



**Maximise the energy yield of your plant with SIGMA ITS!**

## **SIGMA Independent Tracking System<sup>®</sup>**

SIGMA ITS provides an integrated solution for EPCs and plant operators seeking greater tracking accuracy and seamless drive communications.

**SIGMA independent solar tracking system (ITS) developed by Sat Control is the universal solution for control and monitoring of dual- and single-axis solar tracking systems.**

It controls the movement of the tracking system in both elevation and azimuthal directions which makes it suitable for a wide range of applications. Sigma ITS delivers extreme precision and complete supervision of the trackers in photovoltaic (PV), concentrated solar power (CSP) and heliostat plants.



## /// MORE CONTROL

Experience complete control over your tracking system. Sigma features comprehensive settings for the control of individual trackers or groups of trackers, supporting multiple tracker geometries and a multitude of terrain configurations. Smart functions such as back-tracking and power supply management parameters can be manually adjusted to achieve the optimal settings.

## /// REMOTE MONITORING

Experience complete control over your tracking system. Sigma supports comprehensive settings for the control of individual trackers or groups of trackers, multiple tracker geometries and a multitude of terrain configurations. Smart functions such as back-tracking and power supply management parameters can be manually adjusted to achieve the optimal set-up.

## /// FULL INTEGRABILITY

Sigma Server sets new communication standard in the field of automation technology. With fast and easy installation, Sigma system can be easily integrated into the existing control room technology. It enables simple and reliable data exchange between components and applications, supporting 1- and 2-axis trackers.

## APPLICATIONS

**PV** Photovoltaics

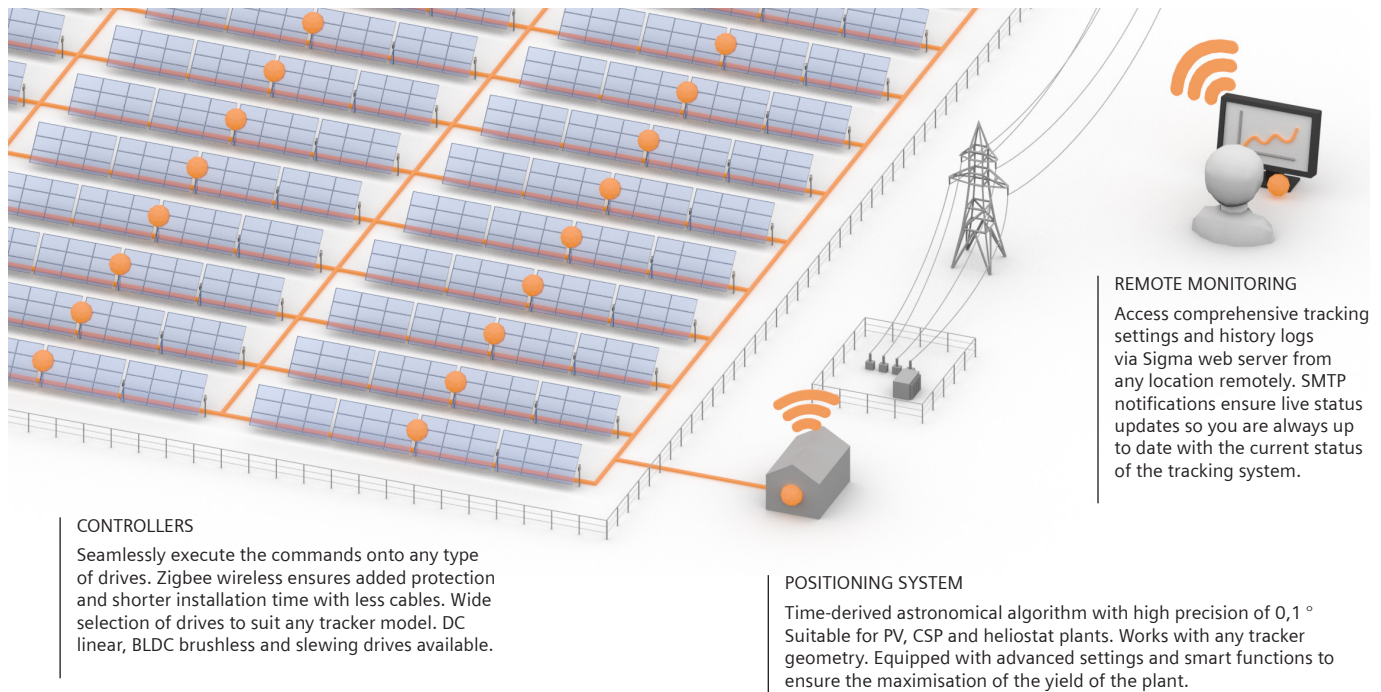
**CSP** Concentrated Solar

**HSF** Heliostats

Engineered & manufactured in

**Top 50  
Solar®**

SIGMA ITS represents a versatile system comprising of high precision tracking algorithm, smart positioning system, wireless drive controllers and remote monitoring with analytics. SIGMA ITS is complemented by the range of Sat Control drives ( DC linear motors, BLDC motors slewing drives ) and a variety of tracker structure geometries specifically developed for multiple plant locations ( northern hemisphere, southern hemisphere, equator areas ).



## COMPONENT OVERVIEW

The components of the Sigma ITS can be used as stand-alone products or in conjunction with other Sat Control components. The components are easily integratable into any existing control room technology.

### ALGORITHM

Time-derived astronomical algorithm with high precision of  $0,1^\circ$ . Suitable for PV, CSP and heliostat plants.

