TECHMIZE by TONGHUI

OM

OPERATION MANUAL

TH2884

Impulse Winding Tester for low-inductance wound components. Touchscreen front-panel operation, nine comparison methods, and remote control over RS232C, USB and LAN; see Chapter 10 for the remote interfaces and Chapter 11 for the HANDLER interface.

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

Rev. 2026-10 · English edition

TH2884 Operation Manual

Impulse Winding Tester

This manual describes the operation of the Techmize TH2884 impulse winding tester. TH2884 is a single-channel, single-model instrument — there are no sub-variants to distinguish. Where this manual and the instrument itself appear to disagree, or a described function is not present on your unit, contact Techmize or your authorized distributor using the details in §1.9 before relying on the instrument for sorting decisions.

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The full SCPI command reference is issued as a separate companion document, TH2884 SCPI Command Reference, in line with Techmize's standard practice for command sets of this size. Chapter 10 of this manual covers the remote interfaces and command-set overview only.

CHAPTER 1

Safety & Compliance

1.1 About this manual

This is the operation manual for the Techmize TH2884 impulse winding tester. 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 IMPULSE VOLTAGE

The TH2884 applies a high-voltage impulse of up to **1000 V** to the device under test at the front-panel test terminals. This is a shock hazard. Never touch the test terminals, test cable, test fixture or device under test while the front-panel **HV** indicator is lit. Disconnect the AC power cord before opening the instrument or changing internal settings; there are no operator-serviceable parts inside.

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

Protective earthing of the chassis, via the three-wire AC power cord, is essential to safety and must not be defeated. Do not place heavy objects on top of the instrument, and keep the side/rear cooling-fan openings clear at all times.

WARNING — ELECTRIC SHOCK

Always use a supply outlet with a protective earth contact. Never connect the AC supply, or operate the instrument, with the protective ground disconnected or with a two-wire (ungrounded) adapter.

Power	
Supply voltage	220 V AC ±10% (198–242 V) or 110 V AC ±10% (99–121 V)
Supply frequency	47.5–63 Hz
Power consumption	≤ 200 VA

High-voltage stability depends on a stable AC supply; use a properly rated, regulated AC source. The AC power-inlet line L, neutral N and earth E conductors must match the instrument's power-inlet wiring.

> **WARNING — TEST TERMINALS AND TEST CABLE**
> The front-panel test terminals, and the HV-rated test cable (TH2884-1) and test fixtures connected to them, carry the impulse test voltage while the **HV** indicator is lit. Always use the test cable and fixture supplied or specified by Techmize/Tonghui. Disconnect the device under test before changing wiring, and never touch the test terminals, cable, fixture or device under test while a test is in progress.

Test fixtures and cables. Use only the test cable and fixture supplied or specified by Techmize/Tonghui; a user-made or third-party cable or fixture can produce incorrect measurement results or create a shock hazard. Keep the fixture, cable and the device-under-test leads clean to ensure good contact.

Environment

Item	Requirement
Operating temperature	0–40 °C
Operating humidity	≤ 75% RH
Transport / storage temperature	0–50 °C
Transport / storage humidity	≤ 93% RH, non-condensing

Do not use the instrument in a dusty, vibrating, direct-sunlight or corrosive-gas environment. Avoid frequent power-cycling, which can risk loss of stored data. If the instrument will not be used for an extended period, store it in its original packaging in a well-ventilated room at 5–40 °C, ≤85% RH.

> **CAUTION — WARM-UP**
> Allow at least **15 minutes** of warm-up after switch-on before relying on the instrument for measurement or sorting decisions.

1.4 Electrical safety test data

If a formal electrical safety test report for the instrument itself is required, contact Techmize or your authorized distributor.

1.5 CE marking

The TH2884 carries the CE mark, as shown on the instrument's rear-panel nameplate. Compliance is supported by the harmonized standards listed in §6.6 (IEC 61010-1:2001, IEC 61326-2-1:2005); the specific EU certificate of conformity references for this model were not available at the time of writing — contact Techmize for the current certificates if required for your import documentation.

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 TH2884 is covered by Techmize's own RoHS (Directive 2011/65/EU, as amended) self-declaration. No independent third-party RoHS certificate is currently available for this model.

