



# SYNCHRONVERTER

*grid stability*

Information Brochure



# SYNCHRONVERTER

**renewable energy  
meets grid stability**



European Commission  
Horizon2020  
European Union funding  
for Research & Innovation



# WORKING AREA

## SYNCHRONVERTER - TECHNOLOGY

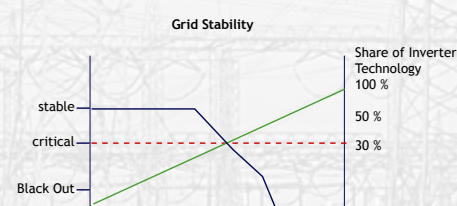
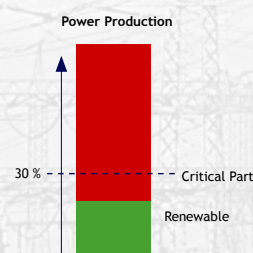
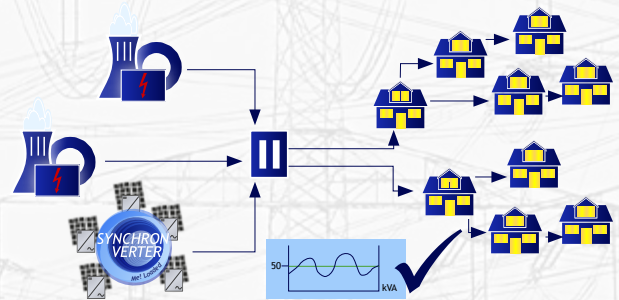
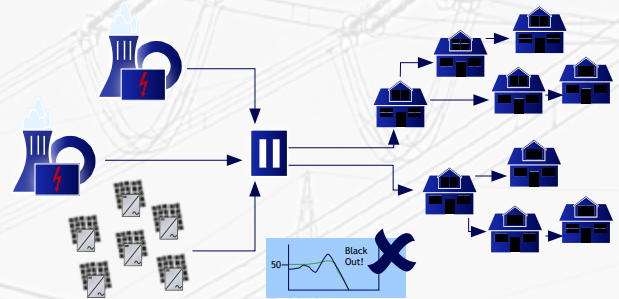
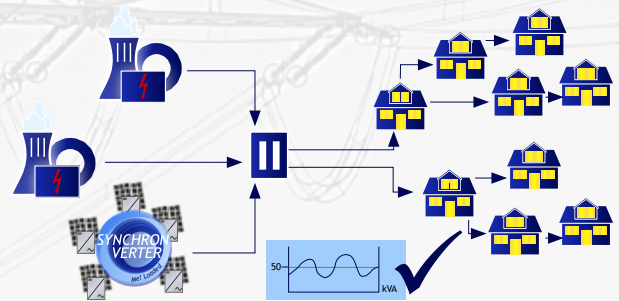
The proportion of renewable energy in the power grids worldwide is increasing. In order to sustainably curb CO<sub>2</sub> emissions and escape the drawbacks of nuclear energy, large industrial nations in particular are relying more and more on alternatives.

However, the power grids, evolved over decades, are exclusively based on generators that supply the energy in the form of alternating current. Renewable electricity is, for the most part, fed into the existing network via electronic converter technology.

Because of the increasing use of this technology, the networks are increasingly lacking the inertia of the generators that keep them stable during natural fluctuations. It can therefore be assumed that from a percentage of around 30% renewable electricity, a grid loses stability considerably. An extensive and uninterrupted power supply is then no longer possible.

Synchronverter solves this problem! With a highly complex algorithm, a power inverter with Synchronverter technology can behave as though it were a classic generator with inertia.

The network therefore regains stability and the proportion of renewable energy can then be increased without worry. The path is therefore free for a future in which electricity can be produced and distributed largely in a clean, safe and resource-saving manner.



Schematic Figure



# CONSORTIUM

## THE CONSORTIUM BEHIND THE PROJECT



The actual Synchronverter algorithm was developed by Israeli company Synvertec and successfully brought to prototype stage.

With the support of the “Horizon 2020 SME Instrument” program, the algorithm was integrated in classic PV inverters together with the two German companies Solutronic Energy GmbH and Q3 ENERGIE GmbH & Co. KG, and tested in practice as well as being presented and marketed as a product worldwide.



### SYNVERTEC

Synvertec is developing breakthrough electronics and control algorithms to be integrated within the core of mini and modern grids.

>> More information about Synvertec under [www.synvertec.com](http://www.synvertec.com)



### SOLUTRONIC ENERGY GMBH

The team of 30 men and women researches, develops, produces and sells individual technologies and service solutions for private households and industrial applications. From grid and off-grid inverters to energy storage systems, power generators to individual electronic components - Solutronic Energy offers everything from a single source.

>> More information about Solutronic Energy under [www.solutronic-energy.de](http://www.solutronic-energy.de)



### Q3 ENERGIE GMBH & CO. KG

Modern and innovative technologies made in Germany assure our prosperity's survival and our children's future. Q3 ENERGIE develops and manufactures these technologies.

>> More information about Q3 ENERGIE under [www.q3-energie.de](http://www.q3-energie.de)



### EUROPEAN UNION FUNDING

The Project „Synchronverter“ is financially supported by the „Horizon 2020's SME Instrument“ (Grant Agreement Number 717516).





