

USER MANUAL



ALR3220

0 – 32 V ; 0 – 20 A

DC PROGRAMMABLE STABILIZED POWER SUPPLY

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1 PREFACE

Manufacturer : ELC 59 avenue des Romains 74000 ANNECY - FRANCE
Phone : +33 (0)4 50 57 30 46 Fax : +33 (0)4 50 57 45 19
Website : <http://www.elc.fr> - commercial@elc.fr
Item : DC STABILIZED PROGRAMMABLE POWER SUPPLY
Brand : elc
Type : ALR3220

2 DESCRIPTION

2.1 PRESENTATION

You just bought a DUAL DC STABILIZED PROGRAMMABLE POWER SUPPLY type elc ALR3220. We thank you and congratulate you for your good choice.

elc's company is a specialist manufacturer proposes a wide range of POWER SUPPLIES and many other electronic test instruments : FUNCTION GENERATORS, DECADE BOXES, DIGITAL PANEL METERS...

This item has been conceived according to the European standard EN61010-1 and supplied in good condition. This electrical instrument is intended to professionals, industrials and school users. This instructions manual contains information and notes, which must be respected by the purchaser, in order to ensure a safe working and to maintain the instrument in good condition.

2.2 FUNCTIONAL DESCRIPTION OF THE UNIT

This item is used in laboratories. It is designed with :

a large graphic display, a touch keypad, a compact vertical box with an handle and a cord storage integrated in the rear panel. This item will give you satisfaction by offering many possibilities.

Fully programmable, this power supply can be controlled in several ways :

- via the front panel using the keypad
- via the isolated USB interface
- via the isolated RS232 or RS485 interface
- via the isolated analogical interface (0 - 10V or the 10K potentiometer)

This DC power supply is regulated in voltage of 0 to 32V and current of 0 to 20A.

Several programmable functions U and I are accessible directly from the keypad and you will make positive or negative ramp, up or down time, or a square, or arbitrary wave.





An automatic remote sensing can be enabled on the front panel or in mode 4 wires on the rear panel output.

The output can be turned "ON" or "OFF" (by key or input signal) and there is a sleep mode by a "standby" touch.

All parameters are displayed on the graphic display.


2.3 SAFETY INSTRUCTIONS

Before any operation, read the following safety precautions to avoid injury and prevent damage to this product or another connected.

-  **To avoid all potential hazards, use this product only in the specified limits.**
-  **Do not use the device without its cover. Do not use the item with its housing or any panels removed.**
- **Any intervention inside the casing, and particularly the fuses replacement, must imperatively be effected by a skilled staff.**
- **The instrument must be used according to the instructions of this manual.**
- **Use it in a well ventilated area. The air inlets and the fan outlet must be widely free, do not block them.**
- **Do not use in wet conditions. Do not use in wet environment to avoid electric shocks or short-circuit inside the product.**
- **Do not use in an explosive atmosphere. It is very important do not operate the item near an explosive atmosphere, to prevent damage to the device or any personal injuries.**
- **The power cable is used as a cut system, the product must be connected to a 230V main source, easily accessible, with earth.**
- **When this unit must be powered via a separate autotransformer for a reduction of voltage, ensure that the common socket is connected to the grounding pole of the circuit of the supply.**
-   **The common mode voltage between ground and the output terminals must not exceed 150VDC. In this case a deemed dangerous voltage (> 60VDC) can be reached between one of the terminals and earth. Therefore, it is imperative to use safety cables to connect the outputs of the device. Also, all connected devices must not have conductive parts accessible.**

2.4 SAFETY TERMS AND SYMBOLS

You will find the following symbols on this equipment :

 CAUTION REFER TO MANUEL	 CAUTION HIGH VOLTAGE RISK	 PROTECTIVE GROUND (EARTH) TERMINAL
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2.5 PACKAGING AND REPACKAGING

Your power supply ALR3220 comes with an quickstart guide and its power cable 2 poles + earth type "EUROPE" : CEE7 / 7 - IEC60320 C13.

3 OPERATING

3.1 TECHNICAL FEATURES

The specifications below are given after at least 30 minutes use within the specified operating temperature range.

Operating	Constant voltage	Automatic	
	Constant current	Automatic	
Mini maxi adjustment	Voltage	0 to 32.00 Volts (0 to ± 10 mV)	
	Current	0 to 20.00 Amps	
	OVP (voltage protection)	0 to 32.20 Volts	
	OCP (current protection)	0 to 20.50 Amps	
Adjustment accuracy \pm (% output + offset)	Voltage	0.03% + 10 mV	
	Current	0.05% + 10 mA	
Regulation / Load 10 – 90%	Constant voltage	< 50 mV	
	Constant current	< 10 mA	
Regulation / Source $\pm 10\%$	Constant voltage	< 1 mV	
	Constant current	< 1 mA	
Ripple	Constant voltage	< 1 mV _{RMS} ; < 3mVp-p noise < 15 mVp-p Pics of commutation	
	Constant current	< 2 mA _{RMS} ou 6mA _{p-p}	
Accuracy measurement (25°C $\pm 5^\circ\text{C}$) \pm (% output + offset)	Voltage	0.03% + 10 mV	
	Current	0.05% + 10 mA	
Temperature coefficient \pm (output % + offset)	Voltage	0.01% / °C	
	Current	0.05% / °C	
Resolution	Voltage / Current	4 digits	
Time of answer (Load variation)	Load 10 – 90%	< 1.5 ms (± 20 mV)	
	Load 90 – 10%	< 1 ms (± 20 mV)	
Overvoltage output	ON/OFF source or output	< 2%	
Voltage programming speed (up) to 1% of the total course		Without load	Load 100%
Rise times	0 – 32 V	30 ms	40 ms
	0 – 5 V	800 μs	20 ms
Fall times	32V – 0V	2,2 s	10 ms
	5V – 0V	360 ms	2.5 ms

3.1.1 Connections

Outputs + and -	Front panel	Safety terminals Ø4 mm
	Rear panel	Screw terminal block for 2,5mm ²
Ground terminal	Front panel	Safety terminals Ø4 mm
	Rear panel	Earth and safety terminal Ø4 mm

