TECHMIZE by TONGHUI

OM

OPERATION MANUAL

TH1953 / TH1963 / TH1963A Series

5½/6½-Digit Bench Digital Multimeter. Covers front-panel operation, measurement functions, math operations and system configuration; see Chapter 7 for the remote-control interfaces and the companion SCPI Command Reference for the full command set.

Techmize Electronic GmbH · Ismaning, Germany
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TH1953/TH1963/TH1963A Series Operation Manual

5½/6½-Digit Bench Digital Multimeter

This is the English-language edition of the TH1953/TH1963/TH1963A Series Operation Manual, covering installation, operation, remote interfaces and maintenance for this instrument family.

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The full SCPI command reference (≈114 commands across 17 subsystems) is issued as a separate companion document, TH1953/TH1963/TH1963A Series SCPI Command Reference, in line with Techmize's standard practice for command sets of this size. Chapter 8 of this manual covers the remote interfaces and command structure only.

CHAPTER 1

Safety & Compliance

1.1 About this manual

This is the original-language (English) edition of the operation manual for the Techmize TH1953/TH1963/TH1963A series of bench digital multimeters. Where this manual and the instrument itself appear to disagree, or where a described function is not present on your particular unit, contact Techmize or your authorized distributor using the details in §1.9 before relying on the instrument for measurement decisions.

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

1.2 Safety symbols used in this manual

WARNING — a hazard that, if not avoided, could result in personal injury or death. This marking indicates terminals may carry hazardous voltage; keep personnel clear of direct contact.

Protective ground — indicates the chassis ground terminal.

CAUTION — indicates the user must consult the operating instructions before proceeding; incorrect use may damage the instrument. Damage caused by disregarding this marking is not covered by warranty.

CAT II

Measurement category II — the input terminals are rated for CAT II use (local-level mains-connected equipment); see §1.4 for the input rating.

1.3 General safety requirements

Before switching on, confirm that the power source matches the rating below and that the instrument is properly earthed through the three-wire AC power cord.

> **WARNING — ELECTRIC SHOCK**
> Always use a supply outlet with a protective earth contact. Never operate the instrument with the protective ground disconnected. Disconnect the power cord before opening the case or servicing the instrument.

Item	Rating
Supply voltage	99–121 V or 198–242 V AC, auto-selected
Supply frequency	47–63 Hz
Power consumption	≤ 80 VA maximum
Operating environment	0–40 °C, ≤90% RH

1.4 Input terminal ratings

WARNING — INPUT TERMINALS

The voltage, current and resistance input terminals can carry hazardous voltage from the device under test. Maximum input ratings: **Input HI/LO (V/Ω/diode):** 1000 VDC, 750 VAC; **Sense HI/LO (Ω4W):** 200 V℗ / 500 V℗; **Current terminals:** 3 A (3.15 A fuse) / 10 A. All input terminals are rated **CAT II, 300 V**. Do not exceed these ratings. Disconnect the device under test before changing wiring.

CAUTION — FUSE RATING

The current-input fuse is a factory-fitted standard part, rated **3.15 A / 500 V**. Replace only with a fuse of the same rating and type supplied by Techmize/Tonghui.

1.5 Warm-up and handling

Allow at least **60 minutes** of warm-up after switch-on before relying on the rated accuracy given in Chapter 9 (the accuracy tables assume this warm-up period and a 1-year calibration cycle, calibration temperature T_{CAL}=23 ℃). Operate within 18–28 ℃ for rated accuracy; the broader 0–40 ℃ range in §1.3 covers normal (non-rated-accuracy) operation.

1.6 Electrical safety test data

Dielectric-withstand, insulation-resistance and leakage-current test figures are not published in the operation manual for this series. Contact Techmize/Tonghui engineering if a formal electrical safety test report is required.

1.7 Low Voltage & EMC compliance

The TH1953/TH1963/TH1963A series carries the CE mark on its rear-panel rating label, in conformity with the currently applicable EU Low Voltage Directive (2014/35/EU) and EMC Directive (2014/30/EU) and their harmonised standards.

1.8 WEEE, RoHS, warranty & liability



WEEE. 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.

RoHS. The TH1953/TH1963/TH1963A series 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 series.

