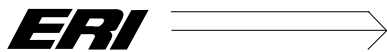

CNC ERI

Instructions

version 3.23



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Original settings

YOUR PARAMETERS

CAUTION : Depending on the type of slide, the threads may differ. Original settings are as follows (might be different from full initialization!)

Facteur vitesse	
Frequence start/stop Z	
Frequence start/stop X	
Frequence start/stop Y	
pas de vis Z	
pas de vis X	
pas de vis Y	
axe X en diam	
accélération Z	
accélération X	
accélération Y	
NB pas/ tour	

Key Features

- N.C. 2 axes with linear and circular interpolation
- Stepper motors with 2.5 microns (800 steps /rev.) or with DC motor 2000 step/rev.
- Large LCD with backlight
- full page editor
- 8 outputs and 7 inputs opto-isolated
- easy programming
- backup settings and 30 programs
- interface RS 232
- MC68332 microprocessor

Mounting

The command connects to the mains 220V 50Hz. Do not connect the controller to an outlet near a device generating electromagnetic interference (eg motor switch, welding machine etc..).

Connect the lathe bed to the power ground, especially if you use the belt for the grinding tool.

Connect the two engines to the rear face of the control, the transverse axis being the X axis, the longitudinal axis being the axis Z.

Position the motor cables downward taking care to flatten the motor flange against the slide (Allen key 4).



Mounting bracket

Maintenance

Using the command causes a heavier stress on the slide than manual operation, therefore lubrication of the screw and the slide should be done as frequently as possible. To remove the screws and the motors from the slide, loosen the two screws (Allen 4) under the slide and continue to turn back the engines.

Setting

The accuracy of the system is strongly linked to the setting of the taper gib. Setting the taper gib too tight will cause excessive wear and may cause a loss of stepper motor. Conversely setting the taper gib too loose will impair precision during machining. Consult the manual for Schaublin adjustment and maintenance of the slide.

General

NC is initialized with parameters that are suitable for use with a Schaublin slide. In case another machine is associated with the NC, it may be necessary to change the settings before use (“settings” above).

The four keys ; Menu, Edit, Start and Jog will:

- return to the main menu as it shows when powering the command.
- pass through mode editing
- pass through mode 'start' key
- pass into the mode shift manual '(Jog).

From the main menu, you can also access other submenus.

Jog (manual operation)

In this mode, the last line of the screen always displays the mode (Jog), the X and Z positions and the speed of movement. Keys X+, X-, Z+ and Z- can manually move (for example to make a contact or to define a '0 ') the slide on these two axes.

A position can be set using the buttons Z or X followed by a number and then press ENT (enter). When setting a position, the arrow ← can make corrections.

The speed is changed by typing a number from 0 to 9 (0 is the highest speed, beware deceleration!).

The F key is used to enter a speed (mm / min.)

In the Jog mode, it is possible to switch outputs directly by pressing the '-' key. Pressing the button corresponding to the number of output will change the state of the output.

The same '-' key allows to return to the manual mode.

Using multiple tools

In the Jog mode, you can define the coordinates Z and X of the tools no. 1 and 2 by pressing “Outils”. Then, select the coordinate with arrows ↑ ↓, press ENT, enter the new value followed by ENT to confirm. The Outils menu is also accessible from the Start mode.

Editing

In Edit mode you can write orders which are executed in the Start mode. The last line always displays the mode (Edit), the X and Z position and the parts counter. Orders will be read from left to right and from top to bottom. A minimum of one space is required between two orders. There may be several orders per line, or only one, or several blank lines between two orders, etc.. A speed command is valid for all the movements following the order until a new order of speed is registered..

Coordinates are given directly in millimetres (mm.) for the Z axis and in diameter for the X-axis in the turning mode (see parameters).

