



# EXP28



V2.02

User's Manual

20 2611 001/..../006



## SUMMARY

1. <b>warnings - safety</b> .....	3
<b>Rules for user security:</b>  .....	3
2. <b>INTRODUCTION</b> .....	4
3. <b>OF WHAT CONSISTS THE EXP28?</b> .....	5
<b>STANDARD</b> .....	5
4. <b>USER'S GUIDE</b> .....	6
<b>Electrical connections :</b> .....	6
<b>Sécurité :</b> .....	6
<b>MACRO</b> .....	10
<b>EXPLODER SCREEN</b> .....	10
<b>Main Functionalities</b> .....	11
<b>Available power</b> .....	12
<b>Communication protocols</b> .....	13
< <b>Rem / Loc</b> > .....	16
< <b>AddIP /</b> .....	16
<b>MaskIP /</b> .....	16
<b>GWIP &gt;</b> .....	16
< <b>ModeIP &gt;</b> .....	16
< <b>PortIP &gt;</b> .....	16
< <b>LCDCal &gt;</b> .....	16
< <b>@? /</b> .....	16
<b>@ /</b> .....	16
<b>Name &gt;</b> .....	16
< <b>IR /</b> .....	17
<b>TR /</b> .....	17
<b>DR&gt;</b> .....	17
< <b>Fir</b> > .....	17
< <b>Trig</b> > .....	17
< <b>Sync</b> > .....	17
< <b>Saf</b> > .....	18
<b>Example of a fire sequence</b> .....	18
<b>Exploder Messages reply in return</b> .....	18
<b>WARNINGS / LIMITATIONS</b> .....	19
<b>User's security:</b>  .....	19
5. <b>CARACTERISTIQUES TECHNIQUES</b> .....	20
<b>WARNING</b> .....	20
<b>POWER</b> .....	20
<b>ELEMENTS MECANQUES</b> .....	20
<b>CARACTERISTIQUES ELECTRIQUES</b> .....	21

# 1. warnings - safety

Rules for  
user security:



Global security is based inseparably both on the design of the equipment as well as the rules of security and the behavior of users. When all of the following rules are not applied, the equipment cannot and should not be used.

All anomalies of operation of the equipment must immediately outlaw the use.

External security and the safety key play a major role at the level of exploder, by disabling the internal supplies of exploder lines output relays when the conditions are not met and as long as the equipment does not give the fire authorization.

The user must only enter in active zones if it are equipped with detections opening the safety of the exploder line and the operator having positioned upgrading switch key on safety and take the key with him (to prohibit any other person to use the exploder).

The safety of the exploder conditions could not substitute for sets of laboratory or the field of fire safety.

The use of the exploder by operators must register in the laboratory or the field of fire safety plan

Note that in "remote" mode, these safety instructions are needed and must be imperatively applied.

The rules of conduct of the operators, security conditions and protection or security organs must be recalled and controlled frequently.

## 2. INTRODUCTION

### Description

#### ✓ **Présentation**

The range of the exploder EXP28 is equipment of high performance pyrotechnic firing (exploder). References products is broken down as follows:

- EXP128 version 1-channel
- EXP228 version 2-channel

Each product is available in version:

- Low energy 100mA / 5A 10 $\mu$ S-100mS for all common tests validation lab or production.
- High-energy 100mA / 5A 10 $\mu$ S 990S to perform more specific tests requiring more power such as fire tests,...
- AKLV16 / Withstand USCAR (only one channel), generating slope of current
- TTT, this version is under development, it incorporates a more powerful processor and interfaces necessary to embed all of the needs of this test (creation of templates, real-time control for reduced response compatible with production cycles,...).

Direct connection to the PLC process (RS232 or Ethernet) without additional computer control.

Its functions allow responding equally to applications such as laboratory and production.

Its design intends it to industrial environments of pyrotechnics such as tests and tests on AIRBAG and the pyrotechnic igniters in a more general way.

Equipped with an isolated serial RS232 and Ethernet port, these facilities are fully controllable.

