Trimble DiNi® 12, 12T, 22
Short Form User Guide

www.trimble.com

◈ **Trimble**™

Welcome to DiNi®

By purchasing a Digital Level from Trimble™ 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.

These abridged instructions are intended to serve as start-up aid for you. Please find more detailed descriptions in the full Operating Instructions.

Good luck.

- Do not point the telescope directly at the sun.

- Do not use the instrument and accessories in rooms with danger of explosion.

- Operate the instrument only in the compliance with the operating conditions specified.

- Protect operator and instrument sufficiently at the site of measurement (e.g. construction site, roads, etc.). Observe any relevant national regulations and the Road Traffic Act.

- Tread tripod legs firmly into the ground to prevent sinking in and falling over of the instrument by wind pressure.

- Mount the instrument to the tripod using the tripod screw immediately after you take the instrument from its case. Never leave the instrument placed loosely only on the tripod head. After loosening the tripod screw, immediately store the instrument in its case.

- Don't make any changes or repairs on the instrument and accessories. This must be done only by a service team or by authorised technical staff.

- When you work with staves in the vicinity of electric plants (e.g. electric railways, aerial lines, transmitting stations, etc.) your life is acutely endangered. This risk exists independent of the staff material (e.g. aluminium or wood). In such cases it is necessary to inform the competent and authorised safety authorities and observe their instructions.

● Don't use the instrument too long when it is raining. During breaks, cover the instrument with the protective hood. Wipe the instrument and case dry in the field and let it dry completely indoors, with the case open.

● In a thunderstorm, don't carry out surveying work to avoid being struck by a lightning.

● Remove the batteries in case of unloading or a longer time without using the instrument. Recharge the batteries with LG 20 battery charger.

● Properly dispose of the batteries and equipment taking into account the applicable national regulations. Prevent improper use of the disposed instrument by proper disposal.

● Before every use of the instrument, verify that it is in perfect condition, particularly after longer transportation, fall or any other improper use. Systematic check measurements particularly before and after extensive surveying projects will help to avoid erroneous measurements.

● 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.

● The magnetic PC Card cover should always be in place to stop environment damage (water, dust).

● Do not use destroyed plugs and cables for accessories with the instrument.

Contents

Standard deviation as per DIN 18723	DiNi® 12	DiNi® 22	DiNi®12T
Standard deviation on 1 km of double levelling Electronic measurement:			
- invar precision barcode staff	0.3 mm	0.7 mm	0.3 mm
- foldable bar code staff	1.0 mm	1.3 mm	1.0 mm
Visual measurement:			
- foldable staff, metric scale	1,5 mm	2.0 mm	1,5 mm

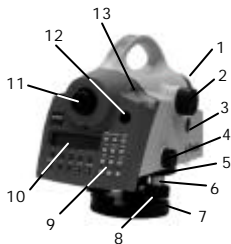## DiNi® 12

- Graduated circle, external
- Exchangeable PCMCIA Card

DiNi® 12 T

- Elektronic circle
- Exchangeable PCMCIA Card

DiNi® 22

- Graduated circle, external
- Internal data memory

1   Telescope objective with integrated sunshield

2   Telescope focusing control

3   Trigger key for measurement

4   Horizontal tangent screw (endless slow motion drive)

5   Graduated circle, external (DiNi® 12, 22)

6   PCMCIA Card plug-in module (DiNi® 12, 12 T)

7   Tribrach

8   Footscrews

9   Keyboard

10 Display

11 Eyepiece

12 Window for circular bubble

13 Cap, to be removed for adjustment of circular bubble

14 Battery compartment

15 15 Sight vane (notch and bead sights)

