TECHMIZE by TONGHUI

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OPERATION MANUAL

TH9410A / TH9411A Series

AC Ground Bond Tester. Covers front-panel operation, test parameter setup, the ground-bond test sequence, file storage and the HANDLER interface; see Chapter 7 for the remote-control interface.

Techmize Electronic GmbH · Ismaning, Germany · an international subsidiary of Changzhou Tonghui Electronic Co., Ltd.

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TH9410A/TH9411A Series Operation Manual

AC Ground Bond Tester — TH9410A / TH9411A

This manual describes the installation, operation and remote control of the TH9410A/TH9411A series. **TH9410A** and **TH9411A** are four-terminal AC ground bond (contact-resistance) testers for verifying the protective-earth continuity of a device under test at a high test current. The two models differ in maximum test current and output power; see Chapter 6 for the full specification comparison.

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The SCPI command set for this series is documented in Chapter 7 of this manual.

CHAPTER 1

Safety & Compliance

1.1 About this manual

This is the operation manual for the Techmize TH9410A/TH9411A series AC ground bond tester. Where this manual and the instrument itself appear to disagree, contact Techmize or your authorized distributor using the details in §1.9 before relying on the instrument for measurement or sorting decisions.

Techmize continually improves the performance, features and construction of its instruments; content, specifications and accessories described here are subject to change without notice.

WARNING — HIGH TEST CURRENT

The TH9410A/TH9411A outputs an AC test current of up to **45.00 A** (TH9410A) or **32.00 A** (TH9411A). If the contact resistance at the test connection is high, the contact point can reach a very high temperature. Never touch the test clips or the device-under-test contact point during or immediately after a test, and never run the output current continuously above the limits given in §1.4 — a burn hazard, not only a shock hazard, applies at this current level.

1.2 Safety symbols used in this manual

The following symbols and signal words appear in this manual and on the instrument itself:

WARNING — a hazard that, if not avoided, could result in personal injury or death.

CAUTION — a hazard that, if not avoided, could damage the instrument or the device under test, or invalidate a measurement.

NOTE — supplementary information that helps with correct or efficient use, but is not itself a hazard.

Protective ground — this terminal must be connected to protective earth. Also printed next to the instrument's rear-panel ground terminal.

1.3 General safety requirements

The TH9410A/TH9411A is classified by the manufacturer as a Class II instrument. A reliable ground connection is nonetheless required as part of the instrument's protection against electric shock:

WARNING — GROUNDING

Ground the instrument by at least one of: (1) connecting the power cable to a single-phase, three-wire outlet with a reliably earthed ground contact; or (2) connecting the rear-panel protective-ground terminal to a reliably earthed ground bar (such as one provided in the production area), using a cable selected, made and installed by a qualified engineer.

Power	
Supply voltage	110 V or 220 V AC, selectable via the rear-panel voltage selector
Supply frequency	47.5–63 Hz
Power consumption	≤900 VA (TH9410A) · ≤800 VA (TH9411A)
Fuse (slow-melting)	10 A at 110 V · 5 A at 220 V, for both models

CAUTION

Before connecting the AC power cable: confirm the power switch is off; confirm the supply is within the instrument's rated voltage range; confirm the fuse rating and fuse-holder position are correct; set the rear-panel voltage-selector switch to match the supply; and use only the power cable supplied with the instrument, or one selected by suitably qualified personnel.

WARNING — OPERATING PRECAUTIONS

This instrument can output a test current of up to 45 A. If the contact resistance at the test connection is high, the contact point can reach a very high temperature. Operators must take particular care and follow every precaution, warning and instruction in this chapter.

Prohibited actions

- **Do not cycle the power switch repeatedly.** Wait at least one minute between switching the power off and back on, to allow the control circuit to power down fully. Repeated rapid on/off cycling can upset the control circuit and may prevent protection functions from operating correctly. Except in an emergency, do not switch off power while the instrument is outputting test current.
- **Do not connect an external voltage to the test terminals.** The instrument's output terminals are not designed to withstand an externally applied voltage when not actively sourcing current; connecting one may damage the instrument.