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 test cable, or damage from operation outside the environmental limits given in §1.3. Repair must be carried out by qualified technical personnel. After any repair, the instrument must be recalibrated before further use.

1.9 Manufacturer & EU contact

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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
TH2884 instrument	1
TH2884-1 high-voltage test cable (BNC to alligator clips)	1
EU power cable (Schuko, CEE 7/7)	1
Warranty card	1
Test report	1

The optional SMD bottom-electrode test fixture TH26095 must be ordered separately. This operation manual is issued in PDF only; no printed edition is included in the standard packing.

Keep the original packaging — it is the recommended way to store or return the instrument. Store the instrument in a dry, well-ventilated room at 0–50 ℃ and ≤93% RH when not in use for an extended period, away from corrosive gases.

2.2 Connecting the power supply

Item	TH2884
Supply	220 V AC ±10% or 110 V AC ±10%, 47.5–63 Hz
Power consumption	≤ 200 VA
Power switch	Front-panel push-push power switch

Match the L (line), N (neutral) and E (earth) conductors of the supply cable to the instrument's rear-panel power inlet, and confirm reliable grounding before switching on.

> **WARNING**
> Make sure the protective-earth conductor is reliably grounded before connecting the power cable, to prevent electric shock.

2.3 Connecting the device under test

Connect the TH2884-1 high-voltage test cable (or an equivalent Techmize-specified fixture, such as the optional TH26095 for SMD/bottom-electrode parts) to the front-panel test port. The test cable carries the impulse voltage to one end of the coil and returns the damped-oscillation signal used for acquisition.

> **WARNING — NEVER TOUCH LIVE TERMINALS**
> Never touch the test terminals, test cable, fixture or device under test while the front-panel **HV** indicator is lit. The test terminals can be at up to 1000 V.

2.4 Acquiring a standard waveform

Before sorting production units, the instrument needs a reference ("standard") waveform to compare against. Connect a known-good sample coil and use the Standard Sampling function (<Measurement Setup> → Sampling, §5.3) to capture it — manually or automatically across sample rates. Techmize recommends acquiring a fresh standard waveform whenever the test fixture, cable or sample batch changes.

2.5 Starting the instrument for the first time

1. Connect the EU power cable to the rear-panel inlet, confirming reliable earth-ground connection.
2. Press the front-panel power switch.
3. The instrument opens on the default <Measurement Display> touchscreen page.
4. If password protection is enabled, the instrument prompts for the startup password before continuing (§6.1.5).

Allow at least 15 minutes of warm-up before relying on the instrument for measurement or sorting decisions (§1.3). For an overview of the front panel, rear panel and screen layout, continue to Chapter 3.

CHAPTER 3

Getting to Know the Instrument

3.1 Front panel

The TH2884 is operated primarily through its 10.1" 1280×800-dot **touchscreen**: all measurement parameters, status and results can be set and viewed by touching the screen directly. A small number of physical controls remain on the front panel.

1 **Trademark & model** label.

2 **Power switch (POWER)** — push-push; pressed-in = on, released = off.

3 **10.1" touchscreen** — 1280×800-dot; touch-operates and displays all parameters, status and results.

4 **START** — starts a test.

5 **STOP** — aborts a test in progress, or silences the FAIL alarm.

6 **USB ports (×2)** — for a USB drive or mouse; only one drive may be connected at a time.

7 **Indicators** — **PASS** (good part), **FAIL** (bad part), **HV** (high voltage present at the test port — never touch the test terminals or DUT while lit).

8 **Knob** — press to toggle/confirm a selection, rotate to move/adjust a value.

9 **Test terminals** — connect the device under test.

10 **Shortcut keys** — **PrtScn** (screen capture to internal storage or USB drive), **KeyLock** (locks all controls except START/STOP/POWER/KeyLock itself), **Help** (context help for the current screen), **Save** (saves the current settings to a file).