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, provided the instrument has been used within the specified operating conditions. This warranty does not cover damage from misuse, accident, unauthorized modification or repair, consumable/wear items such as the fuse, or damage from operation outside the environmental limits of §1.3.

Service & calibration authorization. This instrument must only be serviced or recalibrated by qualified technical personnel. Do not open the instrument or replace any internal component without authorization. After any repair, the instrument must be recalibrated before further use, to avoid affecting measurement accuracy. Damage resulting from unauthorized repair or component replacement by the user is not covered by this warranty, and the user bears the resulting repair cost.

Limitation of liability. Except as expressly stated above, Techmize makes no other warranty, express or implied, regarding this instrument or its documentation. Techmize is not liable for indirect, incidental or consequential damages arising from the use of this instrument, to the extent permitted by applicable law.

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. If the container shows signs of damage, contact your carrier and your Techmize distributor before powering on the instrument. If the contents do not conform to the packing list, notify Techmize or your distributor immediately — keep the original packaging for any future transport or return.

1× TH1953/TH1963/TH1963A bench digital multimeter (model as ordered) · 1× EU power cable (Schuko, CEE 7/7) · 1× this operation manual · test report · warranty certificate. The IEEE-488 (GPIB) interface and the Handler interface are optional, purchased separately, and **cannot be installed at the same time** — confirm at order time which (if either) option is fitted.

2.2 Connecting the power supply

Item	Rating
Supply	99–121 V or 198–242 V AC, auto-selected, 47–63 Hz
Power consumption	≤ 80 VA maximum
Fuse	3.15 A / 500 V

Connect the EU power cable to the rear-panel inlet, confirming reliable protective-earth connection before switching on. If mains conditions are noisy, fitting a power-line filter ahead of the instrument is recommended.

> **WARNING**
>
> Make sure the protective-earth conductor is reliably grounded before connecting the power cable. Disconnect the power cable before replacing the fuse.

2.3 Connecting the device under test

The front panel provides the main Input terminal set (HI/LO for V/Ω/diode/frequency/capacitance, plus dedicated 3 A and 10 A current terminals) and the Sense Ω4W HI/LO terminal set for four-wire resistance measurement. On **TH1963** only, a second, identical Input/Sense terminal set is also provided on the rear panel, selectable via the front-panel [Rear] key — see §3.2 for the full front/rear panel comparison across all three models.

> **CAUTION**
> Do not exceed the input ratings given in §1.4. For resistance measurements above 100 kΩ, shielded test leads are recommended — stray induced currents at low test current can otherwise increase measurement noise.

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 performs a brief self-test, then opens on the default DC Voltage measurement screen.

Allow at least 60 minutes of warm-up before relying on the rated accuracy (§1.5). 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



Front panel, TH1963 shown (TH1953/TH1963A share the same physical layout; display content and function-key labels are common across the series)

USB Host — front-panel USB Type-A port for USB-drive data export and screenshots.

R/S — Run/Stop: starts and stops continuous measurement.

Menu — opens the front-panel menu system (display, measurement, function and system settings — §3.1 menu reference, Chapters 4–6).

Trigger — manual trigger, active when the trigger source is set to manual.

POWER — main power switch.

Display — colour LCD showing the active function, reading, and soft-key labels for the six keys immediately below it.

DCV / **ACV** / **Cont** / **Ω2W** / **Freq** / **Math** and shifted functions **DCI** / **ACI** / diode / **Ω4W** / **Temp** — the 12 measurement-function keys (§4, using **Shift** for the blue-labelled second function on each key).

Arrow keys & **Enter** — menu navigation and value entry.

Null — applies a null (relative) offset to the current reading (§5.1).

Shift — accesses the blue-labelled second function of a key.

Input / Sense terminals — HI/LO voltage-ohms-diode input, Sense Ω4W HI/LO, and dedicated 3 A/10 A current terminals, CAT II 300 V (§1.4, §2.3).

Rear — switches the active input terminal set between front and rear (TH1963 only — see §3.2).

3.2 Rear panel — TH1953 vs. TH1963 vs. TH1963A

The rear panel differs between models. **TH1963** provides a full second set of Input/Sense measurement terminals on the rear panel (selectable with the front-panel [Rear] key), in addition to the common interface cluster. **TH1953** and **TH1963A** do **not** have rear measurement terminals — only the common interface cluster is fitted.

