GIATEC SCIENTIFIC

USER MANUAL

SmartBox™

REAL-TIME MONITORING OF ELECTRICAL RESISTANCE OF FRESH CONCRETE

TABLE OF CONTENTS

PACKAGE CONTENTS

Part	Photo	Package	
		Essential	Full
SmartBox™		✓	✓
Test Spacer		–	✓
Test Rods		✓ (1 pair)	✓ (10 pairs)
Temperature Sensor		✓ (1)	✓ (10)
Stainless Steel Nuts		✓	✓
Charger		✓	✓
USB Charging Cable		✓	✓

Data Recording and Analysis Application (Tablet version)		✓	✓
Ruggedized Tablet		–	✓

* Please note that the images above are for illustration purpose only and might not be to scale.

WARRANTY

LIMITED WARRANTIES

Giatec warrants the Product against defects in materials and workmanship under normal use (the "Warranty") for a period of 12 months from the Delivery Date (the "Warranty Period"), on the condition that the Product has been completely paid for. Unless as otherwise mandated by local law, the Warranty Period does not restart if Customer receives a replacement appliance and/or replacement Software. This Warranty does not apply: (a) to consumable parts, such as batteries and cables unless damage has occurred due to a defect in materials or workmanship; (b) to cosmetic damage, including but not limited to scratches, dents and broken plastic on ports; (c) to damage caused by accident, abuse, misuse, neglect or failure to properly maintain (to include but not limited to water damage and/or condensation or improper temperatures during storage), or improper installation; (d) to damage caused by electrical disturbances or acts of God, to include but not limited to civil disturbance, war, flood, fire, rodents or insects; (e) where manufacturer's serial numbers and security labels have been removed from the Product; and (f) to damage caused during shipment (due to Customer's improper packaging) from Customer to Giatec in the case of Product returns for repair.

Giatec disclaims all other warranties, express or implied, including without limitation to; implied warranties of merchantability, fitness for a particular purpose, or against hidden or latent defects. Giatec's responsibility for warranty claims is limited to repair or replacement. Giatec reserves the right to modify this Warranty at any time, at its sole discretion, and with notice to Customer.

Giatec does not warrant that the operation of the Product will be uninterrupted or error-free. Giatec is not responsible for damage arising from failure to follow instructions relating to the Product's use. This Warranty is voided immediately if repair, modification (to include upgrades, expansions or usage or addition of non-manufacturer parts or accessories), alteration or other service is attempted other than by Giatec. In this regard,

the integrity of the appliance casing (aka the box) should not be violated for any reason, unless expressly authorized by Giatec in writing.

THE WARRANTY SET FORTH IS EXCLUSIVE AND NO OTHER WARRANTY, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED. GIATEC SCIENTIFIC INC. SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

* Please refer to the complete Terms and Conditions of Giatec's products for more details.

* The information contained in this document is subject to change without notice.

SAFETY INSTRUCTIONS

This chapter contains important safety instructions that the user must follow for operating and storage of Giatec SmartBox™. Read the following safety information before any operation to ensure your safety and to keep the instrument in good condition. Keep this user manual in a safe place for future reference.

SAFETY SYMBOLS

In order to ensure the safety of the operator, and increasing the service life of the instruments, pay attention to safety precautions described in this manual. These messages are indicated by a /!\ symbol throughout this user manual.

WARNING: Identifies conditions or practices that could result in injury or loss of life.

CAUTION: Identifies conditions or practices that could result in damage to Giatec SmartBox™ or to other properties.

ATTENTION: Refer to the User Manual

GENERAL GUIDELINES

1- Always follow basic safety precautions when using this product to reduce risk of injury from fire or electric shock.

2- Read and understand all instructions in the documentation that comes with Giatec SmartBox™.

3- Observe all warnings and instructions marked on the product.

DEVICE HANDLING

⚠ CAUTION

- Giatec SmartBox™ is a non-destructive testing device. The electronic parts are sensitive components. Please handle them with care.
- Do not place any heavy object on the SmartBox™ unit or the tablet.
- Avoid severe impact or rough handling that leads to damaging SmartBox™ or the tablet.
- Do not disassemble SmartBox™.
- Store the product in a protected location (e.g. carrying case) where no one can step on or trip over the connection and USB-charging cables, and in a location where these cables cannot be damaged.

DEVICE OPERATION

⚠ WARNING

- Device Input: USB only
- Only use the provided USB charging cable for SmartBox™, and the provided power adapter for charging the SmartBox™.
- Do not use the SmartBox™ beyond the recommended operating temperature as suggested in this manual.
- Place the instrument in the place where the chance of spilling liquids on the device is negligible.

DEVICE CLEANING

⚠ ATTENTION

- Disconnect the temperature sensor after the test.
- Do not use chemicals or cleaners containing harsh products such as benzene, toluene, xylene, and acetone.
- Do not submerge the SmartBox™.

OPERATION ENVIRONMENT

⚠️ **ATTENTION**

- Location: Indoor
- Relative Humidity: 10% to 85%
- Temperature: -20°C to 60°C
- Avoid direct sunlight
- Do not submerge the device

STORAGE ENVIRONMENT

⚠️ **ATTENTION**

- Location: Indoor
- Relative Humidity: 5% to 90%
- Temperature: -20°C to 60°C

SmartBox™ APPLICATION

Giatec SmartBox™ is a compact test device for measuring and monitoring the electrical resistivity of fresh concrete. SmartBox™ provides a fast and accurate approach for measuring the electrical resistance of different types of fresh concrete or any cementitious composites.

SmartBox™ benefits from wireless sensor to transmit data to a commercial smartphone, or tablet. SmartBox™ Data Monitor mobile application provides a user-friendly environment to set up and run different test programs. The application provides real-time data visualization (tabulated data), and provides a convenient way to save and share the test results. Results can be viewed in the application or be shared via email.