16 PCIMCIA Card in the plug-in module (DiNi® 12, 12 T)

- 1 Input
  - 1 max. sighting distance
  - 2 min. sighting height
  - 3 max. station difference
  - 4 Refraction coefficient
  - 5 Addition constant (offset)
  - 6 Date   (DiNi® 12)
  - 7 Time (DiNi® 12)
- 2 Adjustment
- 3 Data transfer
  - 1 Interface 1
  - 2 Interface
  - 3 PC-Demo
  - 4 Update/Service
- 4 Setting of recording
  - 1 Recording data
  - 2 Parameter setting
- 5 Instrument settings
  - 1 Height
  - 2 INP function
  - 3 Display L
  - 4 Shut off
  - 5 Acoustic signal
  - 6 Language
  - 7 Date (DiNi® 12)
  - 8 Time (DiNi® 12)
- 6 Line adjustment (DiNi® 12)

```
├──── 1 Input
│            .......
├──── 2 Adjustment
│            .......
├──── 3 Data transfer
│            .......
├──── 4 Setting of recording
│            .......
├──── 5 Instrument settings
│         ├──── 1 Display L
│         ├──── 2 Display E
│         ├──── 3 Shut off
│         ├──── 4 Acoustic signal
│         ├──── 5 Language
│         └──── 6 Contrast
├──── 6 Set instrument units
│         ├──── 1 Height in
│         ├──── 2 INP function
│         ├──── 3 Direction in
│         ├──── 4 Coordinate System
│         ├──── 5 Coordinate Display
│         ├──── 6 Data
│         └──── 7 Time
└──── 7 Line adjustment
```
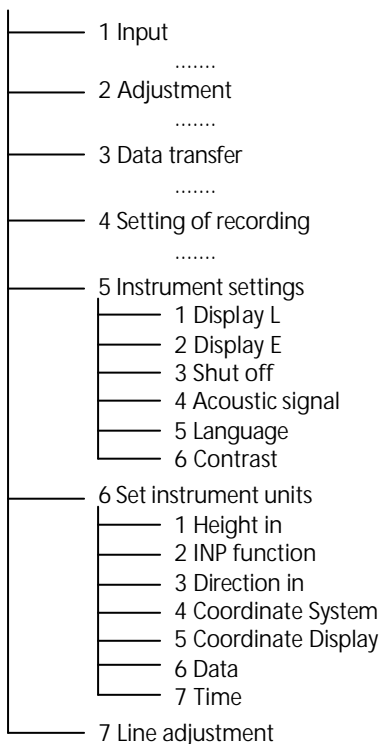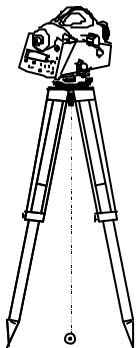
.... DiNi® 12 and 22

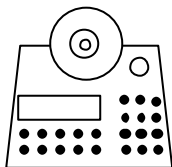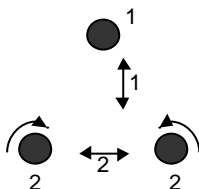## Setting up and switching on

Set-Up

Set up the tripod securely

Remove instrument from container

Place instrument on tripod and screw down tightly (tripod retaining screw)

Move bubble into the centre of the circular level (tripod foot screws)
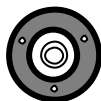
Switching on

⬤ ON/OFF   Press button

Requirements: Battery charged
Memory Card inserted

DiNi® 12 and DiNi® 22

Main menu

```
Normalmess. Punkt
Nivel.-Mode
          P :        1
Zus  ZW  Abst
```

Switching on/off

Measurment   Editor

DiNi® 12T

Main menu

```
Normalmess. Punkt
Tachym.-Mode
Hz simultan P :        1
Zus  ZW  Abst
```

Switching on/off

Measurement   Editor

Measure mode
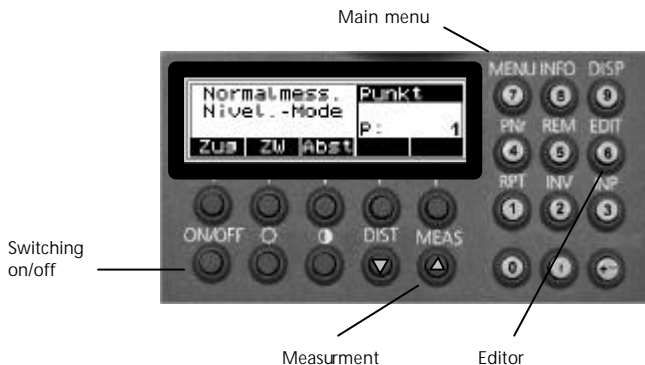
Normal rod	Point
measurement	
→ MEAS	P: 2
Line Intv Sout	
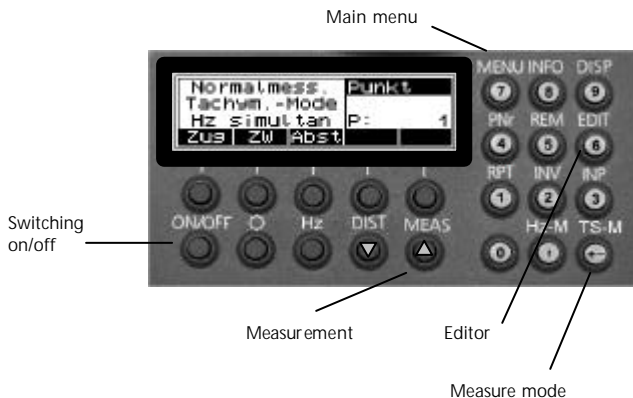
Start Screen

