TECHMIZE by TONGHUI

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OPERATION MANUAL

TH7100 Series

Covers the TH7105, TH7110 and TH7120 single-phase, linear-amplifier programmable AC power sources: front-panel operation, manual and program-mode sequencing, system functions, protection, and remote-control interfaces.

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

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TH7100 Series Operation Manual

Single-Phase Programmable AC Power Source — TH7105 / TH7110 / TH7120

This is the English-language edition of the TH7100 series operation manual. The three models share an identical control platform, front-panel layout, display, menu structure and communication interfaces; they differ only in output power and current capacity (500 W / 1000 W / 2000 W). Where this manual gives a setting range that differs between models, each model's exact figures are listed in Chapter 7, Technical Specifications. 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 the Appendix before relying on the instrument for a measurement or production decision.

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The full SCPI and MODBUS command tables are issued as a separate companion document, TH7100 Series SCPI & MODBUS Command Reference, in line with Techmize's standard practice for command sets of this size. Chapter 6 of this manual covers the remote interfaces and protocol overview only.

CHAPTER 1

Safety & Operating Conditions

1.1 About this manual

This manual covers all three members of the TH7100 series: the TH7105 (500 W), TH7110 (1000 W) and TH7120 (2000 W) single-phase, linear-amplifier programmable AC power sources. All three share the same 0–300 V, 45.0–500 Hz output range, front-panel controls, display, menu structure and communication interfaces — only the rated power and current capacity differ. Techmize continually improves the performance, features and construction of its instruments; content, specifications and accessories described here are subject to change without notice.

> **WARNING — HAZARDOUS OUTPUT VOLTAGE**
> The TH7100 series can output up to **300 V AC** at its front and rear panel output terminals. This is a shock hazard. Never touch the output terminals, output cable or the device under test while the output is on (ON/OFF indicator lit). Disconnect the AC supply cord before opening the instrument or changing internal wiring; there are no operator-serviceable parts inside.

1.2 Power connection

Before connecting the AC supply cord:

1. Confirm that the local mains voltage and frequency are within the instrument's rated AC input range (Chapter 7).
2. Use the supplied EU power cable (Schuko, CEE 7/7); confirm the cable and plug are undamaged.
3. Connect the power cable to a properly earthed outlet. The protective-earth conductor must not be defeated or bypassed.
4. Switch the instrument on only after the output terminals are wired to the device under test, or left unconnected and safe to energize.

> **WARNING — ELECTRIC SHOCK**
> Always use a supply outlet with a protective earth contact. Never operate the instrument with the protective ground disconnected or with a two-wire (ungrounded) adapter.

1.3 Operating conditions

Item	Requirement
Operating temperature	0–40 °C
Operating humidity	20–80% RH, non-condensing
Storage temperature	−20–70 °C
Altitude	Up to 2000 m (operating)
Pollution degree	2
Safety class	Class I (protective earth)

Do not use the instrument in a dusty, vibrating, direct-sunlight or corrosive-gas environment. Keep the side and rear cooling-fan openings clear at all times: the cooling fan runs at increased speed once the internal heatsink exceeds 60 °C, and the instrument shuts down automatically if the heatsink exceeds 130 °C (over-temperature protection, §5.6).

1.4 Precautions

- Do not use the instrument if the enclosure, output cable or supply cord shows signs of damage.
- Do not exceed the current rating of the output cable and any connected fixture.
- Do not modify the instrument or attempt unauthorized internal repairs.
- Do not operate the instrument with any cover removed.
- This instrument is not designed or certified for life-support or other safety-critical applications.
- Keep the ventilation openings clear; do not block the cooling-fan airflow.
- Clean the enclosure with a soft, dry cloth only; do not use solvents.
- Avoid frequent power-cycling.
- Do not operate the instrument in a strong electromagnetic-interference or noisy electrical environment.
- If the instrument will not be used for an extended period, store it in a well-ventilated room at 5–40 °C, ≤85% RH.

CAUTION — WARM-UP

Allow at least **30 minutes** of warm-up after switch-on before relying on the instrument for a measurement or production decision.

1.5 Safety symbols

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 power-inlet ground terminal.

The on/off switch symbols (● for on, ○ for off) and an electric-shock warning triangle also appear on the front panel, next to the power switch and output terminals respectively.

1.6 CE marking

The TH7100 series carries the CE mark, as shown on the instrument's rear-panel nameplate, confirming conformity with the applicable EU directives.

