

PR 15

Mode d'emploi	2-43
Operating instructions	44-85
Manual de Instrucciones	86-127

HILTI

Symbols used

The symbols used in these operating instructions have the following meanings:



WARNING

Usage risk or improper use which can cause severe personal injury or a fatal accident.



Usage information which helps the user to employ the instrument efficiently and in a technically correct manner.



Besides the instructions for use, these operating instructions also contain important safety notes (*see «Safety instructions» section*)

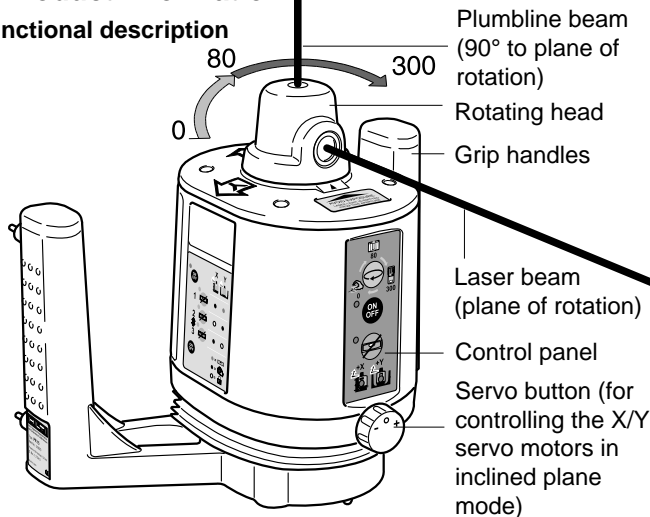


Please read through these operating instructions carefully before using the tool.
Contents

1. Product information	46
Functional description	46
Operating controls and indicators	49
Control panel	50
Quick-start instructions	53
Technical data	54
Items supplied	57
Beam catcher	58
2. Safety instructions	59
Please read this now!	59
Laser classification	59
Applications for which the tool is designed	60
Electromagnetic compatibility (EMC)	60
Usage and handling	61
3. Initial operation and usage	63
Inserting the batteries	63
Horizontal mode	64
Vertical mode	65
Inclined plane mode	66
Operation with the beam catcher (1-30 m)	67
Operation with the manual detector (1-100 m)	68
4. Checks	69
Checking horizontal rotation	69
Checking vertical rotation	72
Making adjustments	73
Checking the oblique error	78
5. Accessories	79
6. FCC statement (valid in USA)	81
7. EU declaration of conformity	83
8. Warranty	83

1. Product information

Functional description

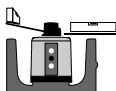


PR 15 rotating laser – for quick and precise alignment

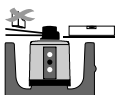
The Hilti PR 15 is a rotating laser level with a rotating laser beam and a plumblines beam offset by 90°.

Features

- Rotational speeds of 0, 80 or 300 r.p.m. (revolutions per minute) are possible.
- When rotation is switched off, the laser beam can also be aligned manually.
- LEDs indicate the current operating status.
- Can be set up directly on the ground, on a tripod, on a wall mounting or sight rail (batter board) mounting (vertical mode).

Functional description, continued**Levelled plane** (automatic alignment)

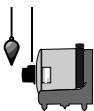
Alignment takes place automatically after switching on the tool, via 2 built-in servo motors for the X and Y directions. The beam only switches on when the specified accuracy has been reached.

**Plane inclined in the X direction** (defined incline direction)

Inclination in the X direction can be set using the servo button. The Y direction is held horizontal by the servo system.

**Plane at any desired inclination** (free alignment)

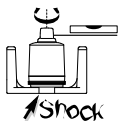
The inclination can be matched, through (alternate) operation of the X and Y motors in accordance with given markers or contours.

**Vertical plane** (automatic alignment)

Alignment according to the plumbline (X direction) takes place automatically. With the servo button, the vertical plane can be manually aligned (rotated).

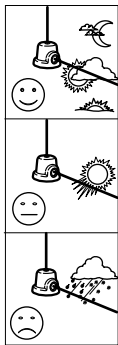
**Inclined plane vertical** (manual alignment)

In the inclined plane mode, the tool can be manually aligned using the servo buttons that control the servo motors.

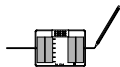
Functional description, continued**Automatic cut-out**

In the case of automatic levelling of one or both directions, the servo system monitors adherence to the specified accuracy. Cut-out takes place:

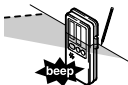
- if levelling is not achieved (levelling range exceeded or mechanical blockage)
 - if the tool is put out of plumb (shock/jolt).
- After switch-off has taken place, the rotation switches off, the laser beam flashes, the Operation LED flashes red, alternating with the Incline LED.

