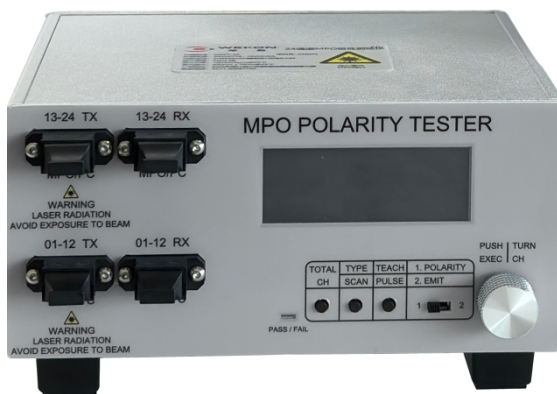




MPO Polarity Tester

Hardware Manual

Please read this manual before use.

Properly keep this manual with the instrument for future reference.

V260812

Please carefully read the following license agreement and declarations before using the instrument. The instrument described in this manual may only be used upon agreement to the following terms.

License Agreement

Any information provided by the company in this manual does not constitute a corresponding authorization for such information.

Any information provided by our company in this manual does not constitute authorization for its use. While our company strives to ensure the accuracy and applicability of the information contained in this manual, we assume no liability for its use, nor any consequential liability. Our company reserves the right to modify all or part of the content of this manual without prior notice.

Important Declarations

- (1) Read this manual carefully to gain a comprehensive understanding of the instrument before use. Pay close attention, as improper operation may damage the instrument.
- (2) Unauthorized modification of the instrument is prohibited. Our company assumes no responsibility for any damage resulting from such modifications.
- (3) This manual is intended for use by the personnel actually operating the instrument. After reading, store it in a place easily accessible to the user.
- (4) Unauthorized reproduction of part or all of this manual is prohibited.
- (5) Modifications to the content stated in this manual due to instrument improvements will be made without separate notice.
- (6) For information on instrument updates, please visit our company website or contact our business representative directly.

Instructions for Safe Use

The instrument delivers stable and reliable performance within its designated operating range. Improper manual operation may cause avoidable damage to the device. Please abide by the following requirements during operation.

- (1) The instrument must be powered by an AC-DC adapter rated for 24 VDC output; select an adapter with the maximum feasible current rating.
- (2) **WARNING:** Keep the instrument away from direct sunlight and other intense light sources.
- (3) **WARNING:** This device has a built-in laser module. Direct eye exposure to laser radiation is strictly prohibited.
- (4) Cut off power supply to the instrument immediately if any abnormal incident occurs during operation.

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1. Profile

1.1. Overview

This product is an intelligent solution designed for polarity determination and continuity testing during the production of optical fiber cables. With its one-touch automatic scanning feature, it quickly identifies the continuity status, polarity (wire sequence), alarms, and error analysis of optical fiber cables, providing a fast, accurate, and efficient solution for cable production and finished product inspection.

