

Trimble 3600-series

User Guide



Part no.: 571 703 001



1	Introduction	Dear Customer..... 1-1
		The system philosophy 1-1
		Important notes..... 1-2
2	Trimble 3600	Hardware overview2-2
	The System In-	Hardware overview 2-2
	strument	Control Unit 2-3
	Description	Options..... 2-3
		DR Version Direct Reflex EDM and Laser Poin- ter (Option)..... 2-4
		Additional trigger key..... 2-5
		Laser Plummet (Option) 2-5
		PositionLight (Option) 2-6
		Safety Notes.....2-7
		Risks in use 2-7
		Laser beam safety 2-8
		Laser beam safety Laser Plummet 2-9
		Laser beam safety Position Light..... 2-10
		Laser beam safety Infrared-Interface..... 2-10
		Laser beam safety EDM in Direct Reflex Mode 2-11
		Laser beam safety EDM in Prism Mode 2-11
		Laser beam safety Laser Pointer 2-12
		Laser beam safety hints on the instrument 2-12
		Technical Data.....2-13
		Trimble 3602 Trimble 3603..... 2-13
		Electromagnetic Compatibility (EMV) 2-16
		Battery Charger LG 20..... 2-17
		Charging the battery 2-18
		Instructions for Maintenance and Care... 2-19



Dear Customer

By purchasing a Trimble™ 3600 series total station you have opted for a leading-edge product in the field of surveying instruments.

We congratulate you on your choice and would like to thank you for the trust placed in our company.

The system philosophy

Surveying today is no longer confined to the measurement of angles and distances. A demand now exists for complex measuring systems which not only meet the increasing requirements for automatization, digital data processing and last but not least efficiency in everyday surveying, but which also set new standards in technology and operating convenience.

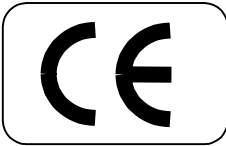
The Trimble 3600 series total stations are part of a complete range of surveying instruments from Trimble. The operating convenience offered by the Trimble 3600 hardware is unique in total stations. The large graphic display and handy keyboard give the user a high degree of flexibility for the processing of the wide variety of information in the measurement dialog.

The different Control Units meet all requirements.

Important notes

⚠ Attention !

Please read the safety notes in chapter 2 carefully before starting up the instrument.



The instrument was manufactured by tested methods and using environmentally compatible quality materials.

The mechanical, optical and electronic functions of the instrument were carefully checked prior to delivery. Should any defects attributable to faulty material or workmanship occur within the warranty period, they will be repaired as a warranty service.

This warranty does not cover defects caused by operator errors or improper handling.

Any further liabilities, e.g. for indirect damages, cannot be accepted.

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Tip

The type label and serial number are provided on the left-hand side and underside of the instrument respectively. Please note this data and the following information in your user manual. Always indicate this reference in any inquiries addressed to our dealer, agency or service department:

Instrument:

- Trimble 3602
- Trimble 3603

Control Unit

- Zeiss Elta
- CU 600 numeric
- CU 600 alphanumeric.

Serial number:

If you have any software-related questions (CU Zeiss Elta only), please also state the version of the relevant software package installed in your instrument:

Software version:

Please note your autoauthorisation code for the software packages::

Basic

Professional

Professional Plus!

Expert

Special

We would like to wish you every success in your work with your Trimble 3600. If you need any help, we will be glad to be of assistance.

Yours



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This chapter gives you an overview of the instrument hardware.

It describes the operation and controls of the instrument as well as the sensors and peripheries which are a special feature of the Trimble 3600 total stations.