ELECTRICAL RESISTIVITY OF CONCRETE

Durability of concrete depends largely on the properties of its microstructure such as pore network and interconnections. A finer pore network with lower connectivity leads to lower permeability. Porous microstructure with a higher degree of interconnections, on the other hand, results in higher permeability and reduced durability in general.

The principal idea behind the electrical resistivity techniques is to quantify the conductive properties of the microstructure of concrete. The electrical resistivity of concrete can be described as the ability of concrete to withstand the transfer of ions when subjected to an electrical field. In other words, resistivity is the inverse of conductivity, which can be attributed to the degree of ionic movement in the pores. In this context, resistivity measurement can be used to assess the size and extent of the interconnectivity of pores. Electrical resistivity measurement provides a non-destructive approach to testing concrete materials, making it suitable for various quality control projects, condition assessment purposes, and research studies. Electrical resistivity is an inherent characteristic of concrete, and is independent of the geometry of the concrete sample.

The electrical resistivity of concrete is well correlated with certain performance characteristics of concrete such as chloride diffusion

coefficient, water absorption, and corrosion rate of embedded steel. The technique is also useful both for the characterization of fresh concrete properties such as setting time, workability, and water content and for the quality control of hardened concrete.

MEASUREMENT CONCEPT

Concrete is a porous composite material, and depending on the moisture content (i.e. degree of the saturation of the pores) it may exhibit conductive or insulated characteristics. For example, a concrete sample might exhibit very high electrical resistance when it is dry, but the same concrete can have much lower resistance in saturated condition. Moreover, concrete has capacitive properties, which means it can hold an electrical charge.

In engineering terminology, the concept of 'impedance' should be used to account for the impeding effect of the electrostatic storage of charge in concrete, in addition to the normal resistance of concrete. Impedance, $\mathbf{Z}$, is described as a complex quantity that has an imaginary component called reactance, $\mathbf{X}$, and a real component called resistance, $\mathbf{R}$. In other words, the vector summation of these two components would result in an impedance vector, $\mathbf{Z}$. Therefore, the electrical impedance $\mathbf{Z}$ can also be represented by a magnitude ($|Z|$) and a phase angle (φ) (Fig.1). Both the magnitude and phase angle of such a vector could vary depending on the frequency of the applied electrical current.
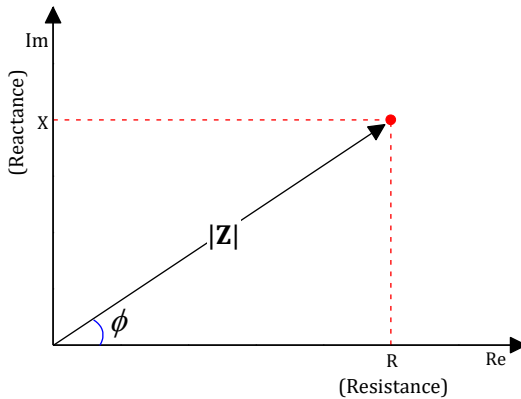

Figure 1. Impedance vector: Real and Imaginary components

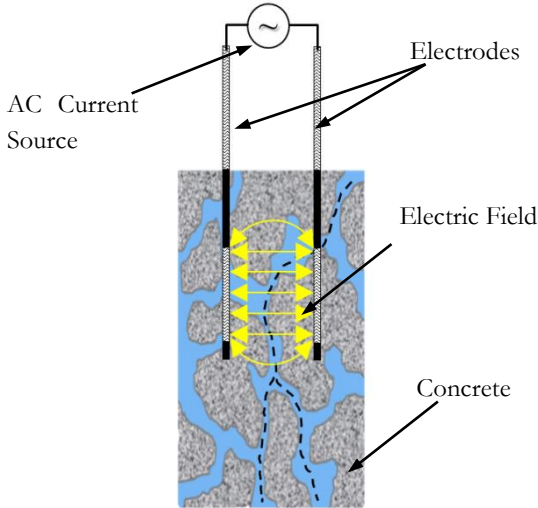Fig. 2 depicts the general concept behind the measurement of electrical resistivity using Giatec SmartBox™.

Figure 2. Schematic view of the pore structure and ionic movement through interconnections

For monitoring the electrical resistance of concrete the ends of the two electrodes that are inserted into the fresh concrete specimen are connected to an AC current source. The source is capable of applying alternate current (I) at the specified frequency. The potential (V) between the two electrodes is measured by the device. The impedance (resistance), Z, is calculated from the measured voltage and applied current values:

$$Z = \frac{V}{I} \qquad \text{Eq. 1}$$

Electrical resistivity is related to the Impedance as described in Eq. 2:

$$\rho = kZ \qquad \text{Eq. 2}$$

where k is the geometry factor of the specimen, and ρ is the electrical resistivity of concrete.

A practical approach to determine the conversion factor for any specific geometry is to use a solution with a known electrical resistivity value. Fill the same geometry (for example a cylindrical mold) with this solution, and

measure the electrical resistance using the electrode test setup. The geometry factor can be calculated by dividing the resistivity (known for the solution) by resistance value (measured by the test setup).

Alternatively, one can calculate the geometry factor by solving the governing differential equation for the specific geometry.

SmartBox™ OVERVIEW

Giatec SmartBox™ has three main components: 1) SmartBox™ measurement unit, 2) Fresh concrete spacer assembly, and 3) Android Tablet or Smartphone.

This section describes how to setup and operate the SmartBox™ device for measuring the electrical resistance and temperature of concrete. Before starting a test, please make sure that the SmartBox™ unit and your data recording unit (smartphone/tablet) are fully charged.

SmartBox™ MEASUREMENT UNIT OVERVIEW

SmartBox™ measurement unit (Fig. 3) benefits from an advanced electrical circuit that is capable of measuring the electrical resistance of fresh concrete. SmartBox™ is also capable of measuring and storing data. The collected data can be transmitted to a tablet or smartphone using Bluetooth technology.

