EL-UR d.o.o. Zagreb

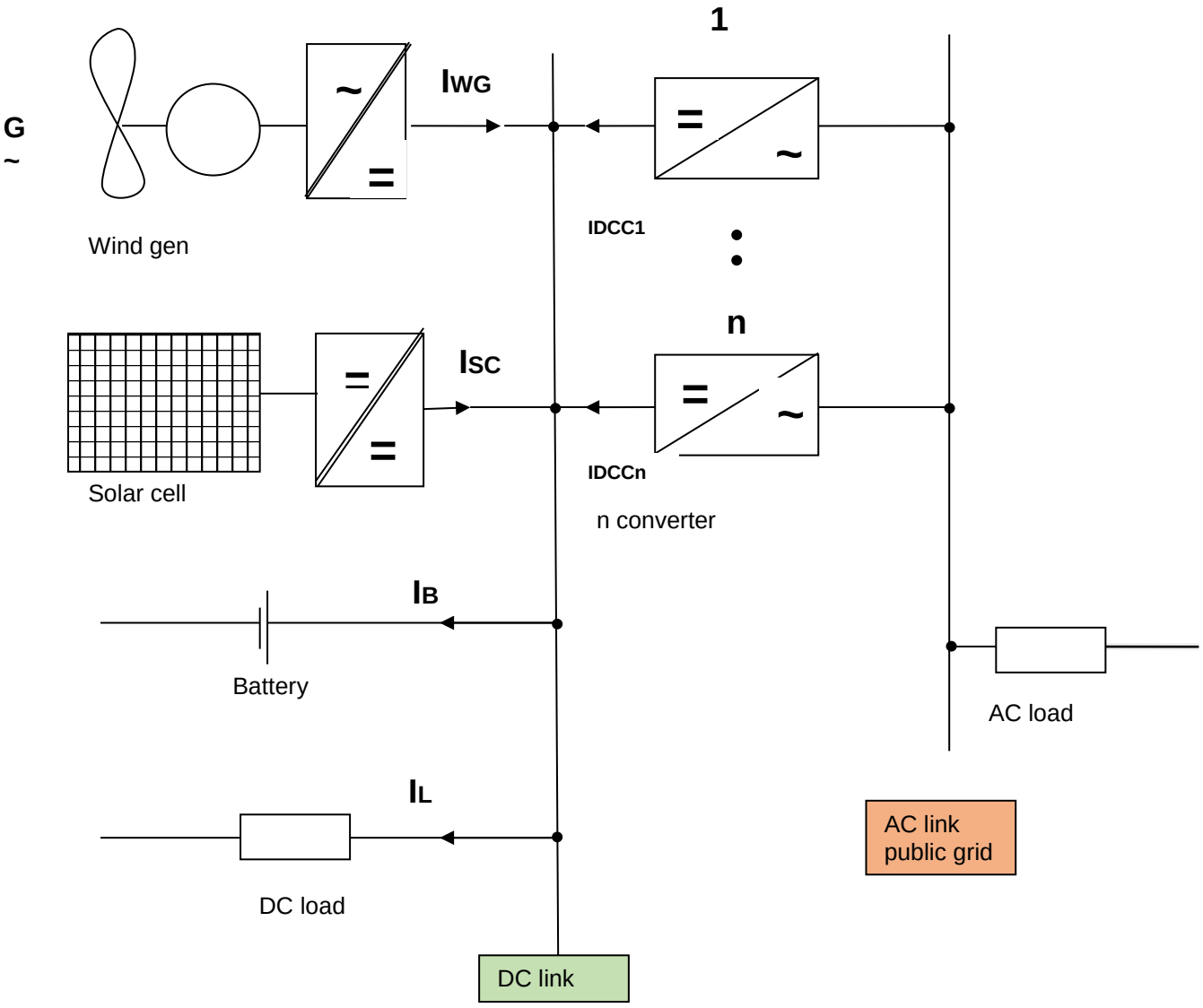
Poduzeće za razvoj, proizvodnju i trgovinu elektrouređajima

