Rev. 7 - 16 December 2025

A255x Series 60W LV Boards

CAEN
Tools for Discovery

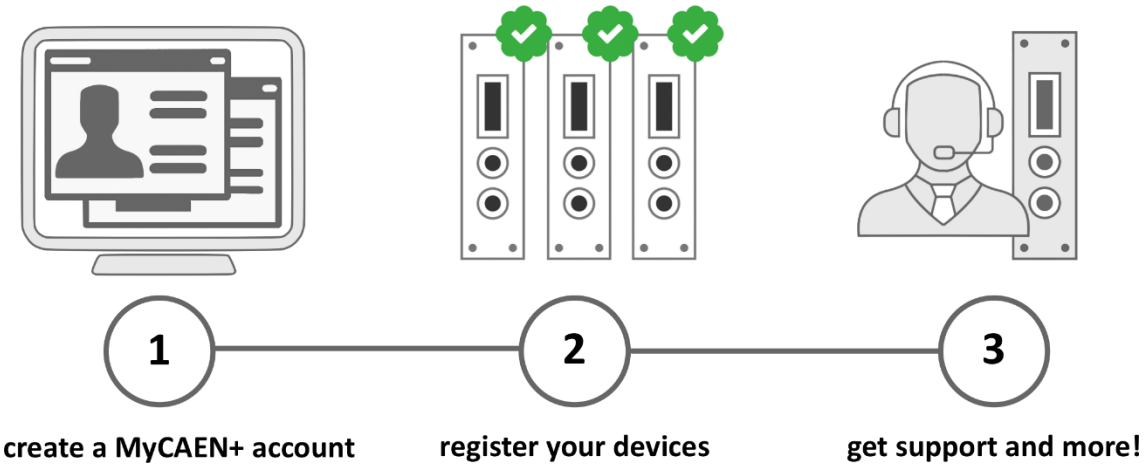
User Manual

UM7940

Register your device

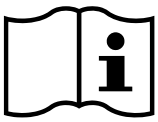
Register your device to your **MyCAEN+** account and get access to our customer services, such as notification for new firmware or software upgrade, tracking service procedures or open a ticket for assistance. **MyCAEN+** accounts have a dedicated support service for their registered products. A set of basic information can be shared with the operator, speeding up the troubleshooting process and improving the efficiency of the support interactions.

MyCAEN+ dashboard is designed to offer you a direct access to all our after sales services. Registration is totally free, to create an account go to https://www.caen.it/become-mycaenplus-user and fill the registration form with your data.



https://www.caen.it/become-mycaenplus-user/

Purpose of this User Manual



This document is the A255x Series 60W LV Boards User's Manual; it contains information about the installation, the configuration and the use of the device.

Change Document Record

Date	Revision	Changes
25 February 2021	0	PRELIMINARY Release
12 April 2022	1	Output control and monitoring
24 January 2023	2	Updated Technical specifications table
11 October 2023	3	Output control and monitoring
19 June 2024	4	Updated with specifications for A2551BA
24 October 2024	5	Updated with Channels in parallel
28 January 2025	6	Updated Technical specifications table
16 December 2025	7	Channel Characteristic Table, Interlock operation, Sense Lines

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Limitation of Responsibility

If the warnings contained in this manual are not followed, CAEN will not be responsible for damage caused by improper use of the device. The manufacturer declines all responsibility for damage resulting from failure to comply with the instructions for use of the product. The equipment must be used as described in the user manual, with particular regard to the intended use, using only accessories as specified by the manufacturer. No modification or repair can be performed.

Disclaimer

No part of this manual may be reproduced in any form or by any means, electronic, mechanical, recording, or otherwise, without the prior written permission of CAEN spa. The information contained herein has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. CAEN spa reserves the right to modify its products specifications without giving any notice; for up to date information please visit www.caen.it.

Made in Italy

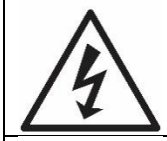
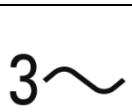
We remark that all our boards have been designed and assembled in Italy. In a challenging environment where a competitive edge is often obtained at the cost of lower wages and declining working conditions, we proudly acknowledge that all those who participated in the production and distribution process of our devices were reasonably paid and worked in a safe environment (this is true for the boards marked "MADE IN ITALY", while we cannot guarantee for third-party manufactures).