**Increased visibility of the laser beam**

Laser beam visibility varies depending on the working distance and ambient brightness. With the aid of a special reflective plate (beam catcher), the beam can be “caught” and held at a specific point. The laser beam oscillates automatically at the desired point within a range of approx. ± 200 to 500 mm. This arc therefore appears considerably brighter.

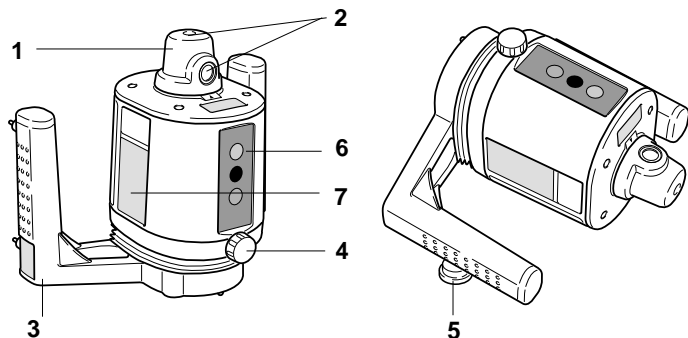


The beam catcher is used at distances of 1 – 30 m.



For distances of 1 – 100 m, the manual detector (optional) is used.

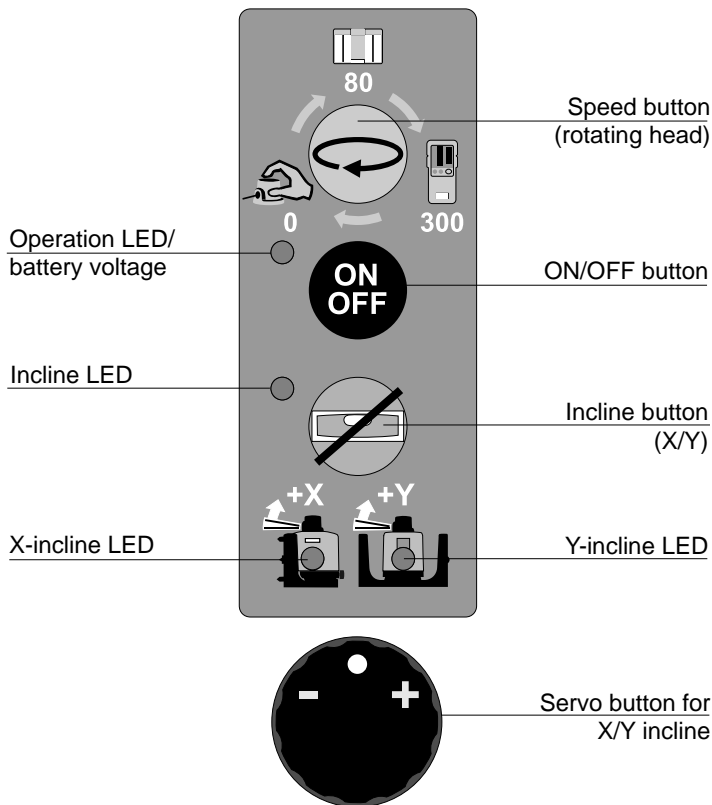
Operating controls and indicators



Item	Name
------	------

- | | |
|---|------------------------------|
| 1 | Rotating head |
| 2 | Laser exit apertures |
| 3 | Baseplate with grip handles |
| 4 | Servo button for X/Y incline |
| 5 | Foot screw for vertical mode |
| 6 | Control panel |
| 7 | Brief instructions |

Control panel



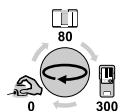
Control panel, continued**ON/OFF button**


For switching the tool on and off. After the tool has been switched on, the laser beams start blinking.

Operation / battery voltage LED

green	Tool is switched on
flashing red	Low battery voltage
continuous red	Battery discharged (→ <i>insert batteries</i>)

Operation LED (red) and Incline LED (orange) flashing
- Following a jolt to the tool

**Speed button**

Select desired operating mode (0 - 80 - 300) using the Speed button . The selected mode remains set even after the tool has been switched off.

- 0** Stopped: Laser rotating head does not turn – laser beam is switched on permanently.
For manual alignment of the laser beam.
- 80** Laser rotating head turns at 80 rpm.
For beam catcher operating mode, for laser beam radius 1 – 30 m.
- 300** Laser rotating head turns at 300 rpm.
For operating mode with manual detector, for laser beam radius 1 – 100 m.


Control panel, continued**Incline button**

For manual setting of the X and Y incline.



Press the Incline button  a first time:



Align X incline using servo button .