1.7 RoHS compliance

The TH7100 series complies with Directive 2011/65/EU (RoHS); supporting documentation is available from Techmize on request.

1.8 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.

1.9 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, or damage from operation outside the environmental limits given in §1.3. Repair must be carried out by qualified technical personnel.

1.10 Manufacturer & EU contact

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CHAPTER 2

Overview

2.1 Front panel

USB port — for a USB drive (file save/load) or firmware update.

Power switch — switches the instrument on/off.

Trademark & model label.

DISP / SETUP / SYSTEM — select the Measurement Display, Setup (manual/program mode) or System Setup page.

V-SET / I-SET / F-SET — quick-set keys for output voltage, current limit and frequency in manual mode.

ESC — cancels a value being entered, or steps back one menu level.

ON/OFF — turns the AC output on or off.

Output jack — front-panel AC output terminals.

ENTER — confirms a value or selection.

LOCK — locks the front-panel keys against accidental changes.

TRIG — manual trigger key for surge/drop (SD) events when SD Cont is set to OFF (§5.3).

Numeric keypad — direct numeric entry, with a delete key.

Adjustment knob — scrolls through menu fields or adjusts a value; press to confirm.

Arrow & OK keys — menu navigation and selection.

Display — 4.3″ colour TFT LCD, 480 × 272 resolution.

2.2 Rear panel

Item	Description
Sync signal output	Outputs a >10 V signal while the AC output is on, for synchronizing external test equipment
Power input / output terminal	AC mains input and rear-panel AC output terminals
SIGNAL OUT	PASS / FAIL / PROCESSING relay outputs for a remote sorter or PLC (§5.7)
Remote control interface	Remote output ON/OFF, and recall of manual-mode memory groups M1–M7 (§5.8)
USB COM interface	External PC control via USB virtual COM port
Nameplate	Production date, serial number and manufacturer details
RS232 interface	Serial communication (Chapter 6)

2.3 Display layout

The 4.3″ colour TFT display (480 × 272) is divided into five regions: a main-menu area across the top; a setting-parameter area on the left, showing sequence number, set voltage, voltage mode, set frequency, start/stop phase angle; a status area (output state, voltage-mode indicator, surge/drop icon); a measurement-result area on the right, showing voltage, current, power and peak current simultaneously, each in its own colour; and a softkey area along the right edge, whose four labels change according to the active page.

2.4 Basic operation

2.4.1 Manual mode — quick start

1. Press SETUP, then the **Manual Mode** softkey, to open <Manual Mode>.
2. Set the voltage mode (AUTO or HIGH) using the direction keys and softkeys.
3. Enter the set voltage using the numeric keypad, then press ENTER.
4. Enter the set frequency in the same way.
5. Press DISP to return to the Measurement Display page, then press ON/OFF to energize the output.

2.4.2 Program mode — quick start

1. Press SETUP, then the **Program Mode** softkey, to open <Program Mode>.
2. Configure the first step's parameters (voltage, voltage mode, frequency, step connect, delay time, test time) using the direction keys and keypad.
3. Select the next step number and repeat step 2 for each additional step required.
4. Press DISP to return to the Measurement Display page, then press ON/OFF to run the sequence.

2.5 Power-on

The power switch is at the lower-left of the front panel. On switch-on, the boot screen shows the Techmize/Tonghui logo, model name and firmware version. If a startup password has been set (§3.4.1), the instrument prompts for it before continuing; the factory default ships with no password set. Allow at least 30 minutes of warm-up (§1.4) before relying on the instrument for a measurement or production decision.

CHAPTER 3

Operation & Configuration

3.1 Measurement Display page

Press DISP to open <Measurement Display>, the instrument's default working page. The setting-parameter column shows the fields below; measurement results update continuously once the output is on.

Field	Description
Memory (sequence)	Manual mode: the active memory group, 1–50. Program mode: group and step, e.g. "01–1"; an asterisk marks a step with Step Connect (§3.3.2) turned on.
Voltage	0.0–300.0 V; quick-adjustable in manual mode with V-SET and the knob.
Current limit (upper)	Model- and voltage-range-dependent, see Chapter 7; quick-adjustable in manual mode with I-SET. Set to 0 to disable the current-limit alarm (HI-A, §5.6).
Frequency	45.0–500 Hz, 0.1 Hz resolution below 100 Hz and 1 Hz resolution from 100 Hz up; quick-adjustable in manual mode with F-SET.
Start / stop phase angle	0–359° — sets the output waveform's starting and stopping phase point.

