TECHMIZE by TONGHUI

OM

OPERATION MANUAL

TH2883S8-5 / TH2883S4-5

Multichannel Impulse Winding Tester (8-channel / 4-channel scanning). Covers channel setup, front-panel operation, comparison-method setup, system configuration and file management; see Chapter 7 for the remote-control interfaces and Chapter 8 for the HANDLER interface.

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

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TH2883S8-5 / TH2883S4-5 Operation Manual

Multichannel Impulse Winding Tester — 8-channel / 4-channel scanning

This is the English-language edition of the Operation Manual for the Techmize TH2883S8-5 (8-channel) and TH2883S4-5 (4-channel) multichannel impulse winding testers. Both models share the TH2883-5 impulse-voltage platform and differ only in the number of scanning test channels (8 vs. 4) — see Chapter 6.

> **SCOPE NOTE**
>
> This manual covers the multichannel scanning models TH2883S8-5 and TH2883S4-5 only. The single-channel models TH2883-1, TH2883-5 and TH2883-10 are documented in a separate companion manual, *TH2883 Series Operation Manual*. Both series share the same impulse-test principle, comparison methods and general operating logic; this manual is self-contained: the comparison methods, standard-waveform sampling, trigger modes and file handling are all described in Chapters 4–6.

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The full SCPI command reference is issued as a separate companion document, TH2883S8-5/S4-5 SCPI Command Reference, which also covers the multichannel-only command subsystems (channel control, step/scan navigation and per-step results) not present in the single-channel command set. Chapter 7 of this manual covers the remote interfaces and command-subsystem overview only.

CHAPTER 1

Safety & Compliance

1.1 About this manual

This is the English-language edition of the operation manual for the Techmize TH2883S8-5 (8-channel) and TH2883S4-5 (4-channel) multichannel impulse winding testers. Where this manual and the instrument itself appear to disagree, or where a described function is not present on your particular model or configuration, 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 IMPULSE VOLTAGE**
>
> The TH2883S8-5/S4-5 applies a high-voltage impulse of up to **5 kV** to the device under test, at whichever scanning test terminal (CH1–CH8 on the TH2883S8-5, CH1–CH4 on the TH2883S4-5) is currently active. This is a serious shock hazard. Never touch any scanning test terminal, 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 rear-panel cooling-fan intake clear at all times.

Power	
Supply voltage	220 V AC ±10% or 110 V AC ±10%
Supply frequency	50 Hz or 60 Hz, ±5%
Power consumption	≤ 200 VA
Fuse (220 V / 50 Hz, as shipped for the European market)	T1AL (time-lag, low breaking capacity); replace only with the same rating and type

The instrument's fuse holder also accepts a T2AL fuse for 110 V / 60 Hz operation.

> **WARNING — SCANNING TEST TERMINALS AND TEST CABLES**
>
> Every scanning test terminal (CH1–CH8 or CH1–CH4) can carry the impulse test voltage while the **HV** indicator is lit, not only the terminal currently selected for test — treat all channel outputs on the rear scanning connector as live during a test sequence. Always use the test cables and fixtures supplied or specified by Techmize/Tonghui. Disconnect all devices under test before changing wiring, and never touch any scanning test terminal, cable, fixture or device under test while a test is in progress.

Test fixtures and cables. Use only the test cables and fixtures 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 at this instrument's test voltages. Keep each channel's fixture, cable and 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. Keep the rear-panel ventilation openings clear, and avoid operating in a high-humidity location, since the instrument itself generates high voltage internally. If the instrument will not be used for an extended period, store it in its original packaging, or a similar box, in a well-ventilated room within the storage conditions above.

> **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 is required, please contact Techmize or your authorized distributor.

1.5 CE marking

The TH2883S8-5/S4-5 carries the CE mark, as shown on the instrument's rear-panel nameplate. Certificates of conformity covering the TH2883S8-5 and TH2883S4-5 (together with the single-channel TH2883-1/-5/-10) were issued to Changzhou Tonghui Electronic Co., Ltd. by Most Technology Service Co., Limited:

Directive	Certificate No.	Date of issue	Standards
LVD 2006/95/EC	MTS/ZNC/F14040239	22 May 2014	EN 61010:2010 · EN 61010-2-030:2010
EMC 2004/108/EC	MTE/SAL/F14050510	6 June 2014	EN 61326-1:2013 · EN 61000-3-2:2006+A1:2009+A2:2009 · EN 61000-3-3:2008

Copies of the certificates are available from Techmize or your authorized distributor.

