



REHLKO *EL*100XA

500 – 3000VA

Technical Specification

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Useful Contacts

UK

www.ups.rehlko.co.uk	Rehlko web site
ukservice.ups@rehlko.com	Service department – booking service, fault reporting etc.
uktechnicalsupport.ups@rehlko.com	Technical queries
uksales.ups@rehlko.com	Hardware sales
ukservicesales.ups@rehlko.com	Extended warranty agreements etc

IRELAND

www.ups.rehlko.ie	Rehlko web site
ieinfo.ups@rehlko.com	Service department, technical queries, hardware sales and extended warranty agreements

SINGAPORE

www.ups.rehlko.sg	Rehlko web site
salesups.sg@rehlko.com	Hardware sales
serviceups.sg@rehlko.com	Contract customer support, maintenance contracts renewals

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CHAPTER 1 – GENERAL DESCRIPTION

1.1 INTRODUCTION

The ELXA is a high performance Emergency Lighting Static Inverter (SI) system, designed to deliver complete emergency lighting protection for a range of applications, in accordance with European BS EN50171 specification.

Key features

High performance, single phase input and single phase output, modular static inverter system ranging from 0.5kVA to 3kVA.

- Microprocessor Controlled
- Automatic restart of load after inverter shutdown
- Smart AVR function (Two buck / boost modes)
- Wide input range 184V~285V
- Pure Sine Wave Output
- High overload capacity (120% continuous)
- Overload and Short Circuit Protection
- Over temperature protection
- Generator compatible & Cold-start capable
- Full function of LCD display with Audible Alarm
- Smart battery management with large charger; wet battery compatible
- Intelligent double stages of charging control
- System and battery test ability
- High battery recharging current
- Battery current-limit
- Deep discharge protection
- Alarm relay contacts
- RS232 communication port
- Remote Monitoring Panel (Optional)
- SNMP Adapter (Optional)
- MODBUS Adapter (Optional)
- AS400 Card (Optional)

Optional features

- • Input/output transformer
- • Internal maintenance bypass switch
- • DC Earth leakage protection
- • High IP rating
- • Other voltage options

Model Range

	EL1005XA	EL1012XA	EL1030XA
Power Rating Kva/Kw	0.5/ 0.4	1.2 / 1.0	3 / 2.4
Input AC Voltage	220/230/240 (1Ph + N + PE)		

1.2 FUNCTIONAL DESCRIPTION

The ELXA is a modular Static Inverter (SI) comprising power module, distribution and batteries in one cabinet.

All components are all accessed from the front of the cabinet with all power connections located at the top of the ELXA cabinet.

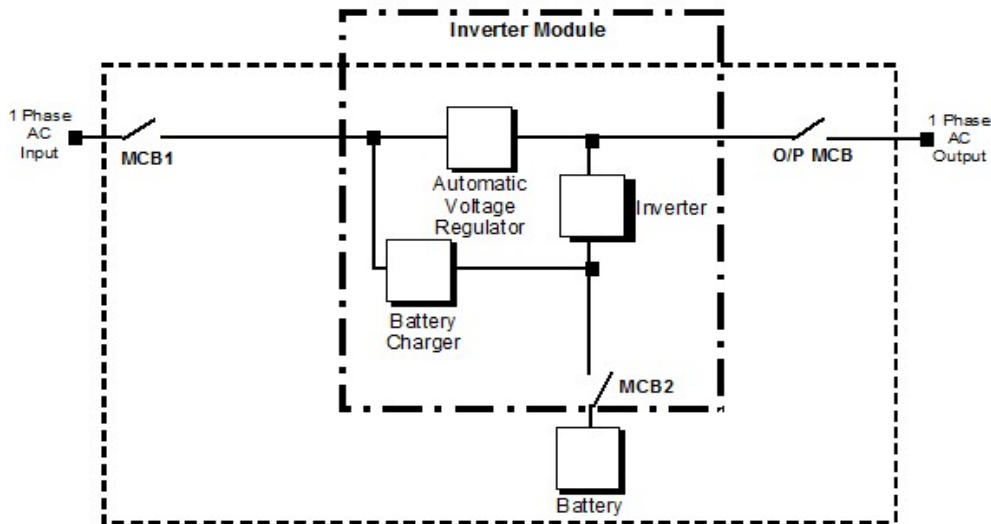


Figure 2.1. Electrical Block Diagram

MCB1	: Mains Input Circuit Breaker.
MCB3-8	: Output Circuit Breaker.
MCB2	: Battery DC Circuit Breaker.

AVR: The first stage of the concept uses a single phase controlled automatic voltage regulator as a form of surge protector. An AVR monitors the voltage constantly to deal with both dips and spikes. This feature includes “Buck” and “Boost” technology to output regulated and controlled voltage at a selectable figure.

CHARGER: In ELXA Series EL INVERTERS, a controlled charger is used to produce DC voltage for both charging the batteries.

BATTERIES: Batteries are used as reserve DC power supply for the Inverter in case of mains failure. Batteries are connected in series to obtain a DC supply. Batteries are discharged by the inverter during mains failure. The discharged batteries are re-charged by the Rectifier on a constant voltage / current limiting basis, if AC mains power is available.

INVERTER: The Inverter converts the DC BUS voltage supplied by the batteries into a well regulated, fully digital controlled AC voltage with fixed voltage and frequency.

The output of the inverter is used to supply the critical loads connected to the EL INVERTER output.

STATIC TRANSFER SWITCH (STS): This is an electronically controlled transfer switch, which enables the critical load to be connected either to inverter output or to by-pass power source. During normal operation, the load is supplied by the mains output, in case of a mains disturbance or a mains failure the load is automatically transferred to the inverter source.

1.3 MODES OF OPERATION

Changeover mode

When operating in the 'changeover' mode the rectifier is turned on to provide battery charging. The inverter is turned on and operating on standby (off load). The bypass-side of the static switch is turned on to connect the SI OUTPUT to the AC INPUT via the internal bypass line.

