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SCPI COMMAND REFERENCE

TH2523/A Series

Battery Internal-Resistance Tester — TH2523 / TH2523A. Complete SCPI command syntax, parameters and examples for all 11 command subsystems, over RS232C, GPIB (optional), USBTMC and USBCDC. Companion to the TH2523/A Series Operation Manual.

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

Rev. 2026-10 · English edition

TH2523/A Series SCPI Command Reference

Battery Internal-Resistance Tester — TH2523 / TH2523A

This document lists the complete SCPI command set for the TH2523/A series, for use over RS232C, GPIB (optional), USBTMC or USBCDC. It is a companion to the *TH2523/A Series Operation Manual*, which covers front-panel operation, remote-interface setup (Chapter 7) and the HANDLER interface (Chapter 8). TH2523/A uses SCPI only — it does not support MODBUS.

Notation conventions

Notation	Meaning
`NR1`	Integer format, e.g. `123`
`NR2`	Fixed-point format, e.g. `12.3`
`NR3`	Floating-point format, e.g. `12.3E+5`
`NL`	Newline / carriage return, decimal 10
`^END`	GPIB bus EOI (end-of-identify) signal

In each command below, the capitalized portion of a keyword is mandatory and the lower-case portion is optional — e.g. `DISPlay:PAGE MEASurement` can also be sent as `DISP:PAGE MEAS`. The instrument does not distinguish upper and lower case on received commands; the mixed case here is only to show which letters may be dropped.

Command subsystems

Subsystem	Covers
`DISPlay`	Active display page, display refresh
`FUNCtion`	Measurement parameter, ranges, monitor, deviation, REL, short-zero, line frequency
`APERture`	Measurement speed and averaging
`TRIGger`	Trigger source, delay, manual trigger
`FETCh?`	Reads back one measurement result
`COMParator`	Comparator on/off, beeper, sort mode, loaded bin
`BINSETup`	Bin mode, bin comparison enables, nominal values, bin limits
`STATIstics`	Statistical analysis: start/stop, limits, mean/max/min, Cp/CpK
`TRACe`	Discharge-curve trace scan: timing, plot range, auto-stop, scan control
`SYSTem`	Key-press beeper, UI language
`Mass MEMory`	Load/store instrument configuration files (internal storage)
Common commands	`*RST` `*TRG` `*CLS` `*IDN?` `*TST?` `*ESE` `*SRE` `*ESR?` `*STB?` `*OPC` (IEEE 488.2)

SUBSYSTEM

DISPlay

Sets and queries the instrument's active display page and the display-refresh state.

DISPlay:PAGE <page name>

Query: DISPlay:PAGE?

Function	Sets, or queries, the instrument's active display page.
Parameters	`MEASurement` — Measurement Display · `BCOmp` — Bin Display · `TSWEEP` — Trace Display · `STATistics` — Statistics Display · `MSETup` — Measurement Setup · `BinSETup` — Bin Setup · `TSETup` — Trace Setup · `SYSTem` — System Setup · `FLISt` — internal file list
Example	`DISP:PAGE MEAS` — opens <Measurement Display>
Return	<page name>`<NL^END>`

DISPlay:STATe ON | OFF

Query: DISPlay:STATe?

Function	Sets, or queries, whether the measurement display page refreshes with new readings.
Parameters	`ON` (1) · `OFF` (0)
Return	<NR1>`<NL^END>` — 0 = OFF, 1 = ON

SUBSYSTEM

FUNCtion

Sets the measurement parameter, ranges, current/voltage monitor switches, deviation-display mode, REL, short-circuit zero and power-line frequency.

