
ENERTRONICA
SANTERNO
Giving energy more value

Enertronica Santerno Worldwide

Europe
Italy
Spain

North America
U.S.A.

Central America
Panama

South America
Brazil
Chile
Colombia

Africa
South Africa

Asia
Singapore

50 Years of history

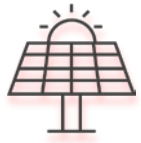
12+ GW installed

150+ Countries

Products and Services

Industrial Automation

For 50 years, Santerno has been defining, designing and manufacturing motor drives and soft starters for industrial applications in 25+ sectors



Photovoltaic

Santerno boasts 35-year leadership in power conversion systems producing solar energy, with 6 GW installed capacity

Energy Storage & Smart Grid

Santerno delivers best-in-class innovation technology offering reliable integrated solutions via tailor-made Smart Grid systems

Industrial Services

Santerno offers industrial services for solar plants as a Full EPC and offers comprehensive Operation & Maintenance service

Monitoring & Cloud

Santerno provides teams, technologies, big data analysis and 24/7 services ensuring comprehensive management of the Customer's plants via advanced cloud-based services

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INDUSTRIAL AUTOMATION

For over 50 years, Santerno has worked alongside our customers in the industrial automation field, offering the international market a complete range of electronic power converters.

Soft Starters, scalar inverters and vector inverters, drives for direct current and electric motors, are all part of Santerno's offer. We are professional provider of solutions with high performance and high energy efficiency.

Inverter
Soft Starters
AC/DC Converters
Solardrive Plus
Asynchronous motors
Remote Drive & Monitoring
Accessories

Drives and Soft Starters

15 product lines
>500.000 inverters sold worldwide
6,8 GW installed

General Purpose products – application specific solutions


CEMENT


STONE CRUSHING


MINING


BALL MILLS


BELT CONVEYORS


MARBLE CUTTING


SOLID WASTE SHREDDING


FORGING PRESSES


OIL & GAS


REGENERATIVE TEST BENCHES

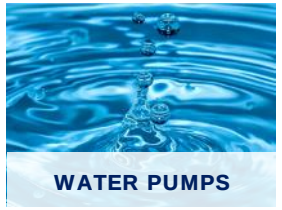

MARINE & OFFSHORE


CRANES – HOIST - WINCHES


GARMENTS DYEING & DRYERS


SUGAR CENTRIFUGES


ELECTROMAGNETS DRIVE


WATER PUMPS


WASTE WATER


REVERSE OSMOSIS


CHEMICAL


PLASTIC & RUBBER


HVAC


REFRIGERATION


FANS and BLOWERS


AIR COMPRESSORS


GAS COMPRESSORS

80 applications
25+ industrial sectors

Our experts provide **pre-sales engineering support** for the proper selection and dimensioning of our products for the most demanding applications, and **after sales technical support** for commissioning start up

ENERTRONICA SANTERNO

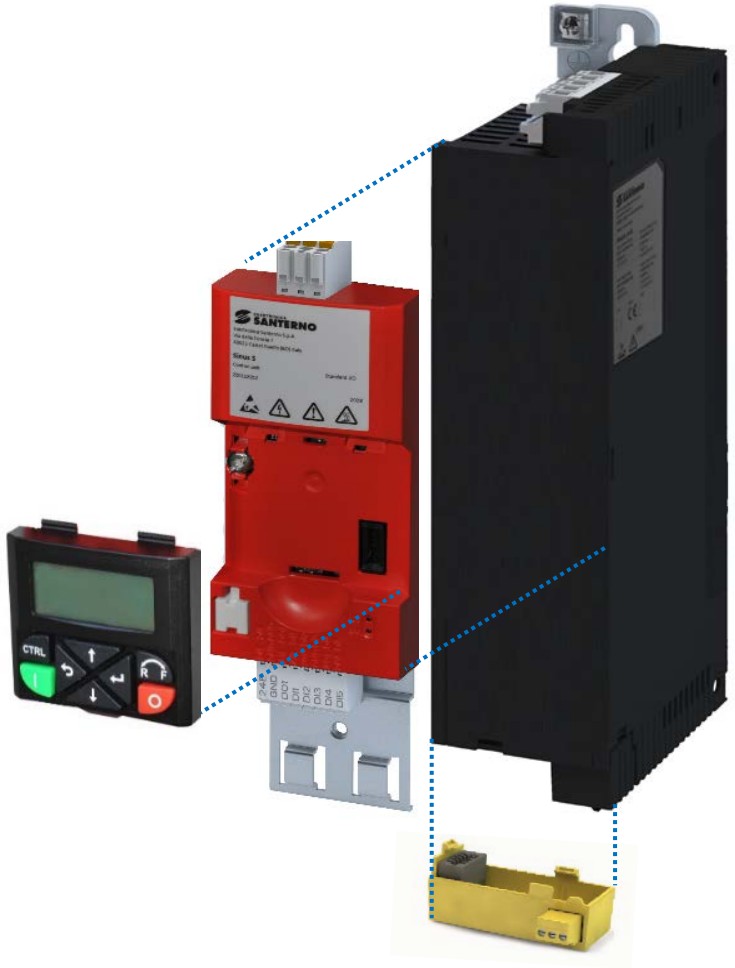
SINUS S

SINUS S

Introduction to an innovative product line.

SINUS S inverter drives..

... are setting the benchmark for inverter drives because:



1) Modularity

Modular and scalable concept allows to select the inverter needed for the individual application.

2) Size

Extremely compact design and effective mounting for applications where space means money.

3) Usability

New, innovative interaction for commissioning, tuning & diagnostic of inverter both for simple stand-alone and demanding highly automated control systems.