### DRIVES

Wide selection of drives to suit any tracker model. DC linear, BLDC brushless and slewing drives available.

### POSITIONING

Translates tracking algorithm into any tracker geometry. Equipped with smart functions to maximise the yield of the plant.

### MONITORING

Access tracking setup, functions and history logs remotely. SMTP notifications provide live status updates in case of an emergency.

### CONTROLLERS

Seamlessly execute the commands onto any type of drives. Zigbee wireless ensures even more protection with less cables.

### TRACKER MODELS (GEOMETRIES)

Select the geometry depending on the application and the location of the plant. 1-axis and 2-axis models available.



**Capacity:** 130 MWp DC

**Locations:** Lampang Thailand

**Client:** Energy Absolute Co. Ltd., Thailand

**Objective:** Increasing the yield of the plant by optimising the efficiency of the existing solar tracking system

The project, developed by Energy Absolute PCL, is located in Lampang province, northern Thailand and is Asia's largest solar PV power plant with an incorporated tracking system with a total installed capacity of app. 130 MWp DC. A total of 424,800 solar panels have been installed on a mounting structure with a single-axis tracking system.

Already in the commissioning phase the owner of the project, Energy Absolute Public Company Limited, started to experience difficulties with the initial tracking technology provided by the appointed Far East vendor as the supplied trackers were unable to perform as advertised. Upon the assessment of the situation Sat Control has been appointed as a part of the crisis resolution board. The heart of the solution provided by Sat Control was the Sigma positioning system which in combination with Nano controllers reanimated the existing tracking system and regained full control over the trackers which have now started to precisely execute Sat Control's time-derived astronomical positioning ( TdAPS ) ensuring the optimal position of each tracker unit at any time. The integration of Sat Control positioning system into the existing control room technology has ensured the plant owner a stable power generating setup providing a massive, over 20% increase in annual energy output ( the annual power generation of the plant is now stable at 207 GWh ).

# Lampang project, increasing the yield by optimising efficiency



The owner of the 130MWp project in Lampang started to experience difficulties with the trackers of the Far East origin already in the commissioning phase.



Sat Control was appointed as external engineering consultancy in order to resolve the crisis situation which paralyzed the Lampang plant.



Sigma ITS components were implemented. Sat Control not only restored the plant's operation but also significantly contributed to the maximisation of the plant's yield.

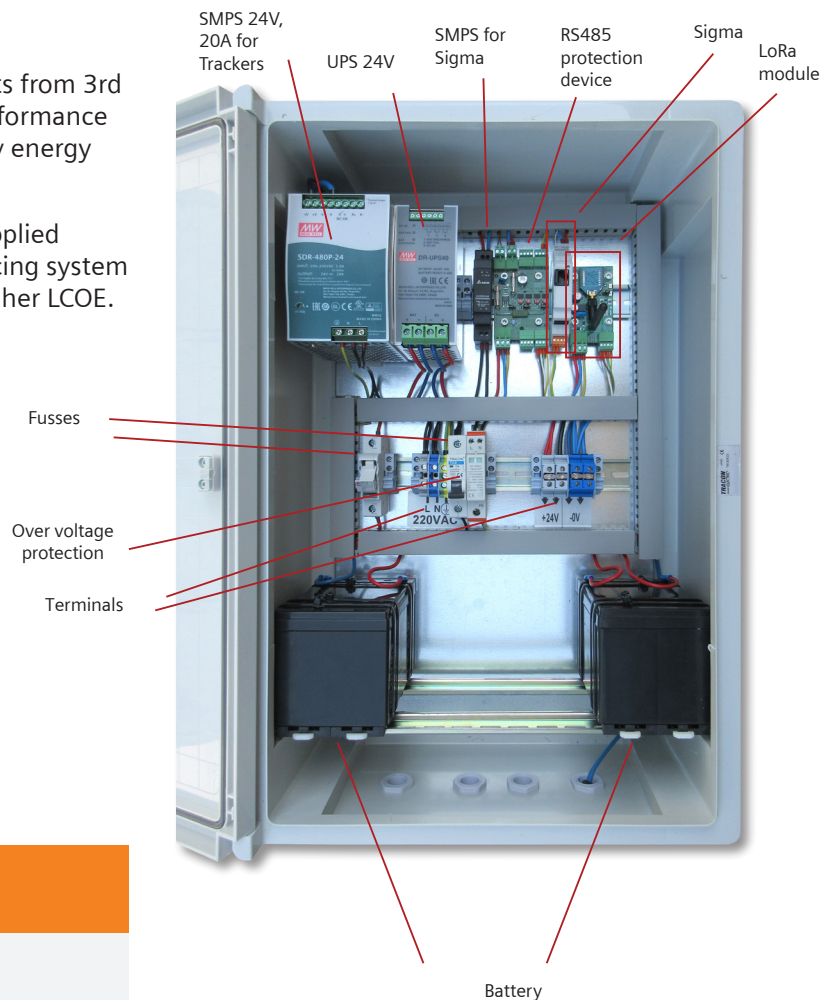
## PROJECT SOLUTION

Existing PV plant, equipped with tracking components from 3rd party causing numerous failures leading to underperformance of the plant and resulting in significantly lower yearly energy output.

In order to increase the profitability Sigma ITS was applied transforming the project into a reliable power producing system without failures, while at the same time ensuring higher LCOE.

