ELCON

RELIABLE POWER

AC & DC POWER SYSTEMS

ELCON **AC & DC** POWER SYSTEMS

Elcon combines modular design, the latest technology, and in-house engineering, manufacturing and testing in order to offer power systems for a variety of critical electrical systems relying on battery backup energy. The power systems are tailored and scaled according to customers' specifications at a competitive price and with sufficient safety margins.

Elcon Power Systems are primarily used in power plants and electricity distribution, but also in industry, hospitals, rail traction, ICT and telecom. With a technical lifetime of up to 40 years, excluding batteries, they offer the lowest lifecycle cost on the market.

SYSTEM CONTROLLER

- Advanced next-generation control and monitoring
- Supervision via Modbus® Communications Protocol
- High resolution colour touchscreen LCD display with advanced local UI
- Integrated USB host for local firmware upgrades, configuration updates and system backup/ restoration
- Comprehensive graphical user interface for advanced system configuration
- Seamless integration of multiple power systems allowing comprehensive management, monitoring and control
- External ADIO peripherals for customizing unique I/O configurations.

INVERTER MAIN FEATURES

- Modular and compact design
- Scalable with required amount of adjacent modules on each rack
- More racks can also be added for larger power
- Up to 10 kVA in 2U for each rack
- Up to 225 kVA in 3 enclosures of 75 kVA each
- High power density
- Hot swappable
- High efficiency
- Dual input sources (AC & DC) with wide AC input range of 150 Vac to 265 Vac
- Transfer time reduced to 0.

RECTIFIER MAIN FEATURES

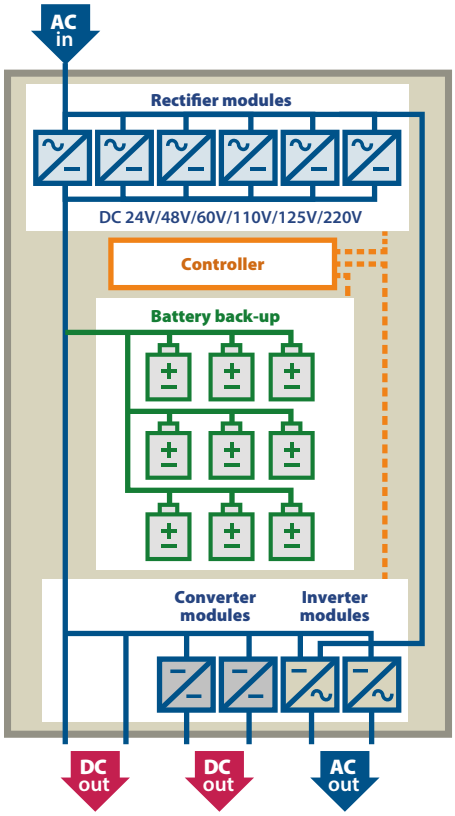
- Modular and compact design
- Scalable with required amount of adjacent modules on each rack
- More racks can also be added for larger power
- High power density
- Hot swappable
- High efficiency
- Power limiting and wide range AC input.

ISO 9001:2015 (QMS) & ISO 14001:2015 (EMS)

Quality Management System (QMS) ISO 9001:2015 and Environmental Management System (EMS) ISO 14001:2015 are certified.

MODULARISED DESIGN – CUSTOMIZED SOLUTIONS

The power system to be backed up and the origin of power can be either alternating current AC or direct current DC. The energy storage is DC, stored in any number of electrical batteries of different sizes depending on the required power during a specified time period.



ELCON POWER SYSTEM

- modularised design
- in-house product development, manufacturing and testing
- small and agile organisation
- committed and competent personnel
- professional technical support.

Elcon Power Systems EPS provides the lowest lifecycle costs on the market:

- the latest technology
- high-quality components, high-end suppliers
- superior efficiency
- long lifetime (up to 40 years)
- competitive pricing, low overhead costs.

Tornio Manga LNG receiving terminal by Wärtsilä

Manga LNG Terminal Oy is the largest liquefied natural gas (LNG) import terminal in the Nordic countries, located in Tornio, Finland. Elcon took part in this exceptional project by delivering power systems with battery backup to ensure that a power outage will not occur in the terminal's critical electrical system.

Transformer stations and substations by VEO

Elcon has delivered several power systems with battery backup for the transformer station expansions and substations VEO has delivered in Finland, Sweden and Norway.

