



INSTRUCTION MANUAL

INCLINOMETER PORTABLE DATA LOGGER

Model ACCULOG-X

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APPENDIX

1 PRODUCT

1.1 GENERAL DESCRIPTION

The ACCULOG-X is a portable inclinometer probe data logger housed in a light and robust, splash-proof, shock resistant ABS plastic case. The unit is completely watertight with the cover closed. With the cover opened, the probe connected and the battery charger and trigger switch connectors in place the unit is splash proof.

The ACCULOG-X is designed to read and store data from force balanced servo accelerometer inclinometer probes and tiltmeters used in the study of the stability of natural sites and civil engineering works. The ACCULOG-X will also read and store volts and mA.

Landslides (banks, slides and cliffs) as well as movements of civil engineering works (foundations, retaining walls, piers, tunnels, dams and bridges) can be monitored over time. Horizontal inclinometer probes are used to monitor settlement of foundation materials, structures and earth or rock embankments.

ACCULOG-X Features

- Interactive menu interfaces make it simple to use.
- Large 160x160 pixel, graphic LCD display with backlight, shows the current depth and readouts for both A/B axes simultaneously.
- Increments automatically after validation of each data point.
- Supports both uniaxial or biaxial inclinometer probes.
- Compatible with most servo-accelerometer based inclinometers, tiltmeters and electro-level tilt sensors.
- Provides a monitoring mode (continuous readings) compatible with 4-20mA, 0-16mA transducers, linear potentiometers, LVDTs, and any other type of transducer with voltage output range comprised within ± 10 Volts.
- Multi data output format: ASCII, spreadsheet and G-Tilt compatible formats.

Hardware

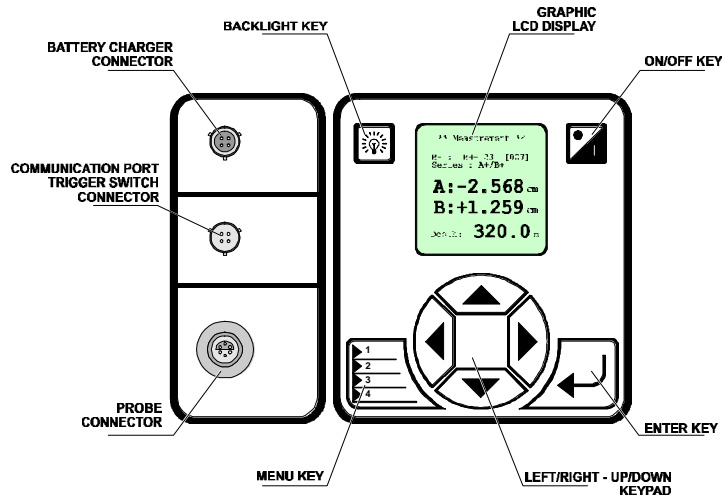
The unit is supplied complete with a battery charger, a remote trigger switch, a data transfer cable and ACCUTALK utility software. An optional jumper cable equipped with battery charging cable clamps is also available to connect an external supply.

Power Supply

The readout unit may be powered by either two internal rechargeable, 12V, 2.3A.h, batteries, or an external 12V battery. Under normal conditions, the unit can provide up to 8 hours operation when properly charged.

1.2 FRONT PANEL

ACCULOG-X front panel comprises 3 connectors, a graphic LCD display and function



keys.

ACCULOG-X Front Panel.

1.2.1 CONNECTORS

Three connectors with splash-proof caps are provided on the front panel:

- Power Connector: the power input for a battery charger or an external 12V battery (requires optional cable with clips).
- Interface Connector: provides a serial communication port (RS-232) and a remote trigger switch input.
- Probe Connector: supports the inclinometer probe cable or a jumper cable, from a cable reel fitted with slip ring to which the inclinometer probe cable is permanently connected.

1.2.2 DISPLAY

The unit can be configured to display any engineering unit using the ACCUTALK utility software. Voltage readings are converted into engineering units by entering a fifth order equation according to the specific type of transducer.

1.2.3 FUNCTION KEYS:

The ACCULOG-X function keys, display and control switches are located on the front panel. They comprise:

Two system keys used to control directly the unit:



POWER ON/OFF KEY:

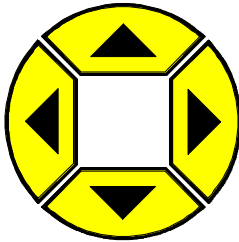
Use this key to toggle power on and off when working with the unit.



BACKLIGHT KEY:

Use this key to light on and off the display.

A keypad and two keys to make choices and settings:



LEFT/RIGHT - UP/DOWN KEYPAD

In a menu or sub-menu, use the **LEFT/RIGHT** or **UP/DOWN** keys to move the cursor from an option to another. In a data field, use the **UP/DOWN** keys to increase or decrease a digit or for scrolling through a list one item at the time, and the **LEFT/RIGHT** keys to move from one digit to another or for scrolling through a list ten items at the time.



<ENTER> KEY:

Use this key to select an option or validate a setting.



<MENU> KEY:

This key allows the user to return to the previous menu. This key may also be used to cancel undesired inputs.

1.3 PRODUCT SPECIFICATIONS

FEATURES	SPECIFICATIONS
Display	160x160 pixel, graphics display
Units	Metric and English, as selected according to the probe type
Function Key	Six function keys are provided to navigate within interactive menus ON/OFF key and ON/OFF Backlight key
Storage Capabilities	128 Kbyte of Static RAM with lithium battery backup : permits 10 000 A/B-axis readings or 20 000 readings for up to 250 data sets Flash memory for factory issued software updates
Data Output Format	ASCII, Spreadsheet and G-Tilt compatible formats
Probes	- RT-20M - RT-20HM RT-SE - RT-20EU - RT-20E - RT-SM - RT-20MU - And any probe compatible with 4-20mA, 0-16mA and $\pm 10V$ ranges
Probe Input Range	$\pm 10VDC$
Readout Resolution	50 μV (analog), 20 bits (digital)
Input Impedance	> 10M Ω and 250 Ω for 4-20mA signal
Probe Supply	Programmable ($\pm 14VDC$ or 14VAC) @ 100mA
Interfacing	Communication Port: RS-232 9600 bauds Trigger switch for remote readouts
Power	Internal batteries: Two 12 volts, 2.3Ah rechargeable sealed lead-acid External battery charger input External power supply input
Connectors	4-pin female connector for external power input, and external battery charger 4-pin male connector for communication port, and trigger switch Probe Connector
Autonomy	8 hours with LCD LED Backlight on
Operating Temperature	-10°C to +70°C (-4°F to 160°C)
Case	Splash proof, shock resistant ABS casing, submersible when closed
Dimensions	12.5 x 25 x 27 cm (5 x 10 x 10.5 in)
Weight	4.5 Kg (10 pounds)
Software Utility	ACCUTALK WINDOWS user interface

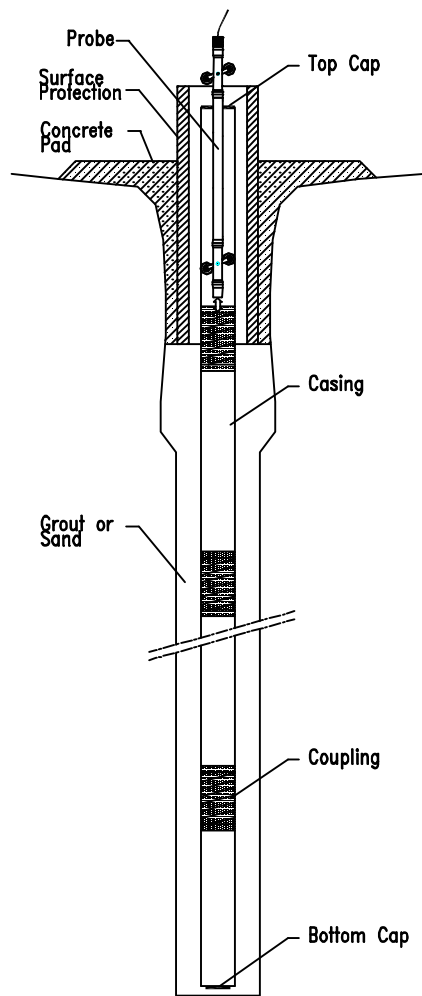
Readout Unit Specifications

2 MEASUREMENT SYSTEM

2.1 GENERAL

A complete inclinometer readout system is comprised of the inclinometer probe, the graduated electrical cable that also serves as a pulling cable, and the ACCULOG-X readout unit. The ACCULOG-X readout unit can also read inclinometer probes from other manufacturers. Please contact RocTest for information. The probe is inserted into the ground inside grooved plastic casing that deforms with its surroundings. The inclinometer probe measures horizontal displacements along the vertical axis. The orientation of the displacement is given by the in-situ orientation of the two orthogonal sets of grooves inside of the casing in which the probe travels.

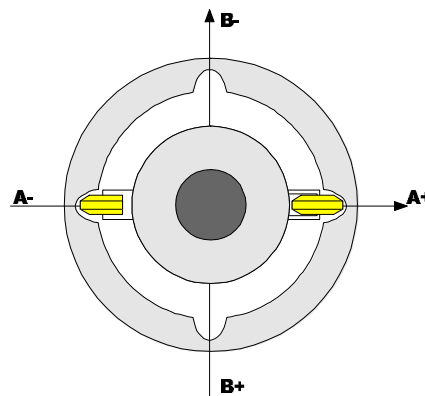
2.2 INCLINOMETER CASING



The inclinometer casing comprises:

- Plain or telescoping ABS plastic casing sections;
- Couplings to link 2 successive casing sections;
- A top cap;
- A bottom cap.