## COMPONENTS SUPPLIED

- > Sigma Solar Tracking Servers
- > Nano-F-ZB Controllers
- > Sigma Monitoring
- > Sigma Analytics



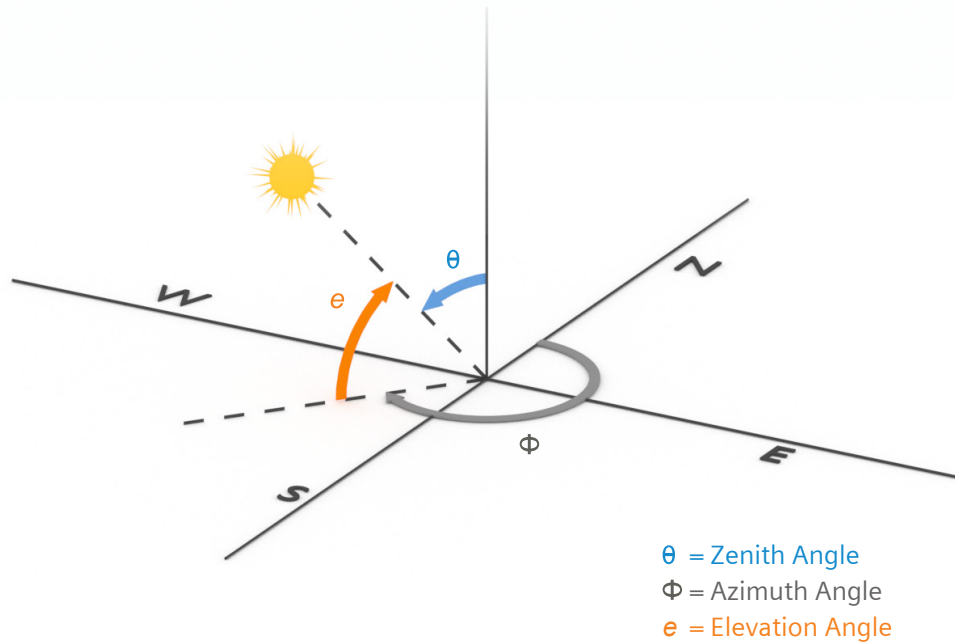
## SIGMA ITS projects in Asia:

**Lampang Solar Plant, 130 MWp DC**  
commissioned 2015

**Phitsanulok Solar Park, 130 MWp DC**  
commissioned 2016

The algorithm calculates the solar angles of the sun. These angles are then used to position the solar modules or reflectors to point toward the sun.

The unique time-derived astronomical algorithm developed by Sat Control utilizes the geo-location of the plant in any world location (longitude / latitude data) and the accurate time in order to calculate the exact position of the sun. Due to its high precision of 0,01dgr the algorithm can be universally used for PV, CSP and heliostat plants. The algorithm is automatic and is designed to operate with extreme precision without the use of sun sensors.



## **SUN TRACKING ALGORITHM**

- > Extreme accuracy –0,1° accuracy
- > Ensures precision in any location worldwide
- > Reliable in any weather situation
- > Ensures cost effective sun tracking
- > Works efficiently without sun sensors
- > calculates the angle of the sun in Cartesian and Polar coordinate system?
- > suitable for PV, CSP and heliostats plants
- > supports NTP to synchronize the clock of the server over a network

Powered by

**SAT CONTROL**  
S O L A R   T R A C K E R S

The stand alone positioning server with real time OS developed specifically for the control of utility scale tracking systems. The system can be used in conjunction with any tracker geometry supporting 1-axis or 2-axis tracking and can be used with virtually any drive (DC linear motors, BLDC brushless, hidrualic, slewing drives.).



The positioning system by Sat Control is packed with smart features in order to extract most value out of the system. It supports up to 8 preset terrain settings or tracker group configurations (such as different tracker geometries, different terrains & parameters), features advanced back-tracking and power supply management settings and can intuitively preset the tracker function modes according to live site requirements (wind mode, cleaning mode, winter mode etc).

The system executes astronomical algorithm with accuracy of  $0.01^\circ$  which makes it suitable for CSP and heliostat plants also whereby high precision movements are a necessity. Sat Control positioning system can be easily integrated in any existing control-room technology.

## /// HIGH PRECISION POSITIONING

- > Independent tracking WEB server
- > Supports 1-axis and 2-axis positioning
- > Compatible with any type of drive
- > High precision of  $0.01^\circ$
- > Suitable for PV, CSP, heliostats
- > Advanced back-tracking
- > Efficient power supply management
- > Smart preset function modes
- > Supports Wireless mesh network
- > Supports external sensors for wind, sun irradiation, temperature
- > Easy integration into existing control room technology
- > High reliability



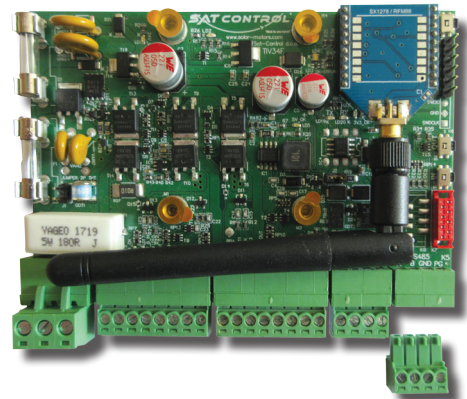
Solar Server Sigma supports 1-axis and 2-axis positioning.

Solar controller Nano-F sets new accuracy standards for utility scale solar plants. Data interface of Nano controller was developed in accordance with the MODBUS communication standards in the field of automation technology and is performed seamlessly via RS485 service interface or via ZigBee/LoRa Wireless mesh network.

The wireless protocol ensures simplified installation set up without the cables while simultaneously providing the whole system comprehensive protection against lightning strikes. Nano-F works accurately in 1-axis as well as 2-axis tracking configurations.