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 TH2883S8-5/S4-5 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 fuse and the high-voltage test cables, or damage from operation outside the environmental limits given in §1.3. 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

Techmize Electronic GmbH

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Tonghui Electronic Co., Ltd. (China)

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Registration

Managing Director: Haohua Zhao
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 (TH2883S8-5)	Qty (TH2883S4-5)
TH2883S8-5 or TH2883S4-5 instrument (model as ordered)	1	1
TH90003R high-voltage test cable (one per scanning channel)	8	4
TH2883-01 high-voltage test cable	Included	Included
TH2881-001 foot switch	1	1
EU power cable (Schuko, CEE 7/7)	1	1
Fuse, T1AL (220 V / 50 Hz)	2	2
Warranty card	1	1
Test report	1	1

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 °C and ≤93% RH when not in use for an extended period, away from corrosive gases.

2.2 Connecting the power supply

Item	TH2883S8-5 / TH2883S4-5
Supply	220 V AC ±10% or 110 V AC ±10%, 50/60 Hz ±5%
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. Disconnect the power cable before replacing the fuse. The fuse holder is rated T2AL for 110 V/60 Hz operation and T1AL for 220 V/50 Hz operation — fit only the fuse type matching the supply voltage in use.

2.3 Connecting the devices under test

Connect one high-voltage test cable (TH90003R, §2.1) per scanning channel to be used (CH1–CH8 on the TH2883S8-5, CH1–CH4 on the TH2883S4-5) on the rear-panel scanning test terminal block. A front-panel high-voltage terminal is also present on every unit (§3.1) and outputs the impulse voltage when START is pressed — connect it only if it is deliberately part of your test setup.

> **WARNING — INDEPENDENT DEVICES ONLY**
>
> Connect only mutually independent devices under test to the different channels. Never connect coupled windings, such as the primary and secondary of a transformer, to different channels (see §4.13).

> **WARNING — NEVER TOUCH LIVE TERMINALS**
>
> Never touch any scanning test terminal, the front-panel high-voltage terminal, test cables, fixtures or devices under test while the front-panel **HV** indicator is lit. Test voltage can reach 5 kV.

2.4 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 displays a startup screen showing the Tonghui trademark, model and firmware version.
4. The display opens on the default <Measurement Display> page.

Allow at least 15 minutes of warm-up before relying on the instrument for measurement or sorting decisions (§1.3). Before testing, configure which scanning channels are active and how each is used (HIGH/LOW/CLOSE, §4.9) — see Chapter 3 for panel layout and Chapter 4 for channel setup.

CHAPTER 3

Getting to Know the Instrument

3.1 Front panel

The front panel is largely identical to the single-channel TH2883 series (display, SOFTKEY, DISP / SETUP / SYSTEM, scroll wheel, numeric keypad, START, HV/PASS/FAIL indicators, USB Host port). One item differs:

Item	Description
Front-panel high-voltage terminal and ground terminal	Present on every TH2883S8-5/S4-5 unit as on the single-channel series. The front-panel high-voltage terminal outputs the impulse test voltage when START is pressed. The rear-panel scanning test terminals have the same function as this terminal; the ground terminal is the low terminal for high-voltage testing.