If the utility supply fails, the static switch will transfer the SI OUTPUT to the inverter within 10ms. However, as the utility supply is in a failed state the rectifier is inoperative and the inverter will be powered solely from the batteries (see Figure 2.5).

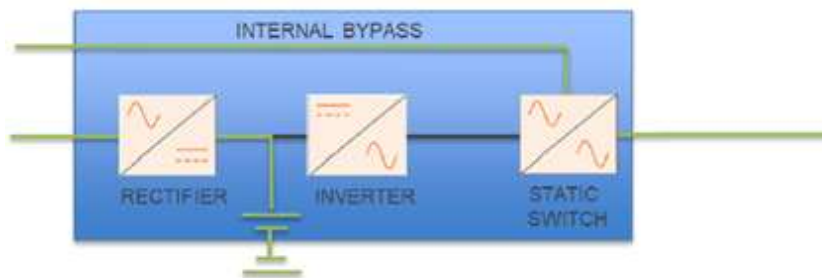


Figure 2.2

On battery operation

If the mains supply fails, the rectifier turns off but the inverter will continue to operate from battery power until the batteries reach their end-of-discharge voltage; at which point the inverter will shut down and disconnect the SI OUTPUT supply.

If the AC INPUT supply is restored before the batteries are fully discharged, the rectifier will turn on automatically to once again power the inverter and recharge the batteries.

The whole process of switching between rectifier and battery power is totally transparent to the emergency luminaires.

1.4 COMPONENT DESCRIPTION

1.4.1 CABINET

The ELXA cabinet, shown in Figure 2.3, comprises a power module, distribution, batteries and test panel.

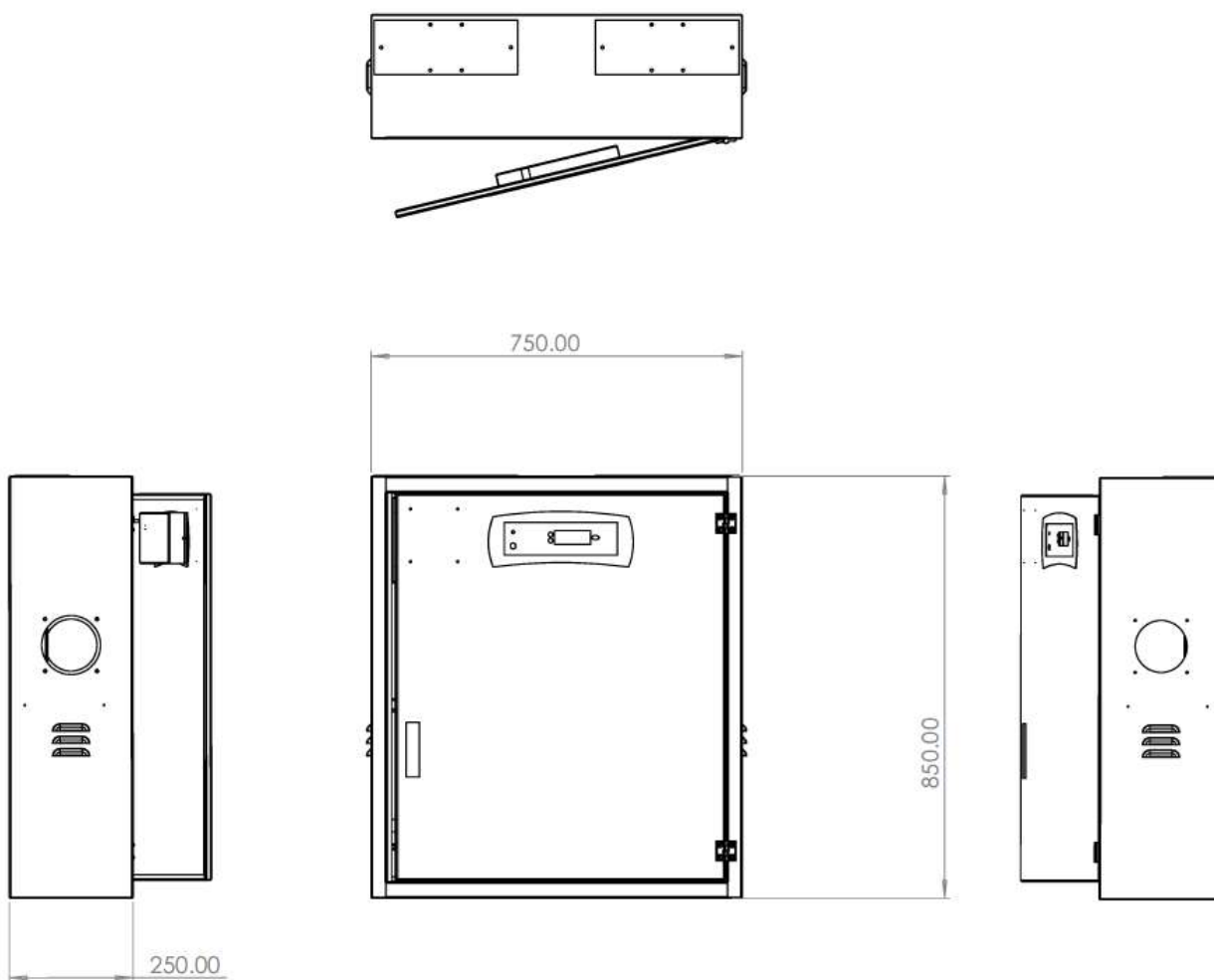
All components can be fitted/removed from the front of the cabinet, making side and rear access unnecessary for servicing or repair.

All the AC and DC power cables are connected to terminals located on the top of the cabinet and two gland plates are provided for top cable entry.



