

## Spindle Speed control through +/-10V DAC channel (ET10)

ET10 control board contains 6 channel +/-10V 12bits DAC outputs. The outputs normally controlled through PID and used for closed-loop analogue servo drivers control. However if PID is disabled, +/-10V DAC output can be used as general purpose DAC.

Output level of DAC output can be controlled through "DAC Offset" register.

ET10BB breakout board contains inverted operational amplifier, so zero (0) value in "DAC Offset" register corresponds to +10V output voltage level, maximum value (0x3ff) corresponds to -10V voltage level.

There are number of ways to access to DAC Offset register.

### PLC controller (Hardware)

DAC offset register is mapped to address 0x32 of [Extern CNC Variables](#) array.

```
#define EXT_ET5_DAC_OFFSET 0x32
```

16 bits value should be written to this register. low 12 bits is DAC value to be written high 4 bits is DAC channel

Message PLCCMD\_SET\_CNC\_EXTVAR should be sent to myCNC control core from PLC to get access [Extern CNC Variables](#), then 2 ms delay should be initiated to push the message from PLC to myCNC Core.

```
#define PLCCMD_SET_CNC_EXTVAR 1020
```

PLC code example for ET10\DAC Value programming

```
dac_value=555; //DAC value to be sent

message=PLCCMD_SET_CNC_EXTVAR; //setup message variable to
PLC-to-CORE command
command=0x32; //EXT_ET5_DAC_OFFSET //setup command register
(var00) for DAC register access
parameter=dac_value+(2<<12); //setup parameter register
(var01), DAC channel is #2
texit=timer+2;do{timer++;}while(timer<texit); //2ms delay to push the
message
```

Another examples with +/-10V DAC programming can be found here - [M03.plc](#), [SPN.plc](#)

### Configuration dialogs

Settings->Cfg->Hardware->Analogue Closed Loop Dialog.

Each DAC outputs can be accessed by changing values in “DAC Offset” spinboxes.

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	Enable	PID, K	PID, K0	PID, Kp/1024	PID, Kd/1024	PID, Ki/8192	Integral Limit	Encoder channel	Dead Zone	DAC offset
Motor#0	<input type="checkbox"/>	-70 <<	0	0		30	3000	2	0	2115
Motor#1	<input type="checkbox"/>	-69 <<	0	0		-10	3000	1	8	240
Motor#2	<input type="checkbox"/>	-70 <<	0	0		-3	3000	0	0	2115
Motor#3	<input type="checkbox"/>	<<						3	0	73
Motor#4	<input type="checkbox"/>	<<						4	0	21
Motor#5	<input type="checkbox"/>	135 <<	0	150		0		3	0	2115

250

150

50

-50

-150

-250

X+

Y+

Z+

A+

B+

C+

X-

Y-

Z-

A-

B-

C-

Position Err

Speed Control

#0	<input checked="" type="checkbox"/>	green	<input type="checkbox"/>	red
#1	<input checked="" type="checkbox"/>	green	<input checked="" type="checkbox"/>	red
#2	<input type="checkbox"/>	red	<input type="checkbox"/>	white
#3	<input type="checkbox"/>	white	<input type="checkbox"/>	white
#4	<input type="checkbox"/>	white	<input type="checkbox"/>	white
#5	<input type="checkbox"/>	white	<input type="checkbox"/>	white

Sampling Rate: 20

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