# ISO Ns – Next Step
GCODE PC APPLICATION

A powerful Numeric Control by a PC

Iso Ns uses innovative technologies to transform a PC in a powerful Numeric Control, useful in a various types of machines.

A modern, customizable and intuitive interface guarantee a complete machine control, bypassing normal CN difficulty.

Useful both for final users and for developers, Iso Ns it's also OPEN SOURCE and then fully adaptable on every types of machine..
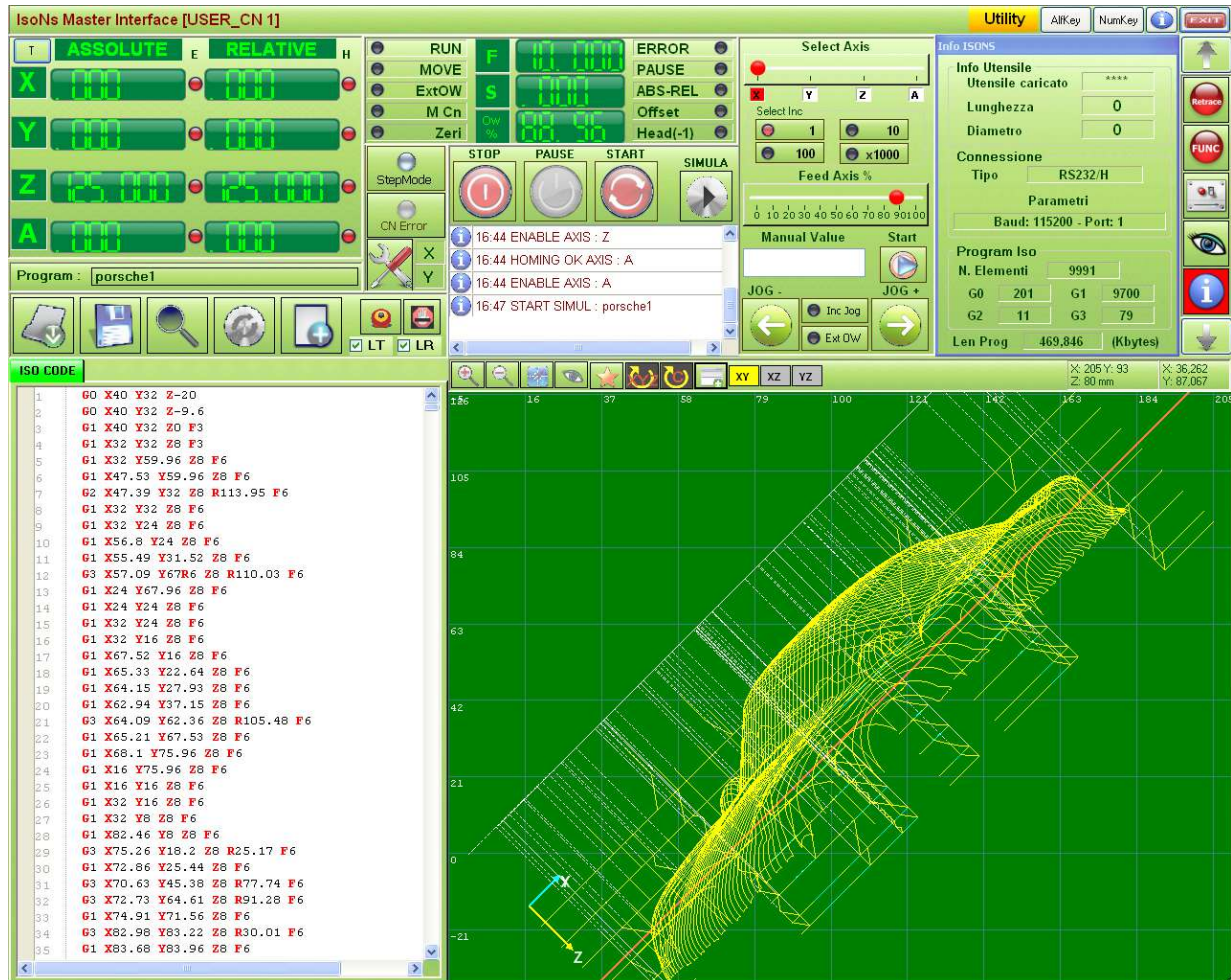
Every types of axes