Instrument Description

Safety Notes

Technical Data

Instrument Description

Hardware overview

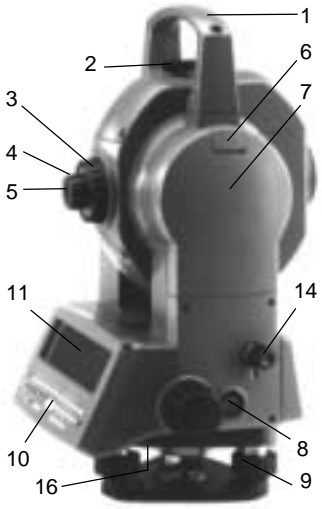


Fig. 1: Trimble 3600

- 1 Handle
- 2 Sighting collimator
- 3 Telescope focusing control
- 4 Crosshair focusing control
- 5 Eyepiece
- 6 Battery clamp
- 7 Battery
- 8 Trigger key for measurement
- 9 Tribrach with footscrews
- 10 Keyboard
- 11 Display (graphical, 320 x 80 pixel)
- 12 Telescope with integrated electro-optical distance meter

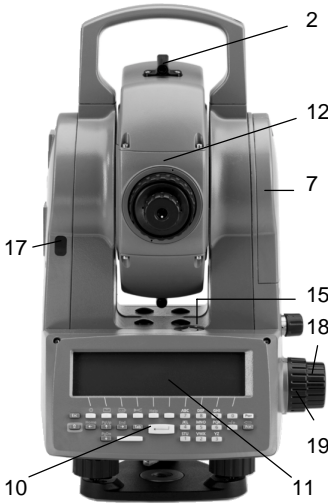


Fig. 2: Trimble 3600

- 14 Optical plummet
- 15 Circular level
- 16 RS232C (V24) cable interface and external battery port (with Zeiss Elta only)
- 17 Serial infrared interface (with Zeiss Elta only)
- 18 Quick Drive Fine coarse Hz
- 19 Quick Drive Fine coarse V
- 20 Position Light



Instrument Description

Control Unit

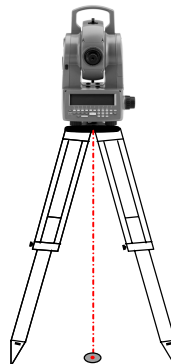
The instruments are each available in three configurations, with the following features being standard in all versions:

- Zeiss Elta CU
MS-DOS® PC with 486 processor,
Graphic display with 320x80 pixel, Infra-
red interface for wireless data trans-
fer
- CU 600 numeric (removable)
Graphical LCD display with 4 lines and 20
columns illuminated. 22 keys.
- CU 600 alphanumeric (removable)
Graphical LCD display with 4 lines and 20
columns illuminated. 33 keys.

Options



- Optical plummet for instrument centering
- Position Light - the optical aid for aligning the prism in setting out.
- Laser plummet – for centering the instrument by the help of a laser pointer.



Instrument Description

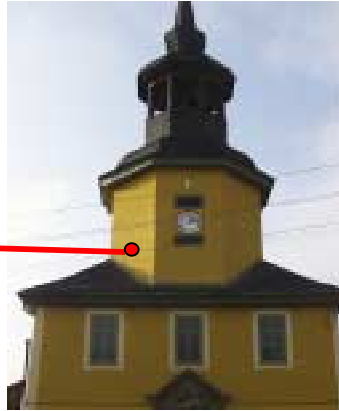
DR Version

Direct Reflex EDM and Laser Pointer (Option)

A instrument with known Prism Mode (PR) is equipped with:

- Direct Reflex Mode (DR) with Laser Pointer

DR – Mode (Option) - measurement without prism



Prism - Mode (Standard) - measurement with prism



Additional trigger key



Additional
trigger key

The key located on the right-hand side of the instrument, below the motorized drives, permits you to trigger measurements. This is particularly useful when measuring in the reverse position.

Laser Plummet (Option)

The Laser Plummet is used to center the instrument over a station point. The plummet is a Laser Pen with an additional optical element which illustrates a center circle on the ground. The instrument has to be moved on the tripod head for centering over the station point.