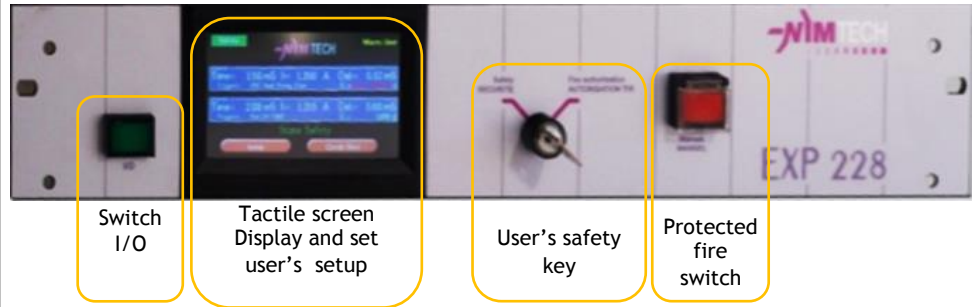
#### ✓ **Warning**

In accordance with the laws on international intellectual property, any total or partial reproduction of this manual or the technical and software of the EXP28 elements are strictly prohibited unless prior written approval of the company Nimtech.

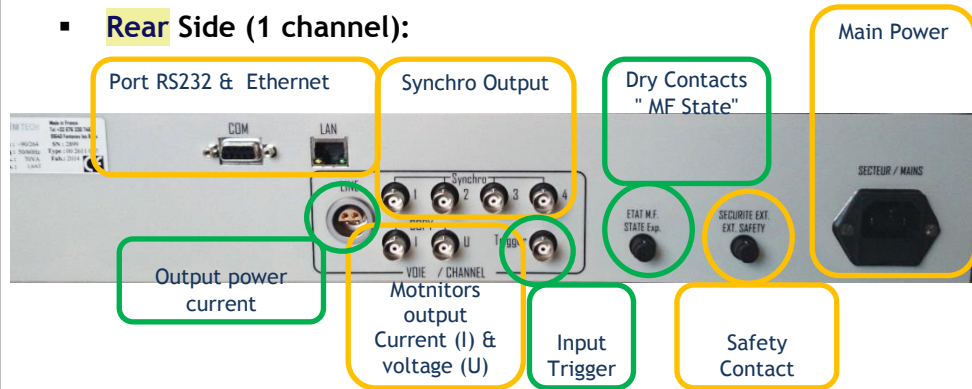
### 3. OF WHAT CONSISTS THE EXP28?

STANDARD

- Brief presentation of the front and rear faces of the equipment:
- Front side:



- **Rear Side (1 channel):**



## 4. USER'S GUIDE

Electrical connections :

✓ **Principle :**

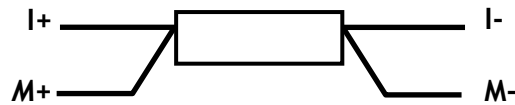
The EXP28 is designed to adapt to different situations and allow users to quickly use the equipment according to their needs.

✓ **Connections**

- *Connection lines wiring:*

LEMO 4 Vn

Pin 1 : I+  
Pin 2 : M+  
Pin 3 : M-  
Pin 4 : I-



NB:

- Output LEMO 2 pin: connections I + / M + and I- / M - are internally connected close to the connector.

- Terminals M-/+ entries measure voltage for the ohmmeter and copy voltage output  
Terminals I-/+ output current ohmmeter or current firing line

- *Outputs connection Exploder State:*

ETAT MF

Pin 1 :  
Pin 2 : 1-2 contacts closed on safety position  
Pin 3 : 3-4 contacts closed on fire position.  
Pin 4 :

Sécurité : ✓ **Safety (connector 3 pins)**

Safety

Pin 1 :  
Pin 2 : 1-3 external Contact  
Pin 3 :

Dry contact for external safety (must be shunted to allow testing)

This function is essential in pyrotechnic applications because it allows disabling internal outputs relay supplies. Thus no fire can be done when this shunt is open and no current can appear at the output.

The State of those contacts is reported on the LCD screen and indicates "SAFETY" in red (Safety loop not closed - Fire sequence cannot run) - Green = Exploder ready.

**Safety**

the Red Safety led indicates the opening of this shunt (external Contact).

