WalkTEM 2

TRANSIENT ELECTROMAGNETICS (TEM)

ABRIDGED USER MANUAL

CONTENTS

1. ABEM WALKTEM 2 RELEASE NOTES (WUI version 1.3.7.10)

The final stages of development for the WalkTEM 2 instrument were impacted by the Covid-19 pandemic. As a result the decision was made to release the product with some limitations on functionality, and reduced support literature, but to then release a series of firmware and documentation updates to improve the operation and customer experience. The instrument, as it stands, is a high-specification, fully functioning TEM device which we believe you will be happy with and we are excited about some of the improvements to be made in the upcoming releases; we hope you will be too. If you encounter any issues please do not hesitate to contact your local Guideline Geo representative or email support@guidelinegeo.com

Known Issues and Limitations:

A. **Battery Status:** Depending upon the design of the internal batteries, you may only see 92% charge on the fuel gauge if the batteries have been charged internally (as opposed to using the external cradle).

B. **Self-discharge of Batteries:** The instrument has some circuitry which is only dormant on power-down rather than completely disconnected. As such, it is advisable to remove the batteries if the instrument is not is use for a long period of time.

C. **Rogowski Coil Tests:** At present, the damping resistor selection is a manual process only; after running the test the user can plot the results and make a choice based on the shape of the decays. This is an improvement over the previous WalkTEM but it is hoped that the instrument will be able to suggest the best resistor in the future.

D. **HighMoment_Noise_10_90ms Script:** If a sounding has been made with this script, do not restart the measurement within 3 seconds of the completion notification appearing on the screen. The TX unit will not reinitiate within that short time frame.

A NOTE ON CALIBRATION

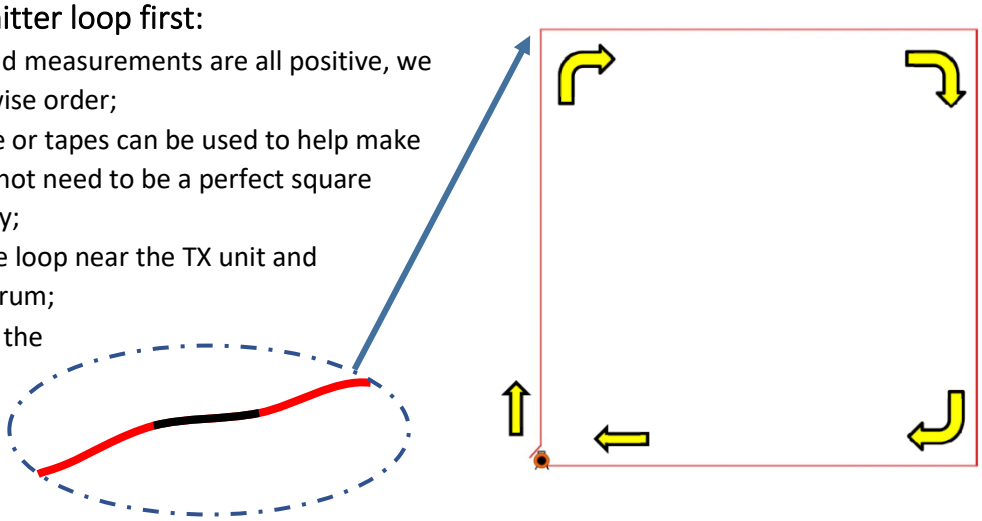
Again, due to the Covid-19 situation, it has not been possible to access the regular Guideline Geo calibration site. The initial release of WalkTEM 2 instruments have undergone a laboratory-based calibration and a full in-field verification. Contact support@guidelinegeo.com for more information.

Version: 1.70
Date: June 2023

2. CENTRE LOOP LAYOUT (TL-1K6, 40x 40m Transmitter Loop)

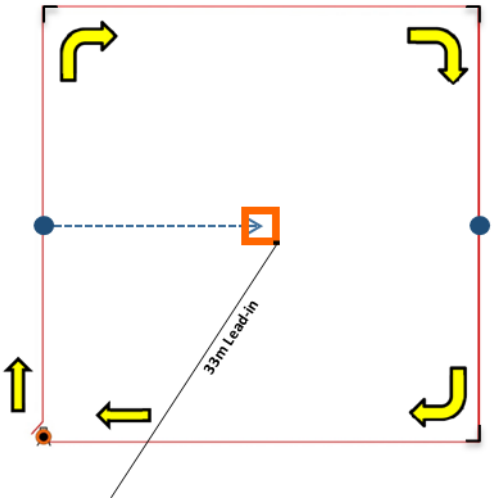
A. Lay out the TL-1k6 transmitter loop first:

- to ensure current flow and measurements are all positive, we lay everything in a clockwise order;
- a compass, optical square or tapes can be used to help make the loop square - it does not need to be a perfect square to still perform acceptably;
- leave the loose end of the loop near the TX unit and walk around with cable drum;
- use the black markers on the loop as a guide for the corner positions:



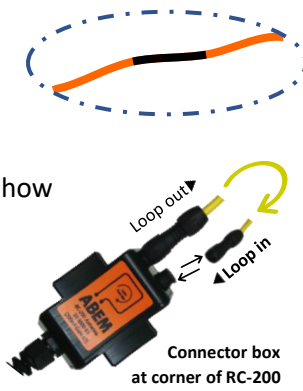
B. Lay out RC-5 receiver coil next:

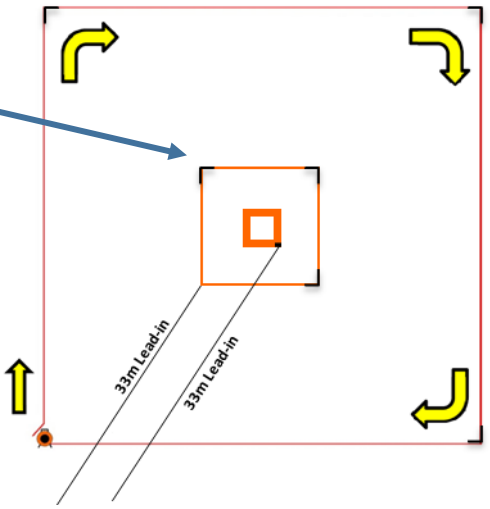
- this is easiest to locate centrally;
- either use people on the corners of the transmitter loop to align someone in the middle **OR** (easier) walk from the middle of one side, toward the middle of the other side, measuring the distance as you walk.
- the RC-5 coil is running clockwise when the black connector is on the top (right);
- ensure that the RC lead-in cable is not coiled and crosses the transmitter loop at 90° (or as close as possible).



C. Lay out RC-200 receiver loop:

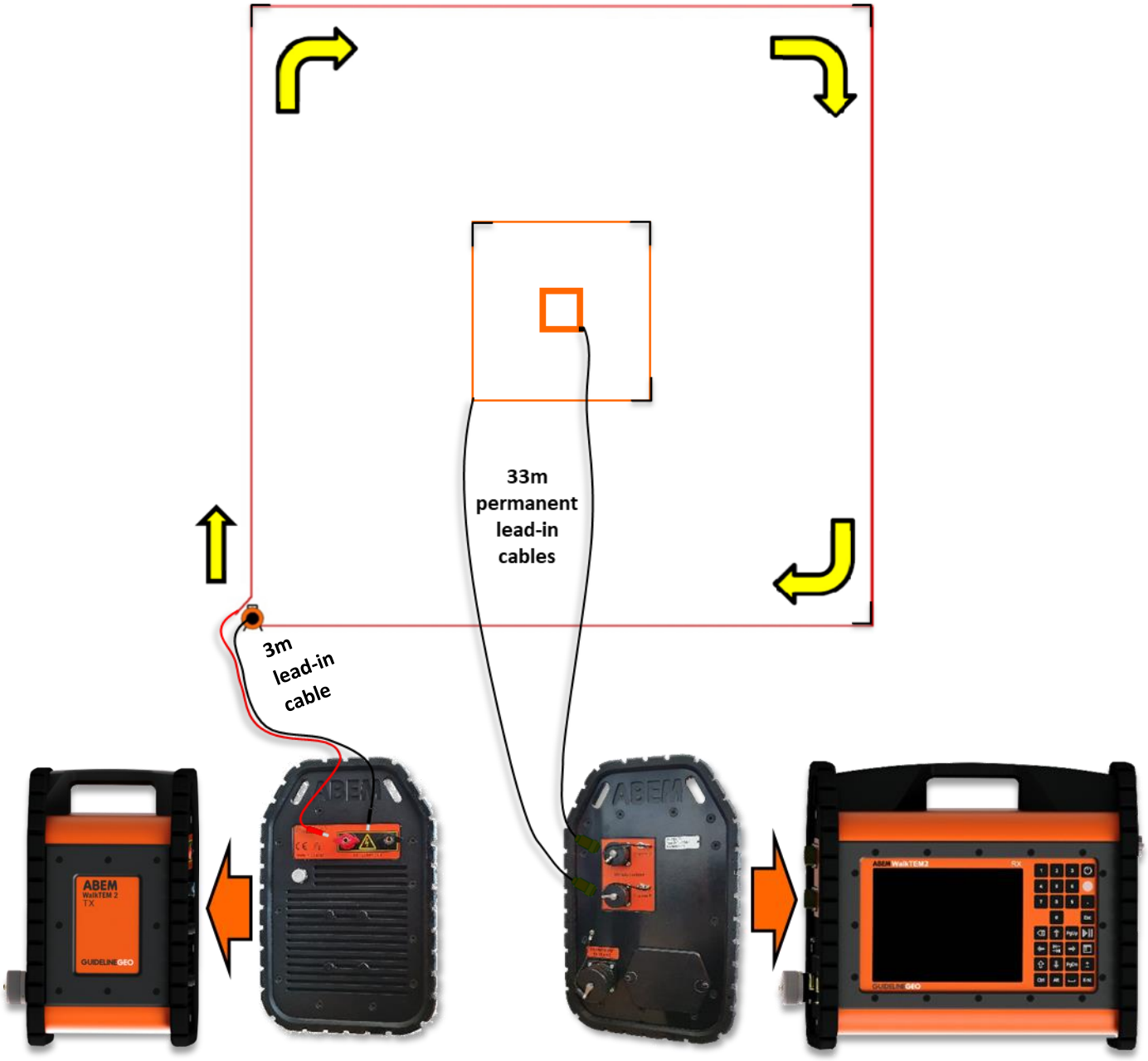
- use the RC-5 as a guide for centring and aligning the RC-200;
- the RC-200 loop also has corner markers on the cable;
- at the corner of the RC-200 there is a connector box with a diagram on it to show which is the correct direction for laying it out (see image, right);
- ensure that the RC-200 cable is not coiled, runs parallel to the RC-5 cable separated by ~2m, and crosses the transmitter loop at 90° (or as close as possible).