Figure 3. SmartBox™ Measurement Unit

Fig. 4 shows the components of the SmartBox™ measurement unit. The electrical circuits and the sensors are embedded in a layer of protective epoxy coating.
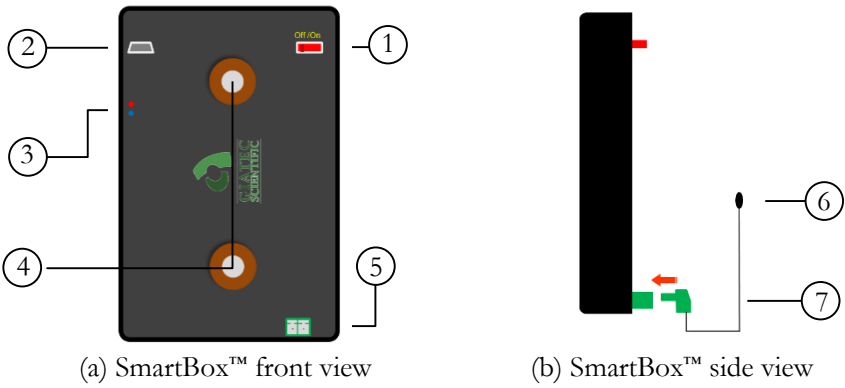
(a) SmartBox™ front view   (b) SmartBox™ side view

Figure 4. SmartBox™ Unit Components

1. Main power key
2. Mini USB charging port
3. LED indicators
4. Main electrode connections
5. Temperature sensor connection port
6. Temperature sensor
7. Temperature sensor connecting jumper

FRESH CONCRETE SPACER ASSEMBLY

Fresh concrete spacer assembly (Fig. 5) is specifically designed to facilitate the measurement of electrical resistance. The spacer can be easily mounted on a standard 75 mm, 100 mm and 150 mm cylinder. The electrodes and the temperature sensor kit can be installed on the spacer unit.
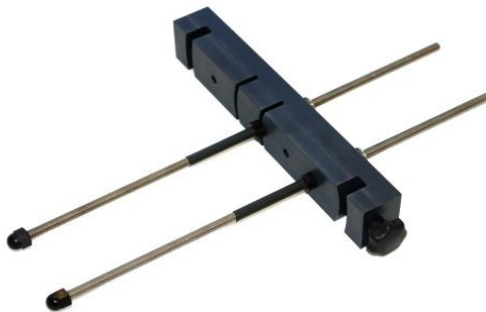
Figure 5. Fresh concrete spacer

The components of the fresh concrete test spacer are illustrated in Fig. 6. Three different electrode spacing options are available on the plastic part of

the test spacer. The electrodes are attached and fixed using the provided nuts. The electrordes pass through the SmartBox™ measurement unit (With SmartBox™ front side facing upward (see Fig. 6(b)). The exterior nuts create the electrical connection between the electrode rods and the SmartBox™ unit.
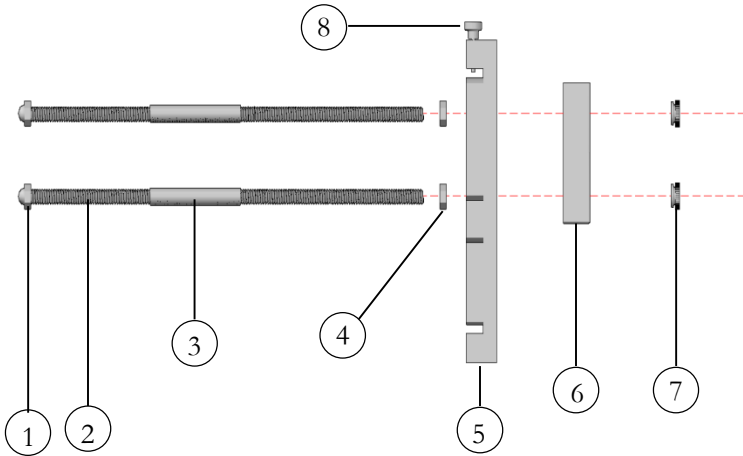
(a) Electrode spacer components
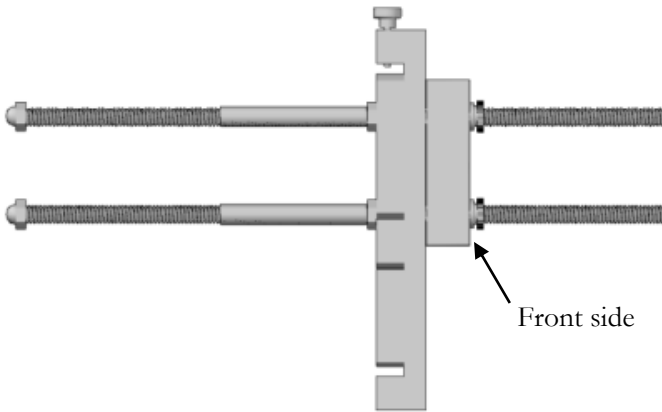
(b) Electrode spacer assembled

Figure 6. Electrode spacer assembly

1. Plastic nuts
2. Stainless steel rods
3. Rubber insulator

4. Plastic nuts
5. Spacer
6. SmartBox™ Measurement Unit
7. Steel nuts
8. Tightening knob

The user can easily mount the spacer assembly on a standard concrete cylinder and tighten the knob to fix the position of the test spacer.

SmartBox™ DATA MONITOR APP

Data recording is performed using an interactive, user-friendly app which is installed on an Android tablet (full package), or Smartphone (essential package).

Figure 7. Data Monitor app for Android tablet or smartphone

For the essential package users, the app is available on the Google Play store. Users can download the app onto their smartphone, and use it for communicating with the SmartBox™ measurement unit.

The full package comes with a ruggedized Android tablet. The SmartBox™ app is pre-installed on the tablet.