Index

1 Safety Notices

N.B. Read carefully the "SAFETY, STORAGE AND SETUP INFORMATION PRODUCT SUPPORT SERVICE AND REPAIR" document provided with the product before starting any operation.

The following HAZARD SYMBOLS may be reported on the unit:

	Caution, refer to product manual
	Caution, risk of electrical shock
	Protective conductor terminal
	Earth (Ground) Terminal
	Alternating Current
	Three-Phase Alternating Current

The following symbol may be reported in the present manual:

	General warning statement

The symbol could be followed by the following terms:

- **DANGER**: indicates a hazardous situation which, if not avoided, will result in serious injury or death.
- **WARNING**: indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**: indicates a situation or condition that, if not avoided, could cause physical injury or damage the product and / or its environment.

CAUTION: To avoid potential hazards

USE THE PRODUCT ONLY AS SPECIFIED.
ONLY QUALIFIED PERSONNEL SHOULD PERFORM SERVICE PROCEDURES

CAUTION: Avoid Electric Overload

TO AVOID ELECTRIC SHOCK OR FIRE HAZARD, DO NOT POWER A LOAD OUTSIDE OF ITS SPECIFIED RANGE

CAUTION: Avoid Electric Shock

TO AVOID INJURY OR LOSS OF LIFE, DO NOT CONNECT OR DISCONNECT CABLES WHILE THEY ARE CONNECTED TO A VOLTAGE SOURCE

CAUTION: Do Not Operate without Covers

TO AVOID ELECTRIC SHOCK OR FIRE HAZARD, DO NOT OPERATE THIS PRODUCT WITH COVERS OR PANELS REMOVED

CAUTION: Do Not Operate in Wet/Damp Conditions

TO AVOID ELECTRIC SHOCK, DO NOT OPERATE THIS PRODUCT IN WET OR DAMP CONDITIONS

CAUTION: Do Not Operate in an Explosive Atmosphere

TO AVOID INJURY OR FIRE HAZARD, DO NOT OPERATE THIS PRODUCT IN AN EXPLOSIVE ATMOSPHERE

THIS DEVICE SHOULD BE INSTALLED AND USED BY SKILLED TECHNICIAN ONLY OR UNDER HIS SUPERVISION

DO NOT OPERATE WITH SUSPECTED FAILURES.
IF YOU SUSPECT THIS PRODUCT TO BE DAMAGED, PLEASE CONTACT THE TECHNICAL SUPPORT

2 A255x Series Overview

The Mod. A255x series are single width (5 TE wide) boards housing 8 LV floating channels, compatible with the CAEN Universal Multichannel Power Supply System (SY4527, SY5527). The floating return allows on-load grounding reducing the noise level; the floating channels are insulated from each other and from Ground up to ±500 V.

Each output channel is provided with individual remote sensing lines to compensate for the voltage drop over the connection cables

The Maximum channel power (connector output) is 60 W.

The available versions are the following:

Version	A2551	A2551A	A2551BA	A2552	A2552A	A2553	A2553A
Output Voltage	0÷8 V	0÷8 V	0÷8 V	0÷16 V	0÷16 V	0÷32 V	0÷32 V
Max. Output Current	12 A	12 A	250 mA	6 A	6 A	3 A	3 A
Output Connector	DSub8	DB37	DB37	DSub8	DB37	DSub8	DB37

The Output Voltage RAMP-UP and RAMP-DOWN Times may be selected independently for each channel in the 1 ÷ 500 V/s range (1 V/s step).

Safety features include:

OVERVOLTAGE: if a channel monitored voltage goes above the programmed Overvoltage threshold value (OVVThr), it is signalled to be in "overvoltage" and is switched off.

UNDERVOLTAGE: when the monitored voltage goes below the programmed undervoltage threshold (UNVThr), the channel is switched off.