SINUS S modularity and flexibility

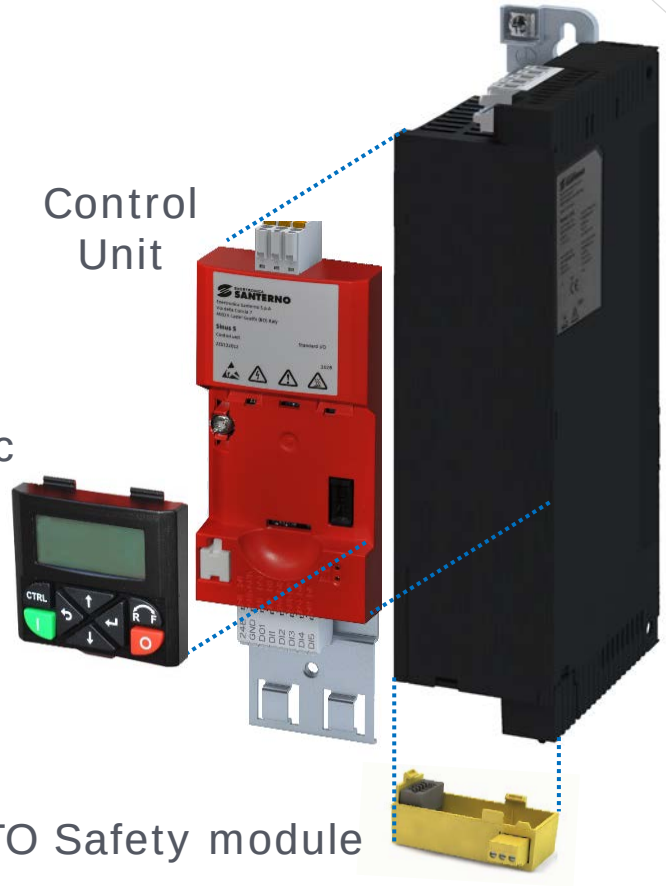
Flexible Diagnostic

Keypad

USB module

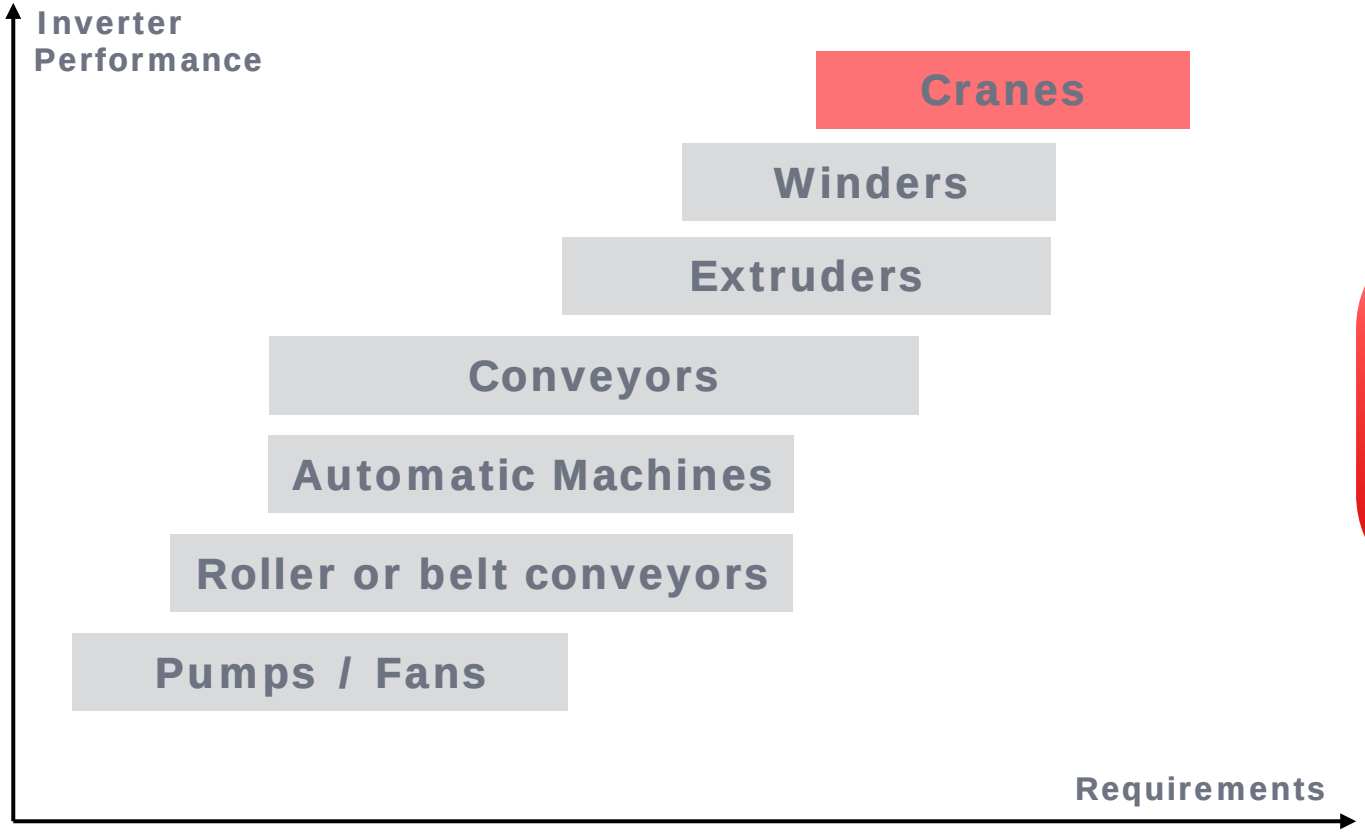
WLAN module

Modularity



SINUS S
highest flexibility :
you define your inverter selecting the single components