USER SECURITY: SEE §1 WARNING - SAFETY

**Connectors BNC****✓ Monitor output:**

I = Current monitor 1V/A of output current.

U = Voltage monitor 1V/V (10 volts max) of load

**✓ 4 output BNC synch:**

These outputs are individually configurable: active TTL to 1 or 0 or opto coupler (also known as abusively contact dry). These 4 outputs can simultaneously control multiple devices (a high-speed camera, a data acquisition system,...)

**✓ Input Trigger :**

This input BNC connector allow to trig fire by setting up at :

- TTL rising edge / falling edge
- Open or close switch (opto transistor).

If a delay is set, it is applied between this trig input end real start of output current.

**✓ RS232 and Ethernet:**

Can control exploder from the outside system (computer, PLC,...).

**Other connections****✓ COM (Female DB9 connector):**

Isolated RS232 port


Terminal 5: mass

Terminal 2: Rx - Receive Data

Terminal 3: Tx - Transmit Data

The serial link is configurable in speed by enter into com menu with the 'SETUP' button  
Protocol: 8 bits, no parity 1 stop bit frame.

Access to the setting of the speed of the link menu series by the button

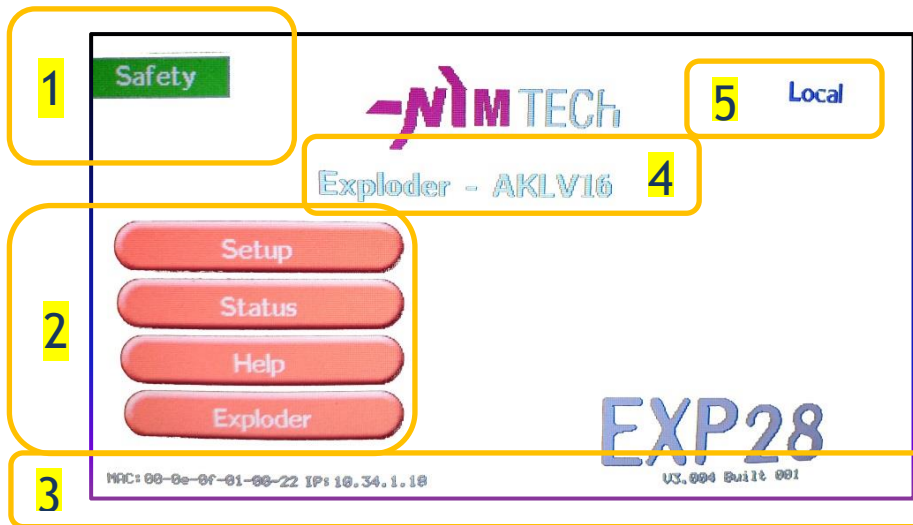
 to the 'SETUP' Com menu

**✓ Ethernet (RJ45) 10/100BT**

The EXP28 is usable on TCP or TELNET mode.

Telnet mode can be used directly with a console in the same way as the COM RS232 port.

✓ Home screen I



**1.-** State safety - Green: safety external contact closed, exploder can be used  
 - Red: the contact is open, the placing of fire may issue no current

**2.-** Buttons to access the main menus:  
 Setup: Setting parameters of the fire  
 Status: Configuration of equipment (serial numbers, Date of manufacture,...)  
 Help: Simple callback connections RS232 and Ethernet available communications order.  
 Exploder: Displays the fire screen (same effect to switch the safety key of the Exploder on fire.

