Independent Pulse Generator

myCNC controllers Axis B can be switched to independent pulse generator output.

```
Independent Pulse Generator was added to firmware dated July 20, 2018.
At the moment the firmware is available as
the "Testing" version at "Support widget.
```

High level access to the pulse generator

There are a number of global array registers to access to the independent pulse generator

Register Name	Address	Description
GVAR_GENERATOR_FRQ_RAW	8130	Pulse Generator RAW frequency value, [units] 1 unit =
GVAR_GENERATOR_ACCEL	8131	Generator Acceleration, [units] 1unit = 0.736 1/c2
GVAR_GENERATOR_FRQ_RATIO	8132	Generator Frequency Ratio
GVAR_GENERATOR_FRQ	8133	Generator Frequency. Frequency*Ratio value is sent to the Generator and saved in the RAW frequency register.

Originally the Pulse generator was supposed to use as Coolant control. Global register GVAR_PLC_COOLANT_STATE (#7372) is used to detect the Current State of the Pulse generator.

If Generator Frequency register (#8133) is changed -

- RAW value is calculated and stored in the RAW register #8130
- If Coolant Register is NOT zero, the RAW value is sent to the myCNC controller to update current frequency. Changing the RAW register in myCNC controller takes effect immediately.
  - If the RAW value is zero, the generator is stopped (with given acceleration).
  - If the RAW value is not zero, the generator is started (or current frequency changed accordingly) with given acceleration.

If the RAW register (#8130) is written directly, the value will be sent to the Frequency Generator despite on Current Coolant state (#7372)

Global variable registers can be written in either Hardware or Software PLC.

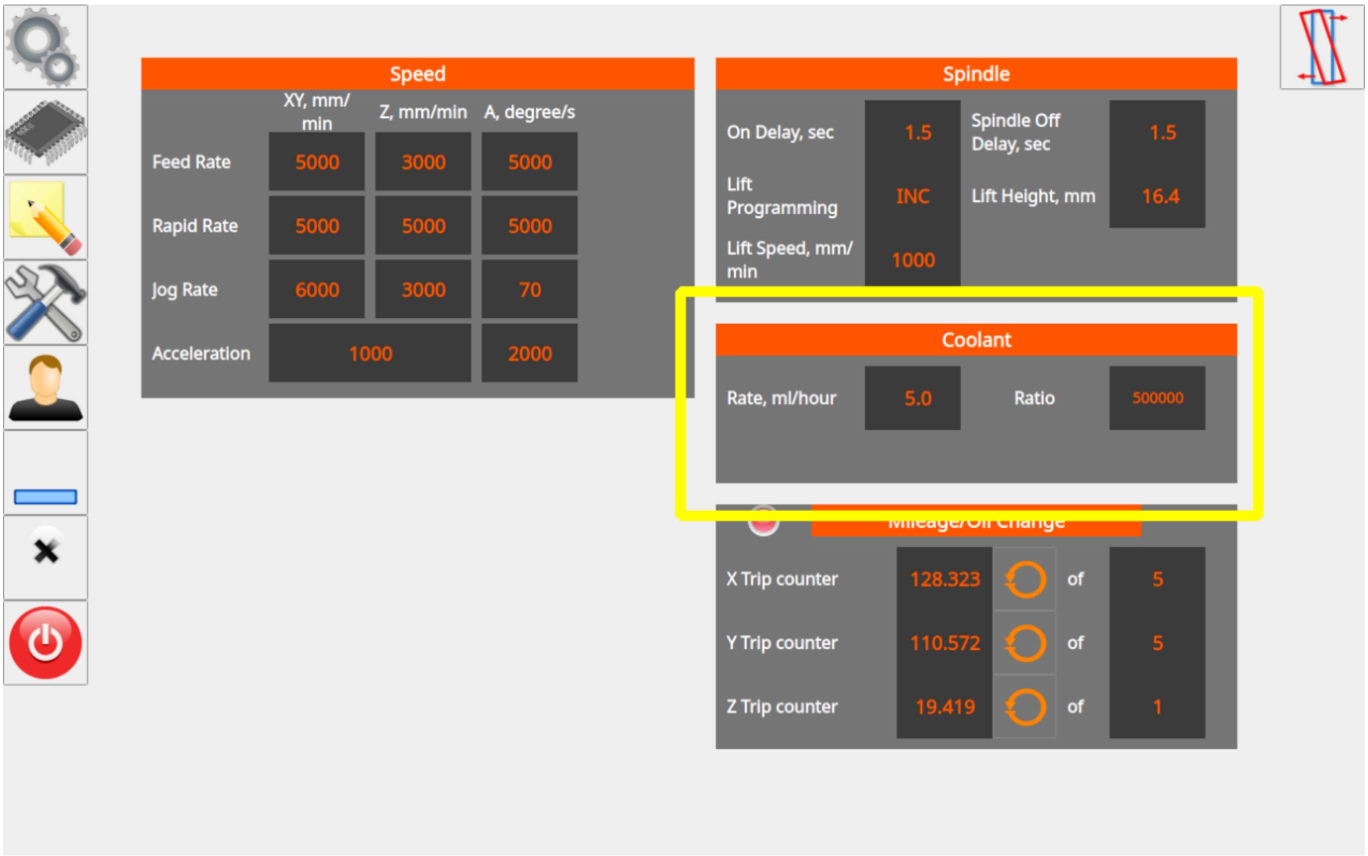
```
Q: Why the Frequency Ratio need?
A: Internal frequency unit has no sense for a normal user. It is convenient
to set up the ratio and has the Frequency value in a unit usable for a user.
Depends on Frequency generator application the unit might be very different.

It can be [1Hz] if you need a simple frequency generator,
or [ml/hour] for Coolant control
or [rpm] for Spindle speed through pulse-dir servo controller.
```