The softkey area offers **Display switch (PARA DISP)**, which cycles the measurement-result readout through voltage, current, power, peak current, power factor and crest factor; and two display-configuration softkeys, **MESA3** and **MESA4**, which choose which parameter (power, peak current, power factor or crest factor) appears in result slots 3 and 4. An **AUTO** softkey switches the voltage-mode setting between AUTO (the instrument selects high/low voltage range automatically from the set voltage) and HIGH (forces the high range, 0–300 V).

3.1.1 Status area

OFF/ON shows whether the output is energized; AUTO/HIGH shows the active voltage range; a surge/drop icon appears (and turns green once the output is on) when the surge & notch function (§5.3) is enabled; and, while the output is on, an elapsed-time or countdown-timer readout appears if a test timer has been set (§3.3.2).

A measurement timeout display (`00:00:00`) appears during an active test; if a timer value has been set, the display counts down and the output switches off automatically once it reaches zero.

3.2 Manual Mode

Press SETUP, then the **Manual Mode** softkey, to open <Manual Mode>. In manual mode the instrument behaves as a simple, single-output power source: the user sets one memory group's output parameters and energizes it directly. The page has two tabs, **Sequence Setting** and **Common Setting**.

3.2.1 Sequence Setting

Field	Description
Memory	Selects the active memory group, 1–50. Each of the 50 groups stores its own set of the fields below.
Set voltage	Output voltage, 0.0–300.0 V.
Voltage mode	AUTO (the instrument selects the high or low voltage range automatically, splitting at 150.1 V) or HIGH (forces the high range, 0–300 V).
Set frequency	45.0–500 Hz.
Current upper limit	Model-dependent (Chapter 7); set to 0 to disable. Output switches off and displays "HI-A" if the output current exceeds this value for longer than the Overcurrent Time (§3.3.2).
Current lower limit	Used with the Test Result function (§5.5) when remote control is enabled: if the output current ends up below this value, the result reports FAIL; otherwise PASS. Set to 0 to disable.
SD voltage, SD position, SD time, SD connect	Surge/drop (SD) waveform-simulation parameters — only shown when Surge/Drop is enabled under Common Setting; see §5.3.

3.2.2 Common Setting

These parameters apply to every one of the 50 memory groups (they are not stored per-group):

Field	Description
Voltage upper / lower limit	0.0–300.0 V; defines the acceptable output-voltage window used by the Test Result (pass/fail) function.
Frequency upper / lower limit	45.0–500.0 Hz; same purpose for output frequency.
Start / stop phase angle	0–359°.
Test result	None / Last / All / P-F — selects how the measurement result is displayed and recorded (§5.5).
Surge/drop	On/off — enables surge & notch waveform simulation and reveals the SD fields in Sequence Setting (§5.3).
Overcurrent fold	On/off — when on, the output voltage folds back to hold the output current at its upper limit once exceeded, instead of shutting down (§3.2.1 current-limit behaviour still applies when off).
Overcurrent time	0–5 s — how long the output current may exceed the upper limit before the output switches off; 0 switches off immediately. Inactive when Overcurrent Fold is on.
Voltage limit	Sets an allowed deviation between the set and actual output voltage; if exceeded continuously for 4 s, the output switches off under OVP or LVP protection (§5.6).
Dimmer mode	Off / leading-edge / trailing-edge — see §5.4.
Timer	Sets an output duration; the output switches off automatically once the countdown reaches zero. Leave unset for continuous output.

3.3 Program Mode

Press SETUP, then the **Program Mode** softkey, to open <Program Mode>. In program mode, each of the 50 memory groups contains up to 9 sequential steps, so a multi-stage output profile (e.g. ramping voltage, a timed test sequence, or chained test conditions) can be programmed without external control. The page has three sub-pages for Sequence Setting (spanning pages 1–3) and one for Common Setting.

