

# Technical Data

The Z+F PROFILER 9012, a compact high-speed phase-based laser scanner with great precision, 119 m range and a 360° field of view. With its scan rate of more than 1 million points per second and maximum scan speed of 200 profiles/sec., very short distances between profiles can be achieved even at high platform speeds.

Laser system			
Laser class	1 (according to EN60825-1 / ANSI Z136.1)		
Beam divergence	< 0.5 mrad		
Beam diameter	Approx. 1.9 mm (at 0.1 m distance)		
Ambiguity distance	119 m (above, range reading restarts at zero)		
Minimum distance	0.3 m		
Range resolution	0.1 mm		
Data acquisition rate	Max. 1.016 million pixel/sec.		
Linearity error	≤ 1 mm		
Range drift (full -10° C ... +45° C)	< 2 mm (without reference) < 0.3 mm (with ref.)		
Accuracy			
Target Distance	White (80%) <sup>1</sup>	Grey (37%) <sup>1</sup>	Black (14%) <sup>1</sup>
1 Sigma Range Noise, 0.3 m	0.5 mm	0.8 mm	1.3 mm
1 Sigma Range Noise, 2 m	0.3 mm	0.5 mm	0.8 mm
1 Sigma Range Noise, 5 m	0.3 mm	0.4 mm	0.6 mm
1 Sigma Range Noise, 10 m	0.2 mm	0.3 mm	0.5 mm
1 Sigma Range Noise, 25 m	0.4 mm	0.6 mm	1.1 mm
1 Sigma Range Noise, 50 m	0.9 mm	1.4 mm	3.1 mm

Deflection unit	
Deflection system	Completely encapsulated, rotating mirror
Vertical field of view	360° un-obstructed
Angular resolution	0.0088°
Angular accuracy	0.02° rms <sup>2</sup>
Rotation speed	50 Hz up to 200 Hz (max. 12,000 rpm)

Settings			
Spindle Speed	200 Hz (12,000 rpm)	100 Hz (6,000 rpm)	50 Hz (3,000 rpm)
Pixel/360°	Data rate / x noise factor <sup>3</sup>	Data rate / x noise factor <sup>3</sup>	Data rate / x noise factor <sup>3</sup>
20,480	---	---	1016 KHz / x 2.8
10,240	---	1016 KHz / x 2.8	508 KHz / x 2.0
5,120	1016 KHz / x 2.8	508 KHz / x 2.0	254 KHz / x 1.4

# Z+F PROFILER 9012

Interfaces	
Data storage	Internal 64 GB flash card, 2 x external 64 GB USB flash drive
Data interface	1 GB Ethernet 2 x USB-2.0 (for removable memory sticks)
Data recording time <sup>4</sup>	4h ... 6h for each 64 GB memory <sup>5</sup> 12h ... 18h in total for 3 x 64 GB PROFILER memory <sup>6</sup>
Control panel	Remote Controlbox for power on / off, emergency stop and display for status messages
Synchronization interface	<ul style="list-style-type: none"> <li>• External encoder input for wheel sensor (Odometer)</li> <li>• GPS input (PPS pulse + UTC message over RS232)</li> <li>• Linesync output (TTL pulse per profile)</li> <li>• Rotor sync in / out (angular movement of two parallel devices can be synchronized)</li> </ul>

Power supply	
Input voltage	PROFILER: 22 - 28 V DC (24 V DC typ.) Power supply: 100 - 240 V AC
Power consumption (24V)	7.0A @ 200Hz; 3.7A @ 100Hz; 3.0A @ 50Hz; 10.5A during rotor speed up

Ambient conditions	
Operating temperature	-10 °C ... +45 °C
Storage temperature	-20 °C ... +50 °C
Lighting conditions	All conditions, from bright sunlight to complete darkness
Humidity	Non-condensing
Protection class	IP 54

Dimensions and weight	
Dimensions (w x d x h)	320 x 260 x 340 mm
Weight	13.5 kg
Mounting flanges <sup>7</sup>	Flanges on bottom / left / right sides, consisting of: 2 x 6 mm -0.00 / +0.02 mm holes for orientation pins 6 x M6 x 10 mm threaded holes for mounting screws

1. Range Noise (1-Sigma interval) is specified at 127 KHz data rate, which is the standard data rate for any Z+F noise specs. However, these specs have to be converted to the appropriate data rate in KHz (1000 pixel/sec.), see table "settings". Detailed explanation on request - please contact info@zf-laser.com
2. RMS (Root Mean Squared): mean value of squared errors
3. The actual data rate in KHz (1000 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 1,016 million pixel/sec., (i.e. 200 Hz spindle speed, 5120 pixel/360° or 100 Hz spindle speed 10,240 pixel/360°)
5. Data compression factor depends on scanned scene
6. Data stream is automatically routed to empty memory in case the selected memory is full - 3 x 64 GB are available in total
7. Drawing provided upon request