Applications



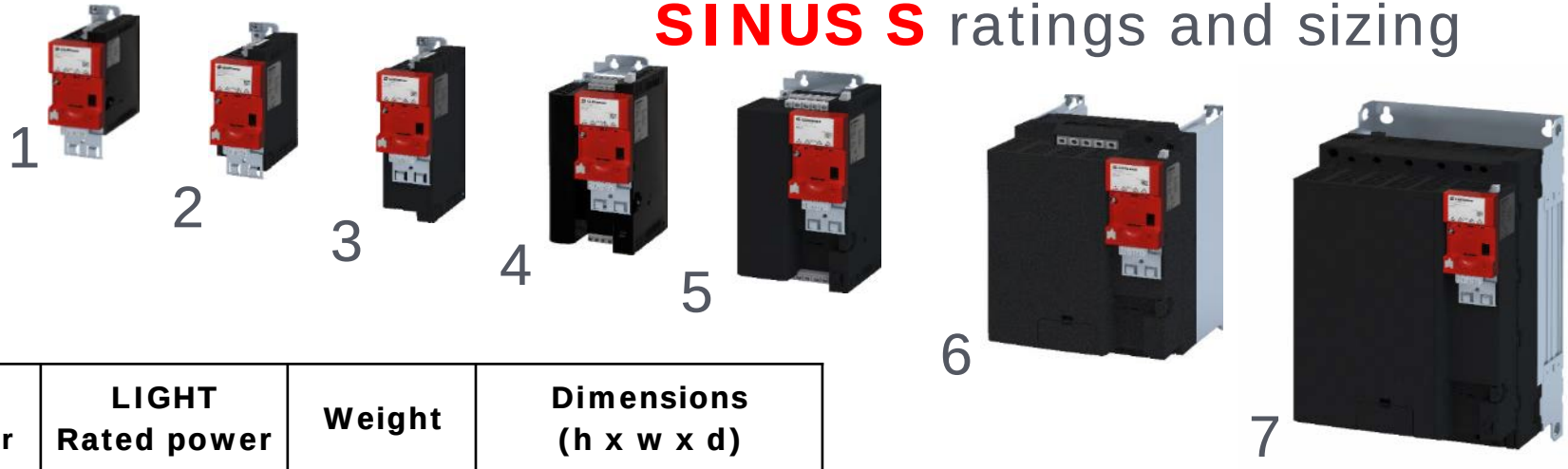
Excellence in Speed and Torque control for most demanding applications !

SINUS S inverter drives at a glance

Key Features

Design & Delivery	Modular design (complete inverter or components)	
Power Range	**0.37 - 30 kW (Heavy Duty)** **4.0 - 37 kW (Light Duty)**	
Hardware	• Memory module • IT-Grid compatible • Integrated EMC filters • Zero clearance mounting • Programmable form „C“ relay • Brake chopper • DC bus sharing • STO (optional) • Dedicated PTC	
I/O Communication Spring loaded control terminals (fixed)	**Standard-I/O** • Pluggable control terminal • Bipolar speed reference • 24 V keep alive • Selectable PNP or NPN logic	**Application-I/O (optional)** • Additional I/Os
Fieldbus	CANopen, Modbus RTU, Profibus, EtherCAT, Profinet , Ethernet-I/P, Modbus TCP (optionals)	
Diagnostics	Hot-swappable options: Keypad, USB module, WLAN module, Remote keypad	
Motor Control	• V / f (**VFC** linear, square & eco) • Sensorless Vector Control (**SLVC**) • **SLPSM** • Servo Control closed loop **SC** (ASM only with 100 kHz HTL)	

SINUS S ratings and sizing



SINUS S Model	HEAVY Rated power	LIGHT Rated power	Weight	Dimensions (h x w x d)
	[kW]	[kW]	[kg]	[mm]
SINUS S 0001 4T BA2K2	**0,37**		0,8	155 x 60 x 130
SINUS S 0002 4T BA2K2	**0,75**		1	180 x 60 x 130
SINUS S 0003 4T BA2K2	**1,5**		1,35	250 x 60 x 130
SINUS S 0005 4T BA2K2	**2,2**		1,35	250 x 60 x 130
SINUS S 0006 4T BA2K2	**3**	**4**	1,35	250 x 60 x 130
SINUS S 0007 4T BA2K2	**4**	**5,5**	1,35	250 x 60 x 130
SINUS S 0011 4T BA2K2	**5,5**	**7,5**	2,3	250 x 90 x 130
SINUS S 0014 4T BA2K2	**7,5**	**11**	3,7	276 x 120 x 130
SINUS S 0017 4T BA2K2	**11**	**15**	3,7	276 x 120 x 130
SINUS S 0020 4T BA2K2	**15**	**18,5**	10,3	347 x 204.5 x 222
SINUS S 0025 4T BA2K2	**18,5**	**22**	10,3	347 x 204.5 x 222
SINUS S 0030 4T BA2K2	**22**	**30**	10,3	347 x 204.5 x 222
SINUS S 0034 4T BA2K2	**30**	**37**	17,2	450 x 250 x 230