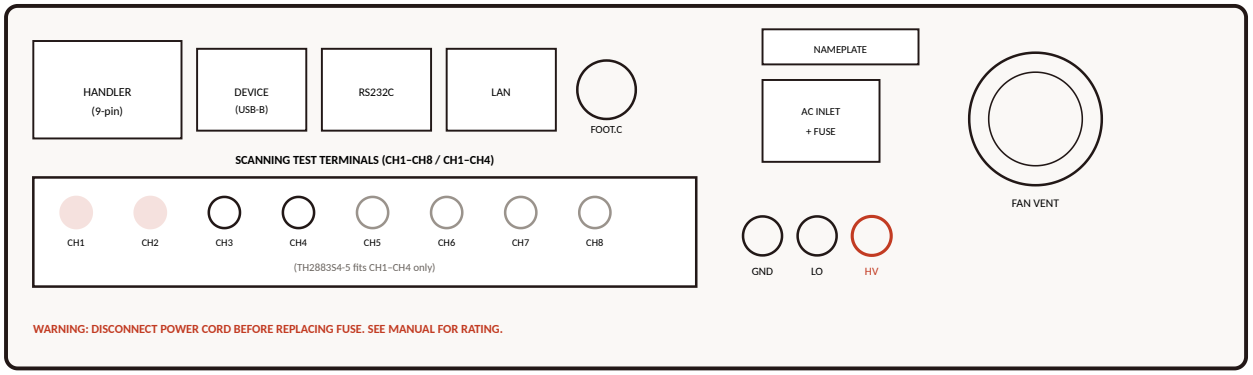
> **CAUTION**
> The front-panel high-voltage terminal outputs high voltage when START is pressed. Treat every high-voltage terminal (front panel and rear panel) as live during a test, and do not leave any of them connected to an unintended fixture or device.

3.2 Rear panel

In addition to the HANDLER, USB DEVICE, RS232C, LAN, FOOT.C, nameplate, fan vent, ground terminal and AC inlet/fuse holder common to the single-channel series, the rear panel carries the scanning test terminal block specific to this model:

Item	Description
Scanning test terminal block	**TH2883S8-5:** 8 scanning test terminal pairs, labelled CH1–CH8. **TH2883S4-5:** 4 scanning test terminal pairs, labelled CH1–CH4. Each channel connects to its own test fixture/DUT via a high-voltage test cable (§2.1, §2.3).

Each channel's terminal is colour-coded by its configured role (set in Channel Setup, §4.9): ● **Red = HIGH** (impulse voltage output), ● **Black = LOW** (return), ○ **White = CLOSE** (channel closed/switched off for the step).



Simplified rear-panel layout (schematic, not to scale) — scanning channel terminals plus the items common to the single-channel series

3.3 Display area & channel indication

The <Measurement Display> page shows the waveform and comparison results of the selected step, with two multichannel-specific additions:

Item	Description
TestStep counter	Shows the current step / total steps (e.g. `3/8`) as the instrument scans through the configured channels in sequence.
Multi / Single display mode	**Multi:** a summary view across all configured channels/steps. **Single:** the detailed waveform and comparison view for the step currently selected.

3.4 Main pages

Page	Reached with	Description
<Measurement Display>	DISP	Live waveform, OK/NG result per channel/step, standard sampling, comparator setup, measure function, utility, statistics
<Measurement Setup>	SETUP	Impulse voltage, sample rate, test/erase pulses, voltage adjust, wave display, trigger mode, delay, BDV test, **step/channel insert-delete and per-channel HIGH/LOW/CLOSE assignment (§4.9)**
<Internal File> / <External File>	SETUP (cycles)	Save/load/delete instrument configurations (incl. step/channel programs), internally or on a USB drive
<System> / <Interface> / <About>	SYSTEM (cycles)	Display, alarms, password, date/time, HANDLER valid time; RS232C/USB/LAN configuration; model/serial/firmware info

3.5 Basic operation

1. Press DISP, SETUP or SYSTEM to reach the page group you want; SETUP and SYSTEM cycle through their sub-pages on repeated presses.
2. Move the cursor to the field to be changed, using the scroll wheel or the numeric-direction-key cluster.
3. Use the softkeys shown for that field, or type a value directly on the numeric keypad and confirm with ENTER.

3.6 Starting the instrument

Confirm reliable earth-ground connection, then press the front-panel power switch (§2.4). The instrument shows a startup screen (trademark, model, firmware version), then opens on the default <Measurement Display> page. Allow at least 15 minutes of warm-up before relying on the instrument for measurement or sorting decisions (§1.3).