LEMENE, a self-contained smart energy system

Elcon delivered the power systems with battery backup for the substations in the Lempäälän Energia LEMENE project, an intelligent and energy self-sufficient environment. The LEMENE project is an energy technology key project of the Ministry of Economic Affairs and Employment in Finland.

Püssi converter station

Anttila converter station

Photo courtesy of Fingrid Oyj

EstLink 2 cross border connection by Fingrid and Elering

Elcon delivered power systems with battery backup to Fingrid for the second cross-border link between Finland and Estonia.

COMPONENTS AND STRUCTURE

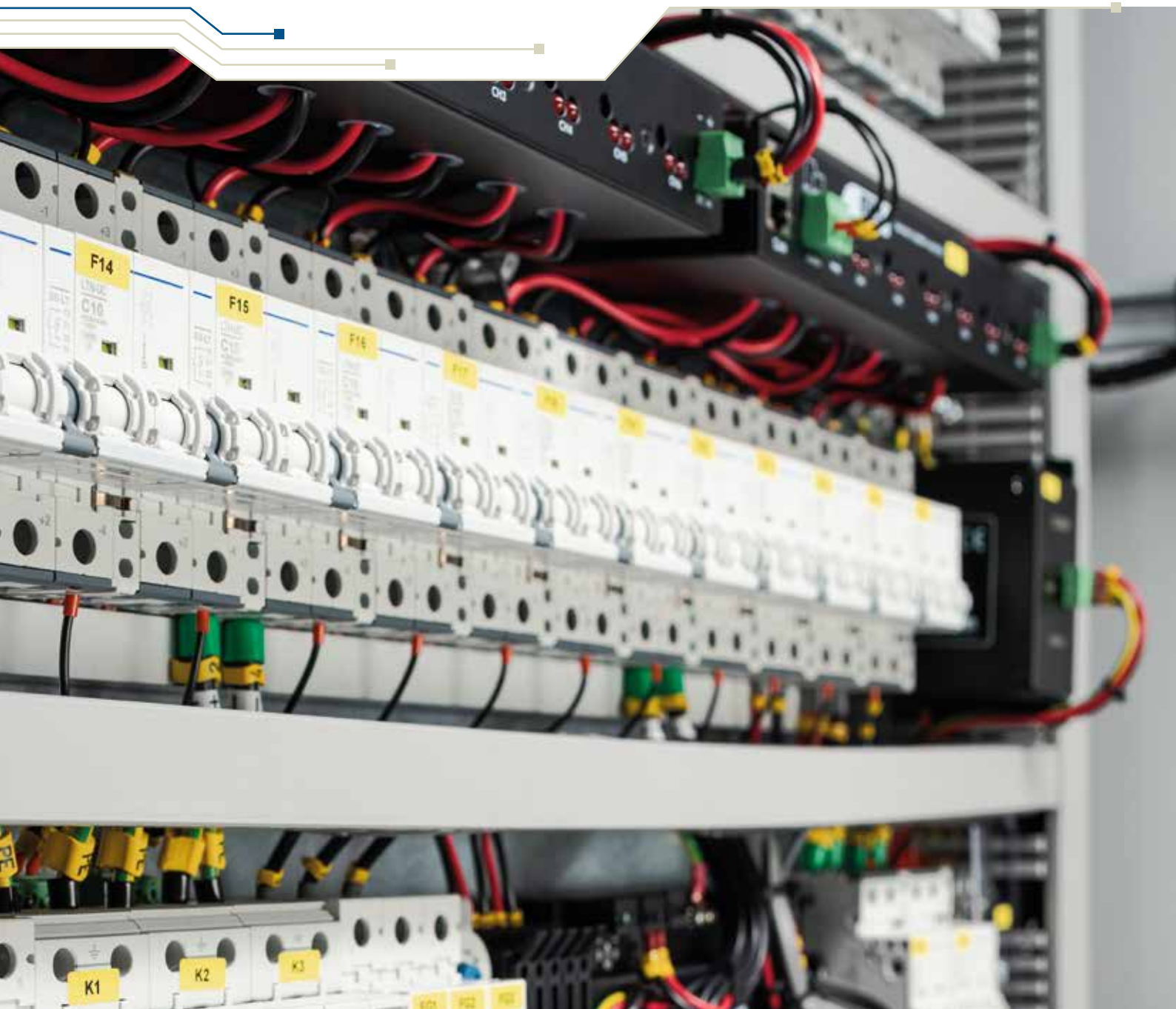
The Elcon Power Systems (EPS) main components are rectifiers, batteries, converters and inverters that are installed in a system cabinet and controlled by the system controller. The main components as well as the outputs are modular. Thereby Elcon Power Systems are customized according to the customer's requirements and expectations.