3.1.2 Display

Display	LCD graphic display FSTN N&B 3.2 inch
Resolution	128 x 64 pixels
Backlight	White LED

3.1.3 Protections

Against short-circuits	By current regulation
Against over-temperature	By fan and thermal circuit-braker
Against over-current on main source	By internal fuse (T5A ; 250V ; 5x20)

3.1.4 Memories

Memory	Storage	15 configurations
	Recall	15 + 1 (factory configuration)

3.1.5 Functions

Functions accessible by keypad	7 available In Voltage or Current	SQUARE periodic
		RAMP positive and negative periodic and single shot
		ARBITRARY periodic and multi shot
Timer (2 Ranges)	Seconde or minute	10 ms to 50 min

3.1.6 Standby

Isolation mode of the output	Enable / disable output
Standby mode	Puts the power supply in standby mode

3.1.7 Remote-sensing

Safety terminals in the front panel	Automatic	By software
Connectors on the rear panel	Mode 4 wires	Disconnect scribe terminal blocks for 0.5mm ² wires
Correcting the voltage drop	Front and rear	2 Volts

3.1.8 Interfaces

Isolation / output	150 Vdc
Isolation / Earth	150 Vdc
USB & RS485	Serie
Processing time of control	< 20ms
Analogical command for U and I (3 operating modes)	Voltage control (0 – 10 V)
	Potentiometer 10K
	Variable resistor 10K
Reaction time U interface	< 100 ms
External ON/OFF	By relay contact or TTL signal (open collector)

3.1.9 Other characteristics

Power source	220 – 240 Volts $\pm 10\%$, 50 – 60 Hz
	EEC socket C14 for cable 2 poles + earth C13 (2P + E)
Maximum power consumption	770W (2.1W in Standby mode)
Internal fuses (x2) AC input	5 x 20 ; 250V T5A
Efficiency	> 84% of the maxi powerful
Safety	Class I, CAT II, degree of pollution 2
	Complies with EN 61010-1, CAT II
CEM	Complies with EN 61326-1 & EN 55011
Voltage on the earth	± 150 Vdc
Operating temperature	0°C to + 40°C
Storage temperature	-20°C to + 60°C
Humidity condition	< 85% to 30°C and decrease to 50% at 40°C
Altitude	< 2000 m
Db level of fan	< 48dB
Presentation	Front panel with soft-touch keypad, back side with handle and cord storage area, metallic case with epoxy finish
Dimensions	111 mm x 210 mm x 260 mm
Weight	3.15kg

4 OVERVIEW

4.1 FRONT PANEL

1	LCD display	2	Keypad double function
3	Functions key	4	ON/OFF general
5	Keys setting	6	Standby
7	Safety socket output	8	Earth socket



4.2 REAR PANEL

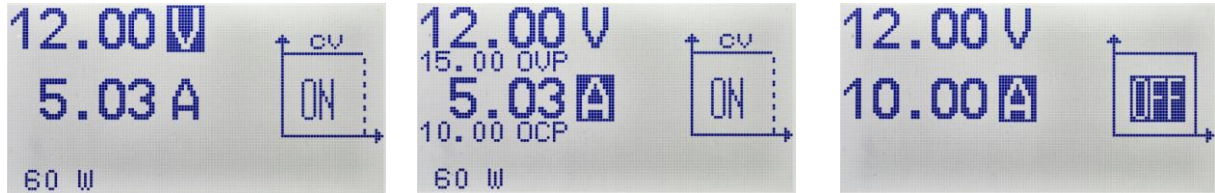
9	Handel	10	RS232 connector
11	RS485 connector	12	Sense connector
13	Powerful connector	14	Analogical control connector
15	USB Connector	16	AC power inlet socket
17	Power AC switch	18	Earth safety socket Ø4mm
19	Cord storage		



5 SHORT DESCRIPTION OF THE FRONT PANEL

5.1 DISPLAY

The basic mode on the LCD display (1) shows the value of the voltage and current setting, the output's powerful, the currently regulation mode (CV or CC) and the output's state (ON or OFF). If the OVP and OCP stopped are less than the maximum setting (32V and 20A) they will be displayed.



The measurement (voltage or current) is displayed instead of the set, if different. Simply touch on V or A selection keys, displays the operator instructions.

5.2 KEYPAD AND SHIFT

The keypad (2) allows directly modifying the set values U and I getting access to secondary functions.

5.3 KEYS CONTROL

The keys (3) allows the selection of the set to change and the selection of the dual function keyboard with shift.

5.4 ON/OFF : GENERAL & STANDBY

The keypad (4) allows to enable/disable the output. The keypad (6) combined with the function "2nd" this is the Standby, which is enabled or disabled.

5.5 KEYS SETTING

The keys (5) allow a direct change to the set value U and I or navigate through the secondary functions menu.

5.6 SOUND SIGNAL

Short signal low frequency : keypad detect [0] to [9].

Short signal medium frequency : keypad detect function ([V], [A], [OK], ...)

Long signal high frequency : Input value error or safety detect.

5.7 SAFETY SOCKETS CHANNEL

The sockets (7) (safety sockets Ø4mm) allow the connection to the output + and – to the load


5.8 EARTH FUNCTIONAL SOCKETS

The sockets (8) (safety socket Ø4mm) & socket (18) (safety and inversed socket Ø4mm) allow a functional connection to the earth.