X LED lights up red. Y LED lights up green.


Y direction is levelled automatically.

Press the Incline button  a second time:

Align Y incline using servo button .

X LED off. Y LED lights up red.

X direction remains inclined as before.

If the previous job was carried out using the manual incline setting, then the Incline button  must be pressed within 3 seconds after switching on. In this way, one can continue to work using the previous incline setting.



If no button is pressed within 3 seconds after switching on the tool, automatic levelling (X and Y) or a reset takes place.

The X and Y LEDs light up green:

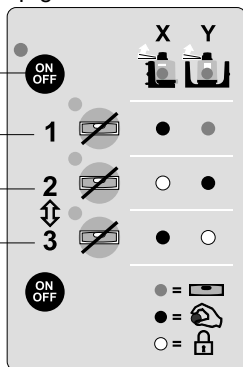


Quick-start instructions



Horizontal mode

Switch on using ON/OFF button . Operation LED lights up green. Alignment takes place automatically (within 30 s). X and Y LEDs on the control panel light up green.



LED	Axis (X/Y)
green	levelled
red	inclined
off	fixed



Inclined plane mode

Press Incline button . Incline LED lights up orange.

- ➔ **1** Set X direction using servo button . Y direction is automatically (servo) levelled.
- ➔ **2** Set Y direction using servo button . X direction remains inclined as before.
- ➔ **3** Adjust X incline using servo button if necessary. Y direction remains inclined as before.

Repeat steps 2 and 3 as often as required until desired incline (X/Y) is achieved.

Technical data**Measurement range**

1 – 30 m [100 ft] (radius) with beam catcher
1 – 100 m [330 ft] with manual detector

Accuracy ± 1.5 mm @ 10 m (horizontal and vertical modes)
 $[\pm 0.06'' @ 33 \text{ ft}]$

Beam diameter

< 10 mm @ 30 m, < 20 mm @ 60 m, < 33 mm
@ 100 m
[< 0.4'' @ 100 ft, < 0.8'' @ 200 ft, < 1.3'' @ 330 ft]

Speed of rotation [r.p.m.]

0 Stopped mode
80 Beam catcher operating mode
300 Operating mode with manual detector

Plumbline beam

Continuously perpendicular to plane of rotation

Laser

Visible, 635 nm, laser class 2 (IEC825-1),
Class II (FDA 21 CFR); output power: < 1 mW

Levelling of tool

Self-levelling $\pm 5^\circ$, LED display

Operating status indicators

- On/Off LED
 - Battery condition LED
 - "Inclined plane" operating mode On/Off LED
 - Levelling indicators
-

Technical data, continued

Automatic cut-out

- If, when in the operating mode “levelled plane”, “vertical plane” or “inclined plane”, the tool is jolted ± 60 arc seconds [± 3 mm @ 10 m] out of levelling,
- rotation stops
 - the laser flashes
 - LEDs flash alternately (Operation red, Incline orange)
-

Power supply

Three size D alkaline batteries, or three size D NiCd batteries

Battery life at 25 C [+ 77 F]

Alkaline: ≥ 30 h NiCd: ≥ 10 h

Tripod thread

5/8 " x 11

Operating temperature

- 20° to + 50° C [- 4° C to + 122° F]

Storage temperature

- 30° to + 60° C dry [- 22° C to + 140° F]