## /// SOLAR POSITIONER NANO-F WIRELESS

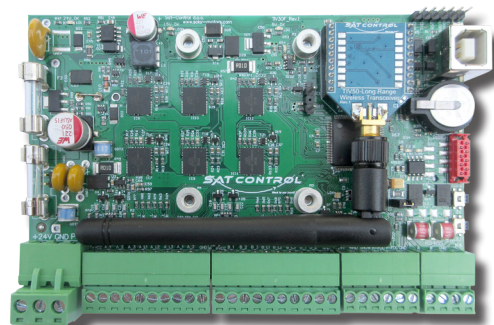
- > Works with 1-axis and 2-axis trackers
- > Data interface in accordance with MODBUS
- > Works via RS485 or LoRa Wireless mesh network
- > Wireless communication secured with encryption
- > Features advanced lightning protection
- > Easy installation set-up
- > Extreme accuracy of 0,01°
- > High precision counting via embedded Quadrature Encoder
- > 100% reliability in keeping the right position
- > Long operational lifetime
- > Meets Low-Voltage Directive (LDV)



Solar Positioner dual axis mod. NANO-F, RS485, DIN rail, LoRa interface, but w/o LoRa mod. TIV34F Rev.1, POZSOLNANO-F

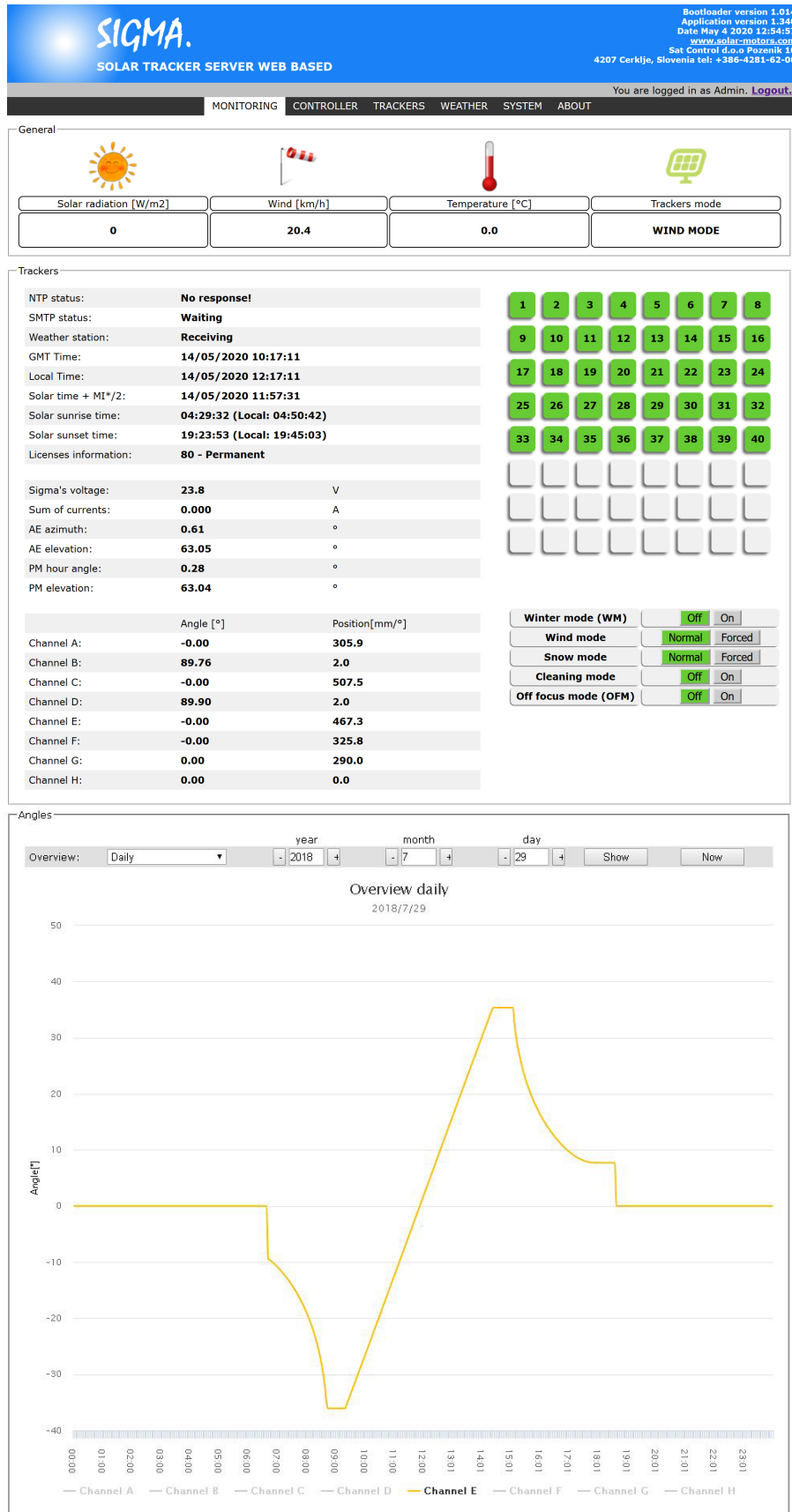
## /// SOLAR POSITIONER QUARK

- > Works with 1-axis and 2-axis trackers with BLDC motors
- > Data interface in accordance with MODBUS
- > Works via RS485 or LoRa Wireless mesh network
- > Wireless communication secured with encryption
- > Features advanced lightning protection
- > Easy installation set-up
- > Extreme accuracy of 0,01°
- > High precision counting via embedded Quadrature Encoder
- > Can works independently when central control is lost
- > 100% reliability in keeping the right position
- > Long operational lifetime
- > Meets Low-Voltage Directive (LDV)



Solar positioner dual axis QUARK for BLDC motors w/o wireless mod., DIN rail, POZSOLQUARK

Secure remote access to the tracking server via internet allows plant executives a comprehensive control over all aspects of their tracking system. The Sigma Monitoring & Analytics delivers the possibility to remotely adjust every individual tracker (groups of trackers or complete tracking system), diagnose potential problems and monitor operations by significantly reducing operation and maintenance costs.