SmartBox ™ OPERATION

TURNING ON THE SmartBox™

Use the main power key (red key) to switch on the SmartBox™ (see Fig. 8).
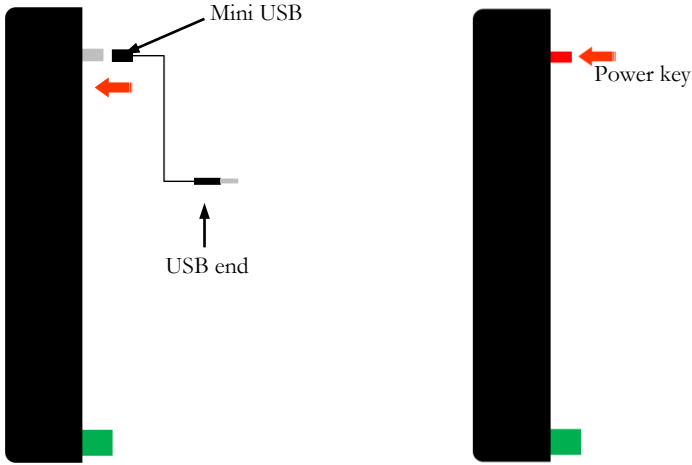
(a) Charging the SmartBox™   (b) Turn On the SmartBox™

Figure 8. SmartBox™ Power: How to Charge and How to Switch On

TEMPERATURE SENSOR CONNECTION

Insert the jumper end of the temperature sensor into the temperature jumper block (as in Fig. 9).
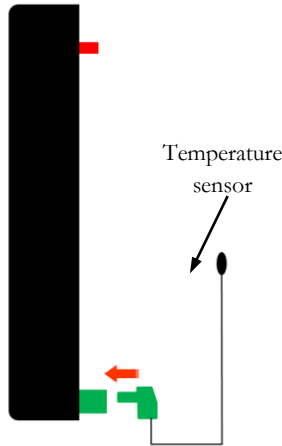
Figure 9. Connect the temperature sensor jumper

CHARGING THE SmartBox™

Connect the mini USB cable to the USB charging connector on the SmartBox™; connect the other end to the USB charger provided with the device. There are two LED indicators (blue and red) on the top side of the SmartBox™. The blue LED will illuminate for 2 seconds as soon as the SmartBox™ is turned on. During the charging process, the red LED will turn on. When battery is fully charged, the red LED turns off. Alternatively, you can check the battery level and its charge status from the Data Monitor app.

ANDROID APPLICATION

INSTALLATION

In order to install a new version or an upgrade to the data monitoring app, the user should download the app from Google Play™[1]. In the Google Play™, search for "Giatec SmartBox™" smartphone app. Press the **Install** button to start installing the app on the device.

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[1] Google Play is a trademark of Google Inc.

APPLICATION OVERVIEW

Launch the Giatec SmartBox™ app by pressing the Giatec icon on your smartphone/tablet screen.

Figure 10. Home screen of the smartphone

When the splash screen fades, the home screen of the app will be loaded on the screen.
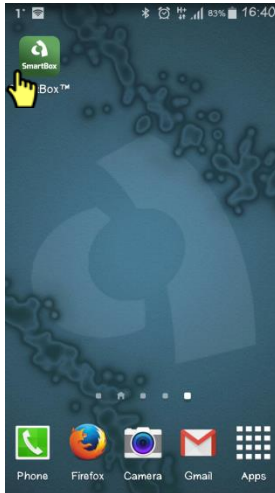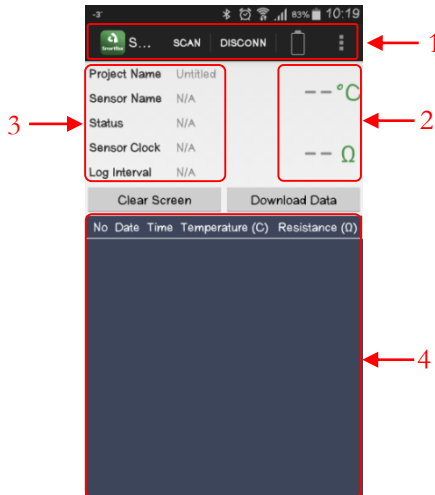

Figure 11. The app screen

The home screen consists of three main sections: The top section (Fig. 11, section 1) is the control menu. You can search for SmartBox™ units,

connect/disconnect to/from the unit, access the application main menu (⋮ icon), and see the SmartBox™ unit battery level. In Fig. 11, section 2 is designated to the real-time sensor data (temperature and resistance). Section 3 is used to present the project information, sensor name and status, and type of data logging. Section 4 is used to show the downloaded test results in a tabulated format.

Press on "**Scan**" to search for the SmartBox™ wireless unit (see Fig. 12(a)). A list of available SmartBox™ wireless units will appear in the search results (Fig. 12(b)). Click on the SmartBox™ unit name to connect to the SmartBox™.
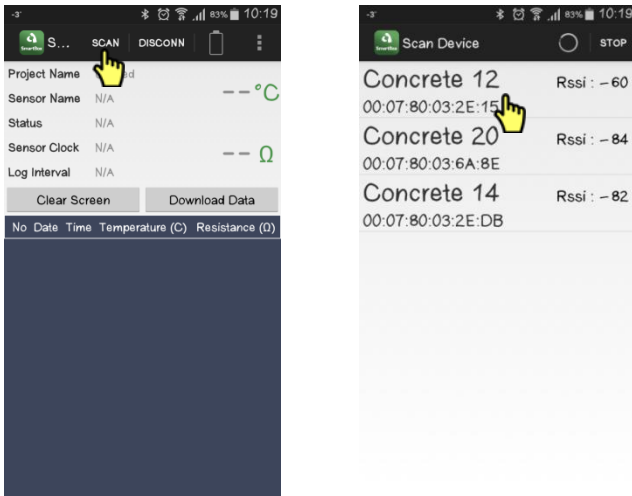
Figure 12. SmartBox™ Wireless Units Search Screen

When the SmartBox™ unit is wirelessly connected to the tablet or smartphone, the real-time temperature and resistance data will appear on the screen (Fig. 13). In addition, the status of the SmartBox™ unit clock, the data log interval setting, and the SmartBox™ unit battery level will be updated.

