ELECTRONIC TEST & POWER SYSTEMS

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

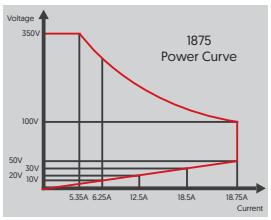
STANDARD MODELS

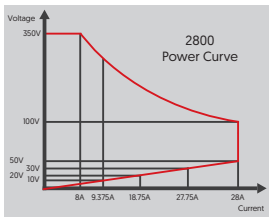
SELECTION TABLE

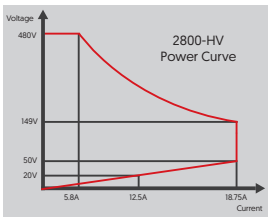
Part Number	Max Power	Maximum Voltage	Current Range	Dimensions (W × H × D)
ELPA-SINE 1875	1875W	350Vrms / 500Vdc	0 - 18.75Arms	19" × 4U × 513mm
ELPA-SINE 2800-HV	2800W	480Vrms / 700Vdc	0 - 18.75Arms	19" x 4U x 513mm
ELPA-SINE 2800	2800W	350Vrms / 500Vdc	0 - 28Arms	19" × 4U × 513mm
ELPA-SINE 3750-HV	3750W	480Vrms / 700Vdc	0 - 28Arms	19" x 4U x 513mm
ELPA-SINE 3750	3750W	350Vrms / 500Vdc	0 - 37.5Arms	19" × 4U × 513mm
ELPA-SINE 5600	5600W	350Vrms / 500Vdc	0 - 56Arms	480mm × 458mm × 590mm[1] [19" × 8U × 513mm[2]]
ELPA-SINE 7500	7500W	350Vrms / 500Vdc	0 - 75Arms	480mm × 458mm × 590mm[1] [19" × 8U × 513mm[2]]
ELPA-SINE 11250	11250W	350Vrms / 500Vdc	0 - 112.5Arms	480mm × 636mm × 590mm[1] [19" × 12U × 513mm[2]]
ELPA-SINE 15000	15000W	350Vrms / 500Vdc	0 - 112.5Arms	480mm × 814mm × 590mm[1] [19" × 16U × 513mm[2]]
ELPA-SINE 18750	18750W	350Vrms / 500Vdc	0 - 112.5Arms	600mm × 1283mm × 600mm[3]
ELPA-SINE 22500	22500W	350Vrms / 500Vdc	0 - 112.5Arms	600mm × 1283mm × 600mm[3]

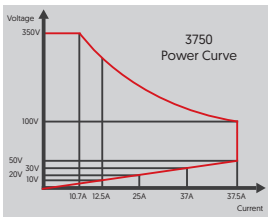
[1] This model comes pre-fitted with removable wheels attached to the base of the unit.
[2] Dimensions when wheels are removed from base of unit.
[3] This model comes pre-fitted into its own wheeled enclosure.