3.3.1 Sequence Setting

Field	Description
Memory / Step	Selects the memory group (1–50) and step (1–9) being edited.
Sequence cycles (MemoryCycle)	0–999 — number of times this memory group repeats; 0 runs continuously until ON/OFF is pressed or the output is interrupted.
Step cycles (StepCycle)	0–999 — number of times this step repeats before advancing; 0 runs continuously.
Set voltage, voltage mode, set frequency	As in manual mode (§3.2.1), but set independently for each step.
Current upper / lower limit	As in manual mode, set independently for each step.
Step connect	On/off — whether this step automatically advances into the next step once its test conditions complete. All 9 steps of every memory group must have Step Connect on for the sequence to chain all the way through to the next memory group; see the worked example in §5.2.
Peak current upper / lower limit	Protective window on the measured peak current for this step; Chapter 7 gives each model's range.
Power upper / lower limit	0.0–model-rated power (W); 0 disables.
PF upper / lower limit	0.000–1.000; 0 disables.
Time unit	Second / Minute / Hour — units for Delay Time and Dwell Time below.
Delay time	0.1–999.9 (in the selected time unit) — how long after the step starts before the Test Result judgement is made.
Dwell time	0.1–999.9 — how long the step's output is held before the sequence advances.
Rise / fall time	0.1–999.9 s — the time for the output voltage to ramp from 0 V up to the set voltage, and from the set voltage back down to 0 V, at the start/end of the step.
SD voltage, SD position, SD time, SD connect	As in manual mode (§3.2.1), set independently for each step; see §5.3.

3.3.2 Common Setting

These parameters apply across all memory groups and steps in program mode (not stored per-group/step):

Field	Description
Voltage / Frequency upper & lower limit, Start/stop phase angle	As in manual mode's Common Setting (§3.2.2).
Test result	None / Last / All / P-F; the Hold option additionally retains the previous result on screen until explicitly cleared (§5.5).
Surge/drop, Overcurrent fold	As in manual mode's Common Setting.
Total loop count	0–999 — number of times the full chained sequence (all step-connected memory groups) repeats; 0 runs continuously.
Single step	On/off — when on, the instrument pauses after each step and waits for ON/OFF to be pressed again before continuing to the next step; when off, steps advance automatically per their programmed timing.

See §5.2 for a full worked example of how Step Connect, Step Cycle and Sequence Cycle interact to build a multi-group program sequence.

3.4 System Setup

Press SYSTEM to open <System Setup>, with three tabs: Environment, Communication and Tools.

3.4.1 Environment

Field	Options
System language	English
Password	On/off — a startup password; no password is set from the factory. Record any password you set, as a lost password requires Techmize/Tonghui support to clear.
Pass beep, Fail beep, Alarm beep, Key beep	On/off — audible feedback for a passing result, a failing result, a protection alarm, and front-panel key presses respectively.
Date / time	System clock, used for file timestamps.

3.4.2 Communication

Field	Options
Bus mode	RS232 / USBCOM — selects the active communication port (Chapter 6).
Bus protocol	SCPI / MODBUS
Baud rate	4800 / 9600 / 14400 / 19200 / 38400 / 57600 / 96000 / 115200 bit/s
Bus address	1–31 (MODBUS slave address)
Remote control	On/off — enables the rear-panel remote-control signal input (§5.8).

3.4.3 Tools

Field	Description
Last-state hold	On/off — when on, the instrument restarts with the parameters active before the last power-off; when off, it restarts with factory-default settings.
Factory reset	Restores all system and measurement settings to factory defaults.
Settings reset	Restores measurement settings only to factory defaults.
System update	Firmware update from a connected USB drive; the update file is supplied by Techmize/Tonghui.

CHAPTER 4

File Management

The TH7100 series can save the complete set of user parameters to a file, so a configuration can be recalled later without re-entering it manually. Press SYSTEM, then **Internal File** (instrument flash storage, up to 54 files) or **External File** (a connected USB drive).

File type	Extension	Loadable	Purpose
Configuration (internal)	`.STA`	Yes	Saves the instrument's parameter settings to internal flash
Configuration (external)	`.STA`	Yes	Saves the instrument's parameter settings to a USB drive
Measurement data (external)	`.CSV`	No	Saves recorded measurement results to a USB drive

4.1 Operations

- **Save** — move to an empty file slot, press Save, enter a file name on the character-selection panel, and confirm with ENTER. An unnamed file defaults to `UNNAMExx.STA`.
- **Load** — select a file and press Load to recall it into the active instrument settings.
- **Copy** — copy a file between internal storage and a USB drive (Copy to E: / Copy to I:).
- **Delete** — select a file and press Delete.

