# Product manual Aurora Manager LITE







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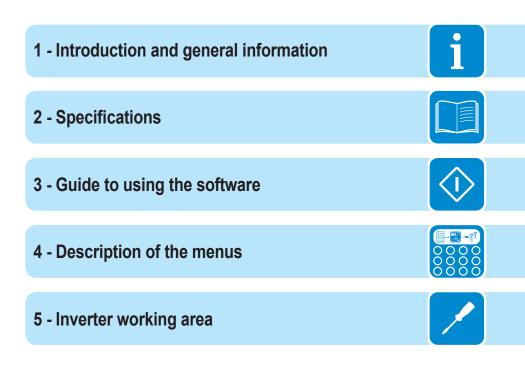
### IMPORTANT SAFETY INSTRUCTIONS



Operators must read this manual and follow its instructions strictly, as ABB will not accept responsibility for damage caused to individuals and/or goods, or suffered by the equipment, if the conditions described below are not complied with.

### **Product Manual**

Aurora Manager LITE - Advanced configuration software



# Introduction and general information

### **D**ocument and intended readers

### Scope and structure of the document

This user manual constitutes a valid guide which permits advanced configuration of the ABB inverters to optimize their operation.



The main language in which the document has been written is ITALIAN; however, in the case of any inconsistencies or doubts ask the manufacturer for the original document.

### Characteristics of the personnel



The Customer must ensure that the operator has the expertise and the training necessary to fulfill their duties. Personnel responsible for the use or maintenance of the equipment must be expert, knowledgeable, and mature enough for the tasks described and must be able to be relied upon to interpret that described in the manual correctly.

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### Field of use, general conditions

ABB does not accept any responsibility for damage of any kind that may be caused by incorrect or careless operations.



Use of the software for any purpose that does not conform to that specified in the field of use is prohibited. The software MUST NOT be used by inexperienced personnel, or personnel who are experienced but perform operations on the equipment which are not in accordance with that described in this manual and in the documentation attached.

### Specified or permitted use

Aurora Manager LITE is technical software used for the following operations:

- Monitoring
- Advanced configuration
- Updating of the firmware of the ABB inverters.

### Limits of the field of use

Aurora Manager LITE can be used on the operating systems Windows XP, 7, 8 (framework .NET version 4.0 or later).

The installation and running of Aurora Manager Lite is only permitted if you have administrator rights.

Aurora Manager LITE CAN be used with 32 bit and 64 bit operating systems. This manual is applicable for Aurora Manager LITE version 5.0.0.56 or later. Aurora Manager LITE can be used linked to the following inverters: UNO-2.0/2.5-I-OUTD UNO-2.0/3.0/3.6/4.2-TL-OUTD TRIO-5.8/7.5/8.5-TL-OUTD PVI-10.0/12.5-TL-OUTD TRIO-20.0/27.6-TL-OUTD TRIO-50.0-TL-OUTD CORE PLUS-PLUS -(HV).(firmware updating only) Access to the INSTALLER level which permits advanced configuration of the inverter is password-protected.

### Improper or unauthorized use

### IT IS STRICTLY PROHIBITED:

- To use Aurora Manager LITE without having read and understood the content of the user manual correctly.
- To use the software to change internal parameters of the inverter which may render it NOT IN CONFORMITY with the regulations in force in the country of installation.

### **Characteristics**

### General conditions

A description of the equipment characteristics is provided to identify its main components and specify the technical terminology used in the manual.

2

This chapter contains information about the models, details of the equipment, characteristics and technical data, overall dimensions and equipment identification.



The customer/Installer takes full responsibility if, when reading this manual, the chronological order of its presentation provided is not observed. All information is provided considering occasional inclusion of information in previous chapters.



In certain cases, there may be a need to separately document software functionality or attach supplementary documentation to this manual which is intended for more qualified professionals.

### **D**escription of the Aurora Manager LITE software

For the characteristics and functions that Aurora Manager LITE makes available is indicated for:

### 1. Local monitoring of the inverter.

It is possible to monitor the main parameters relating to: General state Statistical data relating to the production of energy Input and output values Internal temperature Values relating to the insulation of the photovoltaic generator Date and time

# 2. Advanced configuration of the inverter (INSTALLER access level):

Offers the option of applying advanced settings for the inverter. Access to this section of the software is password protected as it permits the modification of sensitive parameters such as those relating to the standard for connection to the grid in force in the country of installation.

The password can be obtained by registering on the site <u>https://registration.abbsolarinverters.com/</u>

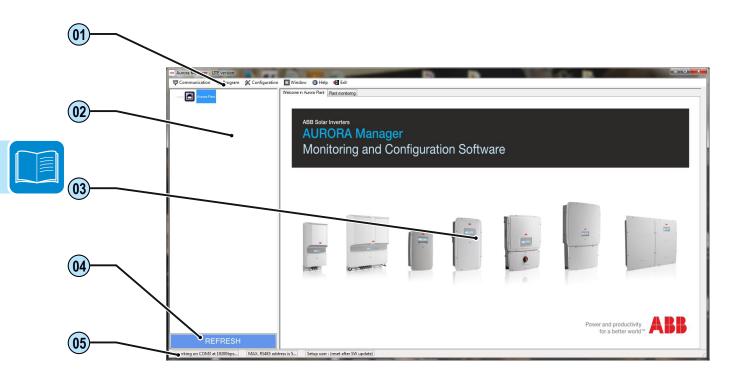
### 3. Updating of the inverter firmware.

Updating the inverter Firmware is process which may become necessary to improve the performance of the inverter or increase its functions.

In order to use the software a connection must be established between the PC and the inverter (by means of an RS485 communication line) using a PVI-USB-RS485\_232 signal converter.

In all cases, the use of ABB products is recommended to avoid problems of incompatibility with the inverter.

## Structure of the software interface



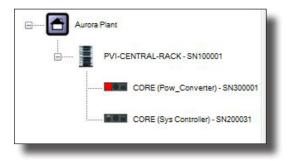
### 1. Menu bar

Contains the menus by means of which the functions of the Software can be accessed.



# 2. Tree diagram of the system

This section shows all the inverters connected to the RS485 line and identified during the scanning process. The inverters are arranged and displayed based on their Serial Number.



For the centralized inverters, the internal components of the inverter will also be displayed.

# 3. Inverter working area

When an inverter shown in the tree diagram of the system is selected, the multitab structure of the program which permits configuration of the inverter is displayed. Depending on the access level (USER or IN-STALLER), the configuration option and therefore also the displaying of the work area will be different.



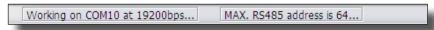
### 4. RS485 bus update key

Permits scanning of the inverters connected to the RS485 bus.



### 5. Information bar

Contains the values of the settings made relating to the Communication menu.



# Structure of Aurora Manager LITE

# Structure of the menus

Menu	Submenu	Command/Option	Description
Communication	COM Setting	COM Port to use	Selection of the COM port used for communication
		Baud Rate	Speed of the communicatio (19200bps)
	Unit Scan setting	•	Possibility of limiting the number of addresses in the RS485 bus scar ning phase
Program	Device update	•	Updating of the inverter Firmwar using the .tib file
Configuration	Assign RS485 addresses	•	Possibility of automatic (or personalized) assigning of the addressed of the inverters connected to the RS485 bus
	Setup Area Access	•	Selection of the access leve The personal information and th password obtained by registerin on the site <u>https://registration</u> <u>abbsolarinverters.com/</u> are reque sted
Window	Restore default window	•	Resizing of the window
Help	About this	•	Information about the version of th Aurora Manager LITE Software
	Aurora Service	•	ABB Service contacts
Exit		•	Closing of the program

# Structure of the work area

, Device info,
ta in real
tion
unication"
a in real time
ontrol" board
real time
ain or to 485 address.
ring the It for unba-
current e/disable,
e board"
time
aud rate
agement
warnings log
l

TAB	Level 1 TAB.	Level 2 TAB.	Command/Option	Description
Setup	DC Side		Vstart1	Setting of the value of the activation voltage of channel 1
			Vstart2	Setting of the value of the activation voltage of channel 2
			TprotUV	Setting of the duration of intervention of the UnderVoltage
				protection (time during which the inverter remains con-
				nected to the grid following the detection of an input UV)
			MPPT Scanning	Possibility of activating/deactivating the MPPT scanning
				function and setting the time interval between scans
		•	MPPT Noise Amplitude	possibility of modifying the MPPT noise amplitude
	AC Side	Grid	Max grid voltage for	Maximum permitted grid voltage allowing connection to
		connection	connection	the grid
			Min grid voltage for	Minimum permitted grid voltage allowing connection to the
		(parameters	connection	grid
		which define	Max grid frequency for	Maximum permitted grid frequency allowing connection to
		the possibility	connection	the grid
		of the inverter	Min grid frequency for	Minimum permitted grid frequency allowing connection to
		connecting	connection	the grid
		to the grid)	Check time before con-	Time at which the inverter performs the checks of the grid
			nection or after generic	before connection to the grid as first connection or after a
			fault	generic fault (not a grid fault)
			Check time before con-	Time at which the inverter performs the checks of the grid
			nection after grid fault	before connection to the grid after a fault of one of the grid
				parameters
			Slow ramp	Enables/disables the ramp for admission of power to
			enable/disable	the grid
			Ramp Slope [%Pn/min]	Slope of the ramp for admission of power to the grid
			Ramp Slope fault	Slope of the ramp for admission of power to the grid after
			[%Pn/min]	disconnection due to a fault
		Grid	U>> Maximum grid	Protection enabling/disabling
		protection	voltage	Protection threshold value
				Duration of intervention of the protection
		(parameters	U> Maximum grid	Protection enabling/disabling
		which define	voltage	Protection threshold value
		the possibility		Duration of intervention of the protection
		of disconnec-	U< Minimum grid	Protection enabling/disabling
		tion of the	voltage	Protection threshold value
		inverter from		Duration of intervention of the protection
		the grid)	U<< Minimum grid	Protection enabling/disabling
			voltage	Protection threshold value Duration of intervention of the protection
			U<<< Minimum grid	Protection enabling/disabling
			voltage	Protection threshold value
			vollage	Duration of intervention of the protection
			F>> Maximum grid	Protection enabling/disabling
			frequency	Protection threshold value
			inequency	Duration of intervention of the protection
			F> Maximum grid	Protection enabling/disabling
			frequency	Protection threshold value
			in equency	Duration of intervention of the protection
			F< Minimum grid	Protection enabling/disabling
			frequency	Protection threshold value
				Duration of intervention of the protection
			F<< Minimum grid	Protection enabling/disabling
			frequency	Protection threshold value
				Duration of intervention of the protection
			K LVRT	Low voltage ride-through coefficient, regulates the reactive
				current during a grid dip