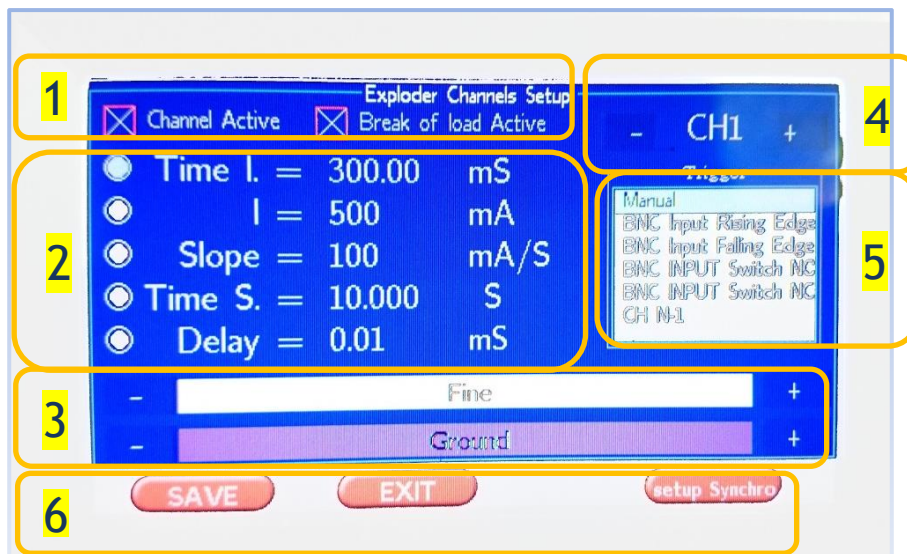
**3.-** Info on the address material and IP and the version of the software.

**4.-** Name of the editable equipment.

**5.-** Macro name loaded originally.



✓ Screen of adjusting the settings



**1-** Boxes:

- Activates the channel
- Active detection of break of load (failure of load)

**2.-** Area of selection of the parameter to be modified:

**3.-** Adjustment of the parameter selected:

- "Fine": fine tuning
- "Ground" QuickSet
- The keys +/-part and other to adjust precisely the desired final value

**4.-** Choice of the channel to be adjusted (if the exploder has several).

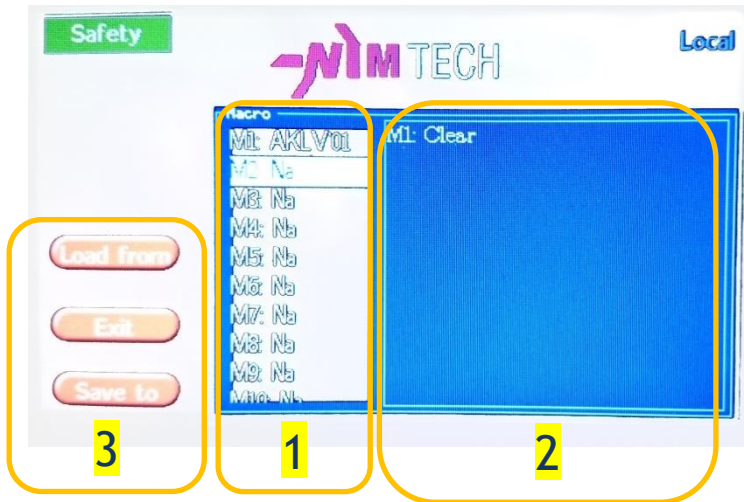
**5.-** Choice of trigger mode

- Manual: Button fire protected front panel
- TTL edge up or down.
- opening or closing contact.
- at the outbreak of the preceding channel (if equipment has several).

**6.-** Access to the menu buttons from:

- setting outputs synch.
- SAVE - Save all changed settings backup
- EXIT - Exit without saving

MACRO ✓ Backup and restore configuration



This menu allows you to save or reload a setup test configuration.

- (1) Choose first the number of macro you want (e.g. M3).
- (2) if the macro contains data, a summary is displayed in the right part of the screen
- (3) the "Save to" button saves the current configuration of the EXP and will replace the data present in the macro.  
The 'Load from' button loads the contents of the macro in the current settings of the EXP.
- (4) the "Exit" button exits the menu without further action.

Macros can be named with a clear name. This is possible by using the RS232 or Ethernet connection (using Telnet). For this it is necessary to use a console connected to the EXP (ex: Hyperterminal, Termit, or mode console can be used with Telnet Windows.)

EXPLODER SCREEN

This screen is automatically displayed when the key is turned in the fire position or when the "Exploder" button is selected from the home screen. It includes the currently active settings that will be used for firing in preparation.



The measurement of line resistance is automatically performed when the key is turned and the security is closed (green Safety). Power over range, the screen displays "Power Fault". The fire line will be switched on the generator only if all the conditions are correct.

