# ELPA-SINE
## SINGLE PHASE AC ELECTRONIC LOAD

**POSITIVE PROBLEM SOLVING**

**While primarily aimed at AC applications this series of electronic loads can also be used for DC testing. A comprehensive feature set is provided as standard.**

When in constant current operation the user can select between sine, square and DC waveforms. Peak currents can be simulated with the crest factor mode. A power factor can be set with adjustments from unity to 0 lagging or leading. The desired wave can be recalled from the front panel or selected via an optional computer interface. A turbo mode is included as standard. This provides the ability to test currents up to double the maximum current range for up to 1 second, ideal for inrush current testing.

+ **Sine, Step & Squarewave Loading Functions**
+ **Adjustable Leading & Lagging Power Factor**
+ **High Power Configurations to 180kW**
+ **CC, CV, CP, CR & Crest Factor Mode**
+ **Last Setting Memory Function**
+ **DC to 440Hz Operation**

## CONTENTS

# STANDARD MODELS

## SELECTION TABLE

| Part Number | Max Power | Maximum Voltage | Current Range | Dimensions Outside of Cabinet [W × H × D] | Cabinet Dimensions [W × H × D] |
|---|---|---|---|---|---|
| ELPA-SINE 1875 | 1875W | 350Vrms / 500Vdc | 0 - 18.75Arms | 19" × 4U × 513mm | N/A |
| ELPA-SINE 2800-HV | 2800W | 480Vrms / 700Vdc | 0 - 18.75Arms | 19" × 4U × 513mm | N/A |
| ELPA-SINE 2800 | 2800W | 350Vrms / 500Vdc | 0 - 28Arms | 19" × 4U × 513mm | N/A |
| ELPA-SINE 3750-HV | 3750W | 480Vrms / 700Vdc | 0 - 28Arms | 19" x 4U x 513mm | N/A |
| ELPA-SINE 3750 | 3750W | 350Vrms / 500Vdc | 0 - 37.5Arms | 19" × 4U × 513mm | N/A |
| ELPA-SINE 5600 | 5600W | 350Vrms / 500Vdc | 0 - 56Arms | 19" × 8U × 513mm | 480mm × 458mm × 590mm* |
| ELPA-SINE 7500 | 7500W | 350Vrms / 500Vdc | 0 - 75Arms | 19" × 8U × 513mm | 480mm × 458mm × 590mm* |
| ELPA-SINE 11250 | 11250W | 350Vrms / 500Vdc | 0 - 112.5Arms | 19" × 12U × 513mm | 480mm × 636mm × 590mm* |
| ELPA-SINE 15000 | 15000W | 350Vrms / 500Vdc | 0 - 112.5Arms | 19" × 16U × 513mm | 480mm × 814mm × 590mm* |
| ELPA-SINE 18750 | 18750W | 350Vrms / 500Vdc | 0 - 112.5Arms | N/A | 600mm × 1283mm × 600mm* |
| ELPA-SINE 22500 | 22500W | 350Vrms / 500Vdc | 0 - 112.5Arms | N/A | 600mm × 1283mm × 600mm* |

* This model comes pre-fitted into its own wheeled cabinet.
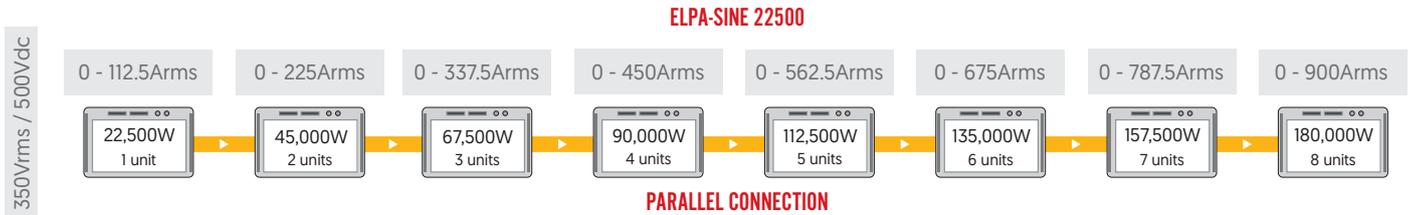
## OPERATING RANGES
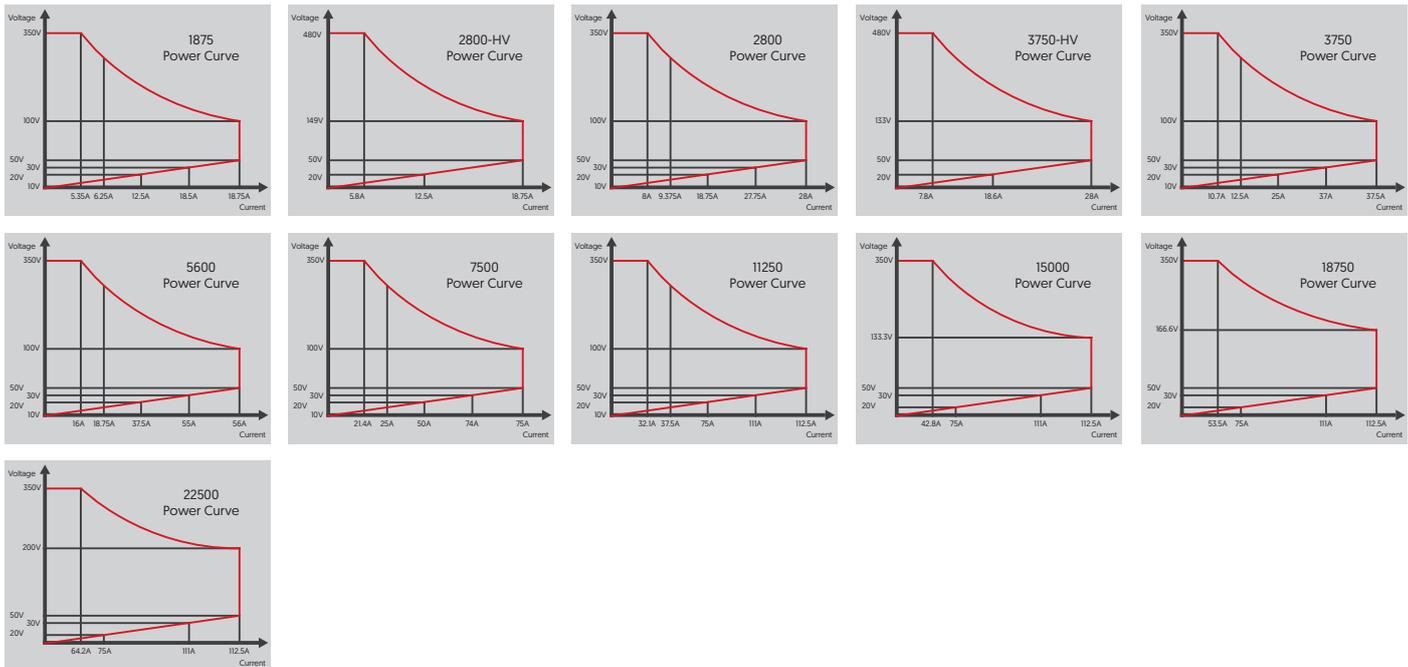


