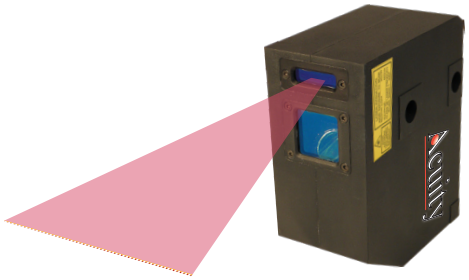
Acuity®

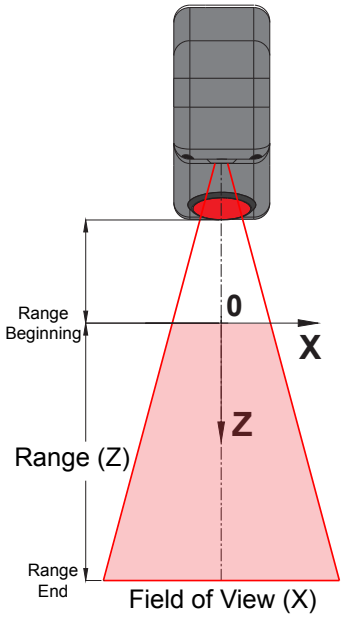
The AP620 profile measurement scanner is Acuity's short-range laser scanner for industrial contour and shape measuring applications. The laser profile scanner quickly and accurately generates 2D or 3D profile scans of objects, surfaces or scenes using high-speed digital CMOS detectors and a tuned laser line generator.

AP620 Profile Measurement Scanner

Principles of Operation

The AccuProfile™620 Profile Measurement Scanner measures surface heights by projecting a beam of visible laser light that creates a line on a target surface. Reflected light from the surface is viewed from an angle by a two-dimensional CMOS detector array inside the AP620 sensor. The 2D contour profile is calculated by the scanner's microprocessor from the pixel data from the diffusely - reflected laser line. The height distance profile is transmitted through ethernet communications to a PC computer. Real-time 3D profiling is created by synchronizing the position of the scanner with encoder inputs from conveyors, linear stages or robotic movements. A variety of models are specified, each to allow a different measurement range and field of view.





Definitions

Range - Working distance between measurement endpoints over which the sensor will reliably measure displacement of a target surface.

Field of View (FOV) - Length of the laser line that can be captured by the scanner's detector. The scanner measures profiles along its linear FOV.

Range Beginning - Defined as ZERO distance in the Z axis of the sensor. The Field of View is narrowest at the Range Beginning.

Range End - Defined as the span endpoint beyond which the sensor no longer reliably reports displacement. The Field of View is widest at the Range End.

Linearity - The largest deviation from a best-fit straight line over the measurement range, created by data from the sensor with reference taken from a true distance scale. States as +/-% of the Range.

Resolution - Smallest increment of change in the Range or FOV that a sensor can detect. Stated as a % of the Range or FOV.

Sample Rate - Speed that data samples are obtained from the scanner in profiles per second (Hz).

Typical Scanner Applications

- **Weld Gap Tracking and Weld Bead Profiling** - High-speed tracking of the weld bead location, size and shape
- **Positional Control of Objects and Surfaces** - Robots can be positioned based on the location of surface features and process variables
- **Tire Profiling** - Measurement of bulge, dent and other sidewall or tread defects.
- **Surface Profiling** - Inspect large surfaces to verify dimensional tolerances or identify and measure surface defects
- **3D Profile Generation** - Gather a part's dimensional information by moving the scanner's laser line across a the entire surface.
- **Dimensioning** - Measure width, thickness, length, surface angle, radius or any shape or any shape dimension using the height-profiling capabilities of a 2D scanner.

AP620 Model Specifications in mm [in.]