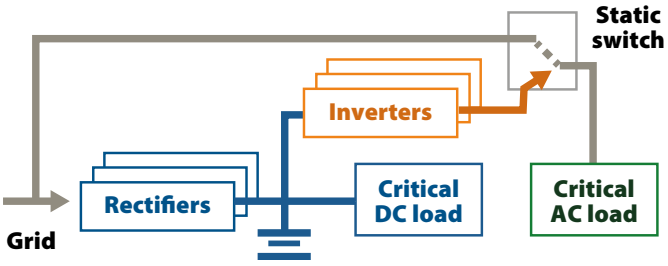
RECTIFIER MODULES

The modular MOSFET-based rectifiers use a high frequency switched mode conversion technology. The DC output is fully regulated and isolated from AC input. The DC output voltage can be any of the standard 24, 48, 110, 125 or 220 VDC, or modified to any other DC voltage.

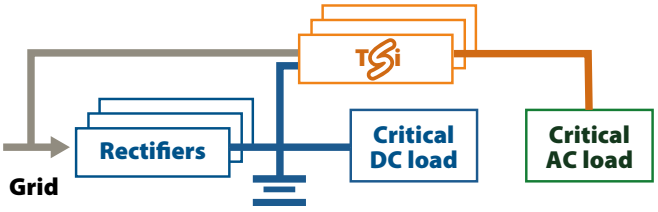
The load level of the rectifier modules is determined by the system controller and the load is evenly distributed between the modules. Should one rectifier module fail, the load level is automatically increased for the remaining modules and an alarm is forwarded.

The rectifier modules are "hot swappable" and can be removed and installed





Traditional inverter connection with static switch



Inverter utilizing TSI technology

without shutting down the power system. Thus, the modules can be replaced in less than a minute. The rectifier modules of the Elcon Power System are fully redundant compared to systems where one module acts as master and the rest of the modules as slaves.

Elcon Power Systems are very reliable with a mean time between failures of more than 40 years.

BATTERY BACKUP

The power system has a battery backup to ensure proper equipment operation during power outages. The battery bank consists of one or several battery strings depending on the required capacity and backup time.

Available battery types:

- sealed lead acid
- flooded lead acid
- Nickel-Cadmium
- Lithium-ion
- any other type.

The battery bank can be mounted in the system cabinet, in a battery cabinet, or in a separate battery room on battery racks.

Every battery string is equipped with a battery MCB or a switch fuse.

CONVERTER MODULES

Converter modules allow multiple voltage outputs to be available from a single power system. Typical conversions are from 110 V to 24 V or from 110 V to 48 V.

INVERTER MODULES

The operation of AC voltages during outages can also be secured by equipping the system with inverter modules providing a pure sine wave AC supply. The AC backup solution uses the latest inverter technology, providing superior energy efficiency in a compact size. The twin sine innovation (TSI) technology eliminates all single point failures with full scalability: up to 32 modules in parallel.

A failure of the static switch in traditional inverter connection can bring down the whole AC system. The TSI technology replaces the traditional solution with a new technology where each module incorporates a triple conversion.

Inverter module:

- hot swappable and exchangeable without shutting down the system
- transfer time 0 ms thanks to DPS controlled dynamic source switching from AC to DC and vice versa
- high efficiency of up to 96%, reducing operating costs.

SYSTEM CONTROLLER

The system controller has a high-resolution touchscreen LCD display for system configuration. The system live signal data and system status can be viewed via the display. There is an integrated USB host for local firmware upgrades, configuration updates and system restoration. Modbus communication protocol enables supervision and communication of alarms and live analogue and digital signals using Modbus protocol.