Protection category

IP 42 M (IEC 529)
Protection against dripping water up to 15° incline

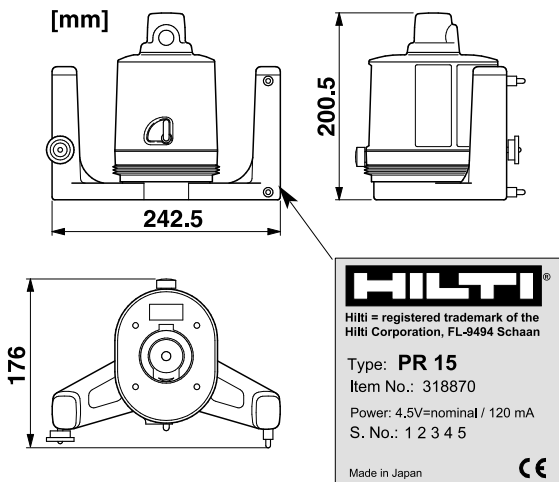
Weight

1.8 kg (3.97 lbs) including three batteries

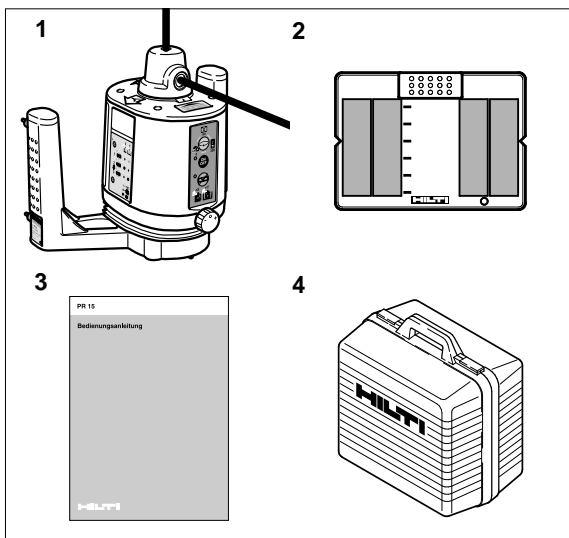
Technical data, continued

Dimensions

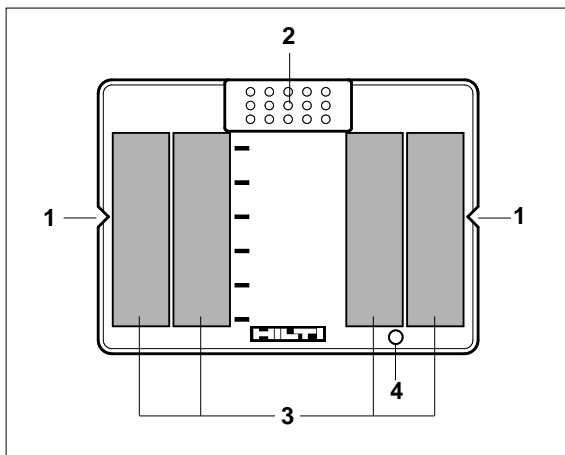
176 (L) x 242.5 (W) x 200.5 (H) mm
[6.9 (L) x 9.5 (W) x 7.9 (H) inches]



Items supplied



Item Number		Name
1	1	PR 15 rotating laser
2	1	PA330/340 beam catcher
3	1	Operating instructions
4	1	Carrying case
-	3	Batteries
-	1	Cleaning cloth
-	1	Desiccant

Beam catcher**Item Name**

- | | |
|---|---|
| 1 | Marking notches |
| 2 | Magnetic holder |
| 3 | Reflective surfaces |
| 4 | Hole for mounting on PA950/960 telescopic rod |

PA 330, scale in [cm]

PA 340, scale in [cm, inches]

2. Safety instructions

Please read this now!



The operating instructions and safety precautions must be read in full and strictly observed. Only then can the tool be operated safely.

Laser classification

The PR 15 rotating laser corresponds to laser safety class 2, based on the standards IEC825-1 / EN60825, and class II based on FDA 21 CFR. The eyelid closure reflex protects the eyes should anyone happen to look briefly into the laser beam. However, this eyelid closure reflex can be impaired by medicines, alcohol or drugs. These devices may be used without further protective measures.

Nevertheless, as with the sun, care should be taken to avoid looking directly into the light source. Do not direct the laser beam at people.

Laser warnings based on IEC825 / EN60825



Laser warnings for the USA based on FDA 21 CFR



This Laser Product complies with 21 CFR 1040 as applicable

Applications for which the tool is designed

The tool is designed to be used for determining and checking horizontal height progressions, inclined planes, vertical lines, alignment lines, plumbline points, partition walls (perpendicular and at right angles to a reference line), such as e.g.:

- transferring metre marks and height marks
 - marking out a partition wall (at right angles and perpendicular)
 - aligning equipment and elements in three axes.
-

Electromagnetic compatibility (EMC)

Although the Hilti PR 15 fulfils the strict requirements of the applicable directives, Hilti cannot completely exclude the following possibilities:

- The PR 15 may cause interference which affects other equipment (e.g. aircraft navigation systems), or
- High levels of radiation may cause interference to the PR 15, possibly leading to incorrect operation.

In these cases, or in other cases of uncertainty, measurements should be taken to check for correct operation.

Usage and handling

- Keep the tool out of reach of children. Laser instruments do not belong in children's hands.
- Check the tool for possible damage before use. If the tool is damaged, have it repaired by a Hilti service centre.
- If the tool has been dropped or subjected to other mechanical forces, its accuracy should be checked. For safety's sake, check the accuracy before each use.
- Avoid unusual body positions when carrying out alignment work from ladders. Make sure that your stance is secure, and always stay in balance.
- When using adaptors, always ensure that the tool is screwed on securely.
- When brought from a very low temperature into a warmer environment, or vice versa, the tool should be allowed to become acclimatised to the ambient temperature before it is operated.
- Measurements taken through panes of glass or other objects may be inaccurate.
- To avoid inaccurate measurements, always keep the laser beam exit windows clean.
- Although the tool is designed for use on the construction site, like any other item of optical equipment (e.g. binoculars, spectacles) it should be handled with care.