6 DESCRIPTION OF CONTROL COMMANDS

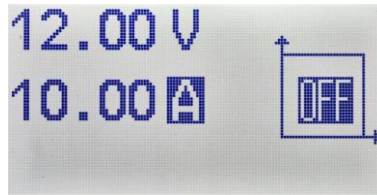
6.1 PARAMETERS SETTING











6.1.1 Escape Key

	Touch 	Allow to go out without taking the value. If no action, allow access secondary function.
--	---	---

6.1.2 Setting Voltage and Current



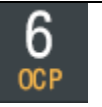

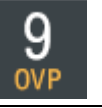



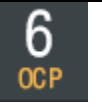

Two possibilities :



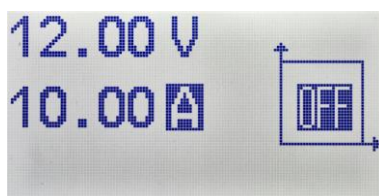
	Action	Description
1.	Touch on  or 	Select the voltage or current value to change
2.	Touch on  to 	Enter the value
3.	Touch on 	Valid the value
1.	Touch on  or 	Select the value voltage or current to change
2.	Touch on 	Select the 'Digit' to modify by successive push
	Touch on  or 	Change value selected, step by step


6.1.3 Setting the OVP or OCP limits



	Action	Description
1.	Touch on 	Select key "2 nd "
2.	Touch on  or 	Enter the U (OVP) or I (OCP) limit
3.	Touch  to 	Enter the value
4.	Touch 	Valid the value
CANCEL OVP or OCP		
1.	Touch on 	Select key "2 nd "
2.	Touch on  or 	Enter the U (OVP) or I (OCP) you need to cancel
3.	Touch 	Cancel the limit selected

6.1.4 Isolation of output



	Action	Description
1.	Touch on 	Touch this key disconnect outputs. So, the instructions are then displayed and editable

By a external signal (see wiring Appendix F), **ext** appear on display.

6.2 MEMORIES

6.2.1 Storage setting

```








STO 2
U = 0.00
I = 0.00
OVP = 32.20
OCP = 20.50

[+ or -] or [0 to 9]
[OK] FOR VALID
  
```

```

STO 5
U = 10.00
I = 15.00
OVP = 32.20
OCP = 20.50

[+ or -] or [0 to 9]
[OK] FOR VALID
  
```

	Action	Description
1.	Touch on 	Select key "2 nd "
2.	Touch on 	Select the function "Storage" configuration
3.	Touch on  to  or touch on  or 	Select where to save the current configuration (1-15). The display shows the registration number and the current contents.
4.	Touch on 	Stores the current configuration in the storage number selected.

6.2.2 Recall setting

The memorie "0" recalls a factory configuration and can't be erased.

```








RCL 2
U = 0.00
I = 0.00
OVP = 32.20
OCP = 20.50


[+ or -] or [0 to 9]
[OK] FOR VALID
  
```

```

RCL 5
U = 10.00
I = 15.00
OVP = 32.20
OCP = 20.50

[+ or -] or [0 to 9]
[OK] FOR VALID
  
```

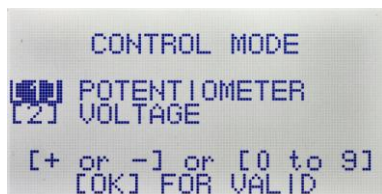
	Action	Description
1.	Touch on 	Select the key "2 nd "
2.	Touch on 	Select the function "Recall" configuration
3.	Touch on  to  Touch on  or 	Select the configuration number (0-15). The display shows the contents of the configuration.
4.	Touch on 	Recall the configuration with the output disconnected


	Action	Description
1.	Touch on M1 or M2 Touch on M3	Recall configuration number 1, 2 or 3.
2.	Touch on OK 	Recall the configuration with the output disconnected

6.3 CONTROL 0-10V

This function allows changing the set values by an analogical voltage or a potentiometer or a variable resistor (see wiring Appendix E).

The maximum setpoint is the one displayed before activating the function.










	Action	Description
1.	Touch on Esc 2nd	Select key "2 nd "
2.	Touch on 0 0-10V	Select the function "0-10V"
3.	Touch on 1 Util to 3 F(t) Touch on + or -	Select the menu with keys
4.	Touch on OK 	Valid the choice with "OK"

6.4 CONTROL REMOTE SENSING

This function compensates the voltage drop of the load in the cables connected.

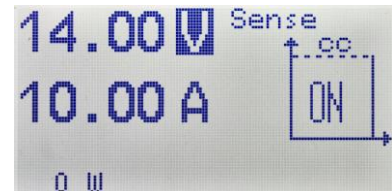


	Action	Description
1.	Touch on 	Select key "2 nd "
2.	Touch on 	Select the function "sense"
3.	Touch on  to  Touch on  or 	Select the menu with keys
4.	Touch on 	Valid the choice with "OK"

Two remote ballasting modes are available :

- Auto mode:

-



-

- the output is at the front on the safety sockets, the maximum compensation is 2V. It is made by software during a calibration phase when the activation of the function.
 - Set the voltage and current supply according to your use.
 - Go to the "sense" menu "AUTO" on the ALR3220.
 - Make the short circuit with your two cords (instead of the load)
 - Validate
 - The sense is active.
 - Connect your load, the cords voltage drop will be taken into account.

CAUTION: if the cords voltage drop is not important enough (100 mV / 5 A or 20 milliohms of resistance), it can be refused.

- **4 wires mode:**

```
[1] NONE
[2] 4 WIRES
[3] SOFTWARE

[+ or -] or [0 to 9]
[OK] FOR VALID
```

```
14.00 Sense
10.00 A
ON
0 W
```

- (see wiring Appendix G) The output is at the back of the terminal block, the maximum compensation of the voltage drop is equal to : $32V - V$ instruction. (example : 12V maximum for 20V nominal).