`FUNCtion:IMPedance <function>`

Query: `FUNCtion:IMPedance?`

Function	Sets, or queries, the measurement parameter on <Measurement Setup>.
Parameters	`R` · `V` · `RV` (R-V) · `RQ` (R-Q) · `LQ` (L-Q) · `LR` (L-R) · `RX` (R-X) · `ZTD` (Z-θ°) · `ZTR` (Z-θr) · `CD` (C-D)
Example	`FUNC:IMP RX` — sets the parameter to R-X
Return	<function> `<NL^END>`

`FUNCtion:IMPedance:RANGe <value>`

Query: `FUNCtion:IMPedance:RANGe?`

Function	Sets, or queries, the resistance range.
Parameters	<value> = 0–5 (integer): 0 = 30 mΩ, 1 = 300 mΩ, 2 = 3 Ω, 3 = 30 Ω, 4 = 300 Ω, 5 = 3 kΩ
Example	`FUNC:IMP:RANG 0` — sets range R to 30 mΩ
Return	<value> `<NL^END>`

`FUNCtion:IMPedance:RANGe:AUTO ON | OFF`

Query: `FUNCtion:IMPedance:RANGe:AUTO?`

Function	Sets, or queries, whether the resistance range is selected automatically.
Example	`FUNC:IMP:RANG:AUTO ON` — sets range R to AUTO
Return	<NR1> `<NL^END>` — 0 or 1

`FUNCtion:VDC:RANGe <value>`

Query: `FUNCtion:VDC:RANGe?`

Function	Sets, or queries, the DC voltage range.
Parameters	<value> = 0 or 1. TH2523: 0 = 60 V, 1 = 6 V. TH2523A: 0 = 300 V, 1 = 30 V.
Example	`FUNC:VDC:RANG 0` — sets range V to 300 V (TH2523A) or 60 V (TH2523)
Return	<value> `<NL^END>`

`FUNCtion:VDC:RANGe:AUTO ON | OFF`

Query: `FUNCtion:VDC:RANGe:AUTO?`

Function	Sets, or queries, whether the DC voltage range is selected automatically.
Return	<NR1> `<NL^END>` — 0 or 1

`FUNCtion:SMONitor:VAC ON | OFF`

Query: `FUNCtion:SMONitor:VAC?`

Function	Sets, or queries, the Monitor V switch (shows the actual Vm applied to the device under test).
Return	<NR1> `<NL^END>` — 0 or 1

`FUNCtion:SMONitor:IAC ON | OFF`

Query: `FUNCtion:SMONitor:IAC?`

Function	Sets, or queries, the Monitor I switch (shows the actual Im applied to the device under test).
Return	<NR1> `<NL^END>` — 0 or 1

`FUNCtion:DEV<n>:MODE ABSolute | PERCent | OFF`

Query: `FUNCtion:DEV<n>:MODE?`

Function	Sets, or queries, the deviation-display mode for the primary (<n>=1) or secondary (<n>=2) parameter.
Parameters	`ABSolute` — absolute deviation · `PERCent` — percentage deviation · `OFF` — measured value, unmodified
Example	`FUNC:DEV1:MODE ABS` — sets primary deviation display to ABS
Return	`ABS` / `PERC` / `OFF` `<NL^END>`

`FUNCtion:DEV<n>:REFerence <value>`

Query: `FUNCtion:DEV<n>:REFerence?`

Function	Sets, or queries, the reference value used by the primary (<n>=1) or secondary (<n>=2) deviation display.
Parameters	<value>: NR1, NR2 or NR3 format
Example	`FUNC:DEV1:REF 10` — sets the primary reference to 10
Return	<NR3> `<NL^END>`

`FUNCtion:DEV<n>:REFerence:FILL`

Function	Triggers one measurement and fills the result into the primary (<n>=1) or secondary (<n>=2) reference value — equivalent to the front-panel Measure soft key.
Example	`FUNC:DEV1:REF:FILL`

`FUNCtion:REL ON | OFF`

Query: `FUNCtion:REL?`

Function	Sets, or queries, the <Measurement Display> Tools REL ON/OFF switch.
Return	<NR1> `<NL^END>` — 0 = OFF, 1 = ON

`FUNCtion:SHORT:IMM`

Function	Executes the short-circuit zero function once — equivalent to the front-panel Tools “Short” soft key. Short the test leads correctly first (see Operation Manual §2.4).
Example	`FUNC:SHORT:IMM`

`FUNCtion:SHORT ON | OFF`

Query: FUNCtion:SHORT?