Usage and handling, continued

- Although the tool is moisture resistant, it should be wiped dry before being put away in its carrying case.
- The tool should be repaired only by Hilti service centres. Radiation in excess of class 2 may be emitted if the correct procedures are not observed when the casing is opened.
- The batteries must be insulated or removed if the tool is shipped.
- When setting up the tool, make sure that the beam is not directed at others or at yourself.
- To avoid damage to the environment, the tool and the batteries must be disposed of in accordance with the regulations applicable in the country concerned, or seek advice from the manufacturer.
- The tool is not designed for use in any area which is at risk of explosions.
- To clean the tool, use only clean, soft cloths. If necessary, these may be moistened with pure alcohol (do not use any other liquids, since these can damage the plastic parts).

3. Initial operation and usage

Inserting the batteries

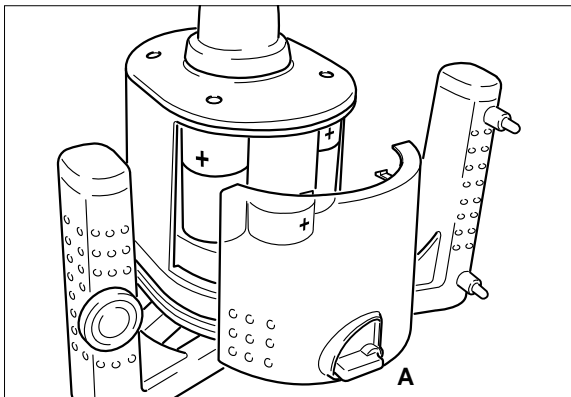
LED: Green flashing – low battery voltage →



ON
OFF

Steady red light, and laser off – battery discharged →

Inserting new batteries



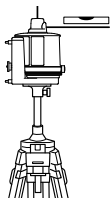
- 1 Turn lever A from the LOCK position to OPEN.
- 2 Remove cover from battery compartment.
- 3 Remove old batteries and dispose of them correctly.
- 4 Insert new batteries, observing correct pole alignment.
- 5 Replace cover and turn lever to LOCK position.



Always replace the complete set of batteries!

- Do not mix old and new batteries.
- Do not use batteries of different makes, or of different types.


Horizontal mode



- 1** Depending on the application, mount the PR 15 rotating laser, e.g. on a tripod.



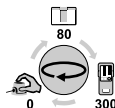
< 30 s


- 2** Switch on the tool using the ON/OFF button . Operation LED lights up green.

Levelling takes place automatically in < 30 s.



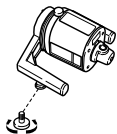
The X and Y LEDs light up green. As soon as levelling has been achieved, the laser beam switches on and rotates (depending on the last operating mode selected).




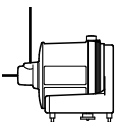
- 3** Using the Speed button , select the operating mode and carry out the work.

- 4** After finishing the work, switch off the PR 15 using the ON/OFF button .

Vertical mode






- 1 Place the PR 15 rotating laser on a level surface and set it approximately horizontal using the foot screw on the baseplate.
- 2 Switch on the tool using the ON/OFF button . Operation LED lights up green.

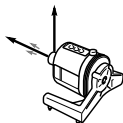



Levelling takes place automatically in < 30 s.

The X LED lights up green = the servo system is operating the now vertical X direction.

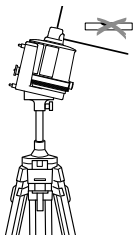
The Y LED lights up red = the vertical plane can be aligned using the servo button . The laser beam switches itself on as soon as levelling has been achieved. The automatic cut-out is then ready.








- 3 The servo button  can now be used for fine alignment of the tool (laser plane remains vertical).
- 4 Manual incline mode can be set using the Speed button . This mode then permits operation in a plane inclined in X- and Y-directions.

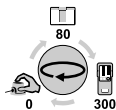




- 5 After finishing the work, switch off the PR 15 using the ON/OFF button .

Inclined plane mode




- 1 Depending on the application, mount the PR 15 rotating laser, e.g. on a tripod.
- 2 Switch on using the ON/OFF button . Operation LED lights up green.
- 3 Press the Incline button . Incline LED lights up orange. X LED lights up red. Y LED lights up green.
- 4 Set X incline using servo button . X LED lights up red. Y LED lights up green. In this operating mode, the Y direction is levelled automatically and the automatic cut-out is ready.
- 5 Press Incline button  and set Y incline using servo button . X LED off. Y LED lights up red.
- 6 Press Incline button  and adjust X incline using servo button  if necessary. X LED lights up red. Y LED off.