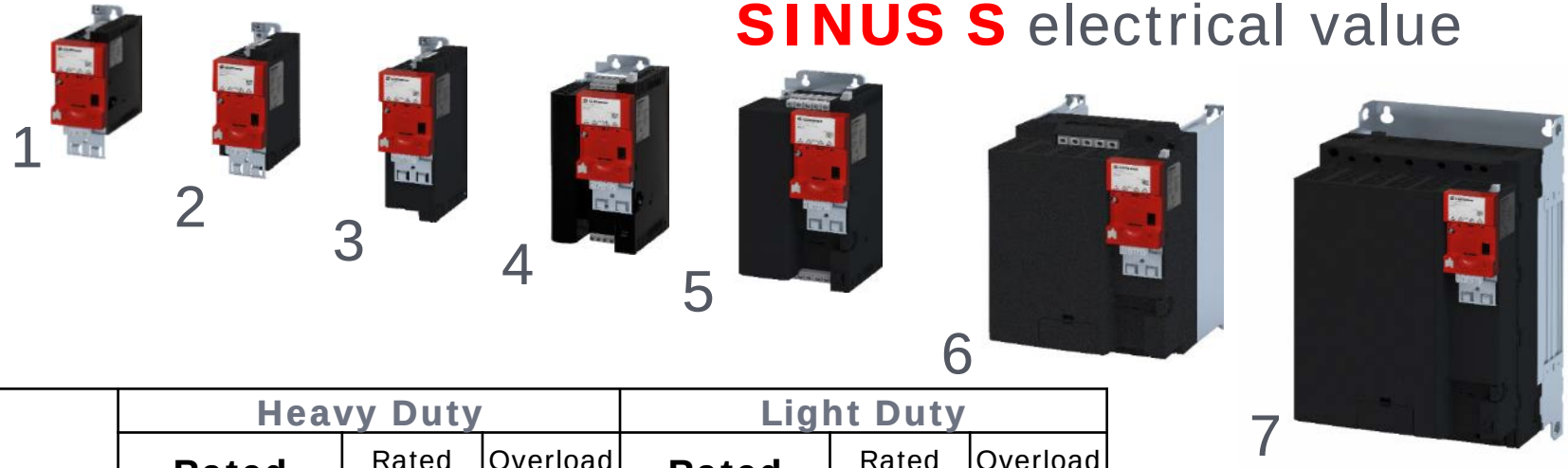
SINUS S :

13 models

7 sizes

Optimized to pack more power in less space

SINUS S electrical value



SINUS S Model	Mains supply	Heavy Duty			Light Duty		
		Rated power	Rated output current	Overload current (60 s)	Rated power	Rated output current	Overload current (60 s)
		[kW]	[A]	[A]	[kW]	[A]	[A]
SINUS S 0001 4T BA2K2	AC 3 phase 380-480 Vac -15%/+10% 45 Hz ... 65 Hz Common DC BUS 450 Vdc -0% ... 750 Vdc +0%	0,37	1,3	2	0,37	1,3	2
SINUS S 0002 4T BA2K2		0,75	2,4	3,6	0,75	2,4	3,6
SINUS S 0003 4T BA2K2		1,5	3,9	5,9	1,5	3,9	5,9
SINUS S 0005 4T BA2K2		2,2	5,6	8,4	2,2	5,6	8,4
SINUS S 0006 4T BA2K2		3	7,3	11	4	8,8	11
SINUS S 0007 4T BA2K2		4	9,5	14,3	5,5	11,9	14,3
SINUS S 0011 4T BA2K2		5,5	13	19,5	7,5	15,6	19,5
SINUS S 0014 4T BA2K2		7,5	16,5	25	11	23	23,6
SINUS S 0017 4T BA2K2		11	23,5	35	15	28,2	35
SINUS S 0020 4T BA2K2		15	32	48	18,5	38,4	48
SINUS S 0025 4T BA2K2		18,5	40	60	22	48	60
SINUS S 0030 4T BA2K2		22	47	71	30	56,4	71
SINUS S 0034 4T BA2K2		30	61	92	37	73,2	92

SINUS S further technical data

Worldwide product due to :
- Norm conformity
- Voltage range

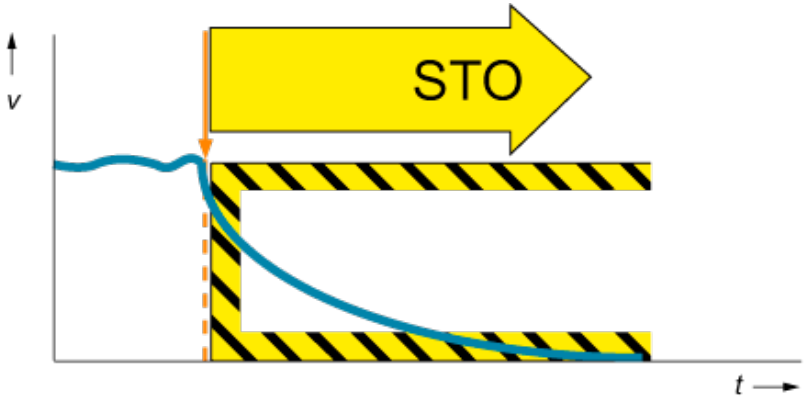
AC 340 V...538 V, 45 hz ...65 Hz

Degree of protection	IP 20, coated PCBs
Mounting	Zero clearance side by side upright mounting, without de-rating
Norm conformity	CE, EAC, RoHS2, cUL
Efficiency Class	IE2 according to EN 50598-2
Main frequency	45 Hz..65 Hz +/- 0%
Overload Capability	HEAVY DUTY 200% rated current for 3 s 150% rated current for 60 s LIGHT DUTY 120% rated current for 3 s
Switching frequency	2,4,8,16 kHz
Output Frequency	599 Hz
Max. motor cable lengths	C2 < 20 m
Temperature	-10 °C – 55 °C (>45 °C reduce rated output current by 2.5%/°C)
MTBF	600'000 h

Safety : STO Safe Torque Off

New innovative design

- Extremely small in size
- Modular design: Only select when needed while remaining in same product family
- Easy to add after installation if requirement changes



STO options: „Safe Torque Off“

- Performance Level PL e[1)]
- Safety Class SIL 3[2)]

1) ISO 13849-1
2) EN 62061 / EN 61800-5-2

The integration of the STO module permits:

- To reduce installation costs
- To reduce the usage of cabinet space
- To reduce the deterioration

Grid specifications and EMC

RCD Operation:
30 mA FI < 2.2 kW

IT-Grid operation
Through removal of IT-Screws

Integrated EMC Filter
C1 < 3 m
C2 < 20 m(1)

1) EN61800-3

Motor Cable shielding either on Cabinet or shield plate (optional) supported

Shield plate control I/O cables

Our summary:

One EMC friendly inverter for various needs.