Setting recording

○ 7 MENU   Call up Main Menu:

| ↑ 2 ADJUSTMENT |
| 3 DATA TRANSFER |
| ↓ 4 SET REC. PARAM. |
| ESC | ↑ | ↓ | | YES |

Select from menus in this way

Ý **ß**	Scroll through menu
Yes	Select marked entry
ESC	Return to previous menu
	or
MOD	Change entry
	or
└──	Change softkeys

| **Ý** **ß** | 4 | SET REC. PARAM. |
| **Yes** | | |

Normal rod
measurement Point
→ MEAS P: 2
Line Intv Bout

The following settings are requirements for subsequent line adjustment!

DiNi® 12 and 22 only:

Yes	1	RECORDING OF DATA	
MOD	2	RECORD	PC Card or iMEM
ESC	3	ROD READINGS	RMC

Return

DiNi® 12T only:

Yes	1	RECORDING OF DATA	
MOD	2	RECORD	PC Card
ESC	Return		

and

○ +- TS-M Set Measure Mode

MOD	1	MODE	Level
MOD	2	REG:- DATA	R,HD,Z
ESC	Return		

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```
Normal rod  Point
measurement
  → MEAS     P:    2
Line Intm SOut
```
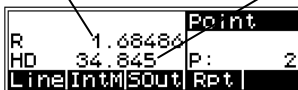
Intermediate sight   Stake out

Without reference height

⦿ MEAS   Initiate measurement – *Repeatable as often as desired*

Staff reading   Horizantal distance

```
              Point
R     1.6848
HD  34.845     P:    2
Line Intm SOut Rpt
```

With reference height

Intm   Start intermediate sight

Input benchmark height:

```
Inp benchmark height
  Z = 100.00000  m
ESC PRJ        ?  o.k.
```

o.k.

Enter counter values in this way

0,1,....9	Use number keys
Ü	Correct input
o.k.	Confirm input

⦿ MEAS   Measure backsight point

o.k.   Confirm measured value

Height difference to the Backsight point

Height of the particular point

```
┌─────────────────────────┐
│Z   99.86715│IntM        │
│h   -0.13285│            │
│HD  28.357  │P:        2 │
│ESC │    │    │Rpt│      │
└─────────────────────────┘
```

○ 9 DISP   Browse values

       A: Further measurements
       B: Return

Stake out the height of a point

SOut	Start staking out
o.k.	Input benchmark height
○ MEAS	Carry out backsight measurement
o.k.	Confirm nominal value
	Input nominal elevation

```
┌─────────────────────────┐
│ Input nominal elev.     │
│  Z =  100.10000   m     │
│ ESC │PRJ│    │ ? │ o.k. │
└─────────────────────────┘
```

o.k.

○ MEAS   Initiate measurement

Actual height of point to be staked out   Visual rodreading

Nominal-actual deviation

```
┌─────────────────────────┐
│Z   100.10989│SOut       │
│dz  -0.00989 │    1.4388 │
│HD  35.234   │P:       1 │
│ESC │    │    │    │o.k.  │
└─────────────────────────┘
```

○ 9 DISP   Browse values

o.k.   Repeat until dz is sufficiently small
       A: Further nominal elevations
       B: Return

Generating a new project (DiNi® 12 and 12T only)

Call up edit mode

◎ 6 EDIT

```
Project    noname.dat
last address      1070
free memory        89%
ESC Disp Del  Inp PRJ
```

Select project management

PRJ

Yes

```
↑ 1 SELECT PROJECT
  2 NEW PROJECT
↓ 3 DATA FROM O. PRJ.
ESC   ↑    ↓      YES
```

Input name

```
Input projectname rst
                   uvw
    muster.dat     xyz
ESC NUM       ←   o.k.
```

— Present character set

Switch to

o.k.

Project name

```
Project    muster.dat
last address         0
free memory       100%
ESC       Inp PRJ
```

ESC

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Input alphanumeric characters in this way

abc, **ABC**, **NUM**	Switch to small, large, numeric
◉ ⇓ DIST.	Browse character set
◉ ⇑ MEAS	Browse character set
0,1,....9	Number keys for characters
ⴸ	Correct input
o.k.	Confirm input

```
Normal rod  Point
measurement
  → MEAS    P:      2
LineIn?Out
```

Start a new line

```
cont. line of Project
         continue line
            new line
ESC
```
New line

Line

new line

Input line number

```
Input line number
        8
ESC | ABC |      | ← | o.k.
```

o.k.

Select sequence of measurem. · Procedure:B/F etc.