Function	Sets, or queries, the <Measurement Display> Tools Short ON/OFF switch (enables the short-circuit zero correction).
Return	<NR1> `<NL^END>` — 0 = OFF, 1 = ON

`FUNCtion:ACFREQuency 50 | 60`

Query: FUNCtion:ACFREQuency?

Function	Sets, or queries, the power-line frequency used to reduce supply-frequency interference (<Measurement Setup>).
Return	50 or 60 `<NL^END>` (Hz)

APERture

Sets and queries the measurement speed and the number of averages (<Measurement Setup>).

`APERture FAST|MED|SLOW1|SLOW2,<value>`

Query: APERture?

Function	Sets the measurement speed and the number of averages in a single command.
Parameters	`FAST` — 100 readings/s · `MED` — 50 readings/s · `SLOW1` — 6.25 readings/s · `SLOW2` — 2 readings/s · <value> = 1–255, the Average setting
Example	`APER MED,55` — sets speed to MED, average to 55
Return	One line per speed: `FAST,<NR1><NL^END>` / `MED,<NR1><NL^END>` / `SLOW1,<NR1><NL^END>` / `SLOW2,<NR1><NL^END>`

SUBSYSTEM

TRIGger

Sets the trigger source, trigger delay, and sends an immediate one-shot trigger.

`TRIGger[:IMMediate]`

Function	Triggers the instrument to perform one measurement immediately.
Example	`TRIG`

`TRIGger:SOURce INTernal|EXTernal|BUS|MAN`

Query: TRIGger:SOURce?

Function	Sets, or queries, the trigger-source mode on <Measurement Setup>.
Parameters	`INTernal` — continuous internal trigger (default) · `EXTernal` — HANDLER interface trigger · `BUS` — RS232C or GPIB bus trigger (required for `*TRG`, see §Common commands) · `MAN` — front-panel `TRIG` key
Example	`TRIG:SOUR BUS`
Return	`INT` / `EXT` / `BUS` / `MAN` `<NL^END>`

`TRIGger:DELay <value> | MIN | MAX`

Query: TRIGger:DELay?

Function	Sets, or queries, the trigger delay — the time from trigger to the start of measurement.
Parameters	<value>: NR1/NR2/NR3, 1 ms resolution, 0–60 s. `MIN` = 0 s, `MAX` = 60 s. No unit suffix defaults to seconds.
Example	`TRIG:DEL 5ms` — sets trigger delay to 5 ms
Return	<NR3> `<NL^END>`

FETCh?

Reads back one measurement result from the instrument's output buffer.

`FETCh?`

Function	Returns the most recent measurement, in a format that depends on the active display page and whether the active parameter is single- or dual-parameter.
Single-parameter	(<Measurement Display> or <Bin Display>, parameter R or V) — returns <primary parameter, NR3>,<status, NR1> `<NL^END>`
Dual-parameter	(parameter R-V, R-Q, L-Q, L-R, R-X, C-D, Z-θd, Z-θr) — returns <primary, NR3>,<secondary, NR3>,<status, NR1> `<NL^END>`
Status	`-1` — no data in buffer · `0` — normal measurement data · `+1` — measurement status error
Example	`FETC?` → `+2.434457E+01,+0` (single-parameter: 24.34457 Ω, normal) · `FETC?` → `+3.02734E+03,+3.87400E-05,+0` (dual-parameter: 3.02734 kΩ, 0.00003874 V, normal)

SUBSYSTEM

COMParator

Sets the comparator on/off, the fail/pass beeper, the sorting mode and the loaded bin (<Bin Display>).

`COMParator:STATe ON | OFF` — Query: COMParator:STATe?

Function	Sets, or queries, whether the comparator function is enabled.
Return	<NR1> `<NL^END>`

`COMParator:BEEper NG | GD | OFF` — Query: COMParator:BEEper?

