# powermaxEDGE<sup>®</sup> Set-Up Guide Powermax Field Service Bulletin

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The world leader in plasma cutting technology

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#### DANGER ELECTRICAL SHOCK CAN KILL

All work must be performed by a qualified technician.

The line disconnect switch must be in the OFF position before making the power cable connections. In the U.S., use a "lock-out/tag-out" procedure until installation is complete. In other countries, follow appropriate national or local safety procedures.

#### Purpose

This document provides the basic information needed to install the Hypertherm bundled package.

#### EDGE Ti bundle with cables and motors - dual side drive

ltem	Part number	Description	Qty
1	System dependent	G3 series mechanized plasma system	1
2	228118	EDGE Ti CNC, 4 axis enabled	1
3	228119	EDGE Ti lifter	1
4	228120	Brushless motor, NEMA-34, 250W with 15 m (50 ft) cable	3
5	228125	Cable set	1
	123896	Cable: powermax interface, 15 m (50 ft)	1
	123987	Cable: lifter interface, 15 m (50 ft)	1
	123902	Cable: lifter motor power/brake, 15 m (50 ft)	1
	123899	Cable: lifter encoder/hall 15 m (50 ft)	1
	228126	Connector kit: Edge Ti, I/O (4 connectors)	1

#### EDGE Ti bundle with cables and motors – single side drive

ltem	Part number	Description	Qty
1	System dependent	G3 series mechanized plasma system	1
2	228118	EDGE Ti CNC, 3 axis enabled	1
3	228119	EDGE Ti lifter	1
4	228120	Brushless motor, NEMA-34, 250W with 15 m (50 ft) cable	2
5	228125	Cable set	1
	123896	Cable: powermax interface, 15 m (50 ft)	1
	123987	Cable: lifter interface, 15 m (50 ft)	1
	123902	Cable: lifter motor power/brake, 15 m (50 ft)	1
	123899	Cable: lifter encoder/hall 15 m (50 ft)	1
	228126	Connector kit: Edge Ti, I/O (4 connectors)	1

#### EDGE Ti bundle with no cables and motors

Part number	Description	Qty
System dependent	G3 series mechanized plasma system	1
228118	EDGE Ti CNC, 3 axis enabled	1
228119	EDGE Ti lifter	1
123896	Cable: powermax interface, 15 m (50 ft)	1
	Part number System dependent 228118 228119 123896	Part numberDescriptionSystem dependentG3 series mechanized plasma system228118EDGE Ti CNC, 3 axis enabled228119EDGE Ti lifter123896Cable: powermax interface, 15 m (50 ft)



Engage the emergency stop button on the Edge Ti before you start the installation.

# Setup

- 1. Verify that the contents of the package are correct.
- 2. Contact the manufacturer of the gear boxes that will be used and verify compatibility with the motors in this package.
- 3. Install all components.
- 4. Install all wiring.
- 5. Loosen motor brackets for the "X" and "Y" axis motors (or otherwise decouple the motor shaft from the machine as necessary) and move them so that the gear on the motor is NOT in contact with the rail. This will prevent unwanted movement of the table during installation and setup.
- 6. Disconnect the motor power/brake cable from the THC lifter.
- 7. Always turn off the Edge Ti CNC before cables are plugged into or unplugged from the CNC. This will prevent damage to the motors or the Edge Ti.





#### 1 Lifter encoder/hall cable

Signal	Pin number	Wire color
Encoder +5 VDC	1	Red
Encoder ground	2	Black
Channel A (+)	3	White
Channel A (–)	4	Black
Channel B (+)	5	Green
Channel B (–)	6	Black
Index (+)	7	Blue
Index (–)	8	Black
Hall 6V	9	Yellow
Hall ground	10	Black
Hall U	11	Brown
Hall V	12	Orange
Hall W	13	White
Shield	14	Braid





#### (2) Lifter motor (with brushes) power/brake cable

Signal	Pin number	Wire color
Motor (+) Motor (–)	1 2	Red Black
Not used	3	Red
Brake (+) Brake (-)	4 5	Red Black
Shield	6	Drain wire
Ground	7	Black



# ③ Lifter interface cable

Signal	Pin number	Wire color
Field +12 VDC	1	Black
Lower limit (shared with general input 11)	2	White
Upper limit (shared with general input 12)	3	Red
Breakaway (torch collision)	4	Green
Field common	5	Brown
Field common	6	Blue
Plate contact –12 VDC	7	Orange
Plate contact sensor	8	Yellow
Plate contact common	9	Purple



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#### (4) Plasma interface cable



