

INSTRUCTION MANUAL LAZER ZONE

PZL-1&PZS-1 PZL-1

Foreword

Thank you for purchasing the Topcon PZL-1&PZS-1.

To quickly and effectively use the PZL-1&PZS-1, please read these brief instructions carefully, and keep them in a convenient location for future reference.



This instruction manual explains the basic operation of the PZL-1 and the PZS-1. For measuring with these instruments, see the instruction manual for the controller.

Handling Precautions

Before starting work or operation, be sure to check that the system is functioning properly.

1. Vibration and impact protection

When transporting the instrument, provide protection to minimize risk of severe vibration or impact. Severe vibration or impacts may affect beam accuracy.

2. Checking battery power

Before operating, check remaining battery life.

3. Storing the instrument for long period

When storing the instrument for long period, remove the batteries.

Safety Information

In order to encourage the safe use of products, to prevent damage to properties, and to prevent any danger to the operator and to others, important warnings are placed on the products and inserted in the instruction manuals.

We suggest that everyone understand the meaning of the following displays and icons before reading the "Safety Cautions" and text.

Display	Meaning
 WARNING	Ignoring or disregard of this display may lead to death or serious injury.
 CAUTION	Ignoring or disregard of this display may lead to personal injury or physical damage to the instrument.

Injury refers to hurt, burn, electric shock, etc.

Physical damage refers to damage to equipment and structure or furnishings.

Safety Cautions



WARNING

- **There is a risk of fire, electric shock or physical harm if you attempt to disassemble or repair the instrument yourself.**

This is to be carried out by TOPCON or an authorized dealer, only!

- **Laser beam can be dangerous, and can cause eye injury if used incorrectly.**

Never attempt to repair the instrument yourself.

- **Cause eye injury or blindness.**

Do not stare into beam.

Do not stare into beam or view directly with optical instruments.

- **Risk of fire or electric shock.**

Do not use a wet battery.

- **May ignite explosively.**

Never use an instrument near flammable gas or liquid matter, and do not use in a coal mine.

- **Battery can cause explosion or injury.**

Do not dispose in fire or heat.

- **The short circuit of a battery can cause a fire.**

Do not short circuit battery when storing it.



CAUTION

Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Let the laser beam reach the aimed object or the target without anybody else in the laser beam path. When operating in an open area, avoid radiating laser beam at eye level. It is quite possible for the beam to enter into one's eyes, and it is possible to lose visual sight temporarily, and lose one's caution and awareness of other dangers - avoid glaring beam.

Do not allow skin or clothing to come into contact with acid from the batteries, if this does occur then wash off with copious amounts of water and seek medical advice.

Risk of injury by dropping the instrument or case.

Do not use a carrying case with damaged belts, grips or latches.

It could be dangerous if the instrument falls over, please check that you fix the instrument to the wallmount or tripod.

Risk of injury by dropping a tripod and an instrument.

Always check that the screws of tripod are tightened.

Please note that the tips of tripod can be hazardous, be aware of this when setting up or carrying the tripod.

User

Wear the required protectors (safety shoes, helmet, etc.) when operating.

Exceptions from Responsibility

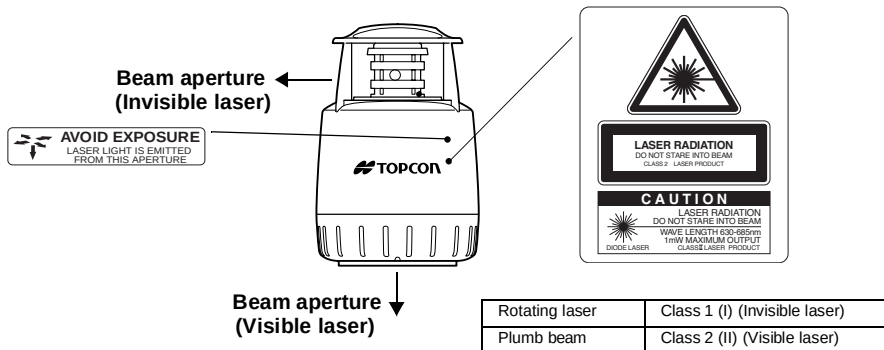
- 1) The user of this product is expected to follow all operating instructions and make periodic checks of the product's performance.
- 2) The manufacturer, or its representatives, assumes no responsibility for results of a faulty or intentional usage or misuse including any direct, indirect, consequential damage, and loss of profits.
- 3) The manufacturer, or its representatives, assumes no responsibility for consequential damage, and loss of profits by any disaster, (an earthquake, a fire, an accident, storms, floods, an act of a third party and/or a usage other than under normal conditions.)
- 4) The manufacturer, or its representatives, assumes no responsibility for any damage, or loss of profits due to a change of data, loss of data, an interruption of business etc., caused by using the product or an unusable product.
- 5) The manufacturer, or its representatives, assumes no responsibility for any damage, or loss of profits caused by usage other than those usages explained in the user manual.
- 6) The manufacturer, or its representatives, assumes no responsibility for damage caused by wrong movement, or action due to connecting with other products.