Control unit I/O : Inputs and Outputs

		Label	Standard I/O	Application I/O
I/O	Digital Input	DIx	5	7
	Digital Output	DOx	1	2
	Ground	GND	3	5
	Analog Input	AIx	2 (Bipolar V/I)	
	Analog Output	AOx	1 (V/I)	2 (V/I)
	10 V Supply	10V	1	
	24 V Internal	24V	1	2
	24 V External	24E	2	
	Encoder HTL 100 kHz	DI 3 /4	Yes	
	PTC	T1/T2	1	
	Relay	NO/NC/ COM	1 (NO/NC)	
	Time		1 msec	
	Logic		PNP o NPN	

Standard-I/O

Scalable I/O to match machine requirements

Integration via fieldbus network

SANTERNO motion control world

CANopen
PROFIBUS
EtherNet/IP
PROFINET
EtherCAT
Modbus-RTU

Highest flexibility for customers

Flexible diagnostic

Keypad

USB module

WLAN module

Features

- **Modularity:** Select the diagnostic module that fits best to you – or none!
- **Hot-Swappable:**
  Change the diagnostic module during operation without any operational disruption.

Customer Benefits

- Conscious decision of what is really required.
- One diagnostic module for multiple inverters in one machine is sufficient.

Modular & hot-swappable diagnostic module help customers reduce cost.