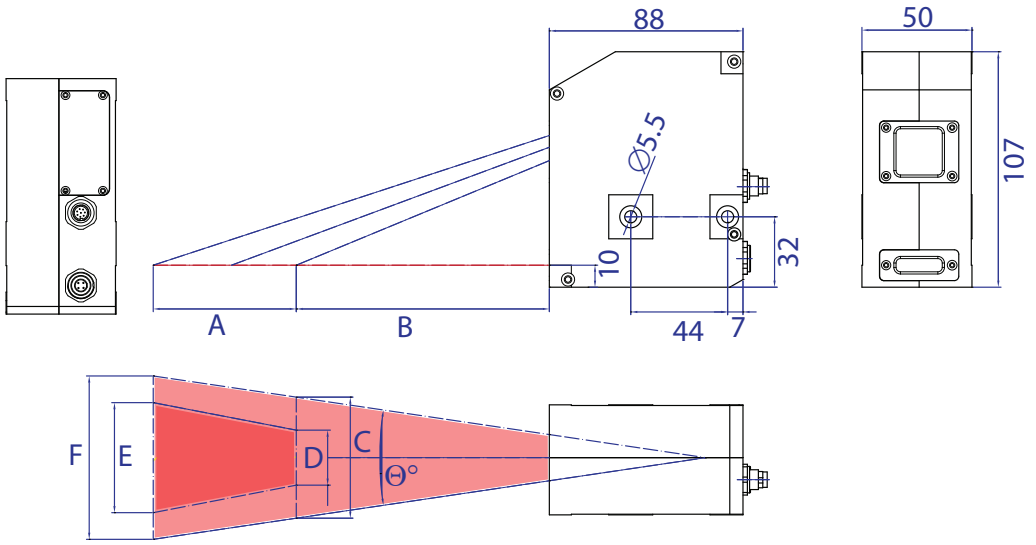
Model	- 7C	- 18C	- 35	- 35C	- 65	- 65C	- 110	- 200	- 300	-650	-1000
Range in Z-axis	7 [0.28]	18 [0.71]	35 [1.38]	35 [1.38]	65 [2.56]	65 [2.56]	110 [4.33]	200 [7.87]	300 [11.81]	650 [25.6]	1000 [39.8]
Range Beginning	24 [0.95]	45.5 [1.8]	60 [2.4]	80 [3.2]	50 [2.0]	115 [4.5]	125 [4.9]	125 [4.9]	165 [6.5]	450 [17.72]	350 [13.78]
Range End	31 [1.2]	68 [2.7]	95 [3.7]	115 [4.5]	115 [4.5]	180 [7.1]	235 [9.3]	325 [12.8]	465 [18.3]	1100 [43.31]	1350 [53.15]
Linearity, Z - axis	+/- 0.1% of the Z range										
µm [10^{-3} in.]	7 [0.28]	18 [0.71]	35 [1.38]	35 [1.38]	65 [2.56]	65 [2.56]	110 [4.33]	200 [7.87]	300 [11.81]	650 [25.6]	1000 [39.8]
Field of View X-axis @ Range Beginning	8 [0.31]	11 [0.43]	20 [0.79]	22 [0.87]	35 [1.38]	25 [0.98]	45 [1.8]	60 [2.4]	125 [4.92]	190 [7.48]	270 [10.63]
@ Range End	10 [0.39]	12.8 [0.50]	30 [1.18]	30 [1.18]	55 [2.16]	50 [1.97]	70 [2.8]	135 [5.31]	240 [9.45]	420 [16.54]	1000 [39.8]
Linearity, X-axis, µm[10^{-3} in.]	+/- 0.2% of the X range										
@ Range Beginning	16 [0.63]	22 [0.87]	40 [1.58]	44 [1.73]	70 [2.76]	50 [1.96]	120 [4.8]	120 [4.8]	250 [9.84]	380 [15.0]	540 [21.3]
Resolution, X-axis, µm[10^{-3} in.]	128 or 256 or 512 or 1024 points / profile										
@ Range Beginning	7.8 [0.31]	10.7 [0.42]	19.5 [0.77]	21.4 [0.85]	34.2 [1.4]	24.4 [0.96]	58.5 [2.3]	58.5 [2.3]	122 [4.8]	186 [7.3]	264 [10.4]
@ Range End	9.8 [0.38]	12.5 [0.49]	29.3 [1.15]	29.3 [1.15]	53.7 [2.1]	48.8 [1.9]	98.9 [3.9]	132 [5.2]	234 [9.2]	410 [16.1]	977 [38.5]
Scan frequency	up to 250 Hz (profiles / s) for the full Range or 256,000 points / s										
Enclosure Design *	Compact	Compact	Standard	Compact	Standard	Compact	Standard	Standard	Medium	Special	Special
Weight (less cables) g [oz.]	350 [12.3]	350 [12.3]	450 [15.9]	350 [12.3]	450 [15.9]	350 [12.3]	600 [21.1]	600 [21.1]	700 [24.7]	2000 [70]	2500 [88]
Laser (see labels below)	660 nm, visible RED, Class 2M		660 nm, visible RED, Class 3R		660 nm, visible RED, Class 3B						
Power	9 - 36 VDC, 2W max consumption										
Operating Temperature	-10° to 55°C [14° to 131°F], With heater option to -30°C [-22°F]										
Environmental	IP67 (NEMA 4X), Keep optical windows clean for best performance. Aluminum case.										
Data Interface	Ethernet, connected via Binder series 712-4 pin male socket										
Signal Inputs	External synchronization input: opto-isolated, 40V max										
Cable 1	Ethernet, Binder series 702-4 pin female socket, 2m, 4 x 2 x AWG26/7, PVC jacket										
Cable 2	Power & Data, 8-conductor 26 AWG 18/38, Binder series 702-8pin female socket, solder-tail termination, 2m, PVC jacket										
	Red – 9 - 36 DC IN			**Yellow** – Sync of result							
	Brown – Power return			**Blue** – Ground for IN / OUT							

