3.2 Standard configuration for CNC use

To avoid the detailed configuration issues there are standard setups available as parameter files. These can be downloaded from www.simplexmotion.com.
We will describe this standard setup and the required connections here.

3.2.1 Electrical connections

The following table lists the connections available on the SimplexMotion100A product, and the required signals for CNC use according to the standard settings.

Motor connection	Signal	Description
IN1/OUT1	Enable	Active low enable input signal. Pull low to activate motor. Input has pullup resistor.
IN2/OUT2	Stop	Active low stop output signal. Pulsed low at error. Uses internal pullup resistor + open drain output which makes it possible to directly connect this signal from several motors for one combined stop signal.
IN3/OUT3		
IN4/OUT4		
IN5/ENCA	Step	Step pulse input. Changes motor position one step for each positive going transition.
IN6/ENCB	Direction	Selects motor direction. Low level is positive direction, defined as clockwise rotation looking at the motor front. High level is negative direction.
IN7/RS485A		
IN8/RS485B		
GND	Signal GND	
+5V (out)		
GND	Supply GND	
+24V (in)	Supply +24V	

The control signals are TTL compatible, and the voltage should be less than 0.7V for a low level, and higher than 2.4V for a high level. The [step] and [direction] inputs can withstand voltages up to 8V, while the [enable] and [stop] signals can handle voltages up to 30V.
Please note that some low cost opto isolated breakout boards does not provide TTL output levels with adequate noise margin.
In systems where the SimplexMotion units are mixed with stepper motors and/or other noisy motor control systems, extra care need to be taken to limit the electrical noise that couples into the low level signals to the motor units. Screened cables should be used, and a noise limiting filter may be needed at the SimplexMotion motor inputs. This filter can be as simple as a small capacitor of 1-100nF connected to GND at the screw terminal.
There is also a software implemented filter for the step/direction inputs that can be configured with the <EncoderControl> register.

The recommended power supply is 24V with a current rating of 5A. For light loads on small machines it could be a lower rating, and for large machines that require fast acceleration and speed the rating should be increased.

Please note that for fast decelerations on heavy machine there will be a lot of mechanical energy transferred to electrical energy when the motors are breaking. This energy can cause the power supply voltage to rise to dangerous levels, since the absolute maximum supply voltage is 30V. In such cases there will have to be an overvoltage protection installed.

3.2.2 Motor operation

The indicator light on the motor shows its current state according to the following table:

State	Indicator
Idle (deactivated or standstill)	Constant green
Running (motor moving or applying torque)	Flashing green (faster at higher speeds)
Error	Red light with yellow flashes. The number of flashes indicates the error source.

When the [enable] signal is not activated, the motor will not be energized and the motor shaft can be rotated freely. The Step/direction interface is disabled and [step] signal pulses will not change the target motor position. The target position is memorized until the next time the motor is activated.

When the [enable] signal is activated, the motor is energized and set in motion if the actual position is not equal to the target position. This motion will be limited in acceleration and speed. When the actual position is equal to the target position the motor will stop and the motor will hold this position. The Step/direction interface is now enabled and any [step] signal pulses will change the target position and the motor will immediately move to the new position.