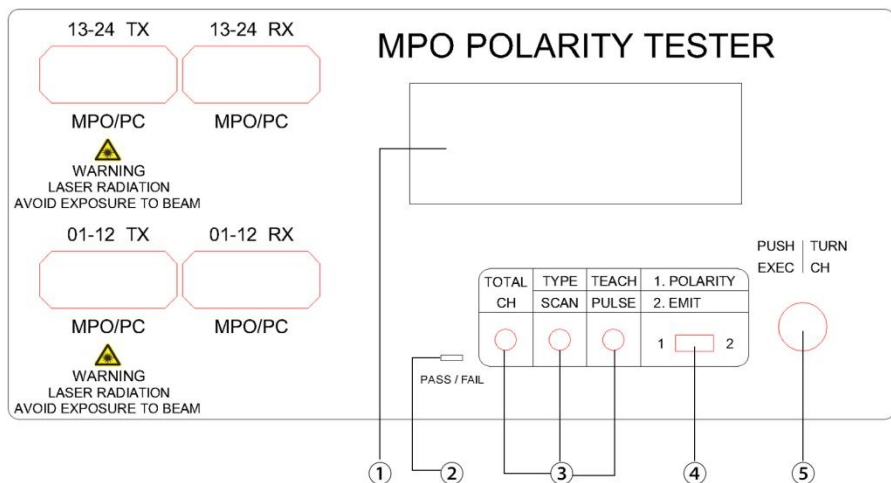
1.2. Features

- Features single-step and one-click test modes
- Features pulse, scan, and manual turn modes
- Equipped with a pedal-operated start function
- Supports standard A, B, and C polarities, and teach polarity
- Supports customizing parameters via a computer
- Supports audio playback of test results
- Supports automation applications
- Supported protocols USB、RS232、RS485 (customizable)
- Supports charging via computer or power bank.

1.3. Specification

Item	Parameters
Number of channels	12 (or 16, depending on the model) channels
Laser Source Type	650nm/10mW
Supported fiber Types	SMF:9/125, MMF: 50/125 and 62.5/125
Laser Interface Type.	SM MPO/PC 12 Cores (or 16, depending on the model)
Receiver Interface Type	SM MPO/PC 12 Cores (or 16, depending on the model)
Test Time	< 0.5 S (12 Cores)
Communication Interface	TYPE-C, Supported protocols USB、RS232、RS485
Monitor	Equipped with an LED screen (or LCD, depending on the model).
Operating Temp.	-5~+40 °C
Storage Temp.	-25~+70 °C
Power Supply	24 VDC, current: 2 A (for 24 channels).
Dimensions	165W*145D*45H mm (Per 12 channels)

2. Front and Rear Panels



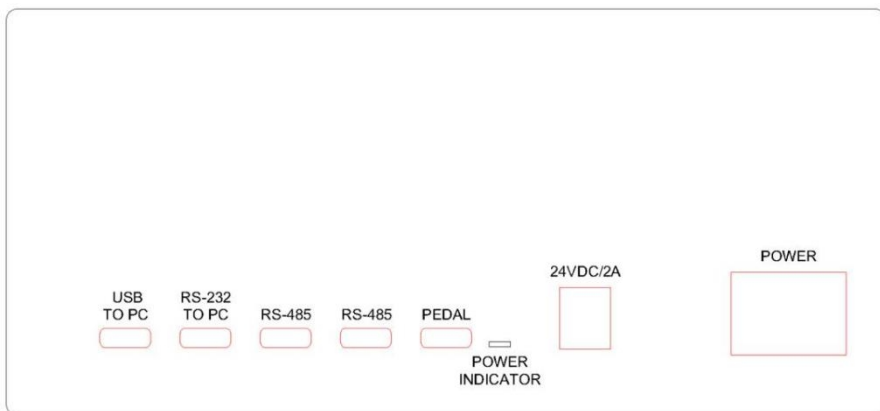
① Display Screen

② Result Indicator

③ Function Button

④ Mode Switch

⑤ Rotary Encoder (With Push)



2.1. Mode Switch

Switch Position	Operating Mode	Description
POLARITY	Polarity test mode	Shows “Channel / Type / Result / Power / Threshold”
EMIT	Laser emission mode	Shows “Channel / Emit”; center shows current laser channel

2.2. Function Button

Physical Button	Polarity Test Mode	Laser Emission Mode
Button 1	Channel	Channel
Button 2	Type	Scan
Button 3	Teach (type D only)	Pulse

The TEACH button requires a long press. In the rest of this document, “long press” means holding the button down for about 0.5 to 1 second.

2.3. Rotary Encoder

Action	Polarity Test Mode	Laser Emission Mode
Push	Start a full-board polarity scan (all channels tested in sequence)	Enter/toggle cycling emission (similar to the Scan button)
Clockwise	Next channel: emit → receive → judge polarity	Next channel and emit
Counter-clockwise	Previous channel: emit → receive → judge polarity	Previous channel and emit

2.4. Pedal Switch

Mode	Pedal Switch Action
Polarity test	Same as encoder press: start full-board scan
Laser emission	Step to the next channel and emit (same as one clockwise click)

3. Display

3.1. Title Bar

The top or bottom of the screen depends on the display orientation setting.