TH1963 — rear Input/Sense terminals fitted



TH1963A — no rear measurement terminals



TH1953 — no rear measurement terminals



All three photos cropped and scaled to the same reference frame for direct comparison. TH1953's rear panel matches TH1963A's layout (no rear measurement terminals).

Item	Description
Sense Ω4W / Input (TH1963 only)	Rear-mounted duplicate of the front-panel Input/Sense terminal set; switched in with the [Rear] key.
GPIB/HANDLER	Covered slot for the optional IEEE-488 (GPIB) or Handler interface card (mutually exclusive — §7.4).
Ext Trig	BNC external trigger input.
LAN	RJ45 wired Ethernet (§7.1).
USB (Device)	USB Type-B port for PC communication (§7.3).
RS-232C	9-pin D-sub serial interface (§7.2).
AC power inlet	IEC power inlet with integrated fuse holder; rating label above (§2.2).

3.3 Screen layout

The measurement display shows: the active function name (e.g. "DC Voltage") and trigger-source indicator at the top; the primary reading in large digits with its unit; and a row of status fields along the bottom (Range, Aperture/speed, Auto Zero, Input impedance, DCV Ratio, 2nd Meas, etc. — the exact fields shown depend on the active function). The six keys below the display are soft keys whose function follows the on-screen label directly above each one.

3.4 Front-panel menu reference

Press [Menu] to reach the settings not covered by a direct function key. The menu is organised into four top-level groups, detailed in the following chapters:

Menu group	Covers	See
Display	Numeric / bar graph / trend chart / histogram display modes	§6.1
Measure	Trigger source, trigger delay, sample count, Average	§6.2
Function	Save/load settings, file management, port configuration, system settings	§6.3
Math	Null, dB/dBm, mX+b, Percent, Statistics, Limit	Chapter 5

3.5 Starting a measurement

1. Connect the device under test to the appropriate Input/Sense terminals for the desired function (§2.3).
2. Press the corresponding function key (e.g. [DCV], or [Shift]+[DCV] for DCI) — see Chapter 4 for the full function list and wiring per function.
3. Press [R/S] to start/stop continuous measurement, or configure a manual/external/bus trigger source first (§6.2.1).

CHAPTER 4

Measurement Functions

Twelve measurement functions are available via the front-panel function keys (using Shift for the second, blue-labelled function on shared keys). Per-range accuracy figures are given in Chapter 9; this chapter covers how to select and configure each function.

4.1 DCV — DC voltage

Model	Range
TH1953	1 V to 1000 V
TH1963 / TH1963A	0.1 µV to 1000 V

Key: DCV. Connect the DUT to the Input HI/LO terminals. Ranges: 100 mV, 1 V, 10 V, 100 V, 1000 V (auto or manual).

4.1.1 DCV Ratio (ratiometric measurement)

Available as a sub-mode of DCV: measures the ratio of the Input-terminal voltage to a reference voltage applied to the Sense terminals, displayed as a dimensionless ratio. Useful for ratiometric resistive-divider or reference-voltage testing. Enabled via the "DCV Ratio" status field / soft key on the DCV screen.

4.2 DCI — DC current

Model	Range
TH1953	1 A to 10 A
TH1963 / TH1963A	10 nA to 10 A

Key: Shift + DCV (DCI). Connect the DUT in series with the 3 A or 10 A current terminal (and Input LO) as appropriate for the expected current. Ranges: 100 µA, 1 mA, 10 mA, 100 mA, 1 A, 3 A, 10 A.

> **CAUTION**
> Do not sustain current above 30 seconds on the high-current ranges — the internal current-sense shunt self-heats under sustained large current, which can shift its resistance and affect accuracy.

4.3 ACV — AC voltage

Model	Range
TH1953	1 V to 750 V (1000 V peak)
TH1963 / TH1963A	0.1 µV to 750 V (1000 V peak)

Key: [ACV]. True-RMS AC coupled measurement, frequency range 3 Hz–300 kHz. Three low-frequency filter settings are available (3 Hz, 20 Hz, 200 Hz, §9.1 footnote [10]) — select the filter matching the lowest frequency of interest.