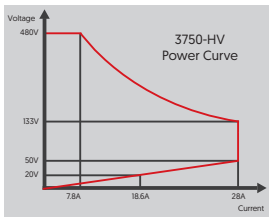
AC OPERATING RANGES

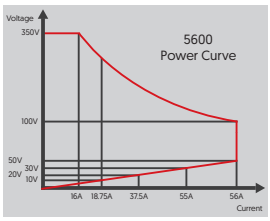


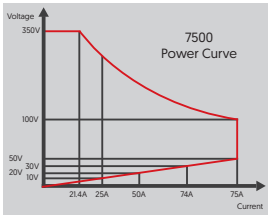


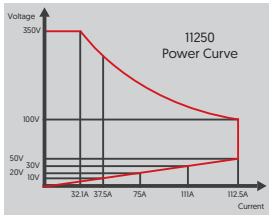


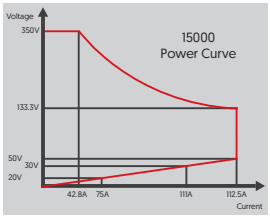


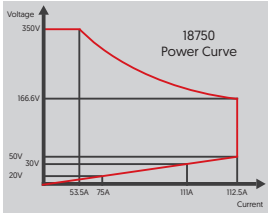


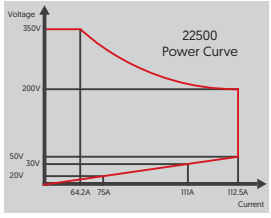












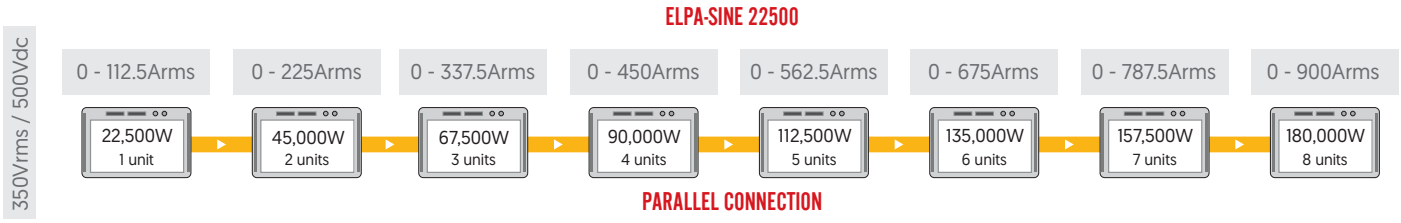
1875-3750W MODEL STANDARD CASE STYLE

5600-15000W MODEL STANDARD CASE STYLE

18750-22500W MODEL STANDARD CASE STYLE

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.

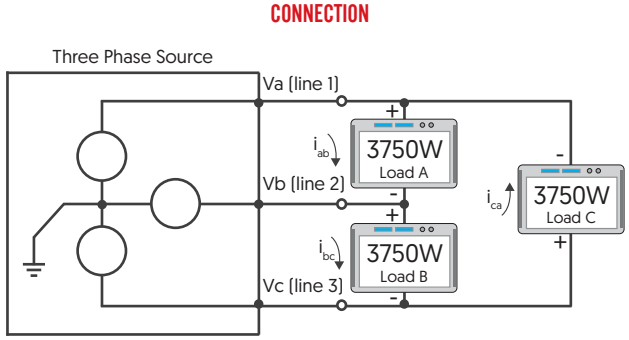


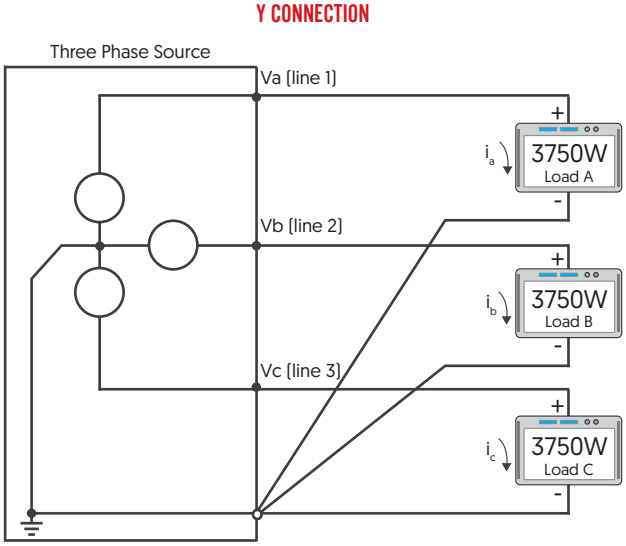
The modular approach is useful for test houses and research labs who regularly test different sized power devices. Individual units can be used for the day to day testing of multiple small devices, then grouped together for larger projects. When operating in single-phase master/slave operation, a number of test modes are not available. Please see the table below for more information.

ELPA-SINE Operating or Test Mode	Independent Unit	Single Phase Master/Slave (up to 8 Units)	Three Phase Master/Slave (1× Identical Unit Per Phase Only)	Three Phase Master/Slave (Multiple Units in M/S per Phase)
CC Mode	✔	✔	✔	✔
Linear CC Mode	✔	✔	✔	✔
CR Mode	✔	✔	✔	✔
CP Mode	✔	✔	✔	✔
CV Mode	✔	✔	✔	✔
Rectifier Load Non-Linear Mode	✔	×	✔	×
Rectifier Load Non-Linear Mode + CR	✔	×	✔	×
Recall/store	✔	×	✔	×
EXTIN	✔	×	✔	×
UPS Efficiency Test	✔	×	✔	×
PV Inverter Efficiency Test	✔	×	✔	×
UPS Transfer Time Test	✔	×	✔	×
UPS Back-Up Time Test	✔	×	✔	×
Fuse/Breaker Trip/ Non-trip Time Test	✔	×	✔	×
Power Source Short Circuit/OPP/OCP Test	✔	×	✔	×
Turbo Mode	✔	×	✔	×
Battery Discharge Test Time	✔	×	✔	×

THREE PHASE MODE

ELPA-SINE units with identical nominals can be configured in Δ or Y connections for 3 phase applications 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. Equal parallel strings of up to 8 ELPA-SINE units can be configured per phase, up to 3 × 180kW. For master/slave functionality in three phase configurations, please see the table above.