# INTERFACE OPTIONS

## OPTIONS

| CODE | DESCRIPTION |
|---|---|
| /GPIB | GPIB interface |
| /RS232 | RS232 interface |
| /USB | USB interface |
| /LAN | LAN interface |
| /AI | External analogue interface |

ETPS
ELECTRONIC TEST & POWER SYSTEMS

# MASTER-SLAVE CAPABILITY

Up to 8 ELPA-SINE systems can be arranged in single phase parallel connection. Each electronic load is able to operate independently, so that systems can be reconfigured, expanded or broken up as needs dictate.

The current is actively shared between each load. The ammeter of the master unit shows the total current that is the sum of all ammeters, The voltmeters of the slaves will show SL1 and SL2.

The modular approach is useful for test houses and research labs who regularly test different sized power devices. Individual units can be used for the day to day testing of multiple small devices, then grouped together for larger projects.

**ELPA-SINE 22500**

350Vrms / 500Vdc

| 0 - 112.5Arms | 0 - 225Arms | 0 - 337.5Arms | 0 - 450Arms | 0 - 562.5Arms | 0 - 675Arms | 0 - 787.5Arms | 0 - 900Arms |
|---|---|---|---|---|---|---|---|
| 22,500W 1 unit | 45,000W 2 units | 67,500W 3 units | 90,000W 4 units | 112,500W 5 units | 135,000W 6 units | 157,500W 7 units | 180,000W 8 units |

**PARALLEL CONNECTION**

# CABINET OPTIONS

Units can be treated to a laboratory rack or flight case integration. Having a programmable power system mounted into a flight case on castors is often advantageous, especially when several departments or test cells share the same equipment. Multiple power systems can be fitted into the same flight case.
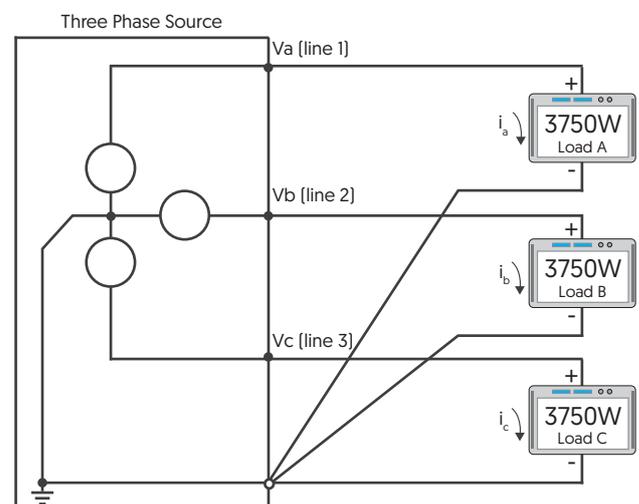
Door hangers are fitted to flight cases for convenience. Existing ETPS systems can also be retrospectively integrated into new flight cases where requested.
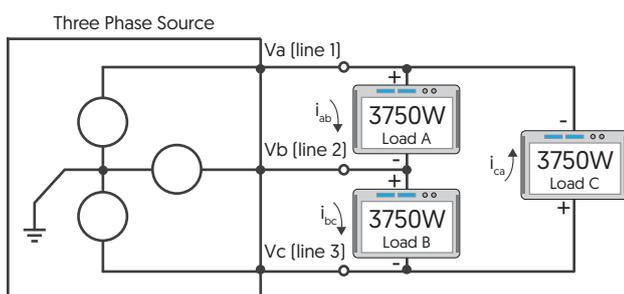
# THREE PHASE MODE

ELPA-SINE units with identical nominals can be configured in Δ or Y connections for 3 phase applications. Systems can be expanded up to 180kW per phase using the master/slave interface. The setting current value (single phase current value) will be sent to each slave unit automatically, the user does not have to set each unit.

**Y CONNECTION**

Three Phase Source

Va (line 1)

$i_a$ 3750W Load A

Vb (line 2)

$i_b$ 3750W Load B

Vc (line 3)

$i_c$ 3750W Load C

**Δ CONNECTION**

Three Phase Source

Va (line 1)

$i_{ab}$ 3750W Load A

Vb (line 2)

$i_{bc}$ 3750W Load B

Vc (line 3)

$i_{ca}$ 3750W Load C

# GENERAL SPECIFICATIONS

## STANDARD FEATURES

| | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Maximum Power | 1875W | 2800W | 2800W | 3750W | 3750W |
| Current Range | 18.75Arms / 56.25Apeak | 18.75Arms / 56.25Apeak | 28Arms / 84Apeak | 28Arms / 84Apeak | 37.5Arms / 112.5Apeak |
| Voltage Range | 50-350Vrms / 500Vdc | 50-480Vrms / 700Vdc | 50-350Vrms / 500Vdc | 50-480Vrms / 700Vdc | 50-350Vrms / 500 Vdc |
| Frequency Range | DC, 40-440Hz (CC, CP Mode), DC-440Hz (LIN, CR, CV Mode) | DC, 40-70Hz (CC,CP Mode), DC-70Hz (LIN,CR,CV Mode) | DC, 40-440Hz (CC, CP Mode), DC-440Hz (LIN, CR, CV Mode) | DC, 40-70Hz (CC,CP Mode), DC-70Hz (LIN,CR,CV Mode) | DC, 40-440Hz (CC, CP Mode), DC-440Hz (LIN, CR, CV Mode) |
| Master/Slave Functionality | Yes, up to eight identical single phase units can be connected in parallel | | | | |
| External Programming Input | F.S. / 10Vdc, Resolution 0.1V (Optional) | | | | |
| External SYNC Input | TTL | | | | |
| Vmonitor (Isolated) | ±500V / ±10V | ±700V / ±10V | ±500V / ±10V | ±700V / ±10V | ±500V / ±10V |
| Imonitor (Isolated) | ±56.25Apk / ±10Vpk | ±56.25Apk / ±10Vpk | ±84Apk / ±10Vpk | ±84Apk / ±10Vpk | ±112.5Apk / ±10Vpk |
| Interface (Option) | GPIB, RS-232, LAN, USB | | | | |
| Operating Temperature | 0 to 40°C (accuracy of the specifications provided are valid at 25°C ±5°C) | | | | |
| Current of Input Impedence | ~V*0.3 ; ~V*2.2 | ~V*0.3 ; ~V*2.2 | ~V*0.45 ; ~V*3.3 | ~V*0.4 ; ~V*2.95 | ~V*0.6 ; ~V*4.4 |
| Weight | 21.5kg | 27.5kg | 27.5kg | 33.5kg | 33.5kg |
| Start Up Loading | Yes, power on loading during inverter / UPS start up | | | | |
| Load ON/OFF Angle | 0-359 degree can be programmed for the angle of load ON and load OFF loading | | | | |
| Half Cycle & SCR/TRIAC Loading | Positive or negative half cycle, 90˚ trailing edge or leading edge current waveform can be programmed | | | | |

| | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Maximum Power | 5600W | 7500W | 11250W | 15000W | 18750W | 22500W |
| Current Range | 56 Arms / 168Apeak | 75 Arms / 225Apeak | 112.5 Arms / 337.5Apeak | 112.5Arms / 337.5Apeak | 112.5 Arms / 337.5Apeak | 112.5 Arms / 337.5Apeak |
| Voltage Range | 50-350Vrms / 500Vdc | | | | | |
| Frequency Range | DC, 40-440Hz (CC, CP Mode), DC-440Hz (LIN, CR, CV Mode) | | | | | |
| Master/Slave Functionality | Yes, up to eight identical single phase units can be connected in parallel | | | | | |
| External Programming Input (Option) | F.S. / 10Vdc, Resolution 0.1V | | | | | |
| External SYNC Input | TTL | | | | | |
| Vmonitor (Isolated) | ±500V / ±10V | | | | | |
| Imonitor (Isolated) | ±168Apk / ±10Vpk | ±225Apk / ±10Vpk | ±337.5Apk / ±10Vpk | ±337.5Apk / ±10Vpk | ±337.5Apk / ±10Vpk | ±337.5Apk / ±10Vpk |
| Interface (Option) | GPIB, RS-232, LAN, USB | | | | | |
| Operating Temperature | 0 to 40°C (accuracy of the specifications provided are valid at 25°C ±5°C) | | | | | |
| Current of Input Impedence | ~V*0.9 ; ~V*6.6 | ~V*1.2 ; ~V*8.8 | ~V*1.8 ; ~V*13.2 | ~V*2.4 ; ~V*17.6 | ~V*3.0 ; ~V*22 | ~V*3.6 ; ~V*26.4 |
| Weight | 58kg | 70kg | 105kg | 140kg | 260kg | 295kg |
| Start Up Loading | Yes, power on loading during inverter / UPS start up | | | | | |
| Load ON/OFF Angle | 0-359 degree can be programmed for the angle of load ON and load OFF loading | | | | | |
| Half Cycle & SCR/TRIAC Loading | Positive or negative half cycle, 90˚ trailing edge or leading edge current waveform can be programmed | | | | | |

# OPERATING MODES
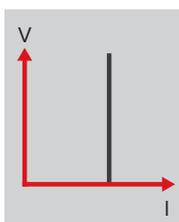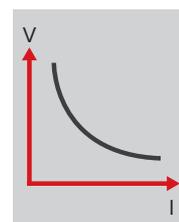


Constant Current Mode
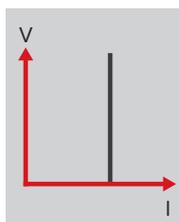
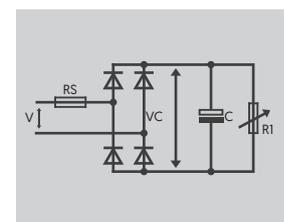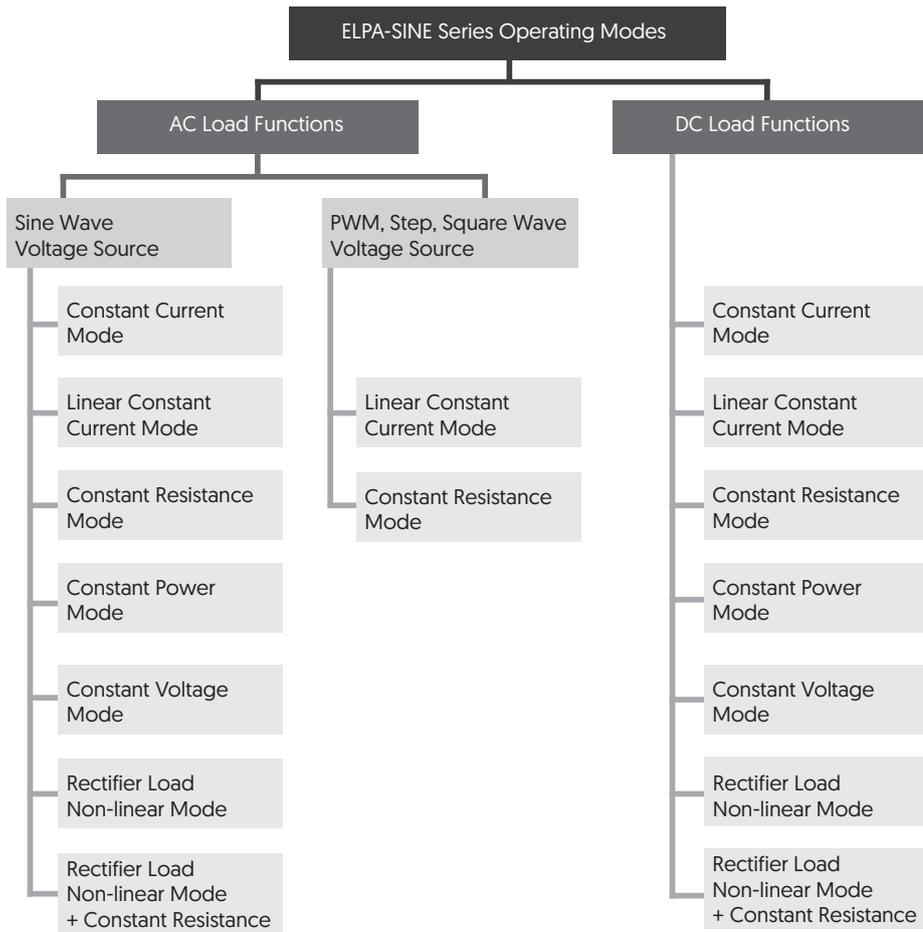Linear Constant Current Mode
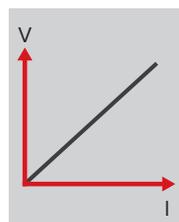
Constant Resistance Mode
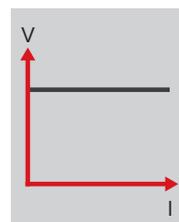
Constant Voltage Mode