4.4 ACI — AC current

Key: [Shift]+[ACV] (ACI). Range 1 A to 10 A (TH1953) / 10 nA to 10 A (TH1963/TH1963A), frequency range 3 Hz–10 kHz. Same current-terminal wiring as DCI (§4.2); the 30-second duty-cycle caution applies equally to ACI.

4.5 Cont — continuity

Key: [Cont]. Test current 1 mA on a 1 kΩ range; the instrument's buzzer sounds when the measured resistance is below the configured continuity threshold. Connect via the Input HI/LO terminals.

4.6 Diode test

Key: [Shift]+[Cont] (diode). Test current 1 mA (typical), 5 V range, displays the forward voltage drop. The 1 mA test current is a typical value; the exact current-source value will shift the measured diode junction voltage drop slightly (§9.1 footnote [12]).

4.7 Ω2W — two-wire resistance

Model	Range
TH1953	0.1 Ω to 120 MΩ
TH1963 / TH1963A	0.01 mΩ to 120 MΩ

Key: [Ω2W]. Connect via the Input HI/LO terminals. For best accuracy at low resistance, perform a Null (relative) measurement first to cancel test-lead resistance (§5.1). Without Null, 2-wire measurement carries an additional error of up to 0.2 Ω from lead/contact resistance.

4.8 Ω4W — four-wire resistance

Key: Shift + Ω2W (Ω4W). Same range as Ω2W. Connect via both the Input HI/LO **and** Sense HI/LO terminals (four-wire/Kelvin connection) to eliminate test-lead resistance from the measurement — recommended for resistance measurements below 100 Ω or where cable length matters. For resistance above 100 kΩ, shielded test leads are recommended regardless of 2W/4W mode (§2.3).

4.9 Frequency / Period measurement

Model	Frequency range
TH1953	3 Hz to 300 kHz
TH1963 / TH1963A	2 Hz to 1 MHz

Key: Freq (Period is the shifted function on the same key). Reciprocal-counting technique; accuracy is specified for sine-wave and square-wave inputs >100 mV, with a reduced-input-level correction for inputs between 10 mV and 100 mV (§9.1 footnote [14]).

4.10 Temperature measurement

Probe type	Probe accuracy contribution
PT100 (DIN/IEC 751)	±0.05 °C
5 kΩ thermistor	±0.10 °C

Key: Shift + Freq (Temp). Same for all three models. Connect the probe to the Input HI/LO terminals; the instrument computes temperature from the probe's resistance using the selected probe-type curve.

4.11 Capacitance measurement

Key: Shift + Math (capacitance). Range and available sub-ranges differ by model — see Chapter 9, §9.6 for the full per-model range/accuracy table (TH1953: 1 nF–10 mF; TH1963: 1 nF–10 mF with tighter 24h/90d accuracy figures; TH1963A: 1 nF–100 µF).

CHAPTER 5

Math Operations

Reached via [Math] or [Menu] → Math. Math operations apply to the primary reading of the active measurement function.

5.1 Null (relative) operation

Key: [Null]. Captures the current reading as a reference (offset) and subtracts it from all subsequent readings — commonly used to zero out test-lead resistance before a 2-wire resistance measurement (§4.7).

5.2 dB / dBm operations

5.2.1 dB operation

Computes the reading in decibels relative to a user-entered reference voltage: $dB = 20 \times \log_{10}(V_{reading} / V_{ref})$. Available for voltage functions.

5.2.2 dBm operation

Computes the reading in decibels relative to a reference power level across a user-selected reference impedance: $dBm = 10 \times \log_{10}(V_{reading}^2 / R_{ref} / 1\ mW)$.

5.3 Scaling operations

5.3.1 mX+b operation

Applies a linear scaling to the reading: result = m × reading + b, with user-entered scale factor (m) and offset (b) — useful for converting a sensor's electrical reading directly into engineering units.

5.3.2 Percent operation

Displays the reading as a percentage deviation from a user-entered reference value: result = 100 × (reading − reference) / reference.

5.4 Statistics

Accumulates minimum, maximum, average and standard deviation across a run of readings, together with a running count. Statistics accumulate from the moment the function is enabled until cleared or the function is disabled; they are not retained across a change of measurement function.