> **NOTE**
> Use a USB drive with a USB 2.0 interface, formatted as FAT16 or FAT32 (FAT32 recommended above 512 MB). Back up data on the USB drive before connecting it — Techmize/Tonghui is not responsible for USB-drive data loss. Keep the number of files and folders on the drive low for reliable performance.

CHAPTER 5

Functions

5.1 Function structure

The TH7100 series supports two output structures. In **manual mode**, 50 memory groups each store a single set of output parameters (set voltage, voltage mode, set frequency, current limits, SD parameters), with a shared set of common limits (voltage/frequency window, phase angle, test result mode, surge/drop, overcurrent fold, dimmer mode, timer) applying across all 50 groups. In **program mode**, each of the 50 memory groups instead holds up to 9 sequential steps, each with its own full parameter set (sequence cycles, step cycles, voltage/frequency/current/peak-current/power/PF settings, step connect, timing, SD parameters), again sharing one common-limits set across the whole structure.

5.2 Program mode output function

Program mode lets each step carry different output parameters, enabling complex programmable output sequences. All 9 steps of every memory group ship from the factory with Step Connect turned on, so that memory groups chain together automatically once all of a group's steps complete — this is required for one memory group's sequence to continue into the next.

Example. If only steps 1–4 of memory group 1 have Step Connect on, the sequence runs M1-1 through M1-4 and then stops, because steps 5–9 of group 1 are not connected and group 2 is therefore never reached — even if group 2's own step 1 has Step Connect on. A chained run through multiple groups' step cycles proceeds step by step, each step repeating according to its Step Cycle count, and the whole chain repeating according to the memory group's Sequence Cycle count (or, if Total Loop Count under Common Setting is set, that count governs how many times the full chained sequence repeats).

5.3 Surge & notch (SD) function

When Surge/Drop is enabled under Common Setting, the instrument can superimpose a brief surge (voltage increase) or notch/drop (voltage decrease) onto the output waveform, useful for simulating mains disturbances.

Field	Description
SD voltage	0.0–300.0 V — the surge/notch's working voltage. A value above the set output voltage produces a surge; a value below it produces a notch.
SD position	The surge/notch's starting position, as a time offset from the waveform's 0° phase point: 0–20 ms when SD Connect is on, or 0–99 ms when off.
SD time	The surge/notch's duration (pulse width): same range as SD Position.
SD connect	On: the instrument triggers a surge/notch automatically, once roughly every 100 ms, for as long as the output is on. Off: each press of **TRIG** (with the output on) fires exactly one surge/notch event.

Once enabled, a surge/notch icon appears in the status area and turns green while the output is on.

5.4 Dimmer mode function

Dimmer mode produces a leading-edge or trailing-edge phase-cut output waveform, as used by household dimmer switches, for testing dimmable loads such as LED drivers. Enabling dimmer mode automatically turns on surge/drop and SD connect. In this mode, manual-mode Sequence Setting is limited to Set Voltage, Set Frequency (45–100 Hz only) and SD Voltage; because of the waveform shape, the Measurement Display page cannot show a valid measurement result while dimmer mode is active, though the phase-cut waveform is still present at the output terminals.

5.5 Result display function

The Test Result field (Common Setting, §3.2.2 / §3.3.2) selects how the instrument reports pass/fail once a test ends:

Mode	Behaviour
None	No result is shown; the Measurement Display page simply returns to showing live readings.
Last	Shows the final measurement reading at the moment the test ended.
All	Shows every step's result in a scrollable list, each with its measurement settings and measured values; results can be saved to a USB drive from this view.
P-F	Shows a full-screen PASS or FAIL. PASS is reported when the output voltage and frequency both stayed within the upper/lower limits set under Common Setting; otherwise FAIL is reported, together with the specific out-of-range parameter (e.g. "V-HI").

P-F mode is also a prerequisite for the SIGNAL OUT PASS/FAIL relay outputs (§5.7) and for the current-lower-limit FAIL condition under remote control (§3.2.1).

5.6 Protection functions

Protection	Trip condition
HI-A (over set current)	Output current exceeds the set current-upper-limit; the Overcurrent Time setting (§3.2.2) controls how long this is tolerated before the output switches off.
OVP (overvoltage)	Output voltage continuously exceeds (set voltage + Voltage Limit) for 4 s.
LVP (undervoltage)	Output voltage continuously falls below (set voltage − Voltage Limit) for 4 s.
OCP (overcurrent)	Output current exceeds 110% of the model's rated current for 2 s continuously, stays between 100–110% for 4 s continuously, or the output is short-circuited.
OPP (overpower)	Output power stays between 100–110% of the model's rated power for 4 s continuously, or exceeds 110% for 2 s continuously.
OTP (over-temperature)	Internal heatsink temperature exceeds 130 °C (the cooling fan speeds up above 60 °C as a first-stage response, §1.3).