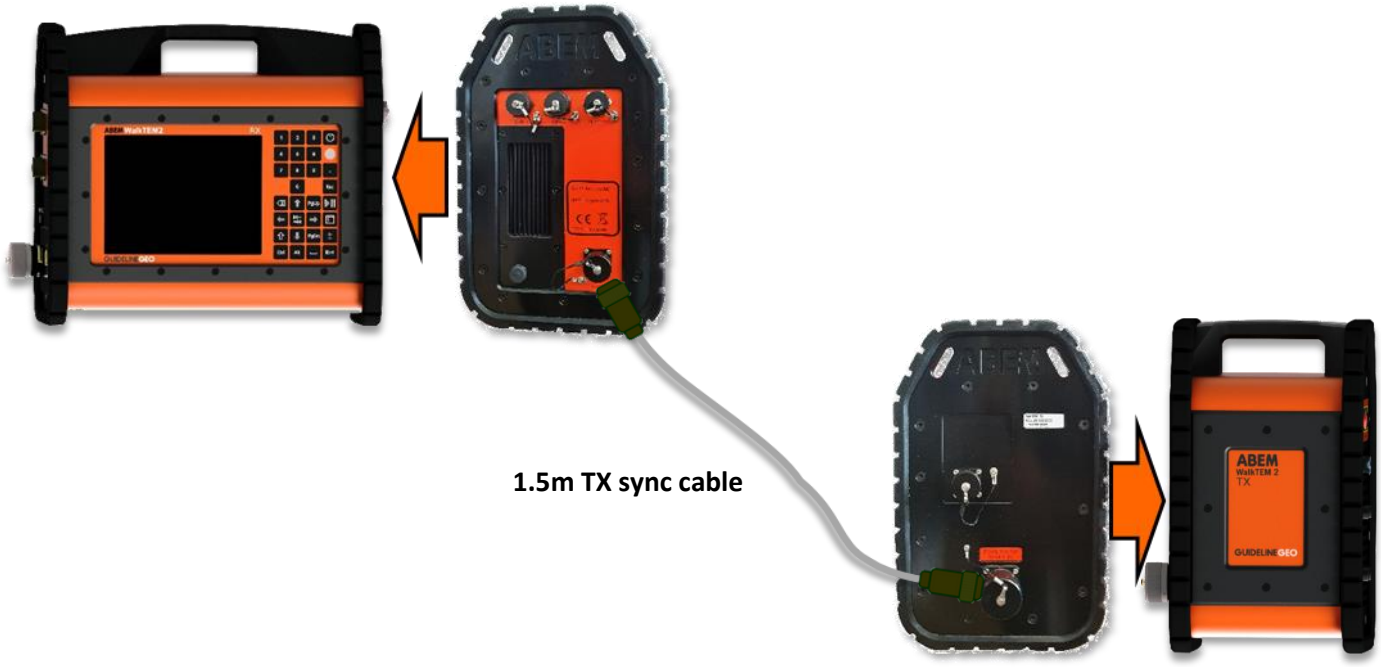
D. Connect TX loop and RX coils to WalkTEM 2 TX & RX units:

- the RC-5 / RC-200 connect to Inputs A and B, on the RX unit; it is good practice to put the RC-5 into Input A and the RC-200 into Input B;
- a 3m lead-in cable connects the TL-1k6 to the TX unit; the black connector attaches to the cable drum, and the red connector attaches to the loose end of the loop. It is only possible to connect it one way round as the loop end of the 3m lead-in cable has one male and one female connector;
- see Section 3 “Damping Resistor Decisions” for instructions on manually choosing a damping resistor if you intend to use an external resistor rather than one from the internal array.



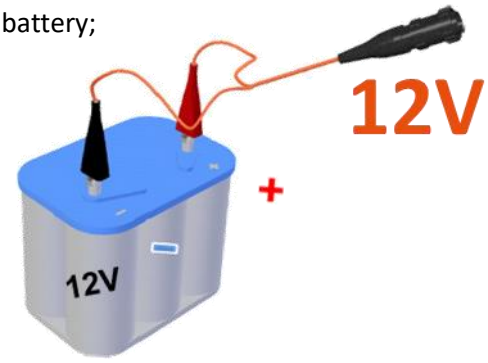
E. Connect the WalkTEM 2 TX & RX units together:

- use the 1.5m TX sync cable to connect the WalkTEM 2 RX and TX units together. Although it is advised to connect this cable before powering up the instruments, the units will sync at any time the connection is made.

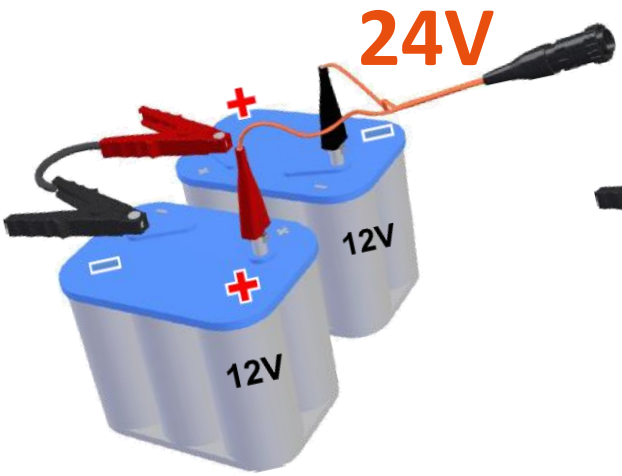


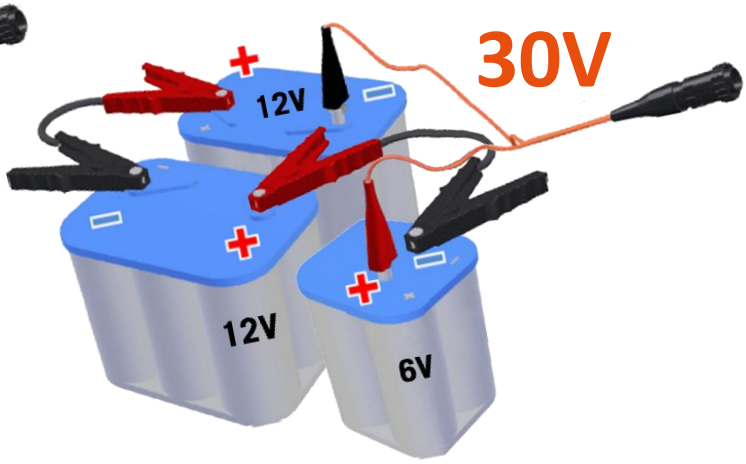
F. Connect external power to the TX (and RX if required):

- the minimum requirement for the TX-8 / TX-20 unit is a single 12V battery;
- an additional 12V battery can be connected **in series** for 24V;
- adding a further 6V battery **in series** will provide 30V and allow the TX to reach maximum current.



NOTE: when setting up to use 24V or 30V, ***ensure correct connection polarities***, otherwise there is a risk of damage to the instrument and harm to the operator. If in doubt consult someone with relevant experience.



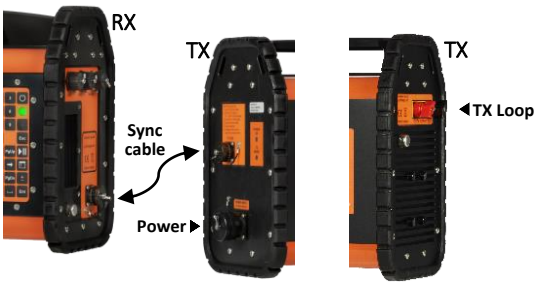


3. DAMPING RESISTOR DECISIONS

When we rapidly shut off the current in a transmitter loop, a 'ringing' effect is created – an unwanted oscillating and decaying current. We use a damping resistor in parallel with the transmitter loop to minimise this effect and the size of the resistor will depend upon the loop properties and the ground over which it lies. In the original WalkTEM all damping resistors were mounted externally and the choice was entirely down to the operator and their experience of how a 'good' sounding should look. With the WalkTEM 2, there are a range of damping resistors installed inside the TX unit, which it is possible to test and analyze in order to determine the best possible resistance value for any given loop or survey area. The analyzer will also run a test on the loop without any of the internal resistors connected thus it would still be possible to mount a custom resistor externally and review its suitability; mounting of an external resistor is covered in Part D of this section. The analysis process would be as follows:

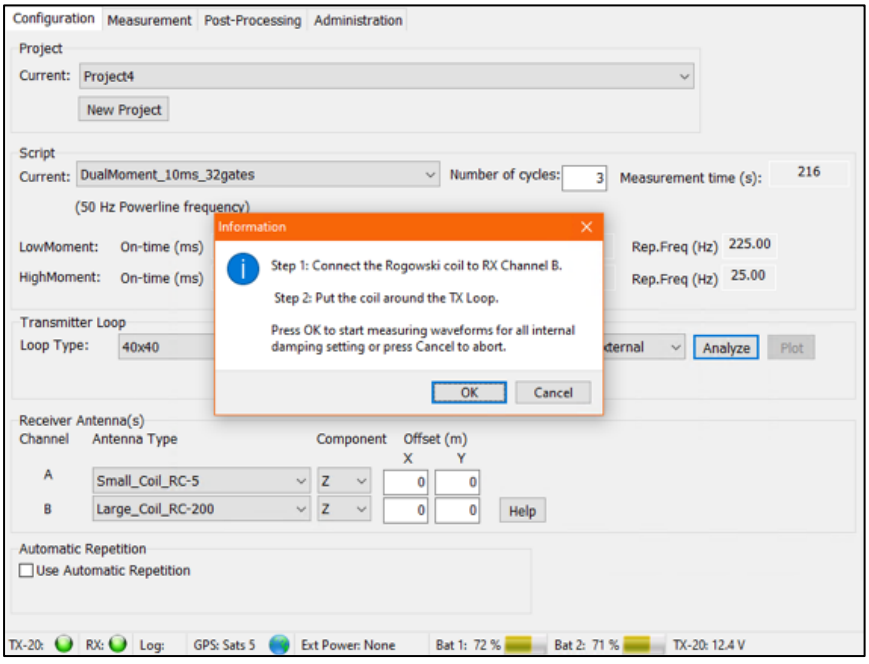
A. Set-up the instrument with a transmitter loop:

- connect the RX and TX units plus, as a minimum, the transmitter loop and power on;
- you need an active project and to select a measurement script before the "Analyze" button will activate.