Iso Ns can be used with every NGS system CN by Promax. Therefore can be used with NG35 and CanOpen, Ethercat, analog (+/-10 V) with encoder feedback axes, or with NGM13 and CanOpen and Step/Dir axes.
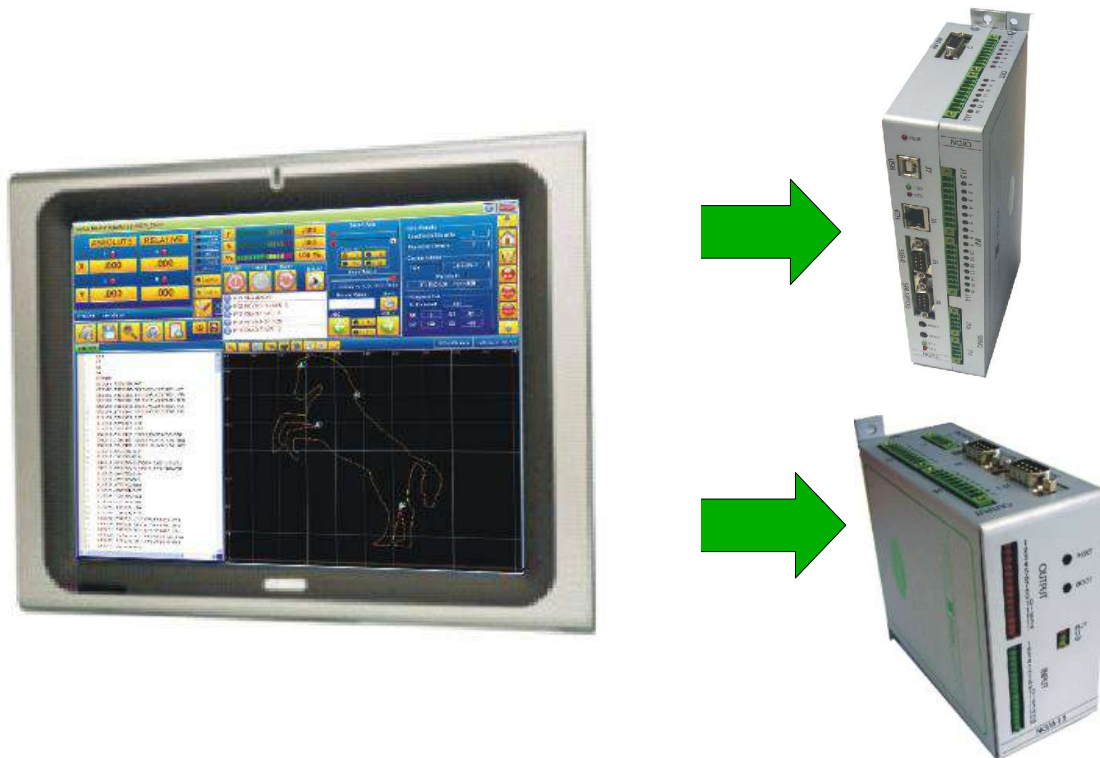
RealTime compiling and error preview on PartProgram

The PartProgram compilation will be done RealTime and syntax or configurations errors will immediately signed.

It enables to perform working only when all code is syntactically correct.

Errors will be immediately signed with a red underlines and also with summary window, that allow to quickly go up to the error line only with a mouse click.

Line	Description
1	ILLEGAL INSTRUCTION.... L

Program : test1

MDI   Fv ☑ Lt ☑ Lr

ISO CODE

1   G1X100 L300

Editor with Online Help

With the last generation Intellisense editor, an OnLine Help it's always available, allowing to write quickly a correct PartProgram.