TAB	Level 1 TAB.	Level 2 TAB.	Command/Option	Description
Setup	AC side	High	Frequency threshold for	Limit frequency value for starting derating
		frequency	power derating start	
		derating	Frequency threshold for	Limit frequency value for stopping derating
			derating stop	
		(reduction	Power/frequency slew	Slew (W/Hz) for limiting the active power due to a high
		of the active	rate	grid frequency
		power admitted to	Restore time after OF derating	Time necessary to restore normal operation of the inverter after the frequency has returned to within the range
		the grid due	Derating Mode	Disabled
		to high grid		BDEW mode
		frequency)		VDE AR-N mode
				CEI 0-21 mode
			Intentional delay time	Setting of the delay starting frequency derating
			Release ramp EN/DIS	Enables/disables the ramp for admission of power to
				the grid
		Vgrid rise sup-	Protection	Enables/disables the disconnection of the grid if the
		pression (max	enable/disable	average grid voltage value exceeds the limit set
		AVG Vgrid)	Derating enable/disable	Enables/disables the derating of the active power to
				prevent the average grid voltage from exceeding the
		(protection/de-		threshold value set and causing disconnection of the
		rating due to		inverter from the grid.
		high average	Protection threshold	Threshold value of the average voltage overvoltage
		grid voltage values)		protection
		Anti Islanding	Active A.I.	Enables/disables the islanding protection (active)
		, and folder daring	Active A.I. freq drift	Enables/disables the checking of the grid by means
				of a frequency chirp
			Passive A.I.	Enables/disables the islanding protection (passive)
			Passive A.I. Δt	Checks the passive protection at a given time
			Passive A.I. DEG	Checks the passive protection for an grid frequency
				amplitude
		LVRT/HVRT	▶	Low voltage ride-through coefficient, regulates the reactive
		LFRT/HFRT		current during a grid dip
	Special		Remote On/Off contact	Enables disables the switching off of the inverter by of the
	functions		management (ext com-	remote ON/OFF signal
			mand) Reset mode	Manual unlocking in the event of errors linked with the grid
				parameters (for the Japanese grid standard)
			Radio frequency Inj	Sets a frequency interval for any conveyed wave signals,
				which the inverter must not identify as grid errors
			Digital alarm cont.	Sets the configuration of the alarm contact
	Ground Fault	•	Minimum R_iso	Setting of the R_iso limit value allowing connection to the
	Interface			grid
			Minimum time for R_iso	Setting of the insulation resistance (R-iso) measurement
			check	time
	Clock		▶	Inverter data and time settings
	Digital input		User Inputs	Setting of the digital input contacts
	Digital output		User Outputs	Setting of the digital output contacts
	Serial Links		User links	Settings of the communication protocol, RS485 line serial address, baud rate
	Night startup		Night mode EN/DIS	Enables/disables night operation
	mode		Max Vin for connection	Sets the max input voltage allowing connection of the inverter
			Min Vbulk for connec-	Sets the min bulk voltage allowing connection of the
			tion	Inverter
			tion Check for connection	inverter Sets the waiting time before connection to the grid

TAB	Level 1 TAB.	Level 2 TAB.	Command/Option	Description
Power	User power	Actual max	•	percentage limitation of power set leaving the inverter
reduction	reduction	power value		
		percent		
		New max	•	new percentage power limitation value set leaving the
		power percent		inverter
		Smooth	Slope mode	fixes the slope of the ramp, time necessary to range from
		time [s]		0 to 100% of the Pmax
			Trip-time mode	Time necessary to pass from the current Pout to the new
				power value set
	P. limits	P regulation	•	limitation of power leaving the inverter
		max value [W]		
		P regulation	•	limitation of power leaving the inverter at cos-phi 0.9
		value at cos-		
		phi=0.9 [W]		
		Smax [VA]	•	Maximum apparent power
		P regulation		Minimum power regulation for smooth time
		MIN smooth		
		time [s]		
Reactive	Select	Regulation	No regulation	No regulation of the reactive power
Power	regulation	mode	cos(phi) fixed	Setting of the power factor to a fixed value
Regulation				
			Q fixed	Setting of Tan-phi (Q/P) to a fixed value
			cos(phi)=f(P)	Power factor as a function of the active power supplied b
				the inverter
			Q(U)	Reactive power as a function of the grid voltage measures
				by the inverter
	cos(phi)=f(P)	•	cos(phi)=f(P) cha-	Setting of the 4 values of P/Pn% and of the relative values
	curve set-up		racteristic construction	of cos-phi necessary to create the curve of admission of
	cuive set-up		(4 points)	reactive power required
			Lock-in/lock-out	Enabling/disabling of the lock-in/lock-out voltage
			voltage thresholds	thresholds
			enable/disable	
			Lock-in/lock-out voltage	Setting of the lock-in and lock-out voltage thresholds
			thresholds setting	
			Check and graph my	Displaying of the cos(phi)=f(P) curve created by setting
			table	the values of P/Pn% and relative cos-phi
			Read table from device	Reading of the cos(phi)=f(P) curve set on the inverter
			Restore default curve	Restoring of the original cos(phi)=f(P) curve
			Write my table on device	Memorization of the cos(phi)=f(P) curve in the inverter
	Q(U) curve		Q(U) characteristic	Setting of the 4 values of the Vout and of the relative
	set-up		construction (4 points)	values of Q/Pn% necessary to create the curve of
				admission of reactive power required
			Lock-in/lock-out active	Enabling/disabling of the lock-in/lock-out voltage
			power thresholds en/dis	thresholds
			Lock-in/lock-out active	Setting of the lock-in and lock-out voltage thresholds
			power thresholds	
			setting	
			Check and graph	Displaying of the Q=f(U) curve created by setting the
			my table	values of P/Pn% and relative cos-phi
			Read table from device	Reading of the Q=f(U) curve set on the inverter
			Restore default curve	Restoring of the original Q=f(U) curve
			Write my table	Memorization of the Q=f(U) curve in the inverter



The sections (TABs) highlighted in grey, relating to the advanced configuration of the inverter (INSTALLER access level), are only available by logging in on the menu "Configuration > Setup Area access".

# Guide to using the software

# 3

# Checking the communication

- 1 Connect the inverter to the signal converter (refer to the instructions given in the product manual)
- 2 Connect the converter to the PC

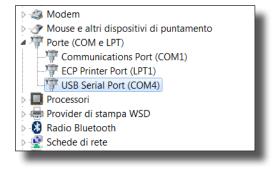
To check with which COM port the converter has been associated, refer to the procedure "Checking the COM port associated with the signal converter" in this manual

- 3 Open the Aurora Manager LITE software
- 4 Apply the communication configuration settings (refer to the Communication Menu paragraph in this manual)
- 5 Scan the RS485 bus (using the refresh button)
- 6 Check the functions available on the Unit ID and Monitoring tabs (refer to the paragraph relating to the Unit ID tab and the Monitoring tab in this manual)

### Checking the COM port associated with the signal converter

- 1 From START, go to the "Control panel"
- 2 Select "Device management"
- 3 Select "Ports (COM and LPT)"
- 4 Check "Communication port (COM)"

Next to the port selected is indicated the name of the COM (in the example COM4) that must be selected in the Aurora Manager Software communication settings.



5 - Double-clicking on the USB port takes you to the port properties screen. On the "general" tab, check that the manufacturer is FTDI.

P	roprietà -	USB Serial Port (COI	VI4)		1 :	2	×
	Generale	Impostazioni della p	orta Driver	Dettagli			
		USB Serial Port (CO	M4)				
		Tipo di dispositivo:	Porte (CON	/leLPT)			
		Produttore:	FTDI				
		Ubicazione:	su USB Se	rial Converte	r		
	Stato d	ispositivo					
	l disp	ositivo funziona corre	ttamente.			*	
						-	
					OK	Annu	lla
				_			



### Analogic inputs configuration procedure

- 1 Follow the procedure for "Checking the communication"
- 2 Apply the settings relating to the ANALOGIC INPUTS (refer to the "Partner devices - Communication Board" tab in this manual)

### String monitoring configuration procedure

- 1 Follow the procedure for "Checking the communication"
- 2 Apply the settings relating to the STRING MONITORING (refer to the "Partner devices - Fuse Control Board" tab - "Global settings" tab)

### Inverter firmware updating procedure

- 1 Carry out the procedure for "Checking the communication"
- 2 Check that you have the .tib file containing the new FW to be installed on the inverter
- 3 Follow the instructions given in the paragraph relating to the "Program" menu in this manual

# **Description of the menus**

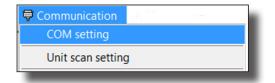


### "Communication" menu

Used to configure the parameters relating to the communication with the inverters connected to the RS485 bus.



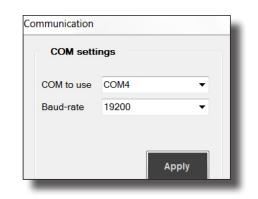
The Communication menu consists of two submenus:



### **C**OM Setting:

Used to select the COM port to which the converter being used for communication with the unit(s) is connected and the baud rate (speed of communication of the devices on the RS485 bus).

To identify the COM port to which the converter is connected, follow the dedicated procedure (Checking the COM port associated with the signal converter). The baud rate must be set at 19200.



The maximum scanning address that has been set is displayed on the information bar (at the bottom left):

Working on COM10 at 19200bps	MAX. RS485 address is 64
------------------------------	--------------------------

# Unit Scan setting:

Used to set a limit for the number of addresses that the Software scans during use. The default value set is 64 (maximum value that can be set on the inverters), so the software scans the entire RS485 bus.

E.g. if the communication line consists of 5 inverters to which have been assigned (from the display) the addresses 2, 3, 4, 5, 6, in this section "6" can be set to limit the time required for scanning.

Max. scan ADDRESS	5	-
	-	iis setting 🔲
	[	Apply



### "Program" menu

This section of the program permits updating of the inverter Firmware.

🛱 Communication 🔌 Program 💥 Configuration 🔲 Window 🚯 Help 🐔 Exit

Updating the inverter Firmware is process which may become necessary to improve the performance of the inverter or increase its functions. Updating the Firmware requires the availability of the Firmware package with which to carry out the update itself: this can be downloaded from the site <u>https://registration.abbsolarinverters.com/</u> or requested from ABB Service and is issued as a .tib file, to be used directly via Aurora Manager LITE in accordance with the instructions described below.

Disconnect the inverter from the grid before reprogramming the firmware. This can be done using Aurora Manager Lite on the tab Setup> Special Function> Remote ON/OFF at OFF and enter SET.

The Program menu consists of a single submenu:





As the first operation, the settings of the "Communication Setup" field must be applied:

Not configurable: the converter used is model PVI-USB-RS485\_232.

The Scan all addresses function can be used to select all the inverter addresses during the scan of the RS485 bus (to be carried out during the following steps).



Next the RS485 bus must be scanned to identify the inverters connected, using the "SEARCH RS485 LINE" button

1-Communication setup	2 - Update setup	2.A-Para	neters reload options			
RS485 converter						
Aurora 232-485						
Not-configurable		Addr	Device	Prog	Prog. state	
RS485 address		1	TRIO-50.0-TL - SN111111		Vald APP	0
<ul> <li>Scan all addresses</li> </ul>						
	Update also with equal versions					
Scan single address	Select Update Files					
Scan address range						
	START UPDATE	J				
Addr. 1 - TRI	0-50.0-TL - SN111111	1				
Unit info	Device Prog. state					
Name: TRIO-50.0-TL						
Prog. type: NEW						
Flash type: GS + LANG						
<u> </u>				SEARCH RS4	95 LINE	
-				SEARCH RS4	OJ LINE	

Once the scan is complete, the inverters that require a Firmware update must be selected (by default all inverters detected during the scan are selected). If several inverters are selected, Aurora Manager LITE will program the units selected sequentially

	Prog	Prog. state	
7627			Valie

Select the file containing the new Firmware to be installed using the "Select Update Files" button. The extension of the file to be used should be [.tib]. Once the new Firmware has been uploaded correctly, Aurora Manager will display the following window:

1 - Communication setup	2 - Update set	up		2.A-Parar	neters reload options	J	
RS485 converter Aurora 232-485						-	
Not-configurable				Addr	Device		Prog
RS485 address				1	т	RIO-50.0-TL - SN111111	
Scan all addresses	Update also with	equal versions		<u>.</u>			
Scan single address	Change Updat	e Files					
<ul> <li>Scan address range</li> </ul>	Update version: START UPD						
Addr. 1 - TR	10-50.0-TL - SN11	1111					
Unitinfo	Device	Prog. state					
Name: TRIO-50.0-TL	Supervisor	Idle	0				
Prog. type: NEW	GS flash	Idle					
Hash type: GS + LANG	Inverter	Idle					
	Booster	Idle					
	service-board	Idle					
	string-control	Idle					

The last operation to be carried out is to confirm the Firmware upgrade using the "START UPDATE" button.

The Firmware upgrade process takes place sequentially for all the inverters that require it based on the Firmware present in the .tib file The entire reprogramming process takes approximately 20 minutes per inverter

Once the programming is complete, the inverter connects to the grid automatically, resetting the remote OFF command set previously.

The end of the programming phase will be indicated by the following window.



