Z+F PROFILER® 9020

The Z+F PROFILER® 9020 is a compact high-speed phase-based laser scanner with high precision, 182 m range and a 360° field of view. With its scan rate of more than 1 million points/sec. and scanning speed up to 267 profiles/sec., very short distances between profiles can be achieved even at a high speed of a moving platform.

Laser system			
Laser class	1 (according to EN60825-1 / ANSI Z136.1)		
Beam divergence	< 0.5 mrad (half angle, 1/e²)		
Beam diameter	Approx. 1.9 mm (at 0.1 m distance)		
Ambiguity distance	182 m (above, range reading restarts at zero)		
Minimum distance	0.3 m		
Range resolution	0.1 mm		
Data acquisition rate	Max. 1.094 million pixel/sec.		
Accuracy / Precision			
Linearity error	≤ 1 mm		
Range drift (full -10° C ... +45° C)	< 0.3 mm (with internal reference), < 2 mm (without ref.)		
Target Distance	White (80%) [1]	Grey (37%) [1]	Black (14%) [1]
1 Sigma Range Noise, 1 m	0.2 mm	0.3 mm	0.4 mm
1 Sigma Range Noise, 2 m	0.2 mm	0.2 mm	0.3 mm
1 Sigma Range Noise, 5 m	0.2 mm	0.2 mm	0.3 mm
1 Sigma Range Noise, 10 m	0.2 mm	0.2 mm	0.3 mm
1 Sigma Range Noise, 25 m	0.2 mm	0.3 mm	0.5 mm
1 Sigma Range Noise, 50 m	0.4 mm	0.6 mm	1.2 mm

Deflection unit	
Deflection system	Completely encapsulated, rotating mirror
Vertical field of view	360° un-obstructed
Angular resolution	0.0088°
Angular accuracy	0.007° rms [2] (122 µrad)
Rotation speed	50 Hz up to 267 Hz (max. 16,020 rpm)

Available Settings (Resolution [Pixel/360°] / Rotor speed [rps] / Pixel rate [kHz])				
Data rate Resolution	1094 kHz (x 2.8) [3]	547 kHz (x 2) [3]	274 kHz (x 1.4) [3]	137 kHz (x 1) [3]
20,480 / 360° 10,240 / 360°	53 rps 107 rps	--- 53 rps	--- ---	--- ---
8,192 / 360° 6,827 / 360° 5,120 / 360°	134 rps 160 rps 214 rps	67 rps 80 rps 107 rps	--- --- 53 rps	--- --- ---
4,096 / 360° 3,413 / 360°	267 rps ---	134 rps 160 rps	67 rps 80 rps	--- ---
2,048 / 360° 1,024 / 360°	--- ---	267 rps ---	134 rps 267 rps	67 rps 134 rps

Interfaces	
Data storage	Internal 128 GB SATA
Data interface	1 GB Ethernet
Data recording time [4]	6h ... 12h in total for internal 128 GB memory [5]
Synchronization interface	• External encoder input for wheel sensor (Odometer) • GPS input (PPS pulse + NMEA message over RS232) • Linesync output (TTL pulse per profile) • Rotor sync in / out (angular movement of two parallel devices can be synchronized)

Power supply			
Input voltage	PROFILER: 20 - 30 V DC (24 V DC typ.), Inrush < 12A (@ 24 V) AC-Power supply: 100 – 240 V AC		
Power consumption Current @ 24 V / Speed	100 Hz	200 Hz	267 Hz
+20°C, speed up +20°C, scanning	2.8 A 1.9 A	5.6 A 3.5 A	7.9 A 5.0 A
-10°C, speed up -10°C, scanning	3.1 A 2.2 A	6.3 A 4.5 A	9.7 A 6.6 A

Ambient conditions	
Operating temperature	-10 °C ... +50 °C
Storage temperature	-20 °C ... +70 °C
Humidity	Non-condensing
Protection class	IP 55
Shock (either side)	70g max (shock sensor inside)

Dimensions and weight	
Dimensions (l x w x h) Weight	314 x 200 x 155 mm 6.5 kg
Mounting flanges [6]	Only bottom flange 2 x 6.02 mm / H7 register pins 4 x 6.6 mm holes for M6 x 25 mm mounting screws

1. Range Noise (1-Sigma interval) is specified at 136 KHz data rate, which is the standard data rate for Z+F noise specs.
2. RMS (Root Mean Squared): mean value of squared errors.
3. The actual data rate in KHz (1,000 pixel/sec.) is stated for each available setting. The Range Noise specs have to be multiplied by the stated factors, yielding the actual 1-Sigma range noise for a particular setting.
4. Continuous data recording at max. data rate of 1,094 million pixel/sec.
5. Data compression factor depends on scanned scene.
6. See manual for drawings.