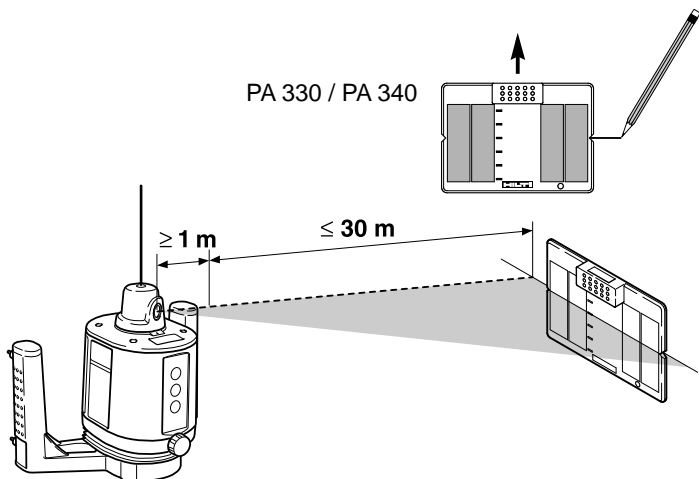



- 7 Using the Speed button , select the desired operating mode and carry out the work.
- 8 After finishing the work, switch off the PR 15 using the ON/OFF button .

If the work is interrupted

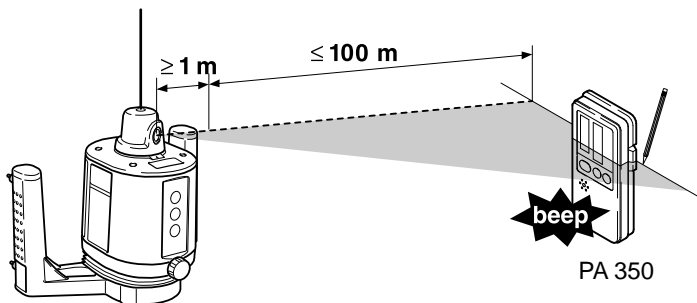
If the Incline button  is pressed within 3 seconds after switching on again, the inclined setting is preserved. Otherwise, the tool levels itself automatically.


Operation in conjunction with a beam catcher (1-30 m)



- 1 Set mode to **80 rpm** using Speed button .
- 2 Hold the beam catcher (PA 330 / 340) within the arc of the rotating laser beam.
The laser beam follows the hand-held beam catcher, and oscillates within the range of ± 200 to 500 mm at the beam catcher. This causes the laser beam to appear much brighter.
- 3 Carry out marking work.

Operation in conjunction with a manual detector (1-100 m)



- 1 Set mode to **300 rpm** using Speed button .
- 2 Hold manual detector (PA350) in the rotating laser beam.
The laser beam is indicated optically and acoustically.
- 3 Carry out marking work.



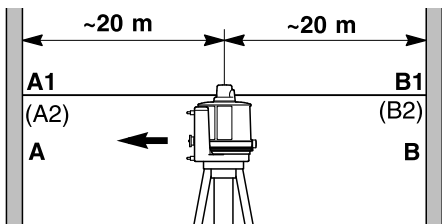
For distances of up to 100 m, or in unfavourable lighting conditions:
use the manual detector (PA 350)

4. Checks

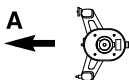
The tool must be checked at regular intervals in order to ensure that it is operating in accordance with the specifications.

Checking horizontal rotation




Checking the horizontal alignment of the PR 15



- 1 Set up the tripod at the mid point between wall A and wall B. The distance between A and B should be approx. 40 m.
- 2 Fix tool to tripod. Note the position of the tool:

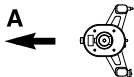



The tool must lie flat on the tripod plate. With the PA910, particular care must be taken that all 3 feet rest on the platform.

- 3 Switch on using the ON/OFF button .
- 4 Set to 80 rpm mode using the Speed button .
- 5 Using the beam catcher, mark the height of the reference line on walls A and B, marks A1 and B1.
- 6 Switch off using the ON/OFF button .

Checking horizontal rotation, continued

- 7 Loosen tripod screw a little and carefully turn the tool through 180°, taking care not to displace the tripod. Fix the tool on again.



- 8 Switch on using ON/OFF button  .
- 9 Using the beam catcher, mark the height of the reference line on walls A and B, marks A2 and B2.

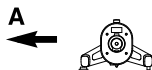
When this is carried out carefully, the distances between the marks A1 – A2 and B1 – B2 should be the same. Any deviation should be no more than 6 mm (related to 2 x 20 m distance). In the event of deviations greater than 6 mm: re-adjust the tool.