BSXT3k

Bidirectional converter
3kW

1. BSXT3k operation mode

1.1. AC-DC mode



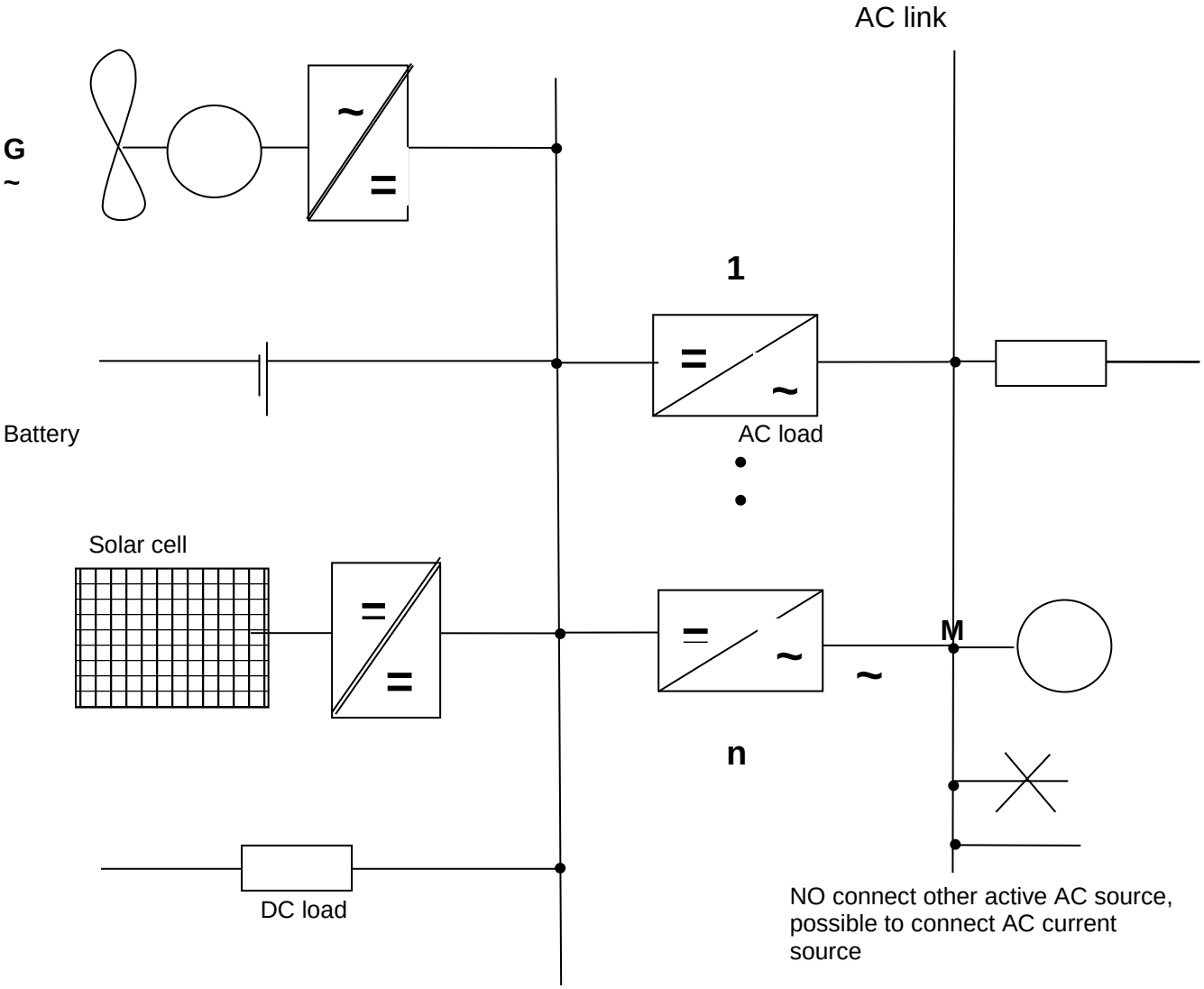
Converter keeps stable DC voltage link by controlling energy flow from AC to DC link.
Converter does not have AC link control.
$I_{WG}+ I_{SC}+ I_{DCC1} + \ldots + I_{DCCn} = I_B + I_L$

1.1. When $I_L + I_B > I_{WG} + I_{SC} \Sigma I_{DCC} \rightarrow 0$
-energy flow from AC to DC link

1.2. When $I_{WG} + I_{SC} > I_L + I_B \rightarrow \Sigma I_{DCC} < 0$
-energy flow from DC to AC link

No limit for number of connected converters.
No additional communication needed for current distribution between converters.

1.2. DC-AC mode, voltage source AC output



This operation mode is useful when only DC source exists, no other AC voltage source as public grid or AC generator.
Converter keeps stable AC voltage link, but has no control of DC link.
This mode is suitable for building AC grid from DC sources.
Number of connected converters has no limit.
No need for current distribution communication between converters.