#### 5 Table-motion motors encoder/hall cable

Signal	Pin number	Wire color
Encoder +5VDC	1	Red
Encoder ground	2	Black
Channel A (+)	3	White
Channel A (–)	4	Black
Channel B (+)	5	Green
Channel B (–)	6	Black
Index (+)	7	Blue
Index (–)	8	Black
Hall 6V	9	Yellow
Hall ground	10	Black
Hall U	11	Brown
Hall V	12	Orange
Hall W	13	White
Shield	14	Drain wire



#### (6) Table-motion motors (brushless and brushed) power/brake cable

Brushless Signal	Pin number	Wire color	Brushed Signal
Phase A	1	Red	Motor (+)
Phase B	2	Black	Motor (–)
Phase C	3	Red	N/A
Not typically used	4 5	Red Black	Brake (+) Brake (–)
Shield	6	Drain wire	Shield
Ground	7	Black	Ground



Note: See "Appendix E: Edge Ti" in the Installation and Setup Guide for brushed motor information

#### Verify inputs/outputs

Identify all the inputs and outputs that need to be wired into the Edge Ti controller and their type (normally closed limit switches, normally open torch breakaway, normally open vent control, etc).

Access the inputs screen from the main screen:

1. Press the Setups button.



2. Press the Diagnostics button.



Cut Mode

Plasma 1

Hardware Key 26A06DFB-0000-0000

3. Press the I/O button and enter the password.



Type Celeron M

Help

🕐 Help

## BUNDLED PACKAGE SET-UP GUIDE

4. To test the input signals, activate the switches manually and verify that the corresponding light changes color. Green = an open state

Red = a closed state.

Note: The first 12 inputs can be assigned by the user.

<ul> <li>On - Y +Overt</li> <li>On - X +Overt</li> <li>On - Y -Overtr</li> <li>On - X -Overtr</li> <li>Off - Input5</li> <li>Off - Input6</li> <li>Off - Input7</li> <li>Off - Input9</li> <li>Off - Input10</li> <li>Off - Input11</li> <li>Off - Input12</li> </ul>	ravel Switch avel Switch avel Switch avel Switch	<ul> <li>Off -</li> </ul>	Input17 Input18 Input19 Input20 Input21 Input22 Input23 Front Panel Start	
<ul> <li>On - X +Overtr</li> <li>On - Y -Overtr</li> <li>On - X -Overtr</li> <li>Off - Input5</li> <li>Off - Input6</li> <li>Off - Input7</li> <li>Off - Input8</li> <li>Off - Input9</li> <li>Off - Input10</li> <li>Off - Input11</li> <li>Off - Input12</li> </ul>	ravel Switch avel Switch avel Switch	<ul> <li>Off -</li> </ul>	Input18 Input19 Input20 Input21 Input22 Input23 Front Panel Start	
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<ul> <li>Off - Input7</li> <li>Off - Input8</li> <li>Off - Input9</li> <li>Off - Input10</li> <li>Off - Input11</li> <li>Off - Input12</li> </ul>		<ul> <li>Off -</li> <li>Off -</li> <li>Off -</li> <li>Off -</li> </ul>	Input23 Front Panel Start	
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<ul> <li>Off - Input10</li> <li>Off - Input11</li> <li>Off - Input12</li> </ul>			Front Panel Stop	
<ul> <li>Off - Input11</li> <li>Off - Input12</li> </ul>		Off -	Front Panel Forward On Path	
Off - Input12		Off -	Front Panel Backup On Path	
		Off -	Raise Torch 1	
Off - Cut/Mark	Sense	Off -	Lower Torch 1	
Off - Input14		Off -	Front Panel Manual	
On - Nozzle C	ontact Sense 1	Off -	Front Panel E-Stop	Canc
On - Torch Co	llision	Off -	Input32	
			8:33:21 AM	🖌 ок

Note: Press the Outputs button to navigate directly to the Outputs screen

# Software set-up

#### Station assignment screen

The controller is preset for the powermax1650 and the EDGE Ti lifter. Navigate to the station assignment screen as shown below if a system other than the powermax1650 or EDGE Ti lifter is being used. See section 4: Password Setup in the Installation and Setup Guide for Touch Screen CNCs for detailed information.

1. Press the Setups button on the touch screen.



2. Press the Passwords button and enter the password.



Cut Mode

#### **BUNDLED PACKAGE SET-UP GUIDE**

	Station 1			Station 2		Help
Lifter assignment	Lifter	Sensor THC	-	Lifter	None	
Plasma system	Plasma 1	PowerMax1650	-	Plasma 1	None	
assignment	Plasma 2	None	-	Plasma 2	None	
	Marker 1	None	•	Marker 1	None	
	Marker 2	None	-	Marker 2	None	
	Laser	None	-	Laser	None	
		Head None	-		Head None	
	Station 3			Station 4		
	Lifter	None	•	Lifter	None	
	Plasma 1	None	-	Plasma 1	None	
	Plasma 2	None	•	Plasma 2	None	
	Marker 1	None	•	Marker 1	None	
	Marker 2	None	-	Marker 2	None	
	Laser	None	-	Laser	None	Const.
		Head None	-		Head None	Carte
						🕗 ок
	Stations 1 thru 4	Stations 5 thru 8		R	leset	
I				Antonio		