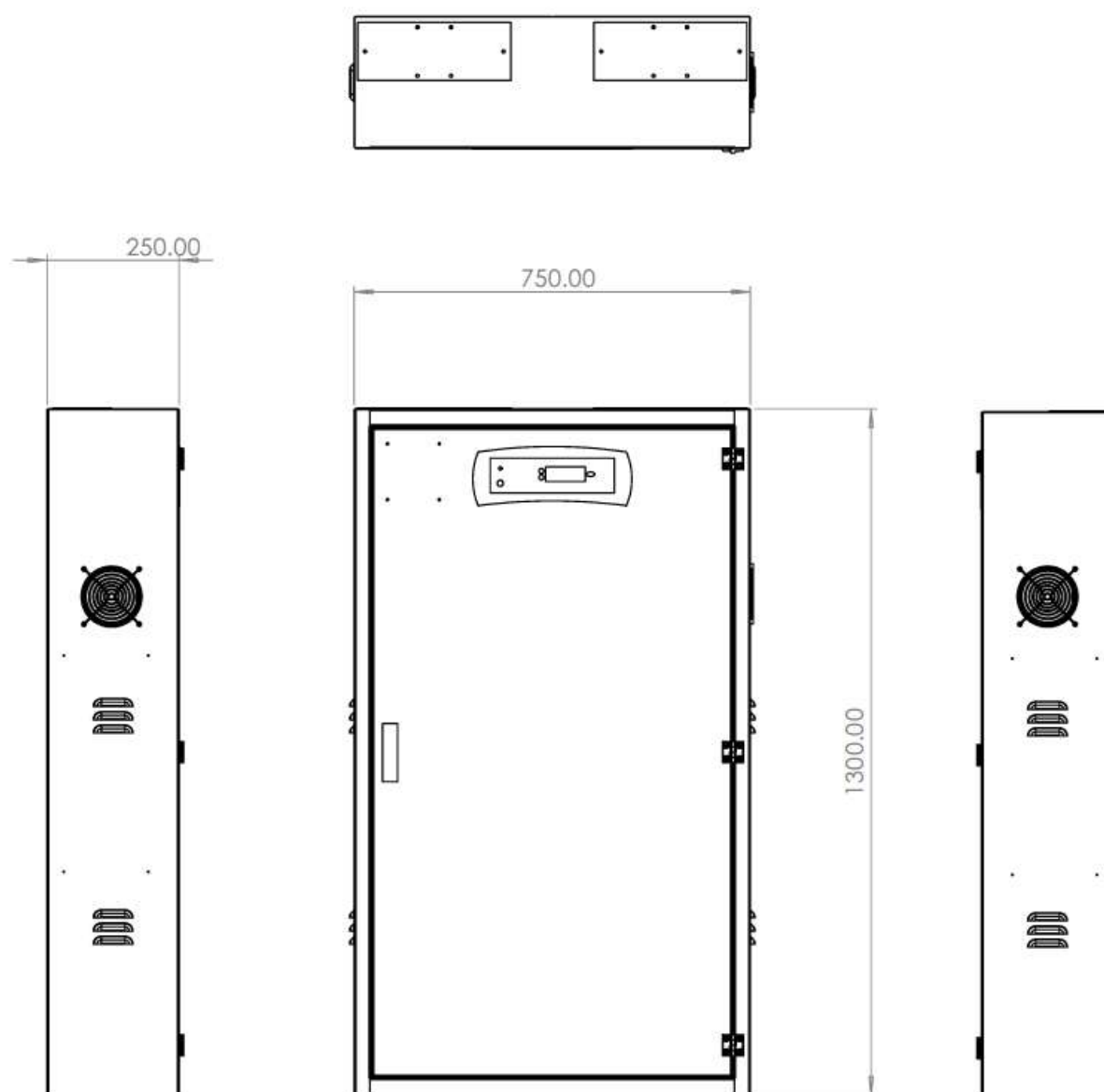
Figure 2.3

1.4.1.1 EL1005XA CABINET



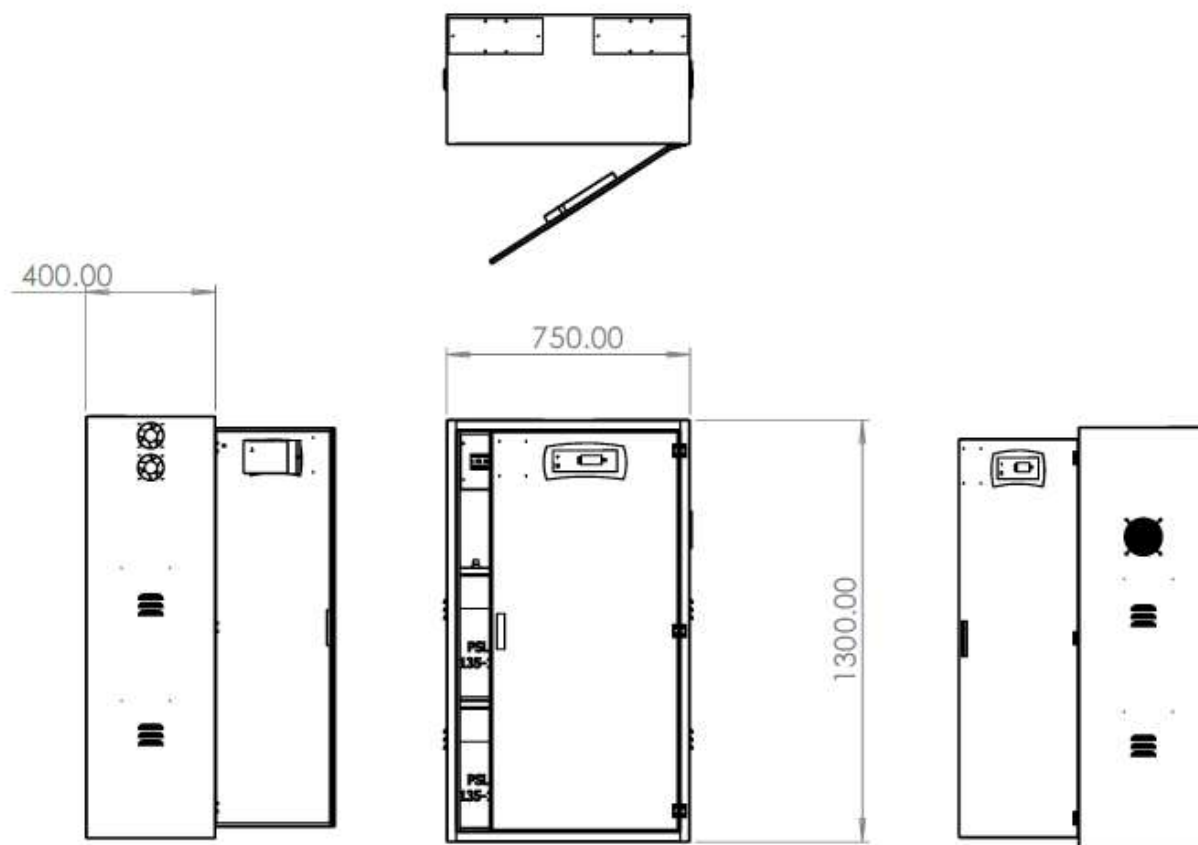
NOTE : Requires 200mm Side Clearance and 1000mm Front Clearance