Function	Sets, or queries, the comparator beeper mode.
Parameters	`NG` — beep on fail · `GD` — beep on pass · `OFF` — beeper off
Return	`NG` / `GD` / `OFF` `<NL^END>`

`COMParator:CompMode BIN | COMPare` — Query: COMParator:CompMode?

Function	Sets, or queries, the sorting mode.
Parameters	`BIN` — bin-sort mode (9 bins) · `COMPare` — single-bin go/no-go mode
Return	`BIN` / `COMP` `<NL^END>`

`COMParator:LOADBinno BIN1…BIN9` — Query: COMParator:LOADBinno?

Function	Sets, or queries, which bin's limits are used as the active comparator limits — applies only in single-bin (`COMPare`) mode.
Example	`COMP:LOADB BIN1`
Return	`BIN1` … `BIN9` `<NL^END>`

BINSETup

Configures the bin-sort/comparator limits for bins 1–9 (<Bin Setup>).

`BINSETup:BinMode ABS | PERCent` — Query: BINSETup:BinMode?

Function	Sets, or queries, the bin-limit mode.
Return	<NR1> `<NL^END>` — 0 = percentage mode, 1 = absolute mode

`BINSETup:COMPareA ON | OFF` — Query: BINSETup:COMPareA?

Function	Sets, or queries, whether primary-parameter (A) bin comparison is enabled.
Return	<NR1> `<NL^END>` — 0 = OFF, 1 = ON

BINSETup:COMPareB ON | OFF

Query: BINSETup:COMPareB?

Function	Sets, or queries, whether secondary-parameter (B) bin comparison is enabled.
Return	<NR1> `<NL^END>` — 0 = OFF, 1 = ON

BINSETup:NORmalA <value>

Query: BINSETup:NORmalA?

Function	Sets, or queries, the primary-parameter (A) nominal value, used only in percentage mode.
Parameters	<value>: floating-point, −10,000 to 10,000
Example	`BINSET:NORA 15`
Return	<NR3> `<NL^END>`

BINSETup:NORmalB <value>

Query: BINSETup:NORmalB?

Function	Sets, or queries, the secondary-parameter (B) nominal value, used only in percentage mode.
Return	<NR3> `<NL^END>`

BINSETup:BINA N:<value,value>

Query: BINSETup:BINA N?

Function	Sets, or queries, the primary-parameter (A) upper and lower limit for bin N.
Parameters	N = bin number, 1–9. <value,value> = upper limit, lower limit (the lower limit must not exceed the upper limit, or the setting is rejected).
Example	`BINSET:BINA 2:15,10` — sets bin 2's primary upper limit to 15, lower limit to 10
Return	<upper, NR3>,<lower, NR3> `<NL^END>`

BINSETup:BINB N:<value,value>

Query: BINSETup:BINB N?

Function	Sets, or queries, the secondary-parameter (B) upper and lower limit for bin N, as BINA above.
Example	`BINSET:BINB 2:15,10`
Return	<upper, NR3>,<lower, NR3> `<NL^END>`

SUBSYSTEM

STATIstics

Configures and controls the statistical analysis function on <Statistics Display> (up to 30,000 readings).

STATIstics:STATe A | B

Query: STATIstics:STATe?

Function	Selects which parameter's statistics are active.
Parameters	`A` (1) — primary-parameter statistics · `B` (2) — secondary-parameter statistics
Return	`A` / `B` `<NL^END>`

STATIstics:STATUS ON | OFF

Query: STATIstics:STATUS?

Function	Sets, or queries, whether the statistics function is enabled.
Return	<NR1> `<NL^END>` — 0 = OFF, 1 = ON

STATIstics:MODE ABS | PERCent

Query: STATIstics:MODE?

Function	Sets, or queries, whether the statistics upper/lower limits are absolute values or percentages.
Return	<NR1> `<NL^END>` — 0 = percentage, 1 = absolute

STATIstics:CLEAr

Function	Clears the current statistics results.