Conditions for extended fault-free operation

Because of the instrument's size, weight and intended duty, its thermal design has specific output-time limits. Operate within the following table:

Ambient temperature	Current	Maximum continuous output time
≤40 °C	>40 A	5 minutes
	>30 A	15 minutes
	<10 A	Continuous

CAUTION

Above 30 A, allow a rest period at least as long as the preceding test before starting the next one — otherwise the instrument may trigger its over-temperature protection. If the cooling fan has run continuously for 30 minutes, pause the instrument; if over-temperature protection trips, stop use for 30 minutes before resuming.

Daily checks

Before starting work each day, confirm: (1) the supply matches the instrument's rated input and the voltage selector is set correctly; (2) the instrument is reliably grounded; (3) the test leads show no breaks, cracks or damage; (4) with no test leads connected, the instrument under default conditions can complete a test normally; and (5) with test leads connected, starting a test and then disconnecting the low-potential and high-potential ends of the test lead produces an OVERFAIL result.

1.4 Environment

Item	Requirement
Operating temperature / humidity	5–35 °C, 20–80% RH (no condensation)
Storage temperature / humidity	−20–60 °C, ≤90% RH (no condensation)

Do not use the instrument near flammable gases or vapours (risk of fire or explosion), in high-temperature or direct-sunlight locations, in a humid or condensing environment, near corrosive gases, in a dusty environment, where ventilation is poor, on an unstable or vibrating surface, near strong magnetic or electric fields, or close to sensitive test/receiving equipment — the instrument's own test voltage/current and leads can radiate RF interference. Keep the side and rear ventilation openings clear to allow the forced-air cooling system to work.

1.5 CE marking

The TH9410A/TH9411A series carries the CE mark, as shown on the instrument's rear-panel nameplate, in accordance with the Low Voltage Directive 2014/35/EU and the EMC Directive 2014/30/EU.

1.6 WEEE — disposal of electrical and electronic equipment



This symbol indicates that the instrument must not be disposed of as unsorted municipal waste at the end of its service life. Within the European Union, return the instrument to Techmize, your distributor, or a designated collection point for electrical and electronic equipment, in accordance with the WEEE Directive (2012/19/EU) and its national transposition in your country.

1.7 RoHS compliance

The TH9410A/TH9411A series complies with Directive 2011/65/EU (RoHS); supporting documentation is available from Techmize on request.

1.8 Warranty

Techmize warrants this instrument to be free from defects in material and workmanship for a period of **two (2) years** from the date of delivery to the original purchaser. During the warranty period, Techmize will repair or replace, at its discretion, a product that proves defective, provided it has been used within the specified operating conditions. A warranty card is required to claim warranty service.

This warranty does not cover damage from misuse, accident, unauthorized modification or repair, consumable/wear items such as the fuse and test clips, or damage from operation outside the environmental or duty-cycle limits given in §1.3–1.4. Repair must be carried out by qualified technical personnel; do not replace internal components without authorization. After any repair, the instrument must be recalibrated before further use.

1.9 Manufacturer & EU contact

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Register Court: Amtsgericht München
HRB 312530 · VAT ID DE463170824

CHAPTER 2

Out of the Box

2.1 Unpacking

Inspect the shipping container for damage after unpacking. It is not recommended to power on the instrument if the container shows signs of damage — contact your carrier and your Techmize distributor before proceeding. Check the contents against your order; if anything does not conform, notify Techmize or your distributor promptly.

Item	Qty
TH9410A or TH9411A instrument (model as ordered)	1
EU power cable (Schuko, CEE 7/7)	1
TH26035B two-end test clip	1 pair
This operation manual	1
Certificate of conformity	1
Warranty card	1

Standard accessories match the TH9410A/TH9411A Series Datasheet. This operation manual is supplied as a PDF document, not as a printed copy. Keep the original packaging — it is the recommended way to store or return the instrument.

2.2 Connecting the power supply

Item	TH9410A / TH9411A
Supply	110 V or 220 V AC (rear-panel selector), 47.5–63 Hz
Power consumption	≤900 VA (TH9410A) · ≤800 VA (TH9411A)
Fuse	10 A slow-melting at 110 V · 5 A slow-melting at 220 V

Before connecting the power cable, set the rear-panel voltage-selector switch to match your local supply. Connect the EU power cable to the rear-panel power inlet, and confirm the instrument is reliably grounded (§1.3) before switching on.