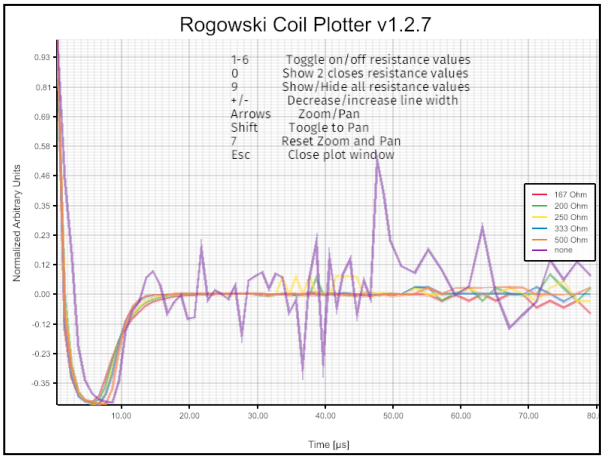


B. Select "Analyze", press ENT, and follow the screen prompt:

- take out the Rogowski coil (below right) and open it, if necessary, by pulling the free end of the loop (**A**) from the blue connector;
- wrap the loop around one of the transmitter coil leads, using the arrow on the blue connector to orient in the correct direction with respect to the direction of current flow in the transmitter loop;
- plug the other end of the Rogowski coil into Input B on the left side of the RX unit (you may need to unplug the RC-200 from Input B);
- press "OK".



C. Once the test measurements have finished, plot the data and choose the best resistor:



- hit “Plot” and a new window will open showing the resulting curves;
- the time axis is in real units but the decay curves are normalized within the current zoom level to arbitrary units;
- the arrow keys allow panning and zooming with the “Shift” key (⌂) toggling between the two functions;
- keys 1 to 6 will switch on/off the individual decay curves;
- pressing numeric key “0” cycles through adjacent decay curves, showing two at a time, for easier comparison;
- decreasing the line width can help visualize the curves better;
- decreasing the line width can help visualize the curves better;
- if the curve is inverted, reverse the Rogowski coil or place it on the other tail of the TX;
- the aim is to pick the decay curve with the steepest drop-off which also returns to zero quickly and without too much further oscillation – typically larger loops and more conductive ground require bigger damping resistors;
- once the best resistance value has been identified, press “Esc” to close the Rogowski plotter and select the relevant resistor from the drop down menu.

D. Using an external damping resistor:

- if a custom resistance value is desired it is possible to mount one externally in parallel with the transmitter loop;
- use a good quality “power resistor” that can withstand the load put on it by the transmitter;
- the resistor should be attached to the instrument end of the 3m TX lead-in cable (right) – although this image depicts the connection on a WalkTEM 1, the arrangement would look the same on a WalkTEM 2 TX unit;
- connection of the Rogowski coil should be on the TX lead-in cable and not around the resistor leads;
- the results of the Rogowski test for this external resistor will be the decay labelled “none” as none of the internal resistors are in use on that measurement.

NOTE: When a Rogowski coil test is run with an external resistor attached, the decays shown for the internal resistors will be affected by the external resistor’s presence; those decays will show the combined effect of the external resistor and the internal resistor.

E. Using an external damping resistor:

- the results of the tests are written out to a time-stamped folder and stored within the file structure of the regular measurement data;
- the results are in a simple text format and therefore can be imported into other software packages for plotting and / or further analysis.

CHARGING THE INTERNAL BATTERIES

The WalkTEM 2 RX has two internal batteries and these can be charged in the instrument or the separate charging cradle.

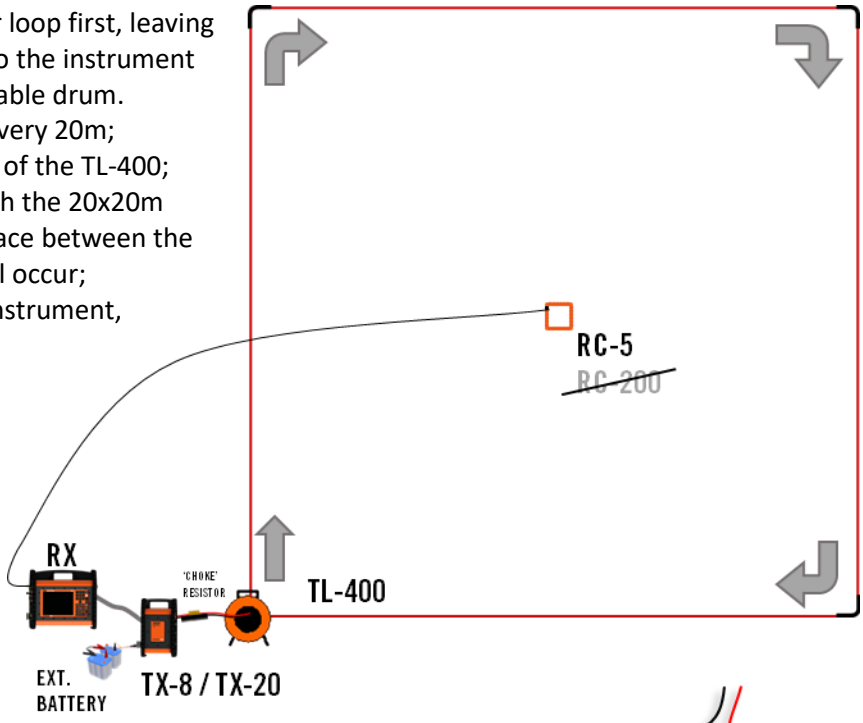
The TX-60 battery is non-removeable and can only be charged using the Office Power Supply; the TX-60 must be switched on to charge (but it does not need to be attached to the WalkTEM 2 RX).

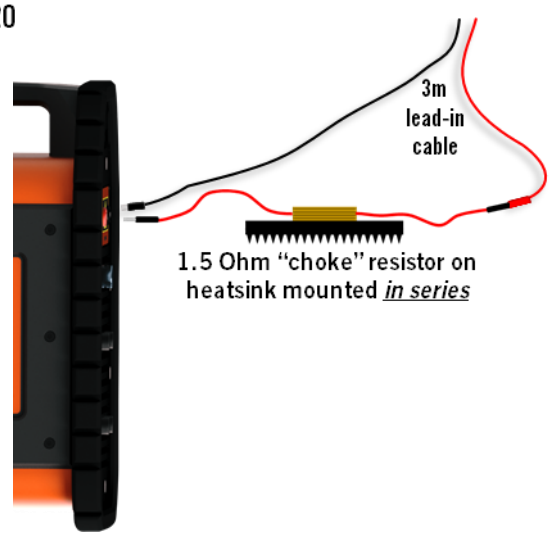
The TX-8 and TX-20 do not have internal batteries.

4. CENTRE LOOP LAYOUT (TL-400, 20X20m Transmitter Loop)

A. Similar layout to using the TL-1k6:

- pull out the TL-400 transmitter loop first, leaving the free end of the loop next to the instrument and walking around with the cable drum.
- The loop has corner markers every 20m;
- next lay the RC-5 at the centre of the TL-400;
- the RC-200 cannot be used with the 20x20m loop as there is not enough space between the two loops and interference will occur;
- now connect the RC-5 to the instrument, typically via Input A;
- the TL-400 is connected to the instrument via the 3m lead-in cable again but also *through* a 1.5 Ohm "choke" resistor on one side of the cable (in series with the loop, not in parallel). This counteracts the low resistance associated with this very short transmitter loop and limits the maximum current to safe levels;
- see Section 3 "Damping Resistor Decisions" for instructions on manually choosing a damping resistor.





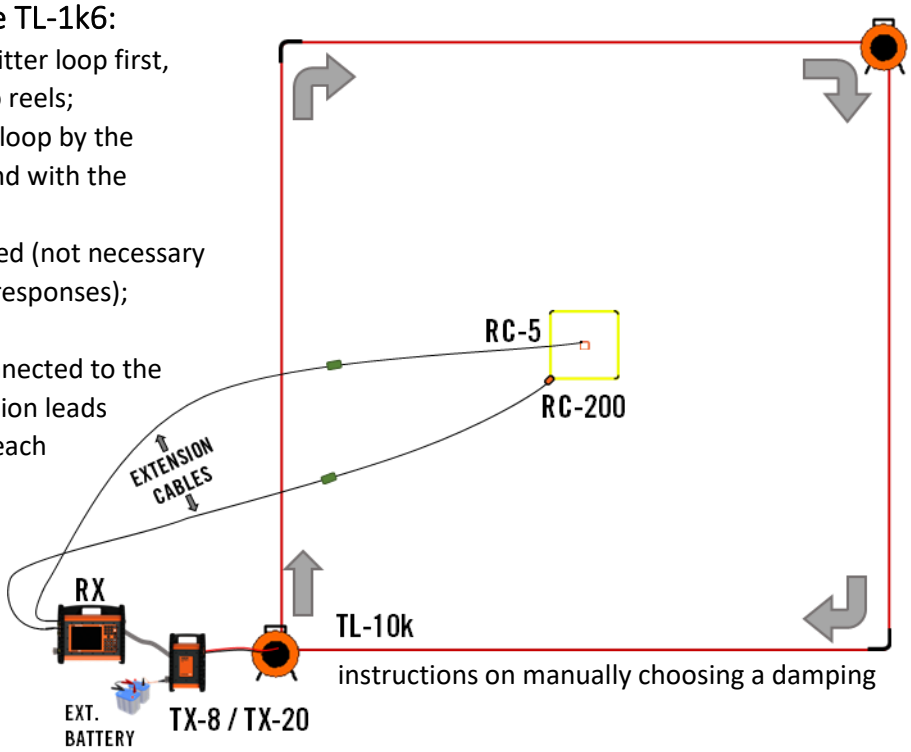
B. Powering the TX:

- a 20x20m transmitter loop should only be powered with 12V (i.e. 1 battery).

5. CENTRE LOOP LAYOUT (TL-10k HP6, 100x100m Transmitter Loop)

A. Similar layout to using the TL-1k6:

- pull out the TL-10k transmitter loop first, this loop is split across two reels;
- leave the loose end of the loop by the instrument and walk around with the cable drums;
- next lay out the RC-5, if used (not necessary if primary focus is deeper responses);
- lay out the RC-200;
- RC-5 / RC-200 are now connected to the instrument via 62m extension leads (total lead-in distance for each coil is now 95m);
- the TL-10k is connected to the TX unit via the 3m lead-in cable;
- see Section 3 “Damping Resistor Decisions” for instructions on manually choosing a damping resistor.



