



Datasheet

FREEDOM *ULTIMATE SCAN*

Ultra accuracy 7-axis portable arm for probes and laser scanners

Go-to metrology and multi-functional capability

- Probing accuracy certified to ISO 10360-12
- Probe and laser scanner multi-sensor technology
- Wireless connection and battery operation capability
- Effortless infinite rotation and unique Zero-G counterbalance
- Simply turn on and start measuring, no encoder referencing
- Convenient LED wrist display and multi-functional buttons
- Hot-swap probes without probe recalibration
- Carbon-fibre construction for long term stability

FREEDOM arm package:

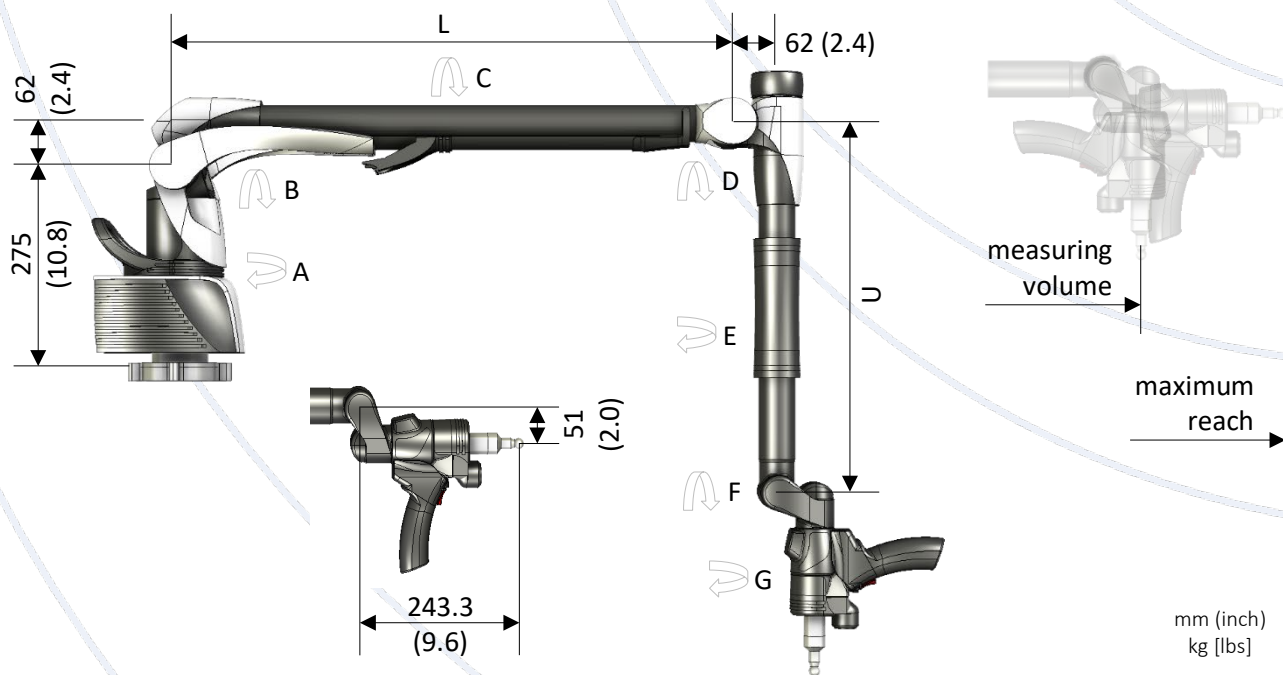
- ULTIMATE SCAN portable arm
- laser scanner SE interface
- rotating spin-grip and spin-knob
- interface software RDS
- base plate mounting ring
- protective dust cover
- storage and transit case
- portable arm power supply
- calibration sphere with ISO17025 certificate
- verification bar with ISO17025 certificate
- accuracy verification with ISO10360-12 certificate for tactile measurement
- 12 months manufacturers standard warranty
- wired control pack CP-C includes
 - cable ODU-Ethernet 3m (9.8 feet)
 - adapter USB-Ethernet
- accessory kit includes:
 - diam. 15mm x 50mm probe
 - diam. 5mm x 50mm probe
 - diam. 3mm x 50mm probe
 - accessory case