Technical data

1.1 Rectifier operation mode

Rated data AC	
AC input voltage	400/230 V, 3/N/PE
AC input voltage tolerance	± 20 %
Frequency	47 - 63 Hz
Over voltage protection	480V, automatically reset 460V
Under voltage protection	320V, automatically reset 340V
Other input protections	Over current, surge
Input current form	Sinus
Input inrush current	10A(…15A) for max. 2ms
Max. THDU	ca. 5%
Max. THDI	4%
Fuse AC Side	Melting fuse 6.3A/slow
Rated data DC	
Rated power	3000 W
Output voltage nominal	750 VDC
Output voltage range	500 – 780 VDC
Output voltage stability (change of input voltage)	Better than 0,5%
Output voltage stability (change of output current)	Better than 1%
Static tolerance	1%
Ripple (voltage)	≤ 0,35% rms, 1,2% pp (@750VDC)
Ripple (current)	≤ 5 % rms (@750VDC)
Output current	4A at 750V (6A at 500V)
Battery charging characteristics (charger option)	IUP
Technology	Switching, µP control
Output protection	Over voltage switch off, over current limited to 6A.
Max. rectifiers in parallel	No limit
Max. output voltage	780VDC, limited by intermediate circuit voltage

1.2 Inverter operation mode

Rated data DC	
DC input voltage	nominal 750 VDC
DC input voltage range	500 – 800 VDC
Tolerable ripple on dc bus	5% rms
Max. DC current	6.3A / 10A at overload 50%
Fuse DC Side	Melting fuse 10A/fast
Rated data AC	
Rated power (cos phi = 1)	3 kVA (max. 1KVA per phase)
Output voltage	400/230 V, 3/N/PE
Output voltage setting range	± 5 %
Voltage tolerance – static	± 1,5 % (parallel operation)
Voltage tolerance – dynamic (load step 100%)	Better than 6%
Voltage tolerance – asymmetric load	3 %
Asymmetric load range	100%
Regulation time	15 ms / 3%
Waveform	Sinusoidal
THDU	< 4% (linear load)
Load power factor range	0,8 lag – 0,8 lead
Output frequency	50 Hz ± 1% (crystal controlled)
Synchronizing range	± 3% (optional)
Overload characteristic	50% (for 30 seconds)
Short circuit characteristic	i2t (electronic)
Short circuit current	2 x In, inverter stops after 5 sec
Input inrush current:	10A(…15A) for max. 2ms
Max. inverters in parallel	No limit

1.3 General technical data

Rated data total system	
Total efficiency at full load, typ.	94%
Power loss max.	192 W
Noise level max.	50dBA
Recommended AC cable cross section	4 mm_2
Recommended DC cable cross section	4 mm_2
General data	
Protection class	1 in accordance with EN 60950
Earth conductor current	< 5 % $I_{Nominal}$ typ. 50 mA
Protection type (EN 60529)	IP 21

Permissible environmental conditions: Long term storage (as per EN 60721-3-1) Short term transport (as per EN 60721-3-2) Operation (as per EN 60721-3-3)	1K2 / 1M3 0 to +40 °C 2K2 / 2M2 -25 to +60 °C 3K7 -40°C to +70°C (>55°C linear derating, 70% of maximum load at 70°C) · 5-85 % rel. humidity, w/o condensation · with cabinet heater up to 95 % rel. humidity without moisture condensation · Degree of contamination 2
Permissible installation height at rated load	2000m
Connection	Bottom side
Dimensions (W x D x H)	483 x 188 x 282 mm
Weight	9,8 kg
Distance to other components (cooling)	100 mm
Paint	RAL 7035, full tone structured coating
Instrumentation	3 LED
Mean Time between failures MTBF:	200000h
Cooling method	"AN" natural air cooling
Insualtion coordination	
General	AC – 3*400VAC / 50Hz DC – 800VDC Permanent interference voltage 250Vac / 16.7Hz (railway track)
Air distance	DC-line to earth: 5.5mm AC-line to earth: 3mm DC-line to AC-line: 6mm (external overvoltage protection necessary)
Creeping distance	DC-line to earth: 8.4mm AC-line to earth: 3mm DC-line to AC-line: 8.4mm
High voltage test	
Test voltages: – AC / DC – AC / body – DC / body	 4.2kVDC 2.69kVDC 4.2kVDC
Applied directive and standards	
Low Voltage Directive	2014/35/EU
EMC Directive	2014/30/EU
EMC standards	EN 50121-5

General requirements and safety requirements	EN 60950-1
Railway applications:EMC	EN 50121-4
Railway applications: Isolation coordination	EN 50124-1
Degrees of protection by enclosures	EN 60529
EMC: Immunity for industrial environments	EN 61000-6-2
EMC: Emission standards for industrial environments	EN 61000-6-4
Railway applications - Environmental conditions for equipment	EN 50125-3
Classification of groups of environmental parameters and their severities – Stationary use at weatherprotected locations	EN 60721-3-3
Safety requirements for power electronic converter systems and equipment	EN 62477-1