6.5 CONTROL UTILITIES

This command control includes the following functions :

- Language choice
- Changing the contrast of the display.
- Pairing mode, link (see appendix I).
- Reset memories
- ON/OFF sound feedback







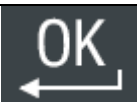
```
[1] LANGUAGE
[2] CONTRAST
[3] LINK
[4] CLEAR MEMORIES
[5] ON/OFF BEEP

[+ or -] or [0 to 9]
[OK] FOR VALID
```

```
[1] FRANCAIS
[2] ENGLISH

[+ or -] or [0 to 9]
[OK] FOR VALID
```

```
CONTRAST 16
USE keys [+ ] or [- ]
[OK] FOR VALID
```







	Action	Description
1.	Touch on 	Select key "2 nd "
2.	Touch on 	Select the function "Util"
3.	Touch on  to  Touch on  or 	Select with keys different configuration choices.
4.	Touch on 	Valid the choice with "OK"

6.5.1 Link mode

This function gives the possibility to make communication between two powers supplies using the RS485 link (see wiring in appendix I).

```
[1] LANGUAGE
[2] CONTRAST
[3] LINK
[4] CLEAR MEMORIES
[5] ON/OFF BEEP

[+ or -] or [0 to 9]
[OK] FOR VALID
```


	Action	Description
1.	Touch on 	Select key "2 nd "
2.	Touch on 	Select the function "Util"
3.	Touch on  or  or 	Select "LINK" mode The power supply on which the command is triggered takes control of the 2nd power supply.
4.	Touch on 	Valid the choice with "OK"

6.6 CONFIGURATION OF RS232 & RS485 INTERFACES

This button allows to configure the following parameters :

- RS232 (see APPENDIX B)
- RS485 port (see APPENDIX C)

Display RS232 menu

```
[1] 4800 Bauds
[2] 9600 Bauds
[3] 19200 Bauds

[+ or -] or [0 to 9]
[OK] FOR VALID
```

```
[1] 7 Bits
[2] 8 Bits

[+ or -] or [0 to 9]
[OK] FOR VALID
```

```
[1] 1 Stop Bit
[2] 2 Stop Bit

[+ or -] or [0 to 9]
[OK] FOR VALID
```

Display RS485 menu

```
[1] RS232
[2] RS485

[+ or -] or [0 to 9]
[OK] FOR VALID
```








```
ADDRESS [1] MASTER

9600 BAUDS
8 BITS & 1 STOP BIT

[+ or -] or [0 to 9]
[OK] FOR VALID
```

```
[1] SLAVE
[2] SLAVE END





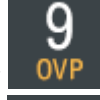



[+ or -] or [0 to 9]
[OK] FOR VALID
```

N°	Action	Description
1.	Touch on 	Select key "2 nd "
2.	Touch on 	Select the function "Com"
3.	Touch on  or  or  or 	Select with keys RS232 or RS485 configuration choices.
4.	Touch on 	Valid the choice with "OK"

6.7 PROGRAMMED FUNCTIONS

Enabling this key allows to get to the output, multiple periodic wave forms or not, in voltage or current mode (see Appendix H).






	Action	Description
1.	Touch on 	Select the key "2 nd "
2.	Touch on 	Select the function generator, "F(t)"
3.	Touch on 	Valid the choice with "OK"
4.	Touch on  or  Touch on  or 	Follow the choices
5.	Touch on 	Valid the choice with "OK"

6.8 OTHER FUNCTIONS

6.8.1 Sleep mode

"Standby" mode is available on the front panel. This mode reduces the current consumption if the power supply is ON but not used.

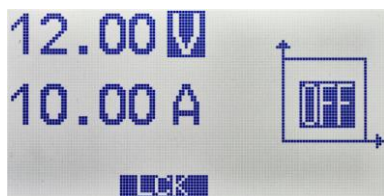
	Action	Description
1.	Touch on 	Select the key "2 nd "
2.	Touch on 	Sleep mode ON The backlight is OFF
3.	Touch on 	Go out the sleep mode The backlight comes back after few seconds

6.8.2 Locked and unlocked keyboard

Two possibilities :

Hold on the key "5"

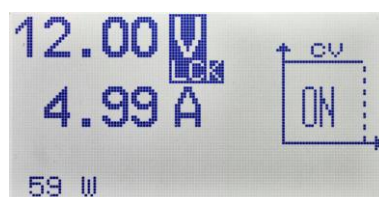
Without a connection to a computer, touch on "Local"



	Action	Description
	LOCKED / UNLOCKED	
1.	Touch on 5 Local during 4s	Active the locked or unlocked keyboard

	Action	Description
1.	Touch on Esc 2nd	Select the key "2nd"
2.	Touch on 5 Local	Active the locked "RMT" or unlocked keyboard. (control via USB or RS485)

6.8.3 Locked setting value





Locked setting voltage value

	Action	Description
1.	Touch on Lock Unlock	Press key 'Lock' until displaying "LCK" for locked setting value
2.	Touch on Esc 2nd and Lock Unlock	Press key 'Unlock' until erase "LCK" on display for unlocked setting value

7 PC control

The activation or deactivation of control via USB or RS232 or RS485 is done like that :



	Action		Description
1.	Touch on		Select the key "2 nd "
2.	Touch on		Enable or disable the takeover via the serial RS485 or USB port.

You will find the list of commands in APPENDIX A

8 MAINTENANCE

No particular maintenance is required for this instrument.

Avoid : dust, humidity, shocks ; your instrument will appreciate it.

For the cleaning, please use a smooth duster.

8.1 TROUBLESHOOTING

If indicators do not light up on switching on, check :

- The mains connection
- The replacement of the cord can be realized only with the model : 3G0.75mm² ; H05VV-F ; CEE7/7 – IEC60320 C13
- The mains voltage
- That the ON switch is pressed

8.2 ERROR MESSAGE

If following messages appear on the display, please contact the after sales service.

Message	Possible cause
"FAULT : FAILURE START-UP VOLTAGE"	Internal auxiliary power doesn't work
"TEMPERATURE SENSOR ERROR"	Internal temperature sensor doesn't work
"UNREGULATED CURRENT/VOLTAGE PROTECTION"	Internal stage power doesn't work
"FAN OUT OFF ORDER"	Fan doesn't work

9 AFTER SALE SERVICE

The after sales service is ensured by the elc company.

During two years, spare parts and workmanship are guaranteed. This guarantee does not apply to instruments presenting defects or faults caused by an improper use (wrong mains voltage, shocks ...) or which have been repaired outside our factory or the repair shops of our authorized agencies.

10 DECLARATION OF CONFORMITY

Manufactuer : elc
Address : 59 avenue des Romains 74000 Annecy France

Declares the product

Name : DC POWER SUPPLY
Type : ALR3220

conformable to the requirements of the directives:

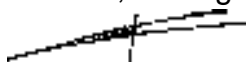
Low voltage 2014/35/UE, Electromagnetic Compatibility 2014/30/UE and
RoHs 2017/2102/UE.