Note: please wait until the device connection status, the battery level and sensor clock get updated before start working with the app. This may take about 2 to 3 seconds.
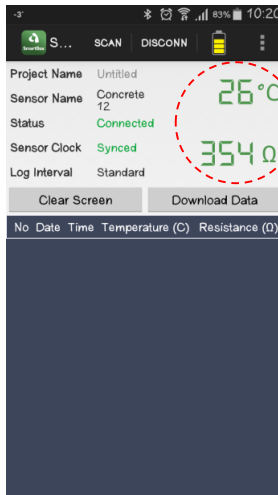
Figure 13. SmartBox™ Unit Connected

The user can disconnect from the SmartBox™ unit by pressing on the "**Disconnect**" icon on the control menu.

TEST SETTINGS

Before beginning logging the data of a new project, the user has to select the settings required for data logging. From the right corner of the control menu, click on the main menu icon () to access to the setting options.
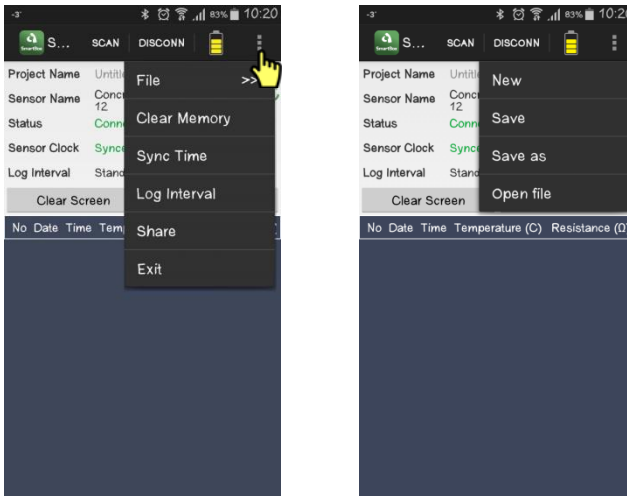
Figure 14. File Menu Items

File: The file menu items enable the user to create a new log file, open a previously saved log file, save or save as the recorded data.

Clear Memory: The user should clear the sensor memory before starting a new log.

⚠️ **Warning:** This will erase any previously saved data on the memory.

Sync Time: The user should syncronize the time of the SmartBox™ unit and their data recording unit (smartphone or tablet) before starting a new test session. If the time between the SmartBox™ unit and the smartphone is not syncronized. The "**Not Synced**" warning in red color in front of the "Sensor Clock" starts blinking (Figure 15(a)).
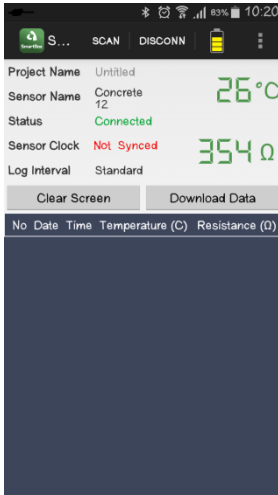
(a) SmartBox™ unit not synced   (b) SmartBox™ unit is synced
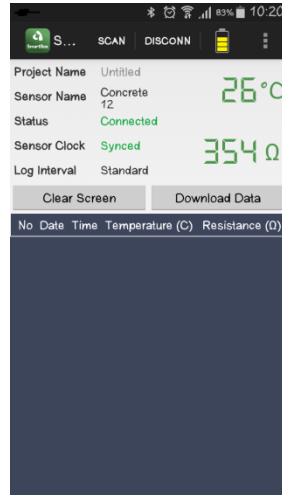
Figure 15. Sync status of the SmartBox™ unit

Log interval: The user can select the data logging interval. The following data log intervals are set as the default "Standard" data log interval:

Table 1: System "Standard" log intervals

Elapsed time from the start (hours)	Log interval (minutes)
<24	5
24 to 72	60
>72	360

The user can also select a custom log interval. The custom log interval is a fixed interval that is entered by the user as shown in Fig. 16.
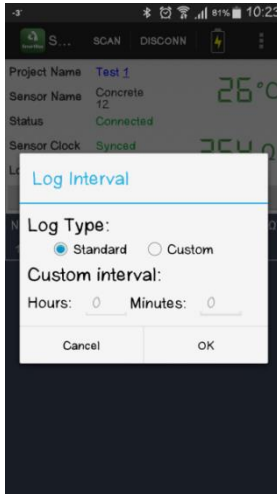
Figure 16. Data log interval menu

DATA LOGGING, DOWNLOAD, AND SHARE

The user can download the test data from the SmartBox™ unit to their data recording device (smartphone or tablet). In order to download the SmartBox™ data, click on the **Download Data** button on the screen (Fig. 17). The downloaded data is then listed in the tabulated format. You can also choose to save the data on your data recording device from File→Save menu in .txt format. The log files are stored on the SD card memory in the SmartBox™ folder.
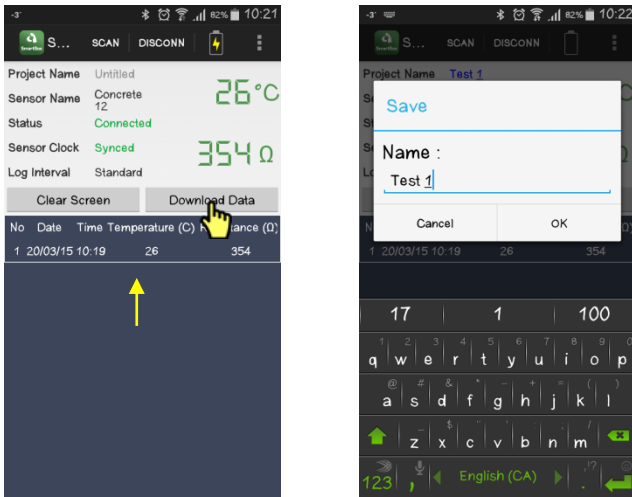
Figure 17. Download and save the data

The downloaded data can be sent out by email or Bluetooth through the share menu.