STATIstics:START ON | OFF | TRIG

Function	`ON` (1) starts statistics collection; `OFF` (0) stops it; `TRIG` triggers one measurement into the running statistics.

STATIstics:COUNt?

Function	Queries the comparator-bucket counts for the statistics run.
Return	<HI count, NR1>,<IN count, NR1>,<LO count, NR1> `<NL^END>`
Example	`STATI:COUNt?` → `1516,9310,737`

STATIstics:MEAN?

Function	Queries the mean of the statistics run.

STATIstics:MAXimum?

Function Queries the maximum value of the statistics run, and its data-sequence number.

Return <max, NR3>,<index, NR1> `<NL^END>`

Example `STATI:MAX?` → `1.2450E+01,5`

STATIstics:MINimum?

Function Queries the minimum value of the statistics run, and its data-sequence number.

Return <min, NR3>,<index, NR1> `<NL^END>`

Example `STATI:MIN?` → `1.2350E+01,8`

STATIstics:SET <num,hi,lo>

Query: STATIstics:SET?

Function Sets, or queries, the number of readings to include and the upper/lower limits (interpretation follows the Mode setting, absolute or percentage).

Example Absolute mode: `STATI:SET 20,200,100` · Percentage mode: `STATI:SET 20,0.03,0.01`

Return <count, NR2>,<hi, NR3>,<lo, NR3> `<NL^END>`

STATIstics:NORminalA <value>

Query: STATIstics:NORminalA?

Function Sets, or queries, the primary-parameter nominal value for percentage-mode limits.

Return <NR3> `<NL^END>`

STATIstics:NORminalB <value>

Query: STATIstics:NORminalB?

Function Sets, or queries, the secondary-parameter nominal value for percentage-mode limits.

Return <NR3> `<NL^END>`

STATIstics:DEViation?

Function Queries the population standard deviation (σ) of the statistics run.

Example `STATI:DEV?` → `0.0159E-3`

STATIstics:SampleDEViation?

Function Queries the sample standard deviation (s) of the statistics run.

STATIstics:CP?

Function Queries the process-capability indices.

Return <Cp, NR2>,<CpK, NR2> `<NL^END>`

Example `STATI:CP?` → `0.86,0.14`

SUBSYSTEM

TRACe

Configures and controls the discharge-curve trace scan (<Trace Setup>, <Trace Display>).

`TRACe:TOTAL <value>`

Query: TRACe:TOTAL?

Function	Sets, or queries, the total scan duration.
Example	`TRAC:TOTAL 20`
Return	<NR2> `<NL^END>`

`TRACe:INTERval <value>`

Query: TRACe:INTERval?

Function	Sets, or queries, the time interval between scan readings.
Example	`TRAC:INTER 1.5`

`TRACe:AM <max value>,<min value>`

Query: TRACe:AM?

Function	Sets, or queries, the plotted Y-axis maximum/minimum for the primary-parameter (A) curve.
Example	`TRAC:AM 3.1600E+03,2.0000E+02`
Return	<max, NR3>,<min, NR3> `<NL^END>`

`TRACe:BM <max value>,<min value>`

Query: TRACe:BM?

Function	Sets, or queries, the plotted Y-axis maximum/minimum for the secondary-parameter (B) curve.
Example	`TRAC:BM 5.1600E+01,1.0000E+01`
Return	<max, NR3>,<min, NR3> `<NL^END>`

`TRACe:ASTOP1 / ASTOP2 / BSTOP1 / BSTOP2 OFF | <value>`

Function	Sets, or queries, the auto-stop high (STOP1) / low (STOP2) limit for the primary parameter (A) or secondary parameter (B) curve. `OFF` disables that auto-stop condition.
Example	`TRAC:ASTOP1 OFF` · `TRAC:BSTOP2 10`

`TRACe:SCAN STARt | STOP`

Query: TRACe:SCAN?