How to use the pulse generator

The first application we used the Pulse Generator was a Coolant control base on a stepper driver.

Pulse Generator settings in User Widget

We added Pulse generator settings to a User Widget of “1280M5” profile. We are going to test it and distribute these settings for other profiles and other applications as well later.



Speed

	XY, mm/min	Z, mm/min	A, degree/s
Feed Rate	5000	3000	5000
Rapid Rate	5000	5000	5000
Jog Rate	6000	3000	70
Acceleration	1000		2000

Spindle

On Delay, sec	1.5	Spindle Off Delay, sec	1.5
Lift Programming	INC	Lift Height, mm	16.4
Lift Speed, mm/min	1000		

Coolant

Rate, ml/hour	5.0	Ratio	500000

Mileage/Oil Change

X Trip counter	128.323	of	5
Y Trip counter	110.572	of	5
Z Trip counter	19.419	of	1

The programming of Pulse the Coolant widget is shown below.

“user-m5.xml” configuration file contains a code for the User Widget. There are lines to add Coolant widget itself and include a xml file with Coolant widget content

```
<gitem  where="user-widget" name="coolant-widget"
 bgColor="##b-widget"  type="myitems"
 position="590;300" width="490" height="150" />

 <include>user-coolant.xml</include>
```

The lines contain “coolant-widget” definition (a background color, position on the parent widget, a widget size and a widget type (myitems).