Button edition

- Arrows ↓ ↑ → move the cursor.
- Ins inserts a space
- Shift + Ins insert a row if the last program line (line number 20) is empty.
- Del and Shift + Del deletes each character and line.
- The white key is a space and erases the character if any.
- The green button (start) moves the cursor to end of the line.
- The green button (start) long pressed displays a reminder (in French !)
- The red button (stop) moves the cursor to the first position of the line.

defining the syntax

a,b,... : is a real number or integer (eg, -23.567).

a,b,... :corresponds exclusively to a positive integer (eg 12).

Order of speed

There are two ways to make an order of speed. Pressing functions F0 to F9 (which limits the choice to 10 different speeds, F0 is the fastest speed), or typing a number (real) followed by a space which gives a feed rate in mm / min. (ex.

253.5 X10 moves the axis X at position 10 at the speed of 253.5 mm / min.). Fast shutter speeds range from 1200 mm / min. to about 3000 mm / min.

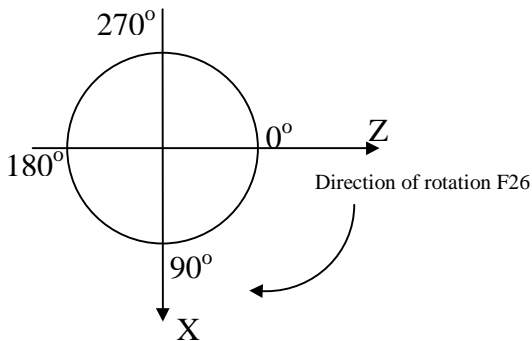
Equivalence between the two speed

F0	maximum velocity, corresponds to 1360 mm / min. No space between the F and 0
F1	is 750 mm / min.
F2	is 500 mm / min.
F3	is 300 mm / min.
F4	is 200 mm / min.
F5	is 150 mm / min.
F6	is 120 mm / min.
F7	is 100 mm / min.
F8	is 3 mm / min.
F9	is 0.75 mm / min.

Order of travel

- Za : Z-axis moves to the position absolute a mm. (Eg Z12.43).
- Xa : X axis moves the absolute position to a mm. (eg X45.95).
- ZXa b : Simultaneously moves the Z axis to absolute position a and X axis to absolute position b. If the speed is less than 1200 mm / min. the displacement will be linear interpolation. Otherwise, the two axes will move at the given speed.
- FZa : Relative displacement of the Z axis of a mm (eg FZ1.5 moves the Z axis of 1.5mm regardless of the position Z above).
- FXa : Ditto for the X axis

F26 a b c : Circular interpolation clockwise.
a = starting angle (in degrees).
b = angle of arrival (degree).
c = the radius (in mm.)



definition of the angles on the circle

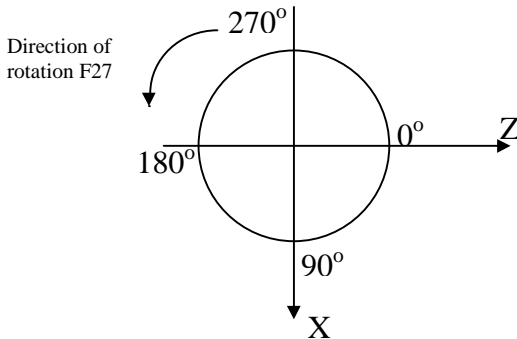
The 1/10 th of a degree are taken into account.
Caution: in a circular interpolation, the motors are not accelerated at startup. If the speed is faster than start/stop frequency parameters defined, the motors may lose steps.

F27 a b c : Circular interpolation counterclockwise..

a = starting angle (in degrees).

b = angle of arrival (degree).

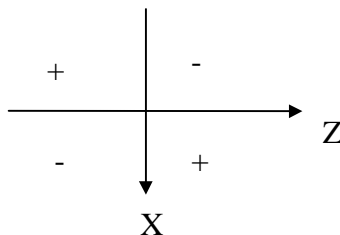
c = the radius (in mm.)



definition of the angles on the circle

F40 a : Linear interpolation of a degrees.

