

# 14

## Technical Data

### 14.1

### Angle Measurement

#### Accuracy

Available angular accuracies	Standard deviation Hz, V, ISO 17123-3	Display resolution			
		["]	[°]	[mgon]	[mil]
1	0.3	1	0.0001	0.1	0.01
2	0.6	1	0.0001	0.1	0.01
3	1.0	1	0.0001	0.1	0.01
5	1.5	1	0.0001	0.1	0.01
7	2	1	0.0001	0.1	0.01

#### Characteristics

Absolute, continuous, diametric. Updates each 0.1 to 0.3 s.

## 14.2 Distance Measurement with Reflectors

**Range**

Reflector	Range A		Range B		Range C	
	[m]	[ft]	[m]	[ft]	[m]	[ft]
Standard prism (GPR1)	1800	6000	3000	10000	3500	12000
3 prisms (GPR1)	2300	7500	4500	14700	5400	17700
360° prism (GPZ4, GPZ122)	800	2600	1500	5000	2000	7000
Reflector tape 60 mm x 60 mm	150	500	250	800	250	800
Mini prism (GMP101)	800	2600	1200	4000	2000	7000
360° Mini prism (GRZ101)	450	1500	800	2600	1000	3300

Shortest measuring distance: 1.5 m

**Atmospheric conditions**

Range A: Strong haze, visibility 5 km; or strong sunlight, severe heat shimmer  
 Range B: Light haze, visibility about 20 km; or moderate sunlight, slight heat shimmer  
 Range C: Overcast, no haze, visibility about 40 km; no heat shimmer

**Accuracy**

Accuracy refers to measurements to standard reflectors.

EDM measuring mode	Standard deviation ISO 17123-4		Measurement time, typical [s]
	<b>TS02 / TS06</b>	<b>TS09</b>	
Prism-Standard	1.5 mm + 2 ppm	1 mm + 1.5 ppm	2.4
Prism-Fast	3 mm + 2 ppm	3 mm + 1.5 ppm	0.8
Prism-Tracking	3 mm + 2 ppm	3 mm + 1.5 ppm	<0.15
Tape	5 mm + 2 ppm	5 mm + 1.5 ppm	2.4

Beam interruptions, severe heat shimmer and moving objects within the beam path can result in deviations of the specified accuracy.

**Characteristics**

Principle:	Phase measurement
Type:	Coaxial, visible red laser
Carrier wave:	658 nm
Measuring system:	System analyser basis 100 MHz - 150 MHz

## 14.3 Distance Measurement without Reflectors (Non-Prism mode)

**Range**

**Power Pinpoint R400 (without reflector)**

Kodak Gray Card	Range D		Range E		Range F	
	[m]	[ft]	[m]	[ft]	[m]	[ft]
White side, 90 % reflective	200	660	300	990	>400	>1310
Grey side, 18 % reflective	100	330	150	490	>200	>660

**Ultra Pinpoint R1000 (without reflector)**

Kodak Gray Card	Range D		Range E		Range F	
	[m]	[ft]	[m]	[ft]	[m]	[ft]
White side, 90 % reflective	600	1970	800	2630	>1000	>3280
Grey side, 18 % reflective	300	990	400	1310	>500	>1640

Range of Measurement: 1.5 m to 1200 m  
 Range of Measurement, FlexPoint: 1.5 m to 30 m  
 Display unambiguous: up to 1200 m

**Atmospheric conditions**

Range D: Object in strong sunlight, severe heat shimmer  
 Range E: Object in shade, or overcast

Range F: Day, night and twilight

**Accuracy**

Standard measuring	Standard deviation ISO 17123-4	Measure time, typical [s]	Measure time, maximum [s]
0 m - 500 m	2 mm + 2 ppm	3 - 6	12
>500 m	4 mm + 2 ppm	3 - 6	12

Beam interruptions, severe heat shimmer and moving objects within the beam path can result in deviations of the specified accuracy.

Tracking measuring*	Standard deviation	Measure time, typical [s]
Tracking	5 mm + 3 ppm	0.25

\* Accuracy and measure time depend on atmospheric conditions, target object and observation situation.