OVERCURRENT: if a channel tries to draw a current larger than its programmed limit, it is signalled to be in "overcurrent"; when overcurrent is detected, the relevant channel can be programmed either to turn off after a programmable trip time or to keep on providing the maximum allowed current: this feature allows the module to work as current generator.

The output channels can be enabled according to the interlock logic (see Interlock operation).

A global enable/disable connector allows to disable the channels and it is also possible, via front panel logic signals, to enable individually each channel (only for DB 37 versions).

A2551BA: Channels are organized into groups, and the turning on/off of the channels within one group can be delayed up to 900ms (User programmable) between each other.

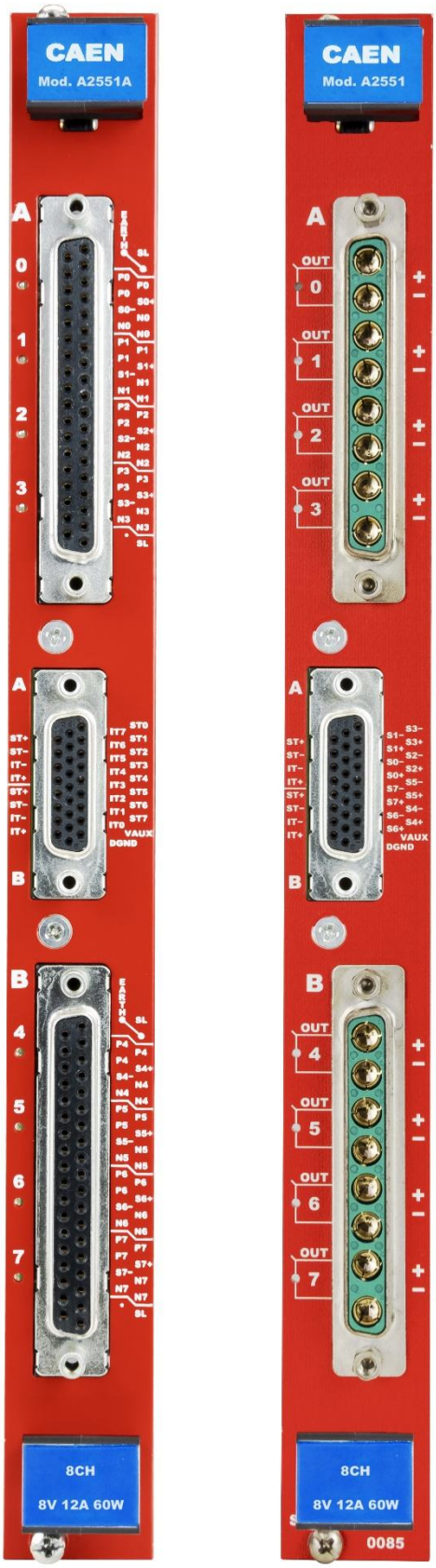
3 Channel Characteristic Table[1]