> **WARNING**
> Make sure the protective-earth path is reliably grounded before connecting the power cable, to prevent electric shock from leakage current. Disconnect the power cable before replacing the fuse, and always replace it with the same type and rating for the selected supply voltage.

2.3 Connecting the device under test

The front panel provides four test terminals: **CURRENT** and **RETURN** (the current-output and current-return terminals) and **SENSE+** and **SENSE−** (the voltage-sampling terminals). This four-terminal (Kelvin) connection separates the high-current path from the voltage-sensing path, so that the resistance of the test leads themselves does not add to the measured contact resistance. The rear panel duplicates all four terminals, for integration into a fixture or automated line.

> **NOTE**
>
> The SENSE+/SENSE− sampling terminals must be connected to the same test point as the correspondingly-coloured CURRENT/RETURN terminal — the closer the sampling connection is to the actual point under test, the higher the measurement accuracy.

> **WARNING — BURN HAZARD**
>
> This instrument can output a test current of up to 45 A. Do not change test leads while a test is running, and do not touch the test-lead connectors or the device-under-test contact point during or immediately after a test — there is a burn hazard at the contact point if the contact resistance is high.

2.4 Zero/base clearing (OFFSET)

Stray resistance in the test leads and fixture can introduce a small base reading before any device is tested. For precision measurement, clear this base resistance: on <SETUP>, select the OFFSET field, set it to **ON**, then press **GET** — the instrument automatically runs a short-circuit measurement of the leads and stores the result as the zero-base value. A base value can also be entered directly. The clearing value cannot exceed 100 mΩ.

> **NOTE**
>
> Clearing the base does not change the instrument's actual test range or rated accuracy — it compensates the resistance reading for the specific test leads/fixture connected, not the instrument itself.

2.5 Starting the instrument for the first time

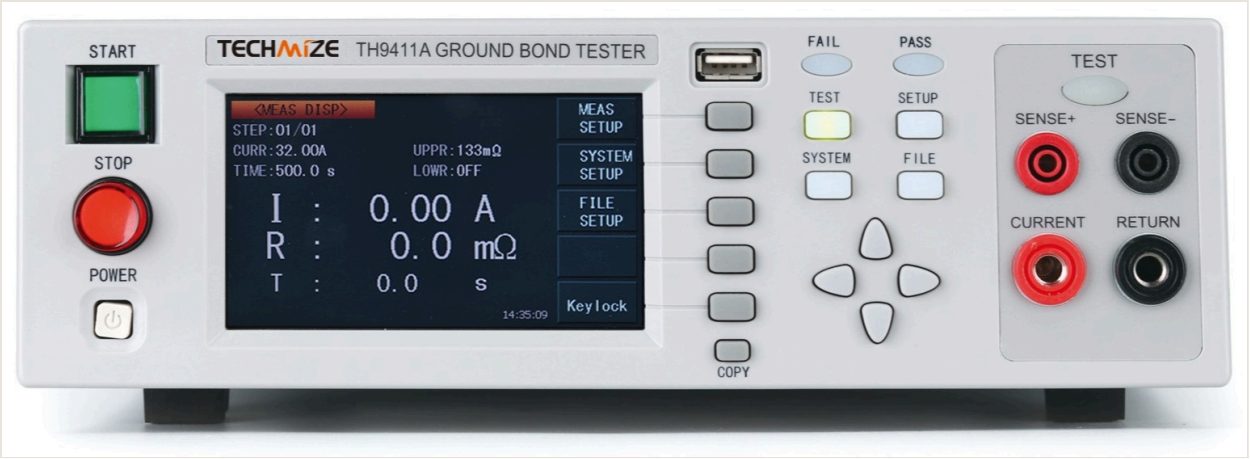
1. Connect the EU power cable to the rear-panel inlet, confirming the voltage-selector switch is set correctly and the instrument is reliably grounded.
2. Press the front-panel POWER switch. The instrument runs its start-up sequence and shows the boot screen (instrument name, firmware version, manufacturer).
3. The instrument then opens on the measurement-setup (SETUP) interface, with the test data last in effect before the previous shutdown.

For an overview of the front panel, rear panel and interface structure, continue to Chapter 3.

