



F1 Hardware Manual

Revision 1, 2021/10/12

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Contents

| | | |
|-----|---|----|
| 1 | Getting Started | 2 |
| 1.1 | Damage in Transit | 2 |
| 1.2 | Setting Up | 2 |
| 2 | Overview | 3 |
| 3 | Ultrasonic Probe | 4 |
| 3.1 | Usage | 4 |
| 3.2 | Cleaning and Maintenance | 4 |
| 4 | F1 Tablet | 6 |
| 4.1 | Status Indicators | 7 |
| 4.2 | System States | 7 |
| 4.3 | Screen Protector | 8 |
| 4.4 | Storing | 9 |
| 4.5 | Front View Buttons | 9 |
| 4.6 | Function Keys | 9 |
| 5 | Removable Batteries | 12 |
| 5.1 | Battery Charging | 12 |
| 5.2 | When to Replace the Battery | 13 |
| 6 | Charger/AC Adapter | 14 |
| 7 | Remote Control | 15 |
| 7.1 | Button Assignments | 15 |
| 7.2 | Pairing | 16 |
| 7.3 | Replacing the Battery | 16 |
| A | Specifications | 17 |
| B | Remote Control Regulatory Compliance Statements | 19 |
| B.1 | FCC Information | 19 |
| B.2 | Industry Canada Information | 19 |
| B.3 | European Community Compliance Information | 20 |
| C | Revision History | 21 |

1 Getting Started

The Tessonics Resistance Spot Weld Analyzer (RSWA) has been designed and manufactured as a high quality instrument. Under normal working conditions F1 will provide long, trouble-free service.

1.1 Damage in Transit

Inspect the unit thoroughly and immediately upon receipt, for evidence of external or internal damage that may have occurred during shipment. Immediately notify the carrier making the delivery of any damage, since the carrier is usually liable for damage in shipment. Preserve packing materials, waybills, and other shipping documentation in order to claim any damages. After notifying the carrier, contact Tessonics to receive assistance in the damage claims, and provide replacement equipment, if necessary. Please note that your shipping container is re-usable and may be used in the future when returning the unit for recalibration or repair.

1.2 Setting Up

Check the list of supplied items. Verify that you have received all items listed on the RSWA Packing List. If anything is missing, please contact Tessonics Sales and Service office.

Connect the A/C adapter to the device and charge the batteries for at least 4 hours before using it for the first time.

2 Overview

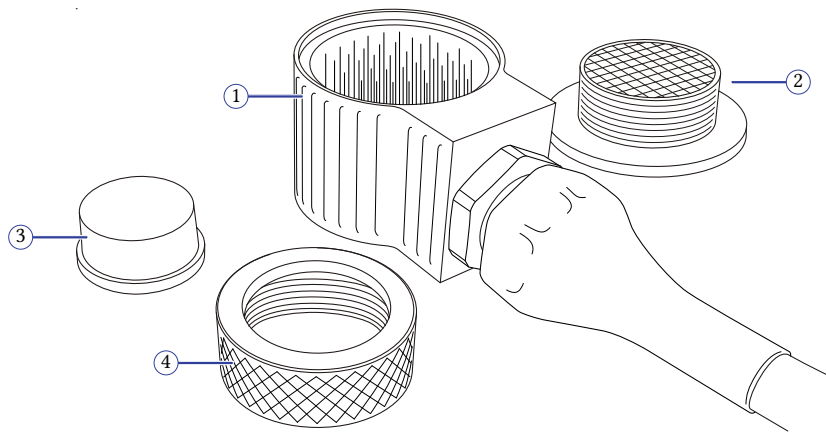
The base F1 unit consists of a Windows-based tablet PC with installed software. The probe has a 52-element matrix transducer which connects to an internal DSP board located within the RSWA. Two removable batteries provide up to 9–12 hours of run time when disconnected from a power source. A charger/AC adapter provides power for simultaneous device operation and battery charging. The device is designed with a ruggedized case to provide protection against shock and mechanical damage.



