CASAGRANDE AND STANDPIPE PIEZOMETERS

USER MANUAL

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Notes on the use of product

For safe and efficient use of the product, please read carefully the following instructions before starting any operation.

Any use of the product other than the one described in this manual shall be considered the user's full responsibility.
The same applies for any unauthorized modifications.
In addition to the hereby listed standards, the user must comply with the provisions of the current legislation regarding personal safety and health together with all other persons in the workplace.
SISGEO is not responsible for any accident, breakdown or other problems due to lack of knowledge and / or non-compliance with the requirements contained in this manual.
Check that the product has not been damaged during the transport.
Verify that the package includes all items as well as any requested optional accessories; if anything is missing, please promptly contact SISGEO.
The user must strictly follow all the operations described in this manual.
Maintenance or repair of the device is permitted only by authorized operators.
These operators must be physically and intellectually suitable.
For information about instrument or to order spare parts, always specify the product information which can be found on the identification label.
When replacing parts, always use ORIGINAL SPARE PARTS.
The manufacturer reserves the right to make either technical and / or commercial changes without prior notice.
It is our policy to keep manuals continuously updated.

Symbols

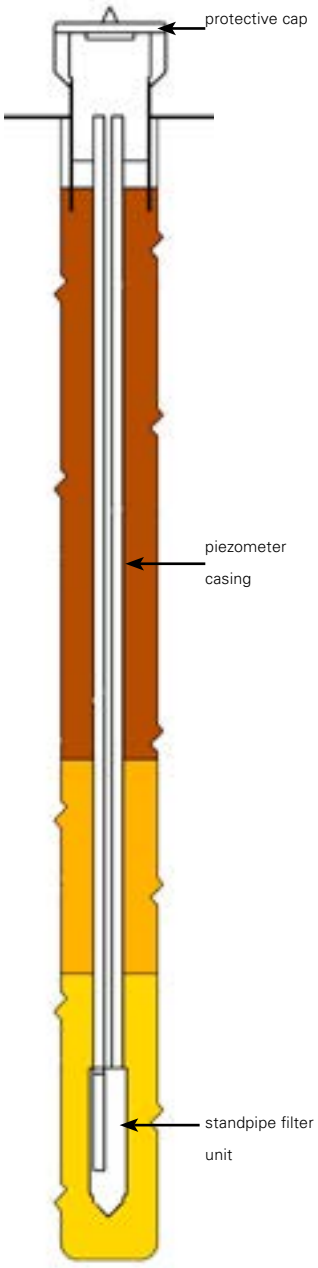
Pay particular attention to the following instruction.

Identification

Instruments can be identified

- From a production lot number (written on the Compliance Certificate)
- From a serial number (s/n) engraved indelibly on the instrument
- From a label on the instrument
- From a label on the cable

INTRODUCTION



Standpipe piezometers, also called "open circuit", have a wide use in civil and foundation engineering, for the survey of water-bearing layer piezometer height, or for the interstitial pressure in saturated grounds.
They can have a single or a double casing and they usually consist in:

- a filter unit (or fissured casings covered with woven-non-vowen fabric);
- 3m long casings and different diameters (0.5"G, 1"G, 1.5"G, 2"G, 3"G);
- couplings;
- protective caps (optional).

The borehole is filled around the casing with sand and/or gravel in order to allow the water to enter the casing through the filter.
After a while (depending on ground permeability), the water stabilizes at the water layer level.

We have a **Casagrande** piezometer when the filter cell is insulated from the borehole in order to measure the interstitial pressure in the layer where it is installed.