The casing has 4 longitudinal grooves referred to as A+ and A- for the first axis and B+ and B- for the second axis. These two sets of parallel axis form two planes located at an angle of 90° to one another. Once the inclinometer casing is installed, carefully record the X, Y, Z co-ordinates of the borehole collar, the orientation of the planes formed by the casing grooves, the length of casing exceeding ground surface (stick-up) and the total casing and borehole depths.



Schematic of Casing (Side and Top Views)

2.3 INCLINOMETER PROBE

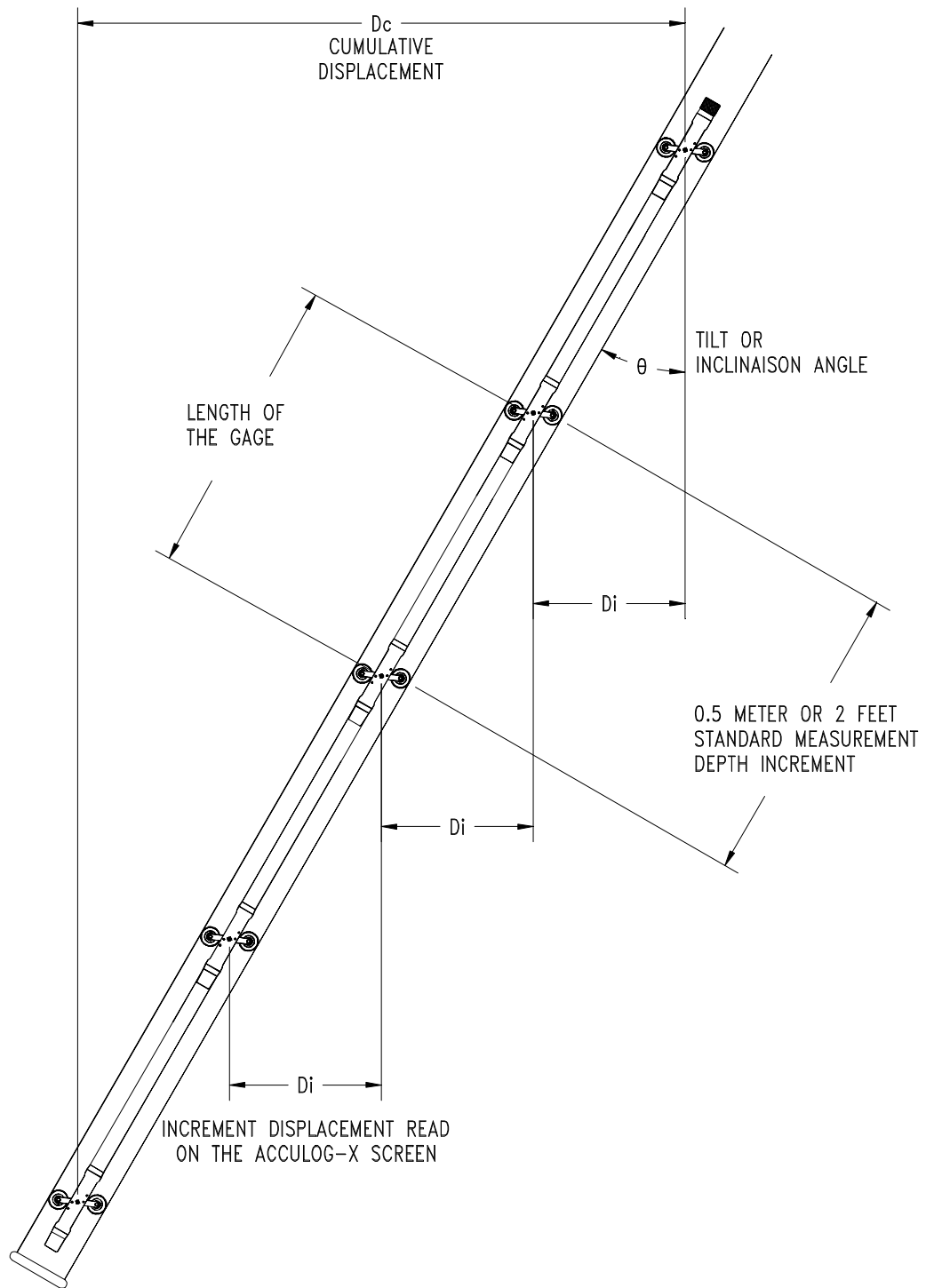
The Accutilt RT-20 probe consists of a 25 mm diameter cylindrical stainless steel core that houses the accelerometer assembly. The probe has an overall length of an approximate 0.75 meter (2.46 feet) and a measurement interval of either 0.5 meter (RT-20M metric probe) or 24 inches (RT-20E imperial probe).

Two fluids damped, forced-balanced, servo accelerometers are mounted in the probe core. The sensitive axes of the two accelerometers are 90 degrees apart. The A axis sensor measures the component of tilt in the plane containing the wheels. The B axis sensor measures the tilt in the plane at 90 degrees to the plane of the A axis measurements.

Two sets of 2 wheels are mounted on spring-loaded pivot arms nested in the core at both extremities of the probe. The wheels maintain the probe in the grooves, parallel to the casing axis. The measurement interval is the spacing between the two wheels.

The probe is factory calibrated. The operator can carry out systematic verifications on the site.

- Error due to a probe asymmetry is quantified by taking two sets of measurements with the probe rotated 180°.
- It is also recommended to ensure that the probe is functioning properly prior to a survey. If possible, the probe should be checked using a fixed multiple position reference frame. The current measured difference(s) between two positions should be confirmed with calculated reference values or prior values known to be precise. Otherwise, verifications can be carried out (control but not calibration) by placing the probe in an inclinometer casing grouted in a borehole drilled in stable ground and comparing the current reading with the true value.

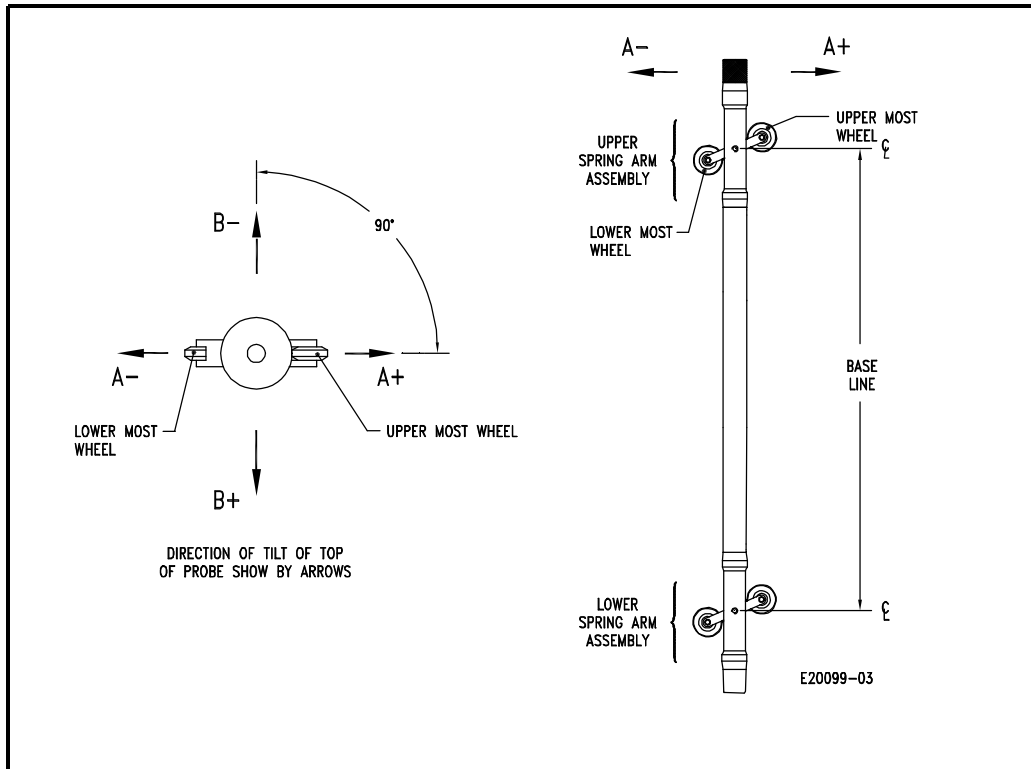


E20099-04

RT-20 Measurement Parameters Schematic.

2.4 TILT AXES AND POLARITY

The tilt axis and polarity are defined as shown in figure below. When you are taking a reading with the readout unit (during the initial A_0 run), a positive value of A indicates a tilt on the probe's side with the upper most wheel. Positive values of B indicate a tilt (i.e. displacement) in a direction of 90 degrees from the positive axis of A; when the positive A axis is facing North, the positive B axis is toward the East.



Polarity of the probe

Note: The polarity is not the same for probes of all manufacturers. Verify polarity before carrying out the first measurements.