- | | |
|-------------------|-----------------------|
| 1. F1 Tablet | 5. RF remote control |
| 2. Probe | 6. Charging cable |
| 3. Batteries | 7. Charger/AC adapter |
| 4. Shoulder strap | |

3 Ultrasonic Probe

The probe consists of a multiple coax cable and an ultrasonic transducer. This is the most critical part of F1. A malfunctioning or damaged probe may not provide accurate measurements. Here are the major parts of the probe:



- | | |
|----------------------|---------------|
| 1. Housing | 3. Delay line |
| 2. Matrix transducer | 4. Coupler |

3.1 Usage

The front face of the transducer is very fragile. Check that there is no dust, grease, or any other foreign particles between the front face of the probe and the delay line before mounting the delay. The delay and the coupler are the only replaceable parts on the probe. Please do not try to disassemble the protective case, take out the matrix transducer, or detach the cable from the protective case as this will damage the probe beyond repair.

3.2 Cleaning and Maintenance

- Clean the front face and the thread of the transducer. If possible, use isopropyl alcohol, dry using an air jet
- Clean the face of the delay which will be in contact with the front face of the transducer and the collar using the same technique, dry with an air jet
- For operation, a very thin layer of a standard ultrasonic gel should be applied between the transducer front face and the delay to provide sufficient acoustical contact

- Make sure the gel is clean and there are no air bubbles in it
- During storage or transportation, the front face of the transducer must be protected with the delay or with a protection cap
- When storing the transducer for long periods of time (longer than a month), make sure there is no gel left on the surface of the transducer
- Under normal operating conditions, the gel layer should be replaced each month; In a warm and dry environment the gel should be replaced more often

Warning: Ensure the delay line is face up before attaching the coupler

4 F1 Tablet

The F1 Tablet is a fully functional computer equipped with an additional electronics module that is attached to the ultrasonic probe.



- | | | |
|----------------------|----------------------|--------------------|
| 1. Power button | 8. Cursor buttons | 15. USB ×2 |
| 2. Speaker | 9. Quick launch | 16. Battery #1 |
| 3. Status indicators | 10. Backspace button | 17. Battery #2 |
| 4. Function button | 11. Security button | 18. Stylus |
| 5. Tab button | 12. Battery latch | 19. Remote control |
| 6. Numeric buttons | 13. Ethernet RJ-45 | |
| 7. Enter button | 14. DC-In port | |

4.1 Status Indicators

Status indicators show the status of system functions such as system power and internal battery charge level.





| Icon | Name | LED State | Remarks |
|---|----------|---------------|--|
|  | Wireless | Blue | Wireless LAN is in use |
|  | HDD | Green | RSWA is accessing the built-in hard disk |
|  | Battery | Green | Battery fully charged |
| | | Orange | Battery charging |
| | | Flashing red | Battery power critically low |
|  | Power | Blue | Power is on and the battery is in use |
| | | Flashing blue | Power is in suspend mode |

Table 4.1 System status indicators

4.2 System States

On Mode

The system is running and the display screen is on.

Idle Mode

Some system functions are regulated or turned off to conserve power. The display screen may be turned off. The system returns to the On state when pen activity or other input is detected.

Suspend-to-RAM Mode

System operation is suspended. Most system functions are turned off to conserve power. Power to memory is on, maintaining data in programs that were running before system operation was suspended. The system does not respond to the pen or other input when in Suspend-to-RAM mode. Push the power button return back to On state.

Save-to-Disk Mode

System operation is suspended. All system functions are turned off to conserve power. Active data in programs that were running before suspending system operation is stored on the hard disk drive. The system does not respond to the pen or other input. Push the power button return back to On state.

Off Mode

All system functions are turned off to conserve power. The system does not respond to the pen or other input. The system boots at the next system power-on.

Note: The system consumes the same amount of power whether it is in Save-to-Disk mode or Off mode.

Your system can be configured to enter some of these states automatically after a period of inactivity to conserve battery power.

4.3 Screen Protector

Using a screen protector will help insure that the screen remains as clear as possible. When installed, the screen protector becomes a durable, replaceable surface that protects the display from abrasion.

Note: The tablet PC is not waterproof. Do not pour liquids on the system or wash it with a wet cloth.