Series		A2551BA	A2551	A2552	A2553
Mechanics		1 unit (5 TE) wide; 6U – High; 2kg			
No. of Channels		8			
Polarity		Individual Floating (±500V isolation)			
Output Voltage		0 ÷ 8V		0 ÷ 16V	0 ÷ 32V
Max Output Current		250mA	12A	6A	3A
Max Output Power (connector Output)		2W	60W	60W	60W
Vset Resolution		0.2mV		0.5mV	1mV
Iset Resolution		100µA	500µA	200µA	100µA
Vmon Resolution		0.2mV		0.5mV	1mV
Imon Resolution		10µA	500µA	200µA	100µA
Ramp Up/Down		1 to 200ms (1ms step)	1-500V/s (1 V/s step)		
Turn on/off delay		0 ÷ 900ms	N.A.		
Voltage Ripple (10Hz ÷ 20MHz)[2]	**Typ**	<3mVpp			<4mVpp
	Max	<5mVpp			<8mVpp
Accuracy[3] Vout/Vmon; Vset/Vout	**Sense wires**	± 0.1% ± 20mV		± 0.1% ± 20mV	± 0.1% ± 50mV
	No sense wires	± 0.5% ± 20mV		± 0.5% ± 20mV	± 0.5% ± 50mV
Accuracy[3] Iout/Imon		± 1% ± 250µA	± 1% ± 50mA	± 1% ± 20mA	± 1% ± 10mA
Accuracy[3] Iset/Iout		± 1% ± 1mA	± 1% ± 100mA	± 1% ± 50mA	± 1% ± 50mA
Hardware OVV Protection		10.5V typ		18V typ	35V typ
Trip		0 to 999.9s; 1000s = Infinite; step 0.1s			
Stability		<5mV (Vset = 5V – No Load – one day after 1 hour warm up)			
Long Term Stability		<10mV (Vset = 5V – No Load – one week after 1 hour warm up)			
Temperature Coefficient		±100ppm/°C			
Load regulation		< 0.05% (Vset = 5V, Iout from 0A to 10A, 1m AWG20 cable / 1m AWG20 sense wire)			
Operating temperature		0 ÷ 45°C			
Storage temperature		-10 ÷ 70°C			
Humidity		0 – 80% non condensing			
Altitude		2000m			
Safety Standard – ROHS – Halogen free		ROHS			
MTBF		Base: 120000 hours			
EMC qualification		CE Standards			

[1] Ratings are guaranteed from 5% to 95% of Full Scale Range
[2] Full Load / 1m AWG20 cable / 1m AWG20 sense wire / 100nF ceramic and 20µF EL std on load
[3] ±% read value ± % FS; accuracy values are valid when the sense wires are connected (see p. 11)

4 Technical description

Front Panel

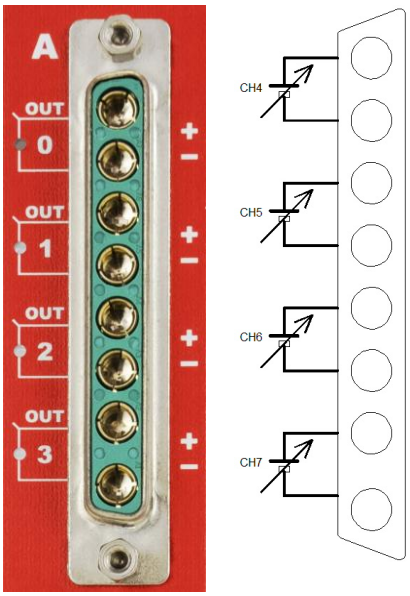


External connections

Output connectors

WARNING! Despite Low Voltage the risk of electric shock still exists; never connect or disconnect the Output connector with the SYx527 power ON/OFF switch ON; always switch SYx527 power OFF and wait at least 30s before connecting or disconnecting output cables.

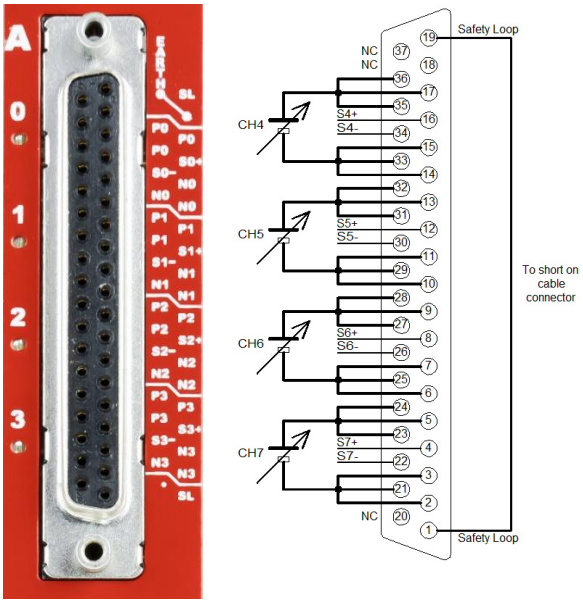
A255x



DC8W8SA00LF D-Sub 8W8; cable connector: Amphenol FCI DC8W8PA00LF; available pin: PIN 10A Amphenol FCI 8638PPS1005LF; PIN 15A Amphenol FCI 8638PPS1505LF; PIN 20A Amphenol FCI 8638PPS2005LF