2.5 ELECTRICAL CABLE

The electrical cable is graduated at regular intervals (usually every 0.5 meter or 2 feet). The cable contains a central strain member and is specially constructed to maintain the correct distance between the graduated intervals. A storage reel or a reel fitted with a slip ring connection and jumper cable to the readout unit is optional. The latter allows the inclinometer to be remained coiled and connected to the ACCULOG-X logger.

2.6 VERIFICATION OF INCLINOMETER CASING

A systematic verification of the inclinometer casing before each measurement session can be carried out, with a dummy probe having the same geometry and weight as the instrumented probe. This is especially advisable when one of the following conditions is suspected.

- Casing damage.
- Casing deformation exceeding the minimum bend radius.
- Large deformation rates.

2.7 INITIAL READINGS AND DATA PRESENTATION

The readings from the initial survey, taken after the casing is first installed, become the set of readings to which all subsequent readings sets are referred to calculate and construct the time history plots of the cumulative horizontal displacements vs. depth for the A and B axes.

The time periods between surveys together with the cumulative displacements are used to calculate the displacement at each measurement depth interval. This data is used in turn to construct plots of ground displacement vs. time for each reading interval depth.

Any set of readings can be used to calculate and plot the absolute position of the casing in plan or section.

2.8 MEASUREMENT PROCEDURES

2.8.1 STARTING UP BEFORE LOWERING PROBE

These are the first steps that you have to follow prior to starting up measurements.

1. Connect the cable to the probe. Ensure that contacts are clean, that the o-ring is not damaged and that the connection is tight.
2. Connect the ACCULOG-X readout unit to the electrical cable (reel).
3. Verify the battery voltage of the readout unit.
4. Select the borehole name previously defined and check the initialisation sequence results.

2.8.2 RAISING AND LOWERING THE PROBE

These are the steps that one have to follow in order to proceed to measurements.

1. Orient and insert the probe into the casing while ensuring that the markings A+ and B+ are consistent with the position of the wheels in the casing and with the polarity. Record the orientation. The pulley assembly, at the top of the tubing, guides the cable and prevents intense wear on the cable marks. The cable clamp facilitates the measurements by holding the probe in place during the readings.
2. Carry out measurements starting from the bottom and proceeding to the top of the casing. When the casing is filled with water, or when there is a large difference between the ambient air and the downhole temperature, the probe must be kept at the bottom of the borehole for up to 15 minutes to allow temperature stabilisation. Stable A and B readings indicate temperature stability.
3. At each reading depth, allow a waiting period of 3 to 5 seconds for each measurement to stabilize before recording it. To improve the measurement accuracy, the cable must be taut and the ascent of the probe must be gentle.
4. Proceed to a second pass in the same groove with probe rotated 180° between passes. These two passes allow arithmetic averaging.

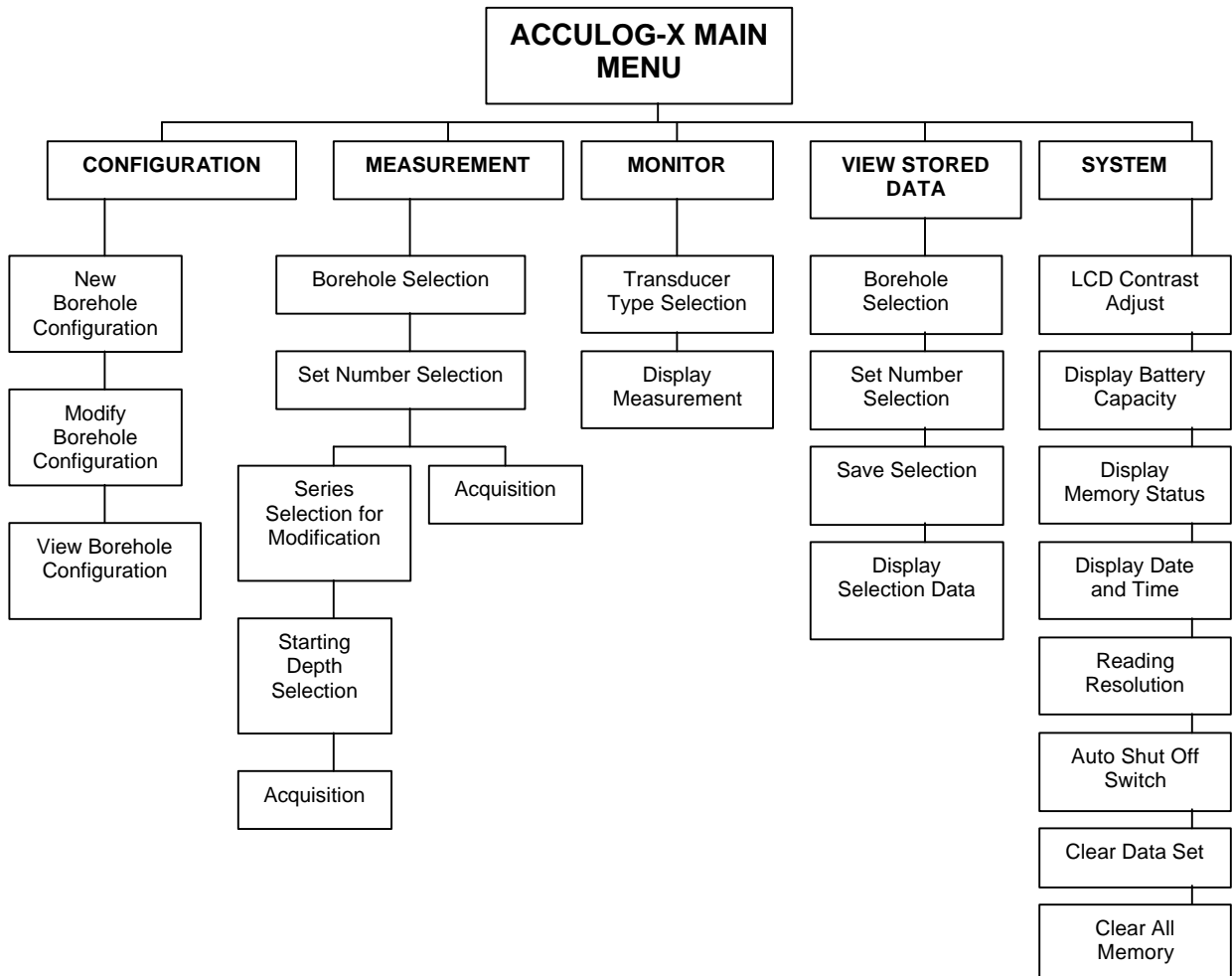
Please refer to your probe's instruction manual for specific instructions concerning your instrument.

3 OPERATING BASICS

This section describes the main menus available when working with the ACCULOG-X. It shows you how to navigate through the different menus and how to use the keys available on the front plate, and it describes connectors and their pinouts.

3.1 OVERVIEW

All functions of the ACCULOG-X are available through five sub-menus according to the diagram showed below.

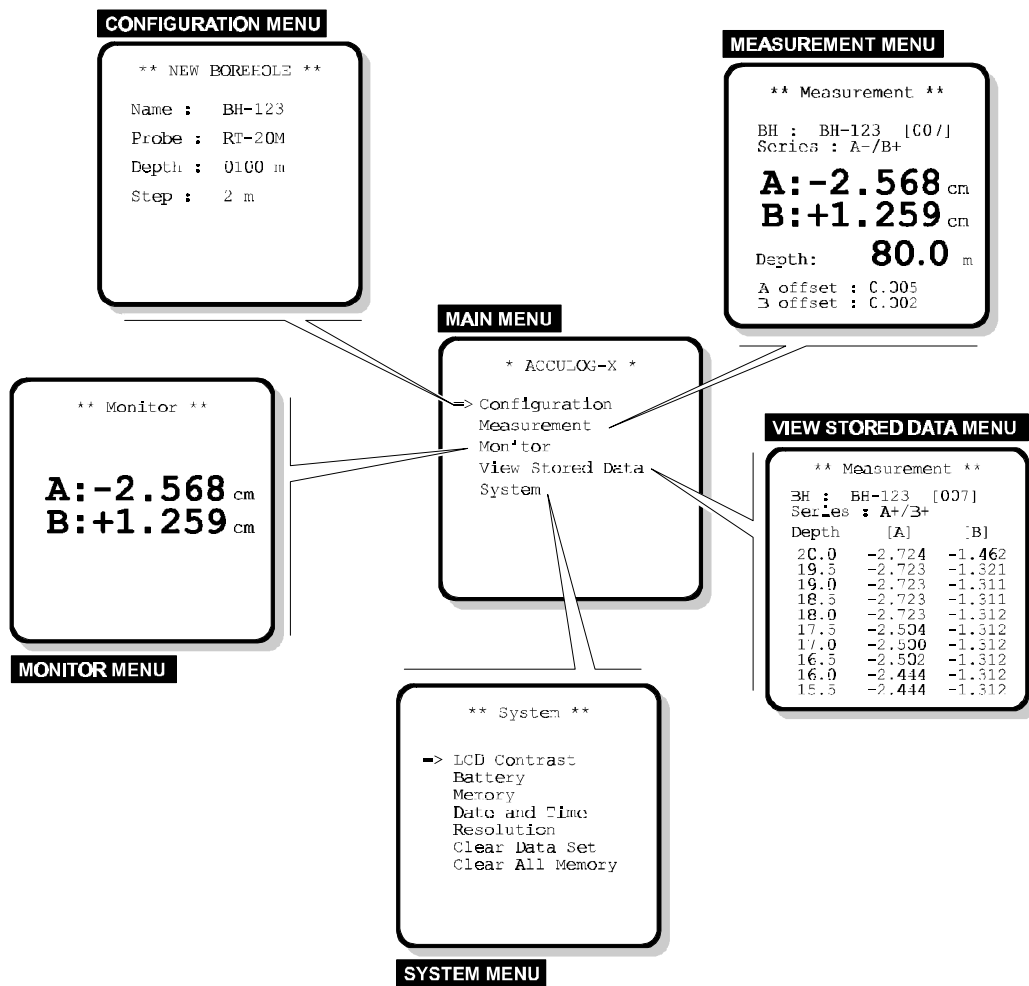


ACCULOG-X Menu.