SYSTEM CABINETS

The standard IP (Ingress Protection) enclosure rating of the system cabinet is 21 or optionally higher if required. The default cable entry is through the cabinet roof. Optionally, the cable entry can be through the cabinet bottom and the cabinet should be equipped with a plinth. To ensure proper cooling, all cabinets are equipped with at least two cooling fans. As option these cooling fans can be equipped with condition monitoring. The size of the system cabinet depends on the amount of equipment, two commonly used sizes are 2000 x 600 x 600 (H x W x D) and 2000 x 800 x 600 (H x W x D). In cases where the cabinet door must be smaller, the 2000 x 1000 x 600 (H x W x D) cabinet with two 500 mm doors is an alternative.

Alternative cabinet sizes and other options are available, including wall mounted cabinets and transparent cabinet doors.

OUTPUTS / DISTRIBUTION

The number of outputs and their size can be customized according to the customer's requirements and expectations. In addition to voltage and current monitoring, the current leakage of the outputs can be supervised.

The OEZ DC miniature circuit breakers (MCB) are intended for over current protection of services and similar installations with rated currents from 0.2 A to125 A.

The DC distribution normally consists of 10…20 pcs 2 pole DC MCBs.

As option, switch fuses, fuse-links, cylindrical fuses or other types of fuses can be used to customize the distribution.

INDIVIDUAL OUTPUT EARTH FAULT MONITORING – LCM

The leakage current monitoring (LCM) unit indicates current differences (leakage current) between the incoming and outgoing current of the system output port. Each LCM unit has six independent measuring channels.

SURGE PROTECTION

As standard, the AC supply of the system cabinets is equipped with AC surge protection devices.

OPTIONS

- Condition monitoring of battery cabinet cooling fans
- Voltage transducers
- Low voltage disconnection (LVD) for batteries
- Low voltage disconnection (LVD) for load
- Cabinet temperature sensor
- Remote and continuous battery monitoring
- Remote and continuous power system condition monitoring and surveillance

Elcon Power System controller with a high resolution touchscreen in the cabinet door

TECHNICAL DATA

RECTIFIER	24 Vdc		48 Vdc		
	400 W Module	3.1 kW Module	650 W Module	1.2 kW Module	2.4 kW Module
Operating Input voltage range	90…320 Vac	208…277 Vac	176…320 Vac	176…276 Vac	120…277 Vac
Input frequency	45…70 Hz	45…70 Hz	45…70 Hz	45…70 Hz	44…66 Hz
Power output (continuous / module)	400 W	3100 W	650 W	1200 W	2400 W
Modules / shelf	4	5	4	3	5
Output power, fully equipped rectifier shelf	1.6 kW	15.5 kW	2.6 kW	3.6 kW	12 kW
Output voltage range	20…29 Vdc	21…29 Vdc	42…58 Vdc	42…58 Vdc	44…58 Vdc
Output current @ V nom	16.7 A @ 24 Vdc	130 A @ 24 Vdc	13.5 A @ 48 Vdc	25.0 A @ 48 Vdc	50.0 A @ 48 Vdc
Output current @ V float	14.8 A @ 27 Vdc	115 A @ 27 Vdc	12.0 A @ 54 Vdc	22.2 A @ 54 Vdc	44.5 A @ 54 Vdc
Cooling	Convection	Fan	Convection	Fan	Fan
Power factor	>0.99	>0.99	>0.99	>0.99	>0.99
THD	<5 %	<5 %	<5 %	<5 %	<5 %
Effciency	>90 %	>90 %	>91 %	>94 %	>96.2 %
Operating temperature range	-40°C…50°C	-40°C…65°C	-40°C…50°C	-40°C…65°C	-40°C…75°C