The sign of the angle defines a quadrant interpolation. This order must be followed by a shift in the X or Z axis (eg F40 -45 Z5 describes a linear interpolation 45° which ends at position $Z = 5\text{mm}$).



Definition of the direction of the linear interpolation according to the sign of the angle

General Functions

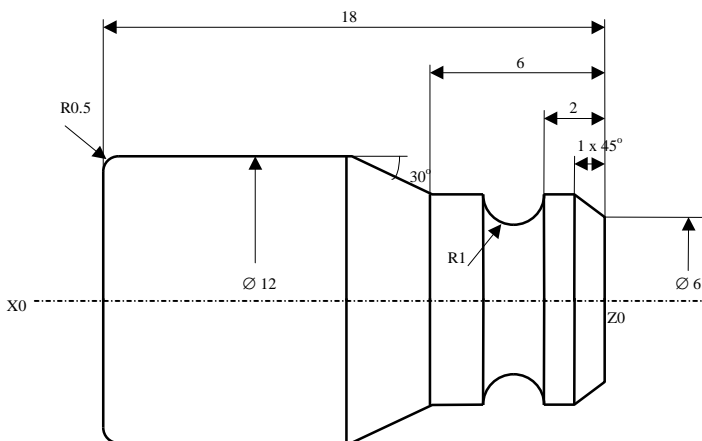
- C : Comment. The rest of the line is not interpreted.
- F10 a : Set the output a to ground. (eg. F10 2 set the output No 2 to the ground).
- F11 a : set the output a to 24VDC (eg. F11 4 set the output No 4 to 24 VDC).
- F12 a : Waiting a ground signal on the input a (eg F12 1 waits for a ground on input No 1).
- F13 a : wait for a second (eg. F13 4.55 wait for 4,55 sec.).
- F14 : Unconditional jump to the beginning of the program.
- F15 a : Call the program No. a (sub-program). The sub-program is executed in full, then the execution of the main program resumes normally
- F16 : Increments the parts counter.
- F17 : end of sub-program (must be at the end of sub-program)
- F25 : Stop program execution and awaits the start button (green).
- F41 a : This command (usually placed at the end of the line) repeat a times the line. (eg F41 5 repeat 5 times all the line)
- F53 : Selects the coordinate system for Tool No 0 (the default system when using a single tool)

- F54 : Selects the coordinate system for the tool No 1 (coordinates defined in the Outils sub-menu).
- F57 : Selects the coordinate system for the tool No 2 (coordinates defined in the Outils sub-menu).
- F60 : If the program is started with the F button (see Start), the first instruction executed will be the one that follows F60.
- F72 abc : homing. Must be followed by the letters X, Y, or Z in the order homing. May be followed by 1, 2 or 3 letters followed by a space. (F72 YZ)
- M30 : End of program. When transmitting Rs232 generates a 'EOF' (character \$ 04)

Example Program

Machining a workpiece:

Note: the screw clearance is assumed to be zero and the program below defines the contour of the part



program :

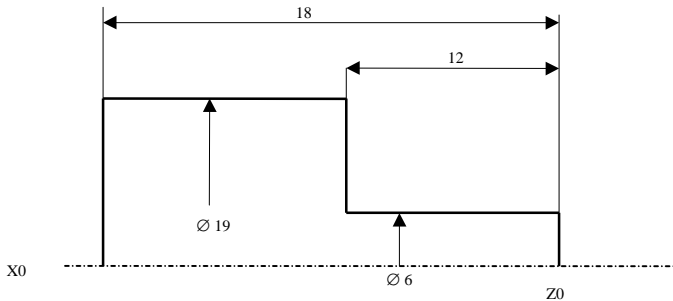
```
C EXAMPLE1
F0 X20 Z0 F25
X13 F4 X0
F0 Z0.1 X6 F40 -45
400 Z-1
Z-2
F6 F27 0 180 1
F4 Z-6 F40 -30 X12
Z-17.5 F26 90 180 0.5
F7 X0 F16 F14 M30
```

comment :

```
Comment program name
retracts the tool for the implementation of the blank, expects "start"
fast approaching, and then grind the face with speed F4
position for the start of chamfer angle 45 °
machining chamfer, speed 400mm/min
machining
speed F6, machining radius
F4 speed ,machining 30 ° chamfer, up to X12
machining diameter 12mm. and 0.5 mm radius.
cutting speed F7, increments the counter, back to the beginning of the
program without stop.
```

