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Hypertherm[®]

HYPERTHERM SHAPE CUTTING CONTROL

INSTALLATION & SETUP GUIDE MICROEDGE™ ADDENDUM



Making people and machines more productive through process *Automation*

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Safety

Read This Manual

Read and understand this instructional manual, the cutting machine manuals, and your employer's safety practices. **Note:** This product is not designed to be field serviceable. Please return to an authorized repair center for any required service.

Dangerous Machinery



Operation and maintenance of automated equipment involves potential hazards. Personnel should take precautions to avoid injury.

Injury and entanglement may occur if hands and limbs come in contact with moving machinery.

KEEP HANDS CLEAR of dangerous moving machinery. All control, including manual, can be effected using the remote interface.

Loose fitting clothing or ties may become entangled in the machinery. These items should not be worn while operating or servicing the machine.

High Voltages



Electric shock can kill. Be sure this equipment is safely installed in accordance with enclosed procedures and specifications.

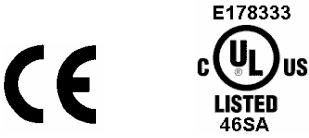
Avoid contact with electrical wires and cabling while power is on.

This equipment should only be opened by trained service personnel.

Please refer to the appropriate appendix in the Installation Guide provided with your control for details on safety certification for that product.

Product Listings

Type “M” and “P” Controls



Note: This product has been designed and manufactured in accordance with CE and UL Safety Standards.

UL has successfully tested and listed the type “M” and “P” (with 10.4” display) control products in accordance with the applicable U.S. and Canadian Safety Standards. File number E178333. Note: Suitable for pollution degree 2 environment only.

This appliance has been successfully tested and listed by CE under the following standards; EN 500081-2 1994, EN 61000-6-2 1999 and EN 55011:1998. Certificate number: Retlif R-3909N

MicroEDGE™ Shape Cutting Control



System Features*

Operating System	Microsoft Windows XP® - Embedded Version
Processor	Intel 2.4 Ghz or greater
Memory	256 Megabytes RAM
Hard Drive	40.0 Gigabyte Hard Drive or greater
Communication	1 x RS232; Programmable to 230K Baud using Hypertherm's communications software
Floppy Drive	1.44 Megabyte Floppy Drive
CD-ROM/DVD Drive	Standard
RFI/ EMI Shielding	Machine side Opto-Isolation: grounding
I/O	24 Lines of user definable Interface Signal (12 In / 12 Out)
Supportable Axes	Standard 2; Optional expansion of up to 4 Axes
SERCOS Interface™	Optional SERCOS Interface™ for expandable axis, I/O and analog inputs
Motherboard Interface	PS2 Keyboard & Mouse**, 5 – 2.0 USB, Parallel Port
Optional Networking	On-board RJ-45 Network Port
Dimensions	14.38"W x 20.00"D x 9.35"H
Weight	35 lbs
Operating Environment	0 to 50C; 95% relative humidity (non-condensing)
Power	On-board Voltage and Temperature Monitoring Universal Input

