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## **SOPROLEC InterpCNC V2.2 5 axes controller**



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# Presentation :

The InterpCNC V2.4 card is an axis control card.  
It has 4 axes command outputs that can be interpolated or independent.

Developed on the basis of a powerful 32-bit processor, the InterpCNC offers ideal performance for digital control applications and also automation applications requiring economical axis control/command.

In addition, the InterpCNC has a Basic language interpreter allowing the management of automation.

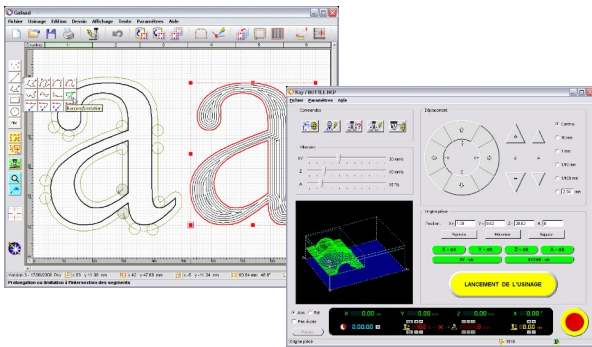
The axis control interface in Step/Direction mode is compatible with the entire range of motorization offered by the SOPROLEC company (stepper motorization, brushless motorization).

Two communication interfaces are available:

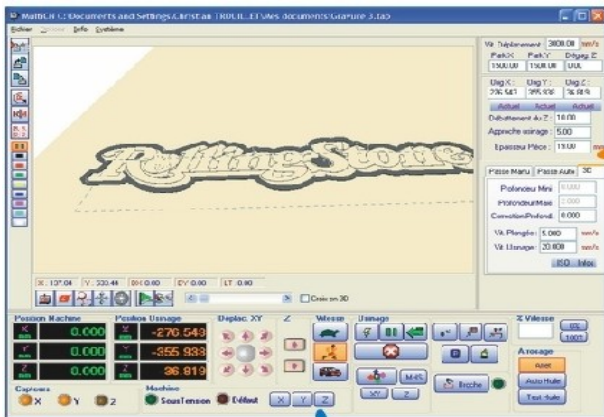
- USB for fast communication in CNC applications,
- RS485 MODBUS for industrial applications.

Different communication libraries allow the use of the InterpCNC with several control software:

- GALAAD (CAD/CAM Integrated Control Package),
- MULTI-CN CNC control solution with professional automation.



GALAAD CAD / CAM / Control



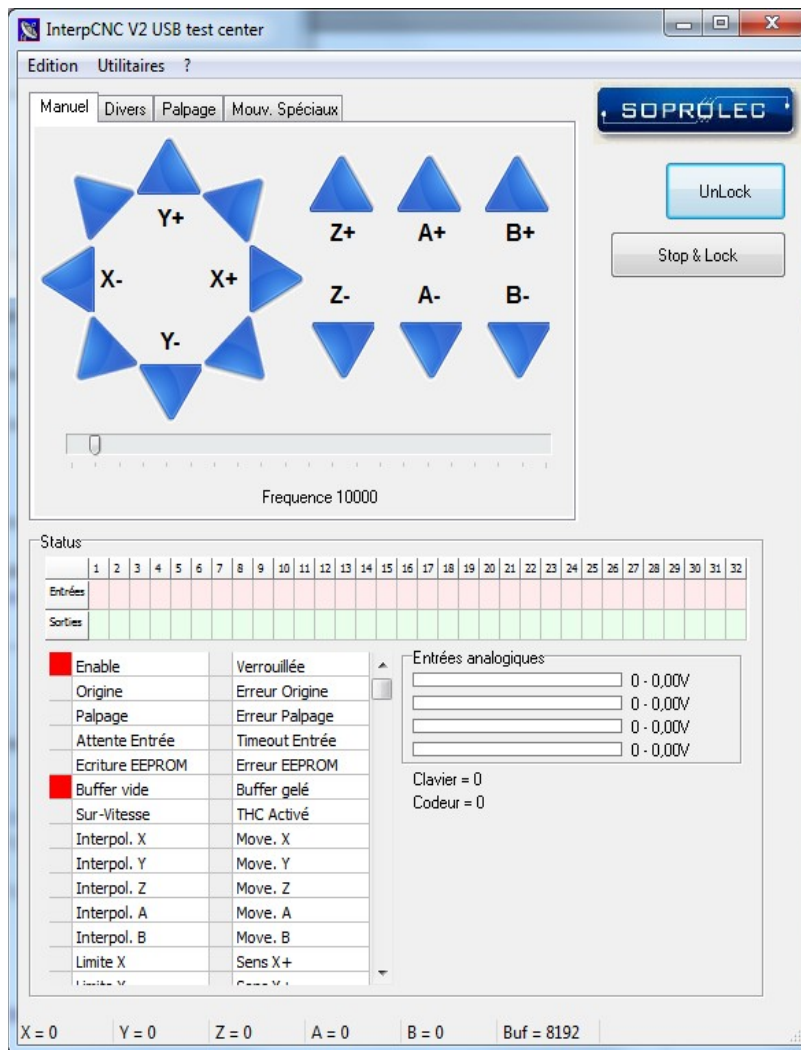
MULTI CN  
Interpreter / Control  
Extended automation management