While writing, IsoNs proposes the instruction list and with a mouse click they can be inserted on code.
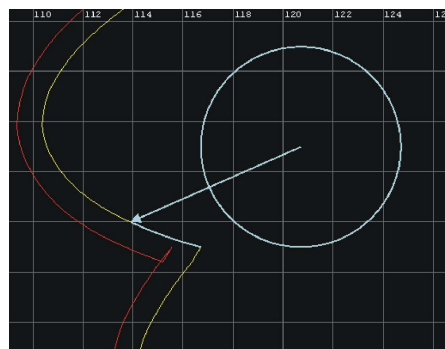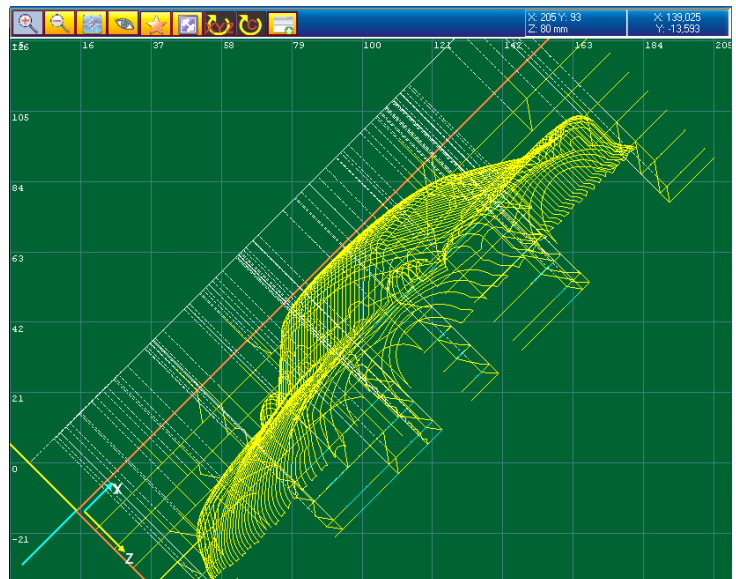
All instructions, will be displayed with an Help and an use example
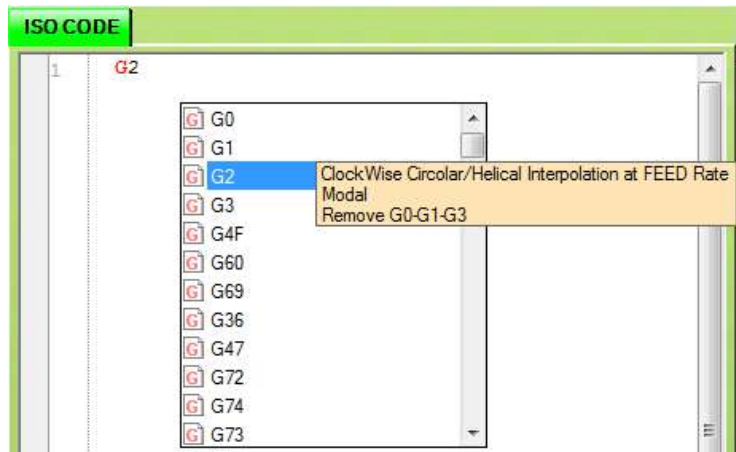
3D work preview

The working 3D preview allows to quickly verify the quality of the performed work. Very fast and accurate, it can also detect errors on G41-G42 offset tool compensation.
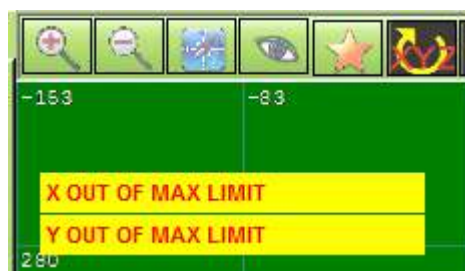
With Zoom in and Zoom out, Pan and rotation functions, it allows to analyze also very small working particular.
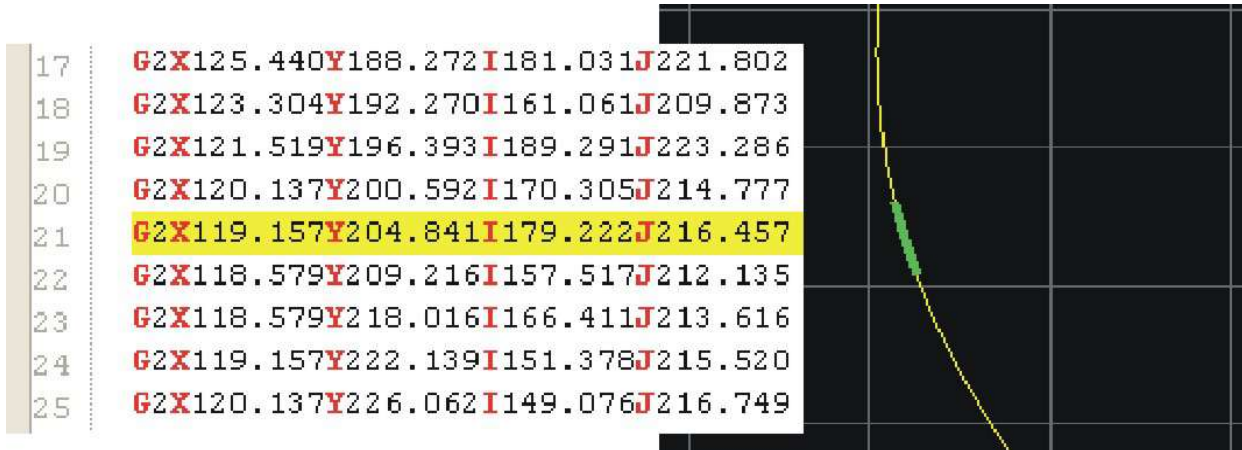
Piece size on 3 axes display

