RENTAL
ELPA-SINE

ELPS
ELECTRONIC TEST & POWER SYSTEMS

ADVANCED AC/DC ELECTRONIC LOAD

POSITIVE PROBLEM SOLVING + =

The ELPA-SINE is an advanced series of electronic loads, aimed at both AC and DC test applications. A comprehensive feature set is provided, as well multiple inbuilt tests.

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**
+ **CC, CV, CP, CR & Crest Factor Mode**
+ **Last Setting Memory Function**
+ **DC to 440Hz Operation**
+ **Inbuilt Battery Tests**

CONTENTS

STANDARD MODELS

SELECTION TABLE

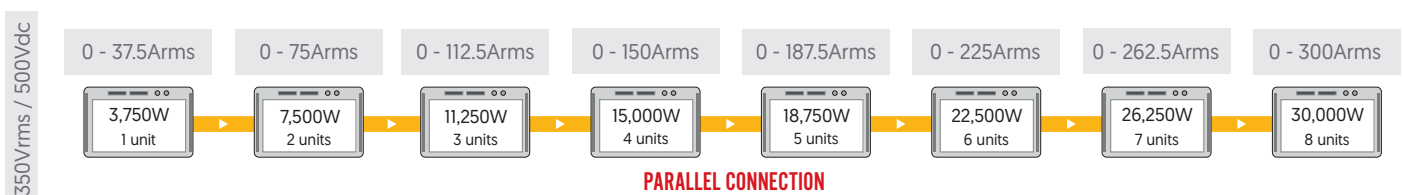| Part Number	Max Power	Maximum Voltage	Current Range
ELPA-SINE 3750-r	3750W	350Vrms / 500Vdc	0 - 37.5Arms

OPERATING RANGE

The ELPA-SINE is able to operate at maximum current across most of its voltage range. This allows one system to test many different types of AC and DC devices. When operating below 50V, the maximum amount of current that the load can sink decreases. Example values for this derating at low voltages are provided below.

3750-r AC Power Curve

3750-r DC Power Curve
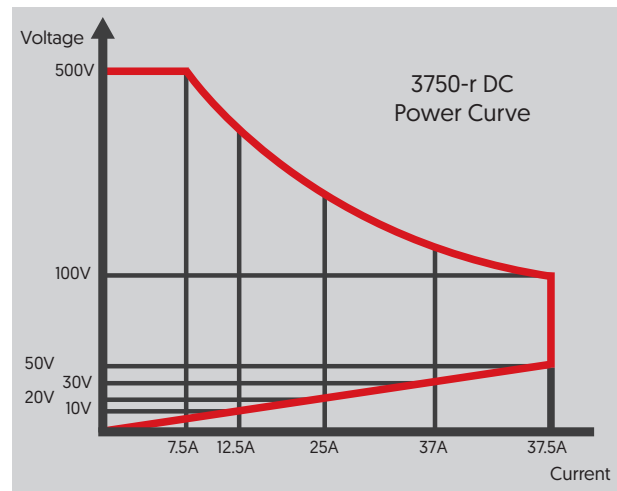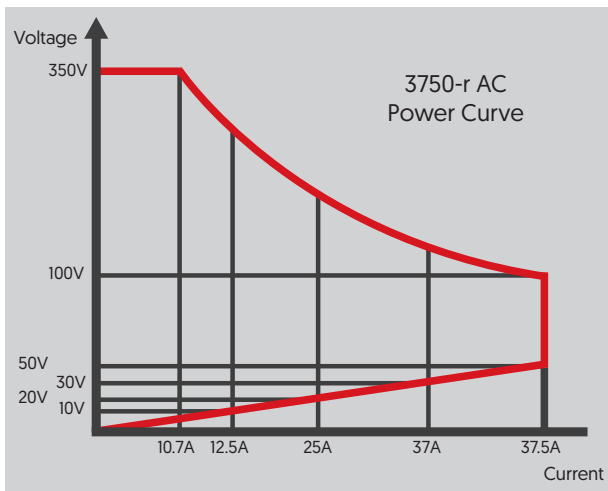
MASTER-SLAVE CAPABILITY

Our rental system can be combined in parallel with any ELPA-SINE 3750 units you have previously purchased, providing they have the same nominal outputs. This allows any short term requirements outside of usual operating ranges to be met. Up to 8 ELPA-SINE systems can be arranged in single phase parallel connection.