OPTIONS

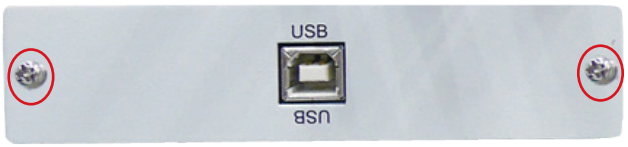
OPTIONS

CODE	DESCRIPTION
/GPIB	GPIB interface
/RS232	RS232 interface
/USB	USB interface
/LAN	LAN interface
/425V	Nominal AC sink voltage of 350Vrms models increased to 425Vrms
/LR	Integration into a 19" lab rack
/FC	Integration into a flightcase

HIGHLIGHTED OPTIONS

RETROFITABLE INTERFACE CARDS

A variety of interface options are available including RS-232, GPIB, USB and LAN. Interface cards can also be easily retro-fitted or even swapped in the field by the user, further expanding the ELPA-SINE's capability. This is possible by simply removing two screws, as highlighted to the right.



LAB RACK AND FLIGHTCASE INTEGRATIONS

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.

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 / 50-500Vdc	50-480Vrms / 50-700Vdc	50-350Vrms / 50-500Vdc	50-480Vrms / 50-700Vdc	50-350Vrms / 50-500Vdc
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 Impedance	~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 / 50-500Vdc					
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 Impedance	~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					

HIGHLIGHTED FEATURES

FRONT PANEL MEMORY

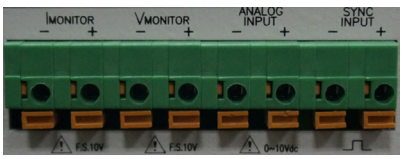
150-state memory allows quick initialisation and limit setting of the unit. Common test routines can be saved and executed at the touch of a button.

SEQUENCING FUNCTION

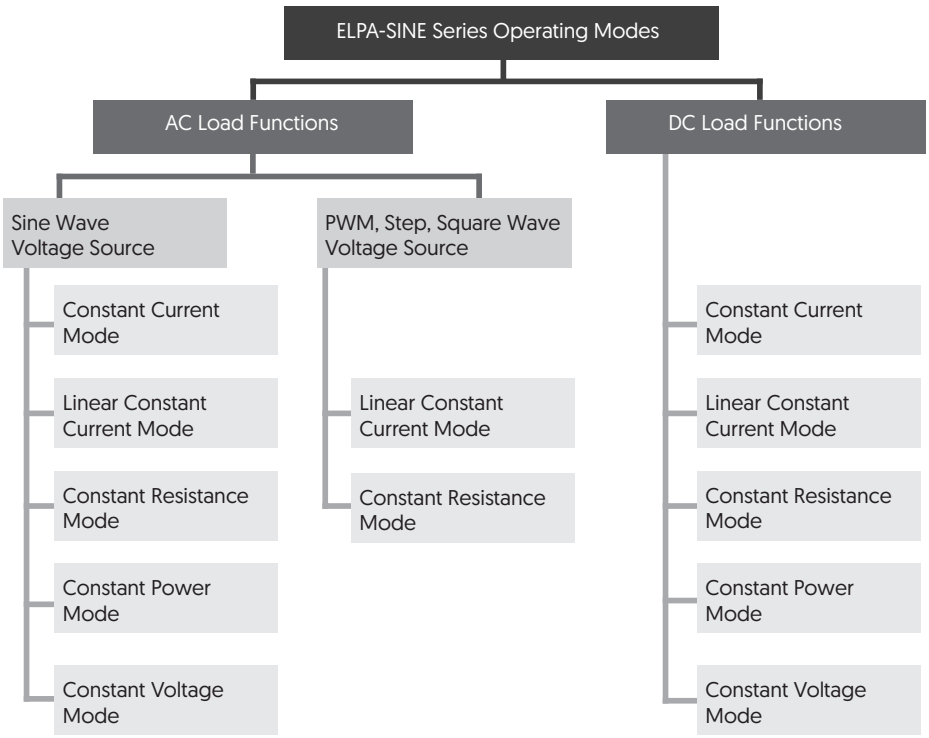
A sequencing function means that stored settings can be implemented against time, enabling the unit to carry out complex test routines without the need for a computer interface.

ANALOGUE INTERFACE

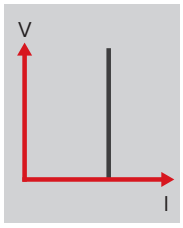
The ELPA-SINE has an analogue programming input available on the rear panel of the load. The analogue programming input enables the load module to track and load according to an external 0-10V signal applied to the analogue terminal. The ELPA-SINE will attempt to load proportionally according to the signal and the load's maximum current or power range.