INVERTER MODULE (Vdc / Vac)	24 / 230	48 / 230	60 / 230	110 / 230	220 / 230
GENERAL					
Efficiency (typical): Enhanced power conversion / on line	> 95.5 % / > 89.5 %	96 % / 91 %			96.5 % / 92.5 %
Ambient / storage temperature / relative humidity	-20 to +50 ° C / -40 to +70 ° C / 95 %, non-condensing				
AC OUTPUT POWER					
Nominal output power	1500 VA / 1200 W	2500 VA / 2000 W			
Short time overload capacity	150 % (15 seconds) 110 % permanent within T° range				
Internal temperature management and switch off	Yes				
AC OUTPUT SPECIFICATIONS					
Nominal voltage (AC*)	220 / 230 / 240 V				
Frequency / frequency accuracy	50…60 Hz / 0.03 %				
Total harmonic distortion (resistive load)	< 1.5 %				
Load impact recovery time	0.4 ms				
Turn on delay	20 s to 40 s depending on the number of modules installed				
Nominal current. Protected against reverse current	6.6 A	10.9 A			
Crest factor at nominal power	2.8 : 1	3:01			
With short circuit management and protection	2.8 : 1	3:01			
Short circuit clear up capacity	10 x In for 20 msec – available while mains is available at AC input port with magnitude control and management				
Short circuit current after clear up capacity	2.1 In during 15 s and 1.5 In after 15 s				
DC INPUT SPECIFICATIONS					
Nominal voltage (DC)	24 V	48 V	60 V	110 V	220 V
Voltage range (DC)	19…35 V	40…60 V	48…72 V	90…160 V	170…300 V
Nominal current	56 A @ 24 Vdc, 1200 W output	46 A @ 48 Vdc, 2000 W output	35 A @ 60 Vdc, 2000 W output	19 A @ 110 Vdc, 2000 W output	9.8 A @ 220 Vdc, 2000 W output
Maximum input current (for 15 second) / voltage ripple	84 A / < 100 mV rms	84 A / < 2 mV Psopho	52 A / < 100 mV rms	29 A / < 200 mV rms	14.9 A / < 200 mV rms
Input voltage boundaries	User selectable with T2S interface				
AC INPUT SPECIFICATIONS					
Nominal voltage (AC)	220 / 230 / 240 V 1P or 3P (Min 3 shelves for 3P)				
Voltage range (AC)	150…265 V				
Brownout	150 to 185 V linear derating 150 VA / 120 Watts per 10 Vac				
	1200 VA / 960 W @ 150 Vac	2000 VA / 1600 W @ 150 Vac			
Conformity range before transfer to DC	Adjustable				
Power factor	> 99%				
Frequency range (selectable) / synchronization range	50…60 Hz / range 47…53 Hz / 57…63 Hz				
IN TRANSFER PERFORMANCE					
Max. voltage interruption / total transient voltage duration (max)	0 s / 0 s				
SIGNALING & SUPERVISION					
Display	Synoptic LED				
Alarms output / supervision	Dry contacts on shelf / Web, MODBUS RTU, SNMP				
Remote on / off	On rear terminal of the shelf via T2S				

	110 Vdc		125 Vdc		220 Vdc	
4.0 kW Module	**1.1 kW Module**	**4.4k W Module**	**1.1 kW Module**	**4.4 kW Module**	**1.1 kW Module**	**4.4 kW Module**
208…277 Vac	208…277 Vac	208…240 Vac	208…277 Vac	208…240 Vac	208…277 Vac	208…240 Vac
45…66 Hz	45…66 Hz	45…70 Hz	45…66 Hz	45…70 Hz	45…66 Hz	45…70 Hz
4000 W	1100 W	4400 W	1100 W	4400 W	1100 W	4400 W
5	6	5	6	5	6	5
20 kW	6.6 kW	22 kW	6.6 kW	22 kW	6.6 kW	22 kW
42…60 Vdc	90…160 Vdc	90…160 Vdc	90…160 Vdc	90…160 Vdc	180…320 Vdc	180…320 Vdc
83.3 A @ 48 Vdc	10 A @ 110 Vdc	40.0 A @ 110V dc	8.8 A @ 125 Vdc	35.2 A @ 125 Vdc	5.0 A @ 220 Vdc	20 A @ 220 Vdc
74.0 A @ 54 Vdc	9 A @ 121.5 Vdc	36.2 A @ 121.5 Vdc	8.0 A @ 135 Vdc	32.6 A @ 135 Vdc	4.5 A @ 243 Vdc	18 A @ 243 Vdc
Fan	Convection	Fan	Convection	Fan	Convection	Fan
>0.99	>0.99	>0.99	>0.99	>0.99	>0.99	>0.99
<5 %	<5 %	<5 %	<5 %	<5 %	<5 %	<5 %
>95.3 %	>93 %	>92 %	>93 %	>92 %	>93 %	>92 %
-40°C…75°C	-40°C…50°C	-40°C…50°C	-40°C…50°C	-40°C…50°C	-40°C…50°C	-40°C…50°C

Critical power to be backed up?
We'll make it reliable.

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RELIABLE POWER

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