Laser Safety

This product projects a visible laser beam during operation. This product is manufactured and sold in accordance with “Performance Standards for Light-Emitting Products” (FDA/BRH 21 CFR 1040) or “Radiation Safety of Laser Products, Equipment Classification, Requirements and User’s Guide” (IEC Publication 60825-1) provided on the safety standards for laser beam.

As per the said standard, PZL-1 rotating laser is classified as “Class 1 (I) Laser Products” and PZL-1 plumb beam is classified as “Class 2 (II) Laser Products”. In case of any failure, do not disassemble the instrument. Contact TOPCON or your TOPCON dealer.

Labels

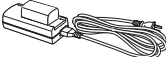


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Standard System Components

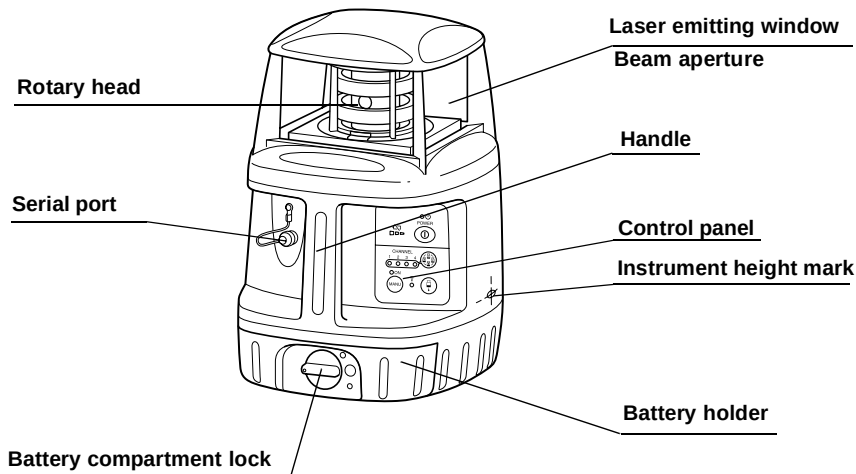
The numerical value in parentheses shows the quantity.

PZL-1(1) 	AD-7C/9B(1) 	PZS-1(1)  (Only for PZL-1&PZS-1 model)
Battery BT-63Q(1) 	Instruction manual(1) 	BC-30(1), BT-62Q(1)  (Only for PZL-1&PZS-1 model)
Shoulder belt(2) 		5/8 inch plug(1)  (Only for PZL-1&PZS-1 model)
Carrying case(1) 		Joint cable JC-8(1)  (Only for PZL-1&PZS-1 model)