CHAPTER 4

Basic Operation & Channel Setup

Each TH2883S8-5/S4-5 tests a coil by applying a high-voltage impulse to a selected scanning channel and capturing the resulting damped-oscillation waveform, then comparing it against a stored standard waveform using up to four independent comparison methods (§4.15). This chapter covers the operating principle and what is specific to multichannel operation: configuring the scanning channels as test steps, and the Match Setup sampling modes used to build a standard-waveform program across several steps.

4.1 <Measurement Display> page (DISP)

Standard Sampling (§4.10), the comparison methods (§4.15), Measure Function, Utility, Statistics and Modify are applied per active step/channel. Comparison limits and ranges are listed in §6.3.

The **Display** softkey selects how the waveform is shown: **Single-step display** shows only the waveform of the current step, which gives a faster test speed; **Scan display** shows the waveform of every step as it is tested, which is slower. In both modes the results of all added steps are listed at the bottom of the screen, and the total result is PASS only if every step is PASS — one failed step makes the total result FAIL.

4.9 Channel Setup

On <Measurement Setup>, each test step corresponds to one scanning channel. Move the cursor to a channel (CH1–CH8 on the TH2883S8-5, CH1–CH4 on the TH2883S4-5) and set its role:

Setting	Terminal colour	Meaning
HIGH	Red	Impulse voltage output for this channel's test step.
LOW	Black	Return/ground for this channel's test step.
CLOSE	White	Channel is closed (switched off) for this step and is used neither as HIGH nor as LOW.

Up to 20 test steps can be inserted, deleted, or reordered (Insert / Back / Next / Delete). Each step also selects its test Mode: **TEST** (ordinary comparison test) or **BDV** (destructive step-voltage sweep, §4.17).

> **NOTE**
>
> A channel set to CLOSE is switched off for the selected step; set it to HIGH or LOW to use it again.

4.10 Match Setup — standard-waveform program

Because a multichannel test sequence may need a different standard waveform for each step, Match Setup (reached by cycling SETUP) configures how each step's standard waveform is sourced:

Mode	Behaviour
Step sampling (Manual / Auto / Loop)	As the single-channel series' Standard Sampling modes: Start / Complete / Average / Undo / Undo All for Manual; auto-stepped sample-rate capture with Select or Select & Check for Auto; continuous re-sampling for Loop. Applied to the step currently selected.
Mode: None	No standard waveform assigned to this step yet.
Mode: Sample	This step's standard waveform is captured directly (as above).
Mode: SW.Copy (Standard Wave Copy)	Copies the standard waveform already captured on another step (selected by Step No.) into this step — available once at least 2 steps exist, avoiding the need to re-sample an identical reference waveform for every channel that tests the same coil type.
Mode: TW.Copy (Test Wave Copy)	Compares the captured waveform of this step with the captured standard waveform of another step (the previous step by default; the source is selected with Step No.) instead of a standard waveform sampled on this step. Available once at least 2 steps exist.

Std.Name sets the file name under which a Sample-mode standard waveform is stored; Step No. selects the step used as the source for SW.Copy (standard waveform to copy) or as the comparison reference for TW.Copy.

4.11 Internal/External file & comparison methods

Internal files (up to 100, non-volatile) and external files (USB drive, `.STA` / `.TXT` / `.CSV`) are described in §5.4; the four comparison methods in §4.15 and the BDV destructive test in §4.17.

4.12 Starting a scan test

With channels assigned HIGH/LOW/CLOSE (§4.9) and each active step given a standard waveform (§4.10), press START (or apply a trigger on the HANDLER interface — both behave the same). One trigger always runs the complete scan: the instrument steps through every configured step in order, applying the impulse test and comparator judgment to each, and advances the TestStep counter (§3.3) as it progresses. **HDL valid time** (§5.1) does not change this; it only determines what the HANDLER /PASS and /FAIL outputs report:

HDL valid time	/PASS and /FAIL output
Set (1–255 ms)	Result of each step, held for the HDL valid time.
Not set (Hold)	Total result of all steps.

Press START again at any time to abort a scan in progress.

> **WARNING**
> Do not touch any scanning test terminal, cable, fixture or device under test while the **HV** indicator is lit — any configured HIGH/LOW channel can become live as the test advances through its steps.