SINUS S - Accessories

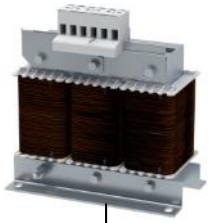
Keypad

Remote Keypad

VLAN Module

USB Module

SW Remote Sinus



Grid input inductances

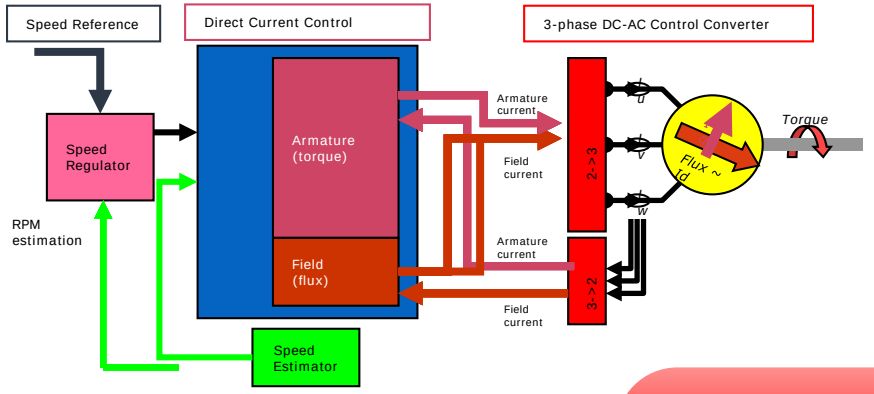
Shield plate for power cables

Braking resistors

Output sinusoidal filters

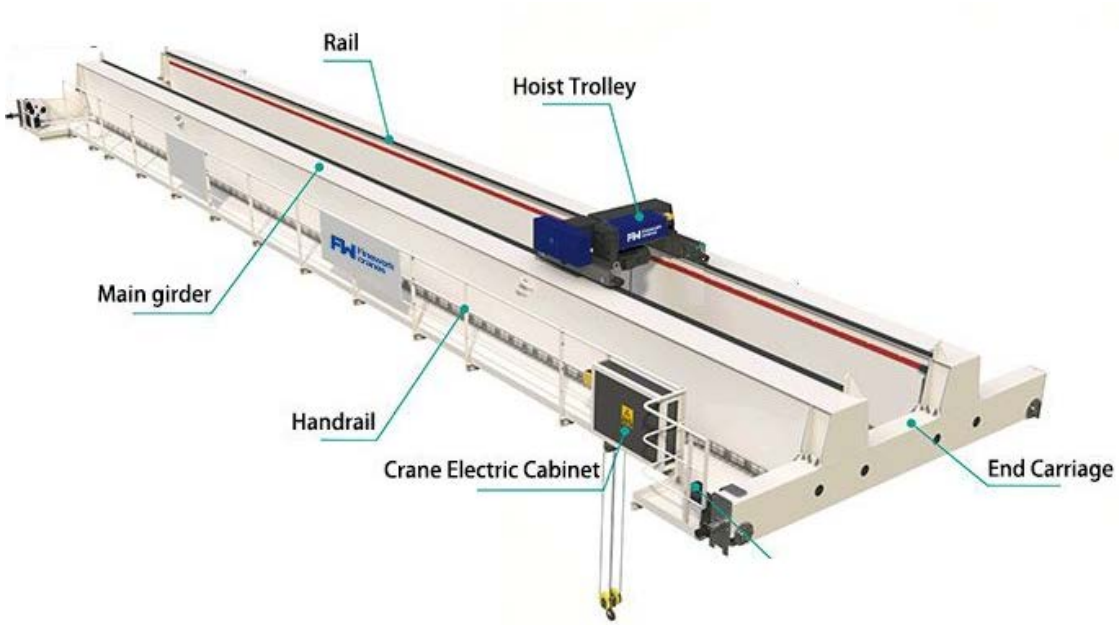
SINUS S - Functionalities

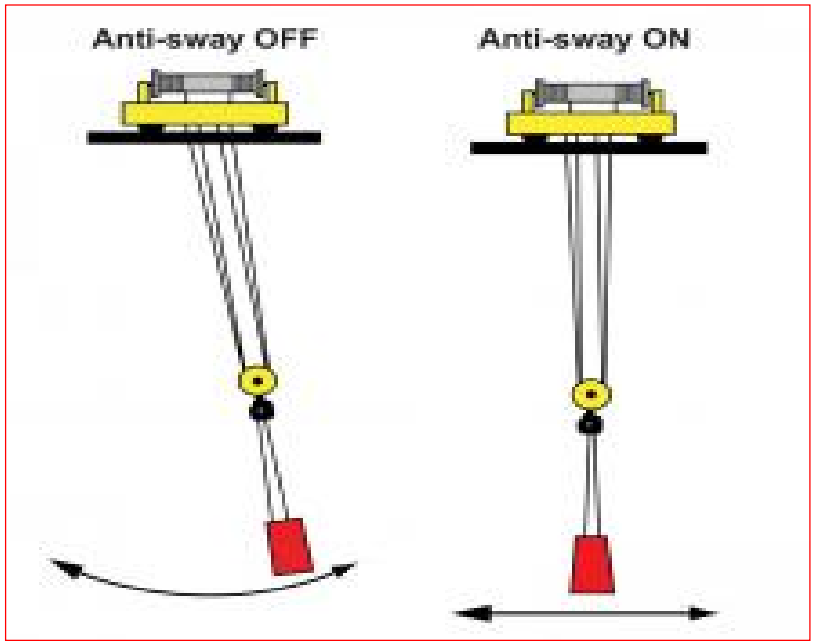
Features	
	Motor Control Mode
	Speed or torque control
	V / f (linear, quadratic) (VFC plus)
	VFC ECO
	Sensorless Vector Control (SLVC)
	Servo Control closed loop (SC)
	Asynchronous & Permanent Magnet Motors
	Multi Motor Parameter Sets (switch sets with DI or Network)
	Main application functions
	Freely assignable user menu
	S-shaped ramps for smooth operation
	PID controller
	Sequencer
	Sleep / rinse function
	OEM parameter set
	DC Brake
	Dynamic Brake / DC bus access



Scaled capabilities that deliver customer solutions

Antisway functions for trolley and gantry





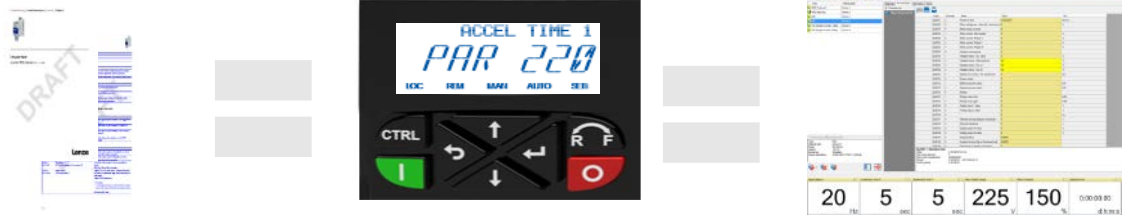
Integrated and easy antisway function for translation operations

Parameters interface

Parameters Group (Keypad, Remote Sinus)	content
Group 0: Preferred	Preferred parameters by the user
Group 1: Diagnostic	All diagnostic
Group 2: Basic Setup	Acceleration , decel jog, etc.
Group 3: Motor control Setup	Motor control parameters
Group 4: I/O Setup	I/O functionalities parameters
Group 5: Fieldbus Setup	Field bus parameters
Group 6: PID Setup	Internal PID when the inverter is used as a controller (i.e. for pumps/fans)
Group 7: Advanced Setup	Parking brake setup, Dinamic braking
Group 8: Setup sequence	Process setup sequence

Easy Interaction !

User interfaces



User Interaction tools

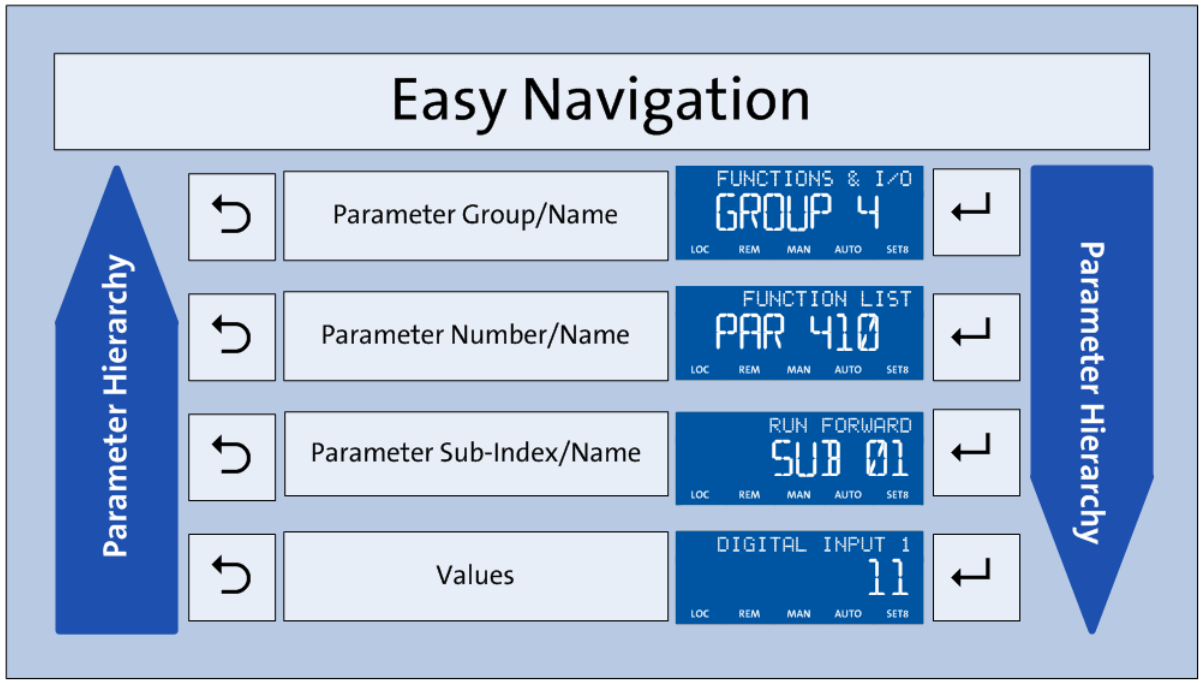
				
	Without diagnostic module	**Keypad**	**WLAN module and PC connection**	**USB module and PC connection**
Operation	✔☐			
Basic parametrization		✔☐		
Advanced parametrization			✔☐	✔☐
Commissioning via field busses	✔☐			
On site diagnostic		✔☐		
Advanced diagnostic			✔☐	✔☐
Diagnostic via field busses	✔☐			