“user-coolant.xml code is shown below

user-coolant.xml

```
<mycnc-configuration version="1.0">
<gitem where="coolant-widget"
 position="0;0" width="490" height="30" labelWidth="490" type="label"
 labelFgColor="white" labelBgColor="##f-display" labelFontSize="18"
labelFontStyle="bold" >
  <message>Coolant</message>
  <message_ru>Охлаждение</message_ru>
  <message_vn>Chất làm mát</message_vn>
</gitem>

<gitem where="coolant-widget"
 position="10;40" width="220" height="60" displayWidth="90"
labelWidth="130"
 type="bdisplay" action="item:cnc-gvariable-8133" name="display-cnc-
gvariable-8133"
 bgColor="##b-display" fgColor="##f-display" fontSize="18"
fontStyle="bold" format="%5.1f"
 K="1" labelFontSize="16" labelFontStyle="bold" labelFgColor="white" >
  <message>Rate, ml/hour</message>
  <message_ru>Расход, мл/час</message_ru>
</gitem>

<gitem where="coolant-widget"
 position="280;40" width="180" height="60" displayWidth="90"
labelWidth="90"
 type="bdisplay" action="item:cnc-gvariable-8132" name="display-cnc-
gvariable-8132"
 bgColor="##b-display" fgColor="##f-display" fontSize="14"
fontStyle="bold"
 format="%d" K="1" labelFontSize="16" labelFontStyle="bold"
labelFgColor="white" >
  <message>Ratio</message>
  <message_ru>Коэффициент</message_ru>
</gitem>

</screen>
```

The code contains 3 parts

- the widget label set up
- the frequency setup
- the Ratio set up

It's supposed operator no need to change frequency acceleration and this setting is hidden from operator. The acceleration can be set up in the Software or Hardware PLC for example.

Pulse Generator settings in the Software PLC

The rate, ratio and acceleration can be set up in the Software PLC as well.

“HANDLER_INIT.plc” procedure is started just after the configuration is sent to the myCNC controller. A few lines to set the Frequency generator can be added there.

HANDLER_INIT.plc

```
main()
 {
 gvarset(60000,1);//run Servo ON procedure

 gvarset(8131, 8000); //set Frequency acceleration
 gvarset(8132, 1359); //set Ratio
 gvarset(8133, 0);    //Off the Generator.

 exit(99);
};
```

(Coolant) Pulse Generator control through Hardware PLC

Function coolant_motor_start() is addaed to “mill-func.h” include file

mill-func.h

```
coolant_motor_start()
{
  timer=10;do{timer--;}while(timer>0);

  gvarset(8131,1000000); //acceleration
  timer=10;do{timer--;}while(timer>0);

  x=gvarget(8133);//get the speed (frequency)
  k=gvarget(8132);//get the ratio

  x=x*k; //calculate the RAW frequency
  gvarset(8130,x); //send the raw frequency to the register
  timer=30;do{timer--;}while(timer>0); //wait a time for the frequency value to be delivered
};
```

M08.plc procedure which starts the coolant motor would be

M08.plc

```
#include pins.h
#include mill-func.h

main()
{
  gvarset(7372,1);
  portset(OUTPUT_FLOOD); //
  coolant_motor_start();
  exit(99);    //normal exit
};
```

A procedure M09.plc to stop a coolant motor is simpler. Just need to write “0” to the raw frequency register.

M09.plc

```
#include pins.h
main()
{
  gvarset(7373,0);
  gvarset(7372,0);

  portclr(OUTPUT_FLOOD);
  portclr(OUTPUT_MIST);

  gvarset(8130,0); //stop the pulse generator
  timer=30;do{timer--;}while(timer>0); //wait a time for the frequency
value to be delivered
  exit(99);    //normal exit
};
```

Low level CNC registers to control independent pulse generator

This is for records only. Users don't have to use low-level access.

Register Name	Address	Description
EXT_GENERATOR_SPEED	225	Generator Frequency, [units] 1 unit = 0.000736 Hz
EXT_GENERATOR_ACCEL	226	Generator Acceleration, [units] 1unit = 0.736 1/c2

Independent pulse output can be used for -

- Spindle control based on Servo motor and pulse-dir driver
- stepper motor based coolant system.

From:
http://docs.pv-automation.com/ - **myCNC Online Documentation**

Permanent link:
http://docs.pv-automation.com/mycnc/independent_pulse_generator?rev=1535900677

Last update: **2018/09/02 11:04**