PASI

User Manual



CHE - BOREHOLE SEISMIC ENERGIZER "P/S waves"

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2.Important Notice

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This guide refers to CHE - BOREHOLE SEISMIC ENERGIZER "P/S waves"

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3. Warranty and safety instructions

Read these instructions carefully before using the product:

- In order to use the instrumentation profitably and correctly, it is necessary to have geological-geophysical skills; upon request we can provide a bibliography in which the titles of some texts to consult, if necessary, are given.
- This instrument was designed and built to make it possible to carry out in-hole seismic energizations to make cross-hole measurements, generating P waves and S waves.
- The warranty will be void, if the product is used without following the instructions outlined in this manual.
- The warranty will be void if the device has been tampered with.
- The device must be used only in accordance with the instructions described in this manual. Correct and safe operation of the device can only be guaranteed if the transportation, storage, handling and use of the device is suitable.
- To avoid damage, use only original or PASI srl approved accessories.

4. Description of the bore-hole energizer



FIGURE 1 BORE-HOLE ENERGIZER "CHE"

Figure 1 shows the bore-hole energizer for CROSS-HOLE measurements model "CHE". The image shows the energizer and the air compressor required for the procedure of clamping the energizer in the bore-hole.

5.Methodology

The bore-hole energizer model "CHE" is designed to carry out bore-hole measurements of the Cross-Hole type.

The objective of down-hole and cross-hole seismic measurements is to determine the propagation velocity of body waves (P-waves, SH-waves, compression waves and shear waves) within the medium around the borehole.

To make cross-hole measurements, at least two boreholes are necessary where the seismic energizer "CHE" and the borehole geophone can be inserted, respectively.

The basic configuration for making measurements is shown in figure 2 below.



FIGURE 2 BASIC CONFIGURATION FOR MAKING CROSS-HOLE MEASUREMENTS

The objective of the measurements is to estimate the elastic properties of the subsurface through the determination of the Poisson's ratio and YOUNG's modulus necessary for the definition of soil stiffness and bearing capacity.

6.Instruction for use

1. First of all, connect the cross-hole energizer to the instrument trigger (refer to the seismograph user manual). Put the instrument in acquisition mode. Make some test hits by pulling the steel cable up or letting it drop down. If everything is ok the instrument should make the acquisition only when reaching the bottom or the top.

ATTENTION: In case the acquisition starts with light movements of the probe, you can reduce the sensibility of the energizer's trigger by turning the trigger sensitivity knob (figure 3). Turning left the knob at its minimum you can reduce the sensitivity, otherwise you can increase the sensitivity turning the knob clockwise.

2. Connect the air compressor to the power supply (12 V) (figure 6).

3. Unroll the cable of the length you need for the test.

4. Connect the air compressor to the connector on the energizer cable reel to allow the air to circulate (figure 3).

5. Verify the clamping system correct functioning by moving the lever on the reel in + (figure 3) and switch on the air compressor, switch off the air compressor and after that move the lever in - position for unclamping (figure 4 and 5).

6. Begin to let down the energizer in the borehole till the necessary depth for the test using only the steel cable (figure 8).

7. When you reach the desired depth inside the borehole push the lever to + (figure 3) to clamp the energizer to the borehole walls and switch on the compressor for clamping (make sure to keep the pressure below 6 bar)

8. By pulling on the steel cable (figure 8), pull up to execute the first shot

9. The trigger installed on the energizer will start the acquisition for the "P/S".

10. To perform the second measurement, you will have to drop the mass to start the acquisition (figure 8).

11. After making both acquisitions unclamp the energizer by pushing the lever to - position (figure 3) and move it to the next testing depth. Repeat all the steps from 7 to 10 for each shot.

12. At the end of all testing the energizer must be pulled out from the borehole, the tube must be disconnected from the reel by pushing with to fingers the green ring of the

connector and with the free hand pulling out the tube (figure 3). Remember to wash and clean the instrument from all mud and soil. If necessary, apply lube to the moving parts.



FIGURE 3 CONTROL PANEL



FIGURE 4 CLAMPING IN LOCKED POSITION



FIGURE 5 CLAMPING IN UNLOCKED POSITION



FIGURE 6 AIR PUMP WITH CIGAR LIGHTER CONNECTOR AND EXTERNAL BATTERY ADAPTOR



FIGURE 7 TRIGGER CONNECTION



FIGURE 8 ENERGIZER PROBE DETAIL