Flexibility to access parameters depending on specific hardware configuration

Keypad Interaction

Example At a glance :

- Group 2 parameters
  - Basic setup
- Parameter 20
  - Acceleration time 1



Intuitive design to facilitate the user

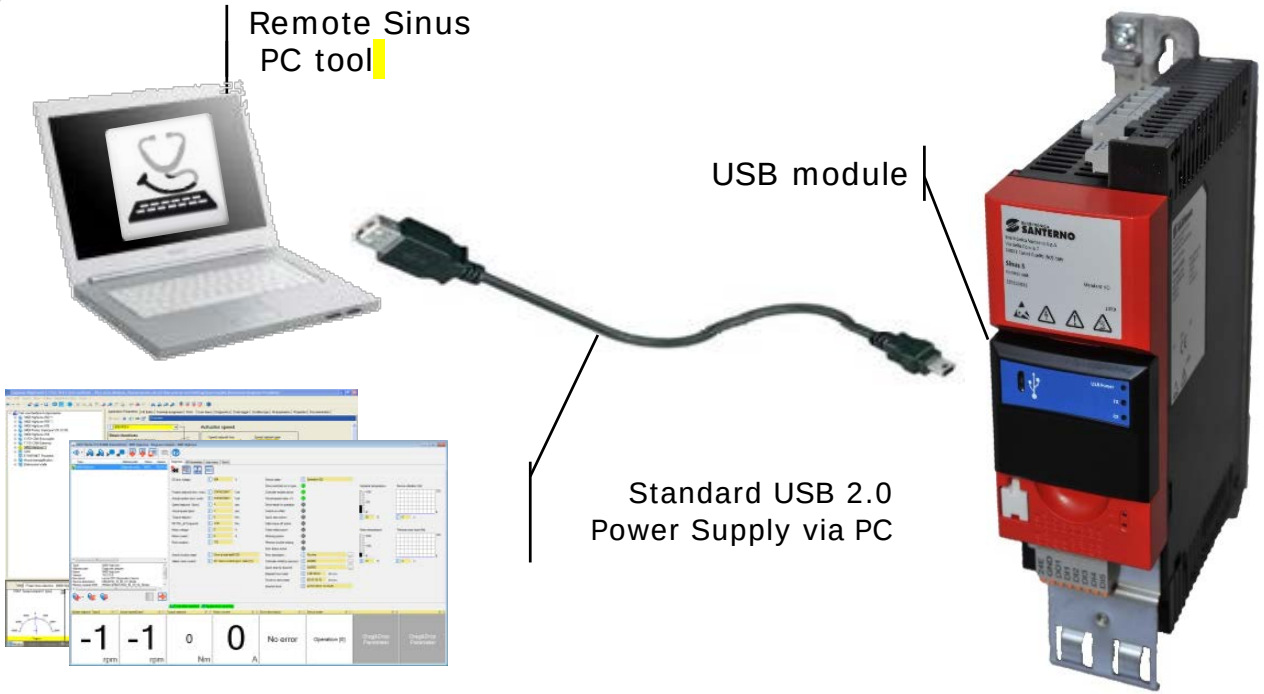
WLAN – PC Interaction

Convenient connection, easy usage with

- Remote Sinus PC Tool

Connection via WiFi and/or WLAN

Engineering Tools & USB Interaction



No external power supply required for interaction with inverter!

- Easy parameterization of inverter or programming automation system in the office.
- Easy serial commissioning

Evolving Easiness with Remote SINUS

Setting parameters online (Remote Sinus)

For easy online diagnostics, parameterization and commissioning – New dialogues for SINUS S

Upload an application (Remote Sinus)

To load complete applications into the SINUS S

Loading firmware (Remote Sinus)

For updating the firmware

Enertronica Santerno proprietary IOT remote control systems

WEB based IOT for SINUS PENTA

Since 2007, We have more than **12000** inverters connected in real-time to our cloud platform **santerno.io**
Thanks to our proprietary dataloggers, mounted inside or besides our inverters we are able to acquire the relevant measure from the inverter and from all sensors connected to it.

We allow the clients to provide added value monitoring and manteinance services to the end customer.