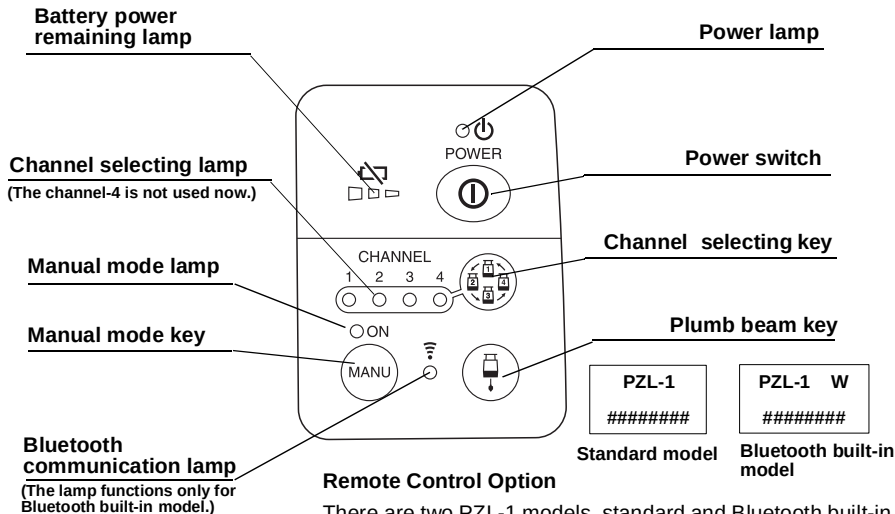
(Make sure that all of the above items are with the instrument when purchased.)

Nomenclature and Functions

PZL-1



Control Panel



Key or Lamp	Function
Battery power remaining lamp	Indicates the amount of battery power remaining. (That lamp will automatically go off after approximately a minute. It will go back on if any key is pressed.)
Channel selecting lamp	Indicates the selected channel.
Manual mode lamp	Lights up when the manual mode is in use.
Manual mode key	When pressed twice, initiates the manual mode. When pressed once in the manual mode, cancels the manual mode.
Bluetooth communication lamp	Blinks during communication with Bluetooth. (The lamp functions only for Bluetooth built-in model.)
Power lamp	Blinks during auto-leveling, and lights up steadily when auto-leveling ends.
Power switch	Turns on the power. When pressed for 2 seconds or more, turns off the power.
Channel selecting key	The channel can be changed by pressing the channel selecting key within 5 seconds after the power goes on (while the channel lamp is blinking). The channels change in order: 1 → 2 → 3 → 1. Each time the channel selecting key is pressed, the operable time of the keys is extended by 5 seconds. The selected channel is set 5 seconds after the channel selecting key is released.
Plumb beam key	This button switches the plumb beam on and off. (That beam will automatically go off after five minutes.)

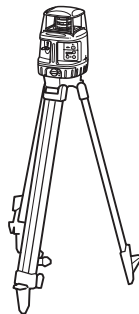
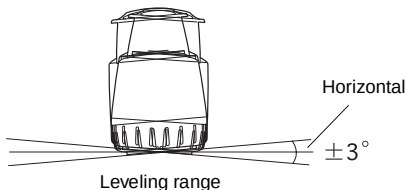
Preparation for Use

Battery Installation

For battery placement or replacement instructions, see Battery section, page 18.

Instrument Set-up Procedure

- 1 Set the instrument on any smooth surface that is within $\pm 3^\circ$ of true level. The PZL-1 auto-level system will not function if the unit is placed more than $\pm 3^\circ$ out of level. For best operation, it is recommended that it be mounted to a tripod.



Battery Power Remaining Lamp

The battery power remaining lamp will be shown for several minutes when the instrument is powered on or when the battery level changes.

The battery power remaining lamp will be shown again when any key is pressed.



The power is low, but laser is still usable.
(Blinking continues until batteries are dead.)



Dead batteries. Recharge the battery or replace the dry batteries with new ones. (The laser will turn completely off after blinking for about five minutes.)

NOTE:

Even if an AC/DC converter is connected at this time, blinking still continues. Once the power is turned off, the battery remaining display will reset.

Turning Auto-leveling Off

To turn off the auto-leveling function (manual mode), press the manual mode key twice in quick succession. The manual mode light will illuminate. The instrument can be positioned in any direction, the laser beam remains on and the head will rotate.

IMPORTANT:

In manual mode, the laser beam will not shut off if disturbed!

To return to Auto-leveling mode, press the manual mode key once.