```
Sequence of measurem.
    BF        BF..BF
MOD |      | ↑↓ |      | o.k.
```
Alternate:yes/no

o.k.

Input benchmark height

```
Inp benchmark height
Z =  100.00000    m
ESC | PRJ |      | ? | o.k.
```

o.k.

Input point number and point code

```
Inp point number
        1
ESC | ABC |      | ← | o.k.
```

o.k.

```
Input point code  | .AB
       AB         | CDE
                  | FGH
ESC | abc |      | ← | o.k.
```

o.k.

```
Z  100.00000 Back  1
              Tp:   1
              P:    1
LEnd
```

Measuring back and foresights

Height of line of sight

◉ MEAS backsight

```
Zi  101.93820 Fore  1
Rb    1.93820 Tp:   1
HD   25.750    Cp    1
LEnd IntM SOut Rpt
```

Next sight

DISP Browse values

Staff reading backsight

```
 Backsight 1  Fore  1
Rb    1.93820 Tp:   1
HD   25.750    Cp    1
LEnd IntM SOut Rpt
```

Repeat

◉ MEAS Foresight etc.

Wdhl Repeat measurement

Ending line

LEnd
Yes

```
End of line end with
closing benchmark ?
 NO            YES
```

Specify end of line as a benchmark height

```
Sh   -0.00220
dz    0.00220
Db 1667.65 Df 1616.36
ESC
```

Overall height difference

Nominal-actual deviation

Total back/foresight distances

20

Line interruption

```
Backsight 1 Fore    1
Rb    1.46756 Tp:    1
HD    35.478  Cp     2
LEnd IntM SOut Rpt
```

Intermediate sight   Stake out

Intermediate sight on the line

IntM	Start intermediate sight
◯ MEAS	Initiate measurement
ESC	Return

Staking out a height on the line

SOut	Start staking out
o.k.	Input nominal elevation
◯ MEAS	Initiate measurement
o.k.	Confirm result
	Continue with next height to be staked out
ESC	Return

Continue with last line

Line

```
cont. line of Project
        continue line
              new line
ESC
```

Select option

Continue
with line
levelling

```
Backsight 1 Fore    1
Rb    1.46756 Tp:    1
HD    35.478  Cp     2
LEnd IntM SOut Rpt
```

Continuing with a line from another project

◉ 6 EDIT

```
Project      noname.dat
last address        1070
free memory          80%
ESC Disp Del Inp PRJ
```

Call up
project,
confirm
project

```
 1 SELECT PROJECT
↓2 NEW PROJECT
 3 DATA FROM O. PRJ.
ESC   ↑    ↓      YES
```

Cont. Line
of Project

```
cont. line of Project
           continue line
               new line
ESC
```

Search for start line

Select
Option

?PNo

?Cod

?Adr

?LNo

o.k.

```
              adr:     1
Start-Line            BF
LNo :       7
ESC   ↑    ↓   ?↓   o.k.
```

Confirm end of line

```
              adr:    78
End-Line
LNo :       7
ESC   ↑    ↓   ?↓   o.k.
```

```
Z    154.69162 Back    1
               Tp:     2
               Cp      1
LEnd
```

Continue
with line
levelling

DiNi® 12 and 12T only

Line adjustments can only be performed if the levelling line has been completed and saved on the memory along with the intermediate heights.

In line levelling, a line is linked to points with known heights at the beginning and at the end so that the measured height difference can be compared with the nominal height difference.

The "line adjustment" program allows to spread the occurring difference over the individual staff stations proportionally to the sighting distances, obtaining adjusted heights as result.

◉ 7 MENU

Yes

```
↑ 5 SET INSTR. PARAM.
  6 LINE ADJUSTMENT
↓ 1 INPUT
ESC │  ↑  │  ↓  │    │YES
```

Search for start of line

i.e.

?ZNr

```
       Search for
       Start-Line

ESC │?PNo│?Cod│?Adr│?LNo
```

o.k.