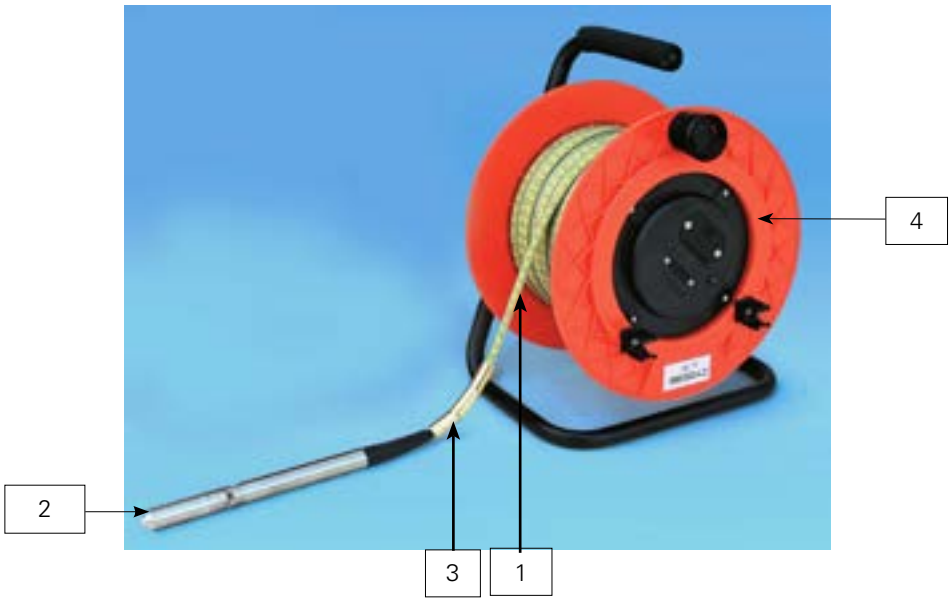
For the measure we use a **water level indicator** or an electric **pressure transducer** (see manual "Pressure Transducer").
Sisgeo designed a special pressure transducer that allows to close the filter cell obtaining a "close circuit" piezometer: the measure of the interstitial pressure variations occurs more quickly also in waterproof grounds such as clay. This transducer can be removed for the maintenance (see manual "Pressure Transducer").

DESCRIPTION

WATER LEVEL INDICATOR

Water level indicator consists of:

1. a coated steel graduated tape and 2 electric conductors at sides;
2. a probe;
3. some weights;
4. a cable reel. On a side there is a 9V power battery and an electronic circuit with a ringtone and a led light (2 batteries and a display for the water/temperature level probe).



FILTER CELLS SATURATION

Porous filters saturation is needed to:

- minimize the possibility that the filter pores would block;
- increase the filter system answer speed when an external pressure is applied.

Usually the filter that has to be saturated is left in a container full of water for 24 h before the installation.
The saturation is more effective if the water had been previously de-aerated making it boil for at least 10 minutes and then make it cool.