With preview, it's also displayed the working piece size, allowing to choose the right material dimensions.

**they'll be also displayed alarms on the piece size off working plane.**

Graphic block search.

It's possible to search the Iso block number on the preview. Simply pointing the mouse on the desired graphic segment, Iso Ns goes to the relative line number of PartProgram. Also it's possible to move the highlighted segment with up and down arrow. Fast,easy and intuitive, graphic block search allow to restart work from every PartProgram line in a very flexible way.

```
17   G2X125.440Y188.272I181.031J221.802
18   G2X123.304Y192.270I161.061J209.873
19   G2X121.519Y196.393I189.291J223.286
20   G2X120.137Y200.592I170.305J214.777
21   G2X119.157Y204.841I179.222J216.457
22   G2X118.579Y209.216I157.517J212.135
23   G2X118.579Y218.016I166.411J213.616
24   G2X119.157Y222.139I151.378J215.520
25   G2X120.137Y226.062I149.076J216.749
```
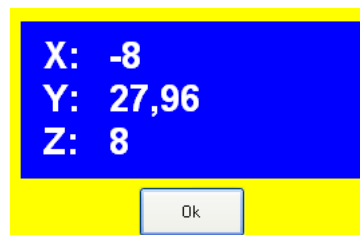
Working state display

During work execution, Iso Ns allow to display the work state both of the single segment and also of the tool. If tools compensation is active, will be signed with a different segment color.
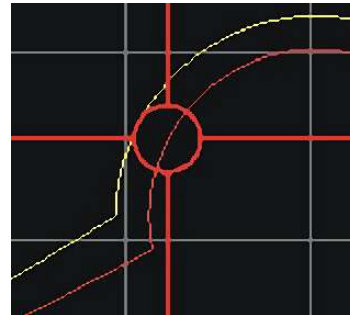
Piece size

Piece size function, allow to directly measure 3D dimensions on preview.

X: -8
Y: 27,96
Z: 8

Ok

Up-to-date technologies functions

Iso Ns give to you a great number of useful functions. Function that will be always useful on a high performances Numeric Control

- *Work plane rotation*
- *Automatic insertion bevels and edges on the corners*
- *Rigth and Left Tools Compensation*
- *High speed work without stops between segment*
- *Auto speed slowing in particular condition – AFC Adaptive Feed Control*
- *Optimized G0 function AntiStress axes*
- *Selectable Work plane on every axes couple*
- *Direct using of I/O on PartProgram (I/O digital and analogic)*
- *Error generation directly from PartProgram with Iso Code.*
- *256 offset axes*
- *256 zero points*
- *256 tools heads*
- *Tools warehouse with 256 tool for every head*
- *horizontal ad vertical mirror function*
- *Tool length Correction*
- *Axes quote acquisition useful in PartProgram*
- *Electronic handwheel management*
- *Tangential axes*
- *Rotation axes ecc.*
- *Gantry axes*
- *Line work identification before blackout*
- *N.U.R.B.S. - NOISE – RLS filters*
- *3D interpolations with edge calculation on 5 axes*

Many Work Origins

It's possible to reset axes quotas both manually and from PartProgram with a G function. Iso Ns have 256 different zero points directly usable.

Manual zero function is fast and easy, you only have to go to the specific position and acquire that position with a specific utility.