Once the programing phase is complete, a report relating to the outcome of the reprogramming will be generated automatically and filed on C:\Programmi\ABB\Aurora Manager\ liteFW\_update\_reports. To check that the reprogramming has taken place, the UNIT ID > device info > Update version tab will indicate the new file with extension .tib.



### "Configuration" menu

Used to assign/change the address of the inverters connected to the RS485 bus.

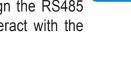


The Configuration menu consists of two submenus:



### Assign RS485 address:

This function is particularly useful if there is a large number of inverters in the RS485 chain as it can be used to assign the RS485 address automatically, therefore without having to interact with the display of each inverter in the system.



UNIT SEARCH IV Search angle SN SN		ASSIGN ADDRESS
Serial Number	Actual ADDR.	New ADDR.

By putting a check mark in the search for an individual inverter by serial number and clicking on "UNIT SEARCH", you see in the table the inverter searched for with indication of the S/N of the inverter, the current RS485 address and the new RS485 address that you wish to assign.



For systems consisting of several units, it is possible to scan all the inverters by putting a check mark in "Use Custom Range"

UNIT SEARCH	Search single SN	Start SN	End SN
	Use custom range	0	999999
Q	TX/RX		

Displaying a table that shows: serial number of the inverters - current address - new address.

The "Assign Address" button can be used to change the 485 addresses, defined in the "New ADDR" field.

For the commissioning phase (all inverters have an address pre-set at 1) Aurora Manager Lite will display a progressive address (editable)

For the maintenance phase (the inverters already have an assigned progressive address) the field "New ADDR" will give the address already set, to be changed manually if necessary.



On completion of the RS485 address assigning procedure, it is advisable to refresh the list of inverters to check that the address has been assigned to each inverter correctly.

### **S**etup area access:

Used to enter the personal data required for access to the INSTALLER level and so unlock the areas of Aurora Manager Lite relating to the advanced configuration of the inverter.

The personal data and the password to be entered are the same as those used when registering on the site <u>https://registration.abbsolarinverters.com/</u>

Setup area currently locked (after SW update)	
User data	
	E-mail address (max 100 characters )
	User name (max 50 characters )
	User sumame (max 50 characters)
	User date of birth ( DDMMYYYY format )
User password (short)	
	Password ( short )
ENTER	

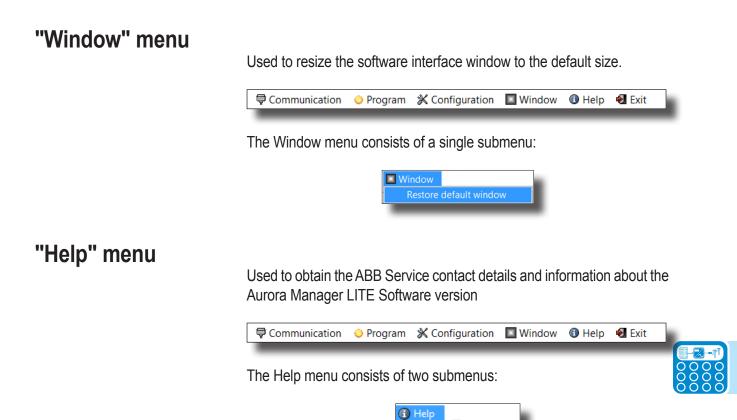
Once the personal data has been entered, press ENTER. Aurora Manager LITE will allow you to carry out the advanced configuration of the inverter.

Setup area unlocked	
User data	
	E-mail address (max 100 characters )
	User name (max 50 characters )
(	User sumame (max 50 characters )
	User date of birth (DDMMYYYY format)

000127BG

To obtain the password, register on the site <u>https://registration.abbsolarinverters.com/</u> where, on entering your personal data, you will receive an e-mail with the login details.

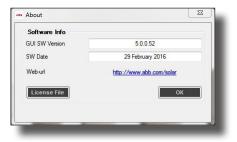




# About this:

Go to the "About This" submenu for information about the Aurora Manager LITE software such as, for example, the Software version

About this... Aurora Service



### Aurora Service:

Go to the "Aurora Service" submenu for the ABB Service contact details



### Inverter working area



After having configured the parameters relating to the Communication menu, the RS485 bus can be scanned to search for the inverters connected to it via the PVI-USB-RS485\_232 signal converter.

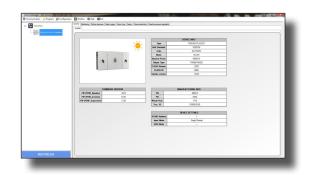
The scan is carried out by clicking on the "REFRESH" button at the bottom left.



Once the scan is complete, the inverters identified are shown in the tree structure of the system.



By selecting one of the inverters, the functions are made available in the work area relating to the inverter.



The default functions of Aurora Manager Lite (gaining access with the USER level) are:

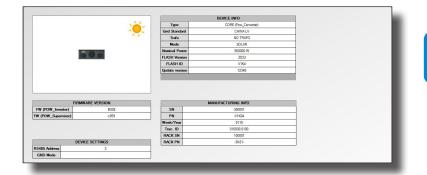
- 1 Unit ID tab
- 2 Monitoring tab
- 3 Partner Devices tab
- 4 Data Logger tab
- 5 Event Log tab
- 6 Setup tab (INSTALLER access level)
- 7 Power Reduction tab
- 8 Reactive power regulation tab (some functions active with INSTALLER access)

### "Unit ID" tab

Displays the "identity card" of the inverter selected. Tabs relating to TRIO-50.0-TL-OUTD string inverter:

			DEVICE INFO	
		Туре	TRIO-50.0-TL-OUTD	
		Grid Standard	BDEW	
-	1 A	Trafo	NO TRAFO	
		Mode	SOLAR	
		Nominal Power	50000 W	
		Output Type	THREE-PHASE	
		FLASH Version	Z038	
		FLASH ID	3N63	
EIDMA	NADE VERSION	Update version		
	WARE VERSION	MAI	NUFACTURING INFO	
FW (POW_Booster)	A086	SN MAI	NUFACTURING INFO	
FW (POW_Booster) FW (POW_Inverter)	A086 B1B7	SN MAI	UFACTURING INFO 111111 -3N63-	
FW (POW_Booster) FW (POW_Inverter)	A086	SN MAI PN Week/Year	NUFACTURING INFO 111111 -3N63- 4915	
FW (POW_Booster) FW (POW_Inverter)	A086 B1B7	SN MAI	UFACTURING INFO 111111 -3N63-	
FW (POW_Booster) FW (POW_Inverter)	A086 B1B7	SN MAI PN Week/Year	NUFACTURING INFO 111111 -3N63- 4915	
W (POW_Booster) W (POW_Inverter) W (POW_Supervisor)	A086 B1B7	SN MAI PN Week/Year Trac. ID	NUFACTURING INFO 111111 -3163- 4915 010000.0100	
W (POW_Booster) W (POW_Inverter) W (POW_Supervisor) DEV	A096 B1B7 C133	SN PN Week/Year Trac. ID SN DCBOX	UFACTURING INFO 111111 -3N83- 4915 010000.0100 66666	
W (POW_Booster) W (POW_Inverter) W (POW_Supervisor)	A096 B1B7 C133	SN MAI SN PN Week/Year Trac. ID SN_DCB0X PN_DCB0X	NUFACTURING INFO 111111 -3N63- 4915 -010000-0100 -66666 -3N63-	

Tabs relating to CORE centralized inverter (Power Converter):



Tabs relating to CORE centralized inverter (System Controller):

			DEVICE INFO
		Туре	CORE (Sys Controller)
		FLASH Version	200C
	1.1	FLASH ID	V1K6
		Update version	
	RE VERSION		MANUFACTURING INFO
	RE VERSION E001	SN	MANUFACTURING INFO 200031
		PN	200031 V1K061
		PN Week/Year	200031
		PN	200031 V1K061
		PN Week/Year	200031 V1K061 0915
(POW_Supervisor)		PN Week/Year Trac. ID	200031 V1K061 0915 N/A

The information available is divided into 4 categories:

Device Info: General information relating to the inverter.

Manufacturing Info: Inverter identification information.

Device Settings: General information relating to the settings applied on the inverter.

Firmware version: Information relating to the firmware installed on the inverter.

### "Monitoring" tab

The displaying of this menu differs depending on the type of inverter to which Aurora Manager Lite is connected:

- 1 TRIO-50.0-TL string three-phase
- 2 TRIO-20./27.6-TL string three-phase
- 3 CORE centralized inverters
- 1 Displaying of the TRIO-50.0-TL string inverter instantaneous monitoring data:

F	Run Run Alarm PPT	Global Inverter Alarm Booster	700.6 2.04 1455 698.3	V_IN_1 I_IN_1 P_IN_1 V_BUL	[A] [W]			User reque High T dera Hig FAC de High VAC o IAC limit de	ating rating lerating rating
AC sid 235.5 2.34	e Vac [V] lac [A]	235.5 407.8	V-R-N [V] V-R-S [V]	236.1 407.5	V-S-N [V] V-S-T [V]	235.0 408.0	V-T-N [V] V-T-R [V]	Max PAC lin	
50.02 1296	Fac [Hz] Pac [W]	2.33 492.6	I-R [A] P-R (W)	2.36 467.8	I-S [A] P-S [W]	2.29 442.9	I-T [A] P-T [W]	E0: Production 536	TOT
0	Qac [VAF	8]						536 0 9	PAR TOD WEK
GF inte	face			Fans (rp	m]			490	MON
0.000	Heak	A		0	Pack 1	0	AC box	536	YEA
3.54 347.9	R-iso   Vgnd	MOhm] A]		0	Pack 2 Pack 3 Pack 4	0	Converter DC box	Power Peak   25480	W] ABS TOD
Tempe	erature [°C]							1000	IOD
29.4 36.7		ter (max) ter (max)	21.7 27.9	T AC box T DC box	26		Ambient	Inner clock	}

The data available relates to:

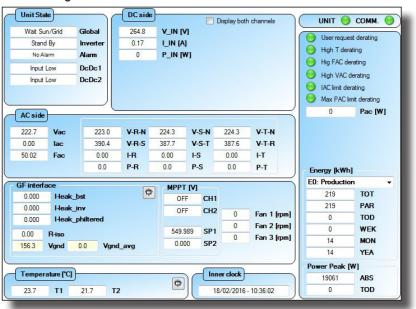
- "Unit State": General state of the inverter
- "DC side": Input parameters
- "AC side": Output parameters
- "GF Interface": Parameters relating to the insulation of the PV generator
- "Fans": Information about the fans in the inverter (revolutions per minute rpm)
- "Temperature [°C]": Internal temperature of the Inverter
- "Inner Clock": Inverter Date and Time
- Indicators relating to the general state of the inverter (status), to the 485 (RS 485) serial communication and power derating
- Statistical data relating to the production of energy by the inverter

The indicators can assume three different states:

- Green LED indicates correct operation
- Red LED indicates alarm
- Orange LED indicates warning



2 - Displaying of the TRIO-20.0/27.6-TL string inverter instantaneous monitoring data:



The data available relates to:

- "Unit State": General state of the inverter
- "DC side": Input parameters
- "AC side": Output parameters
- "GF Interface": Parameters relating to the insulation of the PV generator
- "MPPT[V]: Automatic scanning of MPPT ON/OFF, SP1-SP2 voltage values at which the inverter works if MPPT is at OFF.
- "Fans": Information about the fans in the inverter (revolutions per minute rpm)
- "Temperature [°C]": Internal temperature of the Inverter
- "Inner Clock": Inverter Date and Time
- Indicators relating to the general state of the inverter (status), to the 485 (RS 485) serial communication and power derating
- Statistical data relating to the production of energy by the inverter

The indicators can assume three different states:

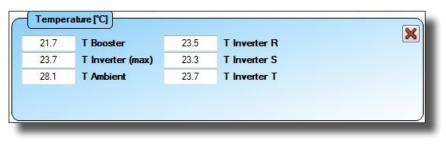
- Green LED indicates correct operation
- Red LED indicates alarm
- Orange LED indicates warning

The "GF Interface" field can be expanded to display more information about the Leakage current and the ground insulation resistance measured by each of the inverter's calculation devices.