CHAPTER 3

Getting to Know the Instrument

3.1 Front panel



1 **POWER switch** — check the power type and test-lead connections before first power-up.

2 **START** (green) / **STOP** (red) — starts a test (TEST indicator lights) / stops the test or clears a PASS/FAIL prompt.

3 **Model & brand** — instrument trademark and model designation.

4 **USB port (Host)** — for a USB storage device, used for test-file export/import and screen capture.

5 **LCD** — 480×272-dot colour TFT display, showing the setup and measurement interfaces.

6 **FAIL / PASS indicators** — FAIL lights when a measured value is outside the configured limits; PASS lights when the test completes within limits.

7 **TEST** / **SETUP** / **SYSTEM** / **FILE** — function keys that switch directly to the matching interface (§4.1); the key lights while its interface is active.

8 **F1–F5 soft keys** — context-sensitive, matched to the labels shown on-screen.

9 **Direction keys** — move the on-screen cursor between fields.

10 **COPY** — captures the current screen to a connected USB storage device.

11 **TEST terminal area** — SENSE+/SENSE− (voltage-sampling) and CURRENT/RETURN (current output/return) four-terminal test connections (§2.3).

3.2 Rear panel



1 **Cooling-fan vent** — forced-air cooling outlet for the power-amplifier circuit; keep clear of obstructions.

2 **SENSE+ / SENSE−** — rear-panel voltage-sampling terminals, duplicating the front-panel terminals for fixture integration; must be wired to the same test point as the matching CURRENT/RETURN terminal.

3 **CURRENT / RETURN** — rear-panel current output and return terminals.

4 **Fuse holder & voltage selector** — select 110 V or 220 V to match the supply (§1.3, §2.2) before connecting power.

5 **AC power inlet** — 110/220 V, 50/60 Hz, per the voltage-selector setting.

6 **Protective-ground terminal** — connect to a reliably earthed ground bar when the power outlet itself cannot guarantee a reliable ground (§1.3).

7 **Nameplate** — serial number, rated input and CE marking.

8 **HANDLER** — DB15 connector for automated test-system integration (§5.2).

9 **USB (Device)** — rear-panel USB port for PC/host communication (§7.2).

10 **RS-232C** — 9-pin D-sub serial interface for PC/host communication (§7.1).

Connector summary

Connector	Type	Notes
HANDLER	15-pin D-sub (female)	Relay-contact outputs; opto-isolated inputs (§5.2)
USB (Device)	USB-B	Requires the matching USB driver on the host PC
RS-232C	9-pin D-sub (male)	Default 9600 bps, 8 data bits, no parity, 1 stop bit

CHAPTER 4

Operation & Configuration

This chapter covers the interface structure, the <SETUP> test-parameter fields, the <SYSTEM> settings, and the ground-bond test sequence.

4.1 Interface structure overview

The front-panel function keys switch directly between four interfaces: <TEST>, <SETUP>, <SYSTEM> and <FILE>. On power-up, the instrument opens on the interface last used before shutdown (<SETUP> by factory default). <SETUP> edits the current test file's steps and parameters; parameters cannot be changed from <TEST>. A test file can hold up to **20 test steps**; up to **20 test files** can be stored (§5.1). Pressing F4 (**UP**) or F5 (**DOWN**) from <SETUP> moves to the previous/next step; F1 (**INS**) inserts a new step after the current one; F2 (**DEL**) deletes the current step; F3 (**NEW**) creates a new, empty test file.

4.2 <SETUP> — measurement setup

Field	Range	Description
STEP	01–20	Current step number / total number of steps in the file
CURR (current)	TH9410A: 1.00–45.00 A · TH9411A: 1.00–32.00 A	Ground-bond test current for this step
UPPER (upper limit)	0–600 mΩ	Contact-resistance upper limit
LOWR (lower limit)	0–600 mΩ (must be less than UPPER), or OFF	Contact-resistance lower limit; OFF applies no lower-limit judgement
TIME (test time)	0.5–999.9 s, or 0 = continuous	0 tests continuously until STOP is pressed
OFFSET (zero-clearing)	OFF–ON · GET · direct value entry	Base-resistance clearing for the test leads/fixture (§2.4)
FREQ (test frequency)	50 / 60 Hz	AC working frequency for the test current

On <SETUP>, F1 inserts a new step, F2 deletes the current step, F3 creates a new test file, F4/F5 move between the previous/next step.