Sigma also features live SMTP notifications delivering immediate alerts in case of any system abnormalities allowing prompt response of the O&M teams.


Fast, efficient data communications via Ethernet connection networks ensure detailed tracking diagnostics such as visualisations of activity of each individual tracker helping to fine tune the tracking system in order to maximise the yield of the plant.

## SIGMA MONITORING

- > Secure remote access to the tracking server
- > Real time system overview via tracking dashboard
- > Manual control over individual or groups of trackers
- > SMTP live error notifications
- > Visual log of daily tracker activities and tracking predictions
- > Daily log record of tracker activity
- > Daily log of weather data (wind, irradiation, temperature)

Experience complete control over your tracking system. Sigma features comprehensive settings for the control of individual trackers or groups of trackers, supporting multiple tracker geometries and a multitude of terrain configurations. Smart functions such as back-tracking and power supply management parameters can be manually adjusted to achieve the optimal settings.

Sigma dashboard with live overview of tracker activity



Bootloader version 1.014  
 Application version 1.340  
 Date May 4 2020 12:54:57  
 www.solar-motors.com  
 Sat Control d.o.o. Poženik 10  
 4207 Cerklje, Slovenia tel: +386-4281-62-00

SOLAR TRACKER SERVER WEB BASED

You are logged in as Admin. [Logout.](#)

MONITORING CONTROLLER TRACKERS WEATHER SYSTEM ABOUT

User parameters

Longitude:	24.7100	Latitude:	45.7500
Sunrise offset(day mode)[min]:	0	Sunset offset(night mode)[min]:	0
Heliostat ref. target azimuth[*]:	0.0000	Heliostat ref. target elevation[*]:	0.0000
Homing interval MA [days]:	90	Homing interval MB [days]:	90
Homing SS/SR offset MA [min]:	SS0	Homing SS/SR offset MB [min]:	SS0
Next homing time MA:	12/08/2020 19:33	Next homing time MB:	12/08/2020 19:33
Moving interval (MI*) [s]:	180	U supply factor[V/V]:	1.0000

Save


Power Supply parameters

Power Supply Line:  Max output current[A]:  [Set](#)

Installer parameters and tracking geometry

Channels:	<input type="text" value="Channel F"/>	Name:	<input type="text" value="Hour angle 18 panels"/>
A1 [mm / °]:	<input type="text" value="498.00"/>	Coordinate mode:	<input type="text" value="11"/>
A2 [mm / °]:	<input type="text" value="400.00"/>	Geometry mode:	<input type="text" value="2"/>
A3 [mm / °]:	<input type="text" value="-55.00"/>	Motor max range [mm / °]:	<input type="text" value="535.00"/>
A4 [mm / °]:	<input type="text" value="141.00"/>	Motor min range [mm / °]:	<input type="text" value="1.00"/>
A5 [mm / °]:	<input type="text" value="0.00"/>	Night position [*]:	<input type="text" value="0.00"/>
A6 [mm / °]:	<input type="text" value="0.00"/>	Wind position [*]:	<input type="text" value="0.00"/>
B1 [mm / °]:	<input type="text" value="13.00"/>	Diffuse position [*]:	<input type="text" value="0.00"/>
B2 [mm / °]:	<input type="text" value="15.00"/>	Cleaning position [*]:	<input type="text" value="20.00"/>
Winter min range [mm / °]:	<input type="text" value="0.00"/>	Winter max range [mm / °]:	<input type="text" value="0.00"/>
Panel width [cm]:	<input type="text" value="300.00"/>	Snow position [*]:	<input type="text" value="-50.00"/>
Panel safety width [cm]:	<input type="text" value="5.00"/>	Panel pitch [cm]:	<input type="text" value="850.00"/>
Fixed Deviation [*]:	<input type="text" value="0.00"/>	Slope of the terrain 1 [*]:	<input type="text" value="0.00"/>
Slope of the terrain 2 [*]:	<input type="text" value="0.00"/>	Off focus difference [mm / °]:	<input type="text" value="0.00"/>

Save



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SOLAR TRACKER SERVER WEB BASED

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MONITORING CONTROLLER TRACKERS WEATHER SYSTEM ABOUT

Positioner

Positioner device ID:  [Send](#)

Positioner's parameters

Motor	A (MA)	B (MB)
Serial number:	419676219	Software version / boot:
CRC Errors:	711	Modbus Port [0,1]:
Motor min range MA [mm or °]:	<input type="text" value="2.00"/> <a href="#">Send</a>	Motor min range MB [mm or °]:
Motor max range MA [mm or °]:	<input type="text" value="535.00"/> <a href="#">Send</a>	Motor max range MB [mm or °]:
Motor home offset MA [mm or °]:	<input type="text" value="0.00"/> <a href="#">Send</a>	Motor home offset MB [mm or °]:
Gear ratio MA [imp / mm or °]:	<input type="text" value="188.0000"/> <a href="#">Send</a>	Gear ratio MB [imp / mm or °]:
Modbus timeout pos. MA [mm or °]:	<input type="text" value="300.00"/> <a href="#">Send</a>	Modbus timeout pos. MB [mm or °]:
Current limitation of MA [A]:	<input type="text" value="3.50"/> <a href="#">Send</a>	Current limitation of MB [A]:

Parameter:

Change slave ID (carefully!):  [Send](#)

Extended LoRa timeout: ☐

Load Configuration MA:  [Load](#)

Load Configuration MB:  [Load](#)

Configure range of IDs MA:  [Send](#)

Configure range of IDs MB:  [Send](#)

Save configuration: [Save ID defaults](#)

Save configuration all: [Save ID defaults all](#)

Delete configuration: [Delete ID defaults](#)

Delete configuration all: [Delete ID defaults all](#)

Power

Power Supply Line:  [Send to all](#)

Set Range:  [Send](#)

Channels

Motor A(MA) is linked to:  [Send to all](#)

Motor B(MB) is linked to:  [Send to all](#)

Set Range:  [Send](#)

Set Range:  [Send](#)

Test mode

No. of cycles A(MA):	<input type="text"/> <a href="#">Send</a>	End position A(MA):	<input type="text" value="20.00"/> <a href="#">Set</a>	<a href="#">Stop testing</a>
No. of cycles B(MB):	<input type="text"/> <a href="#">Send</a>	End position B(MB):	<input type="text" value="20.00"/> <a href="#">Set</a>	
Current limit detection:	<input type="text" value="0.0000"/> <a href="#">Set</a>			

Manual mode

Destination A(MA) [mm/°]:	<input type="text"/> <a href="#">Send</a>	Tracking enable/disable	Clear status	Reset Tracker
Destination B(MB) [mm/°]:	<input type="text"/> <a href="#">Send</a>	Home MA	Home MB	Go home all
		Measure line resistance	Stop motor	Measure Res. all


Sigma features comprehensive settings for the control of individual trackers or groups of trackers, supporting multiple tracker geometries and a multitude of terrain configurations.

Monitoring

ID:  Version:  Boot ☐ Force ☐ Show remaining counter  Clear status range  Enable all ☐ Disable all ☐