Constant Power Mode

Rectifier Load Mode

## ETPS
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# OPERATING MODES

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                    ┌─────────────────────────────────┐
                    │  ELPA-SINE Series Operating Modes │
                    └─────────────────────────────────┘
              ┌──────────────────────┴──────────────────────┐
    ┌──────────────────┐                          ┌──────────────────┐
    │ AC Load Functions│                          │ DC Load Functions│
    └──────────────────┘                          └──────────────────┘
```

| Sine Wave Voltage Source | PWM, Step, Square Wave Voltage Source | | DC Load Functions |
|---|---|---|---|
| Constant Current Mode | | | Constant Current Mode |
| Linear Constant Current Mode | Linear Constant Current Mode | | Linear Constant Current Mode |
| Constant Resistance Mode | Constant Resistance Mode | | Constant Resistance Mode |
| Constant Power Mode | | | Constant Power Mode |
| Constant Voltage Mode | | | Constant Voltage Mode |
| Rectifier Load Non-linear Mode | | | Rectifier Load Non-linear Mode |
| Rectifier Load Non-linear Mode + Constant Resistance | | | Rectifier Load Non-linear Mode + Constant Resistance |

## CONSTANT CURRENT MODE FOR SINE-WAVE

| | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Range | 0-18.75A | 0-18.75A | 0-28A | 0-28A | 0-37.5A |
| Resolution | 0.3125mA/16bits | 0.3125mA/16bits | 0.5mA/16bits | 0.5mA/16bits | 0.625mA/16bits |
| Accuracy | ±(0.1% of setting + 0.2% of range) at 50/60Hz | | | | |

| | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Range | 0-56A | 0-75A | 0-112.5A | 0-112.5A | 0-112.5A | 0-112.5A |
| Resolution | 1mA/16bits | 1.25mA/16bits | 1.875mA/16bits | 1.875mA/16bits | 1.875mA/16bits | 1.875mA/16bits |
| Accuracy | ±(0.1% of setting + 0.2% of range) at 50/60Hz | | | | | |

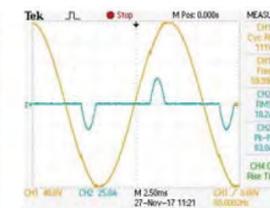In constant current mode, crest factor and power factor tests can be performed on sine wave voltage sources.
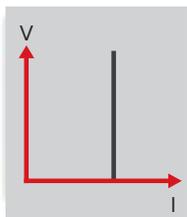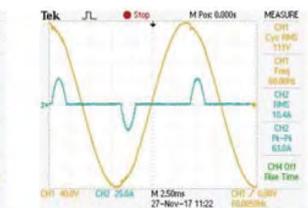
CC Mode
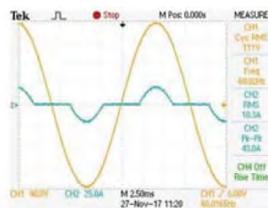
CC mode, Crest Factor = 2
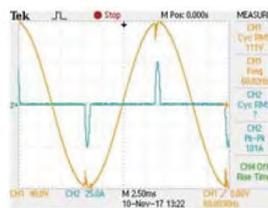
CC mode, Crest Factor = 5

CC mode, Power Factor = +0.5

CC mode, Power Factor = -0.5

# OPERATING MODES

## LINEAR CC MODE FOR SINE-WAVE, SQUARE-WAVE OR QUASI-SQUARE WAVE, PWM WAVE

|  | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Range | 0-18.75A | 0-18.75A | 0-28A | 0-28A | 0-37.5A |
| Resolution | 0.3125mA/16bits | 0.3125mA/16bits | 0.5mA/16bits | 0.5mA/16bits | 0.625mA/16bits |
| Accuracy | ±[0.1% of setting + 0.2% of range] at 50/60Hz | | | | |

|  | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Range | 0-56A | 0-75A | 0-112.5A | 0-112.5A | 0-112.5A | 0-112.5A |
| Resolution | 1mA/16bits | 1.25mA/16bits | 1.875mA/16bits | 1.875mA/16bits | 1.875mA/16bits | 1.875mA/16bits |
| Accuracy | ±[0.1% of setting + 0.2% of range] at 50/60Hz | | | | | |

In linear constant current mode, both sine wave and non-sine wave voltage sources can be tested. The examples below show the testing of a PWM inverter driver step voltage source, as well as an offline UPS sine wave switch to square wave and a square wave switch to a sine wave waveform.
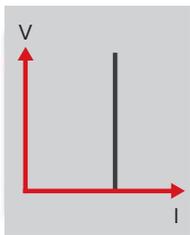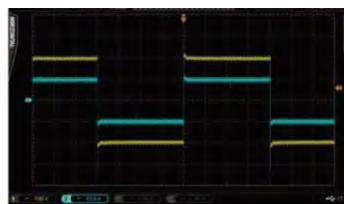


CC Mode
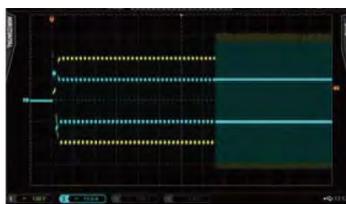


Linear CC Mode, PWM 10A 2.5Hz to 250Hz



Linear CC Mode, PWM 10A 2.5Hz



Linear CC Mode, PWM 10A 250Hz
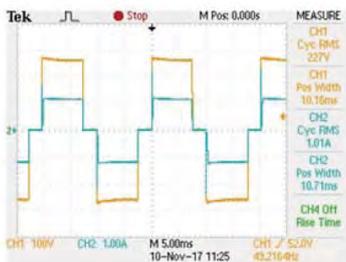


Linear CC Mode, Step 10A
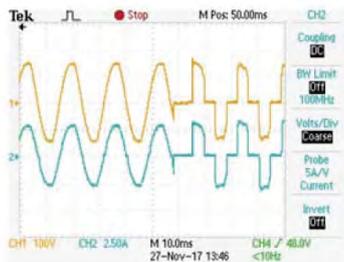


Linear CC Mode, UPS Sine to Square Waveform
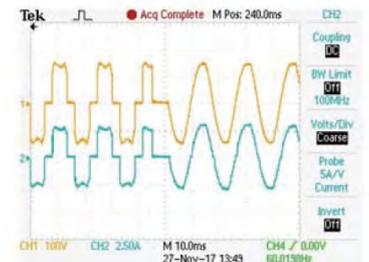


Linear CC Mode, UPS Square to Sine Waveform