3.2 MENUS AND CONTENTS

Some menus provide an arrow on the left border of the display to indicate the option selected.

- ☞ Use the **UP/DOWN** keys to move the arrow from one option to another.
- ☞ Use the **<ENTER>** key to select the option.



ACCULOG-X Menu Contents

3.2.1 CONFIGURATION

Use this function to configure the unit for measurement. A complete measurement set-up comprises the borehole's name definition, the probe type, the depth value, and the measurement step.

Note: It is recommended to prepare a complete borehole list according to the topographic drawing before proceeding to measurements in the field.

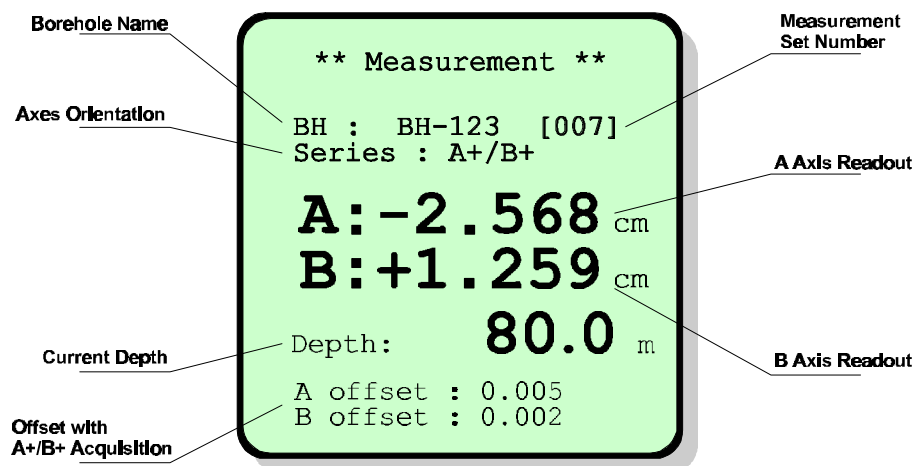
3.2.2 MEASUREMENT

This is the normal operating mode of the ACCULOG-X, during which measurement can be datalogged at intervals along the casing. Carry out measurements starting from the bottom and proceeding to the top of the casing. Several sets of measurements can be provided for a borehole. In such case, the unit will increment automatically the set number assigned to the borehole.

The number of recordings is limited by the size of the memory supported by the unit. With a 128KB internal memory, the unit is capable to store up to 20 000 measurements.

Note: Any set of measurements can be reacquired if any suspect values are detected. The new data will be stored over the previous values.

The measurement display content is described below:



Features Description

Borehole Name: The borehole's name must be selected within the borehole list that has been completed with specifications in the **Configuration** menu.

Set Number: The **Set Number** indicates the current number of the measurement process. The Set number is increased at the beginning of each new measurement set.

Axes Orientation: The information refers to the orientation plane reference according to the topologic specifications. The ACCULOG-X unit allows 180° opposed angle measurements referred as.

A complete measurement set is defined with both A+/B+ and A-/B- readings that provide measurement average within two 180° opposed readings (see **Offset** description).

A/B Readouts: The A and B readout values correspond to a linear displacement and, for the inclinometric probes pre-defined in the readout unit, conform to the following formulae:

$$\text{Readout} = \text{Probe Length} * \text{Sine (Tilt value)}$$

⇒ For example, if the probe's length is 0.5 meter and the inclination angle is θ , then we have: $D_i = 0.5 * \text{Sin}(\theta)$.

Current Depth: Displays the current depth of the probe.

Offset: The offset value is provided to improve the reliability of the measurement when proceeding to A-/B- readouts.

The offset value conforms to the following formulae:

$$\text{Offset} = ((\text{A+}/\text{B+}) \text{ readout} + (\text{A-}/\text{B-}) \text{ readout}) / 2$$

The lower the offset value is, the lower the difference between the A+/B+ and A-/B- readouts is, which means the more the measurement is reliable.

3.2.3 MONITOR

Use this mode to proceed to live measurements into a borehole, or to read transducers of other types compatible with the ACCULOG-X.

3.2.4 VIEW STORED DATA

This function is provided to list a set of measurements associated to a specific borehole. This will allow you to control the measurement values and, if required, proceed to new measurements.

3.2.5 SYSTEM

This option provides the following functions:

- LCD contrast:** Use this function to increase or decrease the contrast of the display.
- Battery checks:** Control the charge of the internal battery by selecting this function. A proper battery charge must be within +11.8 volts and +13.5 volts.
- Memory:** Use this function to display the total occupation of data stored in the memory.
- Resolution:** Use this function to increase or decrease reading resolution.
- Auto shut off:** Use this option to activate or deactivate the unit auto shut off mode. Shut off will occur if you do not use the unit during 15 minutes.
- Clear Data Set:** This function is provided to erase all measurements from the memory. Once they are cleared, you will not be able to retrieve them. Transducer and borehole configuration will be kept.
- Clear Memory:** This function is provided to clear the content of the memory. Pay attention. Once it is cleared, all the data you have stored will be lost, including the pre-defined transducer and borehole configuration. Default configuration will then be set.
- Date & Time:** Display the current setting date and time.

4 REFERENCE

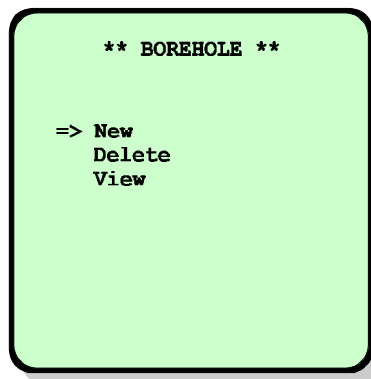
This section describes how to set up the ACCULOG-X when proceeding to measurements in the field by direct keypad programming of the unit.

Alternatively for fast and efficient set-up operations, we recommend you to use the ACCUTALK utility software on a PC to configure the unit and prepare measurements. The complete set-up can then be downloaded to the ACCULOG-X by means of the RS-232 connector.

Setting the unit from the front plate keys must be a complementary operation to complete some settings when proceeding in the field.

4.1 CONFIGURATION SUB-MENU

- ☞ In the **Main menu**, select the **Configuration** option and press the **<ENTER>** key to display the **Configuration** sub-menu.



Each item of this sub-menu is described below.

4.1.1 NEW OPTION

Use this option to create a new borehole configuration. The settings include the name, the measurement probe type, the depth from where the measurements will begin, and the measurement step.

- ☞ At the **Configuration** sub-menu, press the **UP/DOWN** keys to select the **New** function.
- ☞ Press the **<ENTER>** key to open the **New** sub-menu.

Name Field: The name field is limited to 8 digits.

- ☞ Press the **LEFT/RIGHT** keys to move from one digit to another.
- ☞ Press the **UP/DOWN** keys to change the digit value.
- ☞ Press the **<ENTER>** key to continue, or the **<MENU>** key to return to the previous menu.

Probe Type: Six probe types are pre-programmed in the unit:

- ☞ Press the **<ENTER>** key.
- ☞ Press the **UP/DOWN** keys to choose a probe, then press the **<ENTER>** key to select, or the **<MENU>** key to return to the previous menu.

The available probe types and their characteristics are listed below.

POBE MODELS	UNITS	CHARACTERISTICS
RT-20E	ft	Biaxial measurement
RT-20EU	ft	Uniaxial measurement
RT-20M	m	Biaxial measurement
RT-20MU	m	Uniaxial measurement
RT-20HM	m	Uniaxial (horizontal) measurement - Single pass
RT-SE	ft	Spiral measurement
RT-SM	m	Spiral measurement
RT-11	Sin(θ)	Tiltmeter
DC VOLT	V	$\pm 10V$ Voltmeter

Pre-programmed Probe Types

Note: *Other types of probes or transducers can be programmed by the operator by using the ACCUTALK utility program.*

Depth Value: The depth field supports four digits so as it may be configured within a range from 0 and 999 feet or meters according to the probe model you have selected previously.

- ☞ Press the **LEFT/RIGHT** keys to move from one digit to another.
- ☞ Press the **UP/DOWN** keys to change a digit value.
- ☞ Press the **<ENTER>** key to continue, or the **<MENU>** key to return to the previous menu.

Step Value: The measurement steps can be set within a range from 0.5 to 999 (feet or meter) in 0.5 step:

- ☞ Press the **UP/DOWN** keys to change the step value.
- ☞ Press the **<ENTER>** key to validate all settings and finish the set-up, or press the **<MENU>** key to return to the previous menu.

4.1.2 DELETE OPTION

Use this option to suppress an item from the borehole list.