1.4.1.2 EL1012XA CABINET



NOTE : Requires 200mm Side Clearance and 1000mm Front Clearance

1.4.1.3 EL1030XA CABINET



NOTE : Requires 200mm Side Clearance and 1000mm Front Clearance

1.4.2 POWER MODULE

The power module is shelf-mounted.

1.4.3 FRONT PANEL

The front panel of EL-Inverter, consisting of a LCD display, 3 function keys, TEST ON LED, Test Button, allows the complete monitoring of the EL-Inverter status. By using the function keys operator can move on menus.

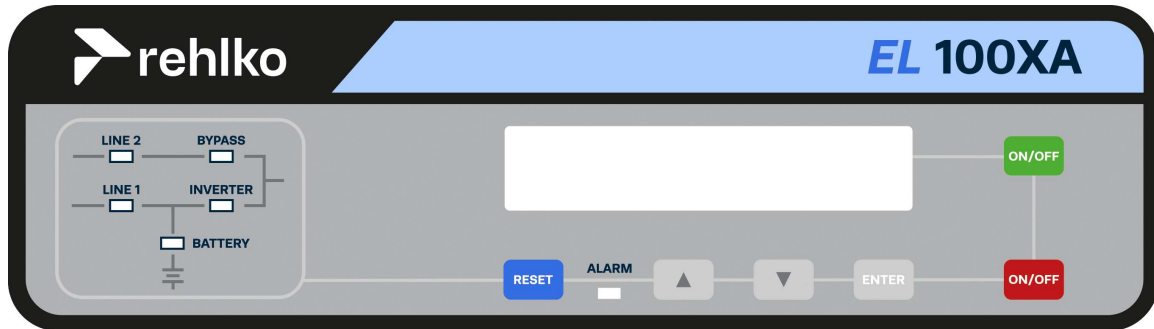


Figure 1.5

LED : If “Test On” lamp is lit maintenance test is active.

There are three function keys on front panel these are MAIN CONTROL ON/OFF BUTTON, UP/DOWN SELECT keys help moving on menus.

Note: The main control on/off button will provide test function at normal mode but will become the alarm-reset function in battery mode.

8.		Thermal alarm	The temperature inside the Inverter is over 55°C. If the user does not reduce the load, the temperature will continue to rise and the Inverter will shut down automatically at 60°C.
9.		Fan is in "High speed"	The symbol will display whenever the cooling fan is running (or high speed), and will disappear when it is off (or low speed).
10.		Silence mode	The audible alarm has been silenced. To reset the alarm in Back-up mode, push the control button (not available during low battery level or abnormal condition).
11.		Inverter fault	The Inverter has failed and must be repaired. Contact a qualified service person.
12.		Battery normal	In normal operation, this symbol indicates a charged battery.
		Battery low	When the battery charge level is low, the word "LOW" will be added to the symbol.
13.		Battery replacement	The battery has failed and must be replaced. The battery is checked each time the Test Function is executed.
14.		Battery voltage level	The higher the battery voltage, the more bars will illuminate. When the Inverter is charging the battery, the battery symbol and the level indicator will blink together.
15	Mode	Value	Description
	AC out	V	AC output voltage.
	AC in	V	AC input voltage.
	AC out	Hz	AC output frequency.
	BATT.	V	DC battery voltage.
	TEMP.	°C	Inverter internal temperature.
	Selection Button for mode & value All the operation data will be displayed on LCD screen. By selecting the required mode (upward or downward), the related value will be displayed.		

1.4.3.2 AUDIBLE ALARMS

During a utility failure or fault operation, the EL-Inverter emits a beeping sound for warning. In back-up mode, the alarm can be silenced by pushing the "MAIN CONTROL ON/OFF BUTTON" button. However, the warning of low battery will still sound, urging the user that the load will be lost.

Basic Indication Table:

	STATUS	ALARM
Idle mode	Utility Good	No Beep
	Utility outage	No Beep
	Timer on, (refer to Item 5.5)	No Beep
Normal / Back-up mode	Normal (Utility good)	No Beep
	Back-up (No load)	One beep every 4 sec (alarm can be silenced).
	Back-up (Loaded)	2 beeps every 8 sec. (alarm can be silenced).
	Battery Low	4 beeps per sec (alarm can Not be silenced).
Abnormal Condition	Over load	Continuous alarm (alarm can Not be silenced).
	UPS fault	Every other 2 sec., 32 beeps in 2 sec (alarm can Not be silenced).
	Thermal alarm	Every other 2 sec., 32 beeps in 2 sec (alarm can Not be silenced).

1.4.4 TEST BUTTON

If the EL-Inverter is in normal operation, it is supplying the load by the incoming utility supply. In the case of a failure in this supply, the output is connected to the static inverter output. This transfer operation is performed internally by the control logic of the Inverter.

The test button installed is a momentary test. When the test button is pressed, the system will transfer the output from mains supply to inverter supply. The inverter will be supplied from its internal battery.

The display test button is momentary and therefore must be held down for the required duration of the test. As soon as the test button is released, the system will transfer back to normal operation.

Note: When the equipment is switched into the Test mode, the red "TEST ON" LED will be lit.