OPERATING MODES

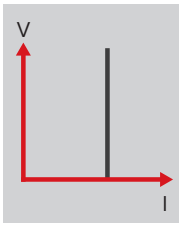


CONSTANT CURRENT MODE



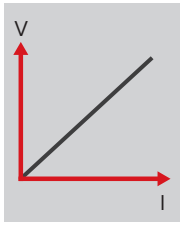
This is the most commonly used mode of operating when testing a voltage source. In this mode of operation, the load will sink a constant level of current as set by the user regardless of any voltage variations. A real time feedback loop ensures a stable current under any voltage variation of the DUT. This mode is recommended for load regulation testing, loop stability testing, battery discharge testing and any other form of voltage regulation loop testing.

LINEAR CONSTANT CURRENT MODE



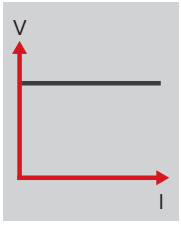
In this mode the load current input depends on the current setting, regardless of the input voltage (i.e. the current setting remains unchanged). The load input current signal will follow the input voltage signal which is useful for step or square waveform devices. The automatic gain control circuit responds almost instantly to adjust for a sudden increase in input voltage. This fast voltage transient response makes is especially suitable for non-sinusoidal AC voltage inputs such as step waveforms, square waveforms and any AC input voltage with a highly distorted waveform.

CONSTANT RESISTANCE MODE



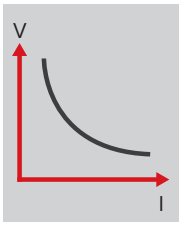
In this mode the ELPA-SINE will sink a current linearly proportional to the load input voltage in accordance with the programmed resistance setting. This mode is useful for discharge testing of battery systems used to power constant impedance loads, as the voltage decreases over time as the battery discharges resulting in reduced current sinking.

CONSTANT VOLTAGE MODE



The ELPA-SINE will attempt to sink enough current until the load input voltage reaches the programmed value. Most power sources are voltage controlled (i.e. they regulate the output voltage to a predefined voltage level). Such voltage supplies should not be tested using CV mode, as the supply voltage regulation loop will conflict with the load control loop.

CONSTANT POWER MODE



The ELPA-SINE will attempt to sink load power (load voltage × load current) in accordance with the programmed power. Constant power mode is useful for battery discharge testing as it simulates constant power drain on the battery, regardless of battery charge state.

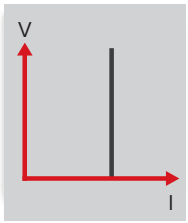
OPERATING MODES

CONSTANT CURRENT MODE FOR SINE-WAVE

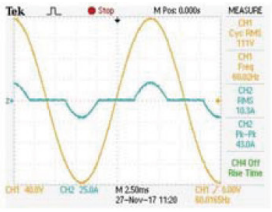
	ELPA-SINE 1875	ELPA-SINE 2800-HV	ELPA-SINE 2800	ELPA-SINE 3750-HV	ELPA-SINE 3750
Range	0-18.75A	0-18.75A	0-28A	0-28A	0-37.5A
Resolution	0.3125mA/16bits	0.3125mA/16bits	0.5mA/16bits	0.5mA/16bits	0.625mA/16bits
Accuracy	±(0.1% of setting + 0.2% of range) at 50/60Hz				

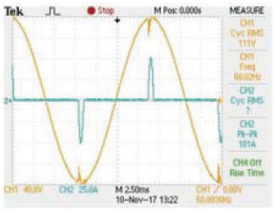
	ELPA-SINE 5600	ELPA-SINE 7500	ELPA-SINE 11250	ELPA-SINE 15000	ELPA-SINE 18750	ELPA-SINE 22500
Range	0-56A	0-75A	0-112.5A	0-112.5A	0-112.5A	0-112.5A
Resolution	1mA/16bits	1.25mA/16bits	1.875mA/16bits	1.875mA/16bits	1.875mA/16bits	1.875mA/16bits
Accuracy	±(0.1% of setting + 0.2% of range) at 50/60Hz					

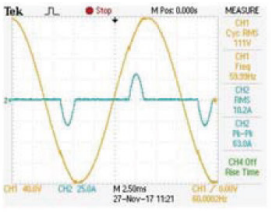
In constant current mode, crest factor and power factor tests can be performed on sine wave voltage sources.