4.13 Worked example — 8-channel test of eight independent coils

Testing eight identical, mutually independent small coils (no electrical or magnetic coupling between them) on a TH2883S8-5, all against one shared standard waveform: assign CH1–CH8 to eight consecutive steps (§4.9); on step 1, sample a standard waveform from a known-good unit (Match Setup → Sample, §4.10); on steps 2–8, set Mode to SW.Copy with Step No. = 1 so all eight steps compare against the same reference; enable Area and Corona comparison with suitable limits (§4.16); connect one coil per channel, and press START to scan all eight in one sequence, reading each step's PASS/FAIL from the Multi display view (§3.3).

> **WARNING — CONNECT ONLY MUTUALLY INDEPENDENT DEVICES UNDER TEST**
> The devices under test on the different channels must be electrically independent of each other. Do not connect windings that are coupled to each other, such as the primary and secondary of a transformer, to different channels. When one winding is energised, the impulse voltage couples into the other winding; testing the secondary can produce a very high voltage on the primary. This is a shock hazard and can damage the instrument.

4.14 Key usage

Control	Function
Scroll wheel	Rotate to move the cursor / change a selected value; press to confirm or toggle. Also used wherever the wheel icon is lit in the status strip.
Numeric direction keys	With the icon lit, keys 8/2/4/6 move the cursor up/down/left/right in a cycle; lighting this icon disables direct numeric entry on those keys until it is turned off again.
Display-page switching	DISP, SETUP, SYSTEM — see §3.4–3.5.

4.15 How the comparison methods work

The tester applies the same impulse to the standard (reference) coil and to the device under test and compares the resulting damped-oscillation waveforms. The waveform depends on the inductance and Q-factor of the coil, so turn-to-turn and layer-to-layer shorts, differences in the number of turns and differences in core material can be detected; at high impulse voltage, poor insulation shows up as corona or layer discharge. Each comparison is evaluated between two points A and B on the waveform.

Method	How it is evaluated	Typical use
Area	Integrates the standard and test waveforms between A and B; deviation = area difference as a percentage of the standard waveform's area.	Area is nearly proportional to energy loss in the winding; a layer-to-layer short appears as increased loss.
Differential area	Integrates the difference between the two waveforms between A and B; deviation = differential area as a percentage of the standard waveform's area.	Reflects inductance and total energy loss; effective for detecting inductance differences between the standard and tested winding.
Corona discharge	Detects the high-frequency corona energy between A and B. The evaluation value is an integer; PASS if it is below the corona difference limit, FAIL if above.	Insulation weakness that area-based methods may not show.
Differential phase	Compares the zero-crossing offset (A–B) between the two waveforms with the oscillation period of the standard waveform (C–D); the percentage is the judging criterion. The zero-crossing to compare is selectable from 2 to 10.	Turn-count and core-material differences (oscillation period).

> **NOTE**
> Differential phase can return four results: PASS, FAIL, FAIL1 (the selected zero-crossing was not found on the tested waveform) and FAIL2 (no complete period can be found on the standard waveform). The selected zero-crossing must be present in the waveform; the first zero-crossing does not reflect actual coil performance and need not be used.

4.16 Setting comparison limits per channel

Each step/channel has its own comparison-method selection and limits, so one scan can mix test objectives across channels. To set an effective corona limit, apply the impulse voltage to a number of sample coils (e.g. 10) and note each coil's corona value; a suitable limit is the maximum corona value plus 20%. To confirm it, test the same coils again and check that the corona result is PASS.

4.17 BDV (destructive) test across channels

The impulse voltage has little effect on turn-to-turn and layer-to-layer short detection, but a large effect on the insulation test. For a new product, or when no voltage is specified by your industry standard, the BDV test can be used to find an appropriate test voltage: switch on BDV mode in the setup page, set Start Volt (100–5000 V, below End Volt), End Volt (100–5000 V, above Start Volt) and Volt Step (1–50%; step voltage = Start Volt × Volt Step), and switch on the corona comparison. Return to the measurement display and press START: the test starts at the Start Volt and raises the voltage by the step voltage. By observing the corona discharge (corona transition value) the voltage can be determined; 70–80% of that voltage is an appropriate test voltage. On the TH2883S8-5/S4-5, BDV mode is set per step (§4.9), so a BDV run can be limited to one step while the other steps stay in ordinary TEST mode.