- ☞ At the **Configuration** sub-menu, press the **UP/DOWN** keys to select the **Delete** function.
- ☞ Press the **<ENTER>** key to display the borehole list.
- ☞ Press the **UP/DOWN** keys to select a borehole.
- ☞ Press the **<ENTER>** key to suppress its content.
- ☞ Press the **<ENTER>** key again to confirm the operation and return to the previous menu, or press the **<MENU>** key to return to the previous menu without suppressing.

Warning!

Do not forget that when you use this option, you erase all readings related to a specific borehole.

4.1.3 VIEW OPTION

Use this option to display the measurement configuration assigned to a specific borehole.

- ☞ At the **Configuration** sub-menu, press the **UP/DOWN** keys to select the **View** function.
- ☞ Press the **UP/DOWN** keys to select one item in the borehole list, then press the **<ENTER>** key to display the set-ups.

Measurement settings are:

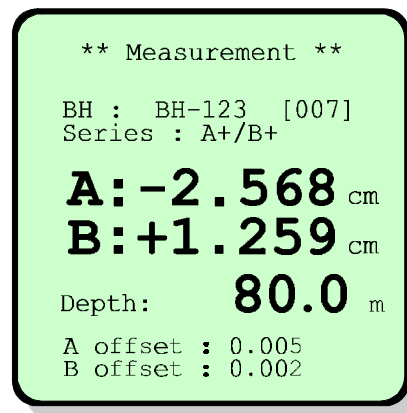
- The borehole name
- The probe type
- The depth
- The measurement step
- The number of measurement set (data set)

- ☞ Press the **<ENTER>** or **<MENU>** keys to return to the previous menu.

4.2 MEASUREMENT SUB-MENU

Measurement is the process of acquiring data provided from the test probe. Each measurement set is assigned to a specific borehole and its set number.

- ☞ At the **Main** menu, select the **Measurement** option, then press the **<ENTER>** key.



- ☞ Press the **UP/DOWN** keys to select the borehole you want to survey, then press the **<ENTER>** key.

When the selected borehole stores more than one measurement set, the set number appears on the display. By default, the unit is ready for a new set of measurements and the set number is assigned automatically for this.

- ☞ Press the **UP/DOWN** keys to select the set number of a previous measurement and proceed to new measurements over the stored data set.
- ☞ Press the **<ENTER>** key to start measurements. The unit enters an initialising sequence, provided probe is connected. This operation lasts about 5 seconds and proceeds to the internal adjustment.
- ☞ Lower the probe in the borehole, then press the **<ENTER>** key to start the measurements.
- ☞ Press the **<ENTER>** key to proceed to the measurement.
- ☞ Pull up the probe one step according to the step value defined in the **Configuration** menu.

Warning!

To improve the reliability of your measurement, at each measurement step, a 3 to 5 seconds delay time is required to ensure that the reading has stabilised.

- ☞ Press the **<ENTER>** key to proceed to a new measurement.
Repeat the operation up to the surface.
At the end of the A+/B+ measurement set, repeat the above measurement steps to acquire the A-/B- data set, or press the **<MENU>** key to return to the **Main** menu.
- ☞ Press the **UP/DOWN** key to select a previous depth to correct an invalid data. Press the **<ENTER>** key to substitute the old measurement by the display readout.

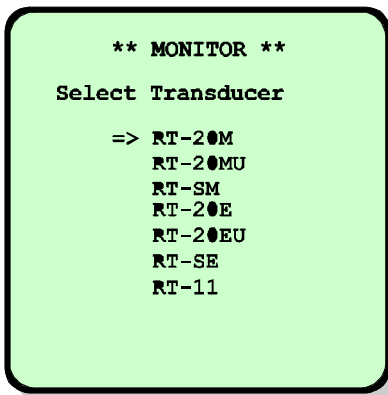
Note: If connected, operating the trigger switch while proceeding to measurements, acts the same way as pressing the <ENTER> key.

4.3 MONITOR SUB-MENU

The monitoring mode (**Monitor** option) allows you to proceed to live measurements using any type of transducers.

This mode makes the ACCULOG-X very versatile to be used with various types of probes while proceeding to continuous measurements. This mode supports transducers such as: 4-20mA, 0-16mA transducers, linear potentiometers, LVDTs, and any other type of transducer with voltage output range comprised within ± 10 Volts.

- ☞ Select the **Monitor** mode, then press the **<ENTER>** key.



- ☞ Select the probe type you will use for the measurement, then press the **<ENTER>** key.
- ☞ Ensure the probe is properly connected to the unit, then press the **<ENTER>** key to proceed to measurements.

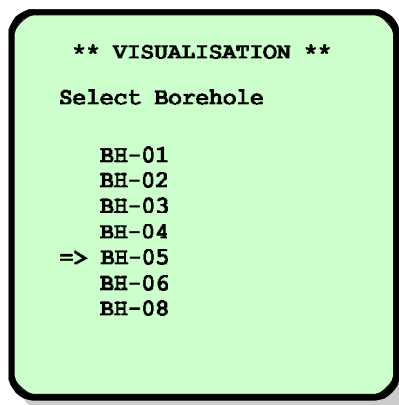
- ☞ Press the <ENTER> key to suspend or resume the measurements. Doing so allows exiting the monitor mode and returning to the **Main** menu.

Note: When running the Monitor mode, the ACCULOG-X does not store the data provided by the probe. This feature is provided for visual control only.

4.4 VISUALIZATION SUB-MENU

Select this option to display a complete set of measurements according to a specific borehole and its set number.

- ☞ At the **Main** menu select the **View Stored Data (Vizualisation)** option and press the <ENTER> key to display the borehole list.



- ☞ Press the **UP/DOWN** keys to select a borehole, then press the <ENTER> key.
- ☞ Press the **UP/DOWN** keys to select the measurement **Set number**, then press the <ENTER> key to list the stored values.
- ☞ Press the <ENTER> key to proceed to the data listing.
- ☞ Press the **UP/DOWN** keys to navigate within the list, one item at the time.
- ☞ Press the **LEFT/RIGHT** keys to navigate within the list, ten items at the time.
- ☞ Press the <MENU> key to return to the previous menu.

Note: The View Stored Data (Visualization) does not allow set-up changes, or measurement operations. This feature is provided for a visual control only.

SYSTEM SUB-MENU

The **System** sub-menu provides the following features:

- ☞ At the **Main** menu, select the **System** option and press the <ENTER> key to display the **System** sub-menu.



The sub-menu summarises features used to control the internal configuration of the ACCULOG-X. They are described as follows:

4.4.1 LCD CONTRAST

Use this option to adjust the contrast value of the LCD display.

- ☞ At the **System** sub-menu, press the **UP/DOWN** keys to select the **LCD Contrast** option, then press the <ENTER> key.

[--- | -----]

- ☞ Press the **LEFT/RIGHT** keys to decrease/increase the contrast value.
- ☞ Press the <ENTER> or <MENU> key to save the new set-up and return to the previous menu.

Note: *The readout unit adjusts automatically the display contrast only at power up. Changing the display contrast may be required when the battery charge level is becoming low, or when the external temperature changes.*

4.4.2 BATTERY

Use this option to display the voltage of the battery. The optimum battery voltage value should range within 11.8 and 13.5 volts to ensure the ACCULOG-X to work properly.

In normal working conditions, the battery autonomy is about 8 hours.

☞ Press <ENTER> or <MENU> key to return to the previous menu.

Warning ! Make certain the ACCULOG-X is connected to a battery charger as soon as a low battery status appears.

Note: The ACCULOG-X warns the user by displaying “Low Battery” and sounding. If battery voltage drops under 11.0 Volts, the unit will shut off automatically, but no data are lost.

4.4.3 DATE AND TIME

Use this option to display the date and the time of the internal clock.

☞ Press <ENTER> or <MENU> keys to return to the previous menu.

Note: Date and time cannot be changed directly on the unit. New values must be downloaded from the ACCUTALK utility software via the RS-232 communication port.

4.4.4 MEMORY

Use this option to display the current data occupation in the memory of the ACCULOG-X. The value is provided in percent.

☞ Press <ENTER> or <MENU> key to return to the previous menu.

4.4.5 RESOLUTION

Use this option to increase or decrease reading resolution

4.4.6 AUTO SHUT OFF

Use this option to activate/de-activate the unit auto shut off mode. Shut off will occur if you do not use the unit during more than 15 minutes.

4.4.7 CLEAR DATA SET

Use this option to clear measurements from the memory.

- ☞ Press the **UP/DOWN** keys to toggle your answer (**YES/NO**).
- ☞ Press the <ENTER> key to clear all measurements, or the <MENU> key to exit the option and return to the previous menu.

Warning !	This option clears all measurement sets located in the memory of the unit. Only the borehole parameters and probes definitions are kept.
------------------	---

4.4.8 CLEAR ALL MEMORY

Use this option to clear measurements, and borehole and transducer parameters from the memory.

- ☞ Press the **UP/DOWN** keys to toggle your answer (**YES/NO**).
- ☞ Press the **<ENTER>** key to clear all data, or the **<MENU>** key to exit the option and return to the previous menu.