## Diagnosis software :

The InterpCNC card is delivered with Test Center, a test and diagnostic software allowing access to all of the functions of the card and to the various parameters.

Attention: the use of this software and in particular of the displacement functions, must be reserved for informed people.

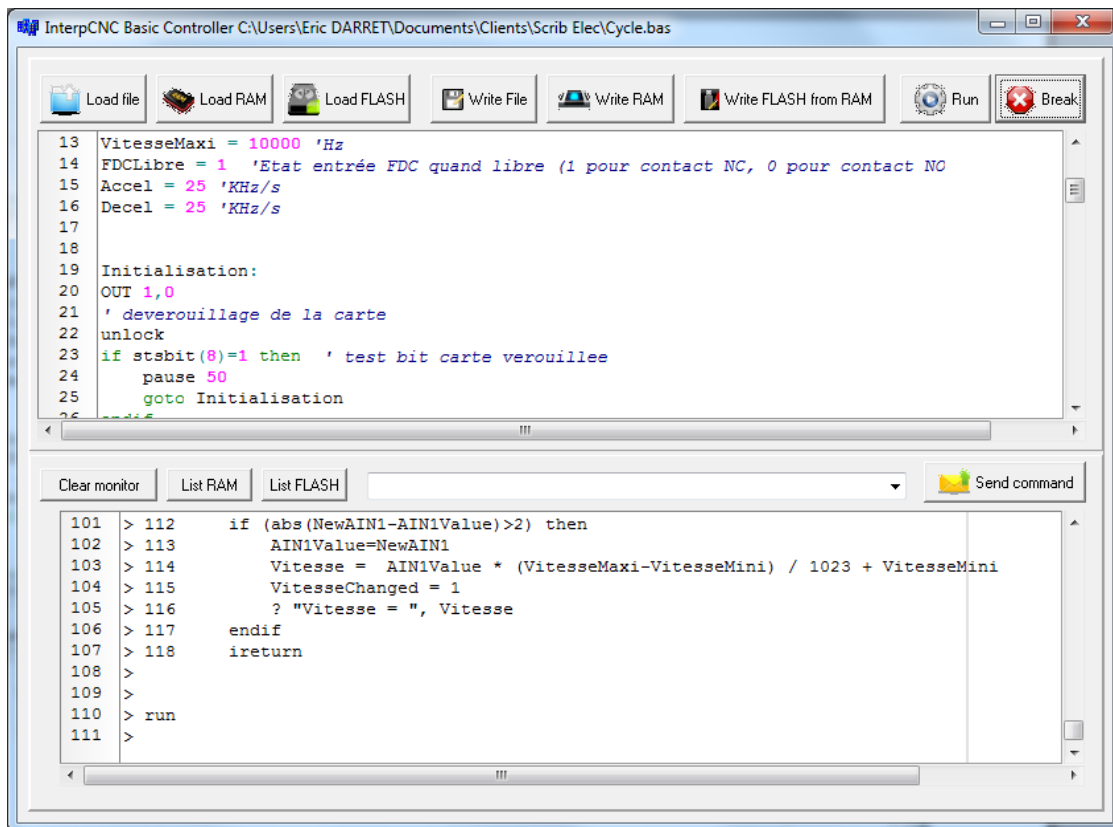
When the card is powered up, movements are locked (not authorised). To authorize operation of the axes and outputs, first click on the "Unlock" button.