In order to disconnect the SmartBox™ unit, simply press on the disconnect button on the screen (Fig. 18). This will increase the life time of the SmartBox™ unit battery.
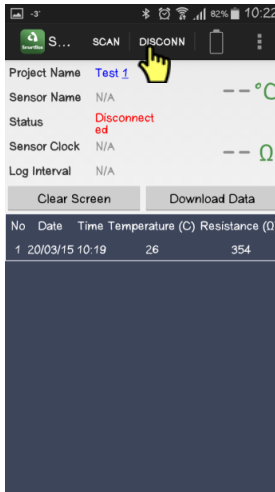
Figure 18. Disconnect the SmartBox™ unit

SAMPLE PREPARATION

Prepare Concrete Cylinder

Step 1: Prepare the concrete cylindrical mold and the SmartBox™ spacer assembly.

Step 2: Fill the cylinder with fresh concrete (Fig. 19(a)); if you are using the original electrode spacer, leave at least 20 mm empty space at the top of the mold, so that spacer can easily fit in.

Step 3: Carefully insert the spacer assembly into concrete. Make sure that the temperature sensor is properly inserted together with the probe ((Fig. 19(b)). You may want to adjust the position of the temperature sensor. Tap on the side of the mold to remove any air gaps between the rods and the concrete.

Step 4: Push the spacer completely through until the mold's wall fill in the spacer. Tighten the knob to keep the electrode spacer assembly stable. You can now start collecting the data on your data recording unit (Smartphone or tablet).

(a)   (b)
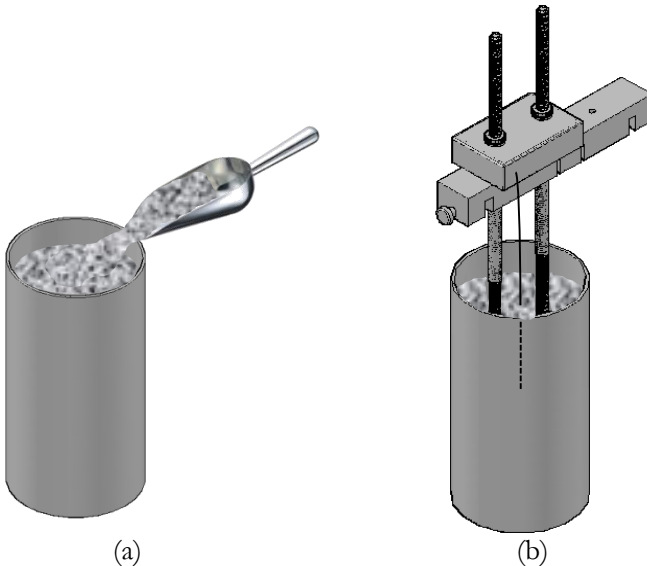
Figure 19. A cylinder mold with concrete and inserted rods

MAINTENANCE

Repairs and servicing not covered in this user manual should only be performed by qualified personnel. Periodically wipe the measurement device with a damp cloth. Do not use abrasives or solvents.

Service

If SmartBox™ malfunctions, call our technical support number provided on the back of this manual. If, after consulting with our technical support department, return is required, the instructions for packaging and returning the device will be provided.

Replacements

For Giatec SmartBox™, use only the replacement parts specified. The USB cable, and temperature sensor is intended to be used only by SmartBox™ device and connecting it to other instruments might damage the cable and/or sensor. To order replacement/disposable parts call Giatec Scientific Inc. using the number provided on the back of the user manual or on the test probe.

For the latest updates, please refer to the Giatec website at www.giatec.ca

SmartBox™ TECHNICAL SPECIFICATIONS

GENERAL

Type	Value
Resistance Measurement Range	1-3000 ohm
Measurement Frequency	10 kHz
Accuracy	±2%
Measurement Time	<1 s
Temperature Measurement Range	-30 ~ 70 °C
Temperature Measurement Resolution	0.5 °C
Communication Protocol	Bluetooth V4.0 LE
SmartBox™ Weight	91 gr

OPERATING CONDITIONS

Type	Value
Operating temperature	-20 ~ 60 °C
Operating humidity	10 ~ 85%
Storage temperature	-20 ~ 60°C
Storage humidity	5 ~ 90%
Dimensions of SmartBox™	55 mm x 85 mm x 20 mm (W x L x H)

TERMS AND CONDITIONS OF SALE ("SALE AGREEMENT")

Please read this Sale Agreement before using the Giatec Scientific Inc. ("Giatec") product (the "Product"). By finalizing Your purchase order, You, the purchaser of the Product, and, if applicable, any end user ("End User") on whose behalf You are making this purchase for (You and the End User are hereafter collectively referred to as "Customer"; Customer and Giatec are hereafter together referred to as "Parties") agree to be bound by and accept the terms and conditions provided below. If You and/or the End User, as the case may be, disagree with these terms and conditions, do not finalize Your order, or if the order has been placed, return the Product immediately upon receipt without using it.

Payment; Purchase Price and Associated Charges. Payment must be made at the time of order unless otherwise agreed to by the Parties. Customer will pay the total purchase price plus shipping and handling, if any, as specified on the emailed invoice. Customer is also responsible for all taxes related to this purchase and to the import of the Product, if applicable, to include but not limited to all sales taxes, value-added taxes, import taxes/customs/duties, and any other similar taxes imposed by any governmental entity.

Title; Risk of Loss. Title to the Product passes to Customer when the Product is paid for in full. However, Giatec bears all responsibility for loss of or damage to the Product during initial shipment after purchase and until Product is received by Customer, unless Customer selects its own mode of shipping. In repair cases, risk of loss is borne by Customer for return of the Product, but by Giatec following repair and upon return to Customer.

Limited Warranties. Giatec warrants the Product against defects in materials and workmanship under normal use (the "Warranty") for a period of 12 months (#) from the Delivery Date (the "Warranty Period"), on the condition that the Product has been completely paid for. Unless as otherwise mandated by local law, the Warranty Period does not restart if Customer receives a replacement appliance and/or replacement Software.