The "MPPT [V]" field, if ON (default), permits automatic scanning of the maximum power point. If OFF, only scans after a reconnection to the grid. SP1-SP2 indicate the inverter working input voltages if the MPPT point search function is disabled.

GF interface Leak [A]						
Booster	Inverter	Commission	OFF	CH1		
Total	Total	Supervisor Total	OFF	CH2	0	Fan 1 (rpm)
0.000	0.000	2.000			0	Fan 2 [rpm]
Resistive	Resistive	Resistive	549.989	SP1 -		-
0.000	0.000	0.000	0.000	SP2	0	Fan 3 [rpm]

The "temperature [°C]" field can be expanded to display more information about the temperatures measured by the various temperature sensors in the inverter:



3 - Displaying of theinstantaneous monitoring data of the CORE centralized inverter CORE (Power Converter).

Unit Sta Rur Rur No Ala upervisor verter Alin	n Globa n Inver arm Alarm Alive CNT ve CNT	ter 2	358.65 3622.90 Vbulk [V] 382.8	V_IN [V] I_IN [A] P_IN [W] VB+ VB-		ner clo 4/12/20	<b>ck</b> ) 015 - 09:29:21		UNIT Grid OF L Grid OF L Grid AVG Anti Islam Grid OC L OTH Der Input OV Temp VS	est derat )erating OV Dera ding Dera )erating ating Derating	ting
286162	Pac (W)	0.0551	100						М	String (	Cell
-7844	Qac [VAR]	OPEN	AC Con	tactor					Energy [k]	Nh]	
50.00	Fac B	315.6	V-T-R	516.53	I-R	25.	B1 Icap_	R	E0: Produc	tion	
50.02	Fac S	317.9	V-R-S	516.81	I-S	26.	01 Icap_	S	5628	T	т
50.01	Fac T	319.5	V-S-T	510.25	I-T	25.	53 Icap_	T	5628	P	AR
50.01	Tac T								93	T	DD
Fans									1205	W	EK
4058	Fan IGBT1 (rp	m] 1403	Fan DO	C1 [rpm]					939	м	ON
4064	Fan IGBT2 [m	m] 1423	Fan DO	C2 [rpm]					5630	Y	EA
3907	Fan IGBT3 (rp	m] 1411	Fan DO	C3 [rpm]							
4011	Fan IGBT4 (m	m] 1416	Fan DO	C4 [rpm]	A	Temp	[°C]				
3935	Fan IGBT5 Im			C5 [rpm]	2	5.7	Pow Supply	52.4	IGBT 1 R	53.0	IGBT 2
	Fan IGBT6 (m		_	C6 [rpm]		_	Ambient	51.2	IGBT 1 S	54.2	IGBT 2
4028				- the mult	-						
4028 0	Fan CAP R [rp		Ean C/	AP S [rpm]	1	1.3	Reactor1	50.8	IGBT 1 T	53.0	IGBT 2

The data available relates to:

- "Unit State": General state of the conversion box
- "DC side": Box input parameters
- "AC side": Box output parameters
- "Fans": Parameters relating to the operating state of the fans (revolutions per minute: rpm)
- "Temperature [°C]": Internal temperature of the Inverter
- "Inner Clock": Inverter Date and Time
- Indicators relating to the general state of the inverter (status), to the 485 (RS 485) serial communication and power derating
- Statistical data relating to the production of energy by the inverter

The indicators can assume three different states:

- Green LED indicates correct operation
- Red LED indicates alarm
- Orange LED indicates warning



### "Partner Devices" tab

Displays the tree structure of the logic and/or signal acquisition boards present in the inverter.

REFRESH	Partner ID States Me	asures Global Settings Strings Settings	
B Supervisor			
□ Display ↓ Communication board	PRESENCE		
- III Fuse-control board	Name	Fuse-control board	
	Presence	ON-LINE	

Used to associate a new component of the inverter, either in the event of replacement of an auxiliary part or in the event of the addition of an expansion board.



Select one of the boards present in the tree structure for more information.



### "Partner ID" tab (display board)

(Depending on the inverter model, the tab may differ or may not be present, refer to the product manual) Displays the display identity card

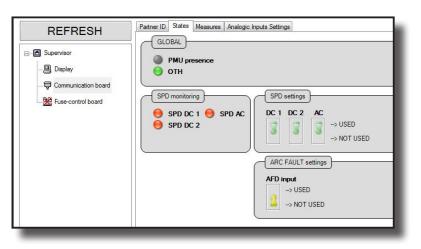
Unit D Monitoring Partner devices Event Lo	g Setup		ú
REFRESH	Pather D		
Communication board	PRESENCE		
	Nome	Display	
	Presence	ON-LINE	
	Inner ID	1	
	Msg count	147	
	RS485 int.	ON-LINE	
	Supervisor link	Valid link	
	(ID FIELDS)		
	FW version	D207	
	SN		
	PN	*****	
	W/Y	1110	
	Supervisor SN	556608	

### "Partner ID" tab (Communication board)

(Depending on the inverter model, the tab may differ or may not be present, refer to the product manual) Displays the communication board identity card

Unit D   Manifoling   Pather devices   EventLag	Partner ID States Meas	veel Avaloge Input Shtring
🖃 🖪 Supervisor	<b>Q</b>	
- B Display		
- Communication board	(PRESENCE)	
E Fuse-control board	Name	Communication board
	Presence	ON-LINE
	Inner ID	2
	Msg count	37940
	RS485 int.	ON-LINE
	Supervisor link	Valid livik
	(ID FIELDS)	_
	FW version	E001
	SN	573885
	PN	V0R97C
	W/Y	3011
	Supervisor SN	556668

### "States" tab (Communication board)



Displays the operating state of the devices monitored by the board.

In particular in the Global section:

PMU presence indicates the presence of the PMU device OTH indicates the state of the temperature protection In the SPD monitoring section:

The state of the dischargers (SPD) is indicated, DC side and AC side. In the SPD settings section:

The monitoring of the DC and AC dischargers is enabled.

Arc fault settings section: The Arc fault protection is enabled.

The indicators can assume three different states (colors):

- green correct operation
- red damage to the part indicated
- gray functionality not checked

### "Measurements" tab (Communication board)

Displays the values of the analogic and environmental inputs acquired

REFRESH	Partner ID States Measures Analogic Inputs Settings		
	MEASURE	Unit	Value
Supervisor	PT100 (ana.)	Ohm	155.189
- Display	PT1000 (ana.)	Ohm	1551.891
	ANA 1 (ana.)	mA	0.000
- Communication board	ANA 2 (ana.)	mA	0.000
K Fuse-control board	PT100 (conv.)	°C	144.370
	PT1000 (conv.)	°C	144.370
	ANA 1 (conv.)	W/mq	0.000
	ANA 2 (conv.)	W/mq	0.000
	NTC (ana.)	V	2.690
	NTC (conv.)	°C	31.000

The number of measurement values acquired varies according to the settings applied on the "Analog Input Settings" tab as, if the reading of the analogic sensors is enabled the value of the measurement converted to the actual value is displayed





### "Analog Input Settings" tab (Communication board)

Used to enable/disable the analogic inputs connected to the inverter in addition to the possibility of applying the settings relating to the AN1 and AN2 analogic inputs. For each of the analogic sensors it is possible to set the Gain, the offset and the unit of measurement. The data will be saved in the inverter on confirming by pressing the SET button.

httD Monitoring Partner devices Eve REFRESH		Analogo Input Settings           Analogo Input Settings           1.000         1.000         GAN           0.000         0.000         OFFSET           Wing W. (WINT         SET
Euse-control board	AN2	AN2           1 000         1.000         GAN           0 000         0.000         OFFSET           Wimq         Wimq         M UNIT
	PT100	
	PT1000	

Below are indicated the values to be set for the ABB sensors that can be connected to the inverter:

	Туре	Gain	Offset	U.of.M.
PVI-AEC-IRR	Radiation sensor	120	0	W/m <sup>2</sup>
PVI-AEC-IRR-T	Radiation sensor with integrated	Radiation: 120	Radiation: 0	Radiation: W/m <sup>2</sup>
	cell temp. sensor	Cell temp.: 10.869	Cell temp.: -20	Cell temp.: °C
PVI-AEC-RAD-13TC	Radiation sensor	130	0	W/m <sup>2</sup>
PVI-AEC-RAD-13-TC-T	Radiation sensor with integrated	Radiation: 130	Radiation: 0	Radiation: W/m <sup>2</sup>
	cell temp. sensor	Cell temp.: 11.507	Cell temp.: -26.1	Cell temp.: °C
PVI-AEC-CONV-T100	PT100/010V converter	15	-50	°C at 010V
PVI-AEC-T1000-INTEGR	Ambient temperature sensor with	10	-50	0°
	integrated converter			
PVI-AEC-WIND-COMPACT	Wind speed sensor	5	0	m/s
PVI-AEC-PYR-1300	Pyranometer (01300W/m <sup>2</sup> )	65	0	W/m <sup>2</sup>
PVI-AEC-T100-ADH	Module temperature sensor (back	N/A	N/A	N/A
	cell) PT100 adhesive			
PVI-AEC-T1000-BOX	Ambient temperature sensor	N/A	N/A	N/A
	PT1000			

### "Partner ID" tab (Fuse Control Board)

(Depending on the inverter model, the tab may differ or may not be present, refer to the product manual) Displays the board's identity card

	lates	measures	rarameters	Global Settings	strings settings
PRESE	INCE				
	INCL	J			)
Name		String	Control		
Presen	ice	ON-LI	NE		
Inner I	D	0			
Msg co	ount	22722	9		
RS485	int.	ON-LI	NE		
ID FIEL					
FW ve	rsion	F014			
SN					
PN					
W/Y					

### "States" tab (Fuse Control Board)

Displays theoperating state of the parameters monitored:

- Image relating to the TRIO-20.0-TL

<ul><li>Strings</li><li>Unbalar</li></ul>	state O	<b>•</b>	Internal warning Autotest
STRINGS		CURRENTS	
<b>●</b> 1.A	😑 2.A	⊖ 1.A	🖯 2.A
<b>1.B</b>	😑 2.В	⊖ 1.B	🖯 2.B
● 1.C	● 2.C	😑 1.C	<b>●</b> 2.C
🖲 1.D	2.D	1.D	2.D
● 1.E	2.E	● 1.E	2.E

- Image relating to the TRIO-50.0-TL

Fuse states     Overcurrer     Unbalanced currents     Overvoltag	
STRINGS       FUSES       1 A     2 A       3 A     4 A       1 B     2 B       3 B     4 B       1 C     2 C       3 C     4 C	CURRENT/VOLTAGE

The "Global" subfield indicates the general state of the protections.

The "Strings" subfield indicates the string fuses state indicators

The "Currents" subfield relating to the TRIO-20.0/27.6-TL-OUTD indicates the state indicators for the individual string currents which in the event of an imbalance change color to red. The monitoring and displaying of the state of the string fuses can be enabled on the "Strings Setting" tab (fuse control board).

The "Current/Voltage" subfield relating to the TRIO-50.0-TL-OUTD indicates the monitoring of the voltage and of the input currents. In particular the protections relating to the currents are monitored in groups. Each group consists of 3 or 4 strings, depending on the DC wiring box model installed on the inverter (12 or 16 inputs).