4.3 <TEST> — running a test

Press <TEST> to open the measurement-display interface; press START to begin. The display shows three live values in large characters: output current **I** (A), measured contact resistance **R** (mΩ), and elapsed time **T** (s). Pressing ▼ (down arrow) from <TEST> switches quickly to <SETUP>. F5 locks the keypad (Keylock); once locked, the instrument responds only to START, STOP and F5 (unlock).

4.4 <SYSTEM> settings

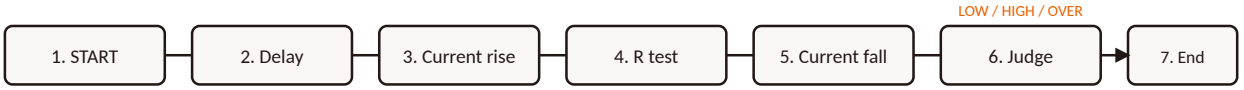
4.4.1 System settings 1 (SYSTEM1)

Setting	Range	Description
PASSHOLD	0.2–99.9 s, or KEY	How long a PASS result is held on screen before the next action; KEY waits for STOP to be pressed
FAILMODE	STOP / CONTINUE / RESTART / NEXT	Behaviour after a FAIL result: exit immediately; continue testing and output the result via the table; re-run the current step on START; or continue to the next step on START
STEPHOLD	0.2–99.9 s, or OFF, or KEY	Wait time between steps in a multi-step test file; KEY waits for START to begin the next step
CTRLMODE	FILE / STEP	Whether the HANDLER interface outputs the result only at the end of the whole test file, or after every individual step
PASSBEEP / FAILBEEP	OFF / LOWLONG / TWOSHORT	Audible tone on PASS / FAIL
KEYBEEP	OFF / ON	Keypad click sound
STRTDLY (start delay)	0.1–99.9 s, or OFF	Delay from pressing START to the first step actually beginning; OFF starts immediately

4.4.2 System settings 2 (SYSTEM2)

Setting	Range	Description
BUSMODE	RS232C / USBTMC / USBVCOM	Active communication mode (§7.1–7.2)
BAUD	9600–115200	Serial baud rate
BUSADDR	1–32	Bus address (not used in RS232C mode)
DEFAULT	—	Restores factory default settings (does not affect the password)
LANGUAGE	English	Display language — English UI only on Techmize-branded units
PASSWORD	OFF / SYSTEM / FILE / change	Password protection, covering system settings or file recall
ADJSET	SET / UPDATA	Calibration entry / firmware-update entry
CMD (command set)	SCPI	Remote command protocol — SCPI only (§7.3)

4.5 Test theory & sequence



1. **Start.** With test conditions configured and the device under test connected, press START to begin.
2. **Test delay.** The first step's start delay (STRTDLY, §4.4.1) elapses; between steps of a multi-step file, the inter-step delay (STEPHOLD) applies instead.
3. **Current rise.** Output current ramps from zero in 5 A/0.1 s steps. No resistance judgement is made during the rise.
4. **Contact-resistance test.** The instrument measures contact resistance at the configured test current, ensuring the measurement circuit and leads are functioning correctly.
5. **Current fall.** Output current ramps down in 0.1 s. No resistance judgement is made during the fall.
6. **Limit judgement.** The measured resistance is compared against the configured limits — see the judgement table below.
7. **Test end.** The result and measured data are shown; the next action depends on FAILMODE / PASSHOLD / STEPHOLD (§4.4.1).

Limit judgement

Judgement	Description
LOW (lower-limit fail)	Used to detect a low-end short circuit at the test terminals; sampled at 100 ms intervals
HIGH / HIFAIL (upper-limit fail)	The most common judgement — the measured contact resistance exceeds the configured upper limit; sampled at 100 ms intervals
OVER / OVERFAIL (voltage-limit fail)	Voltage sampling is comparatively slow; if the output voltage peak exceeds the instrument's rated output limit (because the test circuit is open), this judgement triggers. The reported result is the measurement from the 100 ms immediately before the over-limit was detected. This judgement cannot be disabled.