Out Channels (0÷3; 4÷7); Positive, Negative

A255xA

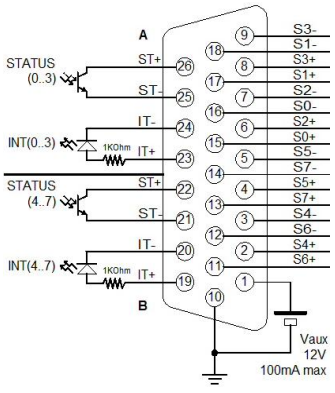


FCI DCPV37S300GT DB37; cable connector: Amphenol FCI DC37P064TXLF

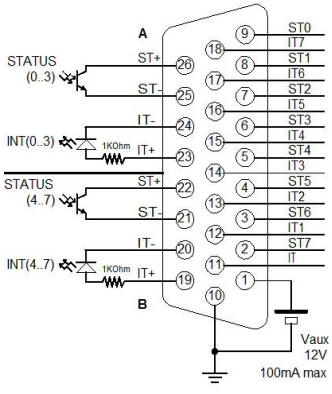
Out Channels (0÷3; 4÷7) Positive, Negative; Sense± (0÷3; 4÷7)

Service connector

A255x



A255xA



Type: FCI ICD26S13E4GV00LF D-Sub SKT 26 POS 2.28mm; cable connector: Amphenol FCI 10090769-P264ALF

Group Interlock (insulated); Group Status (insulated); Sense± (0…3; 4…7); VAUX, DGND

Group Interlock (insulated); Group Status (insulated); Individual Interlock (GND); Individual Status (GND); VAUX, DGND

Interlock operation

A255x
One Group (channels 0..3 and 4..7) can be ENABLED in one of the following ways:

- Short circuit IT- with DGND and IT+ with VAUX pins on service connector; enable board IntckA, IntckB parameters
- Send signal 4÷6V, ~5mA current between IT- and IT+; enable board IntckA, IntckB parameters

A255xA
One Group (channels 0..3 and 4..7) can be ENABLED in one of the following ways:

- Short circuit IT- with DGND and IT+ with VAUX pins on service connector; short circuit Safety Loop pins on output connector; enable board IntckA, IntckB parameters
- Send signal 4÷6V, ~5mA current between IT- and IT+; short circuit Safety Loop pins on output connector; enable board IntckA, IntckB parameters

One channel can be ENABLED in one of the following ways:

- Short circuit IT# with VAUX pins on service connector; short circuit Safety Loop pins on output connector; enable channel Intck parameter
- Send signal 4÷6V, ~5mA current between IT# and DGND; short circuit Safety Loop pins on output connector; enable channel Intck parameter

Status operation

A255x

- Contact closed between ST+ and ST- when no FAIL is present on one Group channel (0..3 and 4..7)
- Contact open between ST+ and ST- when FAIL is present on one Group channel (0..3 and 4..7)

A255xA

- Contact closed between ST+ and ST- when no FAIL is present on one Group channel (0..3 and 4..7)
- Contact open between ST+ and ST- when FAIL is present on one Group channel (0..3 and 4..7)
- Level high on ST# when no FAIL is present
- Square wave (TTL grounded) on ST# when FAIL is present

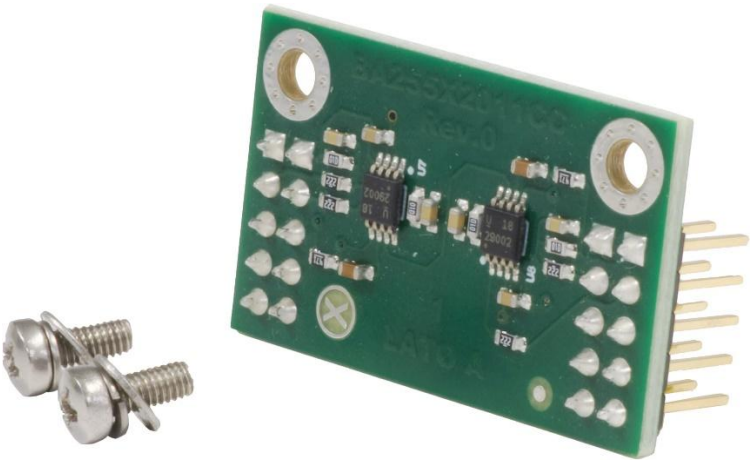
Sense Lines

Output channels have Sense Lines (see p.10) to compensate for the voltage drop over the cable. Voltage is monitored directly at the load by a high input impedance differential amplifier through the sense wires.