This Warranty does not apply: (a) to consumable parts, such as batteries, Plexiglas cell units and cables unless damage has occurred due to a defect in materials or workmanship; (b) to cosmetic damage, including but not limited to scratches, dents and broken plastic on ports; (c) to damage caused by accident, abuse, misuse, neglect or failure to properly maintain (to include but not limited to water damage and/or condensation or improper temperatures during storage), or improper installation; (d) to damage caused by electrical disturbances or acts of God, to include but not limited to civil disturbance, war, flood, fire, rodents or insects; (e) where manufacturer's serial numbers and security labels have been removed from the Product; and (f) to damage caused during shipment (due to Customer's improper packaging) from Customer to Giatec in the case of Product returns for repair.

Giatec disclaims all other warranties, express or implied, including without limitation implied warranties of merchantability, fitness for a particular purpose, or against hidden or latent defects. Giatec's responsibility for warranty claims is limited to repair or replacement. Giatec reserves the right to modify this Warranty at any time, at its sole discretion, and with notice to Customer.

Giatec does not warrant that the operation of the Product will be uninterrupted or error-free. Giatec is not responsible for damage arising from failure to follow instructions relating to the Product's use. This Warranty is voided immediately if repair, modification (to include upgrades, expansions or usage or addition of non-manufacturer parts or accessories), alteration or other service is attempted other than by Giatec. In this regard, the integrity of the appliance casing (aka the box) should not be violated for any reason, unless expressly authorized by Giatec in writing.

Technical Support. Giatec will provide technical support to Customer in accordance with the then-current support policy in effect and in accordance with the Warranty provided herein, unless full payment for the purchase of the Product is not received. Giatec will respond to Customer support problems by phone or by email inquiry. If a support problem cannot be rectified via phone or email, Customer will be provided with return instructions.

Customer agrees and understands that it may be necessary for Giatec to collect, process, and use Customer data to perform the support and repair obligations identified herein. This may include the necessity to transfer data to affiliate third parties that are contracted with Giatec to assist in meeting these obligations. In doing so, Giatec will (i) protect and keep confidential such information, (ii) not use such information for reasons other those discussed above, and (iii) not sell, distribute or pass on such information to any third party.

Repair. Customer should carefully inspect the Product upon its delivery. Customer should maintain all original packaging upon receiving the Product until the Product has been installed and is found to be in proper working order.

If the Product arrives to Customer (the date of arrival is referred to herein as the "Delivery Date") damaged or defective at initial delivery, Customer must notify Giatec Technical Support within 30 days from the Delivery Date of the condition of the Product and obtain return instructions if needed. Product must then be returned immediately to Giatec for repair or replacement at Giatec's discretion. Giatec will then arrange for delivery of temporary or permanent replacement Product. Customer is responsible for properly packing the return shipment of the Product. Giatec will arrange for shipping and insurance.

If Customer fails to notify Giatec within 30 days of the Delivery Date, (i) the Refund Policy below will not apply, (ii) Customer will bear the cost of returning the Product for repair, and (iii) damaged Product will not be accepted.

If during the Warranty Period (as described herein) but following the initial 30 day period the Product is not working properly, Customer must contact Giatec Technical Support to confirm the problem and obtain return instructions if needed. Customer will pay shipping and insurance costs when returning the Product for repair.

If the Product is returned for repair or replacement at any time following purchase by Customer and Giatec discovers that the Warranty is inapplicable due to the reasons provided above (see the "Limited Warranties" section hereof), the Product will not be repaired and will be

returned to Customer at Customer's expense, unless Customer authorizes and pays for repair. Whether Customer authorizes repair or not, Giatec reserves the right to charge a "No Fault Found" fee where the Product is found not to be defective due to any fault of Giatec.

Any Giatec reseller or distributor involved in the purchase of the Product is not authorized to make any modification, extension, or addition to the Limited Warranties provided by Giatec herein, although any such reseller or distributor may provide its own warranty in addition to the warranty coverage provided by Giatec.

Refund Policy and Product Return. On a case-by-case basis, Giatec reserves the right to authorize a full refund of any Product purchase made where a refund is requested within 30 days of the Delivery Date. In such cases where a refund is approved, End User will return the Product to Giatec if the End User made such order itself. If the Product was ordered by a distributor or reseller, such distributor or reseller will coordinate with Giatec for the return of the Product. In either case, Customer is responsible for shipping and insurance charges and any damage to the Product which takes place en route to Giatec. Giatec reserves the right to charge a nominal re-stock fee for any such returns.

Limitation of Liability. Giatec is not liable under any other agreement between End User and a Giatec reseller or distributor for the provision of support (to include but not limited to an extended warranty or any support, service or repair agreement).

If found to have breached this Sale Agreement, Giatec is not liable for any amount above the aggregate dollar amount paid by Customer for the purchase of the Product under this Sale Agreement. Except as provided in the Warranty and to the extent permitted by law, Giatec is not responsible for indirect, special, incidental or consequential damages resulting from any breach of this Sale Agreement, including but not limited to loss of use; loss of revenue; loss of actual or anticipated profits (including loss of profits on contracts); loss of the use of money; loss of anticipated savings; loss of business; loss of opportunity; loss of goodwill; loss of reputation; loss of, damage to or corruption of data or software programs; or any indirect or consequential loss or damage howsoever caused including the replacement

of equipment and property, any costs of recovering, programming, or reproducing any program or data stored or used with the Product and any failure to maintain the confidentiality of data stored on the product. The foregoing limitation shall not apply to death or personal injury claims, or any statutory liability for intentional and gross negligent acts and/or omissions.

Not For Resale. The Product may not be purchased for resale purposes by Customer unless Customer is a legal and authorized reseller of Giatec products.