3.2 Rear panel

Item	Description
HANDLER	Outputs the comparator result and related signals; accepts an external start/stop trigger (Chapter 11)
GPIB	General-purpose interface bus, **optional**
Interlock	Safety interlock terminal — the instrument operates normally only while this terminal is shorted
RS232C	Serial communication interface
USB DEVICE	USB communication interface (USBTMC / USBCDC)
LAN	Gigabit network interface
Nameplate	Factory barcode and serial coding
Power inlet	AC power socket
Fuse	Protects against instrument power overload

3.3 Screen display regions

The <Measurement Display> page is the instrument's working view. Touching the tabs across the top switches between the five main pages (§3.4). The working area shows: the overall PASS/FAIL result; a measurement-function checkbox region; the waveform display (touch-draggable); per-method judgement values (a "––" means that method is currently disabled; a red background marks a failing result); a status strip (messages, USB status, date/time); the horizontal (time) and vertical (voltage) scale rulers; the voltage-adjust status indicator (active only once a standard waveform has been captured and confirmed); the current sample rate and impulse voltage; the loaded settings-file name; the peak voltage reading (Vp0); X/Y zoom controls with a reset icon; and a side-panel toggle (< / >) that opens or closes additional information.

3.4 Main pages

Page tab	Description
Measurement Display	Live waveform, OK/NG result, measurement function (§4.1)
Measurement Setup	Test mode, impulse voltage, sample rate, compare setup, standard sampling (Chapter 5)
System Setup	Environment, test, communication settings (Chapter 6)
File System	Save/load/delete settings files, internally or on a USB drive (Chapter 7)
Assist	About, upgrade, reset, statistics, self-test, log (Chapter 8)

3.5 Status icons

Three small icons can appear in the status strip: a remote-control-active icon, a keyboard-lock icon (while KeyLock is engaged), and a USB-drive-connected icon.

3.6 Basic operation

1. Touch the page tab across the top of the screen to reach the page group you want (§3.4).
2. Touch the field to be changed; a touch-friendly control (slider, toggle or keypad) appears for that field, or use the front-panel knob to move the cursor and confirm/adjust a value.
3. Where a numeric value is required, the on-screen or virtual keypad accepts direct entry.

3.7 Starting the instrument

Confirm reliable earth-ground connection, then press the front-panel power switch (§2.5). The instrument opens on the default <Measurement Display> page. If password protection is enabled, enter the startup password when prompted (§6.1.5). Allow at least 15 minutes of warm-up before relying on the instrument for measurement or sorting decisions (§1.3).

CHAPTER 4

Measurement Display (DISP)

Touch the **Measurement Display** tab to open the live-waveform page, then press START to run a test.

4.1 Measure Function

Reads the peak voltage, time and frequency of the displayed waveform. Open the side panel, enable the Measure Function checkbox, and four measurement lines appear on the waveform area. Press the knob to change the adjustment step (0.01 / 0.1 / 1).

4.1.1 Voltage

Select a horizontal line on the waveform (it changes from dashed to solid); drag to move it, or rotate the knob for fine adjustment. The reading between the two selected lines is shown as "V:XX V".

4.1.2 Time

Select a vertical line on the waveform; drag to move it, or rotate the knob for fine adjustment. The reading between the two selected lines is shown as "T:XX s".

4.1.3 Frequency

Select a vertical line on the waveform; drag to move it, or rotate the knob for fine adjustment. The reading between the two selected lines is shown as "F:XX MHz".

CHAPTER 5

Measurement Setup (SETUP)

Touch the **Measurement Setup** tab, then the **Setup** sub-tab, to reach the fields below.

5.1 Setup

Field	Range / options	Default
Test mode	Normal (single-voltage test) · Breakdown (ramps the test voltage to find a safe margin, §5.1 note below)	Normal
Impulse voltage	10–1000 V	25 V
Voltage adjust	Off (output voltage not corrected for DUT loading) · On (instrument compensates so the DUT sees the set voltage)	Off
Sample rate	200 · 100 · 50 · 25 · 12.5 MSa/s	200 MSa/s
Inductance range	Auto · 1 µH · 10 µH · 100 µH	10 µH
Test pulses	1–32 (final waveform is the average of all pulses)	1
Excitation pulses	0–9 — demagnetizes residual flux left in the coil before the measurement pulse(s), avoiding a first-pulse measurement anomaly	0
Pre-test	Off · On — runs a low-voltage check (via the Laplace and peak-difference methods) before the full-voltage test, to catch a micro-short that the main test voltage might otherwise burn through and mask	Off
Start voltage	10–1000 V (Breakdown mode only)	10 V
End voltage	10–1000 V (Breakdown mode only)	1000 V
Step ratio	1–20% (Breakdown mode only); step voltage = end voltage × step ratio	1%
Pause mode	Off · On — whether Breakdown mode pauses for a new trigger after each voltage step (Breakdown mode only)	Off