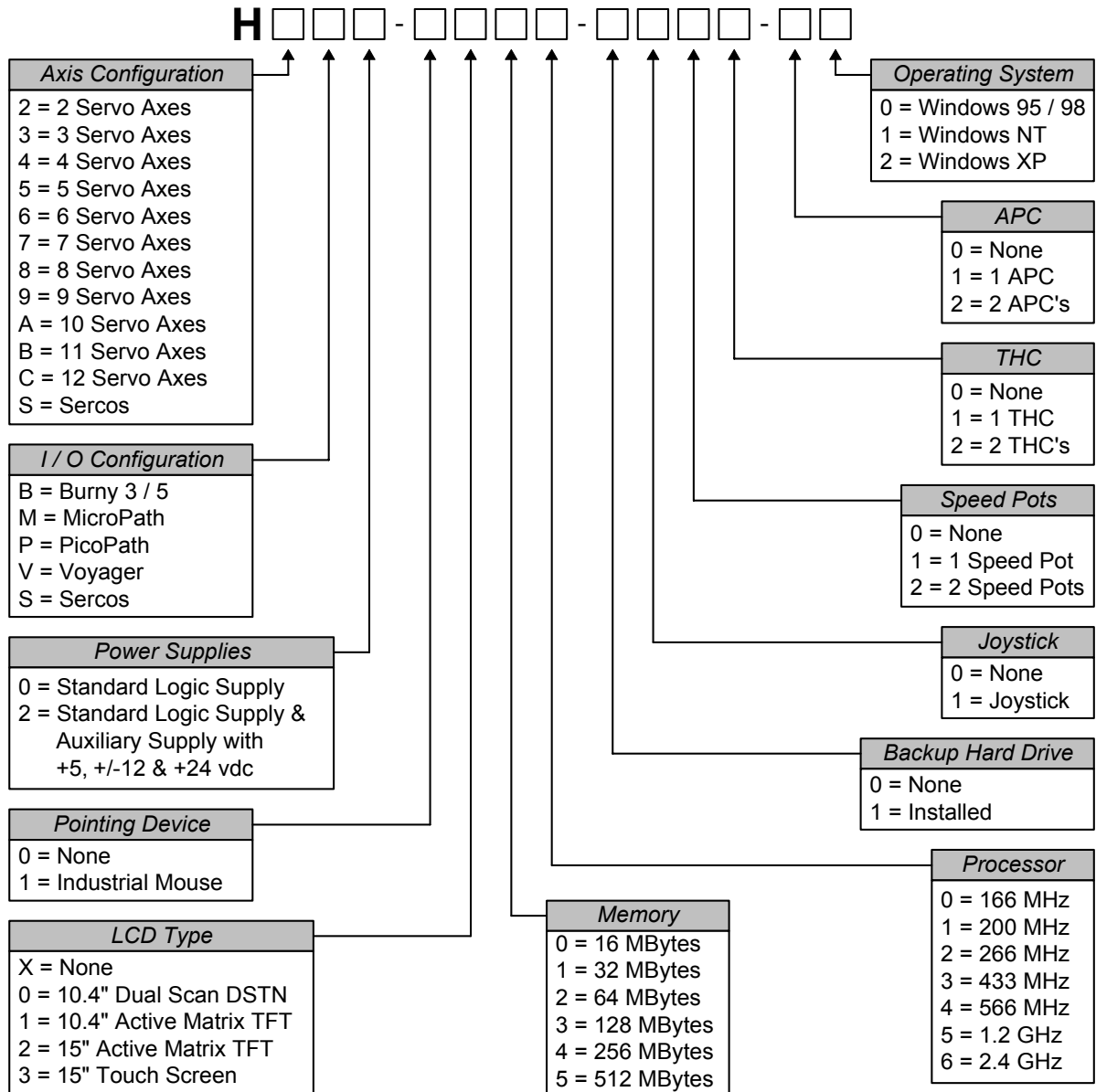
**Information subject to change without notice.*

*** User supplied Display and Keyboard required.*

SERCOS™ Interface is a Trademark of SERCOS North America

Model Numbering System

The control is available with the following hardware and software configurations. Features and control configuration options in software are based on the I/O configuration of the control. Generally, the information presented in this guide is based on the I/O configuration as outlined below. Please refer to your control I/O configuration for available features and product information. The specific configuration is determined by the Model Number, as shown below:



Model Numbers

You may wish to record your Model Number in the space provided below.

Model Number Information
Model Number:
Serial Number:

Overview

The *MicroEDGE™* CNC control is the latest PC based motion control offering from Hypertherm® Automation specifically for the metal cutting industry. This control package provides a unique combination of flexible table configurations, expandable features and an unparalleled ease of use.

MicroEDGE™ utilizes our proprietary Graphical User Interface (GUI) and *SoftMotion* Technology with motion control operation of up to four axes with 24 I/O signals.

This product offers a unique approach to the motion control market by allowing the table manufacturer / system integrator to customize the final package by adding their own Monitor, Keyboard and Mouse.

Additional features such as Joystick, Speed Pots, networking, CAD / CAM Software, Nesting Software provide unlimited combinations of productivity options.

Interface Options

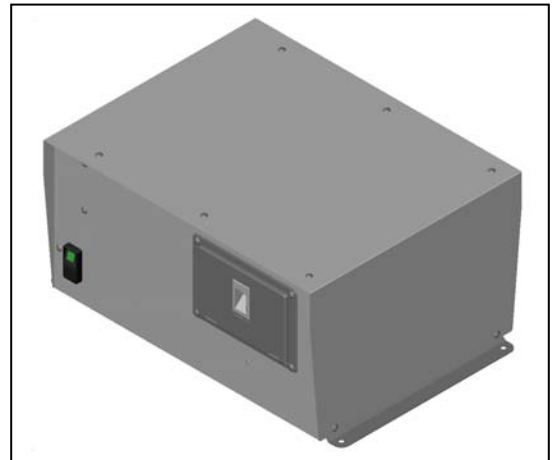
- Type "M" (2 axes)
- Type "P" (2-4 axes)

Please refer to the Operator's and Installation manuals included with your control for additional information on this product. Operation and interface information will be based on the interface option selected (Type P or Type M).