Polarity Test Mode:

Item	Meaning
Channel	Total channels in the current test (e.g. 12, 24)
Type	Polarity type A / B / C / D
Result	?? while testing; OK or NG when finished
Power	Current / peak sampled optical power (%)
Threshold	Power decision threshold (e.g. >5%); below threshold = no valid receive

Laser Emission Mode:

Item	Meaning
Channel	Available channel count
Emit	Mode label

3.2. Channel Matrix

Each column is one physical channel, usually shown as two rows:

Row	Meaning
Upper	Polarity mode: target or measured order; laser mode: target/status digits
Lower	Physical channel numbers (1, 2, 3...)

3.3. Large Center Number

Mode	Content
Laser emission	Current channel number (0 = all off; all-channel emit: AZ)
Multi-channel Sn or host multi-emit	XX

3.4. Indicators

Lamp	Meaning
PASS	Latest test passed
FAIL	Latest test failed

4. Polarity Test Mode

4.1. Enter the Mode

Set the mode switch to the Polarity test side. The UI shows the channel matrix, type, result field, etc.

4.2. Set Channel Count

Action: Press the channel button.

Effect: Cycles through allowed channel counts. On a 24-channel unit, a typical sequence is:

12 → 16 → 24 → 12 →....

After switching, the matrix refreshes. Channel count must be even (12, 16, 24, etc.).

4.3. Select Polarity Type

Action: Press the type button.

Effect: Cycles A → B → C → D → A.

Type	Target Order (Upper Row)	Typical Use
A	1, 2, 3, 4, ...	Straight polarity
B	..., 4, 3, 2, 1	Reversed polarity
C	2, 1, 4, 3, ...	Pair-swap polarity
D	Custom (teach or download from host)	Non-standard MPO polarity

After switching type, the upper row shows the target digits; the lower row remains physical 1 – N.

- If the previous result was NG (PolarErr set), the Type button will not continue cycling until a new test completes or the channel count is changed.

4.4. Type-D Teach

Valid only when the type is D.

Action: Long-press Teach.

Process:

- (1) Result field clears; brief matrix animation.
- (2) The instrument emits and samples channel by channel and auto-records the received order.
- (3) The sequence is stored internally (survives power-off).
- (4) Result shows OK; PASS lamp on.
- (5) If “ voice result announcement ” is enabled, a pass tone plays.

Use case: When the DUT polarity is unknown or not A/B/C, teach once from a known-good sample, then test as type D.

- Host command SXNE can also trigger teach, but without voice. Voice (if enabled) only applies to panel long-press Teach.

4.5. Full-Board Auto Scan

Action: In polarity test mode, press the encoder (or press the pedal switch).

Process:

- (1) Result shows ??.
- (2) Channels 1 through N are tested automatically: emit → receive → compare to target.
- (3) After each channel, the upper row shows the measured channel number; failures are red.
- (4) When finished, result shows OK or NG.
- (5) PASS / FAIL lamps light; if voice is enabled, pass/fail audio plays.

Rule: Every channel's measured order must match the upper-row target; any mismatch → overall NG.

4.6. Single-Step Test

Useful for checking one fiber at a time.

Action: Rotate the encoder (clockwise = next, counter-clockwise = previous).

Each click:

- (1) Turns off the previous laser, switches to the target channel, and emits.
- (2) Receives and evaluates polarity for that channel.
- (3) Updates the measured value and color in the matrix.
- (4) Updates power and result (no voice in single-step mode).

First rotate after a full-board scan: the matrix first shows -- everywhere, then fills cell by cell.

4.7. Typical Polarity Workflows

Workflow A: Standard Type A/B/C

- (1) mode switch → Polarity test.
- (2) Press Channel → match the DUT (e.g. 24).
- (3) Press Type → select A, B, or C.
- (4) Insert the DUT.
- (5) Press encoder (or pedal switch) → full-board scan.
- (6) Check OK/NG and red/green matrix cells.