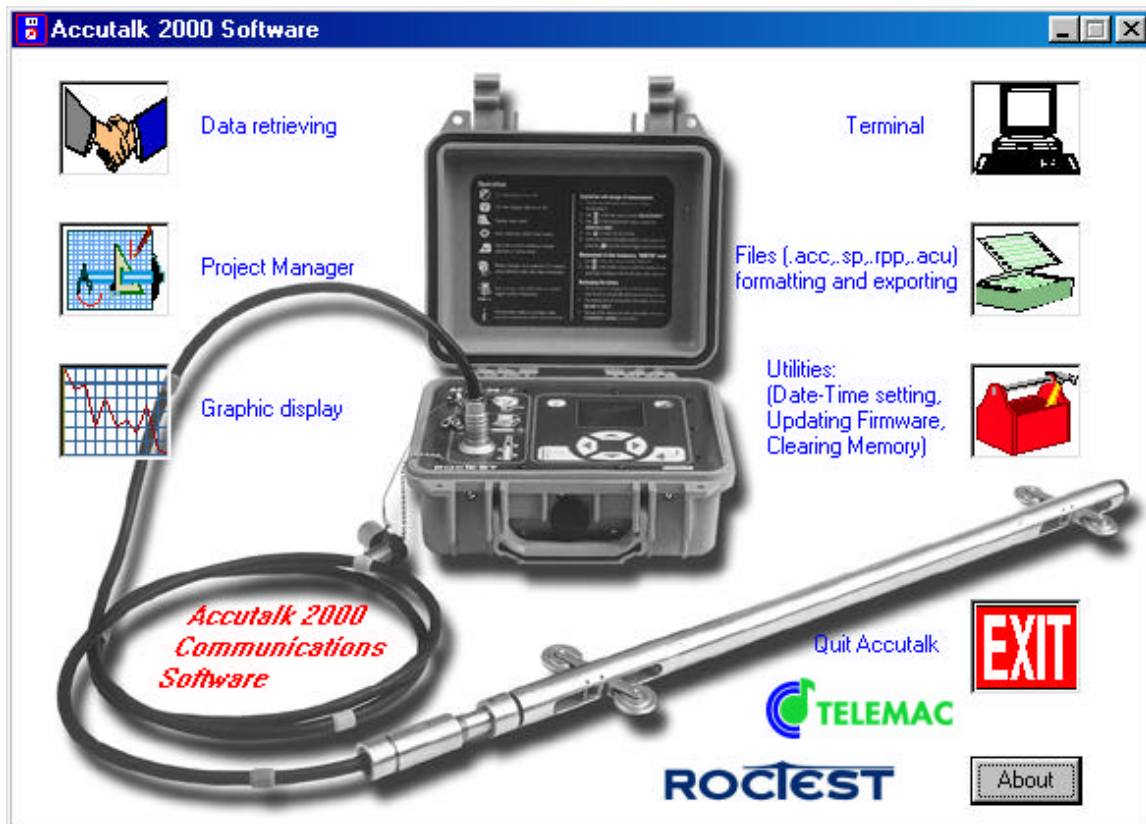
Warning!	This option clears measurements, borehole parameters, and transducer parameters. Default probes definitions are set.
-----------------	---

5 ACCUTALK 2000 FOR WINDOWS

5.1 GENERAL DESCRIPTION

The following section contains general operating information for the ACCUTALK 2000 Communication software. The ACCUTALK software is used to download data to PC, to configure boreholes and transducers, to generate outputs files, to modify ACCULOG-X settings, and as new feature to plot graphs. The **Main screen** is your point-of-entry into the ACCUTALK. It provides accesses to overall control functions using different subscreens. Unlike ACCUTALK 2.00 for DOS, ACCUTALK 2000 is a win 95/98 based application and provides a user-friendly graphic environment.

The **Main screen** appears as follows:



From this menu, you may access the following Subscreens:

- Data Retrieving
- Project Manager
- Graphic Display
- Terminal
- Files Formatting and Exporting
- Utilities
- About

5.2 SUBSCREEN GENERAL DESCRIPTION

SUBSCREEN	FUNCTIONS
Data Retrieving:	Downloading datasets and projects from readout unit to a selected ".ALX" format file.
Project Manager:	Creating and transferring projects (i.e. transducers and boreholes configurations) to / from the ACCULOG-X
Graphics display:	Plotting graphs from selected datasets.
Terminal:	Communicating with readout unit in terminal mode.
Files Formatting and Exporting:	Formatting files for boreholes selected from a ".ALX" file.
Utilities:	Clearing readout unit memory, setting date and time, updating firmware.
Exit:	Quitting ACCUTALK 2000 software.
About:	Displaying software release information.

5.3 INSTALLING THE ACCUTALK UTILITY ON YOUR PC

In order to install the ACCUTALK utility, you must have WINDOWS 95/98 as operating system on your computer.

Under WINDOWS environment, proceed as follows:

1. Close all application and insert disk 1 in floppy drive.
2. Click on “**Start**” then “**Run**”.
3. Type “**A:setup**” or click on “**Browse**” then select file “**Setup**” from disk 1.
4. A message asking to close applications will appear, click on “**OK**”.
5. A directory is suggested. To change this directory click “**Change Directory**”.
6. Click on the icon to start the installation.
7. Installation is now complete.

5.4 GENERAL

Project:	In this manual, “project” means transducers and boreholes configuration.
“.ALX Files”:	These files contain all datasets and projects related to them. Project with no dataset are not included.
“.ACX Files”:	These Files contain projects only. No datasets are included

5.5 DATA RETRIEVING

ACCUTALK 2000 mainly works with “.ALX” files. To create such a file, use the **Data Retrieving** subscreen.

1. Be sure that the ACCULOG-X unit is turned on and properly connected to the computer through serial port.
2. Click on the **Data retrieving** subscreen.
3. Click on “**Browse**” to select the directory where you want to save the file and to write the name of the file.
4. Click on “**Save**”.

Note:

When the retrieving operation is started, the ACCULOG-X cannot be interrupted using ACCUTALK. Only manual resetting of the ACCULOG-X will interrupt it.

5.6 PROJECT MANAGER

Before starting measurement sets in the field, you should configure the ACCULOG-X unit the ACCUTALK 2000, which provides a much more comfortable interface. First, make sure to have a borehole list according to the topographic drawings and information that specifies each borehole. These are the borehole name(s), the probe used while proceeding to measurements, the depth(s) from where measurements will begin, and the measurement step(s). Then, enter the settings as following.

5.6.1 CREATING A NEW PROJECT

1. Click on **“Create a new project”**.
2. A warning message then appears. Click **“OK”** if current project has been saved or if there is no current project.
3. A message asking you to use initial transducers setting will appear. Click **“Yes”** to use factory setting for transducers.
4. You are now able to specify your borehole and to modify or add your transducers setting.

5.6.2 ADDING / MODIFYING TRANSDUCERS

To add a new transducer:

1. Click on the **“Transducers”** folder.
2. Click on **“Add a new transducer to the current project”**.
3. A message box prompts you for the transducer name. Write an 8-character name for the new transducer. Then click **“OK”**.
4. Fill setting for the new transducer.

To modify existing transducers:

1. Click on the transducer name.
2. Change setting for the selected transducer.

5.6.3 ADDING / MODIFYNG BOREHOLES

To add a new borehole:

1. Click on the **“Boreholes”** folder.
5. Click on **“Add a new borehole to the current project”**.
2. Enter the name of the new borehole then click **“OK”**.
3. Select the probe from the drop-down list.
4. Modify setting for depth and step.

To modify existing boreholes

1. Click on the borehole name.
2. Change setting for the borehole.

Note:

You cannot add borehole if there's no transducers defined.

5.6.4 DELETING A BOREHOLE / TRANSDUCERS

1. Click on either “**boreholes**” or “**transducers**” folders.
2. Click on “**Remove an item from the current project**”.
3. Select items to delete by checking proper boxes.
4. Click “**OK**”.

5.6.5 SAVING THE PROJECT TO DISK

You may save your project to a “.ACX” file by doing the following:

1. On the left side of the screen, click on the project folder.
2. Click on “**Save current project to disk**”.
3. Select filename and directory, then click “**Save**”.

5.6.6 SENDING THE PROJECT TO ACCULOG-X

1. Be sure that the ACCULOG-X unit is on and properly connected to the computer through serial port.
2. When all settings are completed (transducers, boreholes), click on the project folders.
3. Click on “**Send the current project to your ACCULOG-X**”.
4. ACCUTALK is looking for the ACCULOG-X and warns you that all ACCULOG-X memory will be erased.
5. Click “**OK**”.

5.6.7 LOADING A PROJECT FROM DISK

ACCUTALK allows you to load project information from disk via “.ACX” and “.ALX” files.

Note:

Project information contained in “.ALX” file concerns only boreholes that have datasets associated with.

1. Click on the project folder.
2. Click on **“load”**.
3. Select the file type using drop-down list.
4. Select the filename then click **“OK”**.

5.7 GRAPHIC DISPLAY

The graphic tools allow you to see borehole dataset plotted on the screen from a “.ACC” or “.ALX” file.

To Begin with graphic display, click on the **“Graphic Display”** icon.

5.7.1 ADDING A PLOTTED DATASET

To add a plotted dataset on the screen; you need a “.acc” or a “.alx” files.

1. Click on **“Add plotted dataset”**.
2. Select the type of file.
3. Select the file.
4. Click **“Open”**.

If you have selected a “.ACC” file, the procedure is complete. Otherwise continue on step 5.

5. Since there are many borehole sets in one “.ALX” file, you need to select the one you want to plot by clicking on borehole name. Using the drop-down list allows you to select the plot to view.