The Laser Center Circle has a diameter of 45 mm at an instrument height of 1,5 m.

Attention!

Never look directly into the laser beam!
Please read the given warnings and hints for laser beam safety in this chapter.

Position Light (Option)



Position Light

Light

Position Light is the optical aid for aligning the prism in setting out. Position Light helps to find the setting out position by optical illumination signals.

Seen from the prism poll means:

green Position Light: left from the point

red Position Light: right from the point

If the setting out direction ($da=0$) is reached, the green light is very closed to the red light (merging).

If distance-tracking is switched on and the setting out direction is reached, you can control the length differences by the help of the Position Light blink-frequency. (Zeiss Elta Control Unit Only)

Light signals:

fast blinking: in front of the point

slower blinking: behind the point

In the left figure the setting out positions 1- 4 will be shown on the prism poll as follows:

1 green light

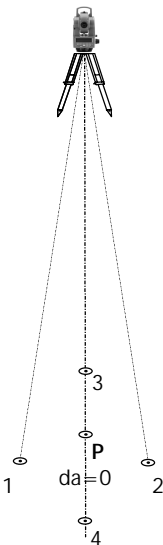
2 red light

3 signal fast blinking

4 signal slowly blinking

P Set out point, constant light, green-red

At a distance of ± 10 cm to the setting out point P Position Light has a constant light signal.



Risks in use



Instruments and original accessories from Trimble must only be used for the intended purpose. Carefully read the manual before the first use and be sure to comply with the safety notes.

Attention !

- Don't make any changes or repairs on the instrument and accessories. This must be done only by a service team or by authorized technical staff.
- Do not point the telescope directly at the sun.
- Make sure to strictly observe the following instructions regarding the use of the laser devices.
- Operate the instrument as described in this manual to avoid your fingers being caught between the handle and the telescope body or between the telescope and the uprights. The forces occurring lie below the threshold for potential injury.
- Do not operate the battery charger and PC card reader in humid conditions (risk of electrical shock). Make sure the voltage setting is identical on the battery charger and voltage source. Do not use instruments while they are wet.
- Check that the instrument has been correctly set up and the accessories are properly secured.
- Take the necessary precautions at your measuring site in the field, note the relevant traffic rules.



⚠ Attention !

- Check your instrument at regular intervals in order to avoid faulty measurements, especially after it has been subjected to shock or heavy punishment.
- The instrument and accessories must only be opened by a service team or by authorized technical staff.
- Remove the batteries in case of unloading or a longer time without using the instrument.
- Properly dispose of the batteries and equipment taking into account the applicable national regulations.
- Do not use destroyed plugs and cables for accessories with the instrument.
- Do not use the instrument and accessories in rooms with danger of explosion.

Laser beam safety

If used for the intended purpose, and if correctly operated and properly maintained, the lasers provided in the instruments are not hazardous to the eye.

⚠ Attention

Repairs must only be performed at a service workshop authorized by Trimble.

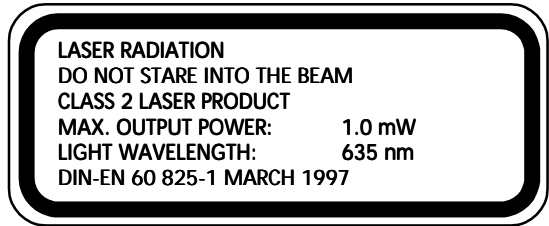
Safety Notes

Laser beam safety

The Laser Plummet produces a visible laser beam emerging from vertical axis below the instrument. Conforms to Class 2 in acc. with DIN- EN 60 825 - 1: March 1997 "Safety of laser devices".

Laser Plummet

- Beam divergence: 3.5 mrad
 - Pulse duration: 17.5 ms (dimming) *)
 - Max. output power: 1.0 mW
 - Wavelengths: 635 nm
 - Measuring uncertainty: $\pm 5\%$
 -
- *) not for Trimble 3600 Zeiss Elta



⚠ Attention !