The indicators can assume 4 different states (colors)

- green correct operation
- red alarm active
- orange warning active
- gray function not enabled (OFF position on the "strings settings" tab)



### "Measures" tab (Fuse Control Board)

Displays the values of the pa as input (image relating to the	•	the strings connected
Name	Value	Measure Unit
STRNG_VOLTAGE_1A	817.005	V

STRNG_VOLTAGE_1A	817.005	V
STRNG_VOLTAGE_1B	816.655	V
STRNG_VOLTAGE_1C	817.005	V
STRNG_VOLTAGE_1D	0.927	V
STRNG_VOLTAGE_2A	59.393	V
STRNG_VOLTAGE_2B	59.393	V
STRNG_VOLTAGE_2C	60.094	V
STRNG_VOLTAGE_2D	0.577	V
STRNG_VOLTAGE_3A	819.105	V
STRNG_VOLTAGE_3B	61.844	V
STRNG_VOLTAGE_3C	62.544	V
STRNG_VOLTAGE_3D	0.927	V
STRNG_VOLTAGE_4A	57.993	V
STRNG_VOLTAGE_4B	59.393	V
STRNG_VOLTAGE_4C	60.794	V
STRNG_VOLTAGE_4D	0.577	V
STRNG_VOLTAGE_GROUP1	811.753	V
GROUP_CURRENT_1	16.612	A
GROUP_CURRENT_2	0.179	A
GROUP_CURRENT_3	5.529	A
GROUP_CURRENT_4	0.052	A

"Parameters" tab (Fuse Control Board)

Displays the parameters set via "Global settings" and "String Settings" (Fuse control board) during the installation phase.

It is possible to extend the configuration of the strings and protections to all or some of the inverters connected to the same 485 line.

ne		Value	Measure Unit
	_CHECK_FLAG	Value 15	measure Unit
	IT_WEIGHT_1	10	
	IT_WEIGHT_2		-
	IT_WEIGHT_3		
	IT_WEIGHT_4	4	
	IT_WEIGHT_5	0	
	IT_WEIGHT_6	0	
	IT_WEIGHT_7	0	
CURREN	IT_WEIGHT_8	4	
CURREN	IT_WEIGHT_9	4	
CURREN	T_WEIGHT_10	0	
CURREN	T_WEIGHT_11	0	
CURREN	T_WEIGHT_12	4	
CURREN	T_WEIGHT_13	0	
CURREN	T_WEIGHT_14	0	
CURREN	T_WEIGHT_15	0	
CURREN	T_WEIGHT_16	4	
	ENT_CHECK_TH	4.000	A
	/OLTAGE_TH	1000 000	v
The second se	ENT_DEVIATION	12.000	A
OVER_C	URRENT_TH	12 000	A
MAX CURRENT I	DEVIATION TRIP TIME	30	s

Pressing the *"Write this configuration on all connected inverters"* button extends to all the inverters that make up the system, connected to the same 485 serial.

Pressing the "Write this connection choosing inverter by s/n and RS485 address" button extends the configuration only to the inverters required in 485 address order.

### "Global Settings" tab (Fuse Control Board)

Used to apply the settings relating to the check of the input currents. Depending on the type of inverter, different screens will be displayed:

1. Screen relating to the TRIO-20.0/27.6-TL-OUTD

### Unbalanced currents check threshold

 Absolute value of enabling of the check of imbalance of the currents (one for each of the two input MPPTs). The default value is 2A.

### **Overcurrent threshold**

- Overcurrent threshold (one for each of the two input MPPTs). The default value is 10A.

### Unbalanced currents check trip time

- Duration for which the current imbalance must be present in order for the alarm to be generated. It is recommended that this parameter is set to more than 900 seconds to avoid false alarms.

2.000	0.000	Unbalanced currents check threshold [A] - CH. 1 Overcurrent threshold [A] - CH. 1
2.000	0.000	Unbelanced currents check threshold [A] - CH. 2
10.000	0.000	Overcurrent threshold [A] - CH. 2
600	0	Unbelanced currents check trip-time [s]
s	ET	
	(1-1)	
C strings set	Hest	
👕> Test e	nabled	
-> Test e	nabled	

By clicking on "SET" the values are set in the fuse control board of the inverter selected.

The "DC strings self-test" function is used to enable the function for checking the polarity of the string voltages during the first start-up of the inverter.

### 2. Screen relating to the TRIO-50.0-TL-OUTD

### Minimum currents check threshold

- Absolute value of enabling of the check of imbalance of the currents (one for each group of 3/4 input strings). The default value is 2A.

### Overcurrent threshold

- Overcurrent threshold (one for each group of input strings). The default value is 12A.

### Max currents deviation

- Maximum imbalance permitted before the alarm is triggered. The default value is 2A.

### Max currents deviation trip time

- Duration for which the current imbalance must be present in order for the alarm to be generated. The default value is 300 seconds.

### Overvoltage threshold

- Overvoltage threshold (one for each group of input strings). The default value is 1000V.

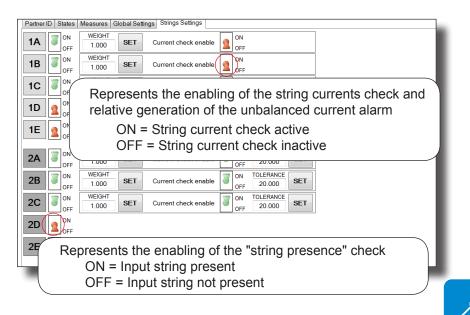
4.000	4.000	Minimum current check threshold [A\string]
12.000	12.000	Overcurrent threshold [A\string]
12.000	12.000	Max current deviation [A\string]
30	30	Max current deviation trip-time [s]
1000.000	1000.000	Overvoltage threshold [V]

By clicking on "SET" the values are set in the fuse control board of the inverter selected.

### "Strings setting" tab (Fuse Control Board)

Used to apply the monitoring settings for each string.

Image relating to the TRIO-20.0/27.6-TL:



In particular it permits:

1. Enabling of the check of the presence of each of the input strings connected.

The check of the presence of the individual input string is enabled by switching the selector from the OFF position to ON (by clicking on the selector)

 Enabling of the check of the current imbalance on each input string andsetting of its current reading weight (weight = N° of strings connected in parallel to the individual string input) and tolerance (maximum imbalance permitted before the alarm is triggered) expressed as a percentage.

The check of the string current imbalance is enabled by switching the selector from the OFF position to ON (by clicking on the selector)

By clicking on "SET" the values are set in the fuse control board of the inverter selected.

The state of enabling of the presence of each string is displayed on the "States" tab (fuse control board) together with the state of the relative fuse.

Image relating to the TRIO-50.0-TL:

Partner ID States Measures Parameters Global Settings Strings Settings	
1A ON WEIGHT 1 SET	Current check G1
1B ON WEIGHT 1 SET	
1C ON WEIGHT SET	
3A ON WEIGHT SET	Current check G3
	OFF
3C OFF	
ON	
4C 2 OFF	

In particular it permits:

1. Enabling of the check of the presence of each of the input strings connected.

The check of the presence of the individual input string is enabled by switching the selector from the OFF position to ON (by clicking on the selector).

When at least one string is activated, the current imbalance check is enabled (default active).

Setting of the current reading weight (weight = n° of strings connected in parallel to the individual input).

The tolerance (maximum imbalance permitted before the alarm is triggered) can be set from the "Global settings - Max Currents Deviation" tab (default 2A).



# "Partner ID" tab (wi-fi board)

(Depending on the inverter model, the tab may differ or may not be present, refer to the product manual) Displays the board's identity card

REFRESH	Partner ID
G Supervisor	Q
Wi-Fi board	(PRESENCE )
III Service board	Name Wifi
String-control board	Presence ON-LINE
	Inner ID 0
	Meg count 530901
	RS485 int. OFF-LINE
	( ID FIELDS )
	FW version W18C
	SN 133131
	PN -3N16-
	W/Y 3415
	Supervisor SN 00000

# "Partner ID" tab (Ethernet board)

(Depending on the inverter model, the tab may differ or may not be present, refer to the product manual) Displays the board's identity card

REFRESH	Parise D	
Supervisor		
W-R board	(PRESENCE)	
*	Name Bhomd Pressoon 0741.116 Invert ID	
	Nag count 0 RS485 int.	
	Spenisorlink	
	(DRUS) IW version	
	SN PN W/Y	
	Spervisor SN	

## "Partner ID" tab (PMU board)

(Depending on the inverter model, the tab may differ or may not be present, refer to the product manual) Displays the board's identity card

REFRESH	Patner ID States Measures Analogic Inputs Settings Aux. RS485 PMU
- C Supervisor	
🗘 Wi-Fi board	PRESENCE
Service board	
	Name Service board
String-control board	Presence ON-UNE
	Inner ID 0
	Mag count 883993
	RS485 int. ON-UNE
	Supervisor link Wating Ink
	DFIELDS
	FW version S016
	SN 721985
	PN - 3827-
	W/Y 0915
	Supervisor SN 000013
Settings	
Accept new component	
	· · · · · · · · · · · · · · · · · · ·



# "States" tab (PMU board)

Displays the operating state of the digital inputs



## "Measures" tab (PMU board)

Displays the values of the parameters relating to the analogic and environmental inputs. The parameters read will have a meaningful value if correctly enabled and configured on the "Analogic input settings" tab.

REFRESH	MEASURE	Unit	Value
Bupervisor	AN1	-	0.020
W-Fiboard	AN2		0.030
	PT100 / PT1000		129.849
📖 Service board	AN3		0.006
	AN4	mA	0.032

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## "Analogic inputs settings" (PMU board)

REFRESH	Partner ID States I	Measures Analogic Inp	us settings	Aux. RS485 PN	10
		CURRENT		MODE	
	AN1	1.000	1.000	GAIN	
	ANT	0.000	0.000	OFFSET	
Service board		W/mq	W/mq	M. UNIT	SET
String-control board		CURRENT		MODE	
Sting control board	AN2	1.000	1.000	GAIN	
	ANZ	0.000	0.000	OFFSET	
		3°	°C	M. UNIT	SET
	РТС	PT100	•	MODE	SET
		CURRENT	,	MODE	
	AN3	1.000	1.000	GAIN	
	ANS	0.000	0.000	OFFSET	
		W/mq	W/mq	M. UNIT	SET
		CURRENT		MODE	
	AN4	1.000	1.000	GAIN	
	7.04	0.000	0.000	OFFSET	CET
		W/mq	W/mq	M. UNIT	SET

Displays the settings relating to the analogic inputs

Used to enable/disable the analogic inputs connected to the inverter in addition to the possibility of applying the settings relating to the AN1/AN2/AN3/AN4 analogic inputs. For each of the analogic sensors it is possible to set the GAIN, the offset and the unit of measurement. The data will be saved on confirming by pressing the SET button.

The PTC function permits enabling/disabling of the input in PT100 or PT1000 mode according to the type of sensor connected.

	Туре	Gain	Offset	U.of.M.
PVI-AEC-IRR	Radiation sensor	120	0	W/m <sup>2</sup>
PVI-AEC-IRR-T	Radiation sensor with integrated cell temp. sensor	Radiation: 120 Cell temp.: 10.869	Radiation: 0 Cell temp.: -20	Radiation: W/m <sup>2</sup> Cell temp.: °C
PVI-AEC-RAD-13TC	Radiation sensor	130	0	W/m <sup>2</sup>
PVI-AEC-RAD-13-TC-T	Radiation sensor with integrated cell temp. sensor	Radiation: 130 Cell temp.: 11.507	Radiation: 0 Cell temp.: -26.1	Radiation: W/m <sup>2</sup> Cell temp.: °C
PVI-AEC-CONV-T100	PT100/010V converter	15	-50	°C at 010V
PVI-AEC-T1000-INTEGR	Ambient temperature sensor with integrated converter	10	-50	°C
PVI-AEC-WIND-COMPACT	Wind speed sensor	5	0	m/s
PVI-AEC-PYR-1300	Pyranometer (01300W/m <sup>2</sup> )	65	0	W/m <sup>2</sup>
PVI-AEC-T100-ADH	Module temperature sensor (back cell) PT100 adhesive	N/A	N/A	N/A
PVI-AEC-T1000-BOX	Ambient temperature sensor PT1000	N/A	N/A	N/A

Below are indicated the values to be set for the ABB sensors connected to the inverter:

# "Aux RS485" tab (PMU board)

Displaying and setting relating to the 485 communication protocol and relative baud rate

REFRESH	Partner ID States Measures Analogic Inputs Settings Aux. RS485	PMU
Supervisor      Wi-Ri board      Service board      Service board      String-control board	Settings           AURORA (dave)         PROTOCOL           AURORA (dave)         BAUD-RATE	SET

## "PMU" tab (PMU board)

Displaying and setting relating to the active and reactive power management mode.