Breakdown mode: for new or experimental coil designs, ramps the test voltage step by step from Start to End voltage until a comparison method fails or the end voltage is reached; the voltage at which failure first occurs, scaled by roughly 70–80%, is a starting point for an appropriate production test voltage. This is a destructive test method — see the caution below.

> **CAUTION**
> Breakdown mode is destructive if it reaches the coil's actual breakdown voltage. Use it only on sacrificial samples, not on production units intended for shipment.

5.2 Compare

Touch the **Compare** sub-tab to configure the instrument's nine comparison methods. Each method has its own Status (on/off), start/end window (where applicable) and limit field(s):

Method	Status	Start	End	Limit range	Default limit
Area	Off/On	1–12000	1–12000	Lower & upper, −99.9%–99.9%	±10%
Area-diff (Zone)	Off/On	1–12000	1–12000	Lower & upper, −99.9%–99.9%	±10%
Burr total (Flutter)	Off/On	1–12000	1–12000	Upper, 1–99999 (unitless)	300
Max. burr (Laplace)	Off/On	1–12000	1–12000	Upper, 1–9999 (unitless)	300
Peak ratio	Off/On	—	—	Lower & upper, −99.9%–99.9%	±10%
Peak diff	Off/On	—	—	Lower & upper, −99.9%–99.9%	±10%
Angular frequency (Omega)	Off/On	—	—	Lower & upper, −99.9%–99.9%	±10%
Damping coefficient (Lambda)	Off/On	—	—	Lower & upper, −99.9%–99.9%	±10%
Quality factor (Q)	Off/On	—	—	Lower & upper, −99.9%–99.9%	±10%

The Angular-frequency/Damping-coefficient pair is covered by Tonghui patent CN117192443; the oscillation is modeled as $V = A \cdot e^{\lambda t} \cdot \cos(\omega t)$, and both parameters are extracted from the sampled waveform and compared against the standard waveform's values.

5.3 Sampling

Touch the **Sampling** sub-tab to capture the reference ("standard") waveform. Two modes are available:

5.3.1 Manual

Control	Function
Start	Runs a single capture at the configured sample rate
Confirm	Completes standard-waveform acquisition
Undo	Discards the most recent captured waveform
Undo all	Discards all captured waveforms
Back	Returns to the previous level

5.3.2 Auto

Pressing Start captures the sample automatically at each sample rate in turn; Select adopts the currently-displayed rate's waveform as the standard, and Lower/Higher step to an adjacent rate's capture for comparison before selecting.

5.3.3 Position

Shows and adjusts the start/end comparison window for the Area, Area-diff, Burr-total and Max.-burr methods. Touch the method name to light the knob icon and show two dashed lines on the waveform marking its window:

1. Press the knob once — the first (start) line turns solid; rotate left to decrease the start point by 10, right to increase it by 10.
2. Press the knob again — the second (end) line turns solid; rotate to move the end point.
3. Press the knob a third time — both lines turn solid; rotate to move the whole window (start and end together) by 10 per step.

The same procedure applies to each of the four methods listed above.

5.4 How the comparison methods work

The TH2884 applies the same impulse voltage to the device under test and compares the resulting damped-oscillation transient against a previously-captured standard waveform. The oscillation's shape and decay reflect the coil's inductance, Q factor and turn count, so a shorted turn, an interturn/interlayer short, a winding-count error or an insulation weakness all show up as a waveform difference from the standard.