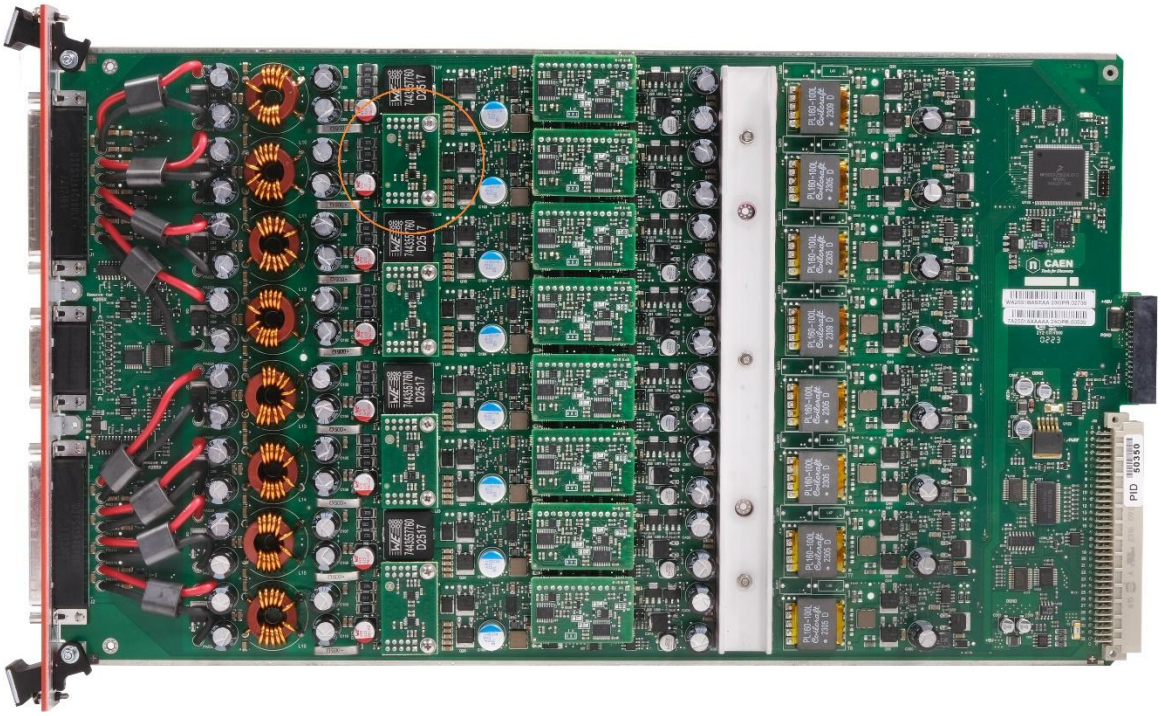
When the sense wires are connected to the load, the Vset value equals the voltage on the load; if the sense wires are not used, they must be left not connected, and Vset will equal the voltage on the connector. Please note also that, when the sense wires are not connected, the voltage is regulated on the connector and the accuracy performances could not be optimal.

Channels in parallel

Optionally, the A255x boards can be ordered with the capability to connect the channels in parallel, in couples (CH0 and CH1, CH2 and CH3, CH4 and CH5, CH6 and CH7).
Boards produced without this option, can be retrofitted.
Four “keys” are provided to parallel two channels; as two channels are paralleled, the system automatically recognizes the actual number of channels: two paralleled channels are seen by the control software as one channel with larger maximum output current (20A for A2551, 10A for A2552, 5A for A2553) and power (100 W Vs. 60 W).