1.5 MODEL VARIANTS

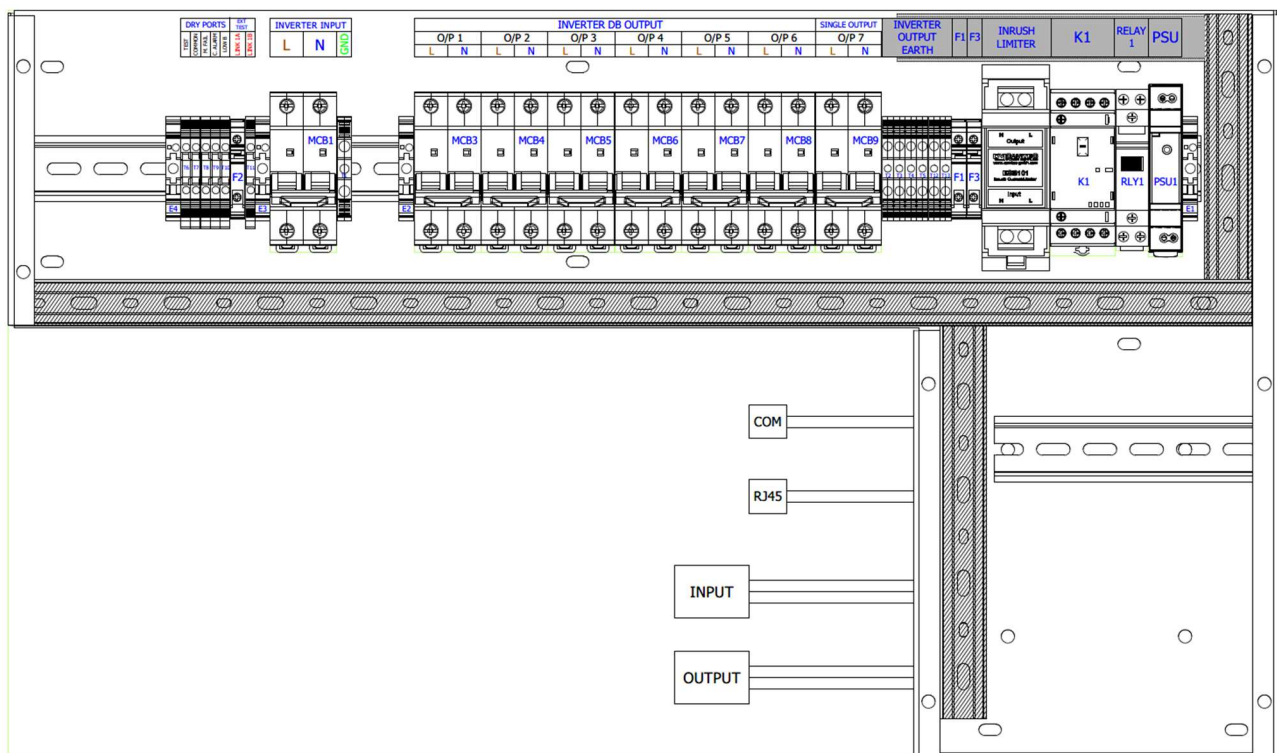
1.5.1 Standard Output configurations

The XA systems can be provided with 3 output variations:

1.5.1.1 10Pv6

Cabinet is provided with 1 x larger output for systems with external distribution. 6 x outputs for internal distribution

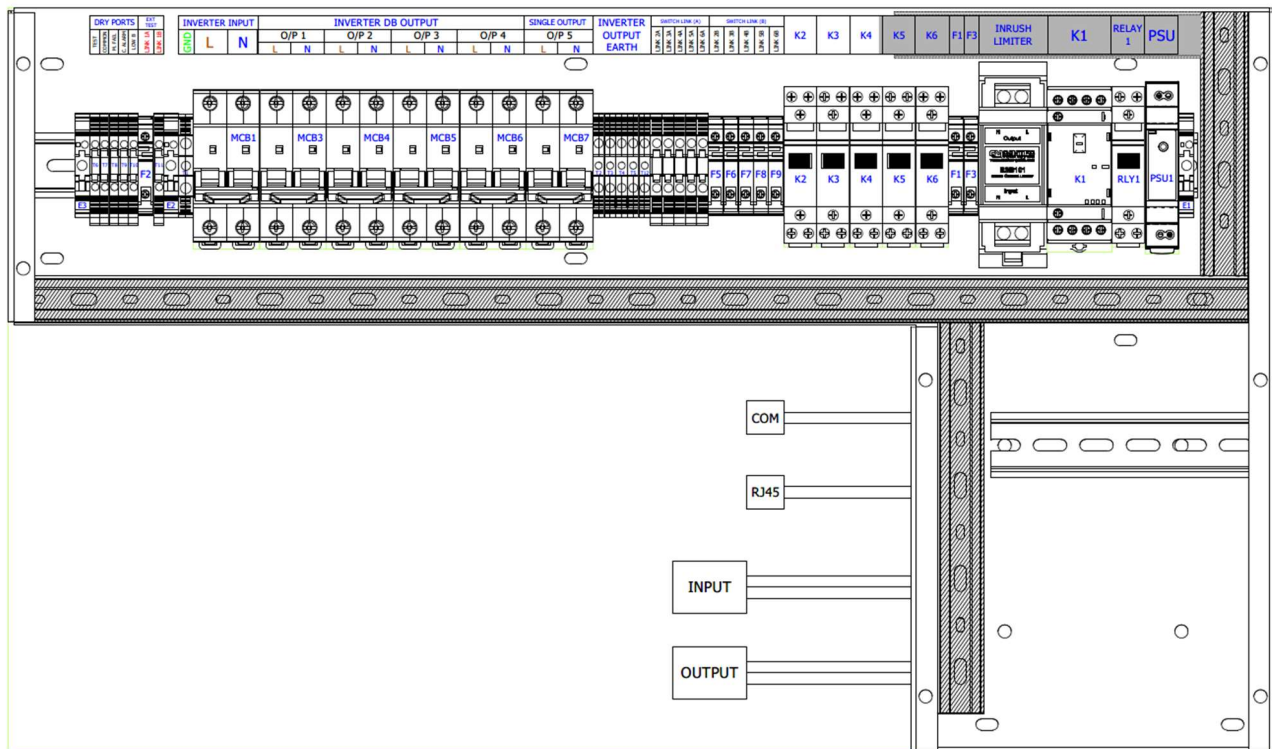
NOTE: If 1 x larger output can not be used at same time as internal distribution – due to emergency lighting regulations



1.5.1.3 1/Cv4C

Cabinet is provided with 1 x large, controlled output for systems with external distribution.