# Software set-up

# Assign inputs/outputs (I/O)

- 1. Turn ON the EDGE Ti controller.
- 2. Identify all the inputs and outputs that need to be wired into the Edge Ti controller and their type (normally closed limit switches, normally open torch breakaway, normally open cut-sense, etc).
- 3. As shipped, the Edge Ti is configured for "dry contact" inputs. Refer to appendix E "I/O configuration" if sourcing inputs are required.
- 4. Navigate to the I/O screen:
  - a. Press the Setups button on the touch screen.



b. Press the Passwords button and enter the password.



Cut Mode Plasma 1 💌

Help

c. Press the I/O button.



- Note: Input assignments are dependent on the incoming signals for a specific set-up. In the example below Input 1 is "X Over-travel." This may be different from what is seen in your application.
- d. Select the appropriate input number and description for each input.



Signals can be changed from normally open to normally closed by double tapping the touch screen.

-		
	Inputs 132 Logic 1073774607	Joystick Installed C No C Yes
	Normally Input	Speed Pot. Installed O No O Yes
	Closed Y +Overtravel Switch	Trial Override 0 to 150 %
Input number	Closed - Y - Overtravel Switch	Oxy Fuel Override 0 to 150 %
)		Plasma Override 0 to 110 %
	Input 1 Y +Overtravel Switch	Laser Override 0 to 120 %
	Torch Collision Uses · Fast Decel · Fault Ramp Spe	ed Pot. 1  Installed on Analog Input 3
Description	Inputs Inverted C No C Yes Analog	Input Offset 1 💌 0 volts
Description —	Outputs 1-32  Logic 0	PFC Valve 1  Installed on None
	Normally     Output       Open     - Output1       Open     - Output2       Open     - Output3       Open     - Output4       Output 1     - Spare	
	Drive Enables © Independent © Series	
	Initial Feedback Delay 0 sec	
		4:37:24 PM 🔀 Cancel 🕐 Help 🔗 OK
	Machine Speeds Pots 1/0	Axes

## Outputs

Access the outputs screen from the main screen:

1. Press the Setups button.



2. Press the Diagnostics button.



3. Press the I/O button and enter the password.



Type Celeron M

Hardware Key 26A06DFB-0000-0000

e Help

4. Press the Outputs button.



5. Test each output signal by activating the switch on the screen and verifying that the correct output device or action is initiated.

Note: The first 12 outputs can be assigned by the user.

				Help
K ● Off-	Output1	🖄 🎱 Off -	Output17	9
🖄 🎱 Off -	Output2	🔊 🎱 Off -	Output18	
🖄 🎱 Off -	Output3	🖄 🎱 Off -	Output19	
🕸 🎱 Off -	Output4	🔊 🎱 Off -	Output20	
🕸 🎱 Off -	Output5	🔊 🎱 Off -	Output21	
🕸 🎱 Off -	Output6	🖄 🎱 Off -	Output22	
🖄 🎱 Off -	Output7	🖄 🎱 Off -	Output23	
🖄 🎱 Off -	Output8	🖄 🎱 Off -	Output24	
🔊 🕘 Off -	Output9	🔊 🎱 Off -	Output25	
🔊 🎱 Off -	Output10	🔊 🎱 Off -	Output26	
🖄 🎱 Off -	Output11	🖄 🎱 Off -	Output27	
🔊 🕘 Off -	Output12	🔊 🖉 Off -	Output28	
🔊 🎱 Off -	Cut Control	🔊 🎱 Off -	Output29	
🕸 🎱 Off -	Hold Ignition	🖄 🎱 Off -	Output30	
🔊 🎱 Off -	Output15	🖄 🎱 Off -	Output31	Cano
🕸 🎱 Off -	Output16	🔊 🎱 Off -	Output32	
	Click Switch or Press SPACE	to Change Output	State 8:34:55 AM	
Inputs	Outputs Analog Input			

#### Drives and motors set-up

The purpose of the Drives and Motors screen is to verify that the rail and transverse motors spin smoothly, and in the desired direction of travel. Polarities for the DAC (Digital to Analog Converter) and Encoder must be set individually to positive or negative as required. The polarity drives the motor in the desired direction. DAC Polarity refers to the analog command voltage sent from the Motion Control Card to the Servo Amplifier and motor. Encoder polarity refers to how the Motion Control Card views the encoder pulses received. This is also the screen where the encoder counts per inch (or millimeter) are entered so each axis moves as anticipated.