The following harmonized standards have been applied :

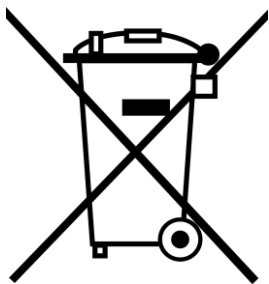
Safety : EN 61010-1:2010
EMC : EN 61326-1:2013

Annecy March 2021

H.CURRI, Manager



ELIMINATION OF MANUFACTURING WASTES BY THE PRIVATE USERS IN THE EU



This symbol written in the product or in its packaging indicates that this product must not be throw in the garbage with your other waste.

Its your responsibility to rid of your manufacturing wastes bringing it to a specialized sorting office for the recycling of electrical and electronic instruments.

Collection and recycling separated of your wastes will contribute to preserve natural resources and guarantee a recycling respectful of the Environment and human health.

For further information concerning the recycling center near your place of residence, contact your town hall, the elimination service of garbage heap or the store where you bought the instrument.

APPENDIX A – OPERATING CODES

Commands control format :

[address] <SP>Parameter<SP>Command<SP>[Value]<CR>

[address] = character ASCII 0 (port USB – port RS232)
character ASCII 0 to 31 (port RS485)
character ASCII 32 (broadcast address)

Parameter = VOLT – CURR – OVP – OCP – OUT – RCL – STO – REM – IDN – SENSE – SERIAL (ASCII character).

Command = WR - RD - MES (ASCII character).

<SP> = 20h (space).

[Value] = ASCII character.

<CR> = 0Dh (return)

Example 1 : 0 VOLT WR 1250 ↵ ➔ *Writing setpoint 1,25 V on USB port*

Example 2 : 1 CURR MES ↵ ➔ *Current measurement request on address 1 from the RS485 port*

Answer :

[address] <SP>Status<SP>Value<CR>

[address] = character ASCII 0 (USB)
character ASCII 1 to 31 (port RS485)

Status = OK- ERR- Local (ASCII character).

OK	Command valid.
ERR	Syntax error in the command.
LOCAL	Command impossible, the power supply is in local mode.

<SP> = 20h (space).

[Value] = characters ASCII.

<CR> = 0Dh (enter)

Example 3 : 0 OK ↵ ➔ *Back of example 1*

Example 4 : 1 OK 450 ↵ ➔ *Back of example 2 current measurement : 450 mA*

Special case of broadcast address 32: Messages sent to address 32 are read by all connected power supplies. This address is only used for sending messages, the commands will not return any information.

Command & Answers	Description
Command : [Address] VOLT WR [0-32200]↵ Answer : [Address] OK↵	Writing the voltage setpoint in mV.

Command & Answers	Description
Command : [Address] CURR WR [0-20500]↵ Answer : [Address] OK↵	Writing the current setpoint in mA.
Command : [Address] OVP WR [0-32200]↵ Answer : [Address] OK↵	Writing the limit voltage setpoint in mV.
Command : [Address] OCP WR [0-20500]↵ Answer : [Address] OK↵	Writing the limit current setpoint (mA) channel 1, In double mode. Writing the limit current setpoint (mA) in serial, parallel or tracking mode.
Command : [Address] OUT WR [0-1]↵ Answer : [Address] OK↵	Disconnect / Connect the output.
Command : [Address] RCL WR [1-16]↵ Answer : [Address] OK↵	Recall the configuration memorised.
Command : [Address] STO WR [1-16]↵ Answer : [Address] OK↵	Save the usual configuration.
Command : [Address] REM WR [0-1]↵ Answer : [Address] OK↵	Mode 'Local' => 0. Mode 'Remote' => 1
Command : [Address] VOLT RD↵ Answer : [Address] OK [0-32100]↵	Reading the voltage setpoint in mV.
Command : [Address] CURR RD↵ Answer : [Address] OK [0-20450]↵	Reading the current setpoint in mA.

Command & Answers	Description
Command : [Address] OVP RD↵ Answer : [Address] OK [0-32100]↵	Reading the limit voltage setpoint in mV.
Command : [Address] OCP RD↵ Answer : [Address] OK [0-20450]↵	Reading the limit current setpoint in en mA.
Command : [Address] OUT RD↵ Answer : [Address] OK [0-1]↵	Reading the output connection.
Command : [Address] REM RD [0-1]↵ Answer : [Address] OK [0-1]↵	0 => Mode 'Local' 1 => Mode 'Remote'
Command : [Address] MODE RD↵ Answer : [Address] OK [0-2]↵	0 => not defined mode (output OFF) 1 => voltage regulation mode 2 => current régulation mode
Command : [Address] VOLT MES↵ Answer : [Address] OK [0-32100]↵	Measure the output voltage in mV.
Command : [Address] CURR MES↵ Answer : [Address] OK [0-20450]↵	Measure the output current in mA.
Command : [Address] SERIAL RD↵ Answer : [Address] OK [0-N]↵	Read the serial number of the device.

Command & Answers	Description
Command : [Address] IDN RD↵ Answer : [Address] OK ALR3220 VERSION [N]↵	Reading the device ID.
Command : [Address] SENSE WR [0-1]↵ Answer : [Address] OK ↵	0 => Change SENSE mode in 'NONE' 1 => Change SENSE mode in '4 WIRES'
Command : [Address] SENSE RD↵ Answer : [Address] OK [0-1]↵	0 => Mode 'NONE' 1 => Mode '4 WIRES'

APPENDIX B –USB CONNECTION

Preparation of communication :