4 x controlled outputs for internal distribution



Each of the outputs are controlled by the switch link connections:

SWITCH LINK (A)					SWITCH LINK (B)				
LINK 2A	LINK 3A	LINK 4A	LINK 5A	LINK 6A	LINK 2B	LINK 3B	LINK 4B	LINK 5B	LINK 6B

OUTPUT 1 – Controlled by Link 2A and 2B

OUTPUT 2 – Controlled by Link 3A and 3B

OUTPUT 3 – Controlled by Link 4A and 4B

OUTPUT 4 – Controlled by Link 5A and 5B

OUTPUT 5 – Controlled by Link 6A and 6B

When Link A and B are Normally closed output is OFF (Non-Maintained)

When Link A and B are Normally open output is ON (Maintained)

Then links can be used to connect light switches / phase failure monitoring / photocell etc.

1.5.2 OPTIONS

There are various options available for the ELXA Series units these options are applied to the standard 3 standard variants detailed in 1.5.1

1.5.2.1 OPTION MB – Maintenance Bypass Switch

Built in break before make maintenance bypass switch. Allows the internal power module to be completely removed and isolated and continue to supply the output load.

1.5.2.2 OPTION SP – Built in SNMP Card G57CS141L

Built in SNMP card that provides:

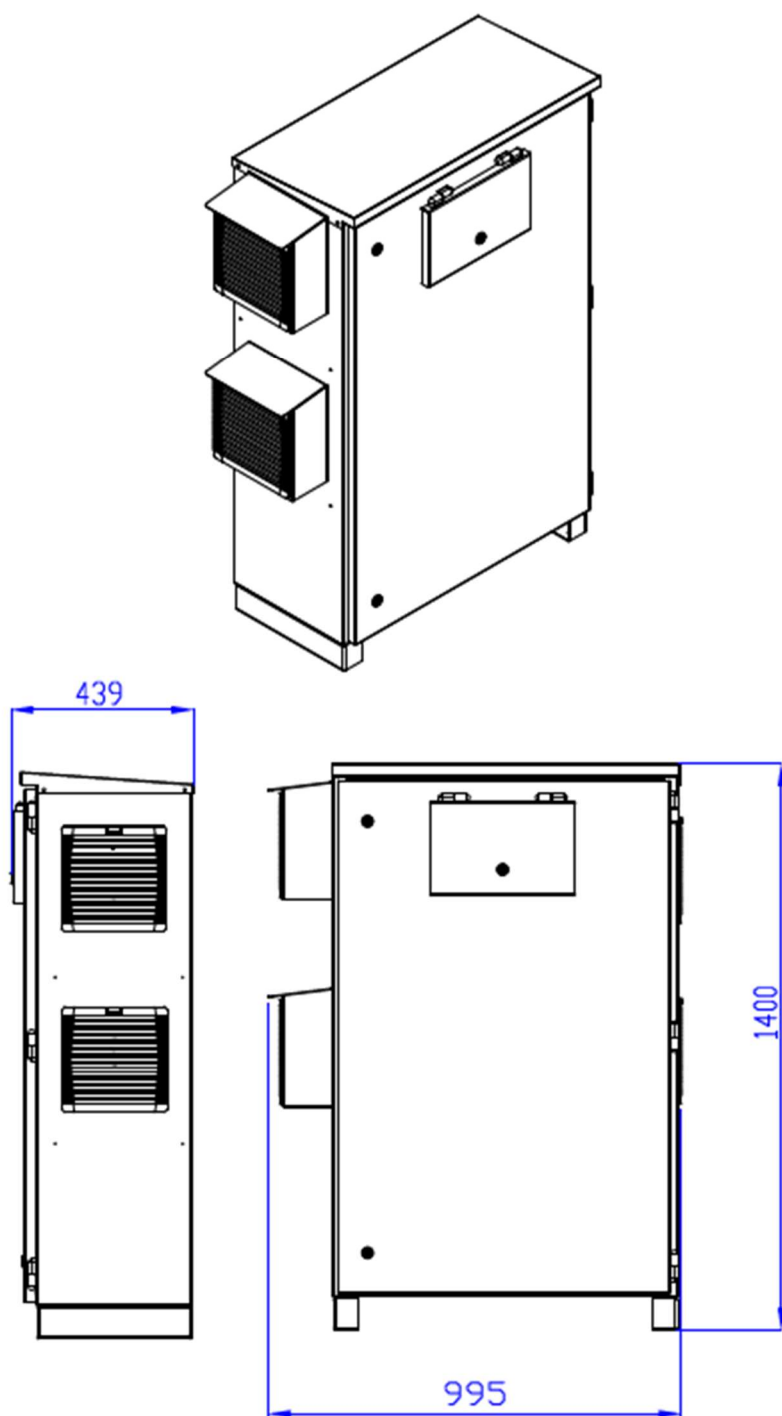
- Webbrowser to monitor Inverter
 - Input and Output Voltages
 - Battery Overall Voltage
 - System Alarms
- Email Alerts
- Modbus IP output signals
- BACnet output signals