...we are metrology

TECHNICAL DATA | Dimensions and Weights

FREEDOM ULTIMATE SCAN



	VOLUME ¹	REACH ¹		AXIS ROTATION ²							SECTIONS		WEIGHT ³
		PROBE	LASER	A	B	C	D	E	F	G	L	U	
FREEDOM ULTIMATE SCAN 25	2500 (98.4)	2980 (117.3)	3250 (128.0)	∞	-0.94 +1.42	∞	-1.35 +1.22	∞	-1.71 +1.71	∞	750 (29.5)	500 (19.7)	9.3 [20.5]
FREEDOM ULTIMATE SCAN 30	3000 (118.1)	3480 (137.0)	3750 (147.6)	∞	-0.94 +1.42	∞	-1.35 +1.22	∞	-1.71 +1.71	∞	900 (35.4)	600 (23.6)	9.6 [21.2]
FREEDOM ULTIMATE SCAN 35	3500 (137.8)	3980 (156.7)	4250 (167.3)	∞	-0.94 +1.42	∞	-1.35 +1.22	∞	-1.71 +1.71	∞	1050 (41.3)	700 (27.6)	9.9 [21.8]
FREEDOM ULTIMATE SCAN 40	4000 (157.5)	4480 (176.4)	4750 (187.0)	∞	-0.94 +1.42	∞	-1.35 +1.22	∞	-1.71 +1.71	∞	1200 (47.2)	800 (31.5)	10.2 [22.5]
FREEDOM ULTIMATE SCAN 45	4500 (177.2)	4980 (196.1)	5250 (206.7)	∞	-0.94 +1.42	∞	-1.35 +1.22	∞	-1.71 +1.71	∞	1350 (53.1)	900 (35.4)	10.5 [23.1]

¹Measuring Volume and Maximum Reach specified as a spherical diameter using 50mm long probe / laser scanner field of view.

²Axis Rotation angles measured in Radians.

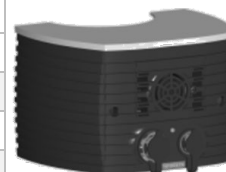
³Arm weight excluding laser scanner.

TECHNICAL DATA | Control Pack

The connection capabilities and power supply options of the FREEDOM arm are defined by the Control Pack. The CP-C Control Pack, for wired connectivity and mains power, is supplied as standard with every arm. For wireless connectivity, battery power and battery hot-swapping, the CP-W Control Pack is available as an optional extra. CP-W provides up to 4 hours continuous battery power, for a touch probe and/or laser scanner, before recharging or hot swapping the battery. Battery hot-swapping allows one of the two rechargeable batteries to be removed, for charging or replacement by a charged battery, while the arm continues to operate on battery power.

CONTROL PACK	SENSOR	CONNECTION			POWER	
		Ethernet cable	USB* cable	wireless	mains	battery
CP-C	PROBE	✓	✓	-	✓	-
	LASER	✓	✓	-	✓	-
CP-W	PROBE	✓	✓	✓	✓	✓
	LASER	✓	✓	✓	✓	✓

*USB connection via included USB to Ethernet cable adapter.



TECHNICAL DATA | Accuracy

FREEDOM ULTIMATE SCAN

The FREEDOM arm is delivered fully traceable to internationally recognised accuracy certification ISO 10360-12 for probing accuracy, giving users complete confidence in the reliability of their measurements.