ID	bVer	Ver	Line	U [V]	I [A]	MA Rem. [mm/°]	MA Pos. [mm/°]	MA Dest. [mm/°]	MA Ch.	MB Rem. [mm/°]	MB Pos. [mm/°]	MB Dest. [mm/°]	MB Ch.	Wait [s]	S	M	H	T
01	1.002	3.041	1	25.8	0.000	-0.4	325.8	325.8	F	0.6	325.8	325.8	F	144	1			
02	1.002	3.041	1	26.0	0.000	-0.1	326.0	325.8	F	-0.0	326.0	325.8	F	144	2			
03	1.002	3.041	1	25.9	0.000	0.7	326.0	325.8	F	-0.1	325.8	325.8	F	145	3			
04	1.002	3.041	1	26.1	0.000	-0.5	325.8	325.8	F	-0.1	325.7	325.8	F	145	4			
05	1.002	3.041	1	26.1	0.000	0.2	325.8	325.8	F	-0.1	325.9	325.8	F	146	5			
06	1.002	3.041	1	26.6	0.000	-0.3	325.7	325.8	F	0.1	325.6	325.8	F	146	6			
07	1.002	3.041	1	25.9	0.000	-0.3	325.7	325.8	F	0.1	325.7	325.8	F	151	7			
08	1.002	3.041	1	26.1	0.000	-0.0	325.8	325.8	F	0.1	325.7	325.8	F	151	8			
09	1.002	3.041	1	28.1	0.000	-0.1	325.7	325.8	F	0.0	325.7	325.8	F	152	9			
10	1.002	3.041	1	26.0	0.000	-0.1	325.8	325.8	F	0.1	325.7	325.8	F	153	10			
11	1.002	3.041	1	26.0	0.000	0.0	325.7	325.8	F	-0.5	325.8	325.8	F	153	11			
12	1.002	3.041	1	26.0	0.000	-0.6	325.9	325.8	F	0.1	325.9	325.8	F	153	12			
13	1.002	3.041	1	25.9	0.000	-0.1	325.6	325.8	F	0.1	325.7	325.8	F	154	13			
14	1.002	3.041	1	25.2	0.000	0.5	325.8	325.8	F	0.0	325.7	325.8	F	154	14			
15	1.002	3.041	1	25.6	0.000	-0.1	325.7	325.8	F	-0.1	325.7	325.8	F	155	15			
16	1.002	3.041	1	25.7	0.000	-0.0	325.7	325.8	F	-0.2	325.7	325.8	F	155	16			
17	1.002	3.041	1	25.6	0.000	-0.2	325.7	325.8	F	0.0	325.7	325.8	F	155	17			
18	1.002	3.041	1	25.7	0.000	-0.4	325.7	325.8	F	0.1	325.7	325.8	F	156	18			
19	1.002	3.041	1	25.4	0.000	-0.0	325.7	325.8	F	-0.1	325.6	325.8	F	156	19			
20	1.002	3.041	1	25.7	0.000	0.0	325.7	325.8	F	0.1	325.7	325.8	F	160	20			
21	1.002	3.041	1	25.5	0.000	-0.3	325.6	325.8	F	0.0	325.7	325.8	F	167	21			
22	1.002	3.041	1	25.5	0.000	-0.1	325.9	325.8	F	0.0	325.8	325.8	F	177	22			
23	1.002	3.041	1	25.7	0.000	-0.1	325.8	325.8	F	-0.0	325.7	325.8	F	11	23			
08	1.002	3.041	1	26.1	0.000	-0.0	325.8	325.8	F	0.1	325.7	325.8	F	136	8			
09	1.002	3.041	1	28.1	0.000	-0.1	325.7	325.8	F	0.0	325.7	325.8	F	137	9			
10	1.002	3.041	1	25.9	0.000	-0.1	325.8	325.8	F	0.1	325.7	325.8	F	138	10			
11	1.002	3.041	1	26.0	0.000	0.0	325.7	325.8	F	-0.5	325.8	325.8	F	138	11			
12	1.002	3.041	1	26.0	0.000	-0.6	325.9	325.8	F	0.1	325.9	325.8	F	138	12			
13	1.002	3.041	1	25.9	0.000	-0.1	325.6	325.8	F	0.1	325.7	325.8	F	139	13			
14	1.002	3.041	1	25.2	0.000	0.5	325.8	325.8	F	0.0	325.7	325.8	F	139	14			
15	1.002	3.041	1	25.5	0.000	-0.1	325.7	325.8	F	-0.1	325.7	325.8	F	140	15			
16	1.002	3.041	1	25.7	0.000	-0.0	325.7	325.8	F	-0.2	325.7	325.8	F	140	16			
17	1.002	3.041	1	25.6	0.000	-0.2	325.7	325.8	F	0.0	325.7	325.8	F	140	17			
18	1.002	3.041	1	25.7	0.000	-0.4	325.7	325.8	F	0.1	325.7	325.8	F	141	18			
19	1.002	3.041	1	25.4	0.000	-0.0	325.7	325.8	F	-0.1	325.6	325.8	F	141	19			
20	1.002	3.041	1	25.7	0.000	0.0	325.7	325.8	F	0.1	325.7	325.8	F	145	20			
21	1.002	3.041	1	25.5	0.000	-0.3	325.6	325.8	F	0.0	325.7	325.8	F	152	21			
22	1.002	3.041	1	25.5	0.000	-0.1	325.9	325.8	F	0.0	325.8	325.8	F	162	22			
23	1.002	3.041	1	25.7	0.000	-0.1	325.8	325.8	F	-0.0	325.7	325.8	F	176	23			
24	1.002	3.041	1	27.3	0.000	-0.4	325.7	325.8	F	0.2	325.7	325.8	F	3	24			
25	1.002	3.041	1	25.5	0.000	-0.1	325.7	325.8	F	0.0	325.7	325.8	F	6	25			
26	1.002	3.041	1	26.7	0.000	0.2	325.8	325.8	F	0.0	325.8	325.8	F	26	26			
27	1.002	3.041	1	25.1	0.000	0.0	325.6	325.8	F	0.1	325.7	325.8	F	30	27			
28	1.002	3.041	1	25.3	0.000	-0.1	325.7	325.8	F	-0.4	325.6	325.8	F	33	28			
29	1.002	3.041	1	25.2	0.000	-0.1	325.6	325.8	F	-0.4	325.7	325.8	F	57	29			
30	1.002	3.041	1	30.2	0.000	0.0	325.6	325.8	F	-0.0	325.7	325.8	F	60	30			
31	1.002	3.041	1	25.3	0.000	-0.2	325.7	325.8	F	0.3	325.7	325.8	F	84	31			
32	1.002	3.041	1	25.4	0.000	-0.0	325.6	325.8	F	0.2	325.9	325.8	F	92	32			
33	1.002	3.041	1	28.5	0.000	-0.1	325.8	325.8	F	-0.0	325.7	325.8	F	119	33			
34	1.002	3.041	1	27.4	0.000	11.8	325.7	325.8	F	-0.4	325.6	325.8	F	121	34			
35	1.002	3.041	1	25.3	0.000	4.1	325.7	325.8	F	-0.1	325.6	325.8	F	121	35			
36	1.002	3.041	1	26.0	0.000	-0.3	325.7	325.8	F	0.2	325.7	325.8	F	122	36			
37	1.002	3.041	1	25.8	0.000	0.0	325.7	325.8	F	-0.2	325.8	325.8	F	122	37			
38	1.002	3.041	1	25.1	0.000	-0.1	325.7	325.8	F	0.1	325.7	325.8	F	123	38			
39	1.002	3.041	1	25.7	0.000	-0.0	325.6	325.8	F	-0.1	325.6	325.8	F	124	39			
40	1.002	3.041	1	25.6	0.000	-0.2	325.8	325.8	F	-0.0	325.7	325.8	F	124	40			

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**SOLAR TRACKER SERVER WEB BASED**

Bootloader version 1.0  
 Application version 1.5  
 Date May 4 2020 12:54:  
[www.solar-motors.com](http://www.solar-motors.com)  
 Sat Control d.o.o. Poženik  
 4207 Cerklje, Slovenia tel: +386-4281-62-

You are logged in as Admin. [Logout](#)

MONITORING
CONTROLLER
TRACKERS
WEATHER
SYSTEM
ABOUT

**Wind parameters**

Enable wind sensor: <input type="checkbox"/>	Enable wind mode: <input checked="" type="checkbox"/>
Impulsed input: <input type="checkbox"/>	Fall time [min]: <input type="text" value="15"/>
Threshold [km/h]: <input type="text" value="25"/>	Measuring coefficient: <input type="text" value="18.0000"/> <small>[(km/h)/V or (km/h)/Hz]</small>