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.
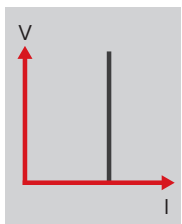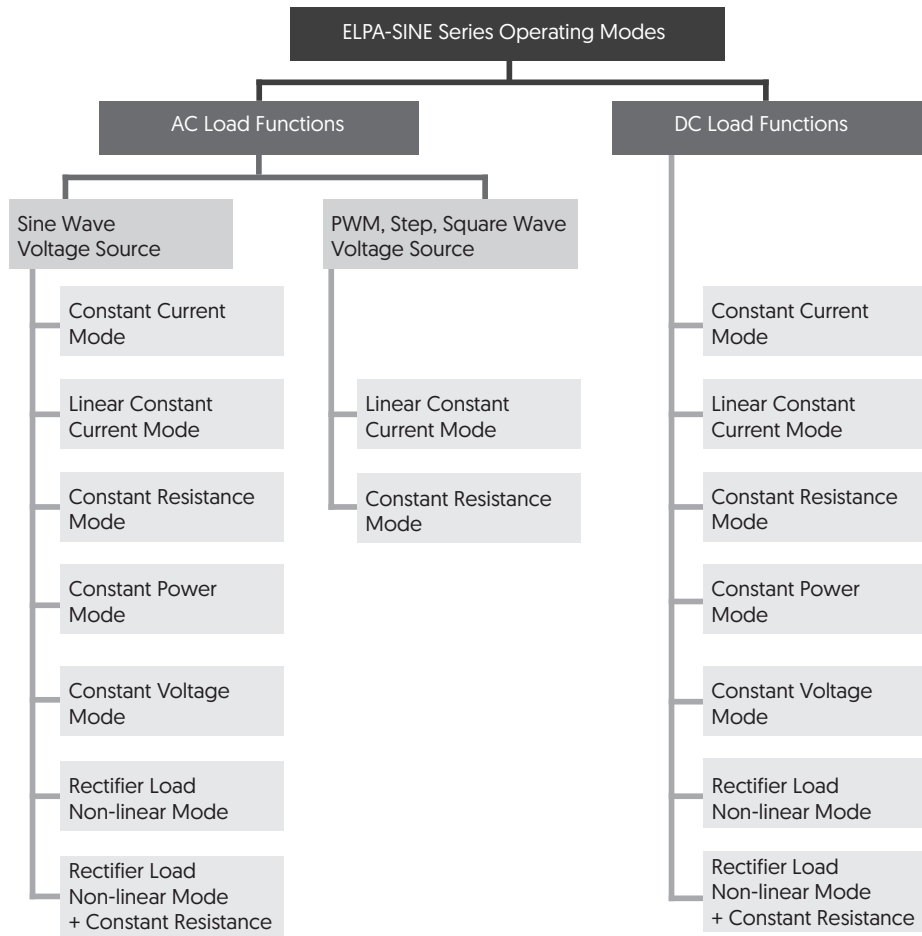

0 - 37.5Arms	0 - 75Arms	0 - 112.5Arms	0 - 150Arms	0 - 187.5Arms	0 - 225Arms	0 - 262.5Arms	0 - 300Arms
3,750W 1 unit	7,500W 2 units	11,250W 3 units	15,000W 4 units	18,750W 5 units	22,500W 6 units	26,250W 7 units	30,000W 8 units

PARALLEL CONNECTION

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GENERAL SPECIFICATIONS

STANDARD FEATURES

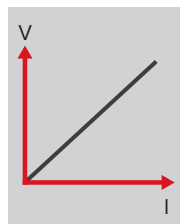| TECHNICAL DATA	
Maximum Power	3750W
Current Range	37.5Arms / 112.5Apeak
Voltage Range	50-350Vrms / 50-500Vdc
Frequency Range	DC, 40-440Hz [CC, CP Mode], DC-440Hz [LIN, CR, CV Mode]
Master/Slave Functionality	Yes, up to eight identical single phase units can be connected in parallel
External Programming Input	F.S. / 10Vdc, Resolution 0.1V [Optional]
External SYNC Input	TTL
Vmonitor [Isolated]	±500V / ±10V
Imonitor [Isolated]	±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*0.6 ; ~V*4.4
Weight	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

OPERATING MODES

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                    ┌─────────────────────────────────────┐
                    │  ELPA-SINE Series Operating Modes   │
                    └─────────────────────────────────────┘
                         │                        │
            ┌────────────────────┐      ┌────────────────────┐
            │  AC Load Functions │      │  DC Load Functions │
            └────────────────────┘      └────────────────────┘
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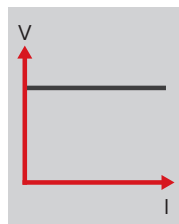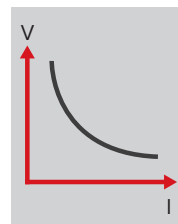| Sine Wave Voltage Source	PWM, Step, Square Wave Voltage Source	DC Load Functions
Constant Current Mode		Constant Current Mode
Linear Constant Current Mode	Linear Constant Current Mode	Linear Constant Current Mode
Constant Resistance Mode	Constant Resistance Mode	Constant Resistance Mode
Constant Power 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