1.5.2.3 OPTION BS – Built in BACS Card

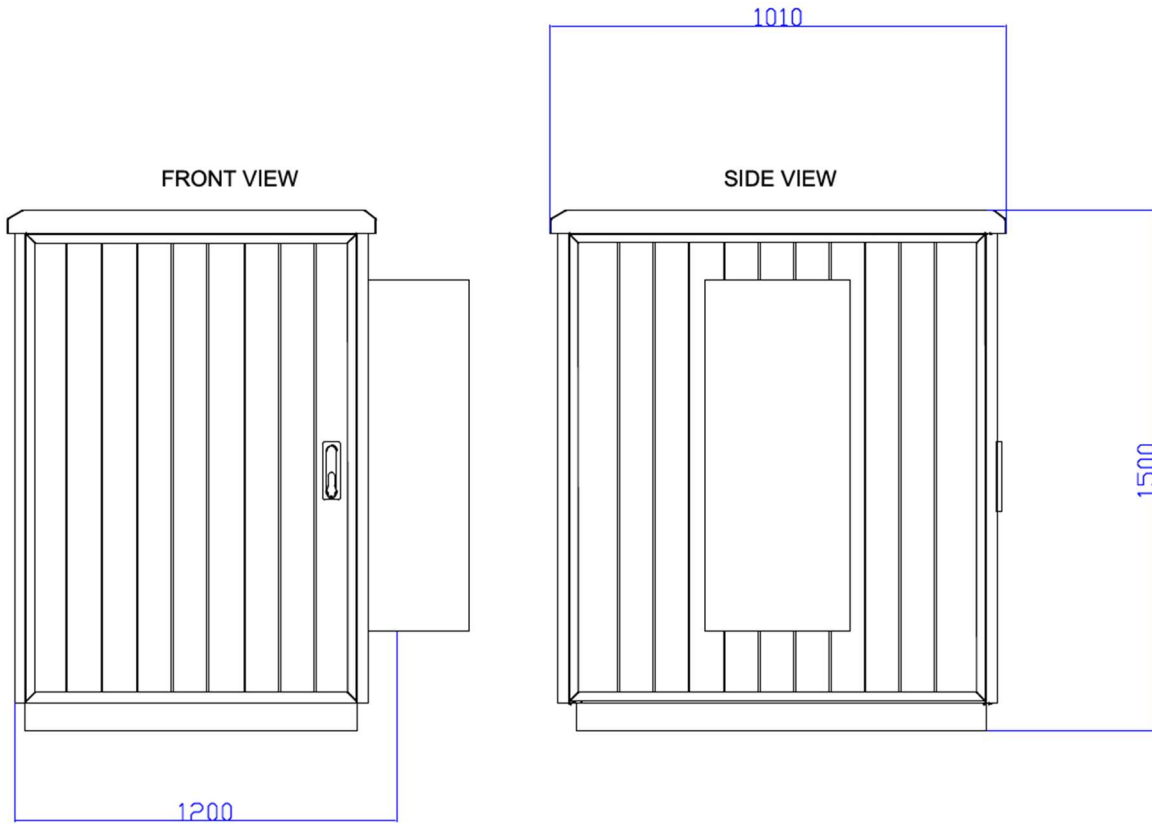
- Built in BACS SNMP card that provides:
 - Webbrowser to monitor Inverter
 - Input and Output Voltages
 - Battery Overall Voltage
 - System Alarms
 - Battery Block Voltage
 - Battery Block Temperature
 - Provides Battery Equalisation
- Email Alerts
- Modbus IP output signals
- BACnet output signals

1.5.2.4 OPTION I54 – System built into indoor use IP54 Chassis

The chassis is provided with an increased level of protection including IP54 intake filters and IP54 Exhaust Fan



1.5.2.5 OPTION O54 – System built into outdoor use IP54 Chassis



Note System requires 1000mm clearance around hole unit.

1.5.2.6 OPTION TD – Time Delay of output during changeover

Modification provides a 350ms break during changeover from mains to battery. Time delay can be adjusted by internal timer.

Modification provides a 24V DC output terminal, terminals provide 24VDC when output is supplied from Mains, 0V when supplied from battery.

1.5.2.7 OPTION TS – Timer Switch – adjustable timer switch

Test Switch on front panel controls internal test timer. When pressed the timer will transfer the system for battery for the preset time.

Timer pre set for 10mins can be adjusted to 3Hrs internally on timer.

NOTE : LED on front panel not provided with this modification

1.5.2.8 OPTION TRANS – Output galvanic isolation transformer

Output transformer installed to provide galvanic isolation of the system output.

1005XA – Built into standard EL1005XA chassis

1012XA – Built into EL1030XA Chassis

1030XA – Built internal to EL1030XA Chassis – Batteries must be in separate cabinet.

1.5.2.9 OPTION SIM – Simtronic connection

Standard dry ports are removed and configured to the following:

DRYPORT 1 – TO IP1 System Healthy (Output voltage is ok)

DRYPORT 2 – TO IP2 Mains Failure

DRYPORT 3 – TO IP3 Common Alarm

NORMAL OPERATION MAINS APPLIED

INPUT 1 - CLOSED SIGNAL

INPUT 2 - OPEN SIGNAL

INPUT 3 - OPEN SIGNAL

SYSTEM IN TEST MODE POWER TOLIGHTS FROM BATTERY

INPUT 1 - CLOSED SIGNAL

INPUT 2 - CLOSED SIGNAL

INPUT 3 - OPEN SIGNAL

MAINS FAILURE

INPUT 1 - CLOSED SIGNAL

INPUT 2 - CLOSED SIGNAL

INPUT 3 - CLOSED SIGNAL

ANY FAULT CONDITION

INPUT 1 - ANY STATE

INPUT 2 - ANY STATE

INPUT 3 - CLOSED SIGNAL

1.5.2.10 OPTION EC – External Control

External loop LK7 applied to 1/Cv4C design. When loop is NO outputs are dependent on separate control. When loop is NC all outputs are forced to maintained.

CHAPTER 2 – COMMUNICATION

2.1 INTRODUCTION

The ELXA system offers a range of interfaces that can be connected to external facilities management and monitoring systems. Many of these options are factory fitted and must be requested at the time of order.