* Each sensor model has unique dimensions.

Laser Safety Labels

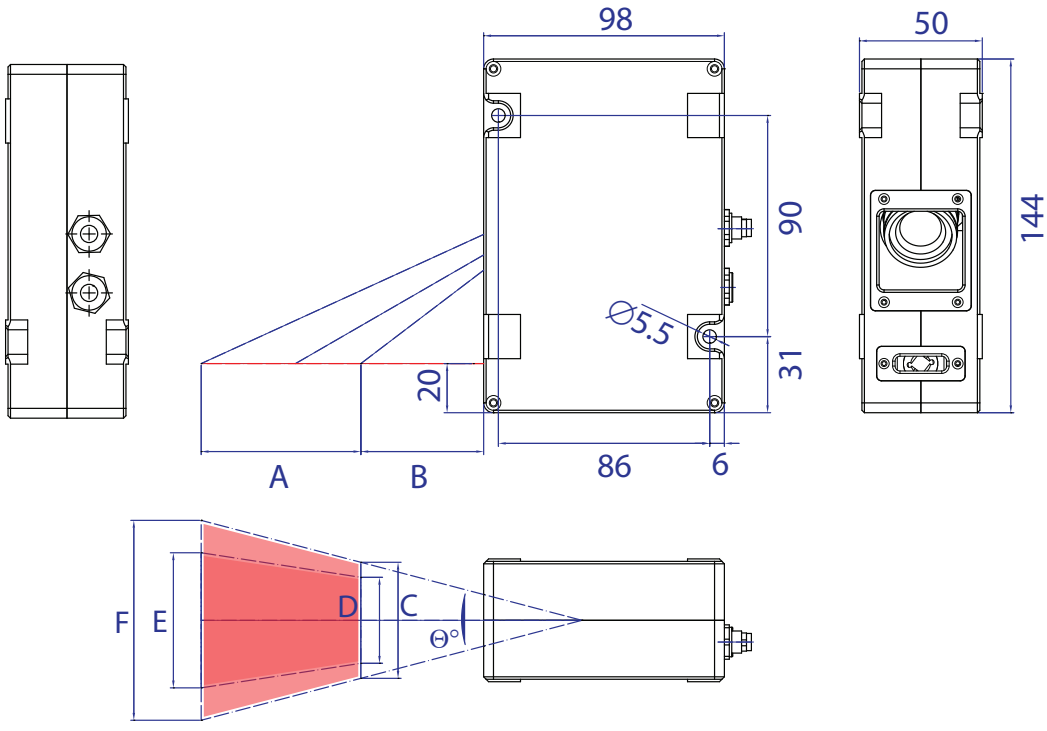
Mechanical Dimensions units in mm

A - Range of Z axis	D - Field of view, at range beginning
B - Range beginning	E - Field of view at range end
C - Laser line length at range beginning	F - Laser line length at range end