5.5 Limit test

Compares each reading against a user-entered upper and lower limit, flagging PASS/FAIL on the display (and via the buzzer, if enabled). Commonly combined with external triggering (§6.2.1) for simple go/no-go production testing without a host PC.

CHAPTER 6

Display & System Settings

Reached via [Menu]. This chapter covers the Display, Measure and Function menu groups introduced in §3.4.

6.1 Display settings

Mode	Description
Numeric (default)	Large-digit numeric readout of the primary reading, with status fields along the bottom.
Bar graph	Analogue-style bar display of the reading relative to the active range, for quickly spotting trend direction.
Trend chart	Scrolling line-graph of the reading over time.
Histogram	Distribution histogram of accumulated readings (works together with Statistics, §5.4).

6.2 Measurement settings

6.2.1 Trigger source

Source	Behaviour
Internal (default)	Continuous, free-running measurement.
Manual	One measurement per [Trigger] key press.
External	One measurement per pulse on the rear-panel Ext Trig BNC input.
Bus	One measurement per remote trigger command (Chapter 8).

6.2.2 Trigger delay

Programmable delay between the trigger event and the start of the measurement.

6.2.3 Sample count

Number of readings taken per trigger event.

6.2.4 Average

Enables a running average over a user-set number of samples, trading measurement speed for reduced reading noise.

6.3 Function settings

6.3.1 Save / load settings

Stores the complete instrument configuration (active function, range, trigger setup, math settings) to one of several internal memory locations, and recalls it later without re-entering every setting.

6.3.2 Manage files

Browses, renames and deletes saved setting files and logged reading data, held in local-mode memory (up to 10,000 readings, §1.1).

6.3.3 Port configuration

Configures the communication parameters (baud rate, address, etc.) for the RS-232, USB, LAN, Handler and GPIB interfaces — see Chapter 7 for the per-interface details.

6.3.4 System settings

General instrument settings: beeper on/off, display brightness/contrast, date/time, language, firmware upgrade, and SCPI/MODBUS protocol selection (Menu→Function→System). The instrument can be calibrated either from the front panel or via a remote-control interface (§1.1).

> **CALIBRATION ACCESS**
>
> Calibration is intended for qualified technical personnel only (§1.8). Recalibrating the instrument without the correct procedure and reference standards can degrade measurement accuracy. After any repair or internal servicing, the instrument must be recalibrated before further use.

CHAPTER 7

Interfaces

Four communication interfaces are available: LAN, RS-232C, USB (all standard), and a choice of one optional interface — IEEE-488 (GPIB) **or** Handler — fitted at order time (§2.1). SCPI and MODBUS are standard protocol support across the whole series on the applicable interfaces; see Chapter 8.

7.1 LAN interface

Standard wired Ethernet (RJ45), supporting SCPI command control over a TCP/IP socket connection. Configure the IP address (static or DHCP) via §6.3.3.

7.2 RS-232 interface

9-pin D-sub connector. Configurable baud rate, parity, data/stop bits via §6.3.3.

Pin	Signal	Pin	Signal
2	TXD	5	GND
3	RXD	7	RTS
—	—	8	CTS

Pins 1, 4, 6 and 9 are not connected.

7.3 USB interface

USB Device port (rear panel) for PC communication via USBTMC or virtual COM port, and USB Host port (front panel) for USB-drive data export and firmware updates.

7.4 Handler interface (optional)

24-pin connector providing pass/fail comparator output signals for limit testing (§5.5) and an external-trigger input, for integration with automated handling equipment. **Optional — purchased separately, and cannot be fitted at the same time as the GPIB interface** (§2.1).

For the complete 24-pin signal assignment, contact Techmize or your Techmize distributor.

7.5 GPIB (IEEE-488) interface (optional)

Standard GPIB bus interface for classical instrument-control systems. **Optional — purchased separately, and cannot be fitted at the same time as the Handler interface** (§2.1). Set the GPIB bus address via §6.3.3 or the front-panel menu. The instrument responds to the standard IEEE-488.2 common commands and bus messages (Chapter 8).

> **NOTE**
>
> SCPI and MODBUS are supported as standard protocols across the full TH1953/TH1963/TH1963A series on the applicable interfaces — neither is a feature unique to a specific model in this series.