## RECTIFIED LOAD SIMULATION FOR IEC62040-3 AND IEC61683 TEST SPECIFICATIONS

The rectifier load mode is fully compliant with IEC test specification requirements for the UPS, IEC 62040-3 UPS Efficiency Measurement Non-Linear and IEC 61683. The rectifier load mode uses CC + CR load mode and maintains current THD at 80%, to simulate the actual PV Inverter connected to the electronic device.
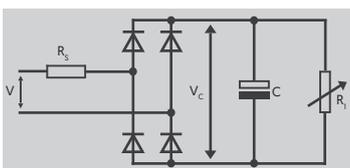


Rectifier Load Mode
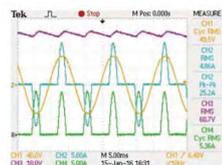


The actual V / A waveform
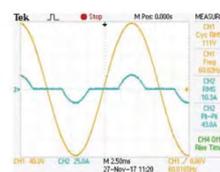


Non-Linear CC mode for UPS test
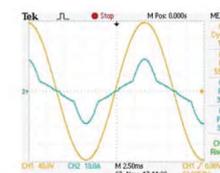


110V, 5A + 22ohm Test
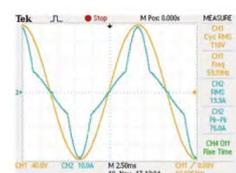
110V, 10A + 11ohm Test

PV Inverter test Non-Linear CC + Resistive mode [CC+CR]

**ETPS**
ELECTRONIC TEST & POWER SYSTEMS

# OPERATING MODES

| | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| **CONSTANT RESISTANCE MODE** | | | | | |
| Range | 3.2Ω - 64kΩ | 4.0Ω - 80kΩ | 2.0Ω - 40kΩ | 2.5Ω - 50kΩ | 1.6Ω - 32kΩ |
| Resolution [1] | 0.0052083mS / 16bits | 0.004166mS / 16bits | 0.0078137mS / 16bits | 0.006666mS / 16bits | 0.010416mS/16bits |
| Accuracy | ±0.2% of (setting + range) at 50/60Hz | | | | |
| **CONSTANT VOLTAGE MODE** | | | | | |
| Range | 50-350Vrms / 500Vdc | 50-480Vrms / 700Vdc | 50-350Vrms / 500Vdc | 50-480Vrms / 700Vdc | 50-350Vrms / 500Vdc |
| Resolution | 0.1V | 0.0125V | 0.1V | 0.0125V | 0.1V |
| Accuracy | ±(0.1% of setting +  0.1% of range) @ 50/60Hz | | | | |
| **CONSTANT POWER MODE** | | | | | |
| Range | 1875W | 2800W | 2800W | 3750W | 3750W |
| Resolution | 0.1W | | | | |
| Accuracy | ±(0.1% of setting +  0.1% of range) @ 50/60Hz | | | | |
| **CREST FACTOR (CC & CP MODE ONLY)** | | | | | |
| Range | √2 - 5 | | | | |
| Resolution | 0.1 | | | | |
| Accuracy | (0.5% / Irms) + 1%F.S. | | | | |
| **POWER FACTOR (CC & CP MODE ONLY)** | | | | | |
| Range | 0 to 1 Lagging or Leading | | | | |
| Resolution | 0.01 | | | | |
| Accuracy | 1% F.S. | | | | |

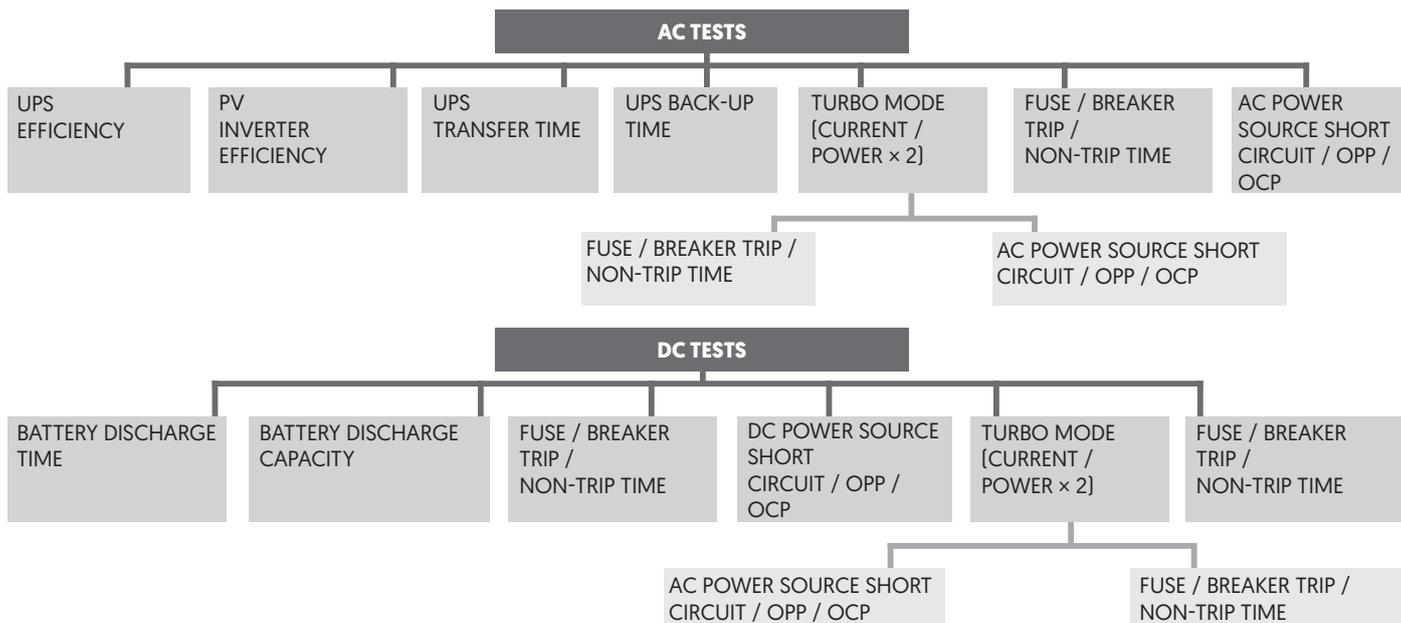| | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| **CONSTANT RESISTANCE MODE** | | | | | | |
| Range | 1Ω - 20kΩ | 0.8Ω - 16kΩ | 0.533Ω - 10.666kΩ | 0.533Ω - 10.666kΩ | 0.533Ω - 10.666kΩ | 0.533Ω - 10.666kΩ |
| Resolution [1] | 0.016666mS/16bits | 0.020832mS/16bits | 0.031248mS/16bits | 0.031248mS/16bits | 0.031248mS/16bits | 0.031248mS/16bits |
| Accuracy | ±0.2% of (setting + range) at 50/60Hz | | | | | |
| **CONSTANT VOLTAGE MODE** | | | | | | |
| Range | 50-350Vrms / 500Vdc | | | | | |
| Resolution | 0.1V | | | | | |
| Accuracy | ±(0.2% of setting + range) @ 50/60Hz | | | | | |
| **CONSTANT POWER MODE** | | | | | | |
| Range | 5600W | 7500W | 11250W | 15000W | 18750W | 22500W |
| Resolution | 0.1W | 0.1W | 1W | 1W | 1W | 1W |
| Accuracy | ±(0.2% of setting + range) @ 50/60Hz | | | | | |
| **CREST FACTOR (CC & CP MODE ONLY)** | | | | | | |
| Range | √2 - 5 | | | | | |
| Resolution | 0.1 | | | | | |
| Accuracy | (0.5% / Irms) + 1%F.S. | | | | | |
| **POWER FACTOR (CC & CP MODE ONLY)** | | | | | | |
| Range | 0 to 1 Lagging or Leading | | | | | |
| Resolution | 0.01 | | | | | |
| Accuracy | 1% F.S. | | | | | |

[1] 1 ms (millisiemens) is the unit of conductance (G). One siemens is equal to 1kΩ

# TEST MODES

**AC TESTS**

- UPS EFFICIENCY
- PV INVERTER EFFICIENCY
- UPS TRANSFER TIME
- UPS BACK-UP TIME
- TURBO MODE (CURRENT / POWER × 2)
  - FUSE / BREAKER TRIP / NON-TRIP TIME
  - AC POWER SOURCE SHORT CIRCUIT / OPP / OCP
- FUSE / BREAKER TRIP / NON-TRIP TIME
- AC POWER SOURCE SHORT CIRCUIT / OPP / OCP

**DC TESTS**

- BATTERY DISCHARGE TIME
- BATTERY DISCHARGE CAPACITY
- FUSE / BREAKER TRIP / NON-TRIP TIME
- DC POWER SOURCE SHORT CIRCUIT / OPP / OCP