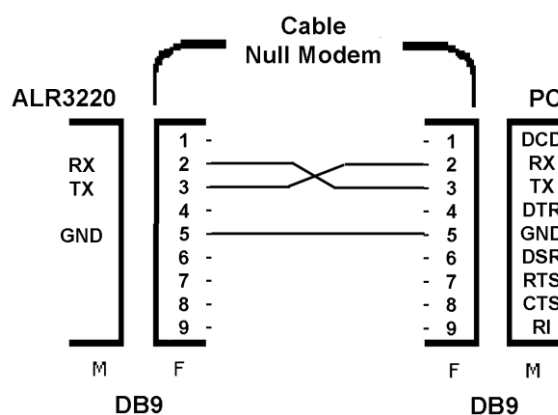
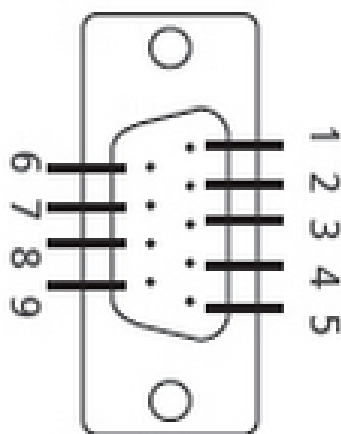


Download on our website www.elc.fr the file : ALR32xx.inf
Connect the power supply to the USB2.0 PC port with a USB cable as A / B type USB (its length shouldn't exceed 5 meters).
Install the file.
Your PC is ready to communicate with the ALR3220.
Use "Hyper Terminal ®" simple utility to communicate via the serial port, present on all PCs with Windows 95®, 98®, XP®, Seven®.

You will find on the website www.elc.fr, LabVIEW ® drivers.

The USB connection allows to upgrade the Firmware (see website).

APPENDIX C – RS232 CONNECTION



Connect power supply to the serial port of the PC using an RS232 cable "null modem" (cross-connections).

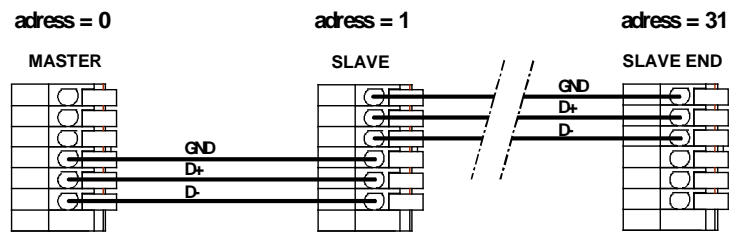
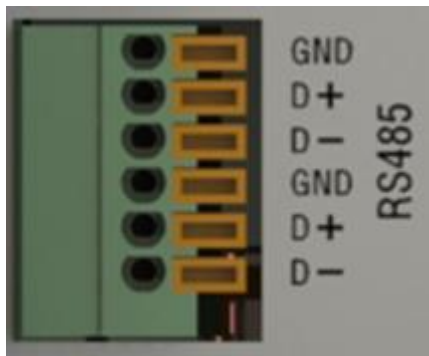
It is recommended to use a shielded cable to minimize the interference caused by the data flowing between the device and the PC and its length must not exceed 3 meters.
Use "Hyper Terminal ®" simple utility to communicate via the serial port, present on all PCs with Windows 95®, 98®, XP®, Seven®.

"Start \ Programs \ Accessories \ Communications \ HyperTerminal".

For Windows 8 ®, you can download a HyperTerminal version on the Internet.

Configure the port with the same settings as the power supply

APPENDIX D – RS485 CONNECTION



You will find on the website www.elc.fr, LabVIEW ® drivers to drive the master.

APPENDIX E – 0–10V CONNECTION

This function changes the voltage setpoints for channels 1 and 2 or voltage / current for channel 1 via an analogical voltage, a potentiometer or resistance.

The maximum setpoint value is the one displayed before activating the function.

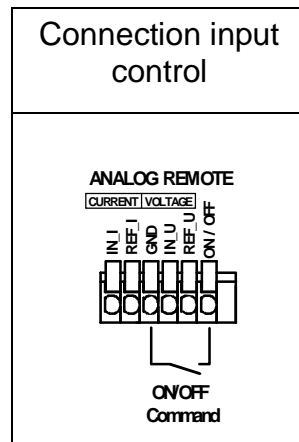
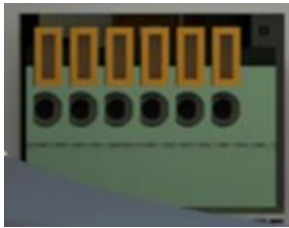


Mode variable resistor (Configuration R)	Mode potentiometer (Configuration U)	Mode voltage driving (Configuration U)
<p>ANALOG REMOTE CURRENT VOLTAGE ON / OFF</p> <p>I U Command Command</p>	<p>ANALOG REMOTE CURRENT VOLTAGE ON / OFF</p> <p>I U Command Command</p>	<p>ANALOG REMOTE CURRENT VOLTAGE ON / OFF</p> <p>I U Command Command</p>

APPENDIX F – ON/OFF EXTERNAL CONTROL

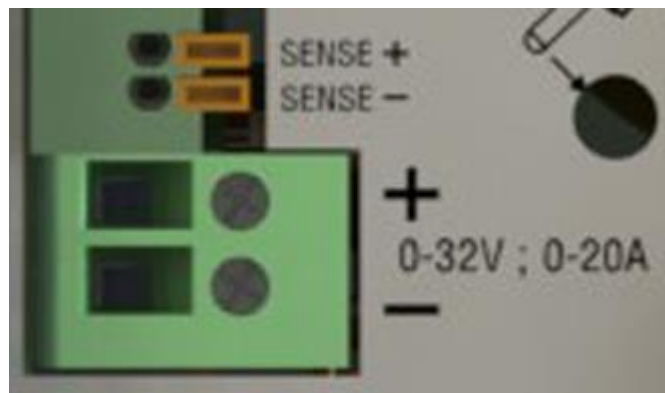
Use pin ON/OFF to GND (relay contact, manual switch, sensor, ..) allow control isolation of output .

Open contact => ON output, Closed contact => OFF output.