## BASIC interpreter programming screen :

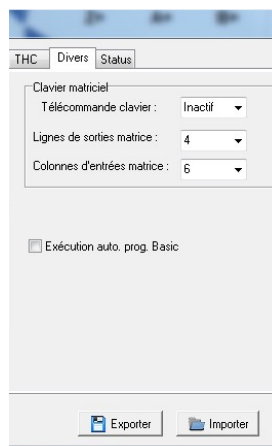
The screen is divided into 3 zones which allow:

- Entering the PLC program,
- The sending of Basic orders to the card,
- The communication monitor.



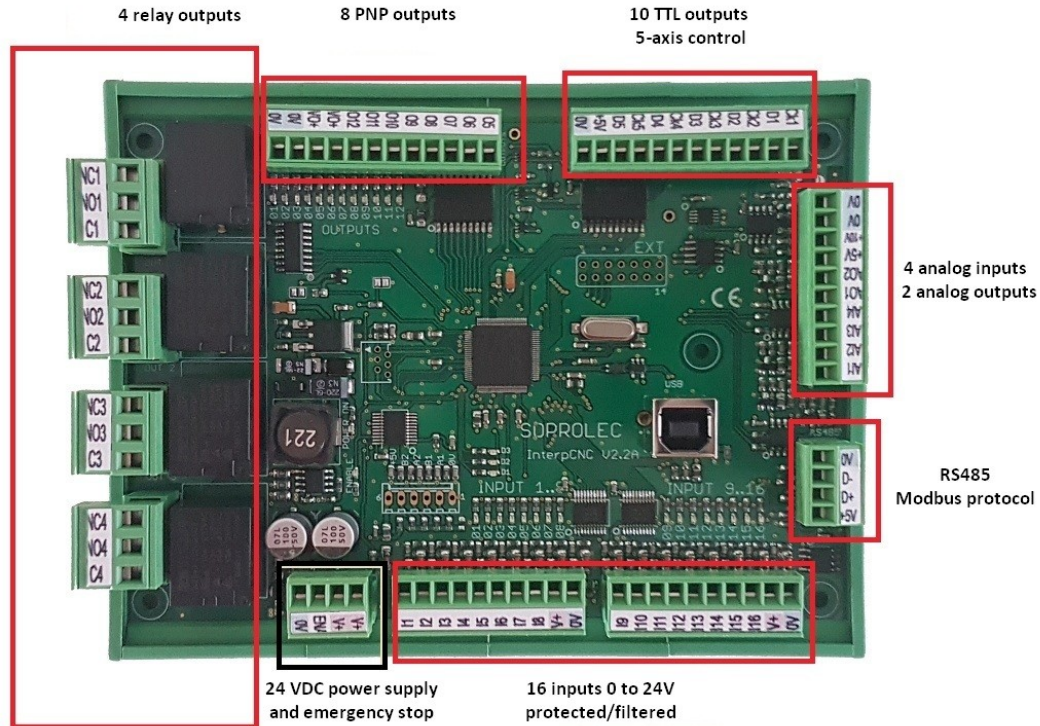
Parameter No. 127 (EE\_AUTORUN\_BASIC) makes it possible to automate the loading and launching of the basic program when the InterpCNC is powered up.

When this parameter is set to 1, the Basic program present in the non-volatile Flash memory will be loaded into memory then executed automatically. (Check box on "Exécution auto. Prog. Basic")



Consult the specific instructions for the Basic interpreter for all additional information.

# Overview of the InterpCNC V2.2 card:



Power supply:  
Card power supply 24VDC/250mA

Output specifications:  
Outputs 1 to 4: Dry contact relay 250V/10A  
Outputs 5 to 12: PNP 350mA (total of all outputs)/24V  
Outputs CK1 to CK5, D1 to D5: TTL output 5V/20mA max

Input specifications:  
Inputs 1 to 13: 0 to 32V max. High level from 3.5V. 1.5KHz filter.  
ENABLE input: Emergency stop function. 0 to 32V max. High level from 3.5V.  
1 incremental encoder input or 1 TTL type fast counting input