Function	Starts or stops the trace scan; active only on <Trace Display>.
Return	`STAR` (scan running) / `STOP` (not scanning) `<NL^END>`

SUBSYSTEM

SYSTem

Key-press beeper and UI language.

`SYSTem:BEEP ON | OFF` — Query: `SYSTem:BEEP?`

Function	Sets, or queries, the key-press beeper.
Example	`SYST:BEEP OFF`
Return	<NR1>`<NL^END>` — 0 = OFF, 1 = ON

`SYSTem:LANGuage EN | CH` — Query: `SYSTem:LANGuage?`

Function	Sets, or queries, the on-screen UI language.
Example	`SYST:LANG EN`
Return	`EN` / `CH` `<NL^END>`

> NOTE — EUROPEAN DEPLOYMENT
>
> The firmware's `SYSTem:LANGuage` command accepts both `EN` and `CH` (see also the Operation Manual's <System Setup> Language field, §5.1). Units shipped for the European market are factory-configured to English, and Techmize markets the TH2523/A series as an English-UI product — this command is documented here for completeness, not as a marketed bilingual-UI feature.

Mass MEMory

Loads and stores instrument-configuration files on internal storage (<Internal File> page).

`MMEMory:LOAD:STATe <value>`

Function	Loads a previously saved configuration file.
Parameters	<value>: file sequence number, 1–100 (NR1)
Example	`MMEM:LOAD:STAT 1`

`MMEMory:STORe:STATe <value>,<name>`

Function	Saves the current instrument configuration to a file.
Parameters	<value>: file sequence number, 1–20 (NR1). <name>: file name without the .STA extension, max. 15 characters.
Example	`MMEM:STOR:STAT 1,ABC`

COMMANDS

Common commands (IEEE 488.2)

Standard commands required by the IEEE 488.2 specification, available regardless of command subsystem.

*RST

Function Resets the instrument.

*TRG

Function Triggers the instrument to measure and places the result in the output buffer. `TRIGger:SOURce BUS` must be set first, or this command has no effect.

*CLS

Function Clears the standard-event status register and the service-request status register.

*IDN?

Function Returns the instrument's identification string.

Return <manufacturer>,<model>,<firmware>`<NL^END>` — e.g. manufacturer = Tonghui, model = TH2523, firmware = e.g. Version1.0.0

*TST?

Function Runs the internal self-test and reports the result.

Return `0<NL^END>` normally (no error)

*ESE <value>

Query: *ESE?

Function Sets, or queries, the standard event-status enable register.

Parameters <value>: NR1, decimal representation of the register bits (see table below)

Bit	Description
7	Power On (PON)
6	User Request (URQ)
5	Command Error (EME)
4	Execution Error (EXE)
3	Device Dependent Error (DDE)
2	Query Error (QYE)
1	Request Control (RQC)
0	Operation Complete (OPC)

This bit layout applies to both `*ESE` / `*ESE?` (event-status enable) and `*ESR?` (event-status register content).

*SRE <value>

Query: *SRE?

Function	Sets, or queries, the service-request enable register.
Parameters	<value>: NR1, decimal representation of the register bits

Bit	Description
7	Operation Status Register Summary
6	RQS (Request Service)
5	Standard Event Status Register Summary
4	MAV (Message Available)
3–0	Always 0

This bit layout applies to both `*SRE` / `*SRE?` (service-request enable) and `*STB?` (status-byte content).

*ESR?

Function	Queries the content of the standard event-status register (bit layout as on the previous page).
Return	<value, NR1>`<NL^END>`

*STB?

Function	Reads the content of the status-byte register, without clearing it.
Return	<value, NR1>`<NL^END>`

*OPC

Query: *OPC?

Function	Sets the standard event-status register's OPC bit once the instrument has completed all pending measurements. The query places ASCII `"1"` (decimal 49) in the output buffer once the preceding operation finishes.
Return	`1<NL^END>`

Related documents

- TH2523/A Series Operation Manual (Techmize)
- TH2523/A Series Datasheet (Techmize)

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