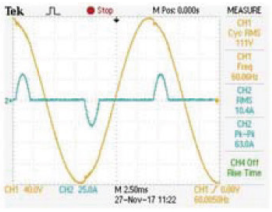


CC Mode


CC mode,
Crest Factor = 2


CC mode,
Crest Factor = 5


CC mode,
Power Factor = +0.5

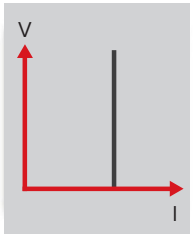

CC mode,
Power Factor = -0.5

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

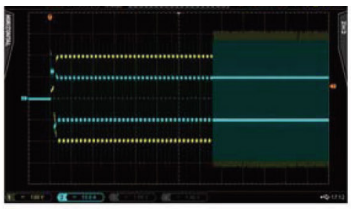
	ELPA-SINE 1875	ELPA-SINE 2800-HV	ELPA-SINE 2800	ELPA-SINE 3750-HV	ELPA-SINE 3750
Range	0-18.75A	0-18.75A	0-28A	0-28A	0-37.5A
Resolution	0.3125mA/16bits	0.3125mA/16bits	0.5mA/16bits	0.5mA/16bits	0.625mA/16bits
Accuracy	±(0.1% of setting + 0.2% of range) at 50/60Hz				

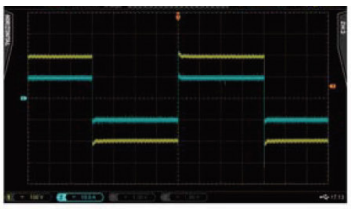
	ELPA-SINE 5600	ELPA-SINE 7500	ELPA-SINE 11250	ELPA-SINE 15000	ELPA-SINE 18750	ELPA-SINE 22500
Range	0-56A	0-75A	0-112.5A	0-112.5A	0-112.5A	0-112.5A
Resolution	1mA/16bits	1.25mA/16bits	1.875mA/16bits	1.875mA/16bits	1.875mA/16bits	1.875mA/16bits
Accuracy	±(0.1% of setting + 0.2% of range) at 50/60Hz					

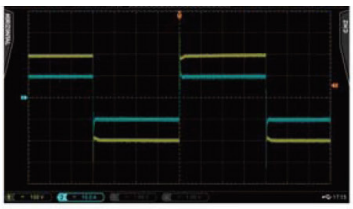
In linear constant current mode, both sine wave and non-sine wave voltage sources can be tested. The examples below show the testing of a PWM inverter driver step voltage source, as well as an offline UPS sine wave switch to square wave and a square wave switch to a sine wave waveform.