Method	What it detects
Area	Integrates the test waveform over a window and compares its area with the standard's; sensitive to energy loss, effective for interlayer/interturn shorts
Area-diff (Zone)	Integrates the point-by-point difference between test and standard over a window; sensitive mainly to inductance (L) differences
Burr total (Flutter)	First-derivative of the waveform, integrated over a window; reflects the amount of partial-discharge activity (insulation breakdown/arcing) in the winding
Max. burr (Laplace)	Second-derivative of the waveform; finds the largest single discontinuity, reflecting electrode/solder-joint discharge severity
Peak ratio	Ratio of the self-resonant waveform's 2nd peak to its 1st peak (P2/P1); reflects equivalent parallel resistance and Q-factor differences
Peak diff	Compares the DUT's peak ratio against the standard's peak ratio, as a percentage difference
Angular frequency / Damping coefficient	Fits the oscillation to $V = A \cdot e^{\lambda t} \cdot \cos(\omega t)$ and compares the fitted ω and λ against the standard's; a high-precision method for detecting small test/standard differences (patent CN117192443)
Quality factor (Q)	Derived from the same damped-oscillation model; detects small Q-factor differences between the DUT and the standard

In addition to the nine comparison methods, §6.2.7–6.2.8 set an inductance-deviation window (relative to the standard) that independently reports an OPEN or SHORT failure when exceeded.

CHAPTER 6

System Parameters (SYSTEM)

Touch the **System Setup** tab, then one of its three sub-tabs: Environment, Test or Communication.

6.1 Environment

Field	Options / range	Default
Key sound	Off · Low · Mid · High	Low
Pass sound	Off · Low · Mid · High	Off
Fail sound	Off · Low · Mid · High	Mid
Language	中文 (Chinese) · **English** — European-market units ship set to English	Chinese
Password	Off · On · Modify — startup password; disabling it still requires the current password	Off
Date / time	Year 2000–2100; adjustable via on-screen controls	—
Test-waveform colour	User-selectable	Green (#00FF00)
Standard-waveform colour	User-selectable	White (#FFFFFF)
Wave display	All on · Standard only · Test only · All off	All on
Grid	Off · On	On
Sub-display	Off (faster refresh) · On (shows the second-derivative waveform; slower refresh)	Off

NOTE

When the result is FAIL and the fail-sound volume is non-zero, the buzzer sounds continuously until STOP is pressed. Record any password you set — a lost password requires Techmize/Tonghui support to clear. Units shipped for the European market are configured to the English operator interface.

6.2 Test

Field	Range	Default
Interval time	10–70 ms (time between two test pulses)	70 ms
Trigger delay	0–9999 ms (delay between receiving a trigger and starting the test)	0 ms
Pre-test voltage ratio	1/2 · 1/3 · 1/4 · 1/5 of the set impulse voltage	1/2
Trigger mode	Manual (front-panel START) · External (HANDLER /E_START input, >1 µs negative TTL pulse, rising-edge triggered) · Bus (RS232C/USBTMC/USBCDC/LAN TRIGGER command)	Manual
Excitation ratio	−20%–20% of the set impulse voltage	15%
Burr threshold	0–20 — discharge-pulse height below this threshold is excluded from the burr-total integration	5
Inductance deviation — upper limit	5%–50% — a DUT/standard inductance difference above this limit is judged OPEN FAIL	8%
Inductance deviation — lower limit	−50%–−5% — a DUT/standard inductance difference below this limit is judged SHORT FAIL	−10%
HANDLER power	External · Internal	External

6.3 Communication

Selects and configures the remote interface. See Chapter 10 for the remote-control overview and the companion SCPI Command Reference for the full command set.

Field	Options / range	Default
RS232C — Baud rate	4800 · 9600 · 19200 · 38400 · 57600 · 115200 bit/s	115200
RS232C — Data bits	5 · 6 · 7 · 8	8
RS232C — Stop bits	1 · 1.5 · 2	1
RS232C — Parity	None · Odd · Even	None
LAN — Port	1–65535	45454
LAN — DHCP	Off (manual IP) · On (automatic IP)	Off
LAN — IP address	Manually configurable when DHCP is off	192.168.13.160
USB — mode	USBTMC · USBCDC (virtual COM port)	—

USB virtual COM port driver

USBCDC mode presents the rear-panel USB DEVICE port as a virtual COM port, so a host application that expects a serial port can address the instrument over USB. Connect the instrument's USB DEVICE port to the host with a standard USB cable, then install the Tonghui-supplied driver.