5.8 TERMINAL

To communicate with the ACCULOG-X in terminal mode, use the **“Terminal”** utility.

5.8.1 SENDING A COMMAND TO THE ACCULOG-X

1. Be sure that the ACCULOG-X is on and properly connected to the computer through serial port.
2. Click on the **“terminal”** icon.
3. Enter command in the command line.
4. Click on **“send”** or hit **“Enter”** key.

For the command list, see section 6 of this instruction manual.

5.8.2 CLEARING THE COMMAND WINDOW

To clear the command window, click on “Clear”.

5.9 FILES FORMATTING AND EXPORTING

The File formatting and exporting option is used to create ".ACC", ".ACU", ".SP" or ".RPP" files from a ".ALX" file. It allows you to select projects and datasets you want to export, and filenames to be created. The ACCULOG-X cannot remember set for borehole after memory has been cleared; ACCUTALK 2000 helps you to manage with this problem. First, it scans the output directory to see if there are files associated with the borehole you are about to export. Second, it suggests a filename regarding the existing files (assuming that the existing files are older than current one).

Example.

You are about to export the borehole Rtest/001 in the directory c:\boredir\ with the “.ACC” and “.RPP” format. In this directory, there are already 3 files: “rtest001.acc”, “rtest001.rpp” and “rtest002.rpp”. Assuming that “rtest002.rpp” is the latest file created for this borehole, ACCUTALK 2000 will propose “rtest003.*” as a new filename. You can always change the suggested filename (ex. If you have file “rtest003.sp” in another directory, you may wish the next filename to be “rtest004.*” instead of “rtest003.*”).

Note:

ACCUTALK 2000 will suggest a new name according to the already existing names with conventional format ([Borehole(5 characters)]pass number (3 digits).file extension)] and with the following extensions: “.ALX”, “.ACU”, “.SP”, “.RPP”.

5.9.1 FORMATTING AND EXPORTING BOREHOLES

Click on “Formatting and exporting files”.

1. Enter input file name (should be an ".alx" type file):
 1. Click on “Browse”.
 2. Select file (".ALX" format).
 3. Click “Open”.

2. Select output directory:
 1. Click on “Browse”.
 2. Select drive.
 3. Select directory and/or expand it by double-clicking on the name.

- The directory-contained files are displayed on the right of the screen.
3. Check box beside selected format type (".ACC", ".ACU", ".SP", ".RPP").
 4. Select data sorting (ascending or descending).

Note:

“.ACU” and “.RPP” extensions do not allow you to select sorting, the data will always be sorted ascending.

5. Click on “Export”.

Boreholes name, dataset, date and time from “.ALX” file, and suggested filenames appear on the new screen.

5.9.2 CHANGING SUGGESTED FILENAMES

To change suggested filename

1. Select one borehole (only one).
2. Click on the up/down button to increase or decrease filename digits part, or type fileset into the box, then press “Enter”.

Note:

If more than one borehole is selected, it will not be possible to change the filename.

5.9.3 RESTORING FILENAME WITH DEFAULT

You can restore suggested filenames to their initial value assigned by ACCUTALK 2000 by clicking “Default”.

5.9.4 CREATING FILES

To create file, click “OK”.

Summary screen shows taken actions and indicates which files were created and which were not.

Note: If an error mention appears, check if your computer was able to access and write into the disk directory.

5.10 USING UTILITIES

Utilities screen gives you the opportunity to:

1. Clear the ACCULOG-X memory.
2. Set the ACCULOG-X date and time.
3. Update the ACCULOG-X firmware (use with care).

To access utilities screen click on “**Utilities**”.

5.10.1 CLEARING THE ACCULOG-X MEMORY

1. Be sure that ACCULOG-X unit is on and properly connected to the computer through serial port.
2. Click “**Clear ACCULOG-X memory**”.
3. Answer “**yes**” to the two warnings.

5.10.2 SETTING THE ACCULOG-X DATE AND TIME

1. Be sure that the ACCULOG-X unit is on and properly connected to the computer through serial port.
2. Click “**Date and time setting**”.
3. Type a new date in the appropriate box (format is “mm-dd-yyyy”).
4. Type a new time in the appropriate box (format is “hh:mm:ss”, with a 24-hour day (ex. 13h00 not 1h00 pm))
5. Click on “**Apply**”.
6. A message gives you the readout unit new settings or warns you if they have not been changed.

5.10.3 UPDATING ACCULOG-X FIRMWARE

Note:

If you update the ACCULOG-X while other applications are running, errors may occur.

1. Be sure that the ACCULOG-X is **on** and connected to the computer through serial port (com x).
2. Select file to download:
 1. Select File **124aXXXe.hex** for English version

Or **124aXXXf.hex** for French version

XXX is the software version

2. Click on **“Open”**.
3. Click on **“Send file”**.
4. A warning for *Running Applications* will appear, click **“OK”**.
5. The software searches for the ACCULOG-X readout on port, and transmits the file.
6. When finished, **“Firmware has been properly updated”** message is displayed.

Note:

The ACCULOG-X memory will be erased while programming it.

If you cancel process, the ACCULOG-X will not be functional until properly re-programmed.

6 TERMINAL MODE COMMUNICATION

6.1 TERMINAL MODE COMMUNICATION

The ACCULOG-X readout unit can support direct data transfers to a PC in terminal mode through the RS-232 interface.

You can use text commands to communicate with the readout unit without running the ACCUTALK V2.XX software. Commands available are listed below.

- TXCONFIG: to receive the current configuration of the ACCULOG-X.
- RXCONFIG: to configure probes and boreholes.
- TXDATA: to receive measurements from the unit.
- TXTIME: to configure time.
- TXDATE: to configure date.
- LOGOFF: to turn-off the unit.

6.2 CONFIGURING THE COMMUNICATION SOFTWARE

Set the following parameters while communicating with the ACCULOG-X:

- Baud Rate: 9600
- Data Bits: 8
- Stop bits: 1
- Parity: none
- Flow Control: Xon/Xoff

Follow the protocol described hereafter to transfer configuration files to ACCULOG-X. Most communication software featuring a terminal mode support this basic protocol.

1. At the end of each line, press <<Enter>>.
2. After a line is transmitted to the unit, the terminal waits for an acknowledgement character « ACK or ^F » from ACCULOG-X before sending a new line.
3. Should a communication error occurs, «NAK or ^U » appears on the monitor and the last line must then be sent back by the communication software.
4. After several communication failures, ACCULOG-X sends the « CAN or ^X » message, and puts an end the current data transfer operation.

It is possible to use the Microsoft Terminal software. The latter transfers configuration files to ACCULOG-X, even though it does not verify points 3 and 4 of the protocol. When you want to use a Microsoft terminal to communicate with the readout unit, configure the program as follows.

Select the following setups in the « Text Control » box:

- Flow Control: Line at a time.
- Transfer a line at a time: Wait for prompt string: ^F.

No protocol is required to receive data from ACCULOG-X. Each line is ended with the Carriage Return/Line Feed character pair.

6.3 INITIATING COMMUNICATION

To communicate with ACCULOG-X, proceed as follows:

1. Run the communication application.
2. Set up the terminal parameters.
3. Turn on the ACCULOG-X and wait until the main menu appears.
4. Connect the RS-232 link.

The **ACCULOG-X>** character display indicates that ACCULOG-X is waiting for a command. Each command is validated as soon as you press « Enter ».

```
ACCULOG-X>
```

The **SE1>** character display indicates that the RS-232 link has been connected before the unit was turned on. Type **main** and press « **Enter** » in order to display a prompt **ACCULOG-X>**.

```
SE1>main
```

```
ACCULOG-X>
```

Execution Error

When an error occurs or when the unit does not respond, disconnect the RS-232 link or reset ACCULOG-X by pressing down the readout unit power key during 15 seconds.

6.4 RUNNING COMMANDS

Commands available in terminal mode are listed below.

6.4.1 TXCONFIG

This command displays probes and boreholes configurations defined in ACCULOG-X. It affects neither current configuration nor measurements stored into the unit.

```
ACCULOG-X>txconfig  
  
[ACCULOG-X]  
  
[Transducer]  
  
Transducer.name = TERRA-20  
Transducer.serial = 123ABC  
Transducer.system = imperial  
Transducer.input = 2,DC,15.0  
Transducer.display = 0,0.235294,0,0,0,0,na  
  
[Borehole]  
  
BOREHOLE.NAME = ABC  
BOREHOLE.TRANSDUCER = TERRA-20  
BOREHOLE.DEPTH = 200  
BOREHOLE.STEP = 2.0
```

6.4.2 RXCONFIG

This command allows you to configure probes and boreholes using a configuration file.