To connect the channels in parallel, insert the Connection Keys between the channels to be paralleled, then secure the Connection Keys with the provided screws, Grover washers, flat washers:



The sockets numbers for the keys are J4-J5 for Channels 0-1, J6-J7 for Channels 2-3, J8-J9 for Channels 4-5, J10-J11 for Channels 6-7.

With this configuration the SYx527 system detects 4 channels (0, 2, 4, 6); the lower channel index is assigned to the paralleled channels.
Remember that, at this point, it is necessary to short circuit the paralleled channels output; these connections must be made as close as possible to the connectors, for both positive and negative voltages. The same procedure is necessary for the Sense terminals.
The specifications reported in the table on page 8 are referred to non-paralleled channels.

5 Operating modes

The A255x boards can be controlled, either locally or remotely, through the SYx527 System software interface. For board installation and details on SYx527 System operation, please refer to the User's Manual of this product. The following sections contain a description of commands available for the board control and status monitoring.

Output control and monitoring

The following board parameters are available:

Parameter	Descritpion
BdStatus (monitor)	bit 0: PowerFail; if 1, failure in the channels local power supply bit 1: Firwmare Checksum Error; if 1, error in the board firmware checksum bit 2: HVMax Calibration Error; if 1, the board HVMax parameter (if present) is not calibrated bit 3: Temperature Calibration Error; if 1, the board temperature sensor (if present) is not calibrated bit 4: Under Temperature; if 1, the board temperature sensor (if present) signals a board temperature < 5 °C bit 5: Over Temperature; if 1, the board temperature sensor (if present) signals a board temperature > 65 °C bits 6..31: Reserved
ClrAlarm (settable)	Clear alarm signal
IntckA (settable)	Enable /disable operation of IT+/IT- signals (section A); Enable /disable safety loop operation on A255xA (section A)
IntckB (settable)	Enable /disable operation of IT+/IT- signals (section B); Enable /disable safety loop operation on A255xA (section B)
OnGroup (settable)	Turn ON channel associated to the selected group (A2551BA)
OffGroup (settable)	Turn OFF channel associated to the selected group (A2551BA)

For each output channel, the following parameters are available:

Parameter	Descritpion
CHANNEL NAME (settable)	Descriptive name for the relevant channel
V0SET (settable)	Output voltage programmable value (make sure it is between UNVTHR and OVVTHR)
I0SET (settable)	Current limit programmable value
UNVTHR (settable)	Set output under voltage threshold
OVVTHR (settable)	Set output over voltage threshold
RUp (settable)	Set voltage ramp-up
RDWn (settable)	Set voltage ramp-down
TRIP (settable):	Set TRIP parameter value, i.e. the maximum time an Over Current condition can last.
VMON (monitor)	Monitored voltage value
VCON (monitor)	Monitored connector voltage value
IMON (monitor)	Monitored current value
STATUS (monitor)	Displays the channel status
PW (ON/OFF)	Power parameter shows the ON/OFF channel status; when set to ON, the channel is switched on (if the INTERLOCK is not active and if the channel is enabled either locally or remotely)
TripInt (settable)	2N-bit word (Dec. 0÷2^2N-1) max 16 lines, where N is the number of the board's Internal Trip Bus lines. Bits [0;N-1] allow the channel to sense the trip status from the corresponding lines when set to one; in the same way, bits [N;2N-1] allow the channel to propagate the trip status over the Trip Bus: bit N on line 0 and so on (see SY4527 User's manual)
TripExt (settable)	Must be set in the 0÷255 range. Bits [0;3] allow the channel to sense the trip status from the corresponding lines when set to one; in the same way, bits [4;7] allow the channel to propagate the trip status over the trip bus: bit 4 on line 0 and so on (see SY4527 User's manual)
PDwn (Kill/Ramp):	Power-Down option, which can be set as KILL or RAMP. It affects the way the channels react at a Power-Off command caused by a TRIP or Alarm condition. If the KILL option is selected, the relevant channel will be switched off at the maximum rate available. If the RAMP option is selected, the voltage will drop to zero at a rate determined by the value of the Ramp-Down parameter programmed for that channel.
TEMP (monitor)	Monitored channel temperature
Intck	Enable/Disable operation of channel interlock signals (only A255xA versions)
ONGRDEL (settable)	Set ON delay between channel in the same group (A2551BA)
OFFGRDEL (settable)	Set OFF delay between channel in the same group (A2551BA)
CHTOGROUP (settable)	Number of group to associate the channel (A2551BA)