PART II

Remote Control

The chapter that follows introduces the TH1953/TH1963/TH1963A series' remote interfaces and SCPI command structure. Part I (Chapters 1–7, plus Chapter 9) is sufficient for front-panel operation; Part II is intended for engineers integrating the instrument into a test system. The full SCPI command set (≈114 commands across 17 subsystems) is documented in the companion *TH1953/TH1963/TH1963A Series SCPI Command Reference*.

CHAPTER 8

Remote Control

The TH1953/TH1963/TH1963A series can be controlled remotely over LAN, RS-232C, USB, and the fitted optional interface (GPIB or Handler, §7.4–7.5). Command parsing supports the standard **SCPI** protocol on all interfaces. See the companion *TH1953/TH1963/TH1963A Series SCPI Command Reference* for the full command set.

8.1 SCPI command structure

SCPI (Standard Commands for Programmable Instruments) is an ASCII-based, hierarchical ("tree") command language. Related commands are grouped under a common root, forming a subsystem. The 17 subsystems implemented on this series are:

Subsystem	Covers
CONFigure	One-shot function/range/resolution configuration, per measurement function
MEASure	Configure-and-read-back in a single command, per measurement function
TRIGger	Trigger source, delay, sample count
[SENSe:]VOLTage	DC/AC voltage sense-layer configuration (range, resolution, filter, ratio)
[SENSe:]CURRent	DC/AC current sense-layer configuration
[SENSe:]{RESistance|FRESistance}	2-wire / 4-wire resistance sense-layer configuration
[SENSe:]{FREQuency|PERiod}	Frequency/period sense-layer configuration
[SENSe:]TEMPerture	Temperature probe type and sense-layer configuration
[SENSe:]CAPacitance	Capacitance sense-layer configuration
SYSTem (I/O config)	Per-interface communication settings (baud rate, address, etc.)
SYSTem (general)	Beeper, display, date/time, error queue
DATA2	Secondary reading buffer
NULL	Null (relative) operation
CALCulate:SCALe	mX+b and percent scaling
CALCulate:LIMit	Limit test
CALCulate:AVERage	Statistics
Other (HANDshake/RETurn/REAR/FRONt)	Front/rear terminal selection and handshake commands

Full syntax, parameters and examples for every command listed above — approximately 114 commands across these 17 subsystems — are documented in the companion TH1953/TH1963/TH1963A Series SCPI Command Reference, consistent with Techmize's practice of issuing a standalone command reference once a series' command set passes roughly 50–60 commands.

CHAPTER 9

Performance & Specifications

Ratings apply after at least 60 minutes of warm-up, with a 1-year calibration cycle, operating temperature 18–28 °C, calibration temperature T_{CAL}=23 °C. Accuracy is stated as ±(% reading + % range) unless noted otherwise. Humidity: ≤80% RH (0–18 °C; ≤70% RH when the resistance range is ≥10 MΩ), ≤70% RH (28–40 °C).

9.1 General

Item	TH1953	TH1963 / TH1963A
Resolution	5½ digit	6½ digit
DC Voltage	1 V–1000 V	0.1 µV–1000 V
AC Voltage	1 V–750 V (1000 V pk)	0.1 µV–750 V (1000 V pk)
DC Current	1 A–10 A	10 nA–10 A
AC Current	1 A–10 A	10 nA–10 A
Resistance (2W/4W)	0.1 Ω–120 MΩ	0.01 mΩ–120 MΩ
Frequency	3 Hz–300 kHz	2 Hz–1 MHz
Additional functions	Period, dB, dBm, continuity, diode test, mX+b, Percent, temperature (PT100 / 5 kΩ thermistor), capacitance	
Programming & interfaces	SCPI command language; USB Device, RS-232C, LAN standard; IEEE-488/GPIB (optional) and Handler (optional) — mutually exclusive	
Local-mode storage	Up to 10,000 readings/settings	
Calibration	Front panel or remote-control interface	
Power supply	99–121 V or 198–242 V AC auto-selected, 47–63 Hz, ≤80 VA max	
Dimensions (W×H×D)	Rack 215×88×300 mm / Bench 235×105×320 mm	
Weight	2.7 kg	