## Main Functionalities

### ✓ fire Line:

The power current generator is connected to the line of fire when the security conditions are met, the ohmmeter measure has been carried out and found good on every channels in use.

The ohmmeter measure must be carried out before shooting. Firing does not test as long as the measures on each channel used is not valid.

The speed of measurement does the ohmmeter disabled not cycle times.

It is possible to upgrade the ohmmeter measure when the previous measurements are incorrect with the Ohm button (key in fire position).

It is possible to make measurements after firing as long as the key is in position shooting.

It is not possible to make ohmmeter measurement when exploder rocked waiting to Trigger.

To ensure the flow of charges of static electricity (ESD) conditions, besides measures or fire the 4 wires (or 2 wires) are interconnected by discharges of 1M $\Omega$  and 10 M $\Omega$  resistors to Earth (chassis ground). This remains true even when the equipment is switched off and / or without power supply.

### ✓ Error detection 4 wires

Before taking a resistance measurement 4 wires equipment ensures that electrical continuity at each end of the resistance are correctly connected (the maximum limit of detection is about 12  $\Omega$ ).

This control allows you to make sure that one of the wires is not broken making random measures (in mode 4 wires).

Otherwise the measurement result is meaningless and the display shows the error in the form below:



R<sub>1</sub> = error u4

## Available power

### ✓ Principle :

The generator is designed to minimize the powers lost inside exploder. This leads to a significant reduction in weight and size of the equipment, but also to a significant improvement in thermal drift. This entails different acceptable levels of usable flows management. When the configuration of fire exceeds these thresholds exploder indicates a defect power (power fault) and the fire is not possible. The maximum power depends on the time and qualified in joule (J) below 1 second or in Watt (W) above.

It is necessary to reduce one of the elements following impact maximum power handling when the message of default power appears:

- The resistance of the initiator
- The current
- The fire time

NB see table at the end of manual

✓ **General principles**

The Protocol is designed to consider a easy and fast implementation.

✓ **Liaison série RS232 / Ethernet (Telnet / socket TCP)**

The RS232 baud rate is parameterized on the menu SETUP => COM

The EXP28 can be connected via RS232 or Ethernet RJ45 10/100BT network.

A console Telnet (port 23 unmodifiable) can be used, it behaves in the same manner as a RS232 terminal

A TCP socket can be opened to access the functions. The port is set by the user (via RS232 or TELNET). -It is fixed at 5001 to delivery.

TCP requires an external program to communicate with the device. Queries remain identical to the COM RS232 mode.

The Telnet port is 23 and cannot be changed. TCP port 5001 by default but can be adjusted

The MAC address and the current IP address are displayed at the bottom of the home screen.

IP settings can be changed:

DHCP mode: equipment gets its IP addresses from a external server.

Static mode: The equipment uses the addresses specified in the equipment, these addresses can be changed manually with RS232 or Telnet.

3 connections can be used simultaneously, but in production mode it is advisable to use one.

- The menu below is obtained by sending the command «? <<>>» (or 'help'). It recalls the set of usable commands in the actual software version.

- E.g.:

```

✓ -----
✓ ----- NIMTECH EXP28 -----
✓ ----- Advanced Exploder Unit -----
✓ ----- Multipurpose and Data acquisition inside -----
✓ -----
✓
✓ Available commands
✓ -----
✓ help : Display list of commands
✓ h    : alias for help
✓ ?    : alias for help
✓ St   : S n: Return status n
✓ E    : Etat EPLD
✓
✓ Rem  : Remote Mode
✓ Loc  : Local Mode
  
```

```

✓ Fir      : Remote Fire state
✓ Saf      : Remote Safety state
✓ Ohm      : laught Ohm Measurement
✓ IR       : Set Remote Current channel
✓ TR       : Set Remote Time channel
✓ DR       : Set Remote Delay channel
✓ Trig     : Set Remote Trigger channel
✓ Sync     : Set Remote Sync channel
✓ Sbl      : Set Remote Channel Detection Break of
load
✓ EnaCH    : Enable/disable Remote Channel
✓
✓ AddIP    : Set IP Address
✓ MaskIP   : Set IP Mask
✓ GWIP     : Set IP GateWay
✓ ModeIP   : Set IP Mode (Static/DHCP)
✓ PortIP   : Set Port IP
✓ Ipconf   : Show ethernet IP Config
✓ LCDCal   : Calibrate LCD tactile area
✓ Name     : Set Measure Name: Syntax => Name
              NumMeas(0/11) NAME : ex. Name 2 All1
              (measure N°2 Name = All1)
✓ @        : Load Save or Erase macro
✓ @?      : list available macro name
✓ ...
✓ ...
✓ -----