If no FAIL condition is detected by the end of the test, the result is PASS. STOP aborts the test at any point and does not produce a judged result; the last measured data before STOP can still be retrieved remotely (§7.3).

4.6 How to run a test

1. **OFFSET zero-clearing** for the test leads/fixture, if required for precision measurement (§2.4).
2. **Configure the test step(s)** on <SETUP>: current, upper/lower resistance limits, test time and frequency (§4.2).
3. **Connect the device under test** using the four-terminal SENSE+/SENSE−/CURRENT/RETURN connection (§2.3).
4. **Run the test**: press START. The instrument steps through the configured test file, applying each step's current and judging the result against its limits. On a FAIL, the behaviour configured by FAILMODE (§4.4.1) determines what happens next.
5. **STOP** at any point aborts the current test and returns the instrument to the test-ready state without a judged result.

> **NOTE — ZERO-CURRENT SELF-TEST**
>
> With no test leads connected, the instrument can still complete a test under default conditions — this is expected behaviour and confirms the control circuit itself is functioning; it does not indicate a valid contact-resistance measurement.

4.7 Restoring factory defaults

Hold F4 while powering on the instrument to restore the factory-default test conditions (<SETUP>) and system settings (<SYSTEM>). This is also the recovery method if a firmware update, or loading a test file saved under an older firmware version, causes a display error.

CHAPTER 5

File Storage & HANDLER Interface

5.1 <FILE> — file storage

Press <FILE> to open the file-management interface. F1 switches to the internal file list, F2 to the external (USB) file list. Within a file list: F1 (**Load**) recalls the selected file as the active test file; F2 (**Save**) saves the active test file to the selected slot; F3 (**Delete**) deletes the selected file; F4 (**Copy to E:** / **Copy to I:**) copies a file between internal storage and a connected USB drive; F5 (**Select**) marks files for batch operations. The instrument can store **20 test files**, each holding up to **20 test steps** (§4.1).

Key	Function
F1	Load — recall the selected file as the active test file
F2	Save — save the active test file to the selected slot
F3	Delete — delete the selected file
F4	Copy to USB / Copy to internal storage
F5	Select — mark the current file for batch processing

5.2 HANDLER interface — overview

The rear-panel HANDLER connector (15-pin D-sub) lets the TH9410A/TH9411A integrate into an automated test or sorting system: it outputs relay-contact PASS/FAIL/TEST status signals and accepts opto-isolated START/STOP/INTERLOCK inputs.

Pin(s)	Signal	I/O	Description
1, 9	FAIL (1 / 2)	Out	Relay output, closes on a FAIL result (duplicated on two pins)
2, 10	PASS (1 / 2)	Out	Relay output, closes on a PASS result (duplicated on two pins)
3, 11, 4	TEST (1 / 2 / 3)	Out	Relay output, closes while a test is running and opens at STOP; carries the test-active status (duplicated on three pins)
7	START	In	External start input; equivalent to the front-panel START key
14	STOP	In	External stop/reset input; equivalent to the front-panel STOP key
15	INTERLOCK	In	Interlock input; the instrument does not allow START while this circuit is open. For standalone bench use, pins 15/8 are shorted by the default jumper
5	DCV+ (+24 V)	Power	Internal, non-regulated ≈24 VDC supply, ≤200 mA, for driving external indicator lamps or low-power PLC inputs only — not for driving higher-power loads directly
13	DCV− (COM)	Power	Return for the internal +24 V supply (pin 5)
8	COM	—	Common return for the START/STOP/INTERLOCK input signals
6	—	—	—

5.3 Using the HANDLER interface

1. Confirm the INTERLOCK loop is closed (by the default jumper for standalone use, or by the external guard circuit in an automated line) — the instrument will not accept START otherwise.
2. Configure the test file on <SETUP> and the relevant behaviour on <SYSTEM1>, in particular CTRLMODE (whether HANDLER reports the result per step or only at the end of the file) and FAILMODE (§4.4.1).
3. Trigger the test with the external START input, or the front-panel START key.
4. Read the PASS/FAIL/TEST relay outputs from the external system as the test proceeds.
5. The external STOP input can abort the test at any point, equivalent to the front-panel STOP key.