Workflow B: Custom Type D (Teach)

- (1) Prepare a known-good reference connector.
- (2) Mode → Polarity test; set channel count; Type → D.
- (3) Insert reference → long-press Teach → result OK.
- (4) Swap to DUT → press encoder to scan → read OK/NG.

5. Laser Emission Mode

5.1. Enter the Mode

Set the mode switch to Laser emission. The UI is simplified; the center shows the current channel number.

5.2. Set Channel Count

Same as polarity mode: long-press Channel to cycle 12 / 16 / 24, etc.

After switching, the unit enters manual single-channel state (channel 0, lasers off). Use the encoder or Scan to select a channel.

5.3. Manual Single-Channel Emit

Action: Rotate the encoder.

Direction	Action
Clockwise	Next channel, emit immediately
Counter-clockwise	Previous channel, emit immediately

The large center number shows the current channel (1 – N).

5.4. Cycling Emission

Action: Press Scan, or press the encoder.

Effect :

- First press: Enter Scan mode; lasers light $1 \rightarrow 2 \rightarrow \dots \rightarrow N \rightarrow 1 \dots$ at the set period.
- Second press: Stop cycling, return to manual mode, lasers off (channel 0).

5.5. All-Channel Pulse On/Off

Prerequisite: Enable all-laser emission must be on in settings (enabled by default).

Action: Press Pulse.

State	Action
Not pulse on/off	Start all-channel synchronized pulse on/off
Already pulse on/off	Stop pulse on/off and turn all lasers off

- On units with more than 24 channels this function may be disabled. For continuous all-channel emit, use host command SL**E (see User Command Guide).

5.6. Typical Fiber-Tracing Workflow

- (1) mode switch → Laser emission.
- (2) Press Channel → select fiber count.
- (3) Rotate encoder → observe light channel by channel.
- (4) Or long-press Scan → auto-poll all channels.
- (5) When done, flip the switch back or long-press Scan/Pulse to stop.

6. Voice & Parameters

These parameters are written by host commands SFW...E and are saved after power-off. There is no separate settings menu on the panel.

Parameter	Example command	Description
UI language	SFWL0E / SFWL1E	0=Chinese, 1=English
Voice result announcement	SFWV1E / SFWV0E	Whether panel scan /teach announces results
Enable all-laser emission	SFWF1E / SFWF0E	Affects SL**E and pulse on/off
Encoder direction	SFWC0E / SFWC1E	0=legacy encoder, 1=new encoder (A/B swapped)
Laser timeout protection	SFWU1E / SFWU0E	Off by default; when on, long single-channel emit auto-shuts off
Pulse/Scan period	SFWP500E	Unit: ms; default 500

Voice rules (panel operations):

Operation	Voice?
Full-board polarity scan (encoder long-press / pedal switch)	Yes (if enabled)
Encoder single-step polarity	No
Type-D teach (panel long-press)	Yes (if enabled)
Host SXSE / SXNE	No

7. Communication Interfaces

7.1. USB & RS-232

Remote control via USB (virtual COM port Wekon MPO-Tester) or RS-232.

Item	Description
Interface	USB or RS-232
Settings	115200, 8-N-1, no flow control
Format	Every command starts with S and ends with E
Handshake	Send SCE; reply CE means link OK

Common remote examples:

SCE	Handshake
SXPdE	Switch to type D
SXNE	Type-D teach (no voice)
SXSE	Run full-board polarity test (no voice)
SL5E	Laser mode: channel 5
SL**E	All channels on (requires SFWF1E)
Sn1,2,3,4E	Multi-channel emit

Full commands, preconditions, and error codes: 《User Instruction Sheet》.

7.2. RS-485 Ports

The rear (or side) panel provides 2 RS-485 ports for networking with external devices, light-source boards, or line controllers.

Item	Description
Count	2× RS-485
Current status	Customization pending — full application logic is not implemented in firmware
Recommendation	Do not integrate using unpublished protocols; baud rate, frame format, addressing, and linkage logic require project-specific development or customization

To use RS-485 on a production line or with third-party equipment, contact technical support or firmware developers and confirm the customization plan before wiring and integration.