```



- Tip: Use a terminal (Hyperterminal, Termite..) on Windows or Linux to test and validate that the RS232 connection is well operational (wiring and Protocol). Used so it can test directly and simply operation of the controls before validating the cockpit by plc.
- The Status of the EXP screen has a utility to display replicating the orders received and issued on RS232 and Ethernet port, allowing the debugged in the development phase.
- Mode < Remote > access to setup menu < Home > key is disabled so as to not interfere with the operation and controls

< st >

#### STATUS EXP:

The Status is representative regardless of the mode (Remote or local).  
Parameter 0-1 - 2

#### 0: internal state of the firing sequencer (hex)

Word (16-bit) binary State of firing:

The status reflects the internal state of the shooting sequences machine.  
The Status is representative irrespective of the mode (Remote or local).  
The States of the Remote mode are specific and meet the graph below (see example of a sequence shot). This graph must be respected for the realization of a pilot remote mode.

	State
0x0000	Transient state: Acquittal for end of sequence shooting or Reset
0x0001	Standby (external security not ok)
0x0002	Transient state (external safely opening)
0x0004	Key position security (external security OK)
0 x 0008	Transient state (permission shooting passage)
0x0010	Transient state (launching ohmmeter)
0x0020	Error ohmmeter (recovery possible)
0x0040	Ready shot, hold Trigger
0x0080	NC
0x0100	Fire current
0x0200	End of fire sequence: hold back key on safety - possible ohmmeter measure
0x0400	State Mode remote - Exploder key in Safety position

#### 1 : STATUS MF : (Hexa)

Bit	Description
0	State fire Switch NO - 0 : safety - 1 : Fire
1	State fire Switch NF - 1 : sécurité - 0 : Fire
2	0 : Mode Local - 1 : Mode Remote
3	internal normal = 1
4	External safety loop: 0: open - 1: closed
5	Key safety position: 0: safety - 1: authorization shooting
6 à 31	Internal use

Example : St 1<CR/LF>

18fe00d = x...x011101 =>

#### 2 : Returns the data type and the EXP28 S/N (NS)

Example : St 2<CR/LF>

```
NS      :      2592
Type    :      00 2611 007
Vers.   :      AKLV16 1CH
Name    :      EXP28
Option:   Na
```

<p>&lt; <b>Rem / Loc</b>&gt;</p>	<p>Set exploder in Remote mode or Local mode.</p> <p>NB the parameters of the local/remote modes are differentiated and the display shows the current mode settings.</p> <p>It is possible to change the settings of the «Remote» mode even when firing is in local mode. In this case the "Remote" parameters are memorized but do not appear on the screen.</p>
<p>&lt; <b>AddIP / MaskIP / GWIP</b>&gt;</p>	<p>The IP configurations must be sent in the form X.Y.Z.V</p> <p>Example : AddIP 10.63.134.43</p>
<p>&lt; <b>ModeIP</b>&gt;</p>	<p>Static: uses local config of the EXP Or DHCP: Sends queries to obtain the configuration of a DHCP server</p>
<p>&lt; <b>PortIP</b>&gt;</p>	<p>Setup dialog port in TCP mode</p> <p>Example : PortIP 5001 (valeur par défaut)</p>
<p>&lt; <b>LCDCal</b>&gt;</p>	<p>Recalibrates the LCD display. Three rectangles appear successively. Point each of them using a stylus (remain pointing to a point 2 to 3 seconds improves the calibration).</p> <p>At the end of procedure restart EXP for refreshing the screen</p>
<p>&lt; <b>@? / @</b>&gt;</p>	<p>Lists macros saved and displays the help</p> <p>Parameter L - S - E</p> <p>@ L No.: Load (load) the macro number no. @ S No.: Save (saves) the current configuration in the macro number no. @ E no.: Erase (delete) the macro number no.</p>
<p><b>Name</b>&gt;</p>	<p>Format: Name nn name &lt; CR/LF &gt;</p> <p>NN = 1-10: appoints the macro number # nn Example: Name 2 TestGen1 (the macro takes the name TestGen1)</p> <p>NN = 0: function is to rename the name of the firing (name displayed on the main screen)</p>