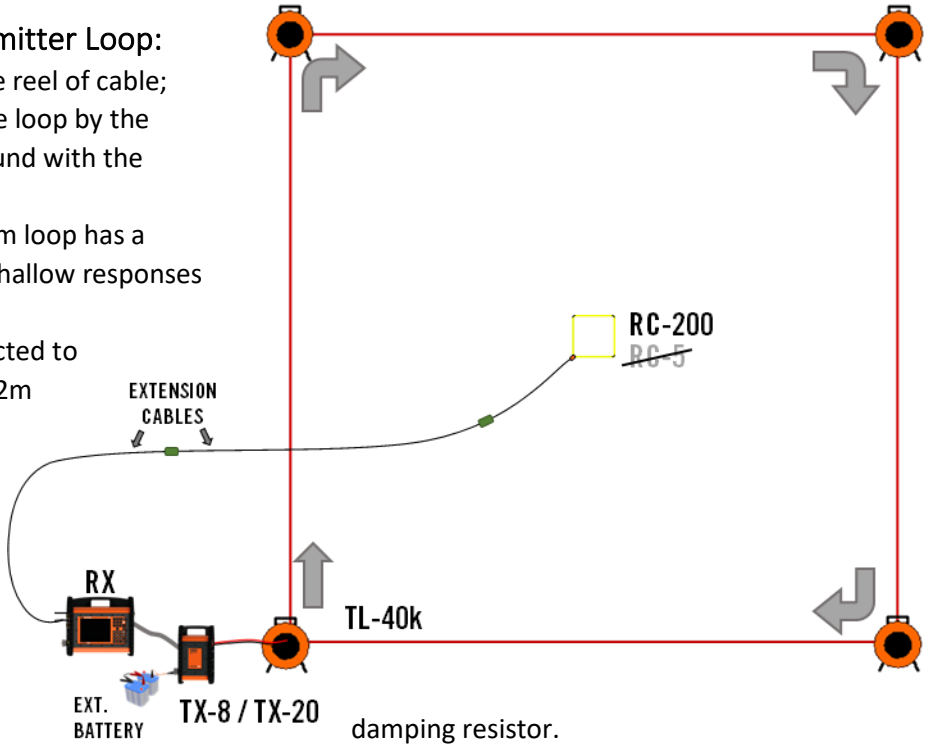
B. Powering the TX:

- a 100m transmitter loop would normally be powered with a minimum of 24V (i.e. 2 batteries).

6. CENTRE LOOP LAYOUT (TL-40k HP6, 200x200m Transmitter Loop)

A. Start by laying out transmitter Loop:

- each side is one complete reel of cable;
- leave the loose end of the loop by the instrument and walk around with the cable drums;
- no RC-5 because the 200m loop has a long switch-off time, so shallow responses are undetectable;
- the RC-200 is now connected to the instrument via **two** 62m extension leads;
- the TL-40k is connected to the instrument via the 3m lead-in cable again;
- see Section 3 “Damping Resistor Decisions” for instructions on manually choosing a damping resistor.



B. Powering the TX:

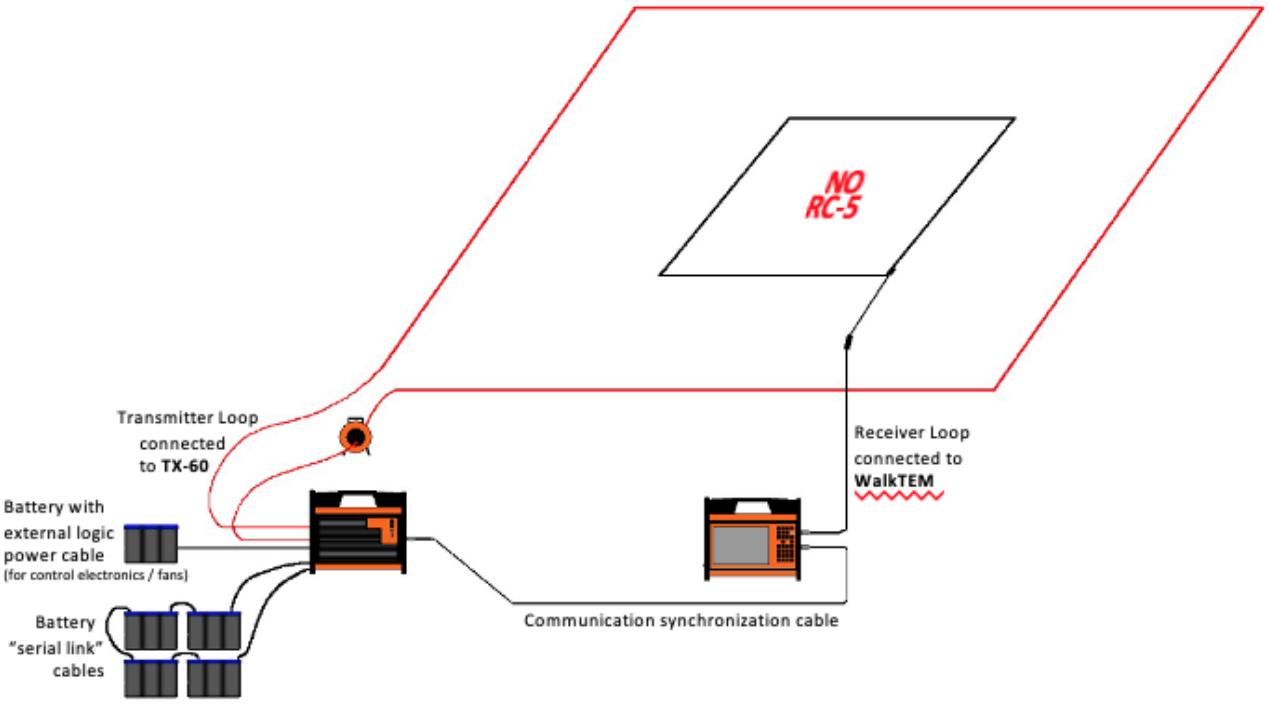
- a 200m transmitter loop should be powered with a minimum of 24V (i.e. 2 batteries).

7. TX-60 LAYOUT, CONNECTIONS AND OPERATION

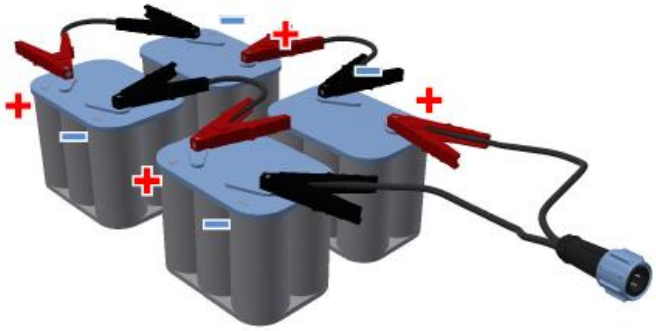
A. The TX-60 is only designed for use with 100m and 200m high power loops (TL-10k HP6 & TL-40k HP6, the TX-8/TX-20 can operate with old-style non-HP6 loops)

B. Layout of the loops is the same as described in previous pages, except for:
- the RC-5 is unnecessary because the TX-60 has no low-moment phase;
- Transmitter Loops are connected with a different lead-in cable, compatible with the HP6 / TX-60 connectors.

C. The TX-60 should be powered by at least 4 batteries:
One for powering the control electronics & cooling fans, and at least 3 for supplying the current generator. Only using two batteries for the current generator is no different from running the WalkTEM 2 on 24V without the TX-60. More batteries will increase the voltage and thus current in the loop (to a maximum of 250V, 60A or 5kW, whichever comes first).



TX-60 END PANELS



CONNECT ALL BATTERIES IN SERIES BEFORE CONNECTING THE CABLE PLUG TO THE TX-60

It is critical to observe the correct polarities when connecting batteries in series. A wrong connection can result in equipment damage as well as personal injury. Only attempt connection if you understand electrical circuits, otherwise seek qualified assistance.

WALKTEM vs TX-60 TRANSMITTER LOOP LEAD-IN CABLES

The standard lead-in wire for use with the original WalkTEM used “banana plug” connectors; the WalkTEM 2 and the TX-60 use a heavier gauge wire, split-spade connectors and screw terminals:

Original WalkTEM Lead-in Cable

WalkTEM 2 & TX-60 Lead-in Cable

WALKTEM TX-60 STATUS LIGHTS

LED indicator	Status	Description
Power status LED		ABEM TX-60 is powered on
		Hardware failure
Operation status LED		Offline
		Starting up
		Online and ready to start
		Transmission in progress (ABEM TX-60 operating)
		Transmission disabled with switch on the left side of the unit
GPS status LED		No satellite fix
		GPS fix on 1 to 3 satellites
		GPS fix on 4 satellites or more
Internal battery status LED		Battery level below 33%
		Battery charging. Level below 33%
		Battery level between 33 and 66%
		Battery charging. Level between 33 and 66%
		Battery level above 66%
		Battery charging. Level above 66%

8. USER INTERFACE AND MEASUREMENT CONFIGURATION

Configuration
Tab for setting up measurement parameters. 1

Measurement
Tab for initiating and monitoring data collection. 2

Post Processing
Tab for file management and inversion. 3

Administration
Tab for instrument settings and error logging. 4

Project
Select existing project to add in additional stations or create a new one. 5

Script
Choose your preferred measurement script with this drop-down and how many repetitions on the right; total time is shown on the right and details of the script are summarised below. 6

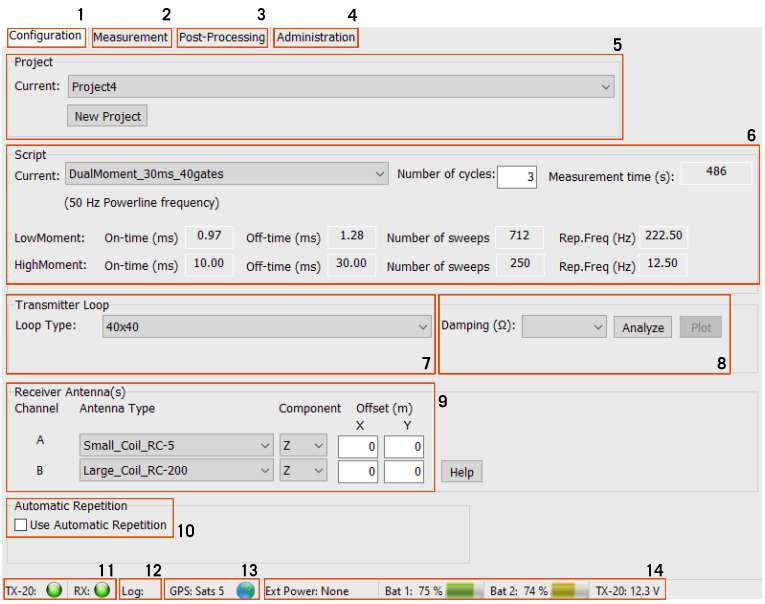
Transmitter Loop
Select the loop you will use for measurement. The choice is limited on an RX Standard. 7

Receiver Antenna(s)
Select which coils and input you will use; RC-5 on A is only option on an RX Standard. 9

Automatic Repetition
Set-up a schedule for repeated measurements. 10

Transmitter/Receiver Status
Yellow shows TX is initialising, green means everything is okay with the TX / RX and ready to measure. During measurement, icons change to show system is active. 11

Log
Notifies of issues recorded on the Administration tab. 12



Damping
Select one of the internal damping resistors from the drop-down or choose to use a custom external resistor.