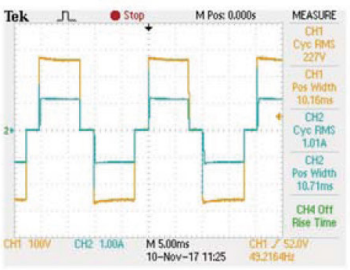


CC Mode

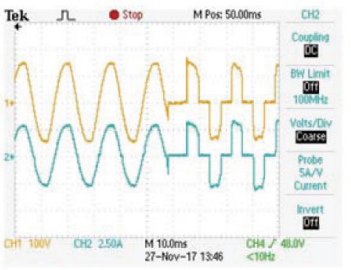

Linear CC Mode, PWM 10A 2.5Hz to 250Hz


Linear CC Mode, PWM 10A 2.5Hz

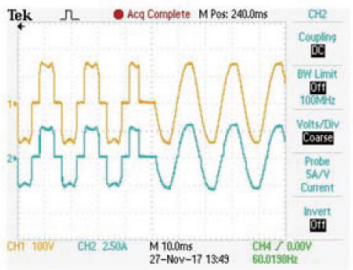

Linear CC Mode, PWM 10A 250Hz



Linear CC Mode, Step 10A



Linear CC Mode, UPS Sine to Square Waveform



Linear CC Mode, UPS Square to Sine Waveform

OPERATING MODES

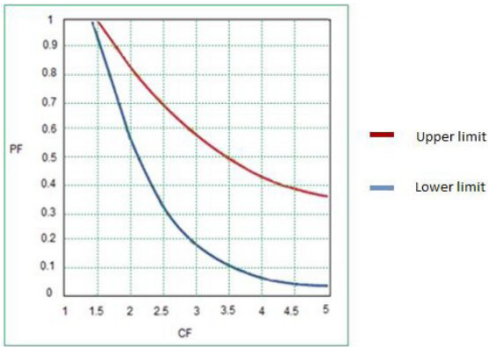
	ELPA-SINE 1875	ELPA-SINE 2800-HV	ELPA-SINE 2800	ELPA-SINE 3750-HV	ELPA-SINE 3750
	CONSTANT RESISTANCE MODE				
Range	3.2Ω - 64kΩ	4.0Ω - 80kΩ	2.0Ω - 40kΩ	2.5Ω - 50kΩ	1.6Ω - 32kΩ
Resolution [1]	0.0052083mS / 16bits	0.004166mS / 16bits	0.0078137mS / 16bits	0.006666mS / 16bits	0.010416mS/16bits
Accuracy	±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 (see page 9)				
Resolution	0.1				
Accuracy	(0.5% / Irms) + 1%F.S.				
	POWER FACTOR (CC & CP MODE ONLY)				
Range	0 to 1 Lagging or Leading (see page 9)				
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 (see page 9)					
Resolution	0.1					
Accuracy	(0.5% / Irms) + 1%F.S.					
	POWER FACTOR (CC & CP MODE ONLY)					
Range	0 to 1 Lagging or Leading (see page 9)					
Resolution	0.01					
Accuracy	1% F.S.					

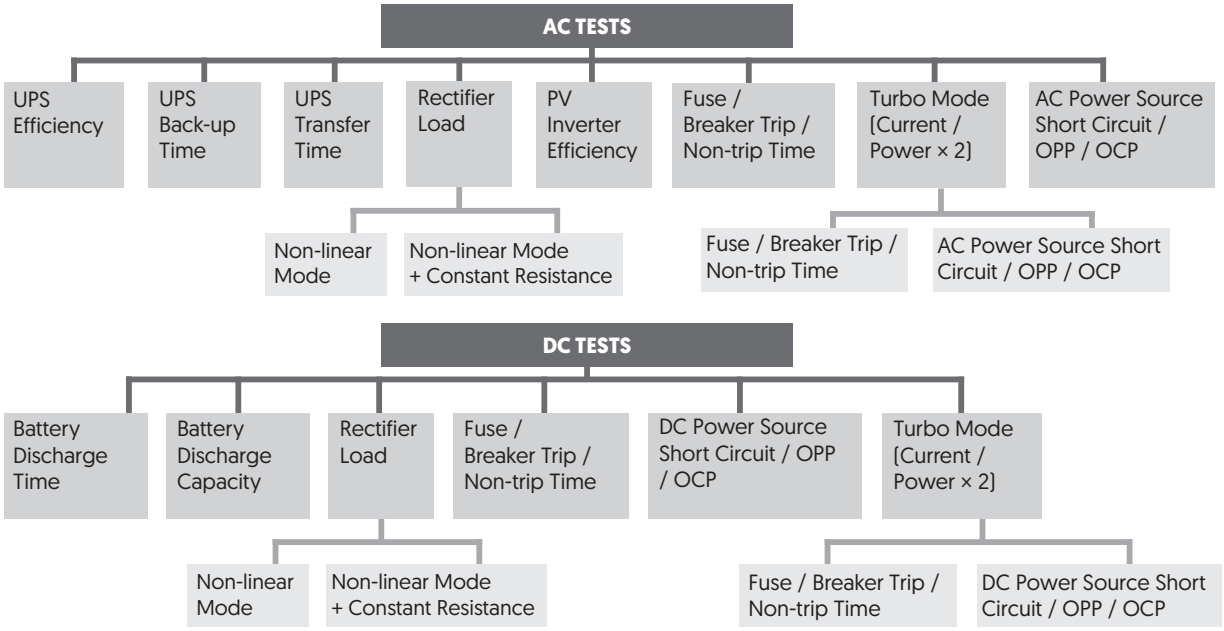
[1] 1 mS (millisiemens) is the unit of conductance (G). One siemens is equal to 1kΩ

CREST FACTOR AND POWER FACTOR RELATIONSHIP

The ELPA-SINE's power factor (PF) range has a restriction in Crest Factor (CF) range and vice versa. Please see the Power Factor vs Crest Factor graph below:



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

TEST MODES

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 (ON) / 0.1s - 10s or continuous (OFF)				
OPP/OCP Step Time (TURBO ON/OFF)	100ms, up to 10 steps (ON) / 100ms (OFF)				
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 continuous (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)

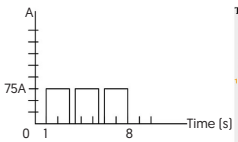
[2] Turbo mode for up to 2 × the Current and Power rating support Fuse, Short/OCP/OPP test function

HIGHLIGHTED FEATURE

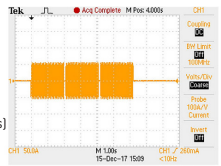
CURRENT PROTECTION COMPONENT TEST

The ELPA-SINE provides a special fuse test function for the verification of current protection components (e.g. fuses, circuit breakers, PTC resettable fuses). This can test and verify protection devices using the rated current and power of the device under test. There are 2 types of fuse test, Trip (fuse) and Non-Trip (no fuse). Fuse test setting parameters include test current, test time and number of test repeats.