_	_				10	
Ger	ieral					
0 : NO	DNE (disab	led)		MO	DE	SET
	DNE (disab					JLI
	egulation in egulation	n 4 steps				
		n 4 steps + Q n	egulation mode 2			
		Q regulation r				
		n 4 steps + Q n · Q regulation r	egulation mode 4			
	egulation r		noue 4			
	egulation r					
			regulation mode 4 (approval te	st)		
	and the state of	1 Characteria	mode 4 (approval test)	200 C		



The following table indicates the active power limitation/reactive power management modes that can be selected via the PMU board:

Name on the display	Operation	Inputs
Mode 0	No PMU function selected	-
Mode 1	Reduction of the active power in 4 steps	K1, K2, K3, K4
Mode 2	Reduction of the active power by means of analogic inputs	AN3
Mode 3	Reduction of the active power in 4 steps	K1, K2, K3, K4
WOULD J	Check of the reactive power by means of analogic inputs	AN4 (Type 2)
Mode 4	Reduction of the active power by means of analogic inputs	AN3
	Check of the reactive power by means of analogic inputs	AN4 (Type 2)
Mode 5	Reduction of the active power in 4 steps	K1, K2, K3, K4
Mode 5	Check of the reactive power by means of analogic inputs	AN4 (Type 4)
Mode 6	Reduction of the active power by means of analogic inputs	AN3
MOUE 0	Check of the reactive power by means of analogic inputs	AN4 (Type 4)
Mode 7	Check of the reactive power by means of analogic inputs	AN4 (Type 2)
Mode 8	Check of the reactive power by means of analogic inputs	AN4 (Type 4)
Mada 0	Reduction of the active power in 11 steps	K1, K2, K3, K4
Mode 9	Check of the reactive power by means of analogic inputs	AN4 (Type 4)
Mode 10	Reduction of the active power by means of analogic inputs	AN3
Node to	Check of the reactive power by means of analogic inputs	AN4 (Type 4)

×

- Check of the active power by means of digital inputs in 4 steps This type of check is used in operating modes 1, 3, 5.

The digital inputs for limiting the active power are K1, K2, K3 and K4  $\,$ 

K1	K2	K3	K4	Maximum active power as % of the nominal power of the inverter
Closed	Open	Open	Open	100
Open	Closed	Open	Open	60
Open	Open	Closed	Open	30
Open	Open	Open	Closed	0

- Check of the active power by means of digital inputs in 11 steps. This type of check is used in operating mode 9.

The digital inputs	s for limiting the	active power are	K1. K2.	K3 and K4
	, ioi illinaity alo		,,	

ino aigia		or minung		c power are ref, re, re and ref
K1	K2	K3	K4	Maximum active power as % of the nominal power of the inverter
Open	Closed	Open	Closed	100
Closed	Open	Open	Closed	90
Open	Open	Open	Closed	80
Closed	Closed	Closed	Open	70
Open	Closed	Closed	Open	60
Closed	Open	Closed	Open	50
Open	Open	Closed	Open	40
Closed	Closed	Open	Open	30
Open	Closed	Open	Open	20
Closed	Open	Open	Open	15
Closed	Closed	Open	Closed	0

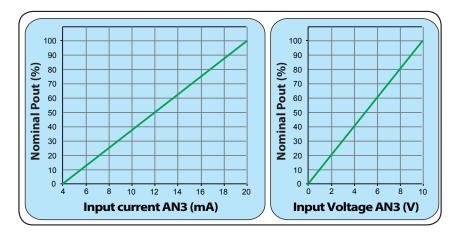
#### - Check of the active power by means of an analogic input (AN3).

This type of check is used in operating modes 2, 4, 6, 10.

The analogic input for the limitation of the active power is AN3.

With this type of check the output active power can be managed dynamically based on the value of the analogic input signal. This signal may be a current (4...20mA) or a voltage (0...10V).

The limitation of the nominal output power is applied to the inverter in accordance with the graphs below (on the left  $\rightarrow$  input current; on the right  $\rightarrow$  input voltage):



#### - Check of the reactive power by means of an analogic input (AN4).

This type of check is used in operating modes 3, 4, 5, 6, 7, 8, 9 and 10. The management modes have different behaviors described below. The analogic input for checking the reactive power is AN4.

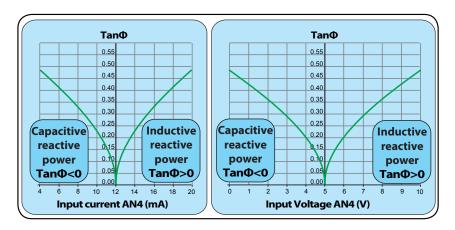
With this type of check the reactive power can be managed dynamically based on the value of the analogic input signal. This signal may be a current (4...20mA) or a voltage (0...10V).

There are 2 reactive power management modes:

 $\mbox{Type 2} \rightarrow \mbox{Tan}(\phi)$  fixed based on the instantaneous output power

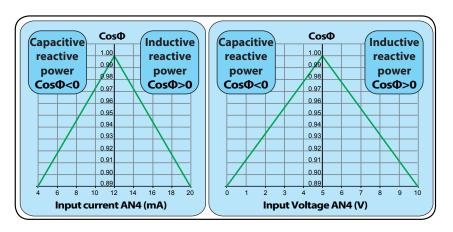
**Type 4**  $\rightarrow$  Cos( $\phi$ ) fixed based on the instantaneous output power The management of the reactive power is applied to the inverter in accordance with the graphs below (on the left  $\rightarrow$  input current; on the right  $\rightarrow$  input voltage):

### Operating mode Type 2





Operating mode Type 4





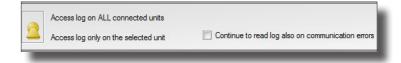
# "Data logger" tab

Displays the values of the input and output parameters detected by the inverter:

- Data logger setting: Used to set the recording period (minimum time 2 seconds) and ticking "Stop after N samples" sets the number of samples.
- Data logger Enable: Enables/disables the recording of the sample.
- File setting: Text mode for saving the logger data.
- Configuration setting: used to upload a customized list of parameters (for service use only).

Unit ID Monitorin	ng Partner der	rices Data Logger	Event Log Se	tup Power reduc	tion Reactive power regulation	
MEASURE	Log Enabled?	Last Read Value				Data Logger Settings
Vin_1_[V]	V	1	Ú.			Logging Period [s] (min. 2 s)
Vn_2_[V]	1	1				
lin_1_[A]	1	·*				Stop after N samples
lin_2_[A]	1	·				
Pin_1_[W]	1					
Pin_2_[W]	<					File Settings
Vout_[V]	1	·				<ul> <li>Text file (bt)</li> </ul>
Vout_R-N_[V]	1	1				Excel file (xis)
Vout_S-N_[V]	1	·				SELECT FILE
Vout_T-N_[V]	1	·				Select File
lout_[A]	V	·				222
lout_R_[A]	V	2				
lout_S_[A]	<	·*				
lout_T_[A]						
Pout_[W]	1	""				
Wind_Freque	<ul> <li>Image: A set of the set of the</li></ul>	1				
R_ISO_[MOhm]	1	·*				
V_GND_[V]	<	·				
Fout_R_[Hz]	V	·				
Fout_S_[Hz]	<					
Fout_T_[Hz]	V					
						Configuration Settings
						SAVE
						Data Logger Enable
						START/STOP
	_	_	_	_	_	

Used to download the alarms and warnings logs and the configuration of the internal variables.



All of the settings that can be applied in this section can be extended to all of the inverters connected to the RS485 bus by positioning the selector on "Apply access log on ALL connected units". The default position applies the setting only to the inverter selected in the tree structure of the system.

By ticking the "continue to read log also on communication errors" field, the scan of the 485 line continues even if communication errors on the part of one or more inverters are detected.

0		ALL connected units on the selected unit	Continue	to read log also	on communication	n errors	
larms & Warnir Read LOG	igs Variab	<ul> <li>ALARM Log</li> <li>WARNING Log</li> </ul>					



# "Event log" tab

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## "Alarms & warnings" tab

Used to download the Alarms and Warnings logs.

Unit ID	Monitoring	Partner devices Event	Log Setup		
Alarr	ns & Warning	19			
R	ead LOG	0	ALARM Log WARNING Lo	Save to XML	
Cod	a Time-stamp	Wake-up/Alarm N	Alarm value	Alam Label	

By means of the two radio buttons "ALARM Log" and "WARNING Log", the type of events to be downloaded can be selected.

Then, downloading is by means of the "Read LOG" button.

larms	& Warnings			
Rea	ad LOG		ALARM Log WARNING L	og
Code	Time-stamp	Wake-up/Alarm N	Alam value	Alarm Label

The "Save to XML" button can be used to export the log as an xml file.



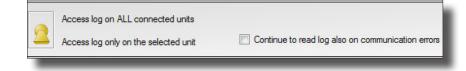
### "Variables" tab

Used to download the variables that have changed compared to the default configuration of the inverter.

arms &	Warnings Variable	95					
Read	IOG						
· would	Loca						
Unit SN	Time-Stamp	Parameter ID	Parameter Descriptor	Value	M. U.	Change Source	Change PSW
Unit SN 150515	Time-Stamp 10/20/2015 14:1	Parameter ID {5505, P:UInt32, Device: POW_Super	Parameter Descriptor DIGITAL OUTPUT 0 - MODE	Value 8	M. U.	Change Source N/A <45>	Change PSW

## "Setup" tab Available only with the INSTALLER access level

Permits advanced configuration of the inverter (by entering the login details obtained after registering on the site <u>https://registration.abbsolarinverters.</u> <u>com/</u> on the "Configuration > Setup area Access" menu).



All of the settings that can be applied in this section can be extended to all of the inverters connected to the RS485 bus by positioning the selector on "Access log on ALL connected units". The default position applies the setting only to the inverter selected in the tree structure of the system. By ticking the "Continue to read log also on communication errors" field, the scan of the 485 line continues even if communication errors on the part of one or more inverters are detected.

All of the parameters that can be set in this section of Aurora Manager LITE are described in the "Structure of the work area" in the Specifications section

### "DC side" tab:

Used to configure the parameters Vstart (Start input voltage), UV protection time (Low voltage protection time) and MPPT.

Star	t input v	oltage						
AC	TUAL	NEW						
42	0.000	420.000	/start 1 - Minimum channel	1 volta	ge for grid conn	ection [V]		
AC	TUAL	e protection tir						
61	0000	60000	JV protection time - Timeou	It for gn	a disconnectior	n <b>r (</b> vin < /u‰ v	start) [ms]	
MPF	т							
AC	TUAL	NEW						
90	00000	900000	Multiple max. scan period [	ns]	Multiple	max. scan ENA	BLED	
5	000	5.000	MPPT noise amplitude [V]		Multiple	max. scan DISA	BLED	
	SET							

- Minimum channel voltage for grid connection: Activation voltage (Vstart) for every input channel.
- Timeout for grid disconnection (UV protection time): Time during which the inverter draws power from the grid in the presence of an input UnderVoltage. Once the time set has elapsed, the inverter disconnects from the grid.
- Enable/disable the "Multiple Max scan" (MPPT scan) function and setting of the time interval between one scan and the next "Multiple max scan period".
- MPPT noise amplitude: used to change the noise amplitude set by the inverter for the maximum power point search.





### "AC side" tab:

Used to configure the parameters which permit connection to the grid and the relative protections and/or power limits.