Direct viewing of the beam must be avoided under all circumstances!

A shortly protection is given by the eyelid close reflex.

Safety Notes

Laser beam safety

Position Light produces visible LED light emerging from an objective above/below the telescope objective. Conforms to Class 2 in acc. with DIN- EN 60 825 - 1: March 1997 "Safety of laser devices".

Position Light

⚠ Attention !

Direct viewing of the beam at a distance of less than 1 m from the instrument must be avoided under all circumstances.

A shortly protection is given by the eyelid close reflex.

- Beam divergence: 80 mrad
 - Pulse duration: 0.05 – 0.5 ms (blinking) *)
 - Max. output power: 0.8 mW 0.065 mW
 - Wavelengths: 645 nm 570 nm
 - Measuring uncertainty: $\pm 5\%$
- *) for 3600 Zeiss Elta only



LED RADIATION
DO NOT STARE INTO THE BEAM
CLASS 2 LED
MAX. OUTPUT POWER: 0.8 mW 0.065 mW
LIGHT WAVELENGTH: 645 nm 570 nm
DIN-EN 60 825-1 MARCH 1997

Laser beam safety

The infrared-interface produces invisible infrared-light emerging at the two windows on the left instrument side. Conforms to Class 1 in acc. with DIN- EN 60 825 - 1: March 1997 "Safety of laser devices".

Infrared-Interface

- Beam divergence: 840 mrad
- Pulse duration: 1.627 μ s
- Max. output power: 400 mW / sr
- Wavelength: 890 nm
- Measuring uncertainty: $\pm 5\%$

Class 1 LED

Safety Notes

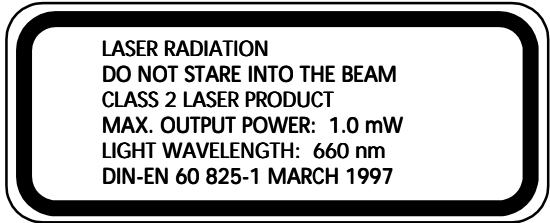
Laser beam safety

The EDM in Direct Reflex Mode produces visible Laser light emerging at the center of the telescope objective. Conforms to Class 2 in acc. with DIN- EN 60 825 - 1: March 1997 "Safety of laser devices".



EDM in Direct Reflex Mode

- Beam divergence: 0,4 mrad
- Pulse duration: 3 ns
- Max. output power: 1 mW
- Wavelength: 660 nm
- Measuring uncertainty: $\pm 5 \%$



⚠ Attention !

Direct viewing of the beam must be avoided under all circumstances.

A shortly protection is given by the eyelid close reflex.

Laser beam safety

The EDM in Prism Mode produces visible Laser light emerging at the center of the telescope objective.

Conforms to Class 1 in acc. with DIN- EN 60 825-1: March 1997 "Safety of laser devices".

EDM in Prism Mode

- Beam divergence: 0,4 mrad
- Pulse duration: 3 ns
- Max. output power: 17 μ W
- Wavelength: 660 nm
- Measuring uncertainty: $\pm 5 \%$



Safety Notes

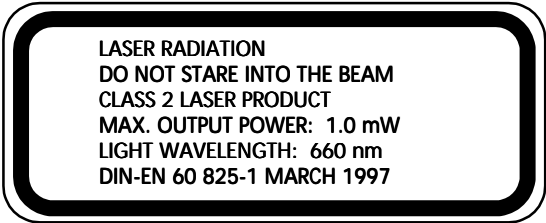
Laser beam safety

The Laser Pointer produces visible Laser light emerging at the center of the telescope objective.
Conforms to Class 2 in acc. with DIN- EN 60 825 - 1: March 1997 "Safety of laser devices".