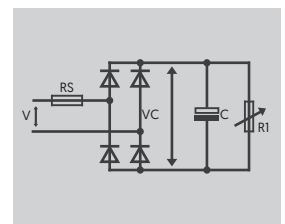Constant Current Mode

Linear Constant Current Mode

Constant Resistance Mode

Constant Voltage Mode

Constant Power Mode

Rectifier Load Mode

OPERATING MODES

## 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.
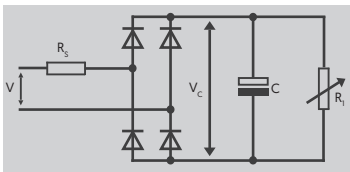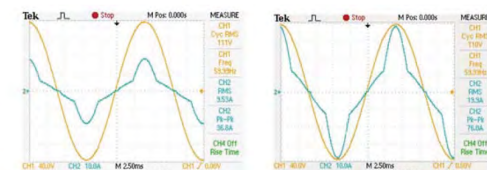

Rectifier Load Mode
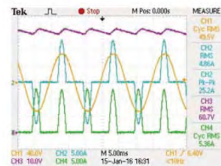
The actual V / A waveform
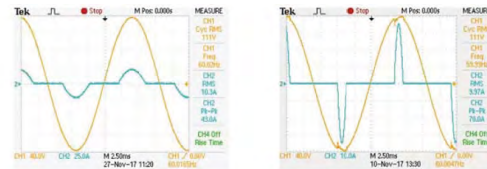
Non-Linear CC mode for UPS test

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

PV Inverter test Non-Linear CC + Resistive mode (CC+CR)
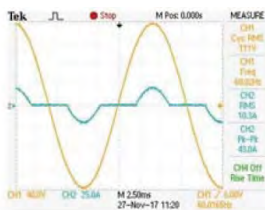
CONSTANT CURRENT MODE FOR SINE-WAVE

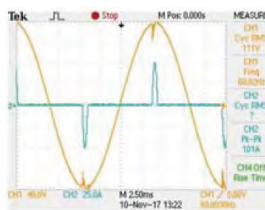| TECHNICAL DATA	
Range	0-37.5A
Resolution	0.625mA/16bits
Accuracy	±(0.1% of setting + 0.2% of range) at 50/60Hz

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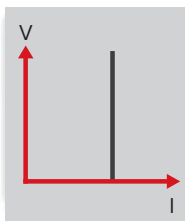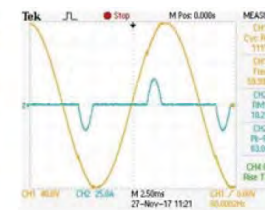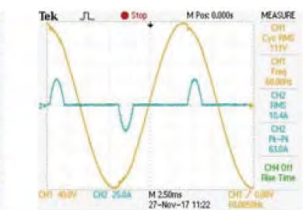

CC Mode

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

LINEAR CC MODE FOR SINE-WAVE, SQUARE-WAVE OR QUASI-SQUARE WAVE, PWM WAVE	
Range	0-37.5A
Resolution	0.625mA/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.
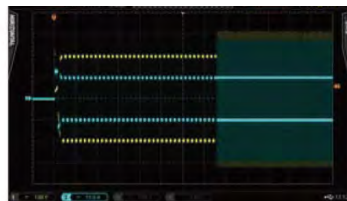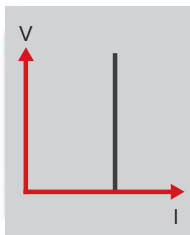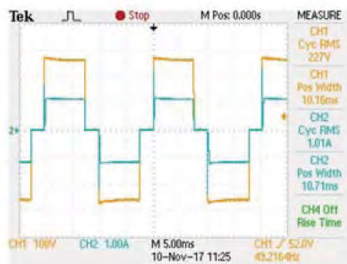

CC Mode

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
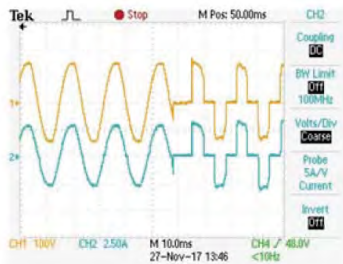
Linear CC Mode, UPS Sine to Square Waveform
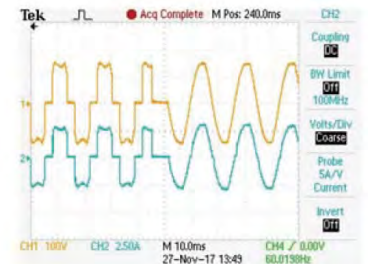
Linear CC Mode, UPS Square to Sine Waveform