Selecting "Analyze" provides instructions on performing a Rogowski Coil test to assess which damping resistor to use. This feature is included on the RX Advanced and an optional extra on the RX Standard.

"Plot" will show the results of the Rogowski Coil tests so you can choose the most suitable damping resistor. 8

GPS Status
Shows number of satellites in use for positioning. 13

Battery Status
"Ext Power" shows if the office power supply is attached or the voltage of externally connected 12V batteries (when connected) – any external battery will take over from the "Bat 1" internal battery.

"Bat 1 / Bat 2" shows the voltage of the internal battery pair. These run the computer, screen and receiver if there is no external power source. To do a 'hot swap', keep one battery in place whilst changing the other.

"TX-8 / TX-20 / TX-60" indicates voltage on the TX unit (when attached). 14

KEYPAD FUNCTIONS

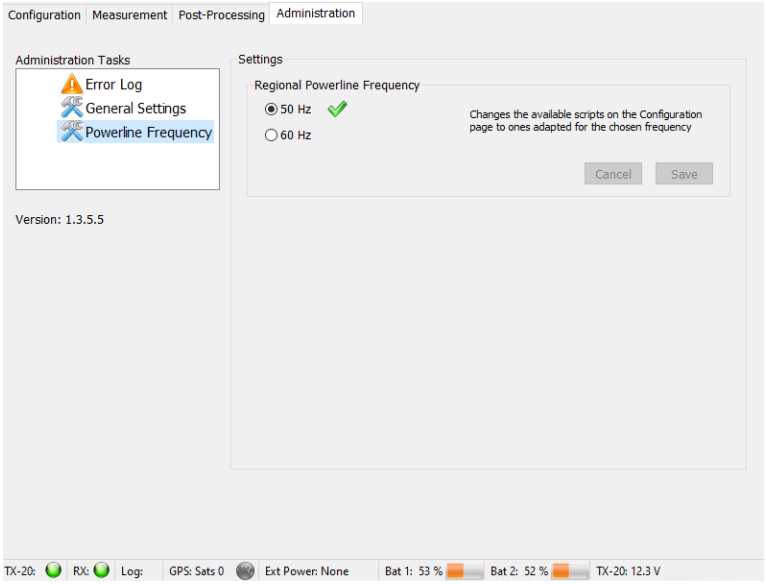
ABEM WalkTEM Keypad Functions		
Numerical keyboard	0 ... 9	For entering values into settings boxes and shortcuts in the Post-Processing tab
Backspace	⌫	Deletes the character on the left of the cursor
Navigation arrows	↑ ↓ ← →	Moves the cursor in desired direction. Primarily used in drop-down menus
Tab	⇤⇥	Jumps to next configuration item or command; jumps backwards in combination with Shift key
Shift key	⇧	Similar to a Shift key on a standard keyboard and used for shortcuts on Post-Processing tab
Ctrl and Alt	CTR ALT	Works as Control and Alt keys on a standard keyboard
On/Off button	⏻	A short press turns the instrument on; within WalkTEM UI, another short press opens a dialog with an option to shutdown the instrument.
Indication LED	((●))	Flashes when instrument is powered on
Esc	ESC	Works as a regular Escape key on a standard keyboard
Start/Stop measuring	⏯	Used as a quick command to start or stop a measuring cycle on the Measurement tab
Menu	▤	Displays a pop-up menu in WalkTEM UI; used in combination with Shift key, the Windows menu appears
+/- sign	±	For entering a plus or minus sign; hold Shift key to enter + sign
Page Up/Down	PgUp PgDn	Used to move between different tabs in the WalkTEM user interface (Configuration, Measurement, Post-Processing, Administration)
Enter	ENT	Acts like the Enter key on a standard keyboard; used to execute commands
Space	␣	Acts like the Space bar on a standard keyboard; used to tick check boxes

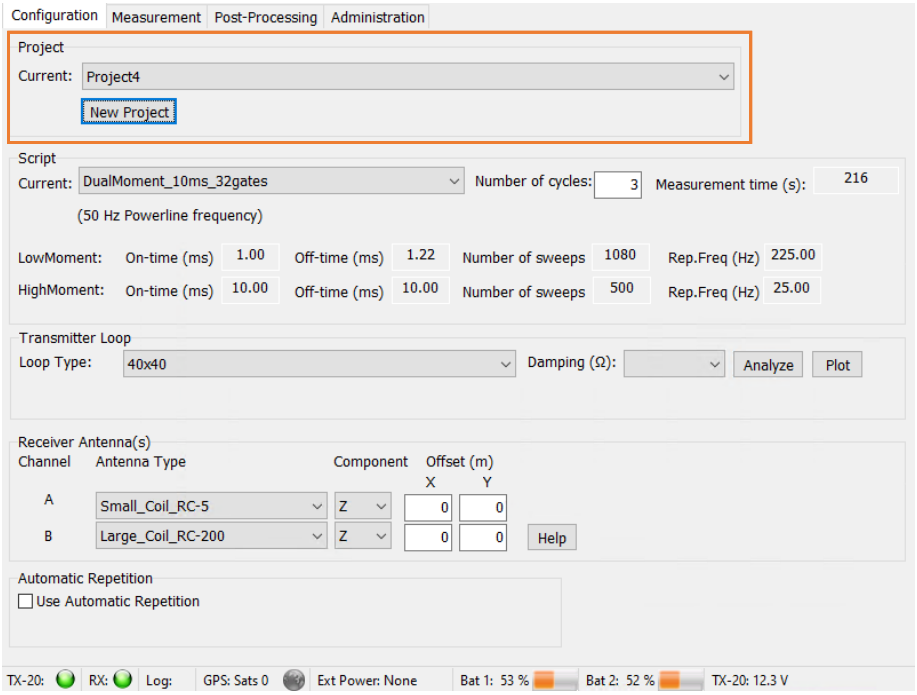
A. The first step is to navigate to the "Administration" tab (*PGUp* or *PGDn*) and choose the correct frequency of electricity transmission for the country or region you are surveying within.

This ensures that only the measurement scripts suitable for use in that region are offered on the configuration tab.

A summary, listed by country, can be found here (other resources are available):

https://www.guidelinegeo.com/powerline-frequencies/

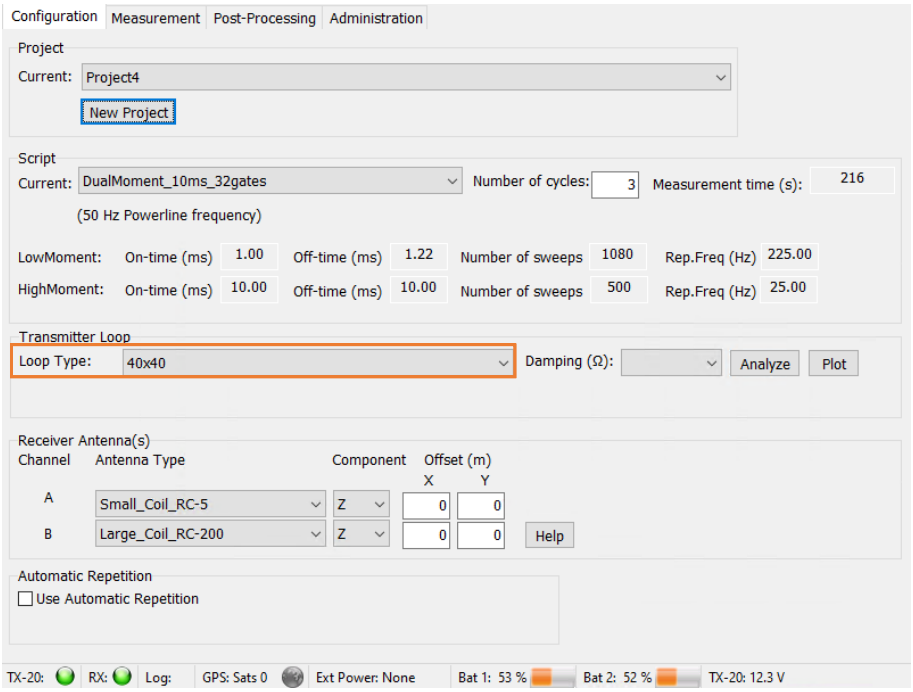




B. Navigate back to the "Configuration" tab and either use the currently active project, a previous project to add additional stations or select "New Project".

Projects are automatically numbered sequentially.

C. After creating the project, select the correct Transmitter Loop. Remember to undertake the Rogowski Coil test (see Section 3) to determine the best damping resistor.



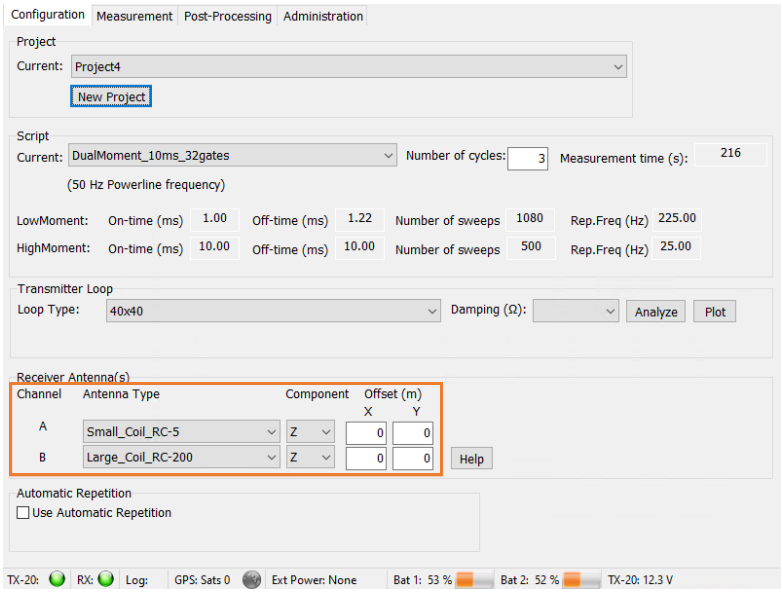
D. Next add in which receiver coils are being used on each input channel.