Operation

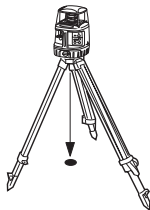
- 1** Set up the instrument on a flat surface or a tripod. At this time, the instrument will perform auto-leveling in a range of $\pm 3^\circ$.
- 2** Turn on the power, then select a channel with the channel selecting key.
(Press the channel selecting key within 5 seconds after the power goes on.)
After auto-leveling ends, the head will rotate and the laser will go on.
For other operations, and for setting the instrument constant, see the instruction manual for the controller.

Using Plumb Beam

You can set the instrument using with the plumb beam for centering.

Press the plumb beam key to emit the plumb beam.

The plumb beam is equipped with an auto cut-off function.



Plumb beam



When the instrument performs auto-leveling, the plumb beam blinks.

Set up the instrument when the beam is emitted.

Height Alert Function

When auto-leveling and height alert function are active, this function prevents the instrument from operating if it is disturbed.

This helps insure accurate control. If the height or inclination of the instrument changes, the height of instrument should be verified and re-established if necessary.

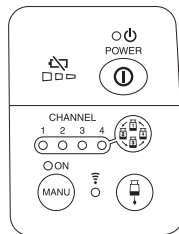
The height alert function will become active about 10 minutes after power is turned on. Then all lamps of the panel blink.

To Activate the Height Alert Function

1 While pressing the MANU key, turn on the power.

All the lamps will blink for 3 seconds, and the height alert function will be turned on.

Turn the power key off and on again, the height alert function will be turned off.



About Channels

By setting channels, up to four PZL-1s can be used at the same time.

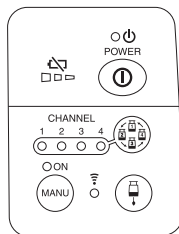
Checking and Adjusting

Switching to Adjustment Mode

1 While pressing the plumb beam key, turn on the power.

The channel selecting lamps will light up in order, from 1 to 4, and the instrument will switch to the adjustment mode.

Use the controller when inspecting or adjusting the instrument. For details, see the controller's instruction manual.



Note

If the adjustment mode doesn't end after approximately 30 minutes, a "calibration time out error" has occurred. See P22 "Error Code".

Storage Precautions

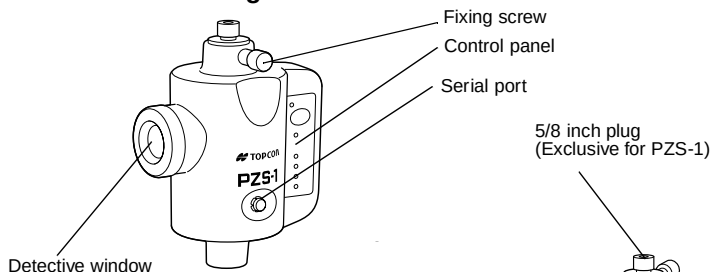
Always clean the instrument after use.

Use a clean cloth, moistened with a neutral detergent or water. Never use an abrasive cleaner, ether, thinner benzene, or other solvents.

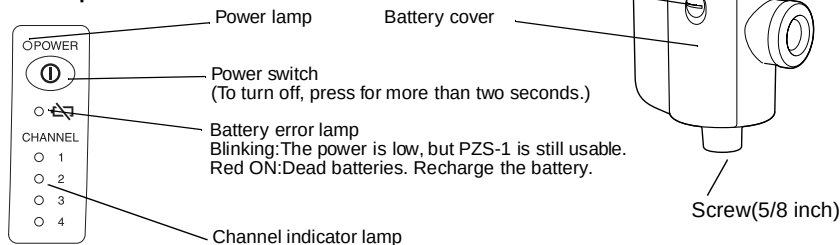
Always make sure instrument is completely dry before storing. Dry any moisture with a soft, clean cloth.

Standard / Optional Accessories

Laser Zone Beam Receiving Sensor PZS-1



Control panel



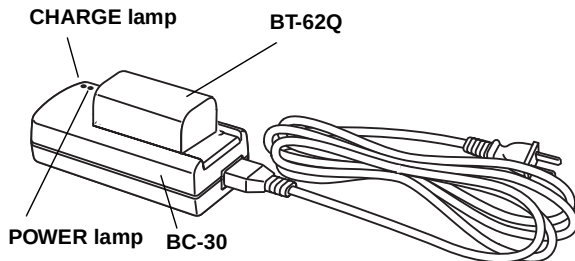
For the measuring method, see the instruction manual for the controller.