Laser Pointer

- Beam divergence: 0,4 mrad
- Pulse duration: 3 ns
- Max. output power: 1 mW
- Wavelength: 660 nm
- Measuring uncertainty: $\pm 5 \%$



⚠ Attention !

Direct viewing of the beam must be avoided under all circumstances.

A shortly protection is given by the eyelid close reflex.

Laser beam safety hints on the instrument

The Laser beam safety notes are given at the button of the instrument and near the telescope objective.



Accuracy as per DIN 18723

Angle measurement	0.7 mgrad (2")	1.0 mgrad (3")
Smallest last unit		0.01 mgrad
Distance measurement		
PR Normal	2 mm + 2 ppm	
PR Rapid	3 mm + 2 ppm	
PR Tracking	5 mm + 2 ppm	
DR Normal	3 mm + 2 ppm	
DR Rapid	5 mm + 2 ppm	
DR Tracking	10 mm + 2 ppm	

Telescope

Magnification	30 x
Aperture	1.2°
Field of view at 100 m	2.2 m
Shortest sighting	1.5 m

Angle measurement

H _z - and V-circles	electronic, absolute
Measuring units	360° (DMS, DEG), 400 grads, 6400 mils
Vertical reference systems	zenith-, height and vertical angle , slope in percent

Distance measurement

Method	electro-optical, modulated infrared light
Transmitter/Receiver optics	coaxial, in telescope
Resolution	0.1 mm
Divergenz	0.4 mrad
Measurement time	
PR Normal*)	< 2.0 s
PR Rapid *)	< 1.8 s
PR Tracking*)	< 0.4 s
DR Normal*)	< 3.0 s
DR Rapid *)	< 2.0 s
DR Tracking*)	< 0.8 s

*) depending from the measurement conditions

Measuring range

Prism Mode

one prism	2500 m
3 prisms	5000 m
Reflexfoil 20 x 20 mm ²	100 m
Reflexfoil 60 x 60 mm ²	250 m

Measuring range

Direct Reflex Mode

one prism	5000 m
3 prisms	7500 m
Reflexfoil 20 x 20 mm ²	200 m
Reflexfoil 60 x 60 mm ²	800 m
Kodak gray card 18% Reflex	80 m ^{*)}
Kodak white card 90% Reflex	120 m ^{*)}

^{*)} depends on the light conditions at the target

Levelling

Circular level	8/2 mm
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Compensator

Type	dual axis compensator
Working range	5'
Accuracy	0.3"

Hardware Features

Position Light	Option
Internal PC (Zeiss Elta only)	486er MS-DOS® PC
Data Recording Zeiss Elta	Internal Memory > 4 MB
Data Recording CU 600	Up to 8000 points.
Data Transfer Zeiss Elta	IR Interface ,
Data Transfer CU 600	RS232 Slip Ring via Keyboard Com1 RS2232

Display screen / keyboard

Zeiss Elta	8 lines by 40 columns, CGA graphic display (320x80 pixels), illuminated, 28 keys optional 2nd display face available
Cu 600 numeric	22 keys; 4 line LCD 20 character / line; illuminated
CU 600 alphanumeric	33 keys 4 line LCD 20 character / line; illuminated

Centering and Positioning

Coarses	Co-axial, friction clamp with endless fine coarse
Centering	Zeiss / Wild
Optical Plummet	Option
Laser Plummet	Option

Power Supply

Charging with LG 20 of an empty	Internal: NiMH battery pack 6 V/3.5 Ah; External: NiCd battery 6 V/7.0 Ah; internal battery takes approx. 1.5 hours external battery takes 3.5 hours
---------------------------------	---

Operating temperatures

-20°C to +50°C

Dimensions

Instrument (WxHxD)	220 x 370 x 185 mm
Trunnion axis height with DIN centering spigot/ Wild centering	175 mm/ 196 mm

Weight

Zeiss Elta	< 6,7 kg
CU Geodimeter	< 6,7 kg

Electromagnetic Compatibility (EMV)

Die EU Conformity Declaration confirms the perfect function of the instrument in an electromagnetic environment.