USBTMC mode (USBTMC-USB488/USB2.0 compliant) requires a VISA/USBTMC driver on the host; once installed, the host's device manager shows a "USB Test and Measurement Device" entry and the instrument is addressable with LabVIEW or any USBTMC-capable client.

CHAPTER 7

File System (FILE)

Touch the **File System** tab. Touch the triangle beside `files` to browse internal storage, or beside `usb` to browse a connected USB drive. Touching a file name opens a menu with the operations below.

Operation	Effect
New folder	Creates a new folder at the current location
Delete	Deletes the selected file or folder
Rename	Renames the selected file or folder
Load	Recalls the selected configuration file into the active instrument settings
Copy / Paste	Copies the selected file and pastes it into a chosen folder

A configuration file captures the current measurement setup and comparison-method limits, so a complete test program does not need to be re-entered manually. Save a new file from the front-panel Save key (§9.2.1), which prompts for a file name on the virtual keyboard.

> **NOTE**
> Use a USB drive formatted as FAT16 or FAT32. Back up data on the USB drive before connecting it to the instrument — Techmize/Tonghui is not responsible for USB-drive data loss.

CHAPTER 8

Assist Functions (ASSIST)

Touch the **Assist** tab, then one of its six icons.

8.1 About

Shows the application name and version, measurement firmware version, key-controller firmware version, hardware version, and serial number. Touch the **X** in the top-right corner to close.

8.2 Upgrade

Place the upgrade file in the root directory of a USB drive, connect it, and touch the Upgrade icon. Confirm to start; the instrument locates the upgrade file automatically and installs it, reporting a reason if the upgrade fails. Touch Cancel, or the top-right **X**, to abort.

8.3 Reset

Option	Effect
Reset settings	Restores measurement and system settings to their defaults
Factory reset	Restores measurement and system settings to their defaults, and deletes internally-saved images and configuration files

Both options require the reset password, entered on a virtual keyboard (↑ toggles case; ← deletes one character; Esc clears the entry; Space enters a space; Enter confirms). An incorrect password clears the entry and prompts for re-entry.

8.4 Statistics

Touch Status to enable the statistics counters (a checkmark appears); Clear resets all counters to zero; Save writes the current statistics to storage as `STAT-TH2884-date.csv`.

8.5 Self-test

Runs an internal self-test of the instrument's boards. Each item reports "OK" or "Error"; contact your supplier or Techmize if any item reports an error.

8.6 Log

Records erroneous remote commands received by the instrument, together with the error reason and timestamp. The log holds up to 100 entries; once full, the oldest entry is dropped as a new one is recorded. Touch Clear to erase the log.

CHAPTER 9

Usage Guide

9.1 Basic measurement

At power-on, the instrument opens by default on the <Measurement Display> page.

9.1.1 No-standard test

For a first trial on a new sample. With the default impulse voltage (100 V) and sample rate (200 MSa/s), connect the test leads to the sample and press START to run a single test. Observe the resulting damped-oscillation waveform's density and adjust the sample rate as needed, then repeat.

9.1.2 Standard-sampling test

For batch production testing. Set the test voltage on <Measurement Setup>, open Sampling → Auto, and press START: the instrument cycles automatically through its sample rates on the reference sample, and Select adopts the best-fitting rate's waveform as the standard. Replace the reference sample with each production unit in turn and press START to test; configure appropriate comparison-method limits (Chapter 5) to sort good parts from bad.

9.1.3 Breakdown test

For finding a suitable test voltage. Winding short-circuit faults are not strongly voltage-dependent, but choosing the right impulse-voltage amplitude still matters for insulation testing. On <Measurement Setup>, enable Breakdown mode (Test mode = Breakdown), set the start/end voltage and step ratio, then return to <Measurement Display> and press START: the instrument steps the test voltage upward from the start voltage until a comparison method fails. A production test voltage of roughly 70–80% of the voltage at which failure first occurred is a reasonable starting point.