Battery

Battery BT-62Q, Battery charger BC-30

For Charging

- 1 Install the battery on the BC-30.
- 2 Plug the power cord in an outlet.(AC-120V or 230V) Charging is completed after approximately 3 hours.



The POWER lamp of BC-30

Red ON : Power is on.

The CHARGE lamp of BC-30 will indicate charging status;

On Solid : Wait for charging.

Red ON : Charging.

On Solid : Charging completed.

Red Flashing : Charging error.

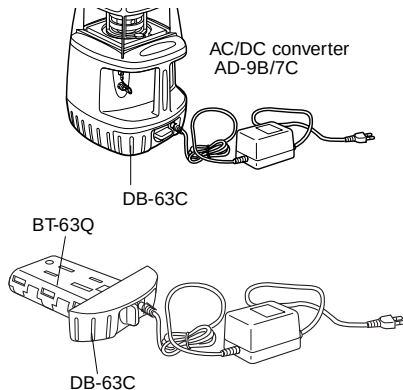
Battery Holder DB-63C

Rechargeable Battery Pack BT-63Q

AC/DC Converter AD-9B/7C

For Charging

- 1** Plug the AC/DC converter (AD-9B/7C) into the DB-63C battery holder.
- 2** Insert the converter power cord in an outlet.
(AD-9B is for AC120V, AD-7C is for AC230V)
- 3** Complete charging by unplugging the converter connector from the DB-63C battery holder after approximately 9 hours.
- 4** Unplug the converter power cord from the outlet.



The lamp of DB-63C will indicate charging status;

- | | |
|----------------|---|
| Red ON | : Charging. |
| Green ON | : Charging completed. |
| Green flashing | : DB-63C is not connected to BT-63Q. |
| Red flashing | : BT-63Q protection feature is working automatically.
PZL-1 can be used in this state. |

Automatic protection feature;

In case of overcharge or high or low temperature state exceeding charging range, charging will be stopped or changed to protect battery.

Note	DB-63C can be used with dry batteries instead of BT-63Q.
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Note for charging

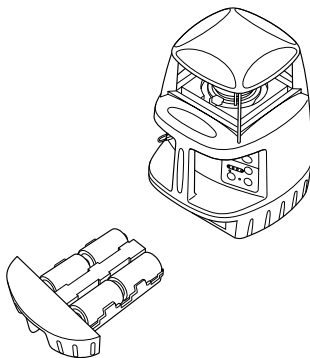
- 1)Recharging should take place in a room with an ambient temperature range of +10°C to +40°C (+50°F to +104°F).
- 2)Exceeding the specified charging time may shorten the life of the battery and should be avoided if possible.
- 3)The battery source will discharge when stored and should be checked before using with instrument .
- 4)Be sure to charge a stored battery source every 15 days and store in a place at +30°C(+86°F) and below when it will not be used for a long period. If you allow the battery to be completely discharged, it will have an effect on the overall performance for proper charging in the future.
- 5)The charger may develop heat while charging, there is no problem of it.
- 6)If charging is done at high temperature, charging time of the battery may take longer.

Dry Batteries

Replacing Dry Batteries

- 1** Remove the battery cover by turning the battery compartment lock to “OPEN”.
- 2** Remove the old batteries and replace with four (4) new “D” cell alkaline batteries making sure each is placed in the proper direction as indicated.
- 3** Replace the battery cover and turn the knob to “Lock”.

Note	Replace all 4 batteries with new ones. Do not mix old batteries and new ones.
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Error Code

Use the table below to determine operation errors indicated by blinking lamps on the control panel.

If corrective action listed does not correct error, please contact your local Topcon dealer.