On any protection trip, the output switches off, the display shows the corresponding fault code, the buzzer sounds continuously (if Alarm Beep is on) and the ON/OFF indicator flashes; press ON/OFF to silence the alarm.

5.7 Remote signal output function

The rear-panel SIGNAL OUT terminal provides relay contacts for a remote sorter, PLC or indicator lamp. This function requires Test Result to be set to P-F (§5.5).

Signal	Contact	Behaviour
PASS	Pin 1–Pin 2	Closes when the result is PASS; opens again once the result display is dismissed.
FAIL	Pin 3–Pin 4	Closes when the result is FAIL; opens again once the result display is dismissed.
PROCESSING	Pin 5–Pin 6	Closes while a test is in progress; opens once the test completes.

5.8 Remote control input function

The rear-panel remote-control (SIGNAL IN) terminal is a 9-pin D-sub socket; enable it under System Setup → Communication → Remote Control (§3.4.2). It lets an external controller switch the output on/off and recall memory groups M1–M7, by shorting the pin combinations below to Pin 1 (common):

Function	Pins shorted to Pin 1
ON	Pin 3
OFF	Pin 4
M1	Pin 7
M2	Pin 6
M3	Pin 7, Pin 6
M4	Pin 5
M5	Pin 5, Pin 7
M6	Pin 5, Pin 6
M7	Pin 5, Pin 7, Pin 6

In manual mode, M1–M7 recall memory groups 1–7 directly; in program mode, the same inputs recall step 1 of memory groups 1–7 (M1-1 through M7-1).

CHAPTER 6

Remote Control & Communication Interface

The TH7100 series can be controlled remotely over RS232 or USB (virtual COM port), using either the SCPI or MODBUS protocol. SCPI and MODBUS are standard capabilities across the full TH7100 range — not exclusive to any one model. Only one interface and protocol combination is active at a time, selected under System Setup → Communication (§3.4.2). For the complete command syntax, registers and parameter ranges, see the companion *TH7100 Series SCPI & MODBUS Command Reference*.

6.1 RS232

The instrument's RS232 interface uses a 9-pin D-sub connector and implements a minimal subset of the full RS-232 standard: transmit data (TXD), receive data (RXD) and signal ground (GND) only — no hardware flow-control lines.

Signal	Pin
TXD (transmit)	3
RXD (receive)	2
GND	5

> **NOTE**
> Switch off the instrument before connecting or disconnecting the RS232 cable, to avoid an electrical transient. Do not short the output terminals together or to the enclosure.

Baud rate (4800–115200 bit/s) and protocol (SCPI or MODBUS) are configured under System Setup → Communication (§3.4.2); for MODBUS, a bus address (1–31) must also be set.

6.2 USB virtual COM port

Selecting USBCOM as the bus mode (§3.4.2) lets a host PC address the instrument over the rear-panel USB COM interface as a standard serial port, using the same SCPI or MODBUS protocol and baud-rate settings as RS232.

6.3 SCPI

The SCPI command set addresses the instrument's display (`DISPlay`), function/setting (`FUNCtion`), measurement (`FETCh`) and system (`SYSTem`) subsystems, covering every parameter described in Chapters 3 and 5 of this manual, plus status/error queries. The full command list, syntax and examples are published in the companion SCPI & MODBUS Command Reference.

6.4 MODBUS

The MODBUS protocol (RTU, over RS232 or USBCOM) exposes the same parameter set as a set of holding/input registers, addressed by the Bus Address configured under System Setup → Communication (§3.4.2). The full register map is published in the companion SCPI & MODBUS Command Reference.

CHAPTER 7

Technical Specifications

Specifications are guaranteed for the operating conditions in §1.3, after the warm-up period in §1.4, unless noted otherwise. Specifications are subject to change without notice.