Warning! When you use the RXCONFIG command, configuration and readings previously stored are erased.

```
ACCULOG-X>rxconfig
Waiting configuration file...

[ACCULOG-X]

[Transducer]

Transducer.name = RT-20M
Transducer.serial = 123ABC
Transducer.system = metric
Transducer.input = 2,DC,15.0
Transducer.display = 0,5.0,0,0,0,0,cm

[Borehole]

BOREHOLE.NAME = ABC
BOREHOLE.TRANSDUCER = RT-20M
BOREHOLE.DEPTH = 200
BOREHOLE.STEP = 2.0

[END]

ACCULOG-X>
```

6.4.3 TXDATA

This command displays readings stored into ACCULOG-X. It does not affect them or the boreholes and transducers configurations.

```
[ACCULOG-X]
ACCULOG-X.project = Init000

ACCULOG-X 3.21
12-10-1998

[MEASUREMENT]
[Transducer]

Transducer.name = RT-20E
Transducer.serial = 1988A21
Transducer.system = imperial
Transducer.input = 2,DC,14.1
Transducer.output = 1,volt,V
Transducer.display =
0.000000,2.400000,0.000000,0.000000,0.000000,0.000000,in

[Borehole]

BOREHOLE.NAME = 9722/001
BOREHOLE.TRANSDUCER = RT-20E
BOREHOLE.DEPTH = 10.0
BOREHOLE.STEP = 1.0
BOREHOLE.DATE = 10:51 12-10-1998
```

DEPTH	A+ AXIS	A- AXIS	B+ AXIS	B- AXIS
10.0	-3.48043	+0.04659	-5.47798	+0.06256
9.0	-3.48052	+3.48645	-5.47816	+5.48874
8.0	-3.42762	+3.43941	-5.43822	+5.44221
7.0	-3.42520	+3.43328	-5.37956	+5.39265
6.0	-3.40405	+3.41862	-5.33380	+5.33797
5.0	-3.31054	+3.29492	-5.26850	+5.29314
4.0	-3.17237	+3.17556	-5.23996	+5.25430
3.0	-3.12038	+3.12810	-5.22526	+5.23291
2.0	-3.05374	+3.06881	-5.15180	+5.15753
1.0	-2.96599	+2.98038	-5.09955	+5.10884

```
[END]
```

6.4.4 TXTIME

This command allows setting up the current time in the readout unit.

```
ACCULOG-X>txtime  
  
Current time: 14:56:05  
Enter new time : 14:58:06  
New time : 14:58:06  
  
ACCULOG-X>
```

6.4.5 TXDATE

This command allows setting up the date in the readout unit.

```
ACCULOG-X>txdate  
  
Current date: 05-09-1998  
Enter new date (mm-dd-yyyy): 05-18-1998  
New date: 05-18-1998  
  
ACCULOG-X>
```

6.4.6 LOGOFF

```
ACCULOG-X>logoff  
Bye . . .
```

This command allows to remotely turning off the readout unit

6.5 EDITING ACCULOG-X PARAMETERS

You can use an ASCII file to configure ACCULOG-X. This file will set up probe types and boreholes with the parameters corresponding to field specifications. Some editing rules must be followed to ensure the integrity of the data that will afterward be stored into the unit:

In order to facilitate configuration files writing, take the following steps:

1. Type TXCONFIG command in order to display the ACCULOG-X current configuration.
2. Change this configuration according to the new specifications.
3. Set up ACCULOG-X with RXCONFIG command.
4. Display and verify the new settings with TXCONFIG command.

6.5.1 GENERAL EDITING RULES

1. At the end of each line press « **Enter** ».
2. Configuration files must be edited using keywords, according to the following order and format:

```
[ACCULOG-X]  
[Transducer]  
[Borehole]  
[End]
```

3. Any data that follows the [End] keyword is ignored.
4. Any data that follows a semicolon is ignored until the next line feed character is detected.
5. Probes must always be defined within the [Transducer] and [Borehole] keywords.
6. Boreholes must always be defined within the [Borehole] and [End] keywords.

7. When combining several parameters in a property, use the comma to separate each item.

6.5.2 EDITING RULES FOR DEFINING OF A PROBE

Each property starts with « Transducer » keyword, followed by a point, the property, and « = » sign.

“**Transducer.name =**” should be used to define the name of the probe. The name’s length cannot exceed 8 characters.

Ex: Transducer.name = RT-20M

“**Transducer.serial =**” should be used to define the serial number of the probe. The serial number’s length cannot exceed 10 characters.

Ex: Transducer.serial = 124ABC98

“**Transducer.system =**” should be used to define the unit system of the probe. Use **metric** to set up a metric probe. Use **Imperial** to set up an imperial probe. If none of these words is recognized, no system unit will be defined.

Ex: Transducer.system = metric

“**Transducer.input =**” should be used to define the power supply parameter of the probe.

Parameter #1: Type “1” to indicate a uniaxial probe, or “2” for a biaxial probe.

Parameter #2: Type “DC” to define a DC excitation or “AC” to define an AC excitation.

Parameter #3: Type the probe excitation voltage within a 0 to 14.0 volts range.

Ex: Transducer.input = 2,DC,15.0; indicates a biaxial probe, 14.0 volt DC powered.

“**Transducer.output =**” should be used to define the readings setups of probe signals.

Parameter #1: Gain on signals. Available values are: 1, 2, 4, 8,16, 32, 64 or 128

Parameter #2: Type “volt” in order to assign conversion polynomial to voltage readings.

Type “sens” in order to assign conversion polynomial to the voltage reading/excitation value ratio.

Parameter #3: Type “V” when ACCULOG-X is used in voltmeter mode ($\pm 10v$). Type “I” when the ACCULOG-X is used in ammeter mode (0-20mA))

Ex: Transducer.output = 2,volt,V; The gain on input signals is 2, interpreted in volt, and the ACCULOG-X is used in voltmeter mode.

“**Transducer.display =**” should be used to define conversion polynomial according to $f(x) = a + bx + cx^2 + dx^3 + ex^4 + fx^5$

Parameter #1: a

Parameter #2: b

Parameter #3: c

Parameter #4: d

Parameter #5: e

Parameter #6: f

Parameter #7: units (with a maximum 3-letter length)

Ex: Transducer.display = 0, 5.00, 0, 0, 0, 0, cm ; a=0, b=5.00 ,c=0, d=0, e=0, f=0, unit = cm

6.5.3 EDITING RULES FOR DEFINING OF A BOREHOLE

Each property starts with the « Borehole » keyword, followed by a point, the property's name, and the « = » sign.

“**Borehole.name =**” should be used to define the name of a new borehole. This name's length cannot exceed 8 characters.

Ex: Borehole.name = BH-01

“**Borehole.transducer =**” should be used to define the type of transducer you are using. Transducer type should be written exactly the same way as previously.

Ex: Borehole.transducer = RT-20M

“**Borehole.depth =**” should be used to define the depth of the borehole. When using a metric probe, the value should range between 1 and 999 m. When using an imperial probe, the value should range between 2 and 999 feet.

Ex: Borehole.depth = 100 ; Depth equals to 100 meters since Borehole.transducer = RT-20M is a metric probe.

“**Borehole.step =**” should be used to define the borehole's step. The step value must obviously be smaller than the depth value.

Ex: Borehole.step = 0.5 ; 0.5 meter measurement step.

7 DATA GRAPHICAL ANALYSIS

Measurement of ground movement with an inclinometer usually generates a large number of data. A commonly used practice consists of drawing plots with those data in order to facilitate their analysis. This practice allows among others to easily visualise the real magnitude of displacement indicated by a particular set of data, and to quickly spot gross error in data input. The ACCULOG-X user may plot these graphs by hand, or one may use between two softwares: EXCEL or GTILT.

7.1 EXCEL SOFTWARE

The EXCEL software utility is a widespread convenient tool, which can be used to automatically plot set of inclinometer data onto graphs.

In order to use EXCEL, the user should transfer data from his ACULOG-X to his PC, and at the same time, set up the format of these data compatibly with EXCEL, i.e. in a file with a *.SP extension. The user should do that using the ACCUTALK utility described in Chapter 5. A data format reset is impossible after a transfer. The right setting should be done only during transfer.

Once data are transferred to the PC in an EXCEL format, the user can run EXCEL and plot graphs.

7.2 G-TILT SOFTWARE

The GTILT software utility is a convenient tool that has been specially developed to automatically plot any set of inclinometer data onto graphs. These graphs may take different forms:

- Cumulative displacement plot ;
- Incremental displacement plot ;
- Absolute position;
- Displacement/time plot;
- Checksum histogram.

In order to use GTILT, the user must transfer data from the ACCULOG-X to a PC, and at the same time, set up the format of these data compatibly with GTILT i.e. in a file with a RPP extension. He should do that using the ACCUTALK utility described in Chapter 5. Data format reset is impossible after a transfer. The right setting should be done only during transfer.

Once data are transferred to his PC in a GTILT format, the user can run GTILT and retrieve them with an *Import RPPFile* command type. GTILT user guide should be consulted for more details. One important thing is to ensure that the GTILT configuring parameters are the same than those of the imported data, especially transducer's unit (English or Metric).

APPENDIX

CONNECTORS AND PINOUTS:

Three connectors are provided on the front plate of the unit. They are described as follows.

POWER CONNECTOR

Type: Female Canon Number of contacts: 4

A – Charger: GROUND or 15VAC

B – Charger: +20VDC or 15VAC

C – GROUND

D – External Supply: +12VDC

COMMUNICATION PORT / TRIGGER SWITCH CONNECTOR

Type: Male Canon Number of contacts: 4

A – GROUND (RS-232/Trigger)

B – Trigger Switch

C – RS-232 RXD signal

D – RS-232 TXD signal

PROBE CONNECTOR

Type: Male/Female LEMO Number of contacts: 6

A – Vout + (positive excitation 0 - 14 V)

B – Vout – (negative excitation 0- 14 V)

C – POWER GROUND

D – A Signal Input (0 – 10 volts)

E – B Signal Input (0 – 10 volts)

F – Common Signal for canal A and B