Pause advanced management

Work pause will be managed in very customizable and flexible way. On pause request, machine stops the program execution and starts a specific ISO routine that setup the specific machine pause management. In pause state, it's possible to move the machines axes with JOG and with specific function you fully manage machine movements (not circular interpolation).

At pause end, will execute another specific ISO routine, that setup the specific machine restart management.

It's useful in various machines types, where there are required many pauses for machine inspections, washing, and tools changing.

Work restart from every line number

A specific function allow a start/restart working from every line number, also selectable from the graphic preview.

As the pause function, it'll be activated a specific ISO routine, that setup the machine with all utilities.

Iso Ns will execute the PartProgram till the selected line number in "RESTART mode", then will start in "WORK mode" till complete work.

Route retrace and work restart from every work point

Retrace function is very useful in some types of machines. It allow to scroll

 all work route with JOG forward and backwards and to stop on whatever route point and restart working from there.

It's also possible to jump on every block number.

In this mode, all axes will move as like route need, allowing to view exactly the restarting points really on the machine and also graphically on the interface, .

When machine restarts, will executes a specific Iso routine, to setup the machine with the correct utilities useful for work.


Configurable functions with Iso Scripts

Iso Ns allow to customize machine functions in a very fast and simple way. Those are managed like a Iso PartProgram and will be inserted as buttons wich activate function. There is no limit on the managed functions number, useful to run specific manual functions (manual tools change, machine washing, utilities management and so on).

These functions can be runs in pause mode. Every function have related a specific Iso PartProgram, eventually a specific sample image and description.

All of this will be inserted as a button, mouse clickable.
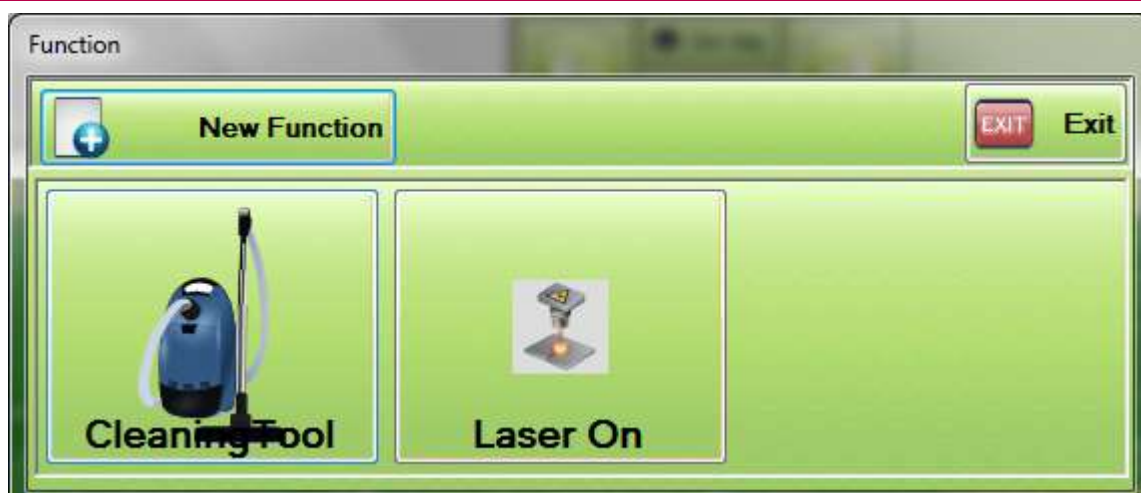
N.U.R.B.S. Filter (Non Uniformal Rational Bspline)