9.2 DC Voltage accuracy

Range	Resolution	24h, T_{CAL}±1°C	90d, T_{CAL}±5°C	1yr, T_{CAL}±5°C	Temp.coef./°C
TH1953					
100.0000 mV	—	0.005+0.005	0.007+0.005	0.012+0.008	0.0005+0.0005
1.000000 V	—	0.005+0.004	0.007+0.004	0.010+0.004	0.0005+0.0001
10.00000 V	—	0.005+0.004	0.007+0.004	0.010+0.004	0.0005+0.0001
100.0000 V	—	0.005+0.004	0.007+0.004	0.010+0.004	0.0005+0.0001
1000.000 V	—	0.005+0.004	0.007+0.004	0.010+0.004	0.0005+0.0001
TH1963					
100.0000 mV	0.1 µV	0.0030+0.0030	0.0040+0.0035	0.0050+0.0035	0.0005+0.0005
1.000000 V	1 µV	0.0020+0.0006	0.0030+0.0007	0.0040+0.0007	0.0005+0.0001
10.00000 V	10 µV	0.0015+0.0004	0.0020+0.0005	0.0035+0.0005	0.0005+0.0001
100.0000 V	100 µV	0.0020+0.0006	0.0035+0.0006	0.0045+0.0006	0.0005+0.0001
1000.000 V	1 mV	0.0020+0.0006	0.0035+0.0010	0.0045+0.0010	0.0005+0.0001
TH1963A					
100.0000 mV	0.1 µV	0.0040+0.0060	0.0070+0.0065	0.0090+0.0065	0.0005+0.0005
1.000000 V	1 µV	0.0030+0.0009	0.0060+0.0010	0.0080+0.0010	0.0005+0.0001
10.00000 V	10 µV	0.0025+0.0004	0.0050+0.0005	0.0075+0.0005	0.0005+0.0001
100.0000 V	100 µV	0.0030+0.0006	0.0065+0.0006	0.0085+0.0006	0.0005+0.0001
1000.000 V	1 mV	0.0030+0.0006	0.0065+0.0010	0.0085+0.0010	0.0005+0.0001

Full-scale accuracy; a Null operation improves low-range accuracy. 1000 V range tests only to 105% of range.

9.3 DC Current & Resistance accuracy

Range (DC Current)	Max.burden	24h	90d	1yr	Temp.coef./°C
TH1963 (TH1953/TH1963A follow the same range set; contact Techmize for TH1953/TH1963A-specific figures)					
100 µA	<0.011 V	0.010+0.006	0.040+0.006	0.050+0.006	0.0020+0.0005
1 mA	<0.011 V	0.007+0.006	0.030+0.006	0.050+0.006	0.0020+0.0005
10 mA	<0.05 V	0.007+0.006	0.030+0.006	0.050+0.006	0.0020+0.0005
100 mA	<0.5 V	0.010+0.004	0.030+0.005	0.050+0.005	0.0020+0.0005
1 A	<0.7 V	0.050+0.006	0.080+0.010	0.100+0.010	0.0050+0.0010
3 A	<2.0 V	0.180+0.020	0.200+0.020	0.200+0.020	0.0050+0.0020
10 A	<0.5 V	0.050+0.010	0.120+0.010	0.120+0.010	0.0050+0.0010

Range (DC Resistance)	Test current	24h	90d	1yr	Temp.coef./°C
TH1963					
10.00000 Ω	10 mA	0.0050+0.0040	0.0100+0.0060	0.0120+0.0080	0.0008+0.0005
100.0000 Ω	10 mA	0.0030+0.0020	0.0080+0.0030	0.0100+0.0040	0.0006+0.0005
1.000000 kΩ	1 mA	0.0020+0.0005	0.0080+0.0010	0.0100+0.0010	0.0006+0.0001
10.00000 kΩ	100 µA	0.0020+0.0005	0.0080+0.0010	0.0100+0.0010	0.0006+0.0001
100.0000 kΩ	10 µA	0.0020+0.0005	0.0080+0.0010	0.0100+0.0010	0.0006+0.0001
1.000000 MΩ	5 µA	0.0020+0.0010	0.0080+0.0010	0.0100+0.0010	0.0010+0.0002
10.00000 MΩ	500 nA	0.0150+0.0010	0.0200+0.0010	0.0400+0.0010	0.0030+0.0004
100.0000 MΩ	500 nA‖10M	0.3000+0.0100	0.8000+0.0100	0.8000+0.0100	0.1500+0.0002

Applies to 4-wire, or 2-wire with Null. Figures shown are for TH1963; TH1963A and TH1953 follow the same structure with slightly different values. Contact Techmize for model-specific figures.