Turbo OFF, Fuse Mode

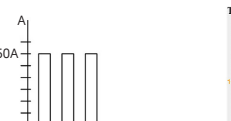


Turbo OFF, Fuse ON, CC Pulse 75A, 2s

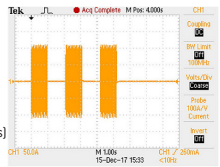


Turbo OFF, Fuse ON, CC Pulse 75A, 2s

Turbo ON, Fuse Mode



Turbo ON, Fuse ON, CC Pulse 150A, 1s



Turbo ON, Fuse ON, CC Pulse 150A, 1s

TEST MODES

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)

UPS TRANSFER TIME

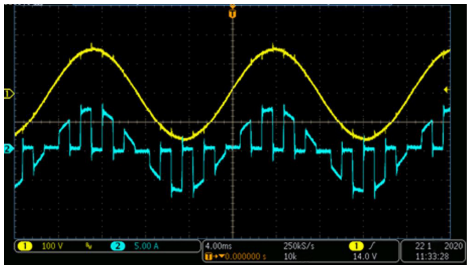
	ELPA-SINE 1875	ELPA-SINE 2800-HV	ELPA-SINE 2800	ELPA-SINE 3750-HV	ELPA-SINE 3750
Current Range	0 - 18.75A	0 - 18.75A	0 - 28A	0 - 28A	0 - 37.5A
UVP (VTH)	2.5V				
Time Range	0.15ms-999.99ms				

	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					

HIGHLIGHTED FEATURE

SPECIAL UPS WAVEFORM APPLICATIONS

Many UPSs feature a modified sinewave which is designed to alternate load current on and off in order to simulate a sinewave. This is designed to create a waveform of 1ms on and 1ms off at 50Hz or 60Hz. This is typically a lower cost approach than producing a pure sinewave. The ELPA-SINE can be used to demand this type of waveform from the DUT. The plot shows a 110V/60Hz waveform in constant current mode set at 5A (Yellow CH1=Voltage; Blue CH2 = Current).



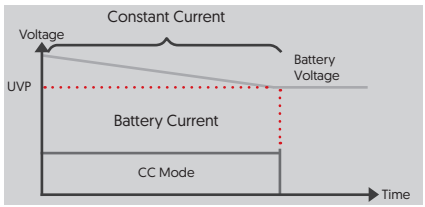
TEST MODES

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

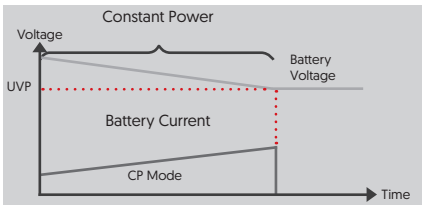
	ELPA-SINE 1875	ELPA-SINE 2800-HV	ELPA-SINE 2800	ELPA-SINE 3750-HV	ELPA-SINE 3750
UVP (VTH)	50 - 350Vrms/500Vdc	50 - 480Vrms / 700Vdc	50 - 350Vrms/500Vdc	50 - 480Vrms / 700Vdc	50 - 350Vrms/500Vdc
Battery Discharge Time	1-99999 Sec. (>27H)				

	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 Time	1-99999 Sec. (>27H)					

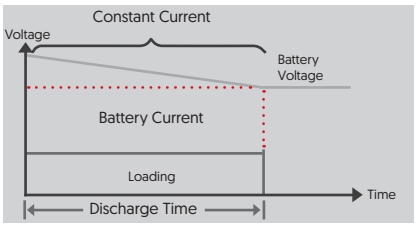
The ELPA-SINE has three inbuilt battery discharge tests The test results can be directly displayed on the LCD display for battery AH capacity, the voltage value after discharge and the cumulative discharge time.