We have developed a special interpolation as N.U.R.B.S. Interpolation, that allows to pattern a PartProgram in a automatic mode. NURBS are a particular type of curves useful to solve B-Spline curves problems: the most significative ones is the no possibility to draw simple shapes like circle. Using NURBS, we are able to draw conical curves and to represent complex ones with a lower number of control points. NURBS are rational types of curves, defined with control points and a related weight; a higher weight means that the control point will be near the curve and a low ones means that the point will be a lower effect on the curve. Iso Ns use this types of curves to perform a smoothing of a point series, that comes to a sequence of Iso blocks. The result will be a profile pattern. NURBS filter, works also on 3D profiles. (download the programming manual for more information)
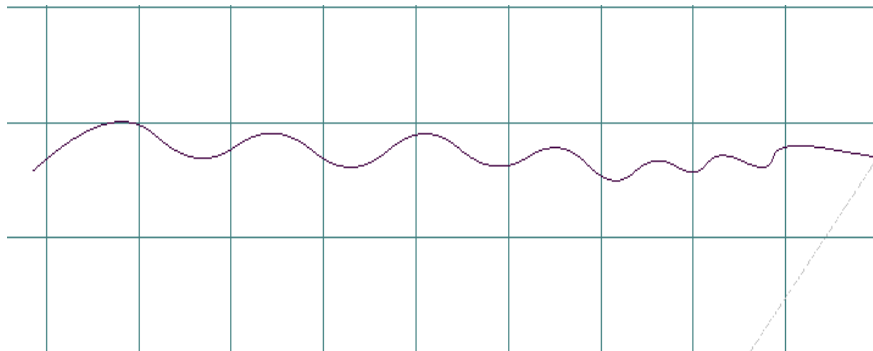
Original profile

```
G0 X107.16 Y130.27
G1 X100.59 Y131.18
G1 X100.14 Y129.37
G1 X96.74 Y130.73
G1 X95.38 Y129.14
G1 X92.66 Y130.5
G1 X89.95 Y128.46
G1 X86.55 Y131.41
G1 X82.24 Y129.14
G1 X77.71 Y132.31
G1 X72.95 Y128.91
G1 X67.97 Y132.31
G1 X62.98 Y129.37
G1 X57.55 Y133.45
G1 X52.34 Y129.59
```
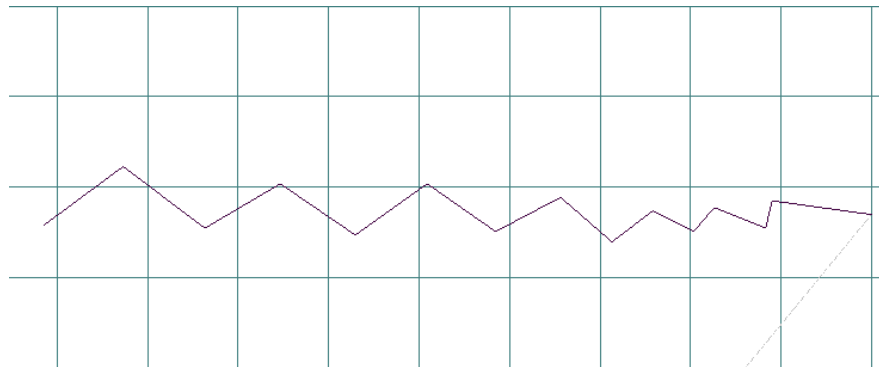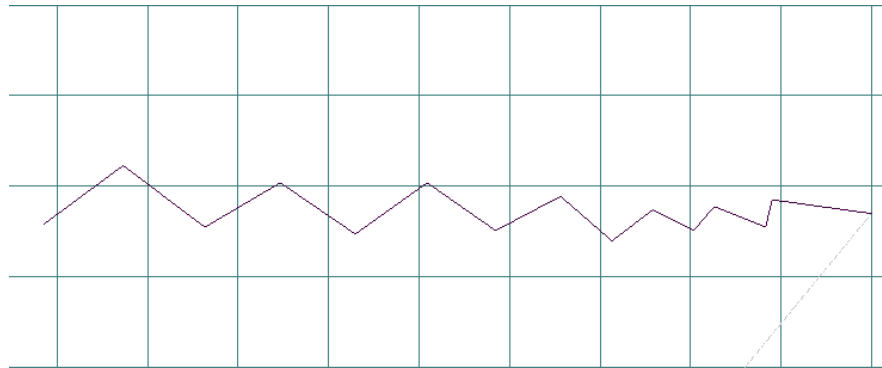
Filtered profile with NURBS MiLen=7mm Order=3 LenSeg=0.2mm

```
G69X200          // ABILITA LHK
// ABILITA NURBS
G72X1Y7
G0 X107.16 Y130.27
G1 X100.59 Y131.18
G1 X100.14 Y129.37
G1 X96.74 Y130.73
G1 X95.38 Y129.14
G1 X92.66 Y130.5
G1 X89.95 Y128.46
G1 X86.55 Y131.41
G1 X82.24 Y129.14
G1 X77.71 Y132.31
G1 X72.95 Y128.91
G1 X67.97 Y132.31
G1 X62.98 Y129.37
G1 X57.55 Y133.45
G1 X52.34 Y129.59
```

NOISE filter|

NOISE filter, cuts all G1 segment who defines very little edges on work route, defined as noise.