**Radiation parameters**

Enable radiation sensor: <input type="checkbox"/>	Enable diffuse mode: <input type="checkbox"/>
Radiation coefficient[(W/m2)/V]: <input type="text" value="130.0000"/>	Reserved: ---
Diffuse start time [hhmm]: <input type="text" value="0500"/>	Diffuse stop time [hhmm]: <input type="text" value="0900"/>
Diffuse trigger [W/m2]: <input type="text" value="0.0000"/>	Diffuse hyst [W/m2]: <input type="text" value="200.0000"/>
Low radiation timeout [min]: <input type="text" value="5"/>	High radiation timeout[min]: <input type="text" value="15"/>

**Temperature parameters**

Enable temperature sensor: <input type="checkbox"/>	
Temperature coefficient [°C/V]: <input type="text" value="1.0000"/>	Temperature offset[°C]: <input type="text" value="-30.0000"/>


**Weather Station**

Weather data transmission mode: <input type="text" value="Receive"/>	Remote station IP: <input type="text" value="192.168.2.177"/>
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**Monitoring**

Wind speed [km/h]:	16.8
Solar radiation [W/m2]:	0
Temperature [°C]:	0.0

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**SOLAR TRACKER SERVER WEB BASED**

Bootloader version 1.0  
 Application version 1.3  
 Date May 4 2020 12:54:55  
 www.solar-motors.com  
 Sat Control d.o.o. Pozanik  
 4207 Cerklje, Slovenia tel: +386-4281-62-4

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MONITORING
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#### System parameters

IP address:	192.168.2.196	Netmask:	255.255.255.0
Gateway:	192.168.2.1	MAC address:	00FF8C3C5EE5
Serial number:	67149836,2924255464,1416562537,4110426304		
Licenses:	80		

#### Licenses management

Export licenses:  Nr:   
 Import licenses: Key:

Target SN:

Registration code:    
 Registration key:

#### Upgrading parameters

Server IP address:	<input type="text" value="192.168.2.181"/>	Server port:	<input type="text" value="80"/>
Upgrade path:	<input type="text"/>	Upgrade interval [min]:	<input type="text" value="30"/>
Upgrade start time [hhmm]:	<input type="text" value="0200"/>	Upgrade end time [hhmm]:	<input type="text" value="0400"/>
Upgrade slave conv. time [hhmm]:	<input type="text"/>		

#### Email reporting

SMTP IP address:	<input type="text" value="86.61.66.230"/>	SMTP port:	<input type="text" value="25"/>
User name:	<input type="text" value="Scanner"/>	Password:	<input type="password" value="*****"/>
Email from:	<input type="text" value="sigma@solar-motors.com"/>	Email to 1:	<input type="text" value="support@sat-control.si"/>
Project Name:	<input type="text" value="Sigma IP196 UCEA DE SUS"/>	Email to 2:	<input type="text" value="fveuceadesus@yahoo.com"/>
OK report time [hhmm]:	<input type="text" value="0101"/>	Error check interval [min]:	<input type="text" value="15"/>
State:	<input type="text" value="Waiting"/> Last error response:		

#### Input function select

ADC2 function (PIN 11):

ADC3 Function (PIN 4):

#### RS485 parameters

Primary Port [0,1]:	<input type="text" value="0"/>	Data rate [kbps]:	<input type="text" value="19.200"/>
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#### Time parameters

GMT Time [hhmmss]:	<input type="text" value="104301"/>	<input type="button" value="Set"/>	Reset time [hhmm]:	<input type="text" value="0000"/>
Date [ddmmyyyy]:	<input type="text" value="14052020"/>	<input type="button" value="Set"/>	Time zone [h]:	<input type="text" value="2.0"/>
NTP Server:	<input type="text" value="89.212.75.6"/>	NTP Port:	<input type="text" value="123"/>	
NTP Update[min]:	<input type="text" value="30"/>	NTP State:	<input type="text" value="No response!"/>	
WEB client time (GMT):	<input type="text" value="14.05.2020 10:42:58"/> <input type="button" value="Sync time"/>		RTC correction:	<input type="text" value="0"/> Last sysc time: -

#### User interface

Page Refresh Delay [s]:	<input type="text" value="3"/>	Reserved:	<input type="text" value="-"/>
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#### External settings

Enable external settings: ☐

Allowed IPs:

#### Sigma

#### Files

Date [yymmdd]:

No file selected.

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Sat Control is the leading innovator in the field of solar tracking industry. With over 20 years of experience in development and manufacturing of independent automotive systems, Sat Control has specialized in providing professional sun tracking solutions for large scale PV, CPV and heliostat plants.

With its strong roots in automotive industry the company has been developing tracking systems since 1996, first in the field of satellite reception technology and since 2005 exclusively in the field of solar energy. Sat Control's proven track record of international projects features utility-scale tracking installations in more than 45 countries all over the World, including Germany, France, Italy, Slovakia, Czech Republic, Australia, Canada and United States. Sat Control's strategic goal is to remain the global provider of automated tracking solutions setting unprecedented reliability standards for commercial tracking systems.

## /// PRODUCT CONFORMITY

Sat Control offers extended international warranty of all its products and services. Every product and application sold under Sat Control brand adheres to strict European Union environmental and safety directives (we use less than 2% of built-in components from East Asia).

Sat Control products are the result of intensive R&D and high precision manufacturing which complies with the principal international standards: International Protection Rating (IEC 60529 IP33 ), Electromagnetic Compatibility (EMC Directive 89/336/EEC) and Low Voltage Equipment Directive (EEC Council Directive 73/23/EEC).



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EUROHS CE



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SOLAR TRACKERS