The mid-points of the paths A1 – A2 and B1 – B2 provide a very precise reference level, which is useful for testing the oblique error (*see page 78, “Checking the oblique error”*). Only when these marks are applied to stable parts of the building, with good foundations, can they be re-used for future checking work.

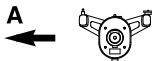
Checking horizontal rotation, continued

To check the other two directions, proceed in similar fashion:

- Measure the first reference line in the position



and then the second in the position



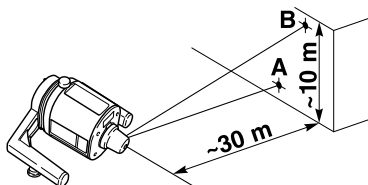
Here too, the two markings must deviate by no more than 6 mm.


In the event of deviations greater than 6 mm, re-adjust the tool.

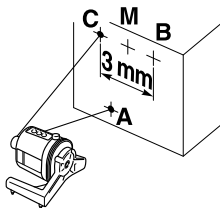
Checking vertical rotation

Procedure

- 1 Set up tool and switch on.



- 2 Set mode to **0 rpm** using Speed button .
- 3 Turn rotating head manually and mark a point A on the wall near the floor.
- 4 Turn the rotating head upwards and mark point B.
- 5 Turn the tool around 180°, and set the laser beam to point A again. Align vertically again.





- 6 Turn rotating head manually and mark point C. Points B and C must differ no more than 3 mm laterally from one another.
In the event of deviations greater than 3 mm, adjust the tool.


Making adjustments

Adjusting the tool

- Adjustment of the PR 15 rotating laser should be carried out only by trained and experienced personnel.
- Accuracy cannot be guaranteed if the adjustment instructions are not followed precisely.
- The tool must be adjusted in all three axes (X, Y, Z). For each axis, it is necessary to adjust the tool in two opposing directions (displacement of 180°).

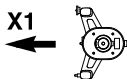
Adjusting the X axis

- 1 Press and release the ON/OFF button  **and** Speed button  **simultaneously.**

Press the Speed button  again within 3 seconds. The Incline LED flashes.

- 2 Align the tool, see *"Checking the horizontal rotation" (carry out points 1-9).*

- 3 Mark the laser in one direction (position X1)

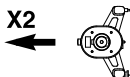




- 4 Turn the tool (not the tripod) through 180°.

Making adjustments, continued

Adjusting the X axis, continued




- 5 Mark the laser on the same wall as before (position X2).



- 6 Using the servo button , bring the laser precisely between the markings.
- 7 Press the Incline button . Incline LED shows a steady light.

Wait until the tool switches off by itself. If the tool is moved during this time, repeat the procedure.

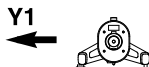
Adjusting the Y axis

- 1 Press and release the ON/OFF button  and Incline button  **simultaneously**. Press the Incline button  again within 3 seconds. The Incline LED flashes, the Operation LED lights up.
- 2 Align the tool, see “Checking the horizontal rotation” (carry out points 1-9).

Making adjustments, continued

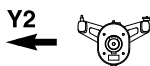
Adjusting the Y axis, continued


- 3 Mark the laser in one direction (position Y1)



- 4 Turn the tool (not the tripod) through 180°.

- 5 Mark the laser on the same wall as before (position Y2).







- 6 Using the servo button , bring the laser precisely between the markings.

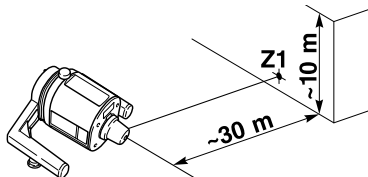
- 7 Press the Incline button . Incline LED shows a steady light.

- 8 Wait until the tool switches off by itself. If the tool is moved during this time, repeat the procedure.

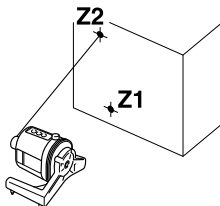
Making adjustments, continued

Adjusting the Z axis



- 1 Press and release the ON/OFF button  and Incline button  **simultaneously**. Press and release the Incline button  and the Speed button  **simultaneously** within 3 seconds. The Incline LED flashes quickly, the Operation LED lights up..
- 2 Align the tool, see *"Checking the vertical rotation"* (carry out points 1-6).
- 3 Mark the laser in one direction (position Z1)



- 4 Turn the tool through 180°.
- 5 Mark the laser on the same wall as before (position Z2).