A2551BA: to ensure that two or more channels are turned on / off with delays programmed by user, these channels must be assigned the same value of the ChToGroup parameter and the desired time must be entered in the OnGrDel and OffGrDel parameters (0 = no delay). The switching on and off are performed by entering the ChToGroup parameter value in the field OnGroup / OffGroup, (available as parameters of the board).

The following messages may be returned by the SYSTEM when monitoring the channel status:

OFF	(channel turned OFF)
OVC	(channel in OVERCURRENT condition)
OVV	(channel in OVERVOLTAGE condition)
UNV	(channel in UNDERVOLTAGE condition)
EXTTRIP	(channel OFF due to external TRIP line signal)[4]
INTTRIP	(channel OFF due to internal OVERCURRENT condition)
EXT_DIS	(channel disabled by board INTERLOCK protection)
PWR_FAIL	(channel OFF due to a Power failure)
OVV_PROT	(channel with connector over voltage detected)
TEMP_ERR	(channel over >85°C / under <5°C temperature)

After an ALARM notification, it is necessary to perform a CLEAR ALARM cycle, before turning the channel ON. If, after the CLEAR ALARM cycle, voltage and/or current monitored values still exceed the channel range by more than 10%, then it is necessary to perform a Power Cycle over the board.

[4] EXTTRIP and INTTRIP parameters are expressed in Hexadecimal format

6 Instructions for Cleaning

The equipment may be cleaned with isopropyl alcohol or deionized water and air dried. Clean the exterior of the product only.
Do not apply cleaner directly to the items or allow liquids to enter or spill on the product.

Cleaning the Touchscreen

To clean the touchscreen (if present), wipe the screen with a towelette designed for cleaning monitors or with a clean cloth moistened with water.
Do not use sprays or aerosols directly on the screen; the liquid may seep into the housing and damage a component. Never use solvents or flammable liquids on the screen.

Cleaning the air vents

It is recommended to occasionally clean the air vents (if present) on all vented sides of the board. Lint, dust, and other foreign matter can block the vents and limit the airflow. Be sure to unplug the board before cleaning the air vents and follow the general cleaning safety precautions.

General cleaning safety precautions

CAEN recommends cleaning the device using the following precautions:
Never use solvents or flammable solutions to clean the board.
Never immerse any parts in water or cleaning solutions; apply any liquids to a clean cloth and then use the cloth on the component.
Always unplug the board when cleaning with liquids or damp cloths.
Always unplug the board before cleaning the air vents.
Wear safety glasses equipped with side shields when cleaning the board

7 Device decommissioning

After its intended service, it is recommended to perform the following actions:
Detach all the signal/input/output cable
Wrap the device in its protective packaging
Insert the device in its packaging (if present)

THE DEVICE SHALL BE STORED ONLY AT THE ENVIRONMENT CONDITIONS SPECIFIED IN THE MANUAL, OTHERWISE PERFORMANCES AND SAFETY WILL NOT BE GUARANTEED

8 Disposal

The disposal of the equipment must be managed in accordance with Directive 2012/19 / EU on waste electrical and electronic equipment (WEEE).

The crossed bin symbol indicates that the device shall not be disposed with regular residual waste.

9 Technical Support

To contact CAEN specialists for requests on the software, hardware, and board return and repair, it is necessary a MyCAEN+ account on www.caen.it:

https://www.caen.it/support-services/getting-started-with-mycaen-portal/

All the instructions for use the Support platform are in the document:

A paper copy of the document is delivered with CAEN boards.

The document is downloadable for free in PDF digital format at:

https://www.caen.it/safety-information-product-support

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00119-19-A255x-MUTX