It can be useful to remove little segment, that can be unnecessary also for NRBS filter.

Original profile

```
G0 X107.16 Y130.27
G1 X100.59 Y131.18
G1 X100.14 Y129.37
G1 X96.74 Y130.73
G1 X95.38 Y129.14
G1 X92.66 Y130.5
G1 X89.95 Y128.46
G1 X86.55 Y131.41
G1 X82.24 Y129.14
G1 X77.71 Y132.31
G1 X72.95 Y128.91
G1 X67.97 Y132.31
G1 X62.98 Y129.37
G1 X57.55 Y133.45
G1 X52.34 Y129.59
```

Filtered profile MinAng=45 MinLen=5

```
G69X200            // ABILITA LHK
G73X1Y45Z5
G0 X107.16 Y130.27
G1 X100.59 Y131.18
G1 X100.14 Y129.37
G1 X96.74 Y130.73
G1 X95.38 Y129.14
G1 X92.66 Y130.5
G1 X89.95 Y128.46
G1 X86.55 Y131.41
G1 X82.24 Y129.14
G1 X77.71 Y132.31
G1 X72.95 Y128.91
G1 X67.97 Y132.31
G1 X62.98 Y129.37
G1 X57.55 Y133.45
G1 X52.34 Y129.59
```
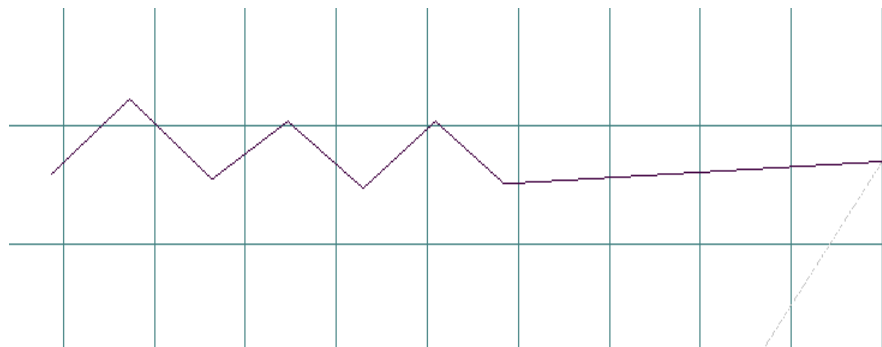
RLS filter (Remove Len Segment)

RLS filter removes little G1 segments that can't be managed because they are off velocity setup of Iso Ns. It happens because with those axes velocity, machine execute a larger distance regards the segment length, in a single CNC cicle time.

With a "zero" parameter, Iso Ns will manage automatically segment length, in accordance with the setup feed .

ORIGINAL PROFILE

MODIFIED PROFILE

LEN MIN
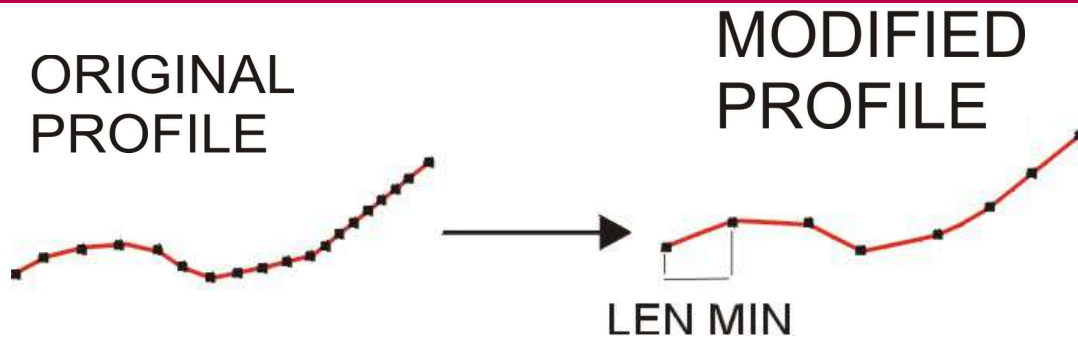
Test Input/Output

Visual and complete test for all available inputs and outputs. Simplify machine installation and assistance.