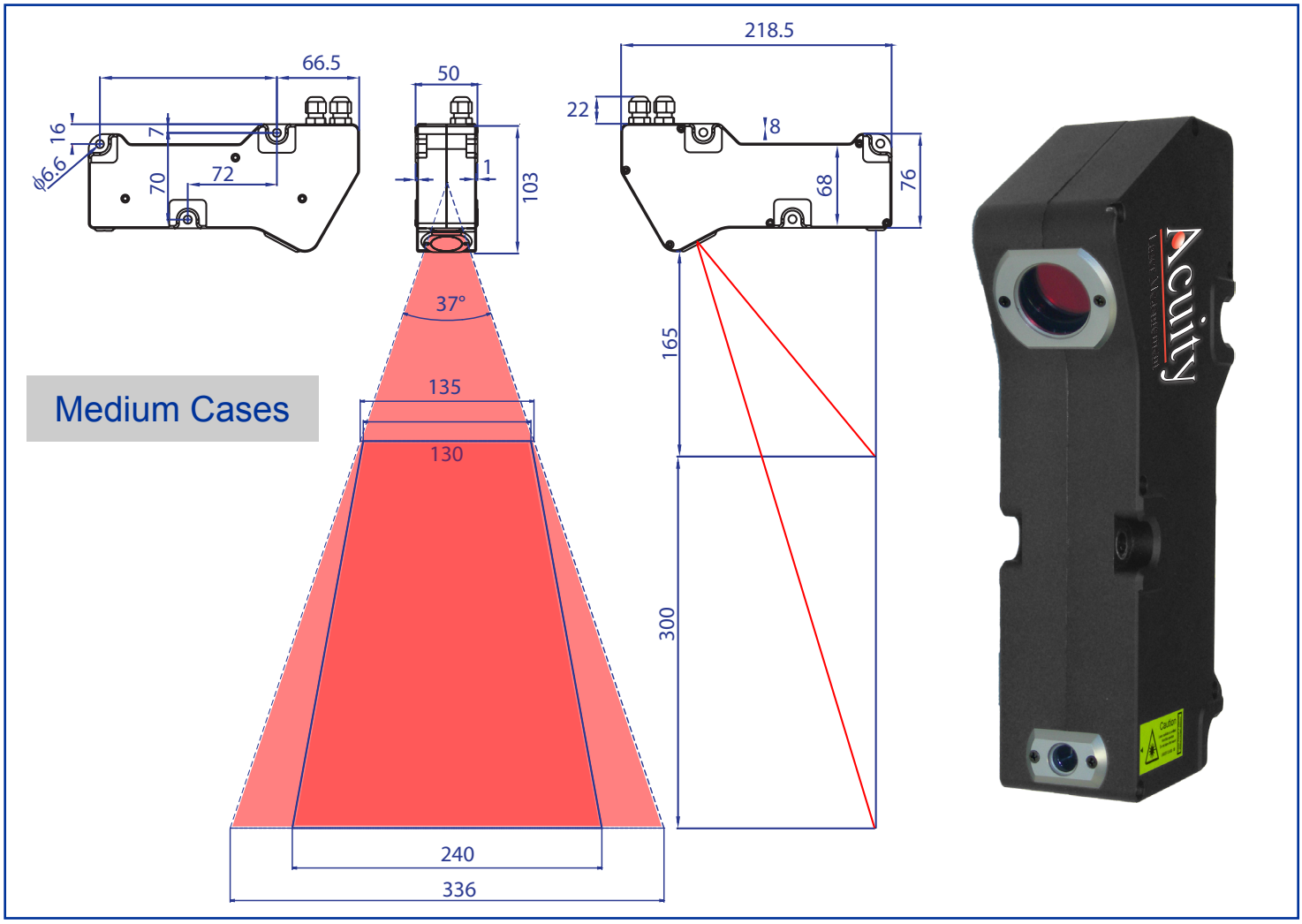
Compact Cases				
	-7C	-18C	-35C	-65C
A	7	18	35	65
B	24	45.5	80	115
C	16	19	33	44
D	8	11	22	25
E	10	12.8	30	50
F	18	22	41	60
Θ	11°	10°	13°	14°

Compact Cases



Standard Cases				
	-35	-65	-110	-200
A	35	65	110	200
B	60	50	125	125
C	30	41	54	72
D	20	35	45	60
E	30	55	70	135
F	40	71	90	159
Θ	17°	26°	19°	25°