8. Safety & Maintenance

- (1) Eye Safety: Never look directly into the laser output; wear appropriate laser safety eyewear.
- (2) Timeout Protection: Enable laser timeout protection to avoid long unintended emission.
- (3) Mode switching: Stop Scan/pulse/laser before moving the mode switch.
- (4) Cleaning: Keep connector end-faces clean so power and polarity judgments remain reliable.
- (5) Channel count: Use even channel configurations only, matching the DUT MPO fiber count.
- (6) Type D: Re-teach or re-download the target order before testing samples with a different polarity sequence.

9. Troubleshooting

Symptom	Likely Cause	Suggested Action
Full-board NG, only a few red cells	Reversed or open fibers	Trace by red cell numbers; single-step with encoder
Power always very low	Dirty end-face, not seated, threshold too high	Clean connector; check threshold with SFRTE; lower with SFWT...E if needed
Type button does nothing	Previous NG not cleared	Change channel count or re-scan
Teach button does nothing	Type is not D	Long-press Type until D
Pulse button does nothing	All-laser emission not enabled	Send SFWF1E from host
Switch moved but UI wrong	Debounce not finished	Wait 1–2 s or hold switch fully seated
No host reply	Missing trailing E / wrong mode	Check S...E format; confirm operating mode
RS-485 no response	Feature not implemented	Customization pending — use USB/RS-232 or request custom development

10. Control Quick Reference

Control	Polarity test mode	Laser emission mode
mode switch	Enter/stay in this mode	Enter/stay in this mode
Btn1 Channel	Press: cycle 12/16/24...	Press: cycle channel count
Btn2 Type/Scan	Press: cycle A/B/C/D	Press: cycle emit on/off
Btn3 TEACH/PULSE	Long-press (type D): teach	Press: all-channel pulse on/off
Encoder push	Press: all channels scan	Press: all channels scan
Encoder rotate	Single channel: emit/receive/judge	Single channel: switch and emit
Pedal switch	Same as encoder long-press scan	Same as one clockwise step

Appendix: User Command Guide

Connection & Serial Settings

The instrument provides USB and RS-232 interfaces. Both use the same command format — connect via either one.

USB Connection

Item	Description
Cable	USB cable between instrument and PC
Device name	Wekon MPO-Tester
Vendor	Wekon Instruments
PC recognition	Virtual COM port
Driver	If no COM port appears on first use, check Windows Device Manager for an unrecognized device and install the driver as prompted

Steps:

- (1) Connect USB cable.
- (2) Open Device Manager → Ports (COM and LPT).
- (3) Confirm Wekon MPO-Tester (COMx) is listed.
- (4) Select that COM port in your terminal software with the settings below.

RS-232 Connection

Item	Description
Cable	RS-232 cable from instrument RS232 port to PC
PC side	Native serial port, or USB-to-RS-232 adapter
Adapter name	May appear as USB-SERIAL CH340 etc. — this is normal
Serial settings	Same as USB — see table below

Serial Settings (USB / RS-232)

Parameter	Value
Baud rate	115200
Data bits	8
Stop bits	1
Parity	None
Flow control	None

- Short form: 115200, 8-N-1, no flow control.

Communication Test

After opening the port with the settings above, send:

SCE

Expected reply:

CE

Before You Start

Command Format

Every command must start with S and end with E. Without the trailing E, neither USB nor RS-232 will execute the command (no reply).

SCE	Handshake
SL12E	Emit laser on channel 12
SL**E	All channels on (requires SFWF1E first)
SXSE	Run polarity test

- in this document means a variable middle section (e.g. Sn1,2,3E, SXT0102...E). It does not mean you may omit the final E.

Two Operating Modes

Mode	Purpose	Commands
Laser emission mode	Turn lasers on/off, pulse, scan	SL, Sn, SB, SY, SP, etc.
Polarity test mode	Polarity check, emit/receive laser	SXP, SXT, SXSE, SXL, SXRE, etc.