High Risk Uses. Customer will not purchase the Product for usage in connection with any high risk or strict liability activity (including, without limitation, air travel, space travel, firefighting, police operations, vehicle operations, power plant operations or power generation applications, transport management systems, military operations, rescue operations, hospital and medical operations or the like) whereby such usage could cause or contribute to damage to property or injury to persons.

Software License. The Product is and contains, the intellectual property of Giatec, and is protected by Canadian, U.S. and international copyright, patent, trade secret laws and international treaties. This Agreement is not intended to grant, and shall in no way be construed to grant, to Customer any rights in the intellectual property of Giatec, including the intellectual property in the Products. The Customer shall obtain a non-exclusive license to use the software contained in the Product (the "Software") only in accordance with the terms of the Software License Agreement, attached hereto as Exhibit A, and the Customer shall agree with its terms prior to installing the Software. Customer acknowledges that the Software is the intellectual property of Giatec and respects Giatec's rights as the intellectual property rights holder. Customer may not and customer agrees not to, or to enable others to, copy, decompile, reverse engineer, disassemble, attempt to derive the source code of, decrypt, modify, or create derivative works of the Software or any part thereof (except as and only to the extent any foregoing restriction is prohibited by applicable law). Any attempt to do so is a violation of the rights of Giatec. By virtue of this Sale Agreement, Customer acquires only the right to use the Software as contained in the

Product and does not acquire any rights of ownership. All rights, title and interest in the Software shall at times remain the property of Giatec.

Product Disposal/Recycling. Giatec is unable to dispose of or recycle the Product following use. End User may dispose of recycle the Product or arrange for the same through the Giatec distributor or reseller which made the Product sale. Any disposal or recycling of the Product must be done in accordance with local government directives.

Export. Customer must comply with all export laws and restrictions and regulations of Canada. Furthermore, Customer will not export, or allow the export or re-export of the Product in violation of any such restrictions, laws or regulations. Additionally, Customer agrees to comply with the above and represents and warrants that it is not located in, under the control of, or a resident of any restricted country.

Entire Agreement. This Sale Agreement constitutes the entire understanding of the Parties as to the subject matter hereof and supersedes all prior offers, agreements, arrangements, negotiations and understanding, written or oral between the parties relating to that subject matter.

Severability; Assignment. If any provision of this Sale Agreement is held to be unenforceable for any reason, the legality or enforceability of the remaining terms shall not be affected or impaired. The failure of Giatec to act with respect to a breach of this Sale Agreement by Customer or others does not constitute a waiver and shall not limit Giatec's rights with respect to such breach or any subsequent breaches. Giatec expressly reserves the right to assign this Sale Agreement and to delegate any of its obligations hereunder. Customer may not assign, delegate or otherwise transfer (whether by operation of law or otherwise) this Sale Agreement or any of Customer rights or obligations hereunder without the prior written consent of Giatec. Giatec may assign the provision of repair services to third parties.

Governing Law; Dispute Resolution. All disputes arising out of or in connection with this Sale Agreement shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with the said Rules. The place of arbitration shall be Ottawa, Ontario, Canada. The language of the arbitration shall be English. For the purposes of this arbitration, this Sale

Agreement shall be governed by and construed under Ontario law as such law applies to agreements between Ontario residents entered into and to be performed within Ontario, Canada. The decision of the arbitrators shall be binding upon the parties hereto, and the expense of the arbitration (including without limitation the award of attorneys' fees to the prevailing party) shall be paid as the arbitrators determine. The decision of the arbitrators shall be executory, and judgment thereon may be entered by any court of competent jurisdiction.

Any non-English language translation of this Sale Agreement is done for local requirements and in the event of a dispute between the English and any non-English versions, the English version of this Sale Agreement shall govern.

EXHIBIT A: END USER SOFTWARE LICENSE

<u>IMPORTANT</u>

PLEASE READ THE TERMS AND CONDITIONS OF THIS SOFTWARE LICENSE AGREEMENT CAREFULLY BEFORE AGREEING TO INSTALL THE SOFTWARE. THIS IS A LEGAL AGREEMENT BETWEEN GIATEC AND THE END USER ("CUSTOMER").

GIATEC IS WILLING TO LICENSE THE SOFTWARE WITH WHICH THIS AGREEMENT IS PROVIDED ("THE SOFTWARE") TO THE CUSTOMER UTILIZING THE SOFTWARE ONLY ON THE CONDITION THAT THE CUSTOMER, ACTING THROUGH YOU, THE CUSTOMER'S AUTHORIZED AGENT, ACCEPT ALL OF THE TERMS OF THIS AGREEMENT.

BY CLICKING ON THE "I ACCEPT THE TERMS IN THE LICENSE AGREEMENT" RADIO BUTTON BELOW, YOU, ON BEHALF OF CUSTOMER, AGREE TO, AND ARE LEGALLY BOUND BY, THE TERMS AND CONDITIONS OF THIS AGREEMENT.

IF YOU DO NOT AGREE WITH, AND DO NOT WISH TO BE LEGALLY BOUND BY, THE TERMS AND CONDITIONS OF THIS AGREEMENT DO NOT CLICK ON THE "I ACCEPT THE TERMS IN THE LICENSE AGREEMENT" RADIO BUTTON AND THE INSTALLATION PROCESS WILL STOP.

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Limited Warranty

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General Provisions

This Agreement constitutes the entire agreement between you and Giatec and supersedes any prior agreement concerning the Software. Giatec is not bound by any provision of any purchase order or any other type of correspondence (written or verbal). Should any court of competent jurisdiction find any provision in this Agreement to be illegal, unenforceable, invalid, or to be overreaching, in whole or in part and for any reason, such illegal, unenforceable, invalid or overreaching provisions or part thereof shall be stricken from this Agreement, and such provision shall not affect the legality, enforceability, or validity of the remainder of this Agreement. This Agreement is governed by the laws of the Province of Ontario and any disputes or claims arising hereunder shall be under the exclusive jurisdiction of the courts situated in the City of Ottawa, Province of Ontario.

Notes

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