Roughing:

from a blank of diameter 20mm, we want to machine the part below with 1mm path:



program :

comment :

```
F0 X25 Z0 F25
X21 F4 X0
F0 Z1 X20 X19
400 Z-18 F0 Z1
FX-1 400 Z-12 F0 Z1 F41 13
F14
M30
```

retracts the tool to put the blank, expects "start"
F0 fast approaching, and then grind the face with velocity F4
positions for the first path over 18mm length
First path
-1 mm relative advance along the X axis, machining of 12 mm, repeat 13 times
back to top
end of prog.

Start

This mode allows the execution of sequences written in the program mode.

- the Start key (green) starts the execution of the program from the beginning.
- Stop key (red) stops the flow.
- ENT resumes program execution to where it was stopped.
- the F key starts the program instruction with F60
- → key : starts the execution step-by-step (Step)

In the Start mode, you can access to the coordinates X and Z of the tools No. 1 and 2 by pressing the key Outil.

Parameters

The Parameter mode can be protected by a password. The default password is 12345. It remains valid. In the Parameter mode, you can configure the order by moving the cursor with the arrow keys \uparrow \downarrow to the desired setting, then ENT and the new value followed by ENT.

List of parameters

- Initialisation : this parameter calls a submenu. Key 1 can delete a program, key 2 sets all parameters to their default value, key 3 initializes the acceleration tables, key 4 initializes the parameters, the tables and deletes all programs, key 5 returns to the setup menu without changes.
- Facteur vitesse : Default value = 2. A decrease in this value increases the speed of all movements and vice versa.
- Freq. start/stop Z : Default value = 2500. Speed from which the Z motor is accelerated at start up. If the value is too small, the motor loses steps.
- Freq. start/stop X : Ditto for X
- Entrée1 : Default value = “non”. When this parameter is “oui” (yes), input 1 must be 'open' before

it can be activated again (useful if start is made with a switch on the clamp pliers).

Pas de vis Z : Default = 2. (screw pitch)

Pas de vis X : Default = 2.

Axe X en diamètre: If this parameter is “oui” (yes), the values on the X axis will be the diameter value, twice larger than the travel (turning). If this parameter is “non” (no), then the values displayed will correspond to travel (pointing, milling, etc.)..

Accélération Z : Default = 600. A smaller value results in a higher acceleration. If the value is too small, the motor loose steps.

Accélération X : As Z.

Corr. axe Z : Used in the Correction mode Z axis travel in mm. This number can be zero (no correction on the Z axis), but larger than the smallest possible displacement (eg. Pas de vis Z and NB PAS/TOUR =800 → 0.0025 (2/800))

Corr. axe X : As for the Z axis

Français allemand : Choice of language.

test para : If the value is “oui”, NC will test if the acceleration, frequency start/stop and speed factor parameters are below the limit values, in which case, a warning signal will

appear. If the value is “non”, the test is not performed.

- Contrôle E2 : If the parameter is “oui”, input 2 must be grounded to let the program run. If the input is released during execution (cover, protection ...), the program stops and output 4 is set to 0 (ex. for stopping spindle).
- NB PAS/TOUR : Depends on the engine type. Typically 2000 for de motors and 800 for stepper motor.
- Password para : If different from 12345, the password is required to access the parameters. 12345 remains always valid.

Corrections

Exclusively the Start mode allows quick corrections influencing directly the absolute positions. The value of these corrections must be given in the parameters.