# TECHNICAL DATA

INVERTER WITH „Me! Loaded“-TECHNOLOGY

Input DC	Unit	SIC3-SE50	SIC3-SE80	SIC3-SE100	SIC3-SE150	SIC3-SE200
Max. recommended power	W	6.000	9.600	12.000	18.000	24.000
Max. grid voltage	V	1.000	1.000	1.000	1.000	1.000
Min. start voltage	V	100	100	100	100	100
Max. MPP voltage	V	750	750	750	750	750
Min. MPP voltage	V	100	100	100	100	100
Max. current per String	A	18	18	18	18	18
Number of MPP trackers		2	2	2	2	2
Number of plug in		2	2	2	2	2

Output AC	Unit	SIC3-SE50	SIC3-SE80	SIC3-SE100	SIC3-SE150	SIC3-SE200
Nominal power	W	5.000	8.000	10.000	15.000	20.000
Max. power	W	5.000	8.000	10.000	15.000	20.000
Rated grid voltage	V	400 V/230 V (3/N/P)	400 V/230 V (3/N/P)	400 V/230 V (3/N/P)	400 V/230 V (3/N/P)	400 V/230 V (3/N/P)
Min. grid voltage	V	207 V	207 V	207 V	207 V	207 V
Max. grid voltage	V	253 V	253 V	253 V	253 V	253 V
Max. current	A	3x 7,25 A	3x 11,6 A	3x 14,5 A	3x 21,7 A	3x 28,9 A
Internal power at night	W	<15	<15	<15	<15	<15
Rated frequency	Hz	50   60	50   60	50   60	50   60	50   60
Max. Frequency	Hz	65	65	65	65	65
Min. Frequency	Hz	45	45	45	45	45
Max. Apparent power	VA	5.000	8.000	10.000	15.000	20.000
Cos phi		0,8c - 0,8i	0,8c - 0,8i	0,8c - 0,8i	0,8c - 0,8i	0,8c - 0,8i
Power factor		>0,98	>0,98	>0,98	>0,98	>0,98

Efficiency	Unit	SIC3-SE50	SIC3-SE80	SIC3-SE100	SIC3-SE150	SIC3-SE200
Max. Efficiency	%	98,5	98,5	98,5	98,5	98,5
European Efficiency	%	98	98	98	98	98



# TECHNICAL DATA

## INVERTER WITH „Me! Loaded“-TECHNOLOGY



Ambient conditions	Unit	SIC3-SE50	SIC3-SE80	SIC3-SE100	SIC3-SE150	SIC3-SE200
Operating temperature	°C	-20 to +60	-20 to +60	-20 to +60	-20 to +60	-20 to +60
Storage temperature	°C	-20 to +60	-20 to +60	-20 to +60	-20 to +60	-20 to +60
Max. Humidity	%	90	90	90	90	90
Degree of protection	IP	65	65	65	65	65
Cooling		Forced Air	Forced Air	Forced Air	Forced Air	Forced Air
Noise emission	dB(A)	<55	<55	<55	<55	<55

Configuration	SIC3-SE50	SIC3-SE80	SIC3-SE100	SIC3-SE150	SIC3-SE200
DC Breaker	yes	yes	yes	yes	yes
AFI	yes	yes	yes	yes	yes
Earth fault monitoring	yes	yes	yes	yes	yes
Synchronverter Technology	yes	yes	yes	yes	yes
Display	Graphic	Graphic	Graphic	Graphic	Graphic
DC Connectors	SunClix	SunClix	SunClix	SunClix	SunClix
AC Connectors	Amphenol	Amphenol	Amphenol	Amphenol	Amphenol

Certifications	SIC3-SE50	SIC3-SE80	SIC3-SE100	SIC3-SE150	SIC3-SE200
	VDE-AR-N 4105	VDE-AR-N 4105	VDE-AR-N 4105	VDE-AR-N 4105	VDE-AR-N 4105
	EN 62109	EN 62109	EN 62109	EN 62109	EN 62109
	EN 62000-6-1	EN 62000-6-1	EN 62000-6-1	EN 62000-6-1	EN 62000-6-1
	EN 62000-6-3	EN 62000-6-3	EN 62000-6-3	EN 62000-6-3	EN 62000-6-3
	EN50438	EN50438	EN50438	EN50438	EN50438
	CE	CE	CE	CE	CE
Canada/USA	CSA C22.2 No. 107.1				
Canada/USA	UL1741				
Australia/New Zealand	AS4777.1, AS 4777.2 and AS 4777.3				

Interfaces	SIC3-SE50	SIC3-SE80	SIC3-SE100	SIC3-SE150	SIC3-SE200
	Ethernet	Ethernet	Ethernet	Ethernet	Ethernet
	USB	USB	USB	USB	USB
	WiFi	WiFi	WiFi	WiFi	WiFi

Warranty	SIC3-SE50	SIC3-SE80	SIC3-SE100	SIC3-SE150	SIC3-SE200
Warranty	6 Years	6 Years	6 Years	6 Years	6 Years

Q3170124 Subject to technical alterations, errors and misprints excepted.