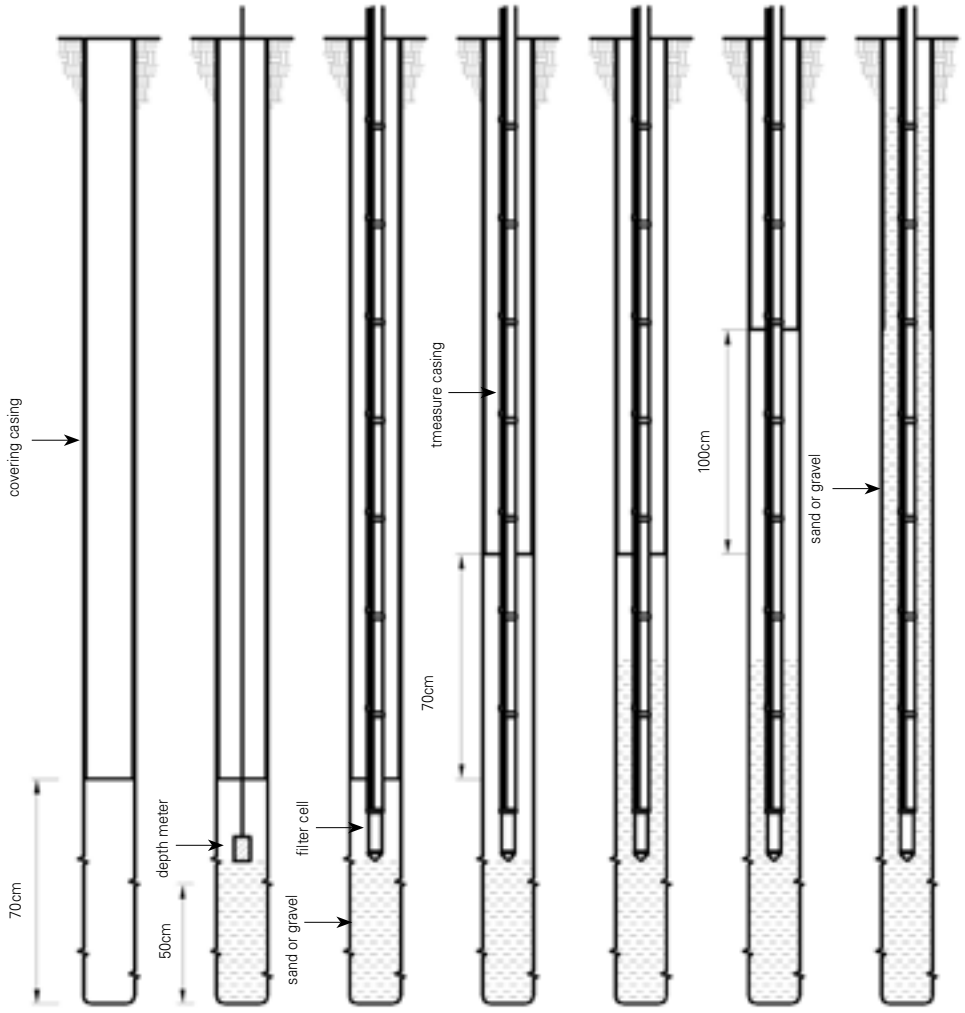
INSTALLATION

STANDPIPE PIEZOMETERS INSTALLATION

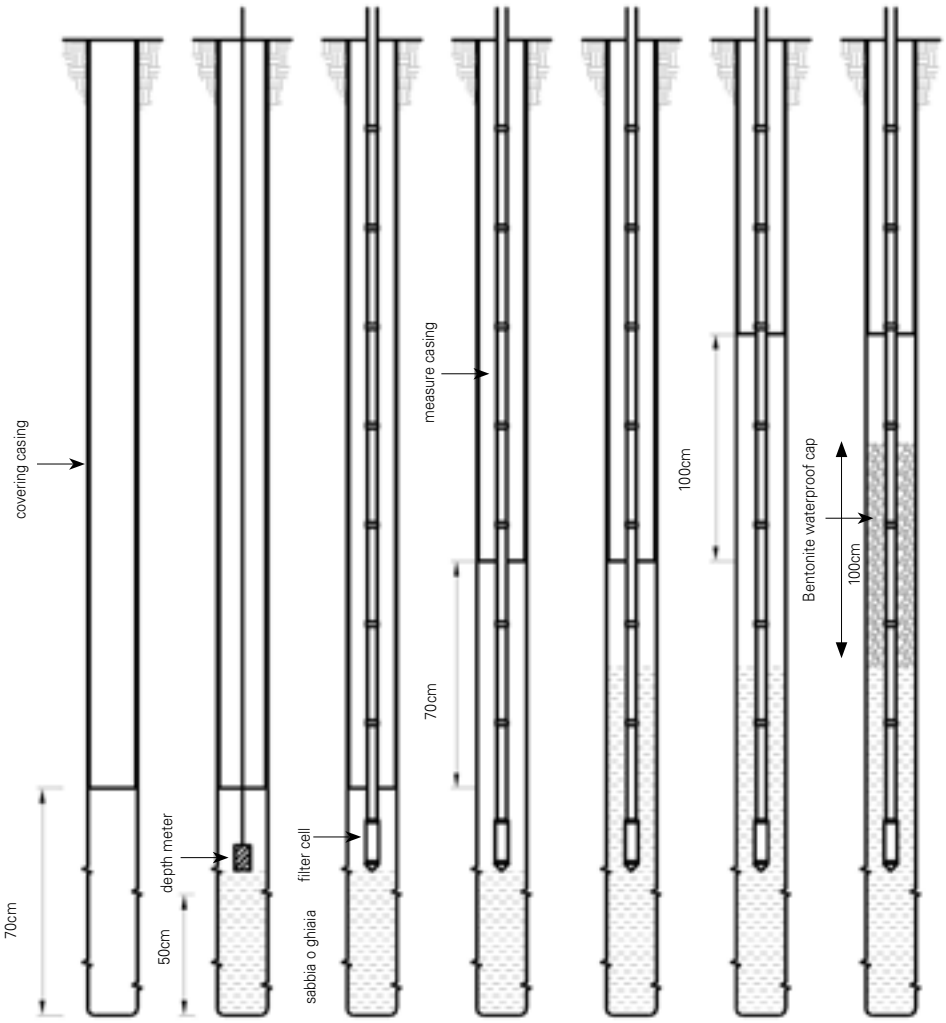
The installation is expected in a borehole carried out through a continuous core or destructive drilling.
We recommend to always stabilize the walls with a temporary covering casing, with an internal diameter not less 85mm, while the use of muds shall be avoided.
To stabilize the bottom hole, without water, you shall keep water level within the borehole a little higher than piezometer level in the ground.
This precaution has to be taken also during the installation.

The needed tools are: depth meter, bentonite pellets, teflon tape, adhesive tape, jig saw.