- TURBO MODE (CURRENT / POWER × 2)
  - AC POWER SOURCE SHORT CIRCUIT / OPP / OCP
  - FUSE / BREAKER TRIP / NON-TRIP TIME
- FUSE / BREAKER TRIP / NON-TRIP TIME

## BATTERY DISCHARGE FUNCTION (CC,LIN,CR,CP)

| | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| UVP (VTH) | 50 - 350Vrms/500Vdc | 50 - 480Vrms / 700Vdc | 50 - 350Vrms/500Vdc | 50 - 480Vrms / 700Vdc | 50 - 350Vrms/500Vdc |
| Battery Discharge | 1-99999 Sec. (>27H) | | | | |

| | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| UVP (VTH) | 50-350Vrms/500Vdc | 50-350Vrms/500Vdc | 50-350Vrms/500Vdc | 50-350Vrms/500Vdc | 50-350Vrms/500Vdc | 50-350Vrms/500Vdc |
| Battery Discharge | 1-99999 Sec. (>27H) | | | | | |

The ELPA-SINE has three inbuilt battery discharge tests The test results can be directly displayed on the LCD display for battery AH capacity, the voltage value after discharge and the cumulative discharge time.
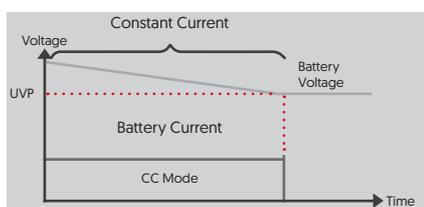
CC + UVP Battery Discharge Mode (Test 1)
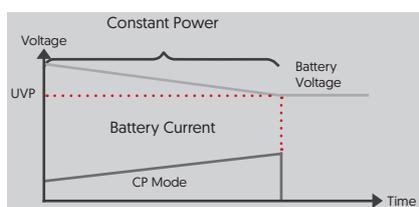
CP + UVP Battery Discharge Mode (Test 2)

Programmed Battery Discharge Time (Test 3)

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# TEST MODES

## MEASURING EFFICIENCY FOR PV SYSTEMS, POWER CONDITIONERS FOR THD 80%

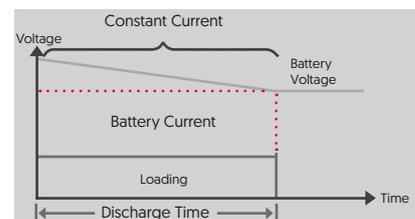|  | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Mode Type | Resistive + non-linear mode | | | | |
| Operating Frequency | Auto ; 40-440Hz | Auto ; 40-70Hz | Auto ; 40-440Hz | Auto ; 40-70Hz | Auto ; 40-440Hz |
| Current Range | 0 - 18.75A | 0 - 18.75A | 0 - 28A | 0 - 28A | 0 - 37.5A |
| Resistive Range | 3.2Ω - 64kΩ | 4.0Ω - 80kΩ | 2.0Ω - 40kΩ | 2.5Ω - 50kΩ | 1.6Ω - 32kΩ |

|  | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Mode Type | Resistive + non-linear mode | | | | | |
| Operating Frequency | Auto ; 40-440Hz | | | | | |
| Current Range | 0 - 56A | 0 - 75A | 0 - 112.5A | 0 - 112.5A | 0 - 112.5A | 0 - 112.5A |
| Resistive Range | 1Ω - 20kΩ | 0.8Ω - 16kΩ | 0.533Ω - 10.666kΩ | 0.533Ω - 10.666kΩ | 0.533Ω - 10.666kΩ | 0.533Ω - 10.666kΩ |

## UPS EFFICIENCY MEASUREMENT

|  | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Mode Type | Non-linear mode | | | | |
| Operating Frequency | Auto ; 40-440Hz | Auto ; 40-70Hz | Auto ; 40-440Hz | Auto ; 40-70Hz | Auto ; 40-440Hz |
| Current Range | 0 - 18.75A | 0 - 18.75A | 0 - 28A | 0 - 28A | 0 - 37.5A |
| PF Range | 0 to 1 | | | | |

|  | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Mode Type | Non-linear mode | | | | | |
| Operating Frequency | Auto ; 40-440Hz | | | | | |
| Current Range | 0 - 56A | 0 - 75A | 0 - 112.5A | 0 - 112.5A | 0 - 112.5A | 0 - 112.5A |
| PF Range | 0 to 1 | | | | | |

## UPS BACK-UP FUNCTION (CC,LIN,CR,CP)

|  | ALL ELPA-SINE MODELS |
|---|---|
| UVP [VTH] | Standard Models: 50 - 350Vrms / 500Vdc,  High Voltage (HV) Models: 50-480Vrms/700Vdc |
| UPS Back-Up Time | 1 - 99999 seconds [>27H] |

# TEST MODES

## UPS TRANSFER TIME

|  | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Current Range | 0 - 18.75A | 0 - 18.75A | 0 - 28A | 0 - 28A | 0 - 37.5A |
| UVP (VTH) | 2.5V |  |  |  |  |
| Time Range | 0.15ms-999.99ms |  |  |  |  |

|  | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Current Range | 0 - 56A | 0 - 75A | 0 - 112.5A | 0 - 112.5A | 0 - 112.5A | 0 - 112.5A |
| UVP (VTH) | 2.5V |  |  |  |  |  |
| Time Range | 0.15ms - 999.99ms |  |  |  |  |  |

## TURBO MODE

|  | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Maximum Current (for up to 1 second) | 37.5Arms (ON) (×2)[2], 18.75Arms (OFF) | 37.5Arms (ON) (×2)[2], 18.75Arms (OFF) | 56Arms (ON) (×2)[2], 28.0Arms (OFF) | 56Arms (ON) (×2)[2], 28Arms (OFF) | 75Arms (ON) (×2)[2], 37.5Arms (OFF) |

