

## Gantry Rack

1298mm long

Drilled M4 every 60mm, first hole centre 11mm in.

Rack: 1.5 Module, Drilled and tapped M6 every 5.75" (146.05mm)

Commences 50mm from end.

Pinion: 20 tooth

Distance/Rev: 94.2477796mm

Timing Belt Gearing: 3:1 (31.4159265mm/rev)

Microstepping 5,000 per rev

159.15494327 steps per mm

## X Axis Rack

Rack: 1.5 module

Pinion: 23 tooth

Distance/rev: 90.32078879mm

Timing belt gearing 5:1 (18.0641577581 mm/rev)

Microstepping 5,000 per rev

276.7912054 steps per mm

## Tubing calculator software

<http://revcad.com/index.html>

Longworth Chuck

<http://ravenview.com/blog/2010/10/17/how-to-make-a-longworth-chuck/>

## Led Current Limiting Resistors (10 mA)

Voltage	Resistor
5 V	180 ohms, ¼ W
12 V	1 k ohms, ¼ W
24 V	2.2 k ohms, ½ W
48 V	4.7 k ohms, 1 W

## Pull up resistors for NPN Proximity Sensors

Voltage	Resistor
24 V	2.2 k ohms, 1 W

## Stepper wiring - NEMA 23's

Signal	Stepper Wire Colour	Cable Wire Colour
A+	Black	Yellow
A-	Green	Green
B+	Red	Red
B-	Blue	Blue

## Stepper wiring - NEMA 34's - Bi-polar Parallel

Signal	Stepper Wire Colour	Cable Wire Colour
A+	Blue & White	Yellow
A-	Black & Orange	Green
B+	Red & Yellow	Red
B-	Green & Brown	Blue

## Stepper panel mount 5 pin socket (from rear)

Pin	Cable Wire Colour
Left bottom	Blue
Left top	Red
Centre	Shield
Right top	Green
Right Bottom	Yellow

## Stepper Cable 5 pin plug (from rear)

Pin	Cable Wire Colour
Left bottom	Yellow; Blue & White
Left top	Green; Black & Orange
Centre	Shield
Right top	Red; Red & Yellow
Right Bottom	Blue;Green & Brown

## Gantry Sensors

DB9 Pin	Gantry Sensor	7i76e Input
1	Y Home	Input-03 TB6-3
2	Y Max Limit	Input-05 TB6-5
3	Y Min Limit	Input-04 TB6-4
4	Breakaway	input-06-not
5	Z lower limit (max-z)	input-07-not
6	24 Volt +	Bus Bar +
7	24 Volt -	Bus Bar -
8	Z home (shared)	input-08
9	Float	input-09

## Table Sensors

DB9 Pin	Gantry Sensor	7i76e Input
1	X - Home (Green)	TB6-12 Input 11
2	X - Min Limit (Yellow)	TB6-13 Input 12
3	X- Max Limit (Purple)	TB6-14 Input 13
4	X1 - Home (White)	TB6-15 Input 14
5	X1 Max Limit (Blue)	TB6-16 Input 15

6	24 Volt +	Bus Bar +
7	24 Volt -	Bus Bar -
8	X1 Min Limit (Orange)	TB5-21 Input 20
9	Brown	NC

## 7i76e Inputs

Should relocate inputs 00-03 as these are also analog in pins

Connector	Input	Signal
TB6-1	00	E-stop switch (which also kills mains power to 48v power supply)
TB6-1	01	Green Run/Step Button
TB6-3	02	Red Pause/Resume Button
TB6-4	03	Gantry Y Home
TB6-5	04	Gantry Y Min Limit
TB6-6	05	Gantry Y Max Limit
TB6-7	06	Gantry Torch Breakaway
TB6-8	07	Gantry Z lower limit (max-z)
TB6-9	08	Gantry Z home (shared)
TB6-10	09	Gantry Torch Float switch
TB6-11	10	Plasma Arc OK, also connect to blue LED on panel
TB6-12	11	X - Home (Green to DB9)
TB6-13	12	X - Min Limit (Yellow to DB9)
TB6-14	13	X- Max Limit (Purple to DB9)
TB6-15	14	X1 - Home (White to DB9)
TB6-16	15	X1 Max Limit (Blue to DB9)