Installation scheme without filter



Casagrande installation scheme with seal



GENERAL RECOMMENDATIONS

- Saturate the cell as explained in the previous paragraph;
- flush accurately the hole with clean water until doesn't get out clear water;
- use fine sand or gravel (Ø max 0.5 cm);
- if the piezometer is expected to be at an intermediate quote, fill in the empty part with a mix of water/cement/bentonite in order to recreate the consistency of the original ground;
- wrap the teflon on the threads to secure the holding. Join two casings using the couplings;
- be careful when you screw the casings to the filter cell. Handle the cell using the black upper junction. DO NOT handle it by the filter. Screw without forcing. If there is a double casing, tie them together with adhesive tape;
- lower the casings in the borehole by hand. Be careful. Don't use pliers;
- let the casing stick out the ground for 20-30 cm (if necessary);
- recover the coverings ensuring that the instrument will not be lifted;
- use the protective cap to protect the casing.

For Casagrande casing

To create the cap, pour the bentonite in more stages; each layer shouldn't be more than 25÷30 cm thick.
Compact the bentonite pellets with a pestle (not supplied) of suitable dimensions.
Verify with the depth meter the solidity of the cap and the quote reached.

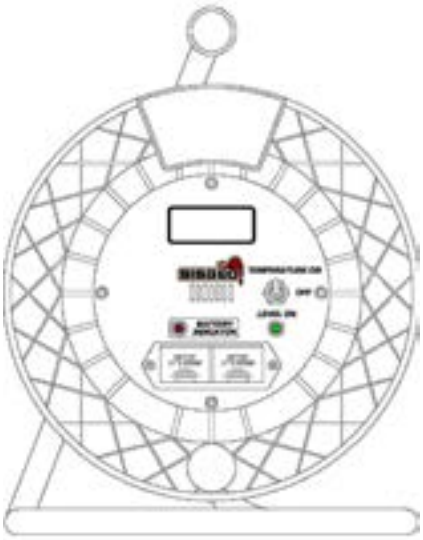
Note: if there is a waterproof ground coat higher then the layer you have been measuring, it is recommended that the bentonite cap is made at the same height of the layer to restore the continuity.

If you need to install two piezometers (with two different layers) in the same borehole, it will be necessary to make two filtering coats and two seals.
Pay attention to the stratigraphy and to the permeable and waterproof ground's coats thickness.
In this case the internal diameter of the casings must not be less then 110mm.

TAKING MEASUREMENTS

To perform a measurement you have to gather the water level quote within the casing, using the graduated tape of the water level indicator.
It's important that the measurement is taken always at the same quote.
Usually the reference is the casing head.
The topographyc survey of the casing height is useful to define the layer level measurement as absolute value.

1. Drop carefully the probe in the piezometer casing until you hear a sound and the led switches on;
2. lift the probe until the sound stops;
3. if necessary shake a little the graduated tape to remove any drop of water that would stick on the probe and create a false signal;
4. drop slowly the graduated tape until you reach precisely the level;
5. gather the value in the chosen reference point;
6. rewind the tape on the reel;
7. clean accurately the probe. Do not use solvents or strong detergents.



MEASURE WITH WATER LEVEL INDICATOR/ TEMPERATURE

The water level probe can be supplied with temperature sensor to gather the temperature at different heights.

- Turn the switch (ON/OFF) on *ON*. Level measurement is active;
- follow the steps as described earlier;
- move the switch in a central position to turn it off;
- move the switch on *temperature ON* to gather the temperature in °C on the display. Attention: the probe must be underwtater to work. Wait 10/15 seconds (or the time needed) in order to adapt the steel probe to the temperature in the casing;
- move the switch in a central position to turn it off;
- rewind the tape on the reel;
- clean accurately the probe. Do not use solvents or strong detergents.

CASAGRANDE PIEZOMETER

With double casing installation, if the measurements taken in the casing will become very different, in time, is recommended to clean the filter cell in order to clean the casings and the filter from impurities or air bubbles.
Enter, in one of the two casings, clean water at the minimum pressure needed for a forced flow, making it leave from the other casing.

TROUBLESHOOTING

Problem	Possible cause	Solution
There is no sound	Low battery	Change the battery
Non-stop sound	False contact caused from waterdrops or sticky liquids.	Shake lightly the graduated tape to remove the waterdrops.

SERVIZIO MANUTENZIONE

After-sales assistance for calibrations, maintenance and repairs, is performed by SISGEO's service department.
The authorization for shipment shall be activated by RMA "Return Manufacturer Authorization". Create your account and then fill in the RMA module clicking on:

http://www.sisgeo.com/repairs.html

Send back the instrument/equipment with the complete accessories, using suitable packaging, or, even better, the original ones.
The shipping costs shall be covered by the sender.

Please return to the following address with correct delivery documentation:

SISGEO S.r.l.
Via F.Serpero, 4/F1
20060 MASATE (MI)

On the delivery document it is mandatory to indicate the RMA code received.

Technical assistance e-mail: ***assistance@sisgeo.com***