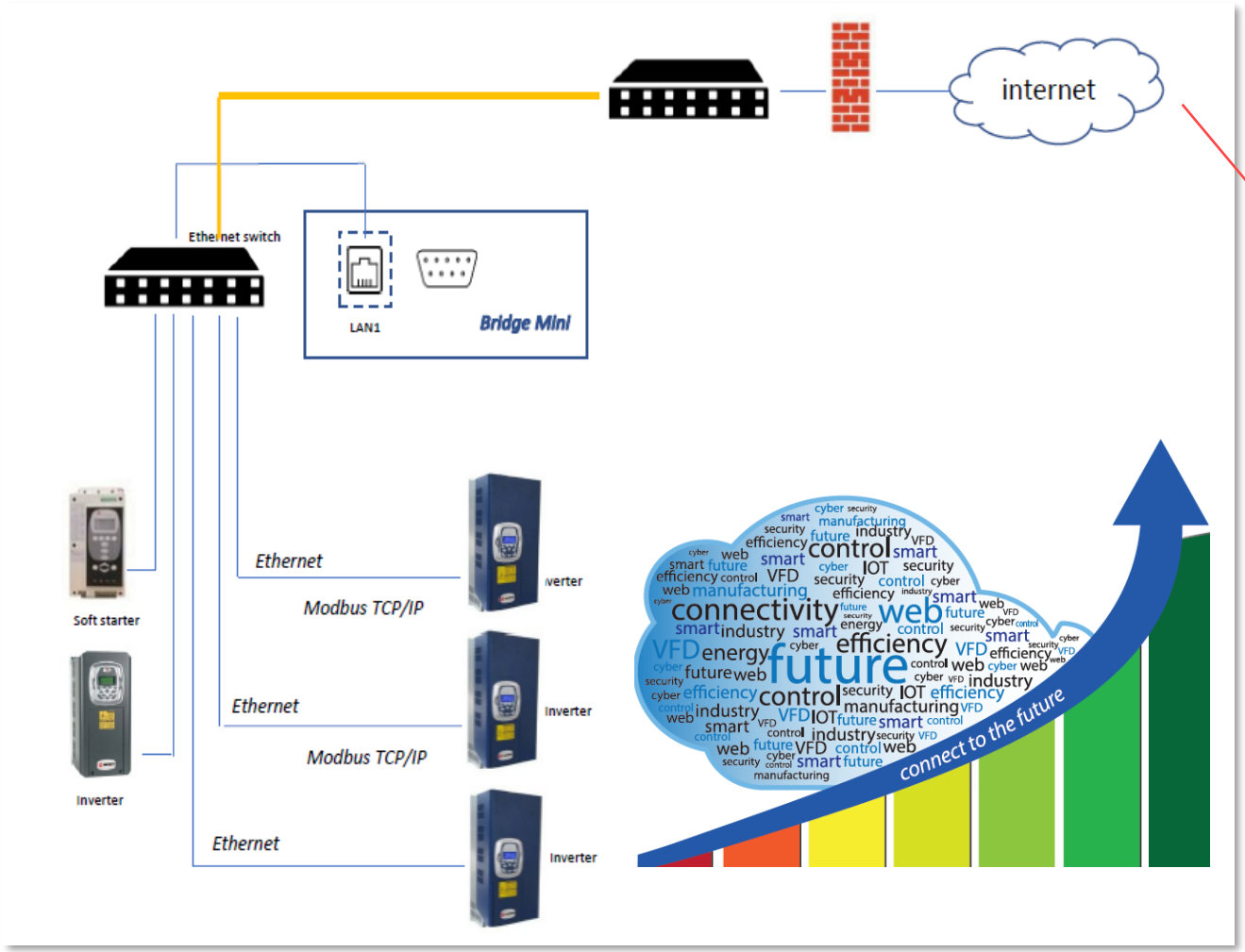
DIN mounted IOT devices for Remote Control

Bridge Mini
Stand alone external version, mountable on DIN rail.

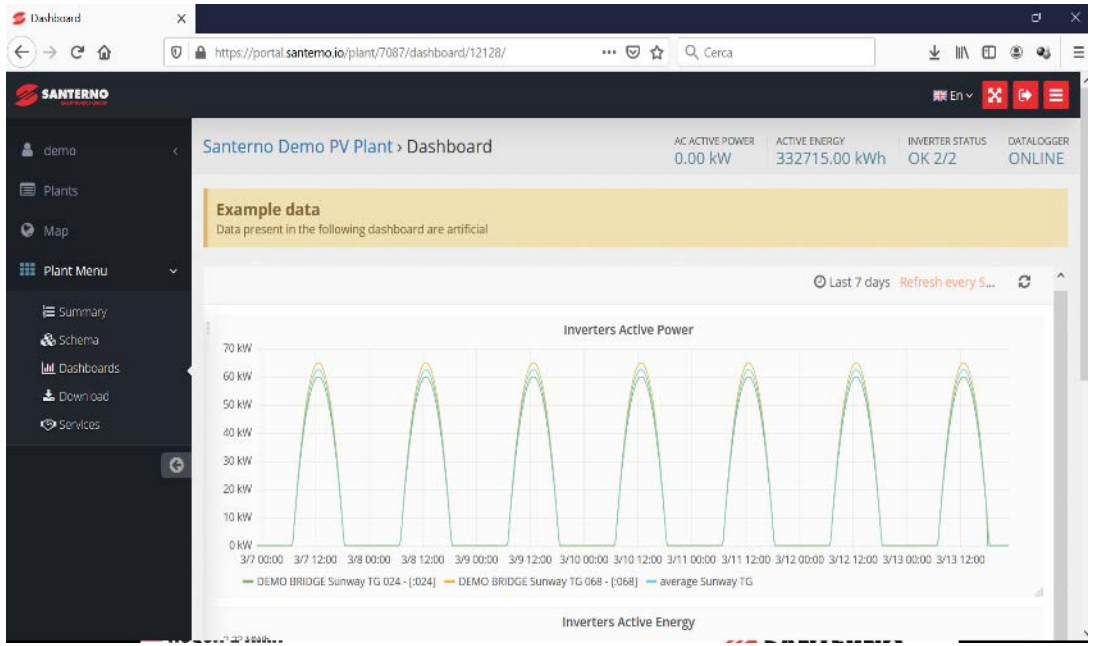
Local datalogger for remote control and monitoring

- **Bridge Mini :** stand alone device, can be mounted on a standard DIN rail and control up to 63 VSD and Soft Starters.

From local IOT dataloggers to Santerno.io platform



Santerno.io



SINUS S inverters Drives

ENERTRONICA SANTERNO

Giving energy more value

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