|  | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Maximum Current (for up to 1 second) | 112Arms (ON) (×2)[2], 56Arms (OFF) | 150Arms (ON) (×2)[2], 75Arms (OFF) | 225Arms (ON) (×2)[2], 112.5Arms (OFF) | 225Arms (ON) (×2)[2], 112.5Arms (OFF) | 225Arms (ON) (×2)[2], 112.5Arms (OFF) | 225Arms (ON) (×2)[2], 112.5Arms (OFF) |

## FUSE TEST MODE

|  | ALL ELPA-SINE MODELS |
|---|---|
| Trip / Non-Trip Time | 0.1s - 1s (ON) / 0.1s - 9999.9s (OFF) |
| Meas. Accuracy | ±0.003 seconds |
| Repeat Time | 0-255 |

## SHORT/OPP/OCP TEST FUNCTION

|  | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Short Time (TURBO ON/OFF) | 0.1s-1s / 0.1s-10s or cont. |  |  |  |  |
| OPP/OCP Step Time (TURBO ON/OFF) | 100ms, up to 10 steps / 100ms |  |  |  |  |
| OCP Istop (TURBO ON/OFF) | 37.5Arms (ON)[2], 18.75Arms (OFF) | 37.5Arms (ON)[2], 18.75Arms (OFF) | 56Arms (ON)[2], 28Arms (OFF) | 56Arms (ON)[2], 28Arms (OFF) | 75Arms (ON)[2], 37.5Arms (OFF) |
| OPP Pstop (TURBO ON/OFF) | 3750W (ON), 1875W (OFF) | 5600W (ON), 2800W (OFF) | 5600W (ON), 2800W (OFF) | 7500W (ON), 3750W (OFF) | 7500W (ON), 3750W (OFF) |

|  | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Short Time (TURBO ON/OFF) | 0.1s - 1s (ON) / 0.1s - 10s or continous (OFF) |  |  |  |  |  |
| OPP/OCP Step Time (TURBO ON/OFF) | 100ms, up to 10 steps (ON) / 100ms (OFF) |  |  |  |  |  |
| OCP Istop (TURBO ON/OFF) | 112Arms (ON), 56Arms (OFF) | 150Arms (ON), 75Arms (OFF) | 225Arms (ON), 112.5Arms (OFF) | 225Arms (ON), 112.5Arms (OFF) | 225Arms (ON), 112.5Arms (OFF) | 225Arms (ON), 112.5Arms (OFF) |
| OPP Pstop (TURBO ON/OFF) | 11200W (ON), 5600W (OFF) | 15000W (ON), 7500W (OFF) | 22500W (ON), 11250W (OFF) | 30000W (ON), 15000W (OFF) | 37500W (ON), 18750W (OFF) | 45000W (ON), 22500W (OFF) |

[2] Turbo mode for up to 2 × the Current and Power rating support Fuse, Short/OCP/OPP test function

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# TEST MODES

## PROGRAMMABLE INRUSH CURRENT SIMULATION: ISTART - ISTOP / TSEP

|  | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Istart, Inrush Start Current | 0 - 37.5A | 0 - 37.5A | 0 - 56A | 0 - 56A | 0 - 75A |
| Inrush Step Time | 0.1ms - 100ms | | | | |
| Istop, Inrush Stop Current | 0 - 18.75A | 0 - 18.75A | 0 - 28A | 0 - 28A | 0 - 37.5A |

|  | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Istart, Inrush Start Current | 0 - 112A | 0 - 150A | 0 - 225A | 0 - 225A | 0 - 225A | 0 - 225A |
| Inrush Step Time | 0.1ms - 100ms | | | | | |
| Istop, Inrush Stop Current | 0 - 56A | 0 - 75A | 0 - 112.5A | 0 - 112.5A | 0 - 112.5A | 0 - 112.5A |

## PROGRAMMABLE SURGE CURRENT SIMULATION: S1/T1 - S2/T2 - S3/T3

|  | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| S1 and S2 Current | 0 - 37.5A | 0 - 37.5A | 0 - 56A | 0 - 56A | 0 - 75A |
| T1 and T2 Time | 0.01s - 0.5s | | | | |
| S3 Current | 0 - 18.75A | 0 - 18.75A | 0 - 28A | 0 - 28A | 0 - 37.5A |
| T3 Time | 0.01s - 9.99s or continuous | | | | |

|  | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| S1 and S2 Current | 0 - 112A | 0 - 150A | 0 - 225A | 0 - 225A | 0 - 225A | 0 - 225A |
| T1 and T2 Time | 0.01s - 0.5s | | | | | |
| S3 Current | 0 - 56A | 0 - 75A | 0 - 112.5A | 0 - 112.5A | 0 - 112.5A | 0 - 112.5A |
| T3 Time | 0.01s - 9.99s or continuous | | | | | |

# MEASUREMENTS

## VOLTAGE READBACK VOLTMETER

| | ALL ELPA-SINE MODELS |
|---|---|
| Range | Standard Models: 500V, High Voltage [HV] Models: 700V |
| Resolution | Standard Models: 0.01V, High Voltage [HV] Models: 0.0125V |
| Accuracy | ±0.05% of [reading + range] |
| Parameter | Vrms,V Max/Min,+/-Vpk |

## CURRENT READBACK AMMETER

| | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Range | 9.375Arms / 18.75Arms | 9.375Arms / 18.75Arms | 14Arms / 28Arms | 14Arms / 28Arms | 18.75Arms / 37.5Arms |
| Resolution | 0.2mA / 0.4mA | 0.2mA / 0.4mA | 0.3mA / 0.6mA | 0.3mA / 0.6mA | 0.4mA / 0.8mA |