Use the mode switch on the instrument or follow the correct workflow. Wrong mode = no response or error reply.

Command Preconditions (Quick Reference)

Condition	Commands	If Not Met
Laser emission mode	SL, Sn, SB, SY, SP	Usually no reply
Polarity test mode	SXP, SXNE, SXT, SXSE	No reply or SnopE
Currently type D	SXNE	No reply
Enable all-laser emission flag=1 (SFWF1E)	SL**E	No reply
Battery hardware present	SVDDE	No reply
No-battery build	SVLE	Still replies, always SVL0E

- SXL, SXRE, SX?E, SXH, S?E, and parameter read/write commands are not mode-dependent (parameter validity still applies).

First-Time Setup

- (1) Complete USB or RS-232 connection and set serial parameters as above.
- (2) Send SCE to verify communication — expect reply CE.

1. Quick Command Reference

Connection & Query

Send	Action	Preconditions	Example reply
SCE	Handshake	None	CE
S?E	Query runtime settings	None	Multi-line info
SX?E	Query current status	None	SM24H24P3T5W0E

- SX?E format: SM{max}H{used}P{type}T{threshold}W{battery}E (W is always 0 when no battery).

Laser Emission

Send	Action	Preconditions	Reply / Notes
SL0E	Turn off all lasers	Laser emission mode	SL0E
SL**E	All channels on	Laser mode; enable all-laser emission flag=1 (SFWF1E)	SL**E; no reply if flag=0; panel: ** (CN) / AZ (EN)
SL{n}E	Single channel	Laser mode; $1 \leq n \leq \text{ChUsed}$, or $n=0$	SL{n}E; out of range: SLErrorE
Sn9,10,11E	Multiple channels	Laser mode; each channel in 1~ChUsed	Echo list or SnerrorE; panel shows XX
SBE	Pulse mode	Laser emission mode	SBE
SYE	Cycling emission	Laser emission mode	SYE
SP500E	Set pulse/scan period	No mode limit; n clamped to 5–5000 ms	SP500E

Examples:

SL12E	Emit on channel 12
Sn9,10,11,12E	Channels 9, 10, 11, 12 together
SP500E	Period = 500 ms
SBE	Start pulse on/off
SL0E	All off

Polarity Test

Send	Action	Preconditions	Reply / notes
SXPaE–SXPdE	Switch type A/B/C/D	Polarity test mode; lowercase a/b/c/d	SXPaE, etc.
SXNE	Type-D teach	Polarity mode; current type must be D	SXNE; no voice from host; panel long-press Teach follows voice flag
SXT0102...E	Download type-D target	Polarity mode; format below	SXT...E or error
SXSE	Run polarity test	Polarity test mode	SOKE / SNG...E or SnopE
SXL5E	Emit on one channel	$n \leq \text{max}$ channels (any mode)	SXL5E or SXLerrorE
SXRE	Laser receive check	No mode limit	SXR{n}E
SXH24E	Temp. channel count	n even and $\leq \text{max}$; $n=0$ = default	SXH{n}E; invalid: no reply

Type-D Target Format (SXT...E)

- Between SXT and E, enter lowercase hex — 2 digits per channel position.
- Example: SXT01020304E = 4 channels, order 1, 2, 3, 4.
- Success reply: SXT...E

Test Results (after SXSE)

Reply	Meaning
SOKE	Pass
SNG0102...E	Fail — hex values show measured order per channel

- Host-initiated SXSE is silent (no voice). Local button scan and panel type-D teach (long-press) follow the enable-voice flag.