To install a new screen protector:

1. If a screen protector is already installed on the display screen, remove it before installing the new screen protector. The screen protector is held onto the display screen surface by a thin strip of adhesive around the edges. A notch in one corner of the screen protector allows you to slide your fingernail under the screen protector for easy removal.
2. Clean the display by wiping the screen surface gently using a soft cotton cloth dampened with denatured alcohol. Ensure that all residues have been removed from the screen before applying a new screen protector.
3. Remove the protective coating from the adhesive side of the screen protector first. Apply the screen protector to the display screen surface. When doing so, orient the screen protector with the adhesive side of the screen protector facing the display screen and the notched corner of the screen protector toward the lower left corner of the display screen.
4. Apply pressure to the screen protector with your finger using a continuous wiping motion along the edges. The adhesive sets completely within 48 hours. To ensure a good seal between the screen protector and the display, do not lift the screen protector from the display once it has been applied.
5. Remove the protective plastic cover from the face of the screen protector.
6. Clean any residue remaining on the screen protector by wiping gently with a soft cotton cloth dampened with denatured alcohol. Wipe the screen protector with a soft dry cloth to remove any low-tack adhesive.

4.4 Storing

Store the equipment in the Off state with a fully charged external battery installed. The external battery always provides power to some system components even when the system is in the Off state. If the system is stored with the external battery removed, these components are powered by the system's internal battery. The internal battery is not designed for extended use and will discharge in a short period of time; this could result in damage to the internal battery. You can store the equipment in the Off state for about 30 days with a fully charged external battery installed. After this period, the external battery pack should be recharged or replaced with a charged external battery.

4.5 Front View Buttons

The hot keys on the front of the unit function as follows:

4.6 Function Keys

Hold the Fn button while pressing the function key










| Icon | Name | Description |
|---|---------------------|--|
|  | Power Button | The power button turns system on and goes into standby automatically. If the unit has been sitting unused for a while. Press momentarily to turn on the system or to exit from standby. Press and hold for at least 3–4 seconds to turn off the system. These settings can be changed. |
|  | Security Button | Similar function as pressing Ctrl+Alt+Delete on a standard keyboard. |
|  | Backspace Button | Same function as on a standard keyboard. |
|  | Quick-Launch Button | Can be assigned to launch specific windows base program as a quick-launcher. |
|  | Function Button | Access to secondary operation of some buttons on the front bezel. (See table below) |
|  | Cursor Control | Acts in the same way as the cursor keys on a standard keyboard |
|  | Tab Button | Same function as on a standard keyboard |
|  | Enter Button | Same function as on a standard keyboard |
|  | Numeric Keys | Same function as on a standard keyboard |

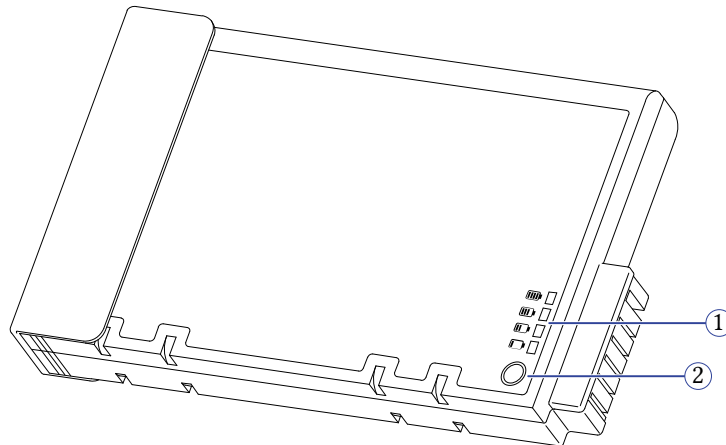
Table 4.2 Front view buttons

| Function Key | Description |
|--------------|--|
| Fn + Down | Volume down |
| Fn + Up | Volume up |
| Fn + Left | Decrease brightness |
| Fn + Right | Increase brightness |
| Fn + 4 | Trigger keypad LED backlight |
| Fn + 7 | Screen auto-rotate on/off |
| Fn + 9 | Same as Esc key on a standard keyboard |

Table 4.3 System function keys

5 Removable Batteries

The device comes with two removable battery packs. It can operate from either or both of these batteries as well as directly from the AC adapter.



1. Power meter
2. Power test button

The remaining battery life can be checked both on the device, using the power manager, as well as with the power meter located on the battery itself. The power meter is activated by pressing the Power Test button. The number of LED lights indicates the power level of the battery pack.

