Lathe/Turning Set up Tips

Lathe Low/High Gears

Codes to switch Lathe gears M41, M42

Code	Name	Description					
M41	G_M41_LATHE_LOW_GEARS	Switch to Low Gears transmission					
M42	G_M42_LATHE_HIGH_GEARS	Switch to high gears transmission					

Global Variables to test Current transmission state

Number	Name	Description					
5715	GVAR_LATHE_GEARS	Show current transmission status. \ 0 - High gears \ 1 - Low gears					
5716	GVAR_LATHE_LOW_GEARS_RATIO	Current Low gears ratio stored in the register					
5717	GVAR_LATHE_LOW_GEARS_1024RATIO	Current Low gears ratio multiplied by 1024 (for integer operations) stored in the register					

The registers described above store the low gears ratio, as well as the current state (regular/high gears versus low gears). If the value of the global variable #5715 is equal to 1, then turning the spindle ON or changing the spindle speed will result in the spindle speed value being multiplied by the factor stored in global variable #5716.

For example, if the gear ratio (#5716) is equal to 2 and the current transmission status (#5715) is set to 1, or Low Gears, then the DAC value will be twice its usual value to maintain the same speed. The M41/M42 commands can then be used to switch between the two gear transmissions, by writing a 0 or a 1 into global variable #5715 and turning the necessary ports on and off.

M41.plc example

M41.plc

```
//Lathe Low gears
#include pins.h
#include vars.h
//#define input_lathe_low_gears 6
//#define input_lath_high_gears 7
//#define output_lath_gears_low 3
//#define output_lath_gears_high 4
main()
{
   gvarset(9159,0);
   a=portget(input_lathe_low_gears);
   b=portget(input_lathe_high_gears);
   a_b=a^b;
```

1/7

```
if (a b == 0)
 {
  gvarset(9159,1); //display error message
  message=PLCCMD_MOTION_BREAK;
  exit(99);
 };
portclr(output_lathe_gears_high);//
if (a!=0)
{
     //change gears
  gvarset(5715,1);//GVAR LATHE GEARS
                                                  5715
  timer=30; do { timer--; } while (timer>0);
  exit(99);
};
if (is modbus!=0)
{
  message=PLCCMD MODBUS SPINDLE SPEED;
  command=spindle low speed;
  parameter=spindle low speed;
  timeout=timer+10; do { timer++; } while (timer<timeout);</pre>
  message=PLCCMD MODBUS SPINDLE CMD;
  command=spindle on reg value;
  parameter=spindle on reg value;
  timeout=timer+10;
  do { timer++; } while (timer<timeout);</pre>
};
timer=10; do { timer--; } while (timer>0);
a0=gvarget(spindle encoder);//Encoder#7; 9048+7=9055
timer=10; do { timer--; } while (timer>0);
ready=0;
do {
  al=gvarget(spindle encoder);//Encoder#7; 9048+7=9055
  ad=a1-a0;
  a0=a1;
  timer=10; do { timer--; } while (timer>0);
  gvarset(7255,ad);
  if (ad>30)
    {
      if (ad<70)
        {
          ready=1;
        };
```

```
};
 } while (ready==0);
portset(output lathe gears low);//3
ready=0;
wait_time=0;
do{
  a=portget(input lathe low gears);
  b=portget(input_lathe_high_gears);
  if (a!=0)
   {
      if (b==0)
        Ł
          ready=1;
        };
    };
  wait time++;
  if (wait_time>5000)
    {
      ready=1;
    };
} while (ready==0);
//portclr(output_lathe_gears_low);//3
message=PLCCMD MODBUS SPINDLE CMD;
command=spindle_off_reg_value;
parameter=spindle off reg value;
timer=10; do { timer--; } while (timer>0);
if (wait_time>5000)
{
  gvarset(9159,1); timer=30; do{timer--;}while(timer>0);
  message=PLCCMD MOTION BREAK;
  exit(99);
};
//change gears
gvarset(5715,1);//GVAR LATHE GEARS
                                               5715
timer=30; do { timer--; } while (timer>0);
exit(99);
             //normal exit
```

};

A simple M41.plc example

M41.plc

```
//Lathe Low gears
#include pins.h
#include vars.h

main()
{
    portclr(output_lathe_gears_high);//
    portset(output_lathe_gears_low);//3

    //change gears
    gvarset(5715,1);//GVAR_LATHE_GEARS 5715
    timer=30; do { timer--; } while (timer>0);
    exit(99); //normal exit
};
```

A simple M42.plc example

M42.plc

```
//Lathe High gears
#include pins.h
#include vars.h

main()
{
    portset(output_lathe_gears_high);//
    portclr(output_lathe_gears_low);//3

    //change gears
    gvarset(5715,0);//GVAR_LATHE_GEARS 5715
    timer=30; do { timer--; } while (timer>0);
    exit(99); //normal exit
};
```