```
              adr:     1
Start-Line           BF
LNo :        6
ESC │  ↑  │  ↓  │  ?  │
```

End of line is automatically found

o.k.

```
                      adr:1027
End-Line
LNo :        ò
ESC | ↑ | ↓ | ? | ok
```

Yes

```
    Line adjustment
    from adr.     1
    to    adr.  1627
NO |   |   | YES
```

```

       Line check

```

Input
benchmark
heights

```
Inp benchmark height
Z = 154.68900  m
ESC | PRO |   | ? | o.k.
```

o.k.

```
Input point code | .ab
                 | cde
       Adi.      | fgh
ESC | NUM |   | ← | o.k.
```
— Mark changed data

Start

```

      Line adjustment

```

End line adjustment

```
    Loop adjustment
        runs
       correct !
ESC |   |   |   |
```

ESC

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Besides entering of data it is possible to call up
the stored data from the memory for line levelling
and Staking out.
Call up the data in this way.

Select project

PRJ

```
Inp benchmark height
Z = 154.68900   m
ESC | PRJ |       | ? | o.k.
```

? To search in memory using specified criteria

Search for:
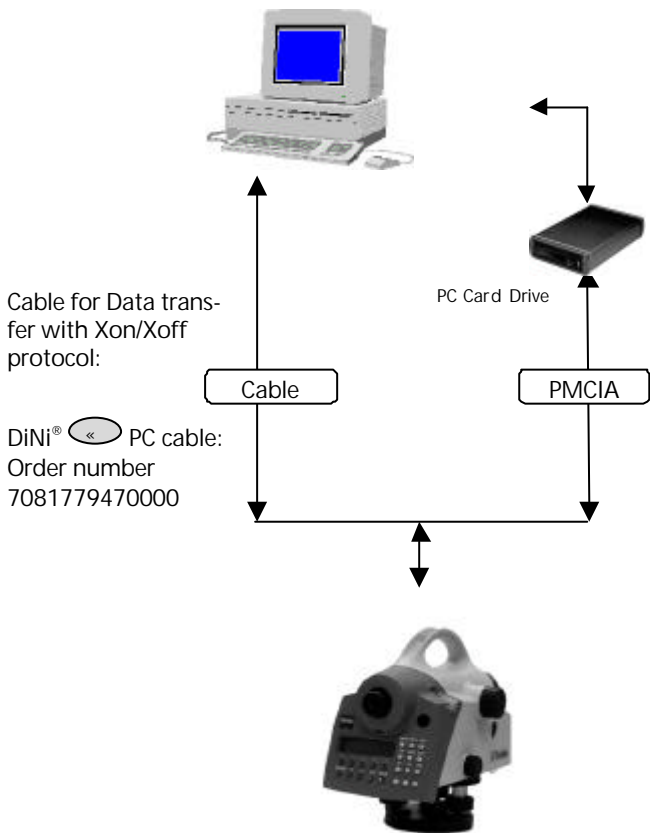Point number, point code or address

?PNr
?Code
?Adr

```
Inp benchmark height
Z = 0.00000   m
ESC |?PNo|?Cod|?Adr| o.k.
```

o.k. Confirm the height

Cable for Data transfer with Xon/Xoff protocol:

DiNi® « PC cable: Order number 7081779470000

PC Card Drive

Cable

PMCIA

Data transfer via cable

● 7 MENU

YES

```
↑ 2 ADJUSTMENT
  3 DATA TRANSFER
↓ 4 SET REC. PARAM.
ESC │ ↑ │ ↓ │ │ YES
```

Select interface

YES

```
↑ 4 UPDATE / SERVICE
  1 INTERFACE 1
↓ 2 INTERFACE 2
ESC │ ↑ │ ↓ │ │ YES
```

Select transfer direction

YES

```
  1 DiNi → PERIPHERY
↓ 2 PERIPHERY → DiNi
  3 SET PARAMETERS
ESC │ │ ↓ │ │ YES
```

Attention !
A requirement for transfer are identical parameters on the instrument and the peripheral device: format, protocol, baud rate, parity and stop bits.

i.e.

all

```
   Selection of data
   lines for transfer
        to COMP1
ESC │ all │ │ ? │
```

Start data transfer

YES

```
  Transfer data lines
     from adr.    1
     to   adr.   20
 NO │ │ │ │ YES
```

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Formatting a PC Card

With the DiNi® 12 and 12T it is possible to format a SRAM - PC Card.

○ 7 MENU

YES