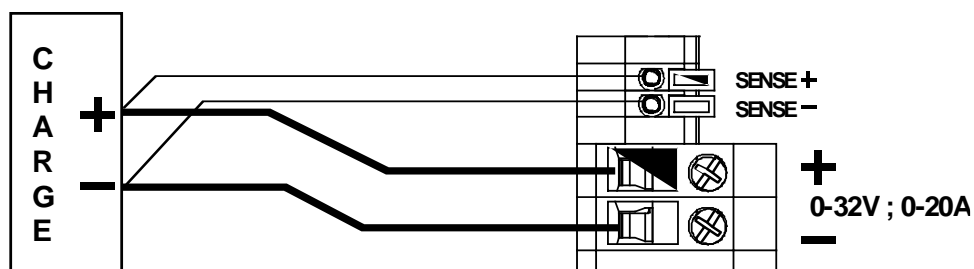
APPENDIX G – SENSE 4 WIRES

Configuration "**sense**" 4 wires for output to terminals on the rear panel of the power supply.




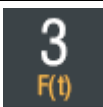

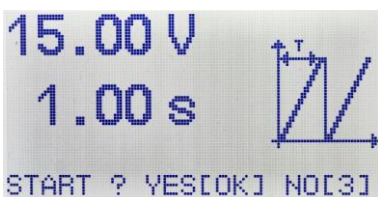






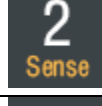



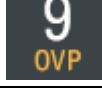
The "sense +" and "sense-" terminals must be connected to the + and - outputs as close as possible to the load.


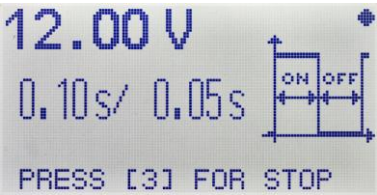





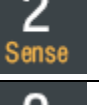

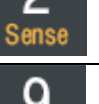





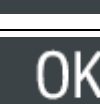

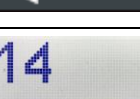
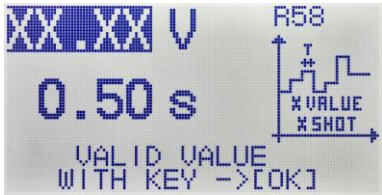
We recommend conductors from 2,5 to 4 mm² for the power ; for the "sense" they will be minimum 0,22mm².

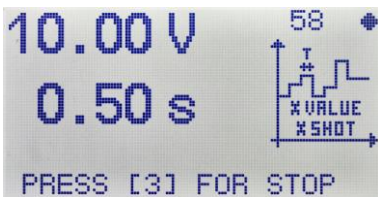


APPENDIX H – SEQUENCER

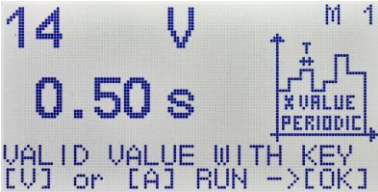

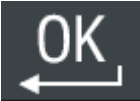
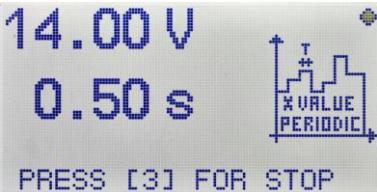
The key  allows to generate the signal function (Voltage or Current) on output.

Step	Action	Description
Before entering the sequencer, initialize the setpoints that will be taken as reference values to generate the signal.		
1.	Touch on 	Select key “2 nd ”
2.	Touch on 	Select sequencer function
3.	Touch on 	If the display signal is suitable, validate with the OK key, the display becomes for example :
		
Setting pre-programmed signal		
1.	Touch on 	Select key “2 nd ”
2.	Touch on 	Select sequencer function
3.	Touch on 	Enter in setup sequencer mode
4.	Touch on  to 	Select signal.
5.	Touch on  or 	Select regulation mode (voltage or current)
6.	Touch on  or 	Select range of timer : seconds or minutes
7.	Touch on  to 	Setting value timer (60 seconds maxi or 50 minutes maxi)

Step	Action	Description
8.	Touch on 	Valid timer value, sequencer run, for exemple :
		
Setting arbitrary multi-shot signal		
1.	Touch on 	Select key "2 nd "
2.	Touch on 	Select sequencer function
3.	Touch on 	Enter in setup sequencer mode
4.	Touch on 	Select multi-shot arbitrary signal.
5.	Touch on  or 	Select regulation mode (voltage or current)
6.	Touch on  or 	Select range of timer : seconds or minutes
7.	Touch on  to 	Setting value timer (60 seconds maxi or 50 minutes maxi)
8.	Touch on 	Timer value is valid when press "OK"
9.	Touch on  to 	Setting value in regulation mode selected step 5 (Voltage or current).
10.	Touch on  or 	Valid value by unit selected step 5 (32 values maximum)
11.	Touch on 	End setting value
		

Step	Action	Description
12.	Touch on 1 Util to 9 OVP	Enter number of repeat signal (1 to 99).
13.	Touch on OK ←	Run sequencer with the key "OK"
		
Displaying at right up repeat value remaining		

Step	Action	Description
Setting arbitrary periodic signal.		
1.	Touch on Esc 2nd	Select key "2 nd "
2.	Touch on 3 F(t)	Select sequencer function
3.	Touch on 3 F(t)	Enter in setup sequencer mode
4.	Touch on 6 OCP	Select periodic arbitrary signal.
5.	Touch on 1 Util or 2 Sense	Select regulation mode (voltage or current)
6.	Touch on 1 Util or 2 Sense	Select range of timer : seconds or minutes
7.	Touch on 0 0-10V to 9 OVP	Setting value timer (60 seconds maxi or 50 minutes maxi)
8.	Touch on OK ←	Timer value is valid when press "OK"
9.	Touch on 0 0-10V to 9 OVP	Setting value in regulation mode selected step 5 (Voltage or current).
10.	Touch on V or A	Valid value by unit selected step 5 (32 values maximum)