5.1 Battery Charging

When the device is connected to an AC adapter, any inserted batteries will automatically begin to recharge. While the batteries are charging, the Battery Charge icon on the Indicator panel will be active after 6–12 seconds. When the batteries are fully charged, the Battery Charge icon will turn off.

Note: When not in use for a month or more, fully charge the battery prior to storing.

When RSWA is turned off, a fully discharged battery will take about 3 hours to recharge. If RSWA is turned on and is not in suspend mode, it will take about 4–5 hours to recharge the battery.

5.2 When to Replace the Battery

Over time, the batteries' capacity gradually decreases. It is recommended that the batteries be replaced when they begin to store significantly less charge. Only use replacement batteries approved by Tessonics. The use of unapproved batteries may cause damage to the device and void the warranty.

Warning: Danger of explosion if battery is incorrectly replaced. Dispose of used batteries according to the manufacturer's instructions.

6 Charger/AC Adapter

The universal AC adapter transforms power line voltage into DC voltage which is used for charging the external battery and/or simultaneous operation of the RSWA.

An input range 100–240 V at frequencies 50–60 Hz makes it possible to use the adapter in most countries around the world. It is strongly recommended to use the supplied power cord, as its plug determines the type of suitable power line.

Note: Keep AC adapter clean and away from spilled liquids and shocks. If there is any type of visible damage to the adapter case or power cord, the item should be replaced.

Warning: Tessonics has no responsibility for damage caused by use of unauthorized power adapters or by connecting the power adapter to improper power lines.

Any battery has a limited number of charge/discharge cycles. With this in mind, using the RSWA with the AC adapter plugged in helps to prolong the life of the battery. This method works best when the RSWA is being used in a table-top manner to inspect welds on a smaller part. It also ensures the battery is fully charged and ready for the next inspector.

7 Remote Control

A remote is supplied with the unit and allows for operation of the device wirelessly. Once the software has been initialized, the remote allows the operator to perform common tasks including probe setup and getting images. When not in use, the remote is stored in a specialized holder on the back on the device.

7.1 Button Assignments

Setup/Get

Perform Setup or Get routine for taking a measurement

+ / -

Increase/decrease the diameter of the manual circle

Pass/Fail

Make a decision on weld quality

Next

Move to next weld or unit

Back

Exit from menu or dialog

Ok

Confirm selection in menus and dialogs

Up/Down

Up and down cursor keys; in Array Explorer's main window: Navigate up and down in the weld list view

Left/Right

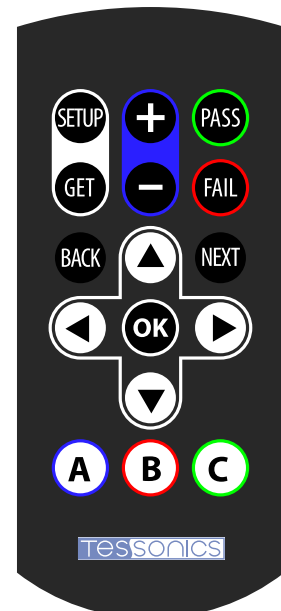
Left and right cursor keys; in Array Explorer's main window: Navigate left and right in recent measurements

A

Opens drop down menu in A-scan view

B

Toggles between front and back cells in weld list view



C

Toggles between automatic and manual circle measurements

7.2 Pairing

The pairing procedure will set up the receiver to be controlled by a specific remote. In the environment with multiple RSWA units and remotes, this allows the user to choose specifically which remote controls which RSWA.

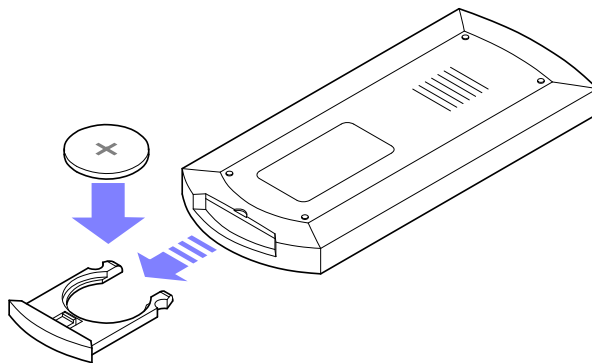
To pair the remote control with the receiver:

- Make sure the receiver is plugged into the RSWA and that RSWA is running
- Bring the remote within a few inches from the receiver located above the screen, push and hold any button on the remote for 5 seconds. The LED on the remote will flash rapidly during the pairing procedure;
- Release the button and test the remote with RSWA applications.