> **NOTE — EXTERNAL POWER**
>
> The internal DCV+ supply (pin 5) is intended only for driving an indicator lamp or an opto-isolated PLC input (≤0.2 A continuous, with a brief peak up to 0.5 A). For a load that needs more than 220 V or 2 A, use an external relay or driver circuit — the instrument's internal relay contacts cannot switch that directly.

> **WARNING — REMOTE OPERATION**
>
> When the instrument is started and stopped through HANDLER, the operator cannot see the instrument's actual state directly from the interface. Keep the external STOP line reliably wired and press it before changing the device under test; in a multi-person work area, tie the INTERLOCK loop to a physical guard that opens whenever the device-under-test area is accessible, and ensure no one can touch the device under test, test leads or output terminals while current is present.

5.4 Other interfaces & functions

- **Front-panel USB (Host)** — connects a USB storage device, for exporting/importing test files and for firmware updates.
- **Rear-panel USB (Device)** — connects to a host PC; two modes are available: USBTMC (standard USB slave mode) and USBVCOM (USB virtual serial-port mode, requiring the matching PC driver).
- **RS-232C** — connects to a host PC; baud rate is set from SYSTEM2 (§4.4.2), data format 8 data bits/no parity/1 stop bit.

CHAPTER 6

Performance & Specifications

6.1 Output & measurement

Item	TH9410A	TH9411A
Current range	1.00–45.00 A (1.00–5.00 A / 5.01–30.00 A / 30.01–45.00 A)	1.00–32.00 A (1.00–5.00 A / 5.01–32.00 A)
Current accuracy	±(2% reading + 3 digit)	
Current setting / readback resolution	0.01 A	
Output voltage	8 V max (1.00–5.00 A) · 6 V max (5.01–45.00 A)	8 V max (full range)
Test frequency	50 / 60 Hz, ±0.1% of setting	
Resistance test range	0–600 mΩ (R_{max} ≤ 6 V / I_{set}); up to 600 mΩ achievable only when the set current is below 10 A	
Resistance accuracy	±(2% reading + 2 digit)	
Resistance resolution	1 mΩ below 10 A · 0.1 mΩ from 10 A up to the model's maximum current	

6.2 Resistance limit & offset settings

Item	Range	Resolution
Upper limit	0–600 mΩ	1 mΩ
Lower limit	0–600 mΩ (must be below the upper limit)	1 mΩ
Offset (base-clearing) range	0–100 mΩ	0.1 mΩ
Offset accuracy	±(2% of setting + 2 digit)	

6.3 Timing & general specifications

Item	Specification
Test time	0.5–999.9 s, or 0 = continuous
Test-time resolution / accuracy	0.1 s · ±(0.1% + 0.05 s)
Current rise / fall	Fixed 5 A per 0.1 s (not user-adjustable); no resistance judgement during rise/fall
Display	480×272-dot colour TFT-LCD, English UI
Internal storage	20 test files, up to 20 steps per file
Standard interfaces	RS-232C, USB Host, USB Device, HANDLER — SCPI command set
Power supply	110 V or 220 V AC (rear-panel selector), 47.5–63 Hz
Power consumption	≤900 VA (TH9410A) · ≤800 VA (TH9411A)
Operating temperature / humidity	5–35 °C, 20–80% RH (no condensation)
Storage temperature / humidity	−20–60 °C, ≤90% RH (no condensation)
Dimensions (W×H×D)	280×88×420 mm
Weight	≈15 kg

See Chapter 1 for the maximum continuous-output duty-cycle table at different current levels (§1.3) — these timing/duty limits are a thermal-design constraint, separate from the test-time setting above.

PART II

Remote Control

Covers the RS-232C and USB remote interfaces and the SCPI command set for the TH9410A/TH9411A series.

CHAPTER 7

Interfaces & Remote Control

The TH9410A/TH9411A can be controlled remotely over RS-232C or USB (USB Host for storage, USB Device for PC control), using the SCPI command set. Select the active communication mode and parameters from <SYSTEM> → SYSTEM2 (§4.4.2).

7.1 RS-232C

Item	Specification
Connector	9-pin D-sub (DB9), rear panel
Default parameters	9600 bps, 8 data bits, no parity, 1 stop bit
Baud rate	9600–115200 bps (§4.4.2)
Terminator	NL (line feed, 0x0A)

Set the active communication mode to RS232C from SYSTEM2 before connecting. Each command must end with the terminator; the instrument does not parse a command with no end marker.