Step	Action	Description
		
11	Touch on 	Run sequencer with the key "OK"
		

Setting example pulse $I = 4A$ $R \text{ load} = 2.25 \Omega$

Function : square

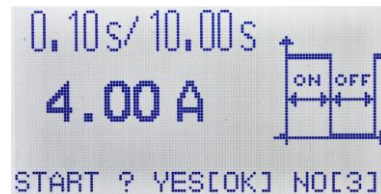
Regulation mode : current

Unity : seconde

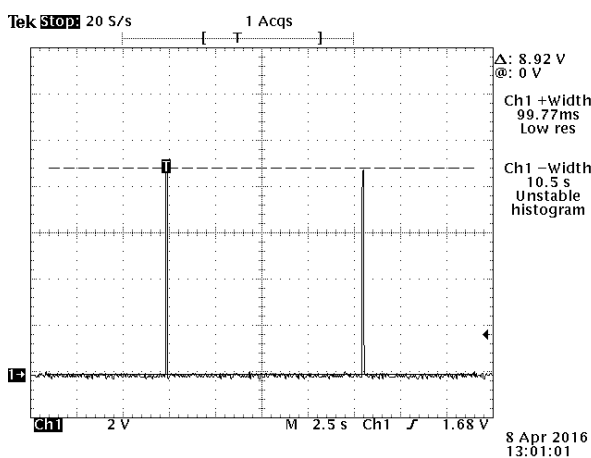
Ton : 0.1s

Toff : 10 s

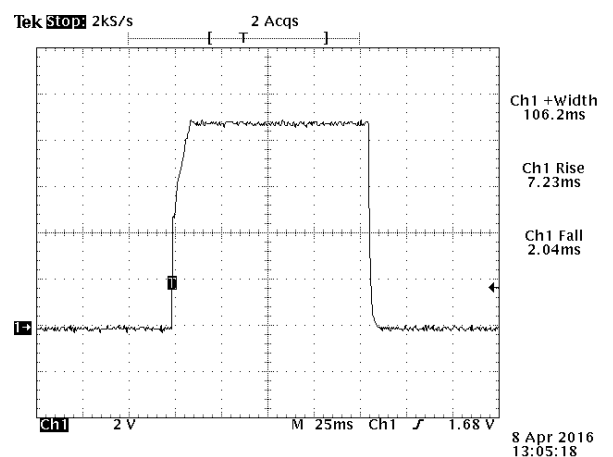
Display after setting the square signal



Measurement results on 2.25Ω resistive load:



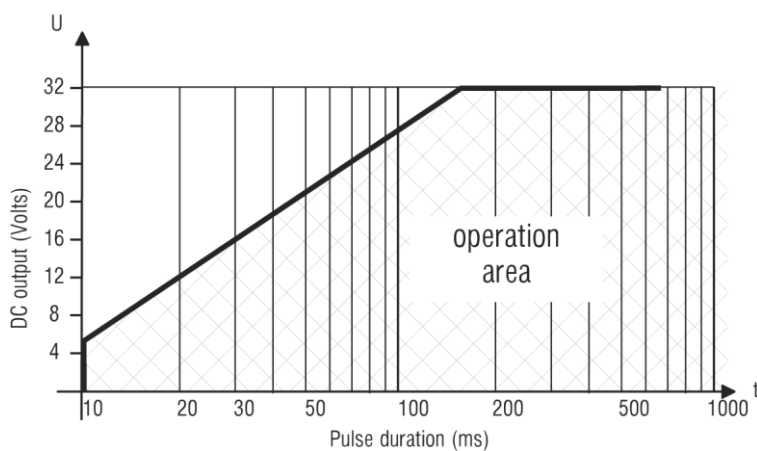
100ms impulse ever 10s..



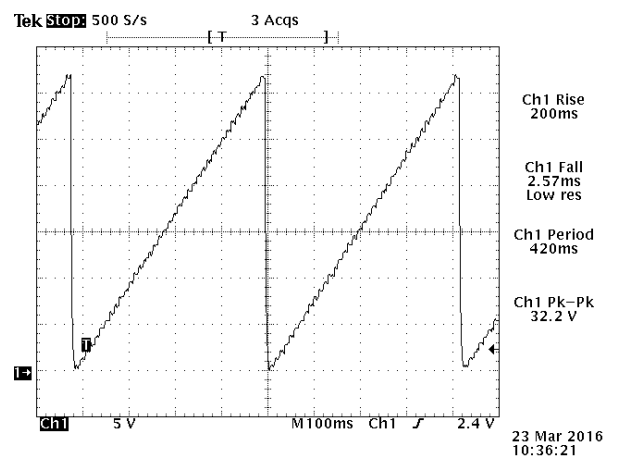
Details of the 100ms impulse

Operating area

(pulse width / voltage)



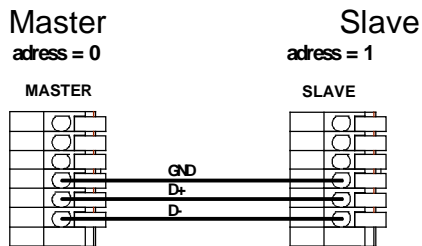
Other form : Ramp of 400ms in parallel mode with $U=32V$ & $I_{max}=12A$



APPENDIX I – SERIAL, SYMMETRIC or PARRALLEL MODE

Link (Linking of two power supplies)

Wire the RS485 as follows :



Mode of setting :

Master

```
[1] LANGUAGE
[2] CONTRAST
[3] LINK
[4] CLEAR MEMORIES
[5] ON/OFF BEEP

[+ or -] or [0 to 9]
[OK] FOR VALID
```

```
[1] OFF
[2] ON

[+ or -] or [0 to 9]
[OK] FOR VALID
```

```
32.00 V Link
20.00 A
640 W
```

Slave

```
[1] RS232
[2] RS485

[+ ou -] ou [0 à 9]
[OK] POUR VALIDER
```

```
ADDRESS 1

9600 BAUDS
8 BITS & 1 STOP BIT

[+ or -] or [0 to 9]
[OK] FOR VALID
```

```
32.00 V
20.00 A
640 W
```

The master power supply sends the information to the slave.

By linking together the two "+" and the two "-" together you make a new power supply :

0 – 32,00V ; 0 – 40,00A

Or, by connecting the "-" from the master to the "+" slave, you make :

In serial mode : 0 – 64,00V ; 0 – 20,00A

In symmetric mode : 0 – $\pm 32,00$ V ; 0 – $\pm 20,00$ A