CONSTANT RESISTANCE MODE	
Range	1.6Ω - 32kΩ
Resolution [1]	0.010416mS/16bits
Accuracy	±0.2% of (setting + range) at 50/60Hz

CONSTANT VOLTAGE MODE	
Range	50-350Vrms / 500Vdc
Resolution	0.1V
Accuracy	±(0.1% of setting + 0.1% of range) @ 50/60Hz

CONSTANT POWER MODE	
Range	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.

[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)

TECHNICAL DATA	
UVP (VTH)	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.
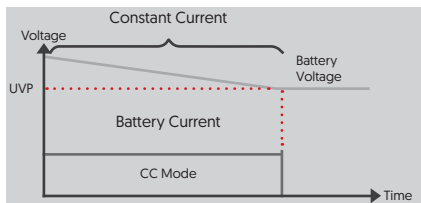
CC + UVP Battery Discharge Mode (Test 1)
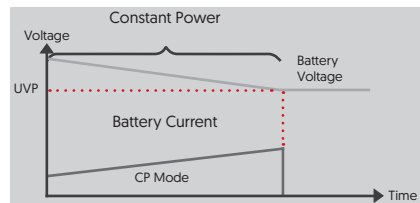
CP + UVP Battery Discharge Mode (Test 2)
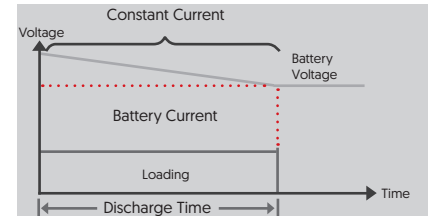
Programmed Battery Discharge Time (Test 3)

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

TECHNICAL DATA	
Mode Type	Resistive + non-linear mode
Operating Frequency	Auto ; 40-440Hz
Current Range	0 - 37.5A
Resistive Range	1.6Ω - 32kΩ

TURBO MODE

TECHNICAL DATA	
Maximum Current (for up to 1 second)	75Arms (ON) $(\times 2)^2$, 37.5Arms (OFF)

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TEST MODES

UPS EFFICIENCY MEASUREMENT

TECHNICAL DATA	
Mode Type	Non-linear mode
Operating Frequency	Auto ; 40-440Hz
Current Range	0 - 37.5A
PF Range	0 to 1

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

TECHNICAL DATA	
UVP (VTH)	50 - 350Vrms / 500Vdc
UPS Back-Up Time	1 - 99999 seconds [>27H]

UPS TRANSFER TIME

TECHNICAL DATA	
Current Range	0 - 37.5A
UVP (VTH)	2.5V
Time Range	0.15ms-999.99ms

FUSE TEST MODE

TECHNICAL DATA	
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

TECHNICAL DATA	
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)	75Arms (ON)[2], 37.5Arms (OFF)
OPP Pstop (TURBO ON/OFF)	7500W (ON), 3750W (OFF)

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

PROGRAMMABLE INRUSH CURRENT SIMULATION: ISTART - ISTOP / TSEP

TECHNICAL DATA	
Istart, Inrush Start Current	0 - 75A
Inrush Step Time	0.1ms - 100ms
Istop, Inrush Stop Current	0 - 37.5A

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

TECHNICAL DATA	
S1 and S2 Current	0 - 75A
T1 and T2 Time	0.01s - 0.5s
S3 Current	0 - 37.5A
T3 Time	0.01s - 9.99s or continuous

MEASUREMENTS

VOLTAGE READBACK VOLTMETER

TECHNICAL DATA	
Range	500V
Resolution	0.01V
Accuracy	±0.05% of [reading + range]
Parameter	Vrms,V Max/Min,+/-Vpk

CURRENT READBACK AMMETER

TECHNICAL DATA	
Range	18.75Arms / 37.5Arms
Resolution	0.4mA / 0.8mA
Accuracy	±0.05% of [reading + range] at 50/60Hz, ±0.2% of [reading + range]
Parameter	Irms,IMax, IMin,+/-Ipk

POWER READBACK WATTMETER

TECHNICAL DATA	
Range	3750W
Resolution	0.0625W
Accuracy	±0.1% 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	DC, 40-440Hz
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

TECHNICAL DATA	
Over Power Protection	≈3937.5Wrms or programmable
Over Current Protection	≈39.375Arms 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.

ETPS
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"
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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POSITIVE **PROBLEM SOLVING**