9.4 AC Voltage & Current, Frequency accuracy

Frequency band	24h	90d	1yr	Temp.coef./°C
AC Voltage — TH1963 (TH1953/TH1963A: same band structure, contact Techmize for exact per-model figures)				
3–5 Hz	1.00+0.02	1.00+0.02	1.00+0.03	1.00+0.03
5–10 Hz	0.35+0.02	0.35+0.03	0.35+0.03	0.35+0.03
10 Hz–20 kHz	0.04+0.02	0.05+0.03	0.06+0.03	0.05+0.03
20–50 kHz	0.10+0.04	0.11+0.05	0.12+0.05	0.11+0.05
50–100 kHz	0.55+0.08	0.60+0.08	0.60+0.08	0.60+0.08
100–300 kHz	4.00+0.50	4.00+0.50	4.00+0.50	0.200+0.020
AC Current — shared across all 3 models (range-dependent burden applies)				
3–5 kHz	0.10+0.04 (100µA–100mA range), 0.10+0.04 (1A), 0.23+0.04 (3A), 0.15+0.04 (10A)			0.015+0.006
5–10 kHz	0.10+0.04 (100µA–100mA), 0.10+0.04 (1A), 0.23+0.04 (3A), 0.15+0.04 (10A)			0.030+0.006

9.5 Frequency / Period counting accuracy

Range	24h	90d	1yr	2yr	Temp.coef./°C
3–10 Hz	0.100	0.100	0.100	0.100	0.0002
10–100 Hz	0.030	0.030	0.030	0.035	0.0002
100 Hz–1 kHz	0.003	0.008–0.010	0.010–0.012	0.015–0.017	0.0002
1–300 kHz	0.002	0.006–0.008	0.010–0.012	0.015–0.017	0.0002

Ranges shown are common to all 3 models at the stated resolution; exact 90d/1yr/2yr figures vary slightly between TH1953/TH1963/TH1963A — contact Techmize for per-model values. Requires 60-min warm-up, sine/square-wave input, signal >10% of range.

9.6 Continuity, Diode, Temperature, Capacitance

Function	TH1953	TH1963/TH1963A
Continuity (1 kΩ range, 1 mA)	1yr: 0.100+0.020	1yr: 0.010+0.030
Diode (5 V range, 1 mA)	1yr: 0.100+0.020	1yr: 0.010+0.030
Temperature	PT100: ±0.05 °C · 5 kΩ thermistor: ±0.10 °C (all 3 models)	
Capacitance	1nF–10mF, 1yr only: 0.5–1.0% +0.1–0.5	TH1963: 1nF–10mF, full 24h/90d/1yr · TH1963A: 1nF–100µF, 1yr only

Figures shown are summarized by range band; contact Techmize for the complete range-by-range breakdown.

APPENDIX

Symbols, Quick Reference & Contact

A.1 Nameplate & panel symbols

Symbol	Meaning
⚠ (triangle, exclamation)	Caution — refer to the operating instructions before use at this terminal/control.
⏻ (circle-slash earth)	Protective ground terminal.
CAT II	Measurement category II, 300 V — input terminal rating.

A.2 Front-panel key quick reference

Key	Function
R/S	Run/Stop continuous measurement
Menu	Display / Measure / Function / Math settings (Chapters 5–6)
Trigger	Manual trigger (§6.2.1)
Null	Null/relative operation (§5.1)
Shift	Accesses the blue-labelled second function on shared keys
Rear	Switches between front/rear Input terminals (TH1963 only, §3.2)
DCV / ACV / Cont / Ω2W / Freq / Math	Primary measurement/math functions (Chapters 4–5)
Shift+ above (DCI/ACI/diode/Ω4W/Temp/capacitance)	Secondary measurement functions (Chapter 4)

A.3 Contact, warranty and support

Warranty: two years from delivery (§1.8). For service, calibration or accessories, contact Techmize using the details below.

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