026)
FREEDOM classic scan 40	4.48 (176.4)	10.0 [22.0]	0.092 (0.0036)	0.136 (0.0054)	0.154 (0.0061)	0.114 (0.0045)	0.051 (0.0020)	0.140 (0.0055)	0.084 (0.0033)
FREEDOM classic scan 45	4.98 (196.1)	10.3 [22.7]	0.122 (0.0048)	0.168 (0.0066)	0.190 (0.0075)	0.158 (0.0062)	0.078 (0.0031)	0.168 (0.0066)	0.106 (0.0042)
FREEDOM select scan 20	2.48 (97.6)	9.0 [19.8]	0.028 (0.0011)	0.048 (0.0019)	0.066 (0.0026)	0.029 (0.0011)	0.010 (0.0004)	0.038 (0.0015)	0.021 (0.0008)
FREEDOM select scan 25	2.98 (117.3)	9.3 [20.5]	0.032 (0.0013)	0.054 (0.0021)	0.070 (0.0028)	0.031 (0.0012)	0.012 (0.0005)	0.048 (0.0019)	0.025 (0.0010)
FREEDOM select scan 30	3.48 (137.0)	9.6 [21.2]	0.038 (0.0015)	0.060 (0.0024)	0.078 (0.0031)	0.057 (0.0022)	0.020 (0.0008)	0.083 (0.0033)	0.038 (0.0015)
FREEDOM select scan 35	3.98 (156.7)	9.9 [21.8]	0.048 (0.0019)	0.076 (0.0030)	0.098 (0.0039)	0.069 (0.0027)	0.024 (0.0009)	0.099 (0.0039)	0.045 (0.0018)
FREEDOM select scan 40	4.48 (176.4)	10.2 [22.5]	0.060 (0.0024)	0.096 (0.0038)	0.114 (0.0045)	0.084 (0.0033)	0.030 (0.0012)	0.120 (0.0047)	0.050 (0.0020)
FREEDOM select scan 45	4.98 (196.1)	10.5 [23.1]	0.080 (0.0031)	0.120 (0.0047)	0.136 (0.0054)	0.113 (0.0044)	0.048 (0.0019)	0.140 (0.0055)	0.065 (0.0026)

mm (inch) kg [lbs]

	H120		MMDx100		MMDx200	
Accuracy[4]	0.007	(0.00028)	0.010	(0.00039)	0.016	(0.00063)
Line width	120	(4.7)	100	(3.9)	200	(7.9)
Measuring range	100	(4.1)	100	(4.1)	150	(6.1)
Stand-off	80	(3.1)	100	(4.1)	110	(4.1)
Resolution (min.)	0.035	(0.0014)	0.065	(0.0026)	0.115	(0.0045)
Frame rate (max.)	450 Hz		150 Hz		150 Hz	
Points per line (max.)	2,000		1,000		1,000	
Laser power adjustment	ESP4 each point in real-time		ESP3 each point in real-time		ESP3 each point in real-time	
Warm-up	0 seconds		0 seconds		0 seconds	
Weight	0.5	[1.1]	0.4	[0.9]	0.4	[0.9]
Laser type	Class 2, 450 nm		Class 2, 660 nm		Class 2, 660 nm	

mm (inch) kg [lbs]

TECHNICAL DATA | **System Requirements**

ENVIRONMENTAL REQUIREMENTS

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Operating temperature	+5°C to +40°C
Storage temperature	-30°C to +70°C
Operating elevation	2000m
Relative humidity	10% to 90% non-condensing

SUPPLY REQUIREMENTS

Power supply	110-240V single phase

CONFORMITY

|	
Portable arm	Probing accuracy certified according to ISO 10360-12
	CE – FCC - IC
Laser scanner	CE – Complies with 21 CFR 1040.10 and 1040.11, Laser Notice No. 50 dated June 24, 2007

TECHNICAL DATA | **Accuracy Verification**

FREEDOM arms are delivered fully traceable to internationally recognised accuracy certification ISO 10360-12 for the probing accuracy of portable measuring arms, giving users complete confidence in the reliability of their measurements.
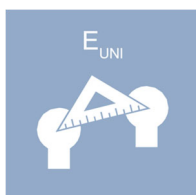
The E UNI value is the maximum permissible error for unidirectional length measurements. It therefore most closely reflects most measurement needs.
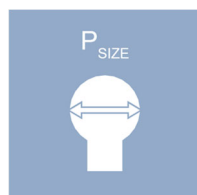
The P SIZE value is the maximum permissible error for measuring the diameter of a sphere. It therefore signifies the accuracy of feature measurements.
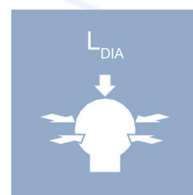
The L DIA value is the maximum permissible error for the articulation location. It therefore represents the repeatability of the arm.

The P FORM value is the maximum permissible error for the form of a sphere. This is a value that defines the dispersion accuracy of the arm.

[1] Laser scanner accuracy specification.
The scanning performance test indicates the performance of the laser scanner combined with a FREEDOM arm. The test is performed by scanning a highly accurate reference plate in 5 different orientations of the articulated arm and laser scanner. The 5 resulting point clouds are merged, and a best-fit plane is constructed through this combined point cloud. For each of the points, the deviation distance to the best-fit plane is calculated. The result of the test is the 2σ value of all of the deviations.

[2] Touch probe accuracy specification.
E UNI   Maximum permissible longitudinal error of measurement – according to ISO 10360-12:2016
P SIZE   Maximum permissible probe deviation, size – according to ISO 10360-12:2016.
L DIA   Maximum permissible probe deviation, position – according to ISO 10360-12:2016
P FORM   Maximum permissible probe deviation, shape – according to ISO 10360-12:2016

[3] Arm weight without laser scanner attached.

[4] Laser scanner accuracy determined by scanning a plane from various directions, each time using the entire scanner field of view. The result is the maximum 1σ deviation of the scan data to fitted plane features.