⚠ Attention !

Computers and radio devices connected to the Trimble 3600 which are not part of the Trimble System delivery, have to meet the same EMV requirements in order to ensure that the overall configuration complies with the applicable interference suppression standards.

Interference suppression as per:
EN 55022 class B

Noise immunity:
EN 50082-2

🔑 Tip

Strong magnetic fields generated by mid and low voltage transformer stations possibly exceed the check criterions. Make a plausibility check of the results when measuring on such conditions.

Battery Charger LG 20

Battery Management

Electrical and thermo-mechanical fuses protect instrument and battery during the operation and the battery during the charging process.

Change of battery after warning:
connect a charged external battery and remove the empty internal battery from the instrument (or vice versa for empty external battery). Switch the instrument off for as long as the power supply is interrupted for the battery change.

Technical Data

LG 20 Universal charger for NiCd-/NiMH cells of safety class II with

nominal capacity: 0.5 Ah to 7 Ah.

input: 230 V \pm 10 % 50 Hz or DC 12 V

output: 9.00 V; 800 mA or
2000 mA DC, resp.

Safety Notes

⚠ Attention!

Please, read and observe these operating instructions before using the LG 20!

Protect the LG 20 against humidity, use it in dry rooms only.

Only the service or authorized specialists are allowed to open the LG 20.

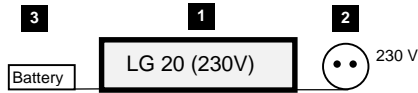
Charge temperature range: 5° to 45°C; optimum: 10° to 30°C.

Charge parameters (nominal charging time, charging current) set automatically by a coding resistor (in battery pack) \Rightarrow no overcharging, protection of instrument and battery.

For operating the LG 20/1 with a 12 V battery, the cable (70 84 10 - 000.000) with integrated fuse link delivered by the manufacturer is to be used unconditionally!

Charging the battery

Connect the power source with the battery demonstrated in the follow picture.. Note, that the voltage of the charging unit is identical with the power source.



Charging start



LED flashing 3x yellow
Starting

Charging procedure



LED flashing green (max. 1.5 h)

Charging of a fully charged battery:
the charging process is stopped after
approx. 5 minutes. If the temperature
is too high or too low the charging
process is stop automatically



LED continuously lit red

the charging process is stopped;
if the charging temperature range is
reached again the charging process is
resumed

End of charging process



LED continuously green lit
Trickle charge



Tip

The batteries cannot be overcharged.

LED continuously yellow lit

Stand-by mode (no battery con-
nected)

Instructions for Maintenance and Care

Instrument	<p>Allow sufficient time for the instrument to adjust to the ambient temperature.</p> <p>Use a soft cloth to remove dirt and dust from the instrument.</p> <p>When working in wet weather or rain, cover the instrument during longer breaks with the protective hood.</p>
Object lens and eyepiece	<p>Clean the optics with special care using a clean and soft cloth, cotton wool or a soft brush, do not use any liquid except pure alcohol.</p> <p>Do not touch the optical surface with the fingers.</p>
Prisms	<p>Steamed prisms must have sufficient time to adjust to the ambient temperature. Remove afterwards the moisture using a clean and soft cloth.</p>
Transportation	<p>For transportation over long distances, the instrument should be stored in its case.</p> <p>When working in wet weather, wipe the instrument and case dry in the field and let it dry completely indoors, with the case open.</p> <p>If, for the purpose of changing the station, the instrument with the tripod is transported on the shoulder, please make sure that instrument and person will not be damaged or injured.</p>
Storage	<p>Let wet instruments and accessories dry before packing them up.</p> <p>After a long storage, check the adjustment of the instrument prior to use.</p> <p>Observe the boundary values for the temperature of storing, especially in the summer (interior of the vehicle).</p>





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