Alarms and machine state management.

Machine states and all alarms will be record in a specific form and permanently in a log-file. If file dimensions becomes to large, will be made a copy of it. On this file will be saved all information needed to understand strange conditions occurred during machine work.

Plug In .NET

Plugins are high-complexity functions that experts programmers can create with Microsoft .NET IDE(c# o Vb.Net). Can be inserted an unlimited numbers of plugins. Plugins must be like DLL and will are automatically loaded on Iso Ns interface and linked with a button in the plugin tools bar.

Normally, all additional functions of Iso Ns are plugin (like homing axes, work zero, line restart and other). If not used, can be removed from the interface.

All the Iso Ns functions are available for the use with plugins, like axes movements, PartProgram management, utility and so on.

A .NET component to create your own interfaces and protect your Know-How
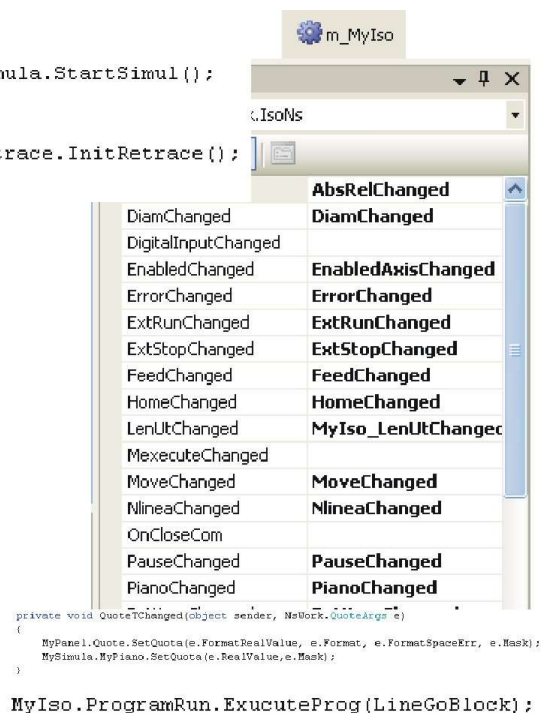
More than all customizable Iso Ns interface functions, can used a .NET component to create your own interface with Microsoft visual studio or other similar IDE. All Iso Ns functions lies in a .NET component that can be imported in yours projects, with all its propriety, methods and events.

The use of a standards platform like .NET, allow to exploit the high number of resources on WEB. Knowledge on programming languages, like c# or VB.NET,are today a very common thing and the IDE for these languages are freely downloadable by various internet sites.

A .NET component, wich have an high performances CN inside, means a great step towards future of CN and Promax have already made and continue to evolve.

Full liberty for machine designers to develop an unique and custom product , with a Know-How protection guarantee.

```
case 1:
    MyIso.Simula.StartSimul();
    break;
case 2:
    MyIso.Retrace.InitRetrace();
    break;
```

m_MyIso

.IsoNs

	AbsRelChanged
DiamChanged	DiamChanged
DigitalInputChanged	
EnabledChanged	EnabledAxisChanged
ErrorChanged	ErrorChanged
ExtRunChanged	ExtRunChanged
ExtStopChanged	ExtStopChanged
FeedChanged	FeedChanged
HomeChanged	HomeChanged
LenUtChanged	MyIso_LenUtChanged
MexecuteChanged	
MoveChanged	MoveChanged
NlineaChanged	NlineaChanged
OnCloseCom	
PauseChanged	PauseChanged
PianoChanged	PianoChanged

```
private void QuoteTChanged(object sender, NsWork.QuoteArgs e)
{
    MyPanel.Quote.SetQuota(e.FormatRealValue, e.Format, e.FormatSpaceErr, e.Mask);
    MySimula.MyPiano.SetQuota(e.RealValue,e.Mask);
}

MyIso.ProgramRun.ExucuteProg(LineGoBlock);
```

Open Source

In a modern software philosophy, Promax decides to join on the Open Source formula. All Iso Ns project is available with all source code. Another forward step, towards high technology CN.

Iso Ns project Open Source agreement, in the inclosure agreement .

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