Lamp Indication	Error	Corrective Action
All lamps blink	Height alert error	Set up the instrument again, turn the power off and on.
Power lamp →Manual mode lamp →Battery power remaining lamp Lamps light up in sequence	Auto-leveling range error	Set up the instrument again.
See p.13 .	Battery power error	Recharge the battery or replace the dry batteries with new ones.
There are 3 types of error indications. Manual mode +channel 1, Manual mode +channel 2, Manual mode +channel 1, 2	Calibration range error	Reinspect and adjust the instrument.
Lamp Channel 1 and Channel 3 blink simultaneously	Calibration time out error	Turn the power off and on.
Lamp Channel 3 and Channel 4 blink simultaneously	Memory error	Turn the power off and on.
All lamp Channels blink	Head rotation error	Turn the power off and on.
Lamp Channel 2 and Channel 3 blink simultaneously	Tilt unit error	Turn the power off and on.

Lamp position

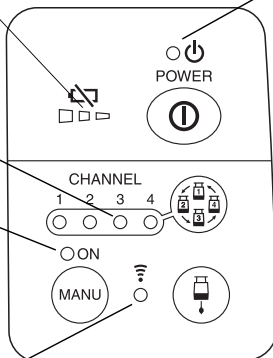
Battery power
remaining lamp

Power lamp

Channel selecting lamp

Manual mode lamp

Bluetooth
communication lamp



Specifications

PZL-1

Zone Width	: $\pm 10^{\circ}$ (5~30m), ± 5 m (30~300m)
Zone Radius	: 300m(985ft)
Laser Zone Accuracy	: Vertical: 1 arc second resolution
Auto-leveling range	: $\pm 3^{\circ}$
Rotation speeds	: 600rpm
Laser Class	: Class 2
Light source	: L.D. (Laser Class : Class 1 (I) , Invisible laser)
Channels	: 3
Plumb beam	: Yes (Laser Class : Class 2 (II) , Visible laser)
Serial port	: RS-232C
Power supply	: Ni-MH with runcharge or 4D-CELL dry batteries
Continuous operating time	: Approx. 15 hours (With Ni-MH batteries)
at +20°C (+68°F)	: Approx. 20 hours (With alkaline batteries)
Protection against water	: IPX6 (Based on the standard IEC60529)
Operating temperature	: -20°C to +50°C (-4°F to +122°F)
Dimensions	: Approx. 186(W) x 201(D) x 282(H) mm Approx. [7.32(W) x 7.91(D) x 11.1(H) in]
Weight	: Approx. 2.9kg [20 lbs] (Without battery)
Bluetooth™ Unit	
Bluetooth™ Standard	: Bluetooth™ Specification v1.1
Bluetooth™ profiles	: Generic Access Profile Service Discovery Application Profile Serial Port Profile
BD Address	: IEEE std 802 48bit LAN MAC Address
Bluetooth™ Transmitting	: Output Class2
Bluetooth™	: About 5m(The range will be different by a condition)
Communication distance	

PZS-1

Detective angle

Horizontal : $\pm 10^{\circ}$

Vertical : $\pm 10^{\circ}$

Serial port : RS-232C

Power supply : BT-62Q

Continuous operating time : Approx. 8 hours

at $+20^{\circ}\text{C}$ ($+68^{\circ}\text{F}$)

Tripod screw : 5/8 inch x 11Thred

Operating temperature : -20°C to $+50^{\circ}\text{C}$ (-4°F to $+122^{\circ}\text{F}$)

Protection against water : IPX6 (Based on the standard IEC60529)

Dimensions : Approx. 170(W) x 86(D) x 144(H) mm

Approx. [6.69(W) x 3.38(D) x 5.67(H) in]

Weight : Approx. 1 kg [2.2 lbs] (With battery)

BC-30

Input voltage : AC-120V or 230V

Recharging time : Approx. 3 hours

(at $+20^{\circ}\text{C}$ / $+68^{\circ}\text{F}$)

Operating temperature : $+10^{\circ}\text{C}$ to $+40^{\circ}\text{C}$ ($+50^{\circ}\text{F}$ to $+104^{\circ}\text{F}$)

Regulatory Information

U.S.A.

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 when the equipment is used in a commercial or residential environment. This equipment generates, uses and can radiate radio frequency energy and, if not used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment is subject to the following two conditions:

- (1) The device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.



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EMC NOTICE

In industrial locations or in proximity to industrial power installations, this instrument might be affected by electromagnetic noise. Under such conditions, please test the instrument performance before use.



N 13813

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