Parameter	TH7105	TH7110	TH7120
AC output			
Rated power	500 W	1000 W	2000 W
Output voltage	0–300 Vac		
Output frequency	45.0–500 Hz		
Max current (RMS)	4.2 A (≤150 V) / 2.1 A (≤300 V)	8.4 A (≤150 V) / 4.2 A (≤300 V)	16.8 A (≤150 V) / 8.4 A (≤300 V)
Max current (peak)	12.6 A (≤150 V) / 6.3 A (≤300 V)	25.2 A (≤150 V) / 12.6 A (≤300 V)	50.4 A (≤150 V) / 25.2 A (≤300 V)
Phase	1Ø / 2W		
Total harmonic distortion	≤0.5% (output 80–140 V low range, or 160–280 V high range; resistive load)		
Crest factor	≥4		
Linearity adjustment rate	0.1%±10%		
Load regulation	≤0.5% (resistive load)		
Response time	<100 µs		
AC input			
Phase	1Ø		
Voltage	115 / 230 Vac ±15%		
Frequency	47–63 Hz		
Max input current (230 V)	8 A	16 A	30 A
Power factor	0.7		
Setting parameters			
Voltage	0–300 V, 0.1 V resolution, ±(0.5% of setting + 2 digits)		
Frequency	45.0–500 Hz; resolution 0.1 Hz (<100 Hz) / 1 Hz (≥100 Hz); ±0.02%		
Start / stop phase angle	0–359°, 1° resolution, ±1° (45–65 Hz)		
Measurement parameters			
Voltage	0–300 Vac, 0.1 V resolution, ±(0.5% of reading + 2 digits)		
Frequency	45.0–500 Hz, resolution as above, ±0.1 Hz		
Current	0.000–4.200 A (≤150 V) / 0.000–2.100 A (≤300 V)	0.000–8.400 A (≤150 V) / 0.000–4.200 A (≤300 V)	0.000–16.800 A (≤150 V) / 0.000–8.400 A (≤300 V)
Current res. / accuracy	0.001 A resolution, ±(0.5% of reading + 5 digits)		
Peak current	0.00–12.6 A (≤150 V) / 0.00–6.3 A (≤300 V)	0.00–25.2 A (≤150 V) / 0.00–12.6 A (≤300 V)	0.00–50.4 A (≤150 V) / 0.00–25.2 A (≤300 V)
Peak current res. / accuracy	0.01 A resolution, ±(5% of reading + 2 digits)		
Power range	0–500 W	0–1000 W	0–2000 W
Power resolution	0.1 W	0.1 W	0.1 W (0–1000 W); 1 W (1000–2000 W)
Power accuracy	±(0.6% of reading + 5 digits), at PF > 0.5		
Power factor	0.001–1.000, 0.001 resolution, displayed to 3 significant digits		

Parameter	TH7105	TH7110	TH7120
General			
Memory	Manual mode: 50 groups · Program mode: 50 groups, 9 steps/group		
Remote signal input	Output ON/OFF; recall manual-mode memory groups 1–7		
Remote signal output	PASS / FAIL / PROCESSING		
Sync signal output	>10 V signal, rear panel		
Protection	HI-A (over set current), OVP, LVP, OCP, OPP, OTP		
Display	4.3″ colour TFT LCD, 480 × 272		
Interfaces	RS232 (SCPI & MODBUS), USB COM		
Mechanical			
Dimensions (W×H×D)	430 × 88 × 600 mm	430 × 88 × 600 mm	430 × 178 × 602 mm
Weight	30 kg	40 kg	75 kg

7.1 Environmental & safety

Item	Specification
Operating temperature / humidity	0–40 °C / 20–80% RH, non-condensing
Storage temperature	−20–70 °C
Altitude / pollution degree / safety class	≤2000 m / 2 / Class I
AC supply	115 / 230 Vac ±15%, 47–63 Hz

APPENDIX

Packing, Warranty & Related Documents

A.1 Standard accessories

Each TH7100 series instrument ships with an EU power cable (Schuko, CEE 7/7). This operation manual is issued in PDF only and is not included as a printed item.

A.2 Transport & storage

Store the instrument in a dry, well-ventilated location at 5–40 °C and ≤85% RH, away from corrosive gases, for any extended period of non-use. During transport, protect the instrument from shock, vibration and moisture; the TH7120's integrated transport casters make it easier to move within a facility, but do not substitute for proper packaging in transit.

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 Related documents

- TH7100 Series Datasheet (Techmize)
- TH7100 Series SCPI & MODBUS Command Reference (Techmize, companion to this manual)

A.5 Contacting Techmize

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

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