< IR /  
TR /  
DR>

Setting the remote current (IR) mode, time (TR) and time (DR)

These commands require 2 parameters, following the format:

$\Omega$  CMD way value < CR/LF >

Example: IR 1 1.25: puts the set current channel 1 to 1.25 A

Rules of construction:

The channels are 1(31 h) => Road N ° 1 / 2(32 h)=> way N ° 2

A space (20 h) separates the parameters

Values can be entered in the simple format 0.0021 or scientific format.1E - 3

The decimal separator is a point <. >

<Fir>

Switch to mode authorization fire (in Remote mode only)

NB. Possible only if the fire unit is previously:

- In REMOTE mode
- Position Remote Security
- The ohmmeter measure was launched and is correct

<Trig>

Specifies the mode used for each channel trigger input:

Ma	Manual
RE	Rising edge TTL
FE	Falling edge TTL
NO	Switch SWO
NC	Switch SWF
CHN-1	Previous channel

Format : Trig CHANNEL VALUE <CR/LF>

Example :

Trig 1 Ma<CR/LF> : Set the Trigger of Channel 1 with button manual

Trig 2 CHN-1<CR/LF> : set channel 2 on the initiation of Channel 1

<Sync>

Specifie le type le mode de fonctionnement de chaque sortie Synchro (BNC) :

TTL+	Rising edge TTL
TTL-	Falling edge TTL
SWO	Switch SWO
SWF	Switch SWF

Format : Sync VOIE N° BNC VALEUR<CR/LF> (needs 3 parameters)

Example : Sync1 1 TTL+<CR/LF> : Set output BNC channel 1 synchro 1 on TTL rising edge

< Saf >

Switch to EXP deactivated - equivalent Safety mode but key in position Fire (Remote mode only)

- Firing line disconnected
- Measurement of line waiting (ohmmeter)

Example of a fire sequence

Commande	Description
<b>REM</b> < CR/LF >	Display mode Remote NB: -the < Home > key is unavailable -If the key MF is not in position shooting the rest of the sequence cannot be carried out - a message to pass the key to the shooting position
<b>FAS</b> < CR/LF >	Mode Remote Security (necessary command)
<b>Ohm</b> < CR/LF >	Launches a measure of line on active channels
<b>FIR</b> < CR/LF >	If resistance of line conditions are OK to fire past in shooting mode and indicates the expectation of Trigger NB: In this situation it is more possible to change shooting settings.
<b>Ohm</b> < CR/LF >	When shooting is finished: opportunity to line resistance measurements.
<b>FAS</b> < CR/LF >	Return of the MF in position Remote Security NB: Mandatory step before raising a shot
<b>Loc</b> < CR/LF >	Back in local mode NB display with user settings refresh

Exploder Messages reply in return

Commande	Message / message d'erreur
<b>Rem</b> <CR/LF>	
<b>Saf</b> <CR/LF>	OK StateSafety or NOK NotRemote
<b>Ohm</b> <CR/LF>	2.015 ( <i>Resistance pathways active</i> ) 2.121 (if 2 channel) or NOK NotReady
<b>Fir</b> <CR/LF>	OK FireReady or NOK NotReady
<b>Ohm</b> <CR/LF>	Remote Check Ohm or NOK NotReady
<b>Saf</b> <CR/LF>	-No message - or NOK NotRemote
<b>Loc</b> <CR/LF>	OK Local

# WARNINGS / LIMITATIONS

## SAFETY AND WARNINGS

- The correct use of the EXP28 requires certain conditions:
  - Avoid **sudden temperature changes** causing condensation on electronic circuits.
  