2. Settings

Read Settings

Send	Reads	Preconditions	Example reply
SFRTE	Power threshold	None	SFRT5E
SFRPE	Pulse/Scan period	None	SFRP500E
SFRME	Max channel count	None	SFRM24E
SFRLE	UI language flag	None	SFRLCNE / SFRLENE
SFRUE	Enable laser timeout protection flag	None	SFRU0E / SFRU1E
SFRFE	Enable all-laser emission flag	None	SFRF1E / SFRF0E
SFRVE	Enable voice result announcement flag	None	SFRV1E / SFRV0E
SFRCE	Encoder direction flag	None	SFRC0E / SFRC1E

Write Settings

Send	Sets	Preconditions	Notes
SFWT50E	Power threshold	$n = 1-99$	Invalid: no reply
SFWP500E	Pulse/Scan period	n clamped to 5–5000 ms	Persistent
SFWM24E	Max channel count	n even, $0 < n \leq \text{limit}$	Invalid: no reply
SFWH36E	Custom channel count	n even, not in fixed list, $\leq \text{max}$; SFWH0E cancels	Invalid: no reply
SFWD0E/SFWD1E	UI display direction flag	$n = 0$ or 1	0=bottom→top, 1=top→bottom
SFWL0E/SFWL1E	UI language flag	$n = 0$ or 1	0=Chinese, 1=English
SFWU0E/SFWU1E	Enable laser timeout protection flag	$n = 0$ or 1	0=disable, 1=enable
SFWF0E/SFWF1E	Enable all-laser emission flag	$n = 0$ or 1	0=disable, 1=enable (SL**E)
SFWV0E/SFWV1E	Enable voice result announcement flag	$n = 0$ or 1	0=disable, 1=enable
SFWC0E/SFWC1E	Encoder direction flag	$n = 0$ or 1	0=legacy encoder, 1=new encoder (A/B swapped)

Standard channel counts: 12, 16, 24, 36, 48, 60, 72.

3. Status

Send	Action	Preconditions	Example reply
SVLE	Read battery level	None; no-battery build always 0	SVL85E or SVL0E
SVDDE	Read battery details	Battery hardware only	LI{i}=n%; no reply if no battery

4. Typical Workflows

Workflow 1: Check specific lasers

SCE	Confirm connection
SP500E	Set period (if pulse on/off)
SL5E	Channel 5 on
SL0E	All off
Sn1,2,3,4E	Channels 1–4 on
SL0E	All off

Workflow 2: Polarity test (preset type D)

SCE	Confirm connection
SXPdE	Switch to type D
SXT01020304...E	Send target order
SXSE	Run test
	← Wait for SOKE or SNG...E

Workflow 3: Polarity test (type-D teach)

SCE	Confirm connection
SXPdE	Switch to type D
SXNE	Start teach (or long-press on panel)
	← Reply SXNE, result shows OK
SXSE	Run test to verify

Workflow 4: Change common settings

SFRTE	Read current power threshold
SFWT50E	Set to 50%
SFRVE	Query enable voice result announcement flag
SFWV0E	Disable voice announcement (flag=0)
SFWL1E	Write UI language flag=English

5. Common Error Replies

Reply	Trigger	Meaning	Common Cause
SLerrorE	SL{n}E	Channel out of range	Wrong mode, or $n > \text{ChUsed}$
SnerrorE	Sn...E	No valid channel	Wrong mode, or all channels invalid
SXLErrorE	SXL{n}E	Channel exceeds max	$n > \text{max channels}$
SnopE	SXT/SXSE etc.	Not in polarity test mode	Switch to polarity mode
SnocE	SXT...E	Missing terminator E	Format error
Snot2E	SXT...E	Invalid type-D data	Bad hex or odd channel count
(no reply)	Any command	Missing terminator E	Must use full S...E format
(no reply)	Various	Preconditions not met	See tables above

6. Tips

- (1) Command format: Must start with S and end with E; no trailing E = no reply.
- (2) Temporary vs saved: SP and SXH are lost on power-off; SFW commands are permanent.
- (3) Enable all-laser emission: SL**E requires SFWF1E flag=1 first (SL88E is obsolete and returns SLerrorE).
- (4) Channel count must be even: e.g. 12, 24, 36.
- (5) Type-D hex is lowercase only: 0-9, a-f — not A-F.
- (6) Enable laser timeout protection: When flag=1, long laser emission auto-shuts off for safety.