**Characteristics**

Type: Coaxial, visible red laser  
Carrier wave: 658 nm  
Measuring system: System analyser basis 100 MHz - 150 MHz

**Laser dot size**

Distance [m]	Laser dot size, approximately [mm]
at 30	7 x 10
at 50	8 x 20

**Technical Data**

**FlexLine, 275**

## 14.4 Distance Measurement Reflector (>3.5 km)

### Range

Ultra&Power (with reflector)	Range A		Range B		Range C	
	[m]	[ft]	[m]	[ft]	[m]	[ft]
Standard prism (GPR1)	2200	7300	7500	24600	>10000	>33000
Reflector tape 60 mm x 60 mm	600	2000	1000	3300	1300	4200

Range of measurement: From 1000 m up to 12000 m

Display unambiguous: Up to 12 km

### Atmospheric conditions

Range A: Strong haze, visibility 5 km; or strong sunlight, severe heat shimmer

Range B: Light haze, visibility about 20 km; or moderate sunlight, slight heat shimmer

Range C: Overcast, no haze, visibility about 40 km; no heat shimmer

### Accuracy

Standard measuring	Standard deviation ISO 17123-4	Measure time, typical [s]	Measure time, maximum [s]
Long range	5 mm + 2 ppm	2.5	12

Beam interruptions, severe heat shimmer and moving objects within the beam path can result in deviations of the specified accuracy.

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**Characteristics**

Principle:	Phase measurement
Type:	Coaxial, visible red laser
Carrier wave:	658 nm
Measuring system:	System analyser basis 100 MHz - 150 MHz

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**14.5****Conformity to National Regulations****14.5.1****Products without Communication side cover**

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**Conformity to national regulations**

Hereby, Leica Geosystems AG, declares that the instrument is in compliance with the essential requirements and other relevant provisions of applicable European Directives. The declaration of conformity may be consulted at <http://www.leica-geosystems.com/ce>.


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**14.5.2**

**Products with Communication side cover**

**Conformity to national regulations**

- FCC Part 15 (applicable in US).
- Hereby, Leica Geosystems AG, declares that the instrument with Communication side cover is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at <http://www.leica-geosystems.com/ce>.

 Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EEA Member state.

- The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.

**Frequency band**

2402 - 2480 MHz

**Output power**

Bluetooth: 2.5 mW

**Antenna**

Type: Mono pole  
Gain: +2 dBi



## 14.6

## General Technical Data of the Instrument

### Telescope

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Magnification:	30 x
Free Objective aperture:	40 mm
Focusing:	1.7 m/5.6 ft to infinity
Field of view:	1°30'/1.66 gon. 2.7 m at 100 m

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### Compensation

Quadruple axis compensation (2-axis compensator with Hz-collimation and V-Index).

Angular accuracy	Setting accuracy		Setting range	
["]	["]	[mgon]	[']	[gon]
1	0.5	0.2	±4	0.07
2	0.5	0.2	±4	0.07
3	1	0.3	±4	0.07
5	1.5	0.5	±4	0.07
7	2	0.7	±4	0.07

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### Level

Circular level sensitivity:	6'/2 mm
Electronic level resolution:	2"

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**Technical Data****FlexLine, 280**

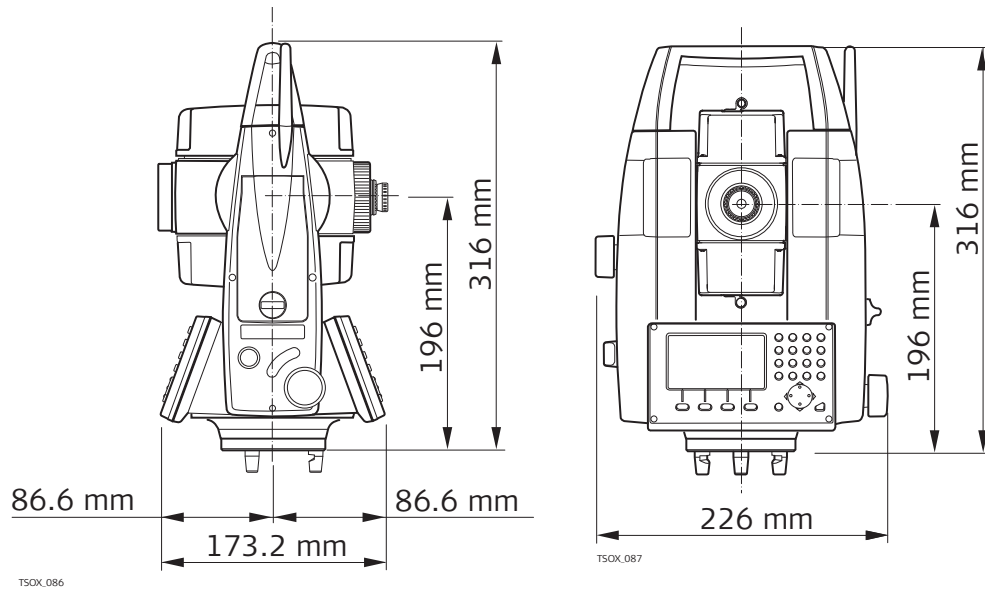
**Control unit**      Display:            280 x 160 pixels, LCD, backlit, 8 lines with 31 characters each, heatable (temp. < -5°).