  - Work at constant temperature, without being near a source of heat radiation (radiator, lamp lighting,...) that strongly reduce the accuracy of the measurements.
  
  - Do not directly connect a **power supply 220V on inputs or outputs of measures or firing lines.**
  
  - **Cable lengths.** Precautions must be taken to ensure the quality of measurements and testing:
    - The length of cables must be as short as possible.
    - The measures must be floating (not connected to an electric potential).
    - Avoid all sources of electromagnetic radiation near the equipment.
  
  - **Warranty:** opening of the housing not effected by NIMTECH removes any warranty.

All realized uses outside the specifications are not covered by the warranty in the event of total or partial destruction of housing or appliances annexes of the said case.

Warranty: 1 year parts and labor (see GTC).

## User's security:



Read first chapter 1.

## 5. CARACTERISTIQUES TECHNIQUES

### WARNING

Equipment are subject to continual improvement, also technical data may change..

### POWER

✓ **Rating**

- Voltage : 85V- à 264V- 45 à 63Hz
- Power : 80W (HE) - 35W (LE)
- Fuses : EXP228 HE : 2 x 3.15A slow  
Others modèles : 2 x 1.6A Slow

### ELEMENTS MECANIQUES

- **Weight:** 2.7 kilograms excluding accessories.
- **Dimensions:** L483 x 260 x H88 mm
- **Temperature Max / Min:**
  - 18 ° C to 22 ° C in use.
  - 5 ° C to 45 ° C in storage.

Product EXP28 is to conforms to CE standards.

**CARACTERISTIQUES ELECTRIQUES**

Accuracy : % of the measured value + % full the size scale

Function	Range	Currentmeasur.	Accuracy	Résolution	drift Temp. A 20°C
Ohmmeter	25 Ω	2 mA		< 100 μΩ	0,0050
Vers. Mesure 4 wires			0,03 ± 0,005		
*Vers. Mesure 2 wires			0,05 ± 0,01		

\*under 2 wires add line resistance to measures errors

Précision : % de la valeur mesurée + % gamme d'utilisation ou Cst

**Low energy**

Fonction / Type	Plage d'utilisation	Accuracy	Résolution	drift Temp. A 20°C
<b>Basse énergie 5A/10A</b>				
Output current	100mA - 1,000A	1,00 ± 0,5	1mA	0,01
	≥ 1A et ≤ 5A	0,25 ± 0,4	1mA	0,01
Time	10μS – 100mS	0,002 – 10μS	10μS	0,0005
Limit energy: E (RI <sup>2</sup> t)	12J*	Na	Na	Na

\* following the use of available energy recovery time between each shoot is necessary

NB : Less than 100mA current can be used but functioning or level are not guaranteed

**High energy**

Function / Type	Range of use	Accuracy	Résolution	drift Temp. A 20°C
Output current	100mA - 1,000A	1,00 + 0,5	1mA	0,01
	≥ 1A et ≤ 5A	0,25 + 0,4	1mA	0,01
Time	10μS – 1000S	0,002 - 10μS	10μS	0,0005
Limit energy : E (RI <sup>2</sup> t)	20J*	Na	Na	Na
Limit power : (W)(t>1S)	60W*	Na	Na	Na

**AKLV16**

Function / Type	Range of use	Accuracy	Résolution	Drift Temp. à 20°C
<b>High energy 5A</b>				
Output current	< 1,000A	1,00 + 0,5	1mA	0,01
	≥ 1A et ≤ 5A	0,25 + 0,4	1mA	0,01
Time square	10μS – 100S	0,002 - 10μS	10μS	0,0005
dl/Dt Slope	< 1/S	1,00 + 0,5	1mA	0,01
	1A/S – 5A/S	0,25 + 0,4	1mA	0,01
Time Slope	10μS – 100S	0,002 - 10μS	10μS	0,0005
energy Limite: E (RI <sup>2</sup> t)	NC J*	Na	Na	Na
Limit power: (W)(t>1S)	50W*	Na	Na	Na

**Synchro BNC**

**Mode (optocoupleur) : 30V max – 20mA max**