# Caution: Loosen motor brackets for the transverse and Rail motors and move them so that the pinion gear on the motor is NOT in contact with the rack. For tables that do not use a rack and pinion, disconnect motor shaft. This will prevent unwanted movement of the table during installation and setup.

Note: with the CNC turned off, disconnect the lifter cables (axis 4) before navigating to the diagnostic screen to avoid unwanted lifter movement.

Access the Drives and Motors screen from the main screen:

1. Press the Setups button.



2. Press the Diagnostics button.



0

3. Press the Drives and Motors button, read the warning and press OK.





5. Select: Single pulse Positive — direction, 2 volts — 10 seconds -	Pulse Type • Single • Repeating Pulse Direction • Positive • Negative • Alternating Pulse Magnitude 2 volts Pulse Duration 10 sec +10 - Volts 0 -10 -	Transverse Position O.000 Rail Position O.0000 Dual Gantry Position O.0000 THC Position O.000	in in in
	Test Test Test Test Test THC	Speed Transverse 0 ipm Rail 0 ipm Dual Gantry 0 ipm THC 1 0 ipm	Cancel Cancel Cancel Cancel Cancel Cancel Cancel Cancel Cancel Cancel Cancel Cancel Cancel

 Press the test button for the axis you want to test and note the value that is displayed in the position box.

Pulse Type C Single C Repeating	Transverse Position	🕐 Help
Pulse Direction C Positive C Negative C Alternating	0.000	in
Pulse Magnitude 2 volts	Rail Position	
+10 -	- 0.000	in
	Dual Gantry Position	
Volts 0	0.000	in
	THC Position	
-10 - Output Signal	0.000	in
	Speed Transverse	
	0 ipm	
	Rail 0 inm	
	Dual Gantry	
	0 ipm	Cancel
	THC 1	O or
	• ibm	<b>O</b> K
Test Test Test Test	Test	Zero
Transverse Hail Dual Ganity IHC	AU	Positions



	X Axis Orientation C Transverse C Rail Table Size X 120 in Y 144 in
	Up Direction • +Y • +X • -Y • -X Sensor THCs Installed
	Right Direction · +X · -X THC 1 V Installed on Axis 4 V Analog 5 V
	Dual Gantry Installed C No C Yes
	CBH Installed @ No C Yes Ignore Torch Collision During IHS @ No C Yes
	X and Y Motor/Encoder © Normal © Swapped
	Auto Torch Spacing C No C Yes
	Til: Rolator Installed @ No C Yes
	Dual Titl Rotator Installed C No C Yes
	Auto Home at Power Up @ No @ Yes
Axes	Folower initially 🕈 Off 🕈 On
and provide the second state of the second state of the	Scaled Rotator Motion @ No @ Yes
	Scale Factor 0
	Dual Titting Octator C No C Mode 1 C Mode 2
	Key Press Logging The C Yes
	635877M 😧 Canod 🕑 Heb 🖉 OK
	Machine Speeds Pots I/O Ares

8. Change the encoder and DAC polarities. It is possible that "negative" will have to be selected for the value in the position box to read positive.

Speed 0 to	1500 i	pm			P Help	1
Proportional Gain	100				Antonio de la constante de la c	E
Integral Gain	0.5					
Derivative Gain	0		NOTE: the encoder counts pe	er inch can be c	alculated using the	1
Feedforward Gain	100		following formula.			
Velocity Gain	200		traveled = Encoder counts per inch.			
			Enter the value in the box as i	ndicated.		
Servo Error Tolerance	0.08 i	n /	Home	to Overtravel Swi	tch 💌	
Encoder Counts per in	80	000	Absolute Home Position	0 in		
Fault Ramp Time	0.1	ec	Home Offset Distance	1 in		
Drive Type	<ul> <li>Velocity</li> </ul>	Current	Home Direction	C Positive C N	egative	
DAC Polarity	Positive	Negative	Use Marker Pulse	○ No ● Yes		
Encoder Polarity	Positive	Negative	e Use Software Travel Limits	• No • Fault	<ul> <li>Fast Decel</li> </ul>	
Encoder Decode Mode	○ 1X ○ 2X	• 4X	Maximum Travel Limit	0 in		
Use Hardware Overtravels	● No  ○ Yes	;	Minimum Travel Limit	0 in		4
Backlash Compensation	0 i	n			Cancel	
					🕥 ок	
					9:03:31 AM	
Transverse Rail	Dual	Santry	ТНС			

- 9. Return to the Drives and Motors screen and repeat the process for the next axis. Note the direction of the gear as you repeat the previous test.
- 10. After the direction and encoder are properly set, put the motors back in place and verify table motion.

# Post installation

- 1. Save a back-up copy of the settings to the CNC hard drive and also to a removable storage device.
- 2. Run the Norton Ghost Utility. See section 3 of the Installation and Setup Guide for Touch Screen CNCs for more information.

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