| Accuracy | ±0.05% of [reading + range] at 50/60Hz, ±0.2% of [reading + range] | | | | |
| Parameter | Irms,IMax, IMin,+/-Ipk | | | | |

| | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Range | 28Arms / 56Arms | 37.5Arms / 75Arms | 56.25Arms / 112.5Arms | 56.25Arms / 112.5Arms | 56.25Arms / 112.5Arms | 56.25Arms / 112.5Arms |
| Resolution | 0.6mA / 1.2mA | 0.8mA / 1.6mA | 1.2mA / 2.4mA | 1.2mA / 2.4mA | 1.2mA / 2.4mA | 1.2mA / 2.4mA |
| Accuracy | ±0.1% [reading + range] at 50/60Hz | | | | | |
| Parameter | Irms, IMax, IMin, +/-Ipk | | | | | |

## POWER READBACK WATTMETER

| | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Range | 1875W | 2800W | 2800W | 3750W | 3750W |
| Resolution | 0.03125W | 0.05W | 0.05W | 0.0625W | 0.0625W |
| Accuracy | ±0.1% of [reading + range] | | | | |
| VA Meter | Vrms × Arms Correspond To Vrms and Arms | | | | |

| | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Range | 5600W | 7500W | 11250W | 15000W | 18750W | 22500W |
| Resolution | 0.1W | 0.125W | 0.1875W | 0.25W | 0.3125W | 0.375W |
| Accuracy | ±0.2% of [reading + range] | | | | | |
| VA Meter | Vrms × Arms Correspond To Vrms and Arms | | | | | |

## MISCELLANEOUS

| | POWER FACTOR METER |
|---|---|
| Range | ±0.000-1.000 |
| Accuracy | ±{0.002 ± [0.001/PF] × F} |
| | **FREQUENCY METER** |
| Range | Standard Models: DC, 40-440Hz, High Voltage [HV] Models: DC, 40-70Hz |
| Accuracy | 0.1% |
| | **METERS FOR OTHER PARAMETERS** |
| Values | VA , VAR , CF_I , Ipeak , Imax. , Imin. , Vmax. , Vmin. , $I_{HD}$, $V_{HD}$, $I_{THD}$, $V_{THD}$ |

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# PROTECTION

## STANDARD FEATURES

| | ELPA-SINE 1875 | ELPA-SINE 2800-HV | ELPA-SINE 2800 | ELPA-SINE 3750-HV | ELPA-SINE 3750 |
|---|---|---|---|---|---|
| Over Power Protection | ≈1968.75Wrms or programmable | ≈2940Wrms or programmable | ≈2940Wrms or programmable | ≈3937.5Wrms or programmable | ≈3937.5Wrms or programmable |
| Over Current Protection | ≈19.687Arms or programmable | ≈19.687Arms or programmable | ≈29.4Arms or programmable | ≈29.4Arms or programmable | ≈39.375Arms or programmable |
| Over Voltage Protection | ≈367.5Vrms / 525Vdc | | | | |
| Over Temperature Protection | Yes | | | | |

| | ELPA-SINE 5600 | ELPA-SINE 7500 | ELPA-SINE 11250 | ELPA-SINE 15000 | ELPA-SINE 18750 | ELPA-SINE 22500 |
|---|---|---|---|---|---|---|
| Over Power Protection | ≈5880Wrms or programmable | ≈7875Wrms or programmable | ≈11812.5Wrms or programmable | ≈15750Wrms or programmable | ≈19687.5Wrms or programmable | ≈23625Wrms or programmable |
| Over Current Protection | ≈58.8Arms or programmable | ≈78.75Arms or programmable | ≈118.125Arms or programmable | ≈118.125Arms or programmable | ≈118.125Arms or programmable | ≈118.125Arms or programmable |
| Over Voltage Protection | ≈367.5Vrms / 525Vdc | | | | | |
| Over Temperature Protection | Yes | | | | | |

Every effort is made to ensure that the information provided within this technical summary is accurate. However, ETPS Ltd must reserve the right to make changes to the published specifications without prior notice. Where certain operating parameters are critical for your application we advise that they be confirmed at the time of order. ETPS Ltd specialises in modifying its proven platforms to suit your needs. Please contact our office if your requirement is non-standard. Please note that your actual unit may differ from those shown.
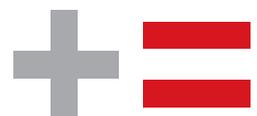
# " WE ARE POSITIVE PEOPLE "

ETPS engineer electronic power supply and testing systems. Our problem solving skills provide the spark of innovation to some of the world's leading technology brands.

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