9.2 Key usage

Key	Function
Save	Opens a virtual keyboard to name and save the current settings to a file
Help	Shows the manual page relevant to the current screen or selected field
PrtScn	Saves a screen capture; to the USB drive's `PIC` folder if one is connected, otherwise to internal storage's `PIC` folder
KeyLock	Locks all touchscreen and key input except START, STOP, POWER and KeyLock itself (a lock icon appears); press again to unlock

9.3 Test procedure

9.3.1 Method one — manual setup

1. **Connect the standard sample.** Confirm the HV indicator is off, then connect the test leads to the reference sample.
2. **Set parameters.** On <Measurement Setup>, set the test mode, impulse voltage and other fields as needed, then configure the comparison-method limits. Open Sampling, press START to acquire a standard waveform, and Confirm to accept it.
3. **Test the device under test.** On <Measurement Display>, press START (or trigger remotely) to run the test.
4. **Result.** If every enabled comparison method passes, the instrument reports PASS, cuts the output, lights the PASS indicator, sounds the pass alarm (if enabled) and outputs PASS on HANDLER. If any one comparison exceeds its limit, the instrument reports FAIL, lights the FAIL indicator, sounds the fail alarm continuously until STOP is pressed, and outputs FAIL on HANDLER.

9.3.2 Method two — loading a saved configuration

1. Touch the **File System** tab, then `files` (internal) or `usb` (external).
2. Touch the configuration file to load, then touch Load.
3. Proceed as in §9.3.1, step 3 (Test the device under test).

PART II

Remote Control & Handler

Covers the RS232C, USB and LAN remote interfaces and the HANDLER interface for automated test integration. The full SCPI command tables are issued separately as the *TH2884 SCPI Command Reference*.

CHAPTER 10

Remote Control

The TH2884 can be controlled remotely over RS232C, USB (USBTMC or USBCDC) or LAN, using the SCPI command set; GPIB is also available as an optional rear-panel interface. Only one interface is active at a time, selected on <System Setup> → Communication (§6.3). For the complete command syntax and parameter ranges, see the companion *TH2884 SCPI Command Reference*.

10.1 RS232C

Item	Specification
Pin assignment (9-pin)	TXD = pin 2, RXD = pin 3, GND = pin 5
Baud rate	4800 · 9600 · 19200 · 38400 · 57600 · 115200 bit/s (§6.3)
Data format	5/6/7/8 data bits · none/odd/even parity · 1/1.5/2 stop bits (all configurable)

As with other instruments of this class, the TH2884's serial interface provides only a minimal subset of the full RS-232 standard (TXD, RXD, GND) rather than the complete signal set.

10.2 LAN

Gigabit network interface. IP configuration can be obtained via DHCP, or set manually (IP address, port) when DHCP is off (§6.3). Default port 45454, default IP address 192.168.13.160 as shipped.

10.3 USB

Rear-panel USB Device port, switchable between **USBTMC** (USBTMC-USB488/USB2.0 compliant; requires a VISA/USBTMC driver) and **USBCDC** (virtual COM port; requires the Tonghui-supplied driver — see §6.3).

10.4 GPIB (optional)

The rear panel provides an optional GPIB port. For GPIB-specific technical documentation, contact Techmize or your authorized distributor if this option is fitted to your unit.

CHAPTER 11

Handler Interface

The rear-panel 36-pin HANDLER interface lets the TH2884 integrate into an automatic test or sorting system: it accepts external start/stop triggers and outputs the overall and per-method PASS/FAIL results together with status signals.

11.1 Power mode

The HANDLER interface can be powered from an external supply or from the instrument's own internal supply; select the mode on <System Setup> → Test → HANDLER power (§6.2).