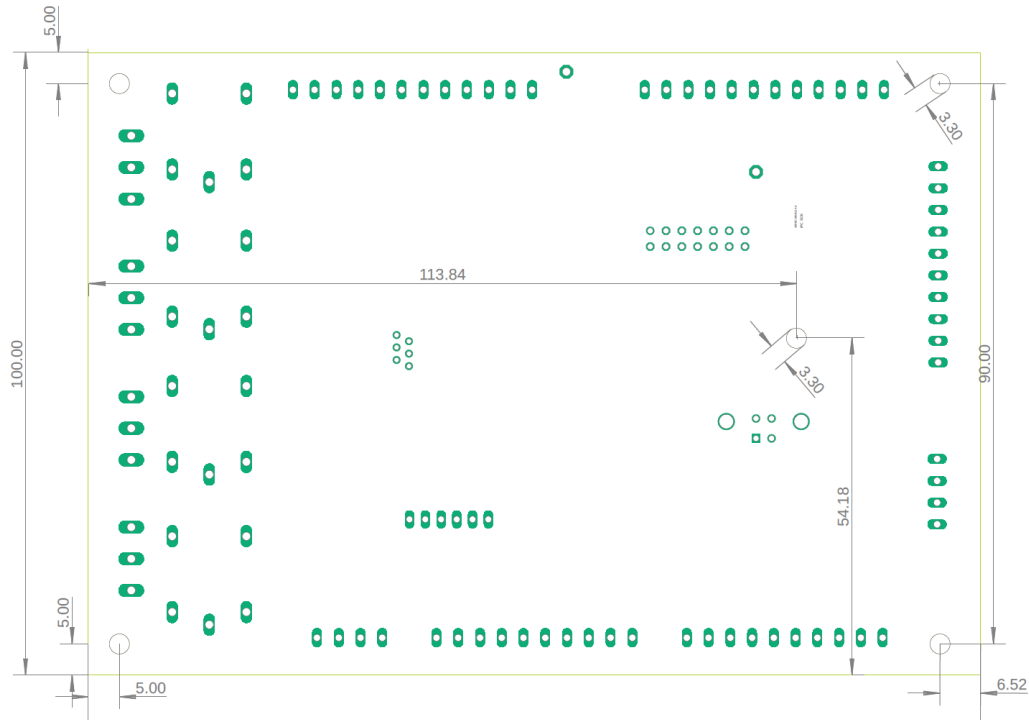
Analog Inputs/Outputs:  
4 analog inputs AI1 to AI4: 0 to 10V. 1M impedance, 10 bit resolution.  
2 analog outputs AO1 and AO2: 0 to 10V. 10 bit resolution.

All connectors are removable for simplified implementation.

## Installation :

The card is integrated in a protective box which can be fixed on DIN rail.

In the case of a fixing on any other support (not recommended without case, loss of the guarantee if deterioration of the seal), here is the drilling plan to be respected:



During the first connection of the InterpCNC card to the PC, Windows prompts for the installation of the USB communication driver.

For Windows 8, Windows 10 and 11, driver installation is automatic.

For Windows 7 or XP, the latter is available in the "**USBDriver**" folder (from the "Product Documents" download section of the card's page on our website [www.soprolec.com](http://www.soprolec.com)).

Use with GALAAD:

Copy the files from the "GALAAD" folder into the GALAAD installation folder.

(NB: the latest version of ICNC2.dll is the one included with **Test Center** (2018)).

For Galaad to work, **Test Center** must remain closed.

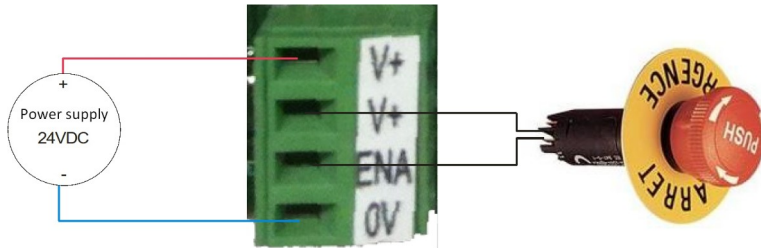
Use with MULTICN:

Copy the "MultiCN" folder to the MultiCN installation folder.



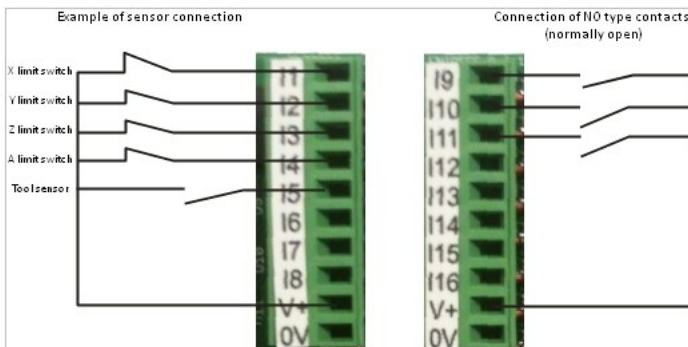
# Connections :

## Power supply, Emergency stop :

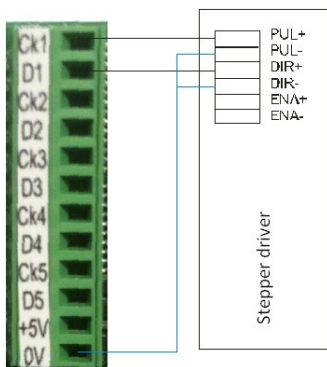


The connection between V+ and ENA is essential. Therefore, use an NC (normally closed) type contact to ensure this connection. For safety, this input physically cuts the power supply to the relay coils.

