



How we build reality



Z+F PROFILER® 9012
Datasheet



Z+F PROFILER® 9012

The Z+F PROFILER® 9012 is 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/sec. and scanning speed up to 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	
	Z+F PROFILER® 9012 Z+F PROFILER® 9012 A Z+F PROFILER® 9012 Z+F PROFILER® 9012 A Z+F PROFILER® 9012 Z+F PROFILER® 9012 A
Target Distance	White (80%) ¹ Grey (37%) ¹ Black (14%) ¹
1 Sigma Range Noise, 0.5 m ⁸	0.5 mm 0.8 mm 1.3 mm
1 Sigma Range Noise, 1 m	0.5 mm 0.3 mm 0.6 mm 0.4 mm 1.0 mm 0.8 mm
1 Sigma Range Noise, 2 m	0.3 mm 0.2 mm 0.5 mm 0.3 mm 0.8 mm 0.4 mm
1 Sigma Range Noise, 5 m	0.3 mm 0.2 mm 0.4 mm 0.3 mm 0.6 mm 0.5 mm
1 Sigma Range Noise, 10 m	0.2 mm 0.2 mm 0.3 mm 0.3 mm 0.5 mm 0.5 mm
1 Sigma Range Noise, 25 m	0.4 mm 0.4 mm 0.6 mm 0.6 mm 1.1 mm 1.1 mm
1 Sigma Range Noise, 50 m	0.9 mm 0.9 mm 1.4 mm 1.4 mm 3.1 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 ²
Rotation speed	50 Hz up to 200 Hz (max. 12,000 rpm)

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 (1,000 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 (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 1,016 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 stick is full – 2 x 32 GB are available in total
7. Technical drawing available upon request
8. Only specified for the Z+F PROFILER® 9012 A

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 ³	Data rate / x noise factor ³	Data rate / x noise factor ³
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

Interfaces	
Data storage	Internal 128 GB SATA, 2 x external 32 GB USB flash drive
Data interface	1 GB Ethernet 2 x USB-2.0 (for removable memory sticks)
Data recording time ⁴	2h ... 4h for each 32 GB memory ⁵ 4h ... 8h in total for internal 128 GB memory ⁶
Control panel	Remote Controlbox for power on / off, emergency stop and display for status messages
Synchronization interface	<ul style="list-style-type: none"> • External encoder input for wheel sensor (Odometer) • GPS input (PPS pulse + UTC 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: 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 natural conditions
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 ⁷	Flanges on bottom / left / right sides, consisting of: 2 x 6 mm holes for orientation pins 6 x M6 x 10 mm threaded holes for mounting screws

Additional technical specifications of the Z+F PROFILER® 9012M

Lasersystem in Marker Mode	
Laser class	<ul style="list-style-type: none"> • 3R (according to EN60825-1/ANSI Z 136.1), with active marker mode • 1 (according to EN60825-1/ANSI Z 136.1), without marker mode or with active marker mode at distances >2m (NOHD)*
Wave length	635 nm
Pulse duration	185 µs
Repetition rate	49 Hz
Peak output power	< 6 mW
NOHD (Nominal Ocular Hazard Distance)	2 m

All further technical data is similar to the standard Z+F PROFILER® 9012.