In particular there are 6 sections (tabs) which permit:

# Grid connection

Used to set the grid parameters that must be observed during the connection phase:

de AC side	Special functions	Ground fault interface	Clock Dig	al Input	t Digital Output	nt Se	erial Links	Night S	tartup M	de		
d connection	Grid protection	High frequency derating	V Grid rise su	ppressio	ion ( Max AVG )	Grid	) Anti Isla	anding			 	
Voltage an	d frequency rar	ges for grid connecti	on									
ACTUAL	NEW											
253.000	253.000	Maximum grid voltage fo	r connection [	n.								
195.500	195.500	Minimum grid voltage for	connection [\	1								
50.100	50.100	Maximum grid frequency	for connection	[Hz]								
49.900	49.900	Minimum grid frequency	for connection	[Hz]								
30	30	Time for V/F check befo	re connection	or after	generic fault (s							
300	300	Time for V/F check after	r grid fault [s]									
Slow	r ramp after grid ramp ENABLED ramp DISABLED	20.000 0.200	20.000		amp Slope %Pn amp Slope Faul		/min					

- Max grid voltage for connection. Maximum Voltage threshold for connection to the grid.
- Min grid voltage for connection. Minimum Voltage threshold for connection to the grid.
- Max grid frequency for connection. Maximum Frequency threshold for connection to the grid.
- Min grid frequency for connection. Minimum Frequency threshold for connection to the grid.
- Time for V/F check before connection or after generic fault. Grid check interval before connection or after a generic fault. Can be set from 0 ... 3600s.
- Time for V/F check after grid fault. Grid check interval before connection after a grid fault. Can be set from 0 ... 3600s.
- Slow ramp enable/disable. Enabling of the function for gradual delivery of the power after connection to the grid.
- Ramp slope [%Pn/min]. Slope of the ramp for admission of power to the grid indicated as a percentage of the nominal power per minute.
- Ramp Slope Fault [%Pn/min]. Slope of the ramp for admission of power to the grid after a disconnection caused by a fault, indicated as a percentage of the nominal power per minute.

# Grid protection

Used to enable/disable and/or set the limit values and intervention times for the protections relating to the grid voltage:

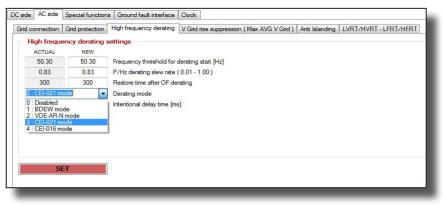
	ind frequency ra	-	grid protection				
IN DIS	ACTUAL	NEW			ACTUAL	NEW	
	287.500	287.500	U>> Maximum	grid voltage [V]	50	50	Trip time [ms]
	264.500	264.500	U> Maximum g	rid voltage [V]	100	100	Trip time [ms]
ه در	184.000	184.000	U< Minimum gr	id voltage [V]	1000	1000	Trip time [ms]
	69.000	69.000	U<< Minimum g	rid voltage [V]	300	300	Trip time [ms]
-	10.000	10.000	U<<< Minimum	grid voltage [V]	300	300	Trip time [ms]
0	65.000	65.000	F>> Maximum	grid frequency [Hz]	100	100	Trip time [ms]
فيرور	51.500	51.500	F> Maximum gr	id frequency [Hz]	100	100	Trip time [ms]
Barris	47.500	47.500	F< Minimum gri	d frequency [Hz]	100	100	Trip time [ms]
0.01	45.000	45.000	F<< Minimum g	rid frequency [Hz]	100	100	Trip time [ms]
1	2.000	2.000	K LVRT				
	orr						
	SET	J					

- U>> Max grid voltage. Grid over-voltage (OV) threshold (extended range). Can be set from Unom to Unom x 1.3
- U> Max grid voltage. Grid over-voltage (OV) threshold. Can be set from Unom to Unom x 1.3
- U< Min grid voltage. Grid under-voltage (UV) threshold. Can be set from 10V to Unom.
- U<< Min grid voltage. Grid under-voltage (UV) threshold (extended range). Can be set from 10V to Unom.
- U<<< Min grid voltage. Third grid under-voltage (UV) threshold. Can be set from 10V to Unom (active for UL Rule 21-Hawaii grid).
- F>> Max grid frequency. Grid over-frequency (OF) threshold (extended range). Can be set from Fnom to Fnom + 5Hz.
- F> Max grid frequency. Grid over-frequency (OF) threshold. Can be set from Fnom to Fnom + 5Hz.
- F< Min grid frequency. Grid under-frequency (UF) threshold. Can be set from Fnom 5Hz to Fnom.
- F<< Min grid frequency. Grid under-frequency (UF) threshold (extended range). Can be set from Fnom 5Hz to Fnom.
- K LVRT low voltage ride-through coefficient. Regulates the reactive current that can be injected into the grid during a grid dip.

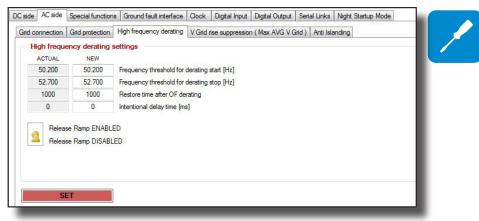
# High frequency derating

Used to set the parameters relating to the power derating due to a high grid frequency:

#### - Image relating to the TRIO-20.0-TL-OUTD



- Image relating to the TRIO-50.0-TL-OUTD



- Frequency threshold derating start/stop: Setting of the frequency threshold at which the inverter starts/stops the power derating.
- Power/frequency slew rate: Setting of the speed of reduction of the power value due to the derating.
- Restore time after OF derating: Time necessary to restore normal operation of the inverter after the frequency has returned to within the range.
- Derating Mode: Selection of the power derating mode in the event of a grid over-frequency. The modes that can be selected, defined by the grid standard set, are: Derating Disabled; BDEW derating; VDE-AR-N derating; CEI derating.
- Intentional delay time: setting of the intentional delay for reduction of the active power in accordance with the grid frequency.
- Release ramp EN/DIS: enabling/disabling of the ramp for derating due to a high grid frequency.

# Vgrid rise suppression (Max AVG grid)

Used to enable/disable and/or set the parameters relating to the overvoltage protection of the average grid voltage value. It is also possible to enable the derating that could prevent disconnection from the grid (the intervention of the protection) by reducing the active power.

and co	nnection	Grid protection	High frequence	v derating V	Grid rise suppression (Max AVG V Grid ) Anti Islanding
A	Protect	grid derating se ion ENABLED ion DISABLED	ttings		
3		g ENABLED	ACTUAL 287.500	NEW 287.500	Protection threshold [V]

In particular it permits the application of the following settings:

- Protection EN/DIS: Enabling/Disabling of the U> protection threshold (10Min).
- Derating EN/DIS: Enabling of the power derating mode due to high values of the average of the readings taken on the grid voltage.
- Protection threshold: Grid over-voltage (OV) threshold (average measurement of the grid voltage value). Can be set from Unom to Unom x 1.3

# Anti Islanding

Used to enable/disable the parameters relating to the anti islanding protection for disconnection of the inverters in the event of loss of the grid, or this protection intervenes to prevent the inverter from working as an island in the event of loss of the grid.

- Image of the TRIO-20.0/27.6-TL-OUTD

connection	Grid protection	High frequency derating	V Grid rise sup	pression (Max AVG	V Grid ) Anti Islanding	LVRT/HVRT - LFRT/HFRT	
Anti islandi	ng settings						
Active A.	I. Reactive Puls	se					
	ABLED						
	SABLED						
- Di	SABLED		Enable				
		14	EndDie				
Active A.	I. Freq. Drift						
	ABLED						
	SABLED						
- Di:	SABLED		F 11				
		V	Enable				
Passive /	VI		Passive AI At		Passive AI DEG		
			ACTUAL	NEW	ACTUAL	NEW	
	IABLED		278	0	5	0	
- DI:	SABLED						
		V	Enable	SET At		SET	



In particular it permits the application of the following settings:

- Active Anti islanding reactive pulse: enables/disables the anti islanding protection. To check the presence of the grid, the inverter generates a frequency variation by means of a reactive power at regular intervals. If the inverter is connected to the grid, the reactive power does not generate any variation in the frequency.
- Active Anti islanding frequency drift: enables/disables the anti islanding protection for three-phase inverters. To check the presence of the grid the inverter generates a frequency chirp at regular intervals. If the inverter is connected to the grid, the chirp does not generate any variation in the grid frequency.
- Passive Anti islanding: enables/disables the passive anti islanding protection. The inverter does not admit chirps to the grid but passively checks the grid parameters. In particular, the protection will be configured with time (expressed in seconds) and grid frequency offset (expressed in degrees) limits.
- Image of the TRIO-50.0-TL-OUTD

Monitoring	Partner devices	Data Logger   Event Log	Setup	Power redu	ction Reactive	power regulat	ion			
r										
Apply s	etup changes to A	LL connected units								
Apply s	etup changes only	to the selected unit								
									_	
ide AC side	Special functions	Ground fault interface	Clock	Digital Input	Digital Output	Serial Links	Night Startu	up Mode		/
d connection	Grid protection	High frequency derating	V Grid	rise suppressio	n (Max AVG V G	Grid ) Anti Isla	anding			
Anti islandir	ng settings									
Active A.I.										
Disabled	-	1								
Disabled										
Reactive Pu		-								
Frequency S										

- Active Anti islanding Disabled: disables the active anti islanding protection.
- Active Anti islanding reactive pulse: enables/disables the anti islanding protection. To check the presence of the grid, the inverter generates a frequency variation by means of a reactive power at regular intervals. If the inverter is connected to the grid, the reactive power does not generate any variation in the frequency.
- Active Anti islanding frequency shift: enables/disables the anti islanding protection for single-phase inverters. To check the presence of the grid the inverter generates a frequency chirp at regular intervals. If the inverter is connected to the grid, the chirp does not generate any variation in the grid frequency.
- Active Anti islanding frequency drift: enables/disables the anti islanding protection for three-phase inverters. To check the presence of the grid the inverter generates a frequency chirp at regular intervals. If the inverter is connected to the grid, the chirp does not generate any variation in the grid frequency.
- Passive Anti islanding Disabled: disables the passive anti islanding protection.
- F.derivate: enables/disables the passive anti islanding protection. The inverter does not admit chirps to the grid but passively checks the variations in the grid frequency within the time limits which can be set (expressed in seconds).

# LVRT/HVRT-LFRT/HFRT

(Depending on the inverter model, the tab may differ or may not be present, refer to the product manual)

Used to enable/disable and set the value of the coefficient which regulates the reactive power admitted to the grid during a grid dip.

irid connection	Grid protection	High frequ	ency derating	V Grid rise suppression ( Max AVG V Grid ) Anti Islanding LVRT/HVRT - LFRT/HFRT
Voltage gri	d support			
I <sub>B0</sub> En/Dis	READ	WRITE		
-	0.00	0.00	KLVRT	
	SET			



## "Special Function" tab

#### - TRIO-20.0/27.6-TL-OUTD

ENABLED (from DISABLED	m digital input or external command)	Reset Mode By-Hand Mode Automatic Mode	
Remote ON/OFF ( OFF command OFF command ON command	(external command)	Reset By-Hand State Reset ENABLED Reset DISABLED	
Radio Frequency Ir ACTUAL 1 0	njection NEW 0 [Hz]	SET	
Digital alarm conta 0 : Production		T MODE	

Permits the application of the following settings:

- Remote ON/OFF: Enabling/disabling of the function for switching the inverter off/on remotely.
- Remote ON/OFF (ext command): Switches the inverter off (OFF command) and on (ON command) via software.
- Reset mode: Inverter restart mode after an alarm relating to the grid parameters. The restart can be set to manual or automatic.
- Radio Frequency Injection: Setting of a frequency value for any PLC signals which the inverter must not identify as errors relating to the grid parameters. If reactive power is admitted to the grid, the PLC signals which fall within the range set will not be reduced.
- Digital alarm contact: Setting of the operating mode of the alarm contact (further details relating to the operating modes can be found in the product manual, "Operation" section, "Settings menu" paragraph).