**Instrument Ports**

<b>Name</b>	<b>Description</b>
RS232	5 pin LEMO-0 for power, communication, data transfer. This port is located at the base of the instrument.
USB host port*	USB memory stick port for data transfer.
USB device port*	Cable connections from USB devices for communication and data transfer.
Bluetooth*	Bluetooth connections for communication and data transfer.

\* Only for instruments fitted with a Communication side cover.

## Instrument Dimensions



## Weight

Instrument:	4.2 kg - 4.5 kg (depending on hardware configuration)
Tribrach:	760 g
Battery GEB211:	110 g
Battery GEB221:	210 g

## Tilting axis height

Without tribrach:	196 mm
With tribrach (GDF111):	240 mm ±5 mm

## Technical Data

**FlexLine, 281**

**Technical Data****FlexLine, 282****Recording**

Model	Memory Type	Capacity [MB]	Number of measurements
<b>TS02</b>	Internal memory	2	13,500
<b>TS06 / TS09</b>	Internal memory	10	60,000

**Laser plummet**

Type:	Visible red laser class 2
Location:	In standing axis of instrument
Accuracy:	Deviation from plumbline: 1.5 mm (2 sigma) at 1.5 m instrument height
Diameter of laser point:	2.5 mm at 1.5 m instrument height

**Power**

External supply voltage: (via serial interface)	Nominal voltage 12.8 V DC, Range 11.5 V-14 V
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**Battery GEB211**

Type:	Li-Ion
Voltage:	7.4 V
Capacity:	2.2 Ah
Operating time*:	approximately 10 hours

\* Based on a single measurement every 30 s at 25°C. Operating time may be shorter if battery is not new.

**Battery GEB221**

Type:	Li-Ion
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Voltage: 7.4 V  
 Capacity: 4.4 Ah  
 Operating time\*: approximately 20 hours

\* Based on a single measurement every 30 s at 25°C. Operating time may be shorter if battery is not new.

**Environmental specifications**

**Temperature**

Type	Operating temperature		Storage temperature	
	[°C]	[°F]	[°C]	[°F]
FlexLine instrument	-20 to +50	-4 to +122	-40 to +70	-40 to +158
Battery	-20 to +50	-4 to +122	-40 to +70	-40 to +158
USB memory stick	-40 to +85	-40 to +185	-50 to +95	-58 to +203


**Protection against water, dust and sand**

Type	Protection
FlexLine instrument	IP55 (IEC 60529)

**Humidity**

Type	Protection
FlexLine instrument	Max 95% non condensing. The effects of condensation are to be effectively counteracted by periodically drying out the instrument.

**Arctic model**

Operating range: -35°C to +50°C (-31°F to +122°F)  
 To minimise unavoidable slowdown of display performance for the Arctic option, switch display heating on and connect the external battery. Allow for a short warm-up time.

**Electronic Guide  
Light EGL**

Working range: 5 m to 150 m (15 ft to 500 ft)  
 Position accuracy: 5 cm at 100 m (1.97" at 330 ft)

**Automatic  
corrections**

The following automatic corrections are made:

- Line of sight error
- Tilting axis error
- Earth curvature
- Standing axis tilt
- Vertical index error
- Refraction
- Compensator index error
- Circle eccentricity