## Connection of inputs:



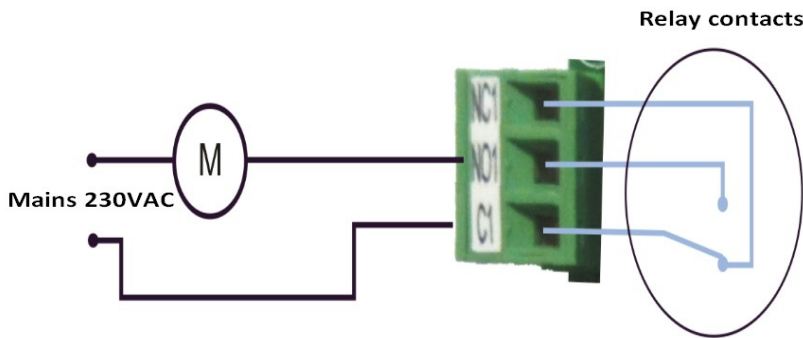
## Command of a motor driver:



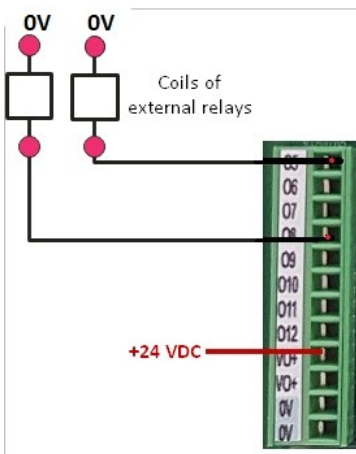
Connecting the X-axis motor driver



**Example of using a relay output to control a spindle motor:**



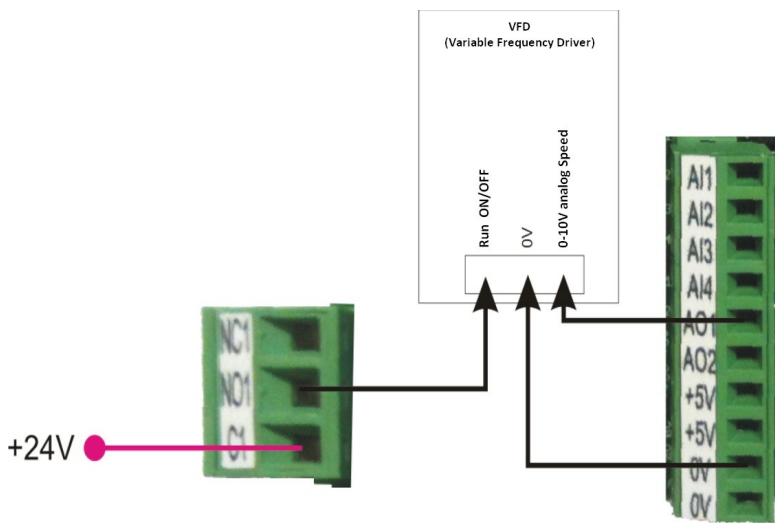
**Example of using outputs OUT1 to OUT8 (PNP)**



Control of 2 external relays using outputs OUT5 and OUT8

NB: The outputs being of PNP type, it is always **necessary to supply VO+** (with +24VDC for example, the 0V being common with that of the power supply of the card), in order to obtain this same voltage on the outputs, at state 1.