### - TRIO-50.0-TL-OUTD

Used to switch the inverter off/on via software:

OFF command			
ON command	SET		



### "Ground Fault Interface" tab

Used to set the parameters relating to the measurement of the photovoltaic generator insulation resistance:

Riso check					
ACTUAL	NEW				
100000.000	100000.000	Minimum Riso [ohm]			
20000	20000	Minimum time for Ris	o check [ms]		
Grounding k	it				
Protectio	on ENABLED	ACTUAL	NEW		
Protecti	on DISABLED	200.000	200.000	Maximum Vgnd [V]	
	T .				
SE					
SE					

In particular it permits the application of the following settings:

- Minimum Riso: Minimum value of the insulation resistance (Riso) which permits connection of the inverter to the grid.
- Minimum time for Riso check: Duration of measurement of the insulation resistance before connection.

Only for TRIO-50.0-TL-OUTD:

• Enables the grounding kit function (Negative ground) and sets the maximum voltage between the negative pole and the ground.

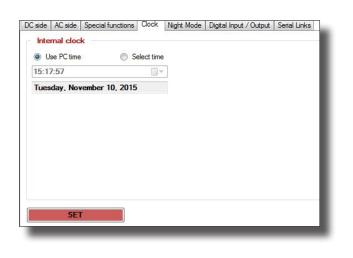


### "Clock" tab

Used to set the inverter's internal date and time.

The inverter date and time can be aligned with those of the PC "Use PC time" or set manually "Select time".

The data will be saved in the inverter on confirming by pressing the "SET" button.

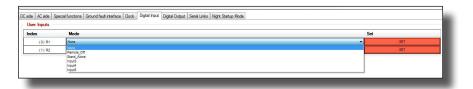




## "Digital input" tab

(Depending on the inverter model, the tab may differ or may not be present, refer to the product manual)

Used to enable the inverter's digital input signals.



User Inputs:

Used to set the digital inputs of the pull-down menu:

- Remote off: enables the remote switching off of the inverter.
- Stand\_Alone: enables islanding, in the event of a black-out, using the optional dedicated board. Further details relating to the operating mode can be found in the product manual, "Installation" section, "Stand alone output connection enabling" paragraph.
- Input3/4/5: not used.

## "Digital output" tab

(Depending on the inverter model, the tab may differ or may not be present, refer to the product manual)

Used to enable the inverter's digital output signals.

lot enable put			
n_Configurable_LatchMatrix 🗣			
rm Num.	Nam Label	Contact trigger	Mode
0	NONE		NO LATCH
1	NONE	(E)	NO LATCH
2	E001 - Input OC	10 M	NOLATCH
3	W002 - Input UV	11 I	NO LATCH LATCH
4	E002 - Input OV	10 M	NO LATCH
5	NONE		NOLATCH
6	E003 - No Parameters	E	NO LATCH
7	E004 - Bulk OV		NO LATCH
8	E005 - Int. Com. Error	E	NOLATCH
\$	E006 - Output OC		NO LATCH
10	E007 - IGET Sat	E	NO LATCH
11	W011-Buik UV	(m)	NO LATCH
12	NONE	<b></b>	NOLATCH
12	W003 - Grid Fault	(m)	NOLATCH

In particular it permits the enabling of:

- OUT Slot: permits the selection of one of the two inverter digital output signals [AUX-ALARM]
- Slot setting: permits setting of the digital output functions of the pulldown menu:
- Production: the relay is activated when the inverter connects to the grid and returns to the rest position when the inverter disconnects from the grid.
- Alarm\_All\_no\_latch: the relay is activated each time a grid parameters outside tolerances error or warning arises and returns to the rest position when the error or warning ceases.
- Alarm\_configurable \_no\_latch: the relay is activated each time an error or warning among those selected from the list on the pull-down menu arises and returns to the rest position when the error or warning ceases.
- Crepuscular: the relay is activated as soon as the input voltage exceeds the activation voltage and returns to the rest position when the input voltage falls below 70% of the V start set.
- Alarm\_all\_latch: the relay is activated each time an error or warning arises and returns to the rest position when the inverter returns to normal operation and has reconnected to the grid.
- Alarm\_configurable\_latch: the relay is activated each time an error or warning among those selected from the list on the pull-down menu arises and returns to the rest position when the inverter returns to normal operation and has reconnected to the grid.
- Alarm\_configurable\_latchmatrix: the relay is activated each time an error or warning among those selected from the list on the pull-down menu arises and the "latch" or "no latch" mode can be set for each individual indication.



### "Serial Link" tab

Used to change the parameters of the serial communication.



In particular it permits changing in the two 485 inputs of the communication protocol and the baud rate.

(Parity checks that the datum received is correct).

## "Night Startup Mode" tab

(Depending on the inverter model, the tab may differ or may not be present, refer to the product manual)

Used to enable night-time operation of the logic functions of the inverter.



In particular, enabling this command keeps the functions of the logic card active, which permits consultation of the display (where present) and of the communication.

- Max Vin for connection: sets the maximum input voltage permitting connection of the inverter.
- Min VBulk for connection: sets the minimum bulk voltage permitting connection of the inverter.
- Check for connection timeout: sets the waiting time for connection to the grid.

# "Power Reduction" tab

This section permits regulation of the limitation of the active power that the inverter admits to the grid by setting the percentage value of the nominal power at which the limitation should take place.

Apply new power redu	ction settings to ALL connected units	
User power reduction		
100 %	Actual max. power percent	
100 %	New max. power percent	
1.00	Smooth time [s] <ul> <li>Slope mode (W/s = Pmax / Tsmooth)</li> <li>Trip+time mode (W/s =  Pactual - Pset-point  / Tsmooth)</li> </ul>	
SET		
Plimits 50000	P regulation MAX value [W]	
P limits	P regulation MAX value [W] P regulation MAX value at cos-phi = 0.9 [W]	
Plimits 50000		

Setting 100% restores the default maximum power value.

Smooth time: this the time necessary to reach the power reduction set, with two different modes:

- Slope mode: Fixes the slope of the ramp, or the time necessary to range from 0 to 100% of the power.
- Trip-time mode: Time necessary to pass from the current output power to the new power value set.
- P limits: displaying of the limits of the inverter's active power.

All of the settings that can be applied in this section can be extended to all of the inverters connected to the RS485 bus by positioning the selector on "Apply setup changes to ALL connected units". The default position applies the setting only to the inverter selected in the tree structure of the system.





## "Reactive Power Regulation" tab

Select regulation mode Cos-phi = f(P) curve setup Q(U) curve setup - Regulation mode Actual Cos Phi set-point 0.9001 NO REGULATION over-excited Q fixed Q fixed cos-phi = f(P) Q(U) Cos Phi set-point 0 9001 over-excited Qlimits Q regulation MAX value [VAR] 0 Q limit [VAR] 50000 0.001 Q regulation MIN cos-phi value 0.01 Q regulation MIN smooth time [s]

This section permits regulation of the admission of reactive power delive-

The regulation of the reactive power is set by selecting from the pulldown menu one of the following modes:

- no regulation

red to the grid by the inverter.

- cos-phi fixed
- Q fixed
- cos-phi =f(P)
- Q(U)

All of the settings that can be applied in this section can be extended to all of the inverters connected to the RS485 bus by positioning the selector on "Apply setup changes to ALL connected units". The default position applies the setting only to the inverter selected in the tree structure of the system.



- Q limits: displaying of the limits of the inverter's reactive power.



### "Select regulation mode" tab

Used to select the management mode for admission of the reactive power to the grid. Five possible selections are available.

cos-phi fixed	- Regu	lation mode
NO REGULATION		
cos-phi fixed		
Q fixed cos-phi = f(P) Q(U)		

#### 1. No regulation

No mode for admission of reactive power to the grid is enabled. (default configuration).

#### 2. Cos-phi fixed

Setting of the power factor to a fixed value.

Once the mode has been selected, the "Cos-phi fixed setup" field appears, permitting setting of the value of the cos-phi (over or under excited).

The selection of the mode must be confirmed using the SET button.

	Regulation mode	0.9001	Actual Cos Phi set	-point	
ET		over-excited			
ed setup	- 04.				
over-excited	<ul> <li>Cos Phi set-point</li> </ul>				
50000	Q regulation MAX v	alue IVARI	NaN	Q limit [VAR]	
0.001	Q regulation MIN co	and the second second			
0.01	Q regulation MIN sn	nooth time [s]			

#### 3. Q- fixed

Setting of Tan-phi (Q/P) to a fixed value.

Once the mode has been selected, the "Q fixed setup" field appears, permitting setting of the value of Q (over or under excited).

The selection of the mode must be confirmed using the SET button.

R]
81



#### 4. Cos-phi = f(P)

Power factor as a function of the active power supplied by the inverter.

			-			
cos-phi = f(P)	- 1	Regulation	n mode	0.9001	Actual Cos Phi set	-point
SET				over-excited		
Cos-phi fixed se	r-excited -	Cos Phi s	set-point			
		• Cos Phi s	set-point			
0.9001 ove			set-point ulation MAX value	e [VAR]	NaN	Q limit [VAR]
0.9001 ove Q limits 50	r-excited v	Q regu		1. T. S.	NaN	Q limit [VAR]

The selection of the mode must be confirmed using the SET button.

The default graph set can be displayed and modified by going to the "Cos-phi=f(P) curve setup" tab described below.

### 5. Q=(U)

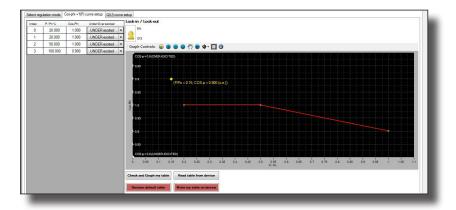
Reactive power as a function of the grid voltage measures by the inverter.

11	<ul> <li>Regulation mode</li> </ul>	-21789	Actual Q set-point ( VAR )	
SET		over-excited		
Q fixed setup				
0.4358 over-excited	<ul> <li>Reactive power over max</li> </ul>	imum power (Q / Pric	n) set-point	
	<ul> <li>Reactive power over max</li> </ul>	imum power (Q / Pric	n ) set point	
	Reactive power over max     Q regulation MAX va		n) set soert	
Q limits		alue [VAR]		

The selection of the mode must be confirmed using the SET button. The default graph set can be displayed and modified by going to the "Q(U) curve setup" tab described below.

### "Cos-phi f(P) curve setup" tab Available only with the INSTALLER access level

In this section the default graph is displayed, which can be modified by setting the values P/Pn% and relative cos-phi (under or over excited) Four points can be set which will define the trend of the graph.



Once the values have been set it will be possible to display the graph created by means of the "Check and graph my table" button.

If the graph created is that required it can be memorized in the inverter by pressing the "Write my table on device" button.

The correct writing in the inverter can be checked using the "Read table from device" button which will display the graph set correctly on the inverter.

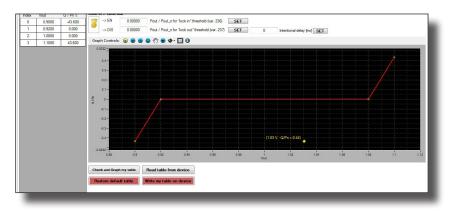
In the event of an error or to set the default curve again, use the "Restore default curve" button.



It is possible to activate/deactivate and set the value of the activation (lock-in) and deactivation (lock-out) threshold for admission of the reactive power to the grid in accordance with the graph set previously.

## "Q(U) curve set-up"

In this section the default graph is displayed, which can be modified by setting the values of the output voltage Vout and relative Q/Pn%. Four points can be set which will define the trend of the graph.



Once the values have been set it will be possible to display the graph created by means of the "Check and graph my table" button.

If the graph created is that required it can be memorized in the inverter by pressing the "Write my table on device" button.

The correct writing in the inverter can be checked using the "Read table from device" button which will display the graph set correctly on the inverter.

In the event of an error or to set the default curve again, use the "Restore default curve" button.

1	> EN	0.00000	Pout / Pout_n for "lock in" threshold (var. 236)	SET
	-> DIS	0.00000	Pout / Pout n for "lock out" threshold (var. 237)	SET

It is possible to activate/deactivate and set the value of the activation (lock-in) and deactivation (lock-out) threshold for admission of the reactive power to the grid in accordance with the graph set previously.



# Further information

For more information on ABB solar products and services, visit www.abb.com/solarinverters

# Contact us

www.abb.com/solarinverters