> **CAUTION**
>
> A BDV test is destructive if it reaches the coil's actual breakdown voltage. Use it only on sacrificial samples on a dedicated step/channel, never on production units intended for shipment.

4.18 Comparator master enable

The Comparator field on <Measurement Setup> turns pass/fail judgment on or off as a whole, independent of each step's own comparison-method selections — with Comparator off, the instrument still runs the scan and displays waveforms, but performs no PASS/FAIL judgement on any channel.

4.19 Trigger modes

The instrument measures only when it receives a trigger in the current trigger mode, and triggers are valid only on the Measurement Display page.

Mode	Behaviour
MAN	Default. Press START or use the foot switch to start a measurement.
EXT	A negative TTL pulse (longer than 1 µs) on the HANDLER interface; its rising edge forms the trigger.
INT	A measurement starts when START is pressed on the Measurement Display page and then repeats continuously until the MEAS EXIT soft key is pressed.
BUS	Trigger commands sent over RS232C, USBTMC, USBCDC or LAN.

CHAPTER 5

System Setup & File Management

The <System>, <Interface> and <About> pages, and internal/external file management, and internal/external file management are summarized in this chapter.

5.1 <System> page (SYSTEM)

Field	Options / range
Brightness	Adjustable, soft-key increase/decrease
Pass/Fail display, Pass alarm, Fail alarm, Key sound	On/Off; alarms independently volume-adjustable
Hard copy (screen-capture) area	Full screen · Waveform area only
Password	On · Off · Modify — startup password, numeric only
Date / Time	Format YYYY/MM/DD, HH:MM:SS
HDL (HANDLER) valid time	1–255 ms, or Hold. When set, /PASS and /FAIL output the result of each step; when not set (Hold), they output the total result. A trigger always runs the complete scan (§4.12).

5.2 <Interface> page

Field	Options / range
I/O	RS232C · USB · LAN (only one active for remote control at a time)
RS232C	Baud rate 4800–115200 bit/s · data bits 6/7/8 · stop bits 1/1.5/2 · parity none/odd/even · terminator LF/CR/LFCR
USB mode	USBTMC (default) · USBCDC (virtual COM port)
LAN	DHCP · Auto IP · manual IP/subnet/gateway/DNS

5.3 <About> page

Displays the instrument's model, serial number and firmware/system version; Reset and Default-Settings soft keys are provided.

5.4 File management

Reached by cycling the SETUP key to <Internal File> or <External File>. Setup files hold the parameters you have set (measurement parameters, comparison parameters, etc.) and can be loaded later instead of re-entering them.

Location	Capacity	Formats	Loadable
Internal (non-volatile memory)	100 files	.STA	Yes
External (USB drive, drive E:)	Limited by media	.STA (loadable) · .TXT · .CSV (export only)	.STA only

- File names may use letters A–Z, digits 0–9 and the underscore. A file saved without a name is stored as `<Unnamed>` (internal) or `FILExxx` with the chosen extension (external, xxx = 001–999).
- Internal files can be copied to the USB drive (Copy to E:) and external `.STA` files copied to the internal list (Copy to I:). Only `.STA` files can be loaded.

> **NOTE**
> Use a USB 2.0 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 6

Performance & Specifications

6.1 Technical specifications

Parameter	TH2883S8-5	TH2883S4-5
Scanning channels	8 (CH1–CH8)	4 (CH1–CH4)
Impulse voltage	100–5000 V, 10 V step	
Inductance test range	≥ 10 µH	
Test speed	167 ms per channel and test step (≈ 6 measurements/s per channel); a scan over *N* channels takes approximately *N* × 167 ms	
Applied pulses	Up to 32 per measurement step	
Input impedance	5 MΩ	
Test steps	Up to 20, each independently assigned to a channel and comparison configuration	

6.2 Display & waveform acquisition

Item	Specification
Display	800×480-dot, 65k-colour TFT; waveform display area 600×256
Sampling rate	Up to 200 MSa/s, 8 adjustable levels
Resolution / memory depth	8-bit · 6k-byte memory depth
Sample averaging	1–32 pulses
Waveform measurement	Voltage, time, frequency