	TOUCH PROBE ⁴				LASER SCANNER ⁵
	LENGTH E UNI	SIZE P SIZE	POSITION L DIA	FORM P FORM	POSITION L DIA
FREEDOM ULTIMATE SCAN 25	0.029 (0.0011)	0.011 (0.0004)	0.044 (0.0017)	0.023 (0.0009)	0.043 (0.0017)
FREEDOM ULTIMATE SCAN 30	0.053 (0.0021)	0.018 (0.0007)	0.076 (0.0030)	0.035 (0.0014)	0.056 (0.0022)
FREEDOM ULTIMATE SCAN 35	0.064 (0.0025)	0.022 (0.0009)	0.092 (0.0036)	0.041 (0.0016)	0.068 (0.0027)
FREEDOM ULTIMATE SCAN 40	0.078 (0.0031)	0.028 (0.0011)	0.110 (0.0043)	0.046 (0.0018)	0.080 (0.0031)
FREEDOM ULTIMATE SCAN 45	0.104 (0.0041)	0.044 (0.0017)	0.125 (0.0049)	0.060 (0.0024)	0.121 (0.0048)

FREEDOM arm accuracy specifications applicable only when the arm is mounted on the standard base plate mounting ring or optional base magnetic fixing with mounting ring with stable environmental conditions - accuracy is not guaranteed with all other stands and volume extension products.

⁴ Touch probe accuracy specification - applicable only when using the probes supplied in the standard accessory kit.

E UNI Maximum permissible longitudinal error of measurement according to ISO 10360-12:2016

P SIZE Maximum permissible probe deviation of size according to ISO 10360-12:2016.

L DIA Maximum permissible probe deviation of position according to ISO 10360-12:2016

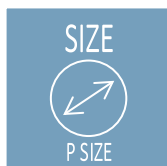
P FORM Maximum permissible probe deviation of shape according to ISO 10360-12:2016

⁵ Laser scanner H120 accuracy specification.

L DIA Maximum permissible optical deviation of position according to ISO 10360-8:2013



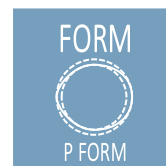
Distance measurement calculated using 105 length measurements over the volume of the measuring arm using two spheres.



Feature measurement calculated as the difference between the calibrated sphere diameter and 25 point measured sphere diameter.



Repeatability of a sphere position when measured using 5 different arm orientations and repeated for two sphere positions.



Total variation of 25 measured points compared to the diameter of the least squares sphere, worst value from two sphere positions.

TECHNICAL DATA | ModelMaker H120 Laser Scanner

The ModelMaker H120 has been developed using the latest blue light laser technology, ultra-fast camera electronics and custom made optics, putting this non-contact 3D laser scanner in a class of its own, especially when digitising the most challenging components.



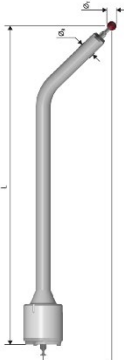
Accuracy ⁶	7 µm	0.00028 inch
Laser line width	120 mm	4.7 inch
Measuring range	100 mm	4.1 inch
Stand-off (min.)	80 mm	3.1 inch
Resolution (min.)	35 µm	0.0014 inch
Frame rate (max.)	450 Hz	
Points per line (max.)	2,000	
Laser power adjustment	ESP4 each point in real-time	
Warm-up	0 seconds	
Weight	0.5 kg	1.1 lbs
Laser type	Class 2	
Maximum output	2.01mW 450nm	1mW 650nm

⁶ Laser scanner accuracy according to manufacturer's test procedure determined by scanning a plane from various directions, each time using the entire sensor field of view depth, width and diagonal. The result is the maximum 1σ deviation of the scan data to fitted plane features.



TECHNICAL DATA | Touch Probes

The FREEDOM arm is supplied as standard with a basic probe accessory kit, other probes sizes and configurations are available.