Standard Cases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Medium Cases
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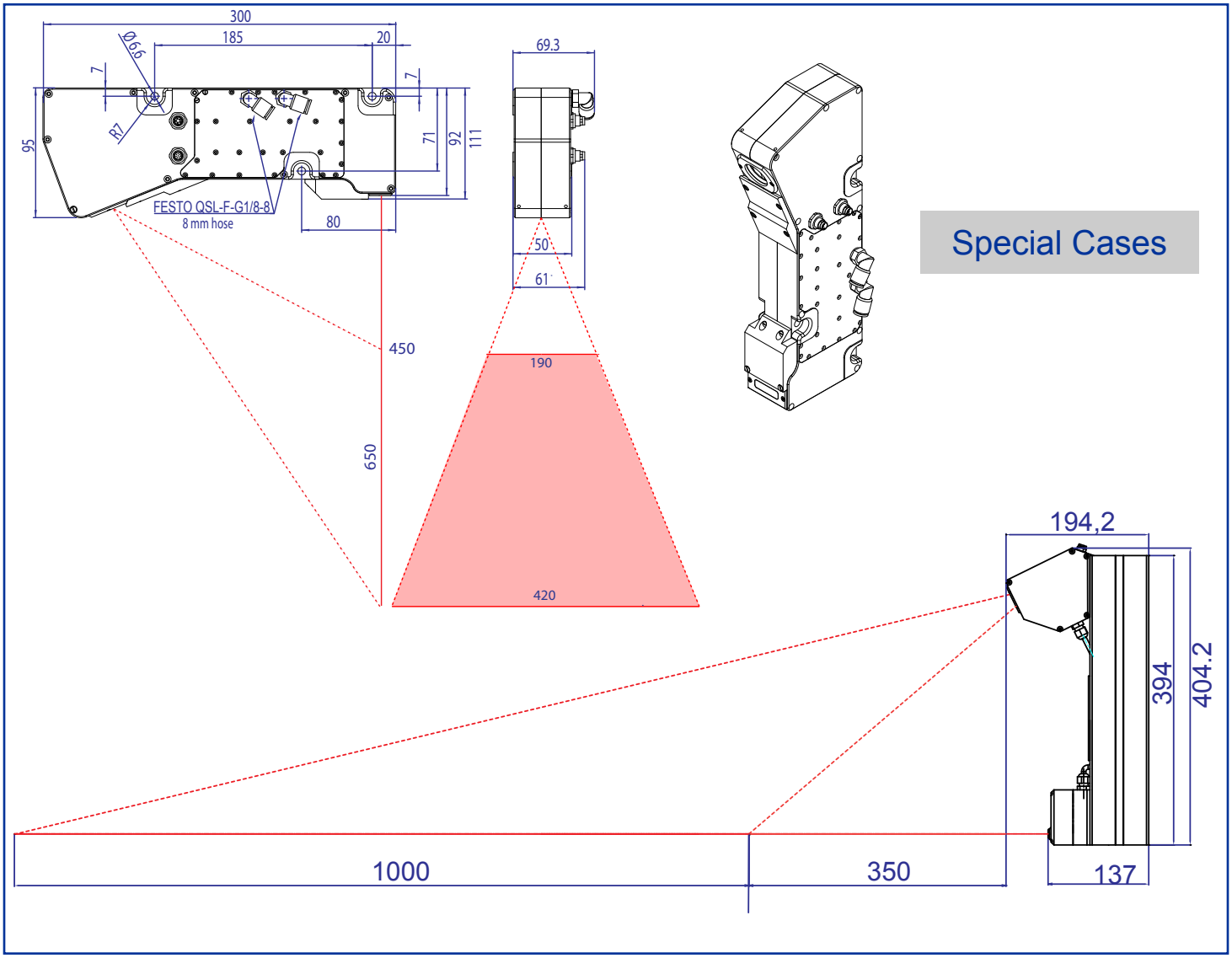

Special Cases

AP620 Profile Scanner Options

Optional Cables: Custom cable lengths and specifications are available

Internal Heater: Extends use of to -30°C [-22°F]

Air Knives: Special enclosure design for dusty environments. Includes two pressurized-air inlets to force air across emitter and collector windows.

Contact Acuity

Schmitt Industries, Inc.
2765 NW Nicolai Street, Portland, Oregon, 97210, USA
Tel: 503-227-5178 Fax: 503-227-5040
www.acuitylaser.com

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