CC + UVP Battery Discharge Mode (Test 1)



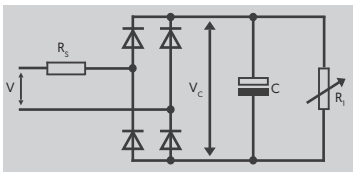
CP + UVP Battery Discharge Mode (Test 2)



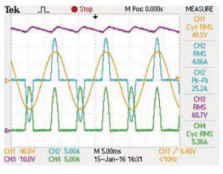
Programmed Battery Discharge Time (Test 3)

RECTIFIED LOAD SIMULATION FOR IEC62040-3 AND IEC61683 TEST SPECIFICATIONS

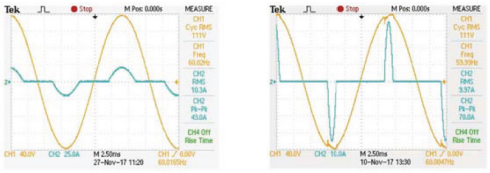
The rectifier load mode is fully compliant with IEC test specification requirements for the UPS, IEC 62040-3 UPS Efficiency Measurement Non-Linear and IEC 61683. The rectifier load mode uses CC + CR load mode and maintains current THD at 80%, to simulate the actual PV Inverter connected to the electronic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



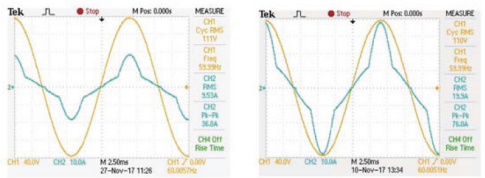
Rectifier Load Mode



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)

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

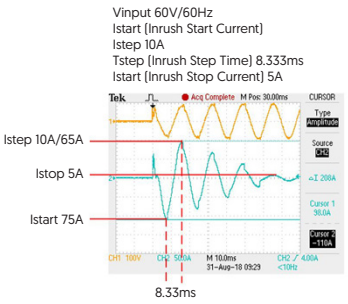
	ELPA-SINE 1875	ELPA-SINE 2800-HV	ELPA-SINE 2800	ELPA-SINE 3750-HV	ELPA-SINE 3750
S1 and S2 Current	0 - 37.5A	0 - 37.5A	0 - 56A	0 - 56A	0 - 75A
T1 and T2 Time	0.01s - 0.5s				
S3 Current	0 - 18.75A	0 - 18.75A	0 - 28A	0 - 28A	0 - 37.5A
T3 Time	0.01s - 9.99s or continuous				

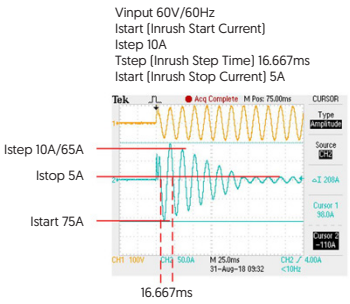
	ELPA-SINE 5600	ELPA-SINE 7500	ELPA-SINE 11250	ELPA-SINE 15000	ELPA-SINE 18750	ELPA-SINE 22500
S1 and S2 Current	0 - 112A	0 - 150A	0 - 225A	0 - 225A	0 - 225A	0 - 225A
T1 and T2 Time	0.01s - 0.5s					
S3 Current	0 - 56A	0 - 75A	0 - 112.5A	0 - 112.5A	0 - 112.5A	0 - 112.5A
T3 Time	0.01s - 9.99s or continuous					

HIGHLIGHTED FEATURE

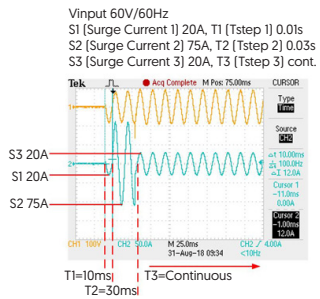
INRUSH AND SURGE CURRENT TESTING

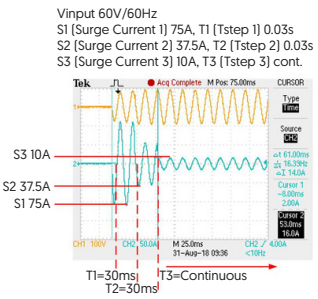
When applying AC power to a rectifier capacitor input circuit of a load, there is an inrush of current which decays. The ELPA-SINE's inrush mode is unique in that the load does not need to sync up to the AC input voltage before applying current. A typical decaying inrush current when applying AC power to a rectifier capacitor input circuit of a load is shown below.





INRUSH CURRENT TEST AT POWER ON





SURGE CURRENT TEST WHEN THE APPLIANCE IS CONNECTED

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}

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					

RENTAL SYSTEMS

If your test requirement is short term, we have a ELPA-SINE 3750 (50-350Vrms/500Vdc, 0 to 37.5A at up to 3.75kWmax) in our rental AC electronic load range. Hire periods start from one week up to however long you need the unit for.

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