2.1.1 SYSTEM TEST (ST) – INCLUDED

The System Test (ST) facility is used to test the ELXA operation on battery power and terminals must be normally closed. In this case, if the connection between the ST terminals goes open-circuit it turns off the rectifier and the load is operated from the inverter using the standby battery power.

The ST function can be connected to a local or remote operating device (switch). The ST terminals send an internal 24V signal internally and therefore no voltage can be applied to the circuit.

When using a remote test facility they should be connected using a screened cable with 1 pair (0.5 mm²) and maximum length of 100m.

Note: If an external ST circuit is not required, a link must be fitted to the ST terminals.

2.1.2 DRY PORT CONTACTS - INCLUDED

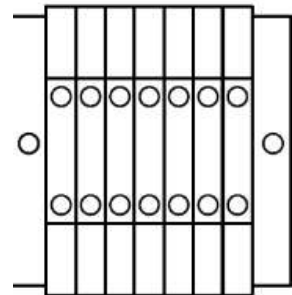
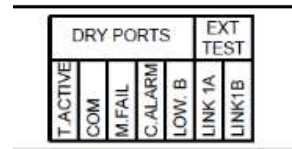
The ELXA provides three hard-wired 'system status' outputs that can be used to drive remote signalling and/or monitoring facilities. These outputs are switched by volt-free relay contacts and are normally open (closed on activation).

The contacts are rated for 110VAC (0.5A) or 24VDC.

As shown in Figure 7.2, the four switched alarm outputs are:

- Mains Failure
- Common alarm
- Battery voltage low
- Battery test active

Connections to these terminals are via the 5 provided Din-Rail terminals



2.1.3 SNMP CARD – OPTIONAL EXTRA

Simple Network Management Protocol (SNMP) is a world-wide, standardised communication protocol that can be used to monitor any network-connected device via a simple control language and display the results in an application running within a standard web browser.

An SNMP card is a factory fitted option, designed to house a Modem/Ethernet SNMP adapter card, is located on top of the power module if fitted.

The SNMP adapter card contains an RJ-45 Ethernet connector which allows the ELXA to be connected to a network using a standard CAT-5 network cable. Once connected, the system management software agent that is preinstalled in the SNMP adapter monitors the ELXA operation and outputs its data in SNMP format to the connected network.

The communication exchanged between the ELXA and network enables event/alarm emails, server shut down (with optional licenses) and other tasks to be performed. It can also be integrated with BMS software over a local area network (LAN) for SNMP or Modbus information over IP.

The SNMP adaptor requires a PC with terminal connections, and for normal operation at least one Ethernet connection.

CHAPTER 3 – TECHNICAL SPECIFICATION

3.1 GENERAL SPECIFICATIONS

Model	EL1005XA	EL1012XA	EL1030XA
Nominal Output Rating (CosØ : 0,8) kVA	0.5kVA	1.25kVA	3kVA
Nominal Output Rating (CosØ : 1) W	400 Watts	1000 Watts	2400 Watts
Efficiency (Load Dependant)	Upto 83% Inverter Mode / Upto 98% Changeover Mode		Upto 86% Inverter Mode / Upto 98% Changeover Mode
Operating Temperature (Ambient)	0-40 °C		
Altitude	<1000 meters (Above Sea level)		
Ventilation	Forced		
Relative Humidity	< 90%		
Protection Degree	IP 20		
Standards	EN 62040-1, EN 62040-2, EN 61000-2-2, EN 61000-3-2, EN 61000-4-2 EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8 EN 50171		
Transport	Packaged and On Pallet		

3.2 RECTIFIER SPECIFICATIONS

Model	EL1005XA	EL1012XA	EL1030XA
Nominal Input Voltage	230 VAC 1 phase + N		
Max Input current (A) per phase @100% resistive load, No charge current.	2.3A	5.2A	12.6A
Max Input current (A) per phase @100% resistive load, Full charge current.	6A	9A	24.6A
Input MCB Fitted to Cabinet	Type C 10A	Type C 16A	Type C 25A
Input Frequency Range	47 – 55Hz		
Input Power Factor	>0.99		
Input Voltage range	140 – 310 Vac		
Input THDi	<5%		
Input Protection	Fuses, Voltage & Frequency tolerance, Input power limit,		

3.3 BATTERY SPECIFICATIONS

Model	EL1005XA	EL1012XA	EL1030XA
Battery Type	Sealed Lead Acid - maintenance Free		
Number of Blocks	4 x 12V Batteries		
Number of Cells	360		
Float voltage	54Vdc		
Battery Cut Off voltage	40Vdc		
Charger Max (A)	15A	15A	45A
Battery Installation	Internal		
Battery Test Automatic	Standard every 6 days		
Battery Protection	Polarity Protection/ Short Circuit Protection / Fuses		

3.4 INVERTER SPECIFICATIONS

Model	EL1005XA	EL1012XA	EL1030XA
Nominal Output Voltage	230 VAC 1 phase + N		
Output Frequency	50 Hz		
Output Frequency Tolerance - Free Running - Line Synchronized	± 3 % ± 10 %		
Overload Capability	120% Load :Continuous 125-150% Load : 1 min >150% Load : By pass		
Harmonic Distortion	< 5 %		
Crest Factor	3/1		
Output Waveform	Sine Wave		
Short Circuit Protection	Electronic Short Circuit Protection		

3.5 BYPASS SPECIFICATIONS

Primary Components	Electronic Relay Switch
Nominal Voltage -V	230 VAC 1 phase + N
Nominal Frequency - Hz	50 Hz ± 5%
Retransfer : Changeover mode to Inverter	Automatic
Overload Capability	150 – 200 % Continuously
Manual By-Pass	Without Interruption

3.6 HEAT DISSIPATION (At nominal load and voltage)

Model	EL1005XA	EL1012XA	EL1030XA
Watts	100	250	600

3.7 MECHANICAL SPECIFICATIONS

Model	EL1005XA	EL1012XA	EL1030XA
Dimension (h x w x d)	850 x 750 x 250	1300 x 750 x 250	1300 x 750 x 400
Weight (W/O battery) (Kg)	35	40	50
Protection Level	IP20		
Colour	Blue		