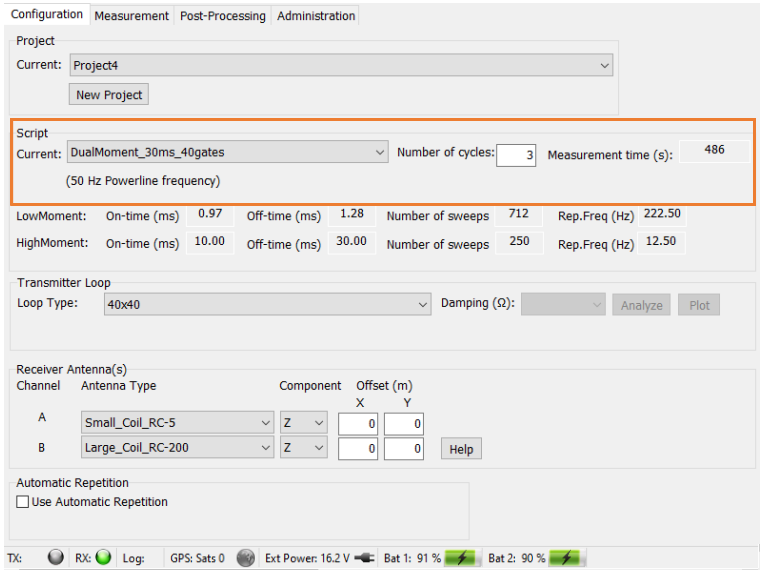
For a 20x20m loop, only use the RC-5.

For a 40x40m or 100x100m transmitter loop, the RC-5 & RC-200 can both be used.

For a 200x200m loop, only use the RC-200.

Offsets can be configured here as well as the orientation of the RX coil. A "Z" component measurement would be from a regular, horizontally laid, receiver. "X" and "Y" are when the loop is mounted vertically with respect to the transmitter loop. "X" would normally be with the RC antenna aligned up the centre of the transmitter loop; "Y" would be with it aligned across the centre of the transmitter loop.





E. Now that the hardware is configured, the final step is to choose a suitable script. A table is provided below to assist with the choice.

The "Number of Cycles" box is how many times the script (which in itself contains hundreds of stacked measurements – see table) will be repeated. Increasing this will increase the signal to noise ratio and help with the deeper signals. But it lengthens the survey time; 3-5 is acceptable under normal conditions.

On the right-hand side, an indication of how long the measurement will take is given.

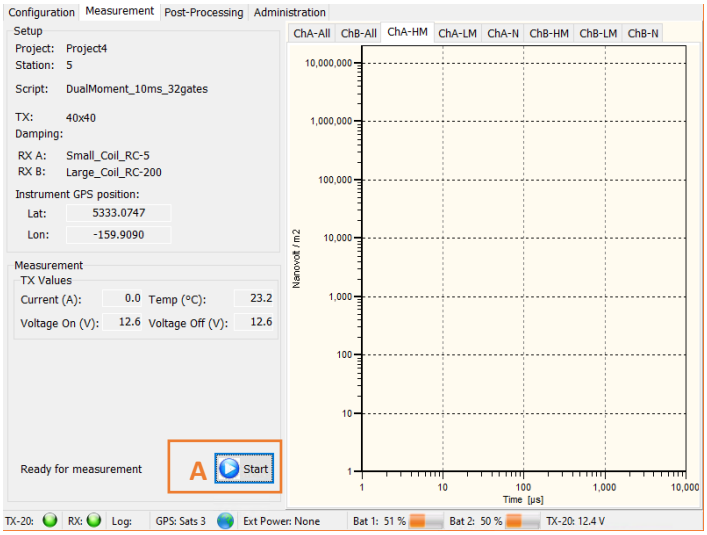
SCRIPT NAME	BRIEF DESCRIPTION	MOMENT SUMMARY	DUTY CYCLE	CYCLE TIME
DualMoment_Testscript	Fast measuring script, useful for quick tests of equipment, set-up and the survey location.	High: 50 stacks Low: 178 stacks Noise: 50 stacks	50%	5s
HighMoment_Testscript	Fast script with only High and Noise moment. Useful for quick tests of equipment, set-up and the survey location.	High: 100 stacks Noise: 50 stacks	50%	6s
DualMoment_10ms_32gates	Measuring script for shallow to deep data collection, divided into 32 gates with slightly longer first gate.	Noise: 250 stacks High: 1250 stacks Low: 2700 stacks	50%	72s
DualMoment_10ms_40gates	Measuring script for shallow to deep data collection, divided into 40 gates; shorter gating at start.	Noise: 500 stacks High: 2500 stacks Low: 5340 stacks	50%	135s
DualMoment_25ms_40gates	40 gate measuring script with a longer measuring time for medium to deep data collection. Useful in hot conditions to lessen heating of transmitter unit.	Noise: 606 stacks High: 1750 stacks Low: 4628 stacks	25%	162s
High Moment_25ms_40gates	Measuring script for medium to deep data collection with no low moment pulses.	Noise: 250 stacks High: 1750 stacks	25%	140s
HighMoment_Noise_10_90ms _51gates	Measuring script for deepest data collection, divided into 51 gates, with now low moment.	Noise: 125 stacks High: 500 stacks	10%	125s

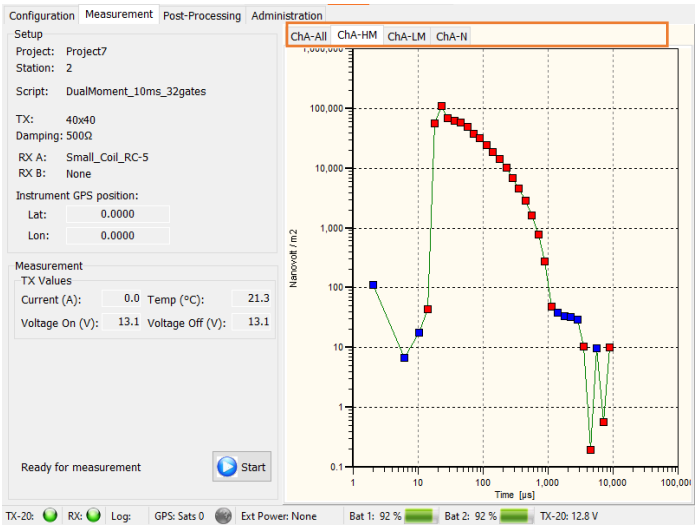
9. MEASUREMENTS

A. All that is required on this page is to press “Start”. This will initiate the cycle of noise, low moment and high moment measurements.

A progress bar will indicate how far into the measurement process you are and an estimation of time remaining.

The instrument has both audio (for which the supplied Bluetooth speaker is required) and visual notifications that the measurement is complete.





B. Use the TAB button to select the first tab above the data plot on the right-hand side of the screen. The left and right arrow will now switch between the different real-time measurement views.

- *ChA-All and ChB-All will redraw the curve each time a new High Moment, Low Moment or Noise measurement is made on Channel A and B, respectively.*
- *In the example here, only the RC-5 is being used and thus ChB feeds are not available to view.*
- *The remaining tabs show only one of the measurement phases (High, Low or Noise) for each channel. These refresh the next time one of these measurement phases are completed*

10. FILE MANAGEMENT & INVERSION

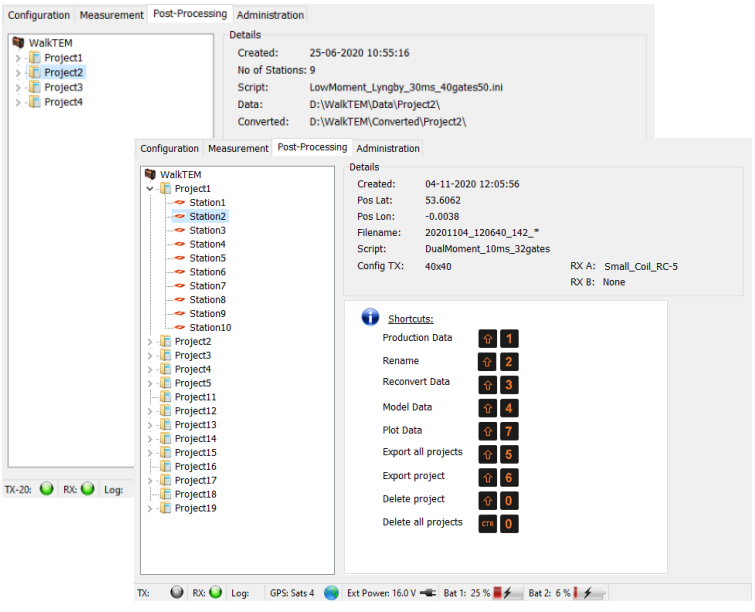
A. Use the Down Arrow to select a project.

The Right Arrow will expand the ‘tree’ to show soundings (Stations) measured within that project.

The Menu button (▤) will give a series of file management options for the Project or the Station depending upon which is highlighted.

Some of these actions have shortcut keys listed on the right of the screen.

To use the “Export” options, a USB drive will need to be attached to the instrument.



B. To review soundings, select “Plot Data” from the menu or shortcut to it by pressing “Shift+7”.

This will initiate the ABEM WalkTEM Visualization Tool; a title screen will show whilst it loads.

When the viewer starts, by default, it will show the stacked decay curves (dB/dt) for all available moments and receiver coils. The data from high and low current, RC-5 and RC-200 are all presented as different colors.

To view raw (unstacked) curves, use the space button (␣) to toggle between the two views; the raw view will also reveal the noise measurements. It is also possible to switch between the stacked and raw views by clicking on the circular selection buttons, if a mouse is connected to the instrument.

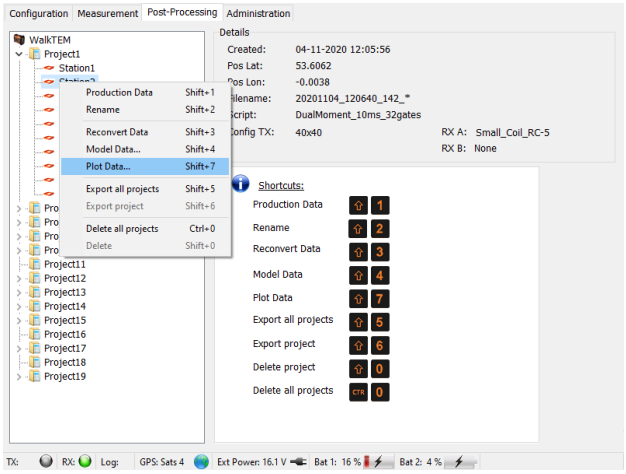
To view apparent resistivity curves, use the “Ctrl” button to toggle between the two views. It is also possible to switch between the decay and apparent resistivity views by clicking on the circular selection buttons, if a mouse is connected to the instrument.