Connector	Input	Signal
TB5-1	16	Pendant MPG Jog Wheel A- Yellow

TB5-2	17	Pendant MPG B Jog Wheel - Green
TB5-3	18	Console MPG A Jog Wheel - Yellow (TO DO)
TB5-4	19	Console MPG B Jog Wheel - Green (TO DO)
TB5-5	20	X1 Min Limit (Orange to DB9)
TB5-6	21	Pendant Scale Select 0 (Pendant Scale X1 - Orange)
TB5-7	22	Pendant Scale Select 1 (Pendant Scale X10 - Green)
TB5-8	23	Pendant Jog Axis Select 0 (pendant X - White)
TB5-9	24	Pendant Jog Axis Select 1 (Pendant Y - Orange)
TB5-10	25	Pendant Jog Axis Select 2 (Pendant Z - Blue)
TB5-11	26	Pendant Estop signal (Pendant EST3 - Green)
TB5-12	27	Pendant - signal (Pendant '-' - White)
TB5-13	28	Pendant + signal (Pendant '+' - Green)
TB5-14	29	Pendant ~ signal (Pendant '~' - Blue)
TB5-15	30	Console Jog Axis Select 3 (TO DO)
TB5-16	31	

## 7i76e Outputs

Connector	Output	Signal
TB6-17	00	Estop Output (to red light)
TB6-18	01	Machine paused (orange light)
TB6-19	02	Running (green light)
TB6-20	03	Plasma Torch On Relay
TB6-21	04	Arc OK LED on panel
TB6-22	05	Stepper Drive Disable relay
TB6-23	06	
TB6-24	07	
TB5-17	08	Warning Light Green (Green Wire)
TB5-18	09	Warning Light Amber (Orange Wire)

TB5-19	10	Warning Light Red (Red Wire)
TB5-20	11	
TB5-21	12	
TB5-22	13	
TB5-23	14	
TB5-24	15	

### THCAD Torch Height Control

Connector	Pin	Signal
TB3	1	THCAD +5 V
TB3	07	THCAD FOUT+
TB3	08	THCAD FOUT-
TB3	6	THCAD -5 V
THC SHIELD	N/A	THC Shield Connect to Frame Ground Earth point (TO DO)
Plasma Pin 6	THC IN+	50:1 divided voltage +
Plasma Pin 4	THC IN-	1 divided voltage -

## Everlast Plasma CNC Port

Plasma Port	Signal	Wire Colour	Cable Pin #	CNC Control Signal
1	Start/Stop 1	Red	1	Torch On Relay
2	Start/Stop 2	Yellow	2	Torch On Relay
3	To Workpiece Clamp (100k)	Blue	3	Ohmic Connector
4	Divided Voltage -	Orange	4	THC IN-
5	Raw Arc Voltage - (100k)	Black (no Connection)		NC
6	Divided Voltage +	Purple (16:1 with 100k resistor in series)	6	THC IN+
7	Raw Arc Voltage + (100k)	Green (No Connection)		NC
8	No Connection	N/A		
9	Arc OK 1	White	9	TB6-10
10	Arc OK 2	Brown	7	+24V
11	No Connection	N/A		
12	No Connection	NC/A		
DRAIN	Cable Drain Wire (not connected at Plasma end)	Connect to Connector Pin 8 at controller end	8	THC Shield Via Pin 8

## Rotary Encoder Inputs

Connector	Input	Signal
TB1	1	Field Power ground, must tie to TB3.23 5 volt GND
<b>ENCODER 0</b>		
TB2	1	MPG X axis GND (-5v) - Blue
TB2	6	MPG X axis +5v - Red
TB3	16	MPG X axis A - Yellow
TB3	17	MPG X axis B - Green
<b>ENCODER 1</b>		
TB2	7	MPG Y axis GND (-5v) - Blue (TO DO)
TB2	12	MPG Y axis +5v - Red (TO DO)
TB3	18	MPG Y axis A - Yellow (TO DO)
TB3	19	MPG Y axis B - Green (TO DO)

Pressure switch DWYER MDS-3