**Control of a VFD :**

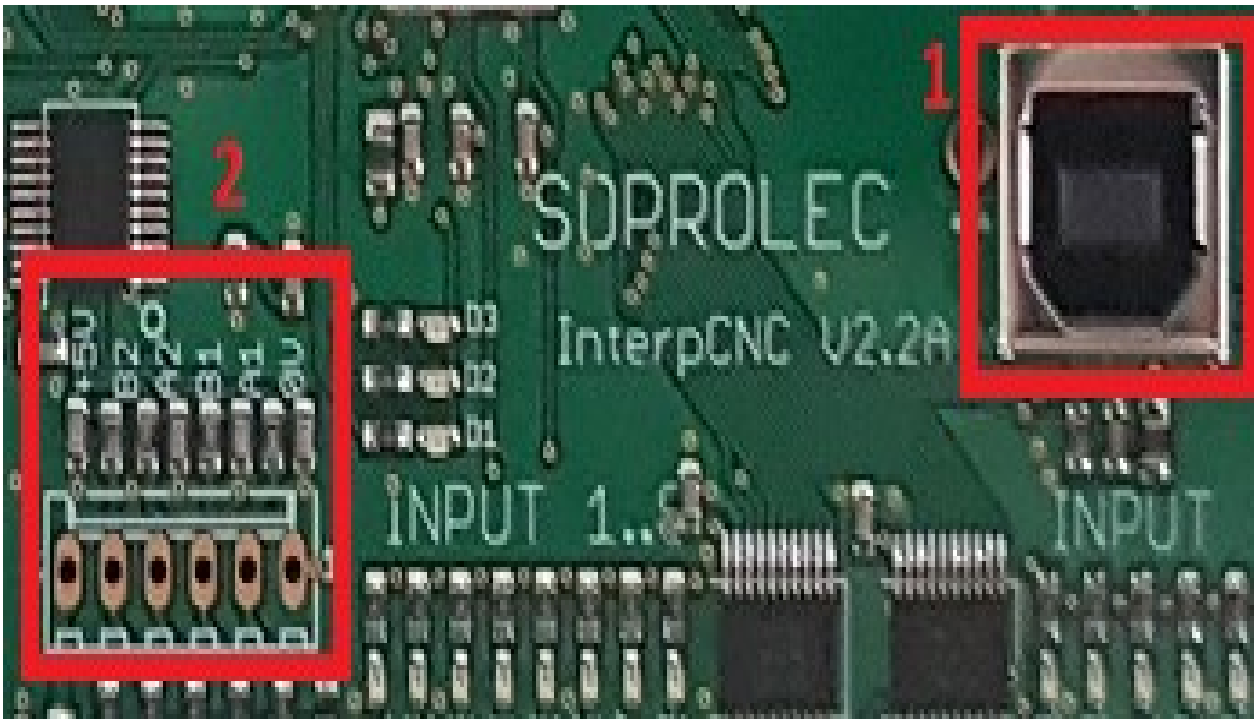


In this example, output OUT1 commands the start of the spindle.  
Analog output AO1 controls the speed variation.

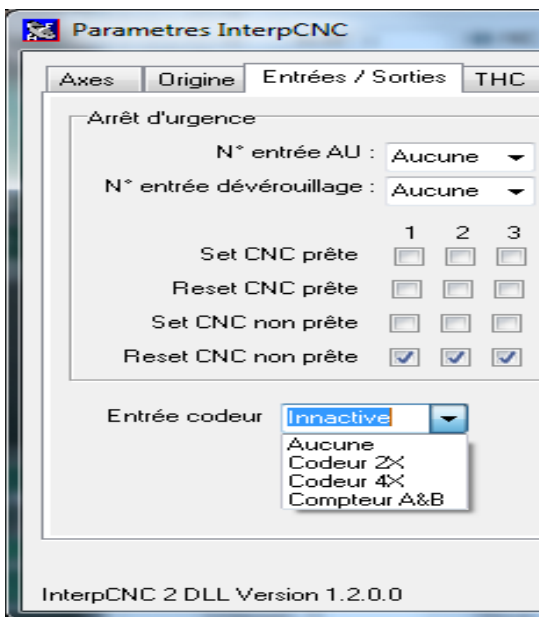
**Use of encoder / counter inputs:**

Two high-speed count inputs (2\*- A1 and B1) are available on the InterpCNC.  
They can be used independently of each other (2 independent counters) or as encoder input (quadrature).

On the connector dedicated to encoder input 2\*, you also have +5V and 0V which can be used to power the encoder.



The choice of the mode of use is made using the parameters of the card.



### **Axis coupling:**

In order to allow the use of 2 motors for the same axis, it is possible to couple 2 axes.

The X axis can be duplicated on the A axis.

Thus the card will generate identical pulse signals on outputs CK1 and CK4, likewise between D1 and D4.