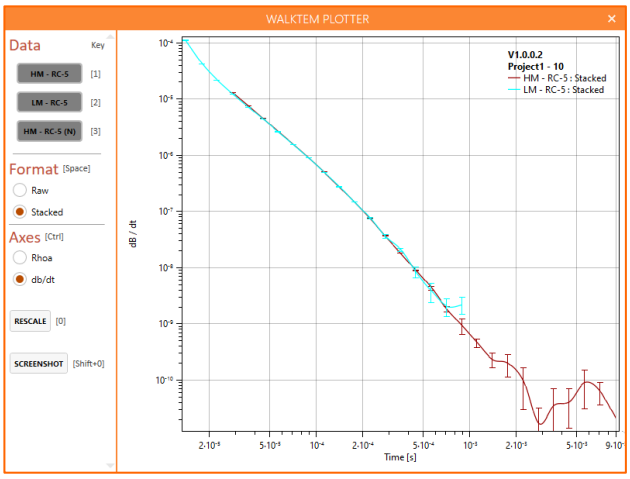
Number keys 1 – 6, will toggle on/off the individual data sets. This can also be achieved by clicking on the named buttons in the top-left of the screen if a mouse is attached.

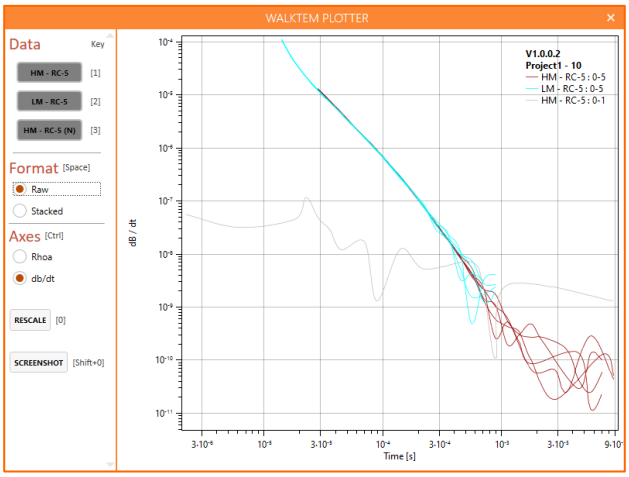
The display will automatically fit to the data extents but it is possible to zoom in/out using the “PgUp” / “PgDn” buttons. The arrow keys will pan the screen. If a mouse is attached the scroll wheel will zoom in/out. Using the scroll wheel with the mouse pointer in the centre of the plot zooms both axes together. Using the scroll wheel with the mouse pointer over one of the axes will adjust only that scale. Moving the mouse whilst holding the right mouse key will pan. To reset to default zoom, press “0” or click the “RESCALE” button with a mouse.

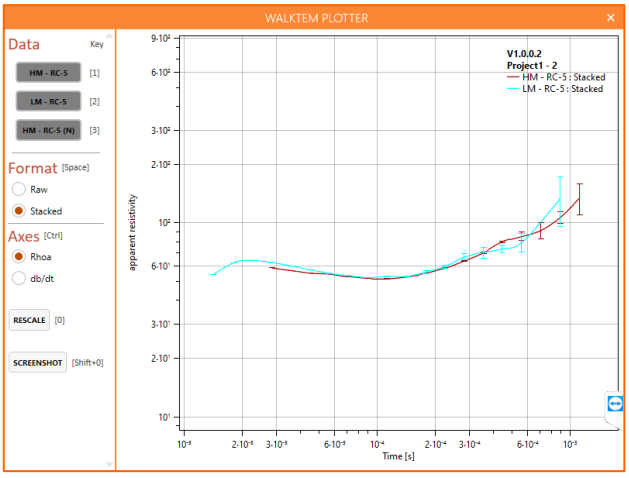
Screenshots can be taken by pressing “Shift+0” or clicking on the “SCREENSHOT” button with a mouse. These images will be saved into the project folder and exported with the data.

To exit the ABEM WalkTEM Visualization Tool press escape or click the “x” in the top-right of the screen.









C. With a station highlighted, either select “Model Data” from the menu or shortcut to it by pressing “Shift+4”.

The SPIA TEM software will start (this can take some time).

Use PgUp/PgDn to switch between the inversion tab and the data view tab where options to view individual channels and raw or stacked curves are available.

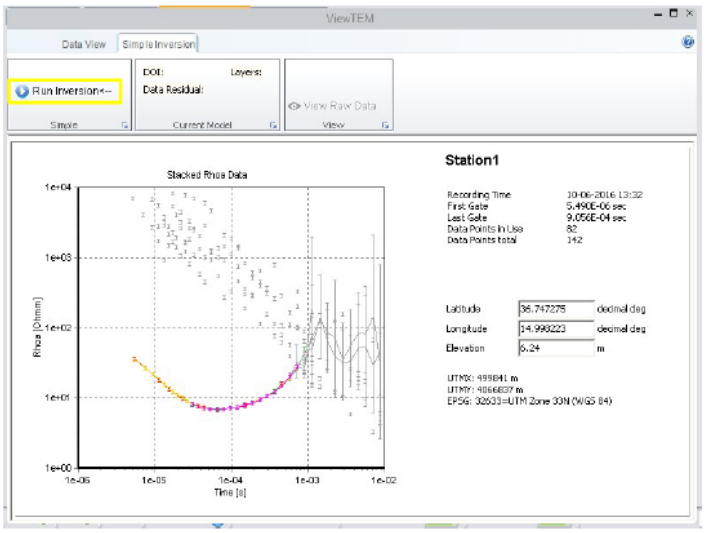
When ready to carry out an inversion, ensure that the small black arrow is at the right-hand end of “Run Inversion” (this may require a single press on the down arrow on the WalkTEM 2 front panel) and press “Ent” on the keypad.

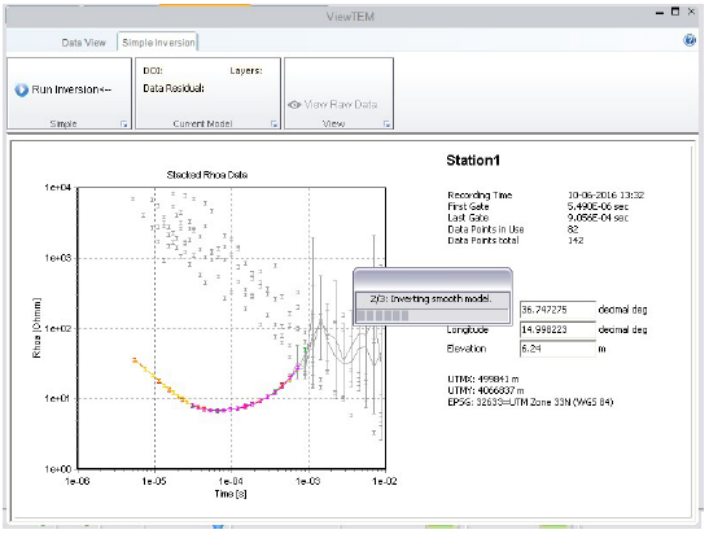
The inversion software will automatically discard poor quality readings and complete the inversion provided there are sufficient good data points available. Data points that will be carried forward for the inversion are always coloured, whilst those which have been automatically discarded will be greyed out.

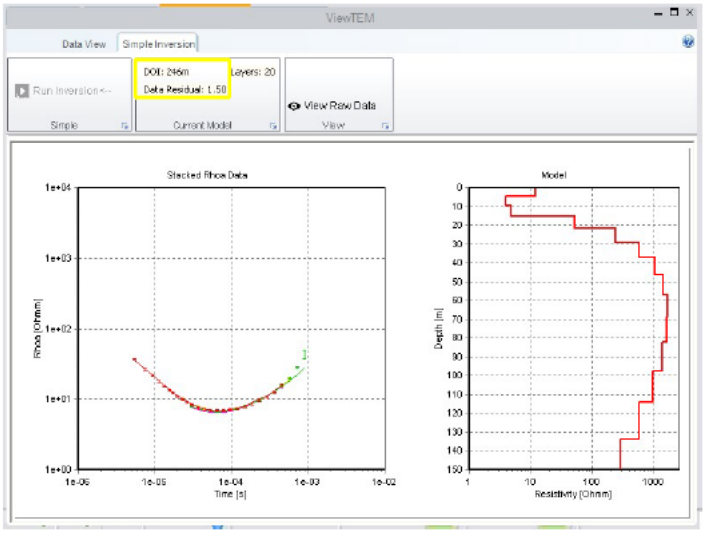
After the inversion has been completed (approximately 1-2 minutes), a smooth-layered model will be displayed with a residual value giving an indication of the model’s reliability.

To exit SPIA TEM and return to the data collection software, press “ESC”.

The modelled data will be saved in the regular project folder and exported along with the sounding data. Once the project is opened in the desktop version of Aarhus SPIA TEM, the instrument inversion will be there and available for further processing or just as a comparison with a new set of inversions.