6.3 Comparison methods

Method	What it detects	Limit type
Area	Energy-loss differences; interlayer/interturn shorts	% of standard-waveform window area
Area-difference	Inductance (L) and energy-loss differences	% of standard-waveform window area
Corona-discharge	Interlayer/inter-winding insulation weakness (high-frequency content)	Unitless count, 0–255
Phase-difference	Timing offset at a chosen zero-crossing; multi-winding/tap differences	% of standard oscillation period

6.4 Trigger, output & memory

Item	Specification
Trigger mode	Manual (incl. foot switch) · External · Internal · Bus
Detection output	OK/NG display, LED indicators, buzzer alarm, HANDLER output
Measurement statistics	Pass/fail count and pass rate per comparison method
Memory	20 groups of standard waveforms and instrument settings; internal file system with up to 100 files (measurement and comparison parameters); USB drive for external storage
Interfaces	HANDLER, RS232C, USB Device, USB Host, LAN

6.5 General specifications

Item	Specification
Power	110/220 V AC ±10%, 50/60 Hz ±5%, ≤200 VA
Warm-up time	≥ 15 minutes
Operating environment	0–40 °C, ≤75% RH
Dimensions / weight	400(W) × 132(H) × 420(D) mm · 15 kg
Safety & EMC (certified standards)	EN 61010:2010, EN 61010-2-030:2010, EN 61326-1:2013, EN 61000-3-2, EN 61000-3-3 — see §1.5

All other specifications (display, waveform acquisition, comparison methods, interfaces) are identical across TH2883S8-5/S4-5 — only the number of scanning channels differs.

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, including the multichannel-only command subsystems, are issued separately as the *TH2883S8-5/S4-5 SCPI Command Reference*.

CHAPTER 7

Remote Control

The TH2883S8-5/S4-5 can be remotely controlled over RS232C, USB (USBTMC or USBCDC) or LAN, using the SCPI command set. Only one interface is active at a time, selected on <Interface> (§5.2).

7.1 Command-set overview

All command subsystems available on the single-channel series — `DISPlay`, `IVOLTage`, `SRATE`, `COMParator`, `TRIGger`, `STATistic`, `WADJust`, `SWAVE`, `FETCh?`, `MEASure`, `ABORt`, `MMEMory`, plus the common commands `*RST`, `*TRG?`, `*IDN?` — are also implemented on the TH2883S8-5/S4-5, with the same syntax conventions (tree structure up to 3 levels, case-insensitive, `;` / `;:` command separators, NR1/NR2/NR3 numeric formats).

Two additional subsystems are specific to the multichannel models:

Subsystem	Purpose
`MeasSTEP`	Insert/delete/reorder test steps and assign each step's channel role (HIGH/LOW/CLOSE) and test mode (TEST/BDV) — the remote-control equivalent of Channel Setup (§4.9).
`WaveSTEP`	Step/scan navigation and standard-waveform-copy mode selection (NONE/SAMPLE/SW.COPY/TW.COPY) — the remote-control equivalent of Match Setup (§4.10).

The `FETCh?` subsystem is correspondingly extended with two multichannel-only queries, `:CCRESULT?` (overall scan judgment) and `:MCRESUlt?` (per-step judgment array), alongside the single-channel `FETCh?` queries.

For the complete command syntax, parameter ranges, query return formats and worked examples — including the full `MeasSTEP` / `WaveSTEP` and extended `FETCh?` tables — see the companion *TH2883S8-5/S4-5 SCPI Command Reference*.

CHAPTER 8

Handler Interface

The rear-panel 9-pin HANDLER interface lets the TH2883S8-5/S4-5 integrate into an automatic test or sorting system: it accepts an external start/stop trigger and outputs the comparator result, together with a measurement-complete (end-of-conversion, /EOC) signal and a BUSY status line. The final result of all steps is shown on the Measurement Display page (§3.3); per-step and scan-wide results are also available over the remote interfaces (`FETCh:MCRESUlt?` and `FETCh:CCRESULT?` , see the SCPI Command Reference).