- Corr key enters the correction mode (displayed at the left corner of the screen: corr.).
- To correct the Z axis: Z + or key-Z in the direction of the correction.
- To correct the X axis: Press X + and X-in the direction of the correction.
- Keys 0-9 can modify program variables (A0 to A9). To use them, contact us.

The axis affected by the correction will move according to the value indicated in the parameter, but the absolute position won't change. The program resumes, if applicable, where it stopped.

Using inputs and outputs

This NC allows control of 7 inputs and 8 outputs (opto-isolated) numbered 1 to 8.

An input signal is done by connecting the input to the ground (M).

The outputs are 24 VDC non stabilised. Maximum output current is 400 mA, and the maximum current for all outputs is 1.6 A. The outputs are protected against short circuits and overloads.

S1	E1
M	M
S2	E2
M	M
S3	E3
M	M
S4	E4
M	M
S5	E5
M	M
S6	E6
M	M
S7	E7
M	M
S8	E8
0	24

The connections marked M are connected to ground (0V). On the left side are the outputs S. Inputs E are on the right side. To use an input, for example input # 1, set the F12 1 instruction in the program. When reading this instruction, the program will stop and wait for a connection (ex. switch) between M and input No. 1.

An output, for example output # 3, will be at 24 volts with instruction F11 3 and at 0 V. with F10 3. You can connect a relay, for example, between the terminal S3 and M. The terminal marked 24 is connected to 24VDC (sensor connection, etc.)

Input Output connector
on the back

Warning: some caution is necessary when using inputs and outputs, some items may be damaged by incorrect connection. The use of inputs or outputs shall not threaten the safety of operators.

Selection of the program number

NC keeps 30 programs in memory (0 to 29). In the main menu, press key 2 to select the program you will work with.

Parts counter

The instruction F16 written in a program will increment a counter. The counter is visible in the lower right corner of the display as C. . . . In the main menu, press key 3, to load or set the counter to 0.

List

To facilitate archiving of stored programs, a name can be associated to each program. In the main menu, with the key 4, a list of program numbers appears. Arrows ↓ ↑ bring the cursor to the program No., ENT to enter the program name. Valid characters are:

- the figure 0-9.
- A dot and the minus sign.
- A space.
- Letters accessible with Shift.
- arrows ← → which move the cursor.
- ENT valids the program names.

The F key returns to the main menu and replaces the number of the current program by the program selected by the cursor. The Menu button returns to the main menu.

RS232 interface

The controller has a serial interface RS 232. This interface allows connecting the NC to another computer, printer or any other device with the same interface.

To function properly, this interface must be configured identically on both devices.

The default configuration is as follows:

- speed 19200 baud
- no parity
- length 8 bits
- 1 stop bit

These settings can be changed; key 5 in the main menu then submenu Setting.

In the Rs232 menu, you can either transfer or receive programs for the device. The transmission format is ASCII.

Upon receipt of a program, the command expects character hex 04 (EOF).

During transmission, the function M30 generates the hex character 04 (EOF).

Câble : Distrelec 670535

CN db9 female

PC db9 female

2	_____	2
3	_____	3
5	_____	5 (GND)

Origins

It is possible to connect proximity switches or limit sensors for homing.

The sensor (NPN contact) Z axis must be connected to input 5 (E5), the X axis to E6 and Y axis to E7 on. From the main menu button 7 goes into the menu origin. In this menu you can choose:

- the sequence of the axes.
- Vitesse lente: Speed Homing
- Vitesse approche: Approach speed
- Mm degagement: Distance back after the first contact
- Direction de rotation: Depends on sensor location. The value is 1 or -1.

The start button initiates homing.

Version Number

The version number is indicated on the main menu page. It consists of a number followed by three letters.

Ex : 3.14 TLS

The 1st letter : T for turn, F for milling, M for pearler machine
2 nd: L or S depending on the type of display

The 3rd : P for stepper motor, D for DC motor