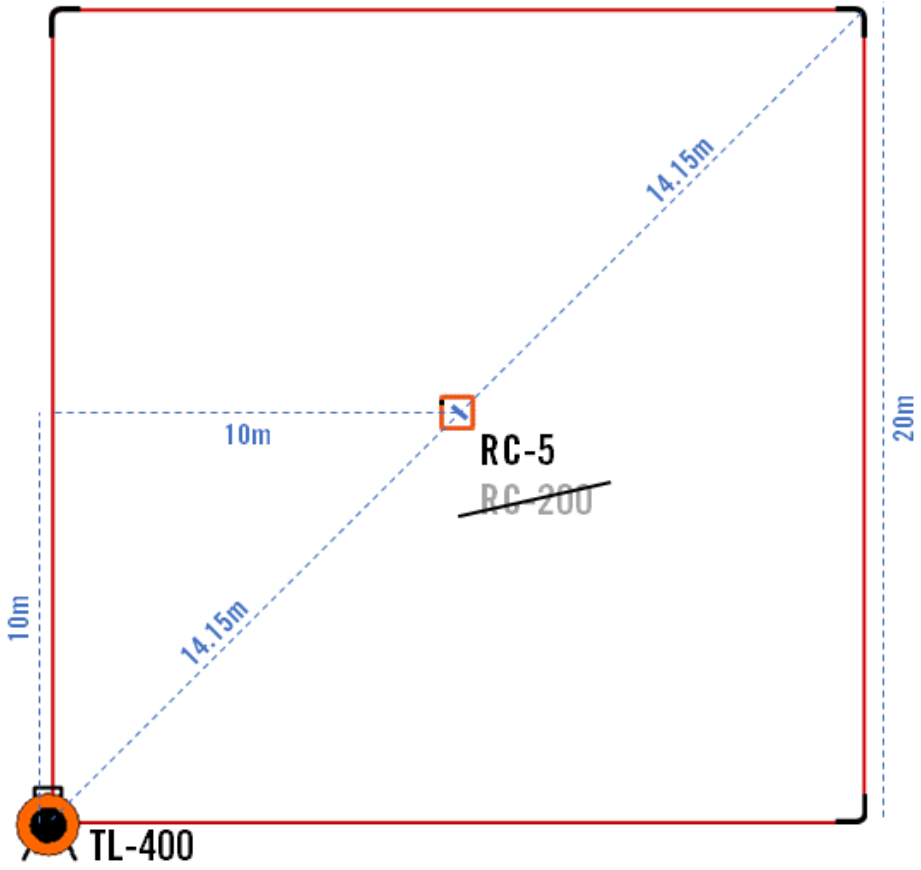


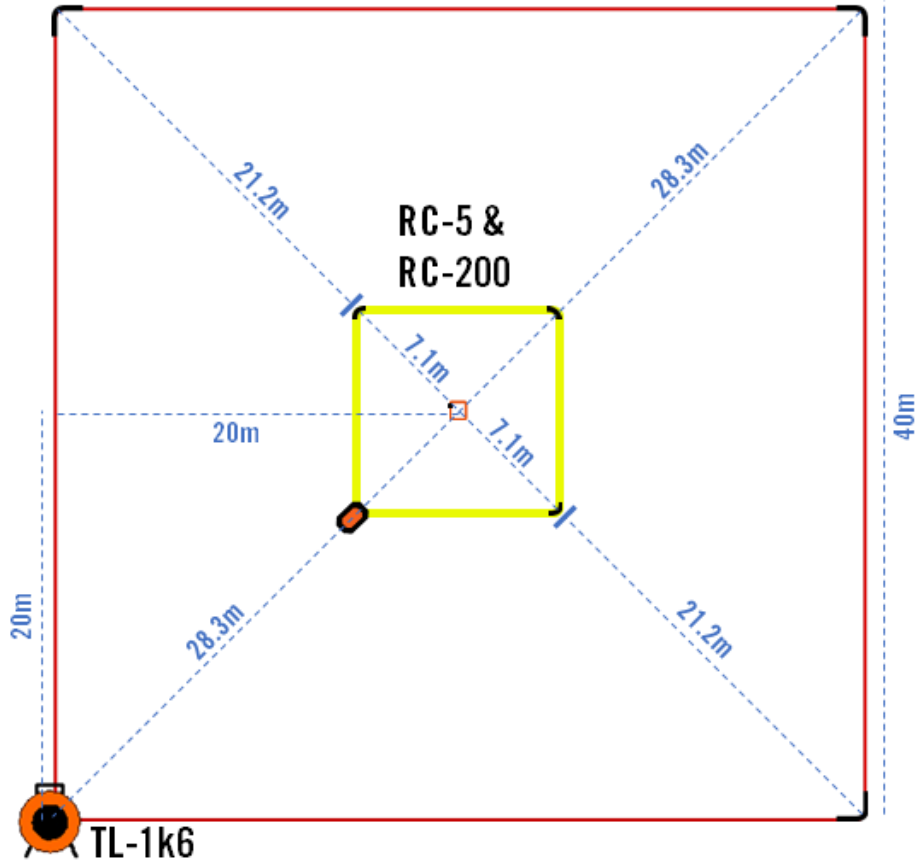


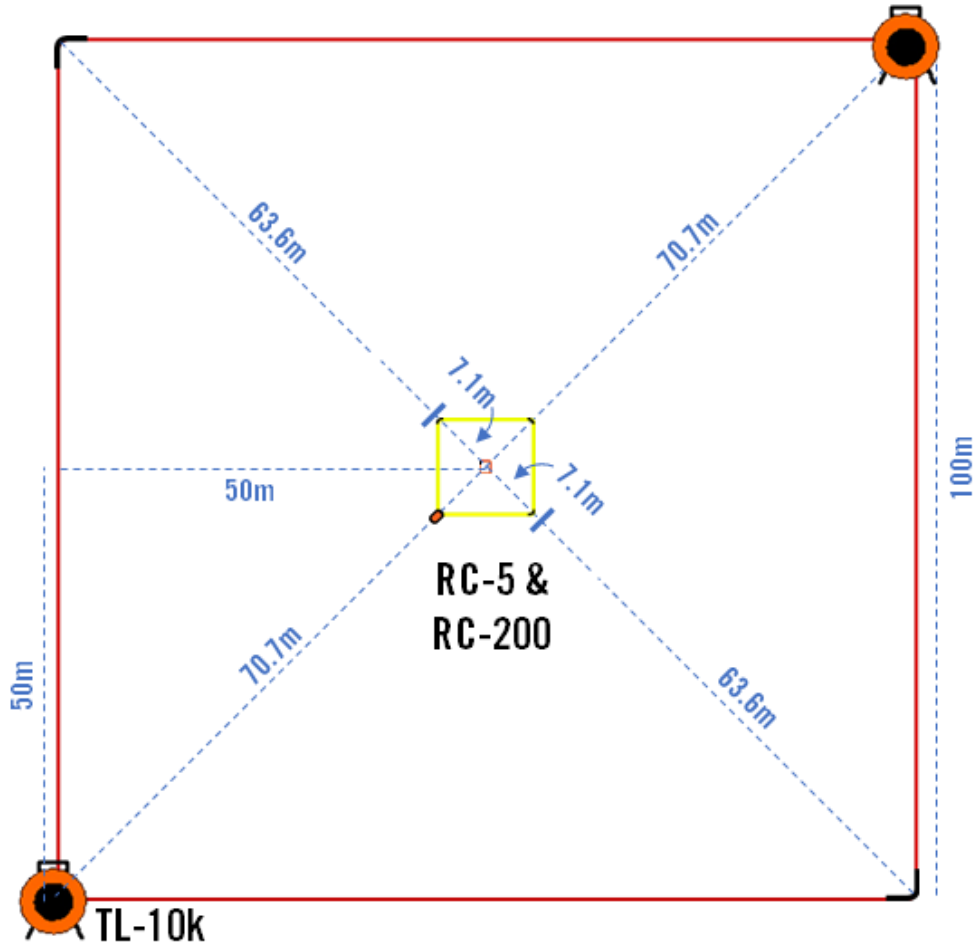


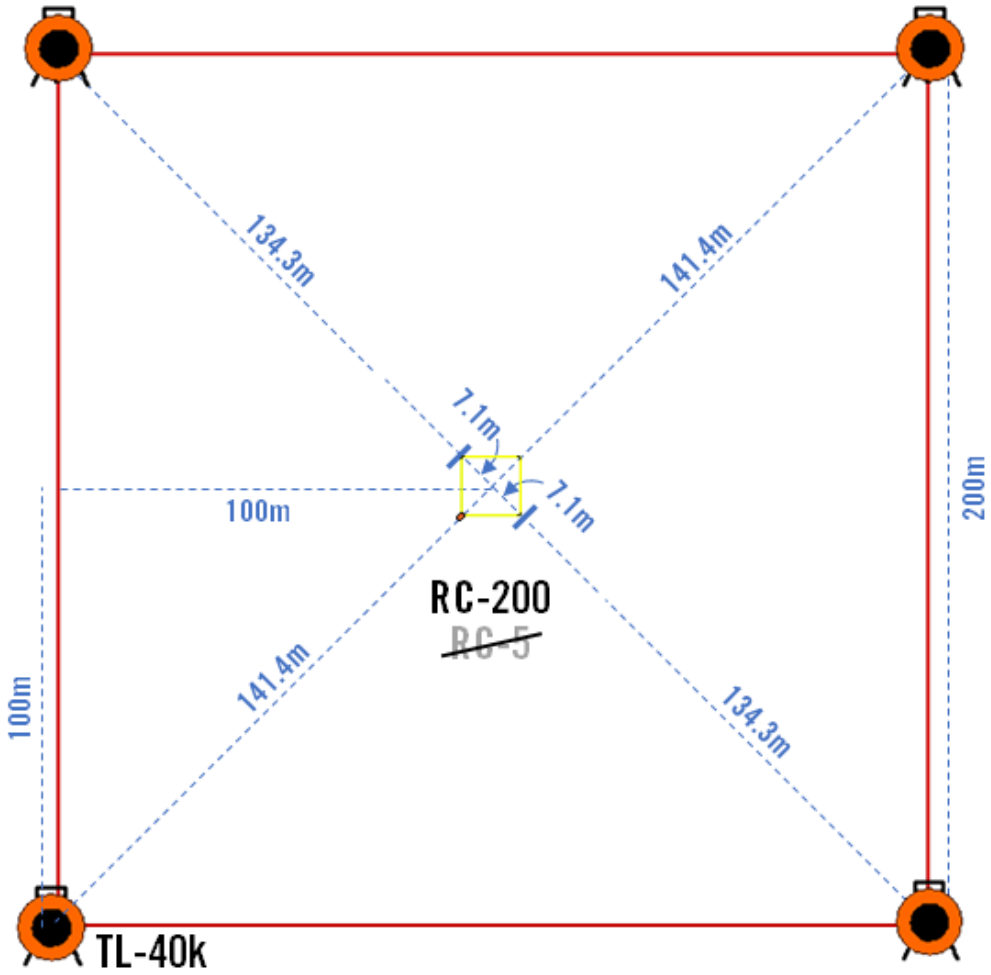
11. WALKTEM 2 LAY-OUT DIMENSIONS

Tapes or measuring wheels can be used to layout accurate loops if so desired, using the following measurements:






63.6m
70.7m
7.1m
7.1m
50m
100m
RC-5 &
RC-200
70.7m
63.6m
50m
TL-10k


134.3m
141.4m
7.1m
7.1m
100m
200m
RC-200
RC-5
141.4m
134.3m
100m
TL-40k

The ABEM WalkTEM 2 is a user-friendly, rapid survey solution that can provide precise resistivity models directly in the field for the search, mapping and monitoring of groundwater, mineral deposits, and environmental change. The system is scalable, with modular hardware, which allows expansion of the instrument capabilities to keep up with your changing needs.

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GUIDELINE GEO has been in the geophysics business since 1923 and is the global leader in near-surface geotechnology. Our advanced technology ensures practical solutions to everyday, societal, and global problems. We deliver total solutions in the technological fields of ground penetrating radar, seismic, geoelectrical and electromagnetic measurement. The Guideline Geo AB share (GGEO) is listed on Nasdaq First North Growth Market. We are a Swedish company with international offices and regional partners serving clients in over 100 countries.

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