8.1 HANDLER connector pin assignment

Pin	Signal	Description
1	EXGND	Reference ground for the external power supply EXV. Tied to the instrument's own reference ground when the internal supply is used.
2	/EOC	End-of-measurement signal, active low, once the A/D conversion completes; the sort result is valid once BUSY also goes low.
3	BUSY	Active while a measurement (or scan step) is in progress; goes low once computation and display are complete.
4	/PASS	Comparator pass signal output, active low.
5	/FAIL	Comparator fail (NG) signal output, active low.
6	EXV	External power input for /EOC, BUSY, /PASS, /FAIL and the /START, /STOP inputs, when HANDLER power is set to external (§8.2).
7	/START	External trigger input, active low pulse, rising-edge triggered, when Trigger mode = External. Starts the next step/channel in sequence.
8	/STOP	External test-abort input, rising-edge active; aborts the scan in progress.
9	VCC	Instrument-internal +5 V supply. Current draw should be kept under 0.1 A if used, and signal wiring kept away from noise sources.

"/" denotes an active-low signal. All DC-isolated outputs (/EOC, BUSY, /PASS, /FAIL) are open-collector via optocoupler, pulled up through a 4.7 kΩ resistor to either the internal +5 V (VCC) or an external supply (EXV, +5–24 V) — see §8.2.

8.2 Electrical characteristics

Signal	Low level	High level	Max. current	Reference ground
/EOC, BUSY, /PASS, /FAIL (DC-isolated outputs)	≤0.5 V	+5–24 V	6 mA	Internal: instrument GND · External: EXGND

/START and /STOP (DC-isolated inputs) connect to the cathode of an internal LED optocoupler; the instrument triggers on the rising edge of /START and aborts on the rising edge of /STOP. The LED anode can be driven from the internal +5 V supply or from the external EXV supply (shared with the output signals). A current-limiting resistor on the HANDLER interface board must be matched to the external supply voltage in use: 680 Ω for 5–8 V (factory default, also used with the internal supply), 1.2 kΩ for 8–15 V, 2.2 kΩ for 15–24 V. Using an external supply above 8 V without changing this resistor risks component damage.

Internal vs. external power, for both the output and input signal groups, is selected by two jumpers on the HANDLER interface board (factory default: both jumpers set for external power). Both jumpers must be moved together when switching between internal and external power.

> **WARNING**
>
> Switch off and disconnect the power cord before opening the instrument to change the HANDLER board jumper settings.

8.3 Using the HANDLER interface

1. Set Trigger mode to External (§3.4) so the instrument waits for a HANDLER trigger.
2. Enable the Comparator and configure the comparison method(s) and limits for each step (§4.9, §4.18).
3. Apply a trigger pulse to /START (pin 7) from the external handler/sorter. One trigger runs the complete scan (§4.12).
4. The instrument runs the impulse test and comparison (for all steps); BUSY stays active until computation and display are complete, then /EOC pulses once the result is ready.
5. Read the sort result from /PASS (pin 4) or /FAIL (pin 5). With HDL valid time set, the output is the result of each step, valid for the time set; with HDL valid time not set (Hold), the output is the total result of all steps and remains valid until the next trigger.

APPENDIX

Packing, Warranty & Related Documents

A.1 Standard accessories

See §2.1 for the standard packing contents (instrument, TH90003R high-voltage test cables (8×/4×, one per scanning channel) and the TH2883-01 high-voltage test cable, as listed in the TH2883S8-5/S4-5 Datasheet; TH2881-001 foot switch, EU power cable, fuses, warranty card, test report). This operation manual is issued in PDF only and is not included as a printed item.

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 (TH2883S8-5 or TH2883S4-5); serial number and date of manufacture; the supply-voltage/fuse rating table; and the CE mark.

A.4 Related documents

- TH2883S8-5/S4-5 Datasheet (Techmize)
- TH2883S8-5/S4-5 SCPI Command Reference (Techmize, companion to this manual)
- TH2883 Series Operation Manual (Techmize) — single-channel models TH2883-1/-5/-10, separate document; cross-referenced throughout this manual for content shared across both series
- TH2883 Series SCPI Command Reference (Techmize) — single-channel command set

A.5 Contacting Techmize

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

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