11.2 Pin assignment

Pin	Signal	I/O	Description
1–6	/STN0–/STN5	Out	Reserved
7	/PASS	Out	Low on overall PASS, high on overall FAIL
8	/FAIL_AREA+	Out	High→low on Area upper-limit failure
9	/FAIL_AREA−	Out	High→low on Area lower-limit failure
10	/FAIL_ZONE	Out	High→low on Area-diff (Zone) failure
11	/FAIL_LAPLAC	Out	High→low on Max.-burr (Laplace) failure
12	/FAIL_FLUTTER	Out	High→low on Burr-total (Flutter) failure
13	/Lx_OPEN	Out	High→low when the inductance-deviation upper limit is exceeded (§6.2.7)
14	/Lx_SHORT	Out	High→low when the inductance-deviation lower limit is exceeded (§6.2.8)
15	/SYSTEM_ERROR	Out	High→low on an internal system error
16	/EOT	Out	High while a test is in progress; low once the test is complete
17, 18	Reserved	Out	—
19, 20	+VEXT	—	External DC supply positive input, +3–26 V
21, 22	+24VIN	—	Internal DC supply positive output, +24 V
23	Reserved	In	—
24–26	/RECALL1–3	In	Reserved
27	/E_STOP	In	External STOP input; active low, aborts the current measurement
28	/E_START	In	External START input; active low, triggers a measurement
29	/FAIL_PK	Out	High→low on Peak-ratio failure
30	/ACQ	Out	High while sampling is in progress; low once sampling is complete
31	/FAIL	Out	High→low on overall FAIL
32	Reserved	Out	—
33, 34	EXGND	—	External supply reference ground (when external power is selected)
35, 36	INGND	—	Internal supply reference ground (when internal power is selected)

"/" denotes an active-low signal. Pin 7 (/PASS) and pin 31 (/FAIL) both report the overall result; per-method pins (8–14, 29) identify which comparison caused a FAIL.

11.3 Timing diagram

Interval	Limit	Description
T1	> 20 ms	External trigger (/E_START) pulse width
T2	< 20 ms	Time from /E_START to /EOT going inactive
T3	—	Trigger-delay setting (§6.2)
T4	—	Time required for sampling
T5	—	Time required for the test
T6	> 10 ms	Settling time before the PASS/FAIL result outputs are valid
T7	> 10 ms	Hold time for which the PASS/FAIL result outputs remain valid

11.4 Electrical characteristics

Each DC-isolated output is an optocoupler-isolated, internally pulled-up open-collector output; the output voltage on each signal line is set by the HANDLER supply (program-selectable, §11.1): internal supply fixed at DC 24 V, or external supply DC 3–26 V.

Power mode	Output low	Output high	Output current	Input current	Reference ground
External	≤0.5 V	+3–26 V	6 mA	10 mA±4 mA	EXGND
Internal	≤0.5 V	+24 V	6 mA	—	INGND

11.5 Using the HANDLER interface

1. Set Trigger mode to External on <System Setup> → Test (§6.2) so the instrument waits for a HANDLER trigger before each measurement.
2. Configure the comparison method(s) and limits to be used for sorting (Chapter 5).
3. Apply a trigger pulse to /E_START (pin 28) from the external handler/sorter.
4. /ACQ (pin 30) goes high while sampling, then /EOT (pin 16) stays high until the test is complete.
5. Read the overall sort result from /PASS (pin 7) or /FAIL (pin 31), and the specific failing method, if any, from pins 8–14 or 29 — all active-low, valid for at least T7 (§11.3).

WARNING

Switch off and disconnect the power cord before opening the instrument to change any HANDLER-related internal wiring or jumper settings.

APPENDIX

Packing, Warranty & Related Documents

A.1 Standard accessories

See §2.1 for the standard packing contents (instrument, TH2884-1 high-voltage test cable, EU power cable, warranty card, test report). This operation manual is issued in PDF only and is not included as a printed item. The TH26095 SMD/bottom-electrode test fixture is an optional accessory, purchased separately.

A.2 Transport & storage

Store the instrument in its original packaging, in a dry, well-ventilated location at 0–50 °C and ≤93% 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

Each instrument's rear-panel nameplate carries: the manufacturer's name/trademark; product name and model; serial number and date of manufacture; the supply-voltage rating; and the CE mark.

A.4 Dimensions & weight

Item	Specification
Dimensions (W×H×D)	430 × 177 × 570 mm
Weight	≈ 27 kg

A.5 Related documents

- TH2884 Datasheet (Techmize)
- TH2884 SCPI Command Reference (Techmize, companion to this manual)

A.6 Contacting Techmize

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

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