	0085535	aluminium 50mm (1.97") pointed tip M3 tungsten carbide
	0085536	aluminium 75mm (2.95") pointed tip M3 tungsten carbide
	0085537	aluminium 100mm (3.94") pointed tip M3 tungsten carbide
	0085538	aluminium 50mm (1.97") diam. 3mm (0.12") ruby tip M3
	0085539	aluminium 75mm (2.95") diam. 3mm (0.12") ruby tip M3
	0085540	aluminium 100mm (3.94") diam. 3mm (0.12") ruby tip M3
	0085541	aluminium 50mm (1.97") diam. 6mm (0.24") ruby tip M3
	0085542	aluminium 75mm (2.95") diam. 6mm (0.24") ruby tip M3
	0085543	aluminium 100mm (3.94") diam. 6mm (0.24") ruby tip M3
	0085544	carbon fibre 85mm (3.35") pointed tip M3 tungsten carbide
	0085545	carbon fibre 100mm (3.94") pointed tip M3 tungsten carbide
	0085546	carbon fibre 130mm (5.12") pointed tip M3 tungsten carbide
	0085547	carbon fibre 150mm (5.91") pointed tip M3 tungsten carbide
	0085548	carbon fibre 180mm (7.09") pointed tip M3 tungsten carbide
	0085549	carbon fibre 200mm (7.87") pointed tip M3 tungsten carbide
	0085550	carbon fibre 85mm (3.35") diam. 3mm (0.12") ruby tip M3
	0085551	carbon fibre 100mm (3.94") diam. 3mm (0.12") ruby tip M3
	0085552	carbon fibre 130mm (5.12") diam. 3mm (0.12") ruby tip M3
	0085553	carbon fibre 150mm (5.91") diam. 3mm (0.12") ruby tip M3
	0085554	carbon fibre 180mm (7.09") diam. 3mm (0.12") ruby tip M3
	0085555	carbon fibre 200mm (7.87") diam. 3mm (0.12") ruby tip M3
	0085556	carbon fibre 85mm (3.35") diam. 6mm (0.24") ruby tip M3
	0085557	carbon fibre 100mm (3.94") diam. 6mm (0.24") ruby tip M3
	0085558	carbon fibre 130mm (5.12") diam. 6mm (0.24") ruby tip M3
	0085559	carbon fibre 150mm (5.91") diam. 6mm (0.24") ruby tip M3
	0085560	carbon fibre 180mm (7.09") diam. 6mm (0.24") ruby tip M3
	0085561	carbon fibre 200mm (7.87") diam. 6mm (0.24") ruby tip M3
	0085562	aluminium 45° offset 149x38mm (5.87x1.50") pointed tip M3 tungsten carbide
	0085563	aluminium 45° offset 149x38mm (5.87x1.50") diam. 3mm (0.12") ruby tip M3
	0085564	aluminium 45° offset 149x38mm (5.87x1.50") diam. 4mm (0.16") ruby tip M3
	0085565	aluminium 45° offset 149x38mm (5.87x1.50") diam. 6mm (0.24") ruby tip M3
	0085566	aluminium 60° offset 149x57mm (5.87x2.24") pointed tip M3 tungsten carbide
	0085567	aluminium 60° offset 149x57mm (5.87x2.24") diam. 3mm (0.12") ruby tip M3
	0085568	aluminium 60° offset 149x57mm (5.87x2.24") diam. 4mm (0.16") ruby tip M3
	0085569	aluminium 60° offset 149x57mm (5.87x2.24") diam. 6mm (0.24") ruby tip M3
	0085570	aluminium 90° offset 173x43mm (6.81x1.69") pointed tip M3 tungsten carbide
	0085571	aluminium 90° offset 173x43mm (6.81x1.69") diam. 3mm (0.12") ruby tip M3
	0085572	aluminium 90° offset 173x43mm (6.81x1.69") diam. 4mm (0.16") ruby tip M3
	0085573	aluminium 90° offset 173x43mm (6.81x1.69") diam. 6mm (0.24") ruby tip M3

TECHNICAL DATA | Requirements

ENVIRONMENT

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

SUPPLY

Power supply	110-240V single phase
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CONFORMITY

Freedom Arm	Probing accuracy certified according to ISO 10360-12 CE – FCC – IC
Modelmaker H120 Laser Scanner	CE – Complies with 21 CFR 1040.10 and 1040.11, Laser Notice No. 50 dated June 24, 2007