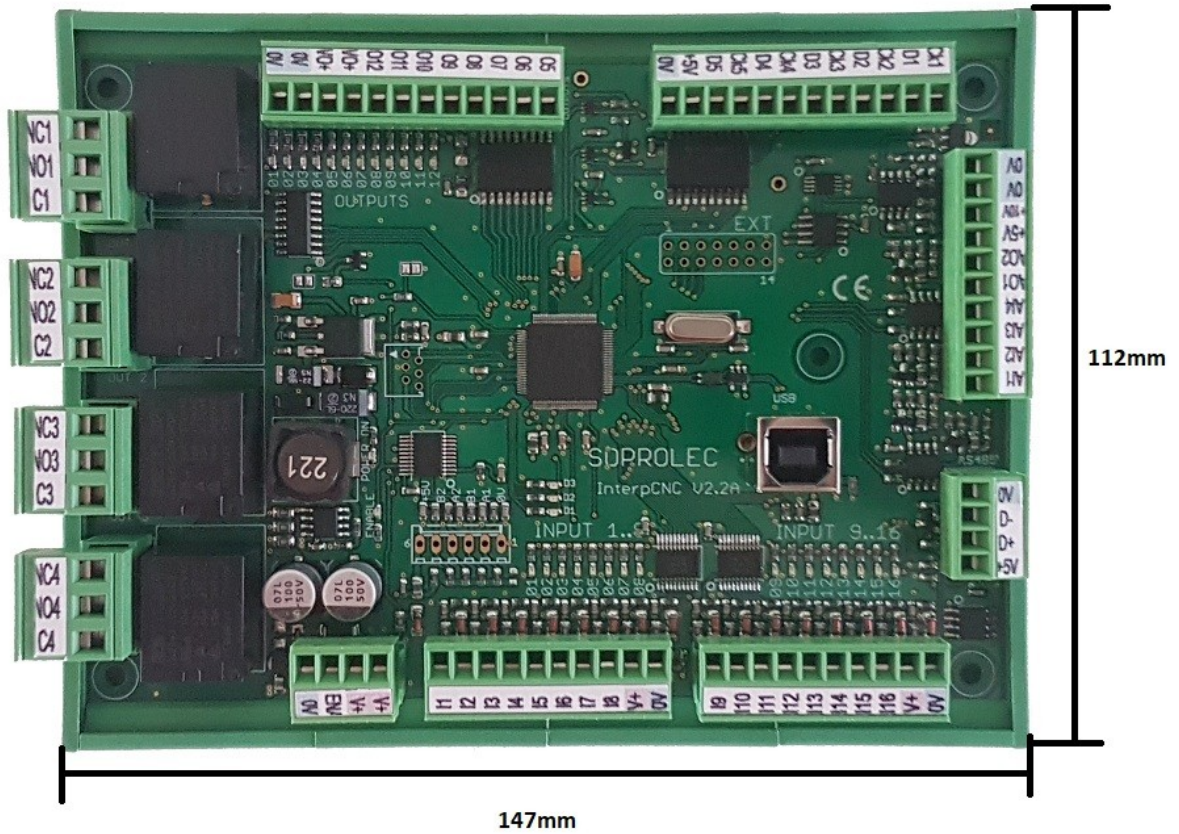
In the Test Center settings, choose "**Duplication axes: X vers A**", and click on "**Envoyer**" (=send).

Or the X axis can be duplicated on the B axis.

The card will generate identical pulse signals on outputs CK1 and CK5, likewise between D1 and D5.

In the Test Center settings, choose "**Duplication axes: X vers B**", and click on "**Envoyer**" (=send).

# InterpCNC V2.2 implementation



The terminals marked V+ are all interconnected.  
The 0V terminals are all connected together.  
The +5V terminals are all linked together (regulated +5V output from the card).

The state of the outputs is visualized by the green LEDs.  
The state of the inputs is visualized by the red LEDs.

The ENABLE LED represents the state of the ENA input which functions as an emergency stop.

## Use of the THC regulation function integrated into the card:

The InterpCNC board has a Z-axis position servo function. This functionality allows autonomous management of the THC regulation during plasma cutting or engraving depth regulation.

The activation of this function can be done by software commands or quite simply, when activating a card output. Typically, it is enough to indicate in the THC parameters the start-up output number of the plasma station for the THC to start.