7.2 USB

Item	Specification
USB Host (front panel)	USB storage device, for test-file export/import and screen capture (§5.1, §3.1)
USB Device (rear panel), USBTMC mode	Standard USB slave mode for PC control
USB Device (rear panel), USBVCOM mode	USB virtual serial-port mode, same data format as RS-232C; requires the matching PC driver

7.3 SCPI command set

Commands are organized into SCPI subsystems: `DISPlay` (display page selection), `FUNCtion` (test start/stop and the per-step ground-bond parameters), `SYSTem` (test-safety and environment settings), `MMEM` (internal file store/load) and `FETCh` (measurement-result retrieval), plus the common query `*IDN?` and the product-identification query `THID:PRODSNUM?`.

Subsystem	Command	Description
DISPlay	`DISP:PAGE <name>` / `DISP:PAGE?`	Set/query the active display page (MEASurement, MSETup, SYST1, SYST2, FLISt)
FUNCtion	`FUNC:STAR`	Start the test (equivalent to front-panel START)
	`FUNC:STOP`	Stop the test (equivalent to front-panel STOP)
	`FUNC:SOUR:STEP NEW / INS / DEL`	Create a new test file / insert a step / delete the current step
	`FUNC:SOUR:STEP <n>:CURR <A>`	Set/query step <n>'s test current (1–45 for TH9410A, 1–32 for TH9411A)
	`FUNC:SOUR:STEP <n>:UPPC / LOWC <mΩ>`	Set/query step <n>'s resistance upper/lower limit
	`FUNC:SOUR:STEP <n>:TTIM / OFFS / FREQ`	Set/query step <n>'s test time, offset value, or frequency
SYSTem	`SYST:PASS / STEP / FAIL / BEEP / DELA`	Set/query PASSHOLD, STEPHOLD, FAILMODE, buzzer mode, start delay
	`SYST:LANG <0/1>`	Set/query the display language
	`SYST:RES`	Restore all settings to factory default
	`SYST:ON`	Enter firmware-update mode (requires a USB drive)
	`SYST:CMD?`	Query the active remote command set — always returns SCPI on Techmize-branded units
MMEM	`MMEM:STOR:STAT <1–20>[,<name>]`	Save the active test file to internal file slot <n>
	`MMEM:LOAD:STAT <1–20>`	Load internal file slot <n> as the active test file
FETCh	`FETC:AUTO <ON/OFF>`	Enable/disable automatic return of the measurement result after each test
	`FETC?`	Query the latest measurement result (per-step current, resistance and PASS/FAIL)
Common	`*IDN?`	Returns <manufacturer>,<model>,<firmware>
Common	`THID:PRODSNUM?`	Returns the instrument's serial number

Command keywords use mixed-case notation: the capitalized portion of a keyword is mandatory, the lower-case portion optional. The instrument does not distinguish upper and lower case on received commands.

APPENDIX

Packing, Warranty & Related Documents

A.1 Standard accessories

See §2.1 for the standard packing contents (instrument, EU power cable, TH26035B two-end test clip, documentation).

A.2 Transport & storage

Store the instrument in a dry, well-ventilated location within the storage conditions of §1.4 (−20–60 °C, ≤90% RH), away from corrosive gases, for any extended period of non-use. During transport, protect the instrument from shock, vibration and moisture.

A.3 Nameplate & markings

The instrument's rear panel or nameplate carries: the manufacturer's name/trademark; product name and model; serial number; rated input voltage/frequency; and the CE mark.

A.4 Model comparison

Item	TH9410A	TH9411A
Current range	1.00–45.00 A	1.00–32.00 A
Output voltage	8 V max / 6 V max (current-dependent)	8 V max (full range)
Power consumption	≤900 VA	≤800 VA

SCPI remote control, file storage and the HANDLER interface are standard across both models — not a unique feature of either one.

A.5 Related documents

- TH9410A/TH9411A Series Datasheet (Techmize)

A.6 Contacting Techmize

For technical support, accessories, calibration or service, contact Techmize directly or through your authorized Techmize distributor.

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