1. Select Basic profile as "Lathe" in Cfg - Preferences - Common dialog

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5/7

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SYS CFG		P							
Preferences Profile Macros PLC Build	er Axes/Motors Inputs/Sensors Technology Network Camera 5 axes RTCP Panel/Pendant Hardware Advanced								
Common Start/Stop Motion Screen	3D Visualisation G-codes settings								
Character encoding	WINDOWS-1251 V								
NC code folders	~/DNC								
	/media								
NC code Network Folders	/media/network;/media/network2								
Network Mirror Folder	~/DNC/mirror								
Lib storage folder	~/DNC/lib								
NC code filename extension	ngc nc tap txt NC dnc nmg tap ;fan	1							
G04 cycle time,s									
(*default value is 0.004, ma	(*default value is 0.004, may vary depends on firmware version)								
Disable keyboard events									
Basic machine profile	Lathe V								
Forced Homing macro name	M805								

- 2. Select "Lathe Visualisation" in Cfg Preferences 3D visualisation configuration dialog
- 3. Select axes **X**, **Z** for visualisation and deselect the rest axes.

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SYS CFG	UPPORT	CFG								res)
Preferences Profile Macros PLC Bui	der Axes/Mo	otors Inputs/Ser	nsors Technology	Network	Camera	5 axes RTCP	Panel/Pendant	Hardware	Advanced	
Common Start/Stop Motion Screen	3D Visualis	sation G-codes :	settings							
3D Visualisation								1		
Tunin	g 1		D	imension lines						
Visualisation by Lines/Do	ts Lines 🗸			Show extent						
Touch screen sensitivity for Pannin			Lath	e visualisation						
Cursor size rat	1									
Zeros size rat	io 2		Render time limit 99 🗘							
Default Viewpoir	nt -45	0	-45							
Background Color RGE	A 50 🗘	50 🗘	50 🗘 242	\$						
Foreground Color RGE	A 190 🗘	190 🗘	o 🗘 O	٢						
Foreground Color(G0) RGB	A 135 🗘	135 🗘	135 🗘 135	\Diamond						
Visualisation setup										
Axis	Enable	Show as			Direction	Tilt				
x		X'	~		+ ~					
у		Y'	~		+ ~					
z		Z'	~		+ ~					
a		A' - rotation/til	t around X $\!$		CW ~					
b		B' - rotation/til	t around Y 🗸		cw ~					
c		C' - rotation/til	t around Z \smallsetminus		CW ~					

4. Check G-code settings related to Lathe operations in **Cfg** - **Preferences** - **G-codes settings** configuration dialog

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SYS CFG	CFG							res la constante de	
Preferences Profile Macros PLC Build	ler Axes/Motors Inputs/Sensors	Technology Network	Camera	5 axes RTCP	Panel/Pendant	Hardware	Advanced		
Common Start/Stop Motion Screen	3D Visualisation G-codes setting	gs							
G-codes settings									
G4 P value given in	seconds ~	Command	M50: THC di	sable	\sim				
G18/G19 ignore		Comman	G59: Coordi	inate System #6					
		command		inace system we					
		Tool Change N	6Txx: Disabl	ed ~					
Accept single S-code									
G18 Switch G2/G3 (CW/CCW meaning)									
G19 Switch G2/G3 (CW/CCW meaning)									
G76 Thread Pitch (F) set in	units 🗸								
G96 CS speed (S) set in	meters/min ~								
G2/G3 is a circle if start-end distance less than	0.000001								
DXF import settings									
Ellipses interpolation by	lines 🗸								
Ellipse segments	16 🗘								
DXF toolpath optimisation									
Contour direction	Original 🗸								
Spline segments	32 🗘								
Knife support								•	
Knife 45 degree support									
Spindle Single Pass									
Spindle Multi Pass									
Pockat									

5. Goto Cfg - Technology - Lathe configuration dialog and setup appropriate settings

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SYS CFG	SUPPORT E									r.
Preferences Profile Macros PLC	Builder	/Sensors Techno	ology Network	Camera	5 axes RTCP	Panel/Pendar	t Hardwar	e Advance	ed	
PWM PIDs Plasma Cutting Cutcharts	THC Lathe Too	ls Spindle	Gas/Oxyfuel	Multi Head	3D Printer M	Iulti-Device Ma	axLaser Las	er control	Circular Saw	Tang < >
Lathe Enabled										
X position as diameter	0									
Thread cutting depth Infeed R	tadial Infeed 🗸 🗸									
2 lines G76]									
G96 CSS Max Speed (default)	200 🗘									
G96 CSS mode active A	All motion 🗸 🗸									
Tool number input format	XYYZZ ~									
Thread Finishing distance % 1	\diamond									
Thread Acceleration Multiplier 1	\Diamond									
Tool List	0;20;30;40;					2				
Tool # To	ool Length X	Tool Length Z	Tool T Compensation X (ool Compensation	z Tool Tip rad	lius				
Tool #10 0)	20.476	0	0	0					
Tool #20		0	0	0	0					
Tool #30 0)	0	0	0	0					
Tool #40 0		0	0	0	0					

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