```
↑ 2 ADJUSTMENT
  3 DATA TRANSFER
↓ 4 SET REC. PARAM.
 ESC │  ↑  │  ↓  │      │YES
```

YES

```
↑ 3 PC-DEMO        OFF
  4 UPDATE / SERVICE
↓ 1 INTERFACE  1
 ESC │  ↑  │  ↓  │      │YES
```

YES

```
  1 FORMAT PC Card
↓ 2 UPDATE DiNi

 ESC │     │  ↓  │      │YES
```

Attention !
Make sure to transfer the data stored in the PC Card to another storage medium beforehand, as all data in the memory is lost during formatting.

Adjustment

○ 7 MENU

The instrument adjustment defines the necessary corrections and correction values for the line sight of DiNi®, which are required to ensure optimum measuring accuracy.

YES

```
↑ 2 ADJUSTMENT
  3 DATA TRANSFER
↓ 4 SET REC. PARAM.
ESC | ↑ | ↓ |    | YES
```

Before starting any adjustment, allow the instrument to adapt to the ambient temperature.

Different Methods with identical result

	Situation
Förstner	 **A** **1** **2** **B** I 1/3 I 1/3 I 1/3 I
Nähbauer	 **1** **A** **B** **2** I 1/3 I 1/3 I 1/3 I
Kukkamäki	 **2** **A** 1 **B** I app. 20m I app. 20m I

After the selection of the adjustment method, you can change the settings of earth curvature and refraction. This is not possible at another point of the DiNi® menu system. Changes of earth curvature and refraction settings become effective only if you adjust the system afterwards. The line of sight will then be corrected accordingly.

with graphic help

○ MEAS

.....

Result

$\Delta c\_$:			$-1.1"$
Rpt			o.k.
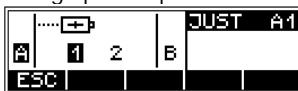
o.k.

If the new line of sight correction is adopted, the program requests the checking of the reticule alignment (for visual reading).

screw below the eyepiece - 1

Adjust horiz. line
R = 1.501
at rod A
ESC

1

Adjustment of circular bubble

Check the function of circular bubble:
By turning the instrument 180° round the vertical axis the circular bubble has to remain within the circle.

Adjustment of circular bubble:
Remove the screw (2) of the protection cap with the adjusting tool and detach the protection-cap.

Turn the instrument 180°.

Eliminate half the residual deviation of the circular bubble by means of the tribrach screw and half by adjusting the circular bubble (J1..3).

Repeat this procedure and check the residual deviation.

Fix the protection cap again. Make sure that the rubber joint is placed in the groove.

Foldable staff made of wood
length: 3 m or 4 m

Telescopic staff made of aluminium
length: 4 m or 5 m

Special parts and invar tape
made of aluminium, invar and foil

length: 30 cm, 50 cm and 1 m

Invar staff

- small and wide base
- length: 1 m, 2 m and 3 m
- Transport case
- Telescopic support

Battery pack, charger and car connecting cable

Memory Card and data transmission cable

Software updates are offered by the manufacturer on Internet sites with reservation as to extensions of the functional range. Surf to our Web sites. The dealer will be pleased to communicate the Internet site names, when required.

The updates offered contain the following functions:
- Update of the instrument computer
- Update of the interface computer (DiNi® 12 and DiNi® 12 T only)
- Loading of an additional language (four languages can be loaded)

DiNi® PC Cable:

Order-number 708177-9470.000

The files loaded from the Internet sites have to be unpacked and copied on a floppy disk.

For the update processes, the operating system DOS has to be used in any case.

Additionally to the files required for the update process, the update instructions have to be loaded from the Internet in any case and have to be observed strictly. No liability will be assumed for claims resulting from the non-compliance with the specification.

In these instructions, all steps are described in detail. They may contain and explain commands that differ from the description given here.

Instructions for Maintenance and Care

Allow sufficient time for the instrument to adjust to the ambient temperature.

Use a soft cloth to remove dirt and dust from the instrument.

When working in wet weather or rain, cover the instrument during longer breaks with the protective hood.

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.

Do not touch the optical surface with the fingers.

For transportation over long distances, the instrument should be stored in its case.

When working in wet weather, wipe the instrument and case dry in the field and let it dry completely indoors, with the case open.

Let wet instruments and accessories dry before packing them up.

After a long storage, check the adjustment of the instrument prior to use.

Observe the boundary values for the temperature of storing, especially in the summer (interior of the vehicle).

Trimble