If you need to pair a remote to a different RSWA, remove the battery from the remote for about 1 minute. This will reset it to the original unpaired state. Then put the battery back and repeat the pairing procedure with the different receiver.

7.3 Replacing the Battery

This remote needs a battery to operate. Replace the battery when needed with CR2025 battery.



To replace the battery:

- Pull the battery compartment out and remove the old battery
- Insert the replacement battery with the positive side facing up
- Close the battery compartment
- If necessary, perform the pairing procedure

A Specifications

Probe

- Frequency (-6 dB): 20 MHz
- Bandwidth (-6 dB): 60%
- Number of channels: 52
- Elementary pitch: 1.25 mm
- Stainless steel housing
- Cable length: 2 m

Tablet

- Processor: Intel® Atom N270 1.6 GHz
- Main RAM: 2 GB DDRII SODIMM
- Hard disk drive: 2.5" 60 GB Solid State SATA
- Digitizer: Resistive
- Display: 10.2" TFT LCD display with LED backlight, Sunlight readable 500 nit
- Resolution: 1024 × 600 pixels
- LAN: Gigabit Ethernet 10/100/1000 Mbps
- WLAN: 802.11b/g
- External ports: Two USB 2.0, Audio in/out, RJ45 Ethernet jack, PCMCIA slot, CompactFlash slot, 15 pin D-sub VGA port
- Batteries: Two 9-cell Li-ion (7800 mAh each)
- Average battery run time: 9–12 hours
- External power adapter: 100–240 Vac, 50–60 Hz, 19V 3.42A DC
- Weight with batteries: 4.5 kg (10 lb)
- Dimensions: 27 × 26 × 11.5 cm (10.6 × 10.2 × 4.5 in)
- Operating temperature: 5°–40° C (41°–104° F)
- Storage temperature: -20°–60° C (-4°–140° F)
- Operating and storage humidity: 20%–80% non-condensing

Remote Control

- Operating frequency: 2.400–2.4853 GHz
- Channels: 125
- Transmission method: GFSK

B Remote Control Regulatory Compliance Statements

B.1 FCC Information

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution: Changes or modifications not expressly approved by Tessonics Inc. could void the user's authority to operate this device.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

B.2 Industry Canada Information

This Class A digital apparatus complies with Canadian ICES-003

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

The Term “IC:” before the certification/registration number only signifies that the Industry Canada technical specifications were met.

B.3 European Community Compliance Information

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

C Revision History

| Date | Revision | Changes |
|------------|----------|-----------------|
| 2021/10/12 | 1 | Initial release |

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Canada Headquarters

Tessonics Inc.
597 Ouellette Ave.,
Windsor, Ontario
Canada N9A 4J3
tessonics.com

Sales and General Inquiries

ph: +1 (519) 250-4455 x224
tf: +1 (866) 440-3313 x224
fax: +1 (519) 250-5747

Technical Support

ph: +1 (519) 250-4455 x229
tf: +1 (866) 440-3313 x229

United States

Tessonics Corp
2019 Hazel Street,
Birmingham, Michigan,
U.S.A 48009
tessonics.com

ph: +1 (248) 885-8335

Germany

Tessonics Europe GmbH
Augustinusstr. 9d,
50226 Frechen, Germany
ph: +49 (0)2234 911002-0
fax: +49 (0)2234 911002-9
saleseu@tessonics.com
tessonics.de

Russia

Тессоникс Россия
г. Москва
salesrus@tessonics.com
tessonics.ru

China

Tessonics Technology
(Beijing) Ltd
Beijing, China
ph: +86 17321126387

Poland

Tessonics Poland SP. Z. O.O.
Zatorska 78 / 7 51-215,
Wroclaw, Poland
ph: +0048603518150
mk@tessonics.com