Making adjustments, continued**Adjusting the Z axis, continued**

- 6 Using the servo button , bring the laser precisely between the markings.
- 7 Press the Incline button . Incline LED shows a steady light.
- 8 Wait until the tool switches off by itself. If the tool is moved during this time, repeat the procedure.

After calibration, the accuracy of the tool should be checked once more.

If the Operation LEDs flash red alternating with green and the orange Incline LED, please contact your local Hilti agent.

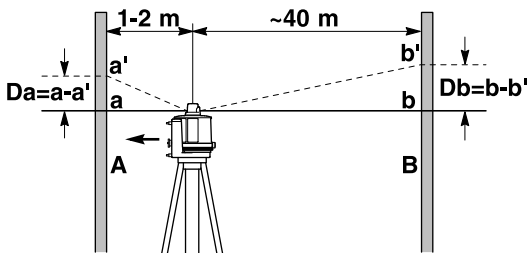
Checking the oblique error

Preconditions

- The horizontal rotation must have been checked, and any deviations must be within the tolerance range.
- The tool must rest flat on the tripod plate. With the PA910, particular care must be taken that all 3 feet are resting on the platform.

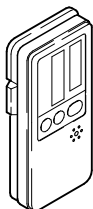
Procedure

- 1 Align the tool horizontally and make the markings on walls A and B (see *"Checking the horizontal rotation"*, carry out points 1-9).
- 2 Set up the tool 1 to 2 metres in front of wall A and align it horizontally.



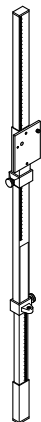
- 3 Mark the reference lines at points a' and b' . The differential value between Db and Da must be ≤ 4 mm. In the event of deviations > 4 mm, please contact your local Hilti agent.

5. Accessories



Manual detector

At distances of greater than 30 metres and when lighting conditions are unfavourable, a manual detector should be used to detect the laser beam. The position of the laser beam is indicated optically and acoustically.



Measuring rod

The measuring rod can be pulled out telescopically, and is equipped with attachment points for the beam catcher and the manual detector.

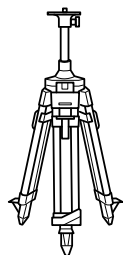
The rod is marked with a measuring scale.



Sighting glasses

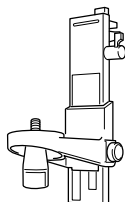
For better visibility of the laser target point.

5. Accessories, continued



Tripods

Various tripods are available for setting up the PR 15 at the job site.



Wall mounting bracket

The wall mounting bracket makes it easy to mount the PR 15 on a wall.

6. FCC statement (applicable in U.S.)



WARNING:

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

6. FCC statement (applicable in U.S.), Continued



WARNING:

Changes or modifications not expressly approved by Hilti for compliance could void the user's authority to operate the equipment.

Label:


CAUTION

**LASER RADIATION - DO NOT
STARE INTO BEAM**

 **620-690nm/0.95mW max.
CLASS II LASER PRODUCT**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.





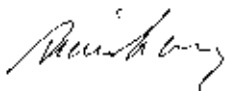
This Laser Product
complies with 21CFR
1040 as applicable

7. EC declaration of conformity

Designation: PR15
Serial no.: 10000 - 99999
Year of design: 1998
CE-conform

We declare, on our sole responsibility, that this product complies with the following standards or standardisation documents: 89/336/EEC

Hilti Corporation



Armin Spiegel
Leiter Positioning Systems

Head of Business Unit

Positioning Systems
01/1999



Bodo Baur
Leiter Qualität Positioning
Systems

Quality Manager of
Business Unit

Positioning Systems
01/1999

8. Warranty

Hilti warrants that the tool supplied is free of defects in material and workmanship. This warranty is valid so long as the tool is operated and handled correctly, cleaned and serviced properly and in accordance with the Hilti Operating Instructions, all warranty claims are made within 12 months from the date of the sale (invoice date), and the technical system is

8. Warranty, continued

maintained. This means that only original Hilti consumables, components and spare parts may be used in the tool.

This warranty provides the free-of-charge repair or replacement of defective parts only. Parts requiring repair or replacement as a result of normal wear and tear are not covered by this warranty.

Additional claims are excluded, unless stringent national rules prohibit such exclusion. In particular, Hilti is not obligated for direct, indirect, incidental or consequential damages, losses or expenses in connection with, or by reason of, the use of, or inability to use the tool for any purpose. Implied warranties of merchantability or fitness for a particular purpose are specifically excluded.

For repair or replacement, send tool and / or related parts immediately upon discovery of the defect to the address of the local Hilti marketing organization provided.

This constitutes Hilti's entire obligation with regard to warranty and supersedes all prior or contemporaneous comments and oral or written agreements concerning warranties.

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