Example of THC function configuration using InterpCNC Test Center software:

Paramètres InterpCNC

Axes Origine Entrées / Sorties **THC** Divers Status

Fonction THC : Inactif

Mesure Arc

Mesure tension Arc sur AIN2

Filtre mesure Arc 2

Régulation

Période échantillonnage 2

Vitesse maxi : 22400

Accel maxi : 160

Gain Intégrateur 0

Gain proportionnel 90000

Correcion + Maxi 960

Correcion - Maxi 960

Limitation de vitesse par X Y

% de vitesse XY 100

Contrôle THC

No sortie activation Aucune

No entrée validation Aucune

Retard activation 500

Consigne par Logiciel

Consigne Mini 0

Consigne Maxi 1023

InterpCNC 2 DLL Version 1.2.0.0

Exporter Importer Envoyer Fermer

**Advanced THC Settings Details** : (go to “Paramètres InterpCNC”+Ctrl+Shift)

EE\_THC\_ALLOWED: If =1, THC function active.

EE\_THC\_FMAX: Maximum movement speed of the Z axis during regulation (in Hz)

EE\_THC\_MAX\_SPEED\_DEVIATION: Acceleration/Deceleration of regulation movements (in Hz/sampling period. See EE\_THC\_PID\_SAMPLE\_TIME)

EE\_THC\_AIN\_FILTER\_TIME: THC measurement analog input filter (3 recommended)

EE\_THC\_TEMPO\_START: time delay in ms between the activation of the THC function and the actual start of regulation).

EE\_THC\_AIN\_NUMBER: Arc voltage measurement input number.

EE\_THC\_PID\_SAMPLE\_TIME: PID controller sampling period (usually 3ms).

EE\_THC\_KI: Coefficient integrator (normally 0)

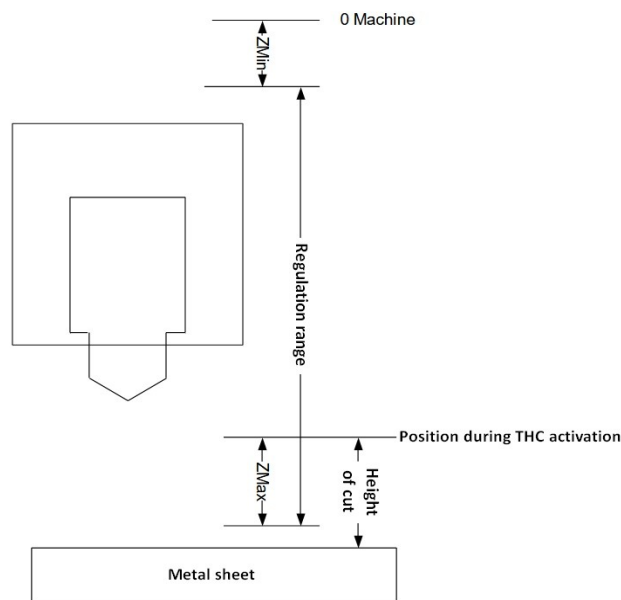
EE\_THC\_IMAX: Integrator positive limit

EE\_THC\_IMIN: Integrator negative limit

EE\_THC\_KP: PID proportional gain

EE\_THC\_MAX\_CORRECTION\_PLUS: Lower limit of THC correction (to limit descent)

EE\_THC\_MAX\_CORRECTION\_MOINS: High limit of THC correction



Z min operating range: Distance between machine 0 of the Z axis and the point above which regulation will be limited. When the regulation is active, the torch will not rise above this point.

**Recommended value : 10mm**

Max Z Operating Range: Maximum distance the Z axis moves downward from the Z position when the THC function is activated.

**Recommended value : minimum cutting height usually used (ex : 0.5mm).**

EE\_THC\_ACTIVATION\_OUTPUT: If >0, the THC function will be active when the indicated output is activated. If = 0, the THC must be activated by software commands. In the example above, the parameter is at 1. Consequently, as soon as MACH activates output N°1, the THC function will be active.

EE\_THC\_CONTROL\_INPUT: If >0, THC will only be truly active if the specified input is active. This parameter can for example be used by indicating the return of OK station to condition the operation of the THC.

EE\_THC\_XYSPEED\_LIMITATION: If 0, no limitation. If = 1, the movement speed of the Z axis is limited according to the movement speed of the X and Y axes. This prevents the torch from diving on the corners or the machine slowing down.

EE\_THC\_XYSPEED\_LIMITATION\_VALUE:  
Percentage of limitation with respect to XY speed.

EE\_THC\_SOURCE: Indicates how the instruction is given. If 0, the instruction will be given by a call to a card function.

From 1 to 4 allows you to adjust the THC setpoint using a potentiometer connected to one of the analog inputs.

EE\_THC\_SOURCE\_MINI: Set to 0

EE\_EE\_THC\_SOURCE\_MAXI: Set to 1023