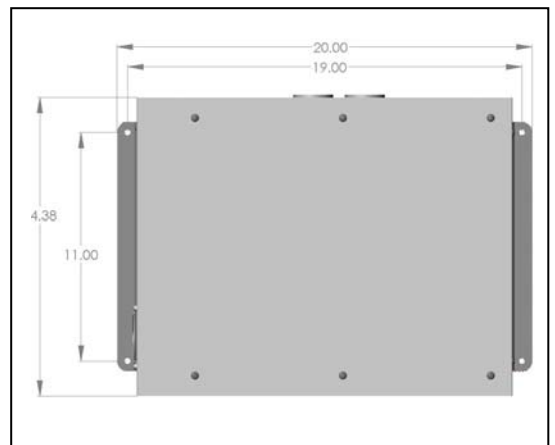
Disclaimer

No warranty, expressed or implied, extends to this product beyond original hardware and software provided by Hypertherm Automation®.

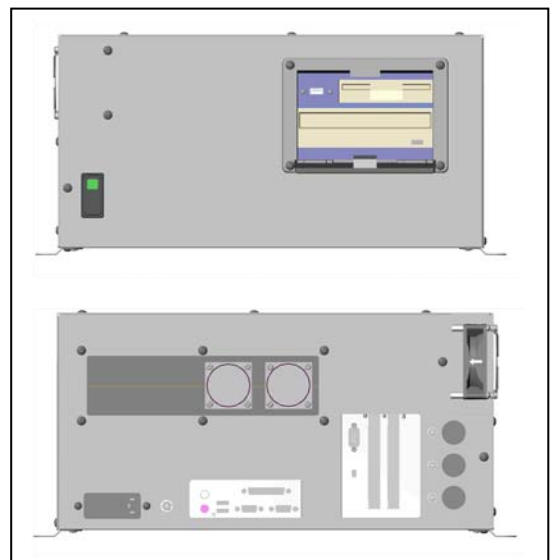
MicroEDGE™



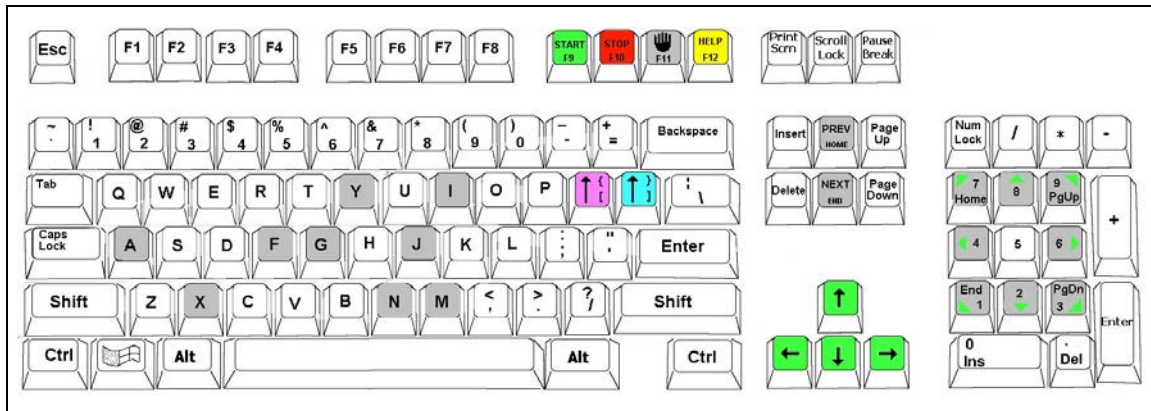
Top View



Front and Rear View



Keyboard Layout



Typical Keyboard Layout

Keyboard Functions

Function Keys F1-F8 are equivalent to the soft keys on the display screen.

Function Key F9 is equivalent to the START key.

Function Key F10 and Pause Key are equivalent to the STOP key.

Function Key F11 is equivalent to the MANUAL MODE key.

Function Key F12 is equivalent to the HELP key.

Arrow direction keys are used for manual motion.

The HOME key is equivalent to the PREV field key.

The END key is equivalent to the NEXT field key.

The [key is equivalent to the purple arrow shift key.

The] key is equivalent to the blue arrow shift key.

The Esc key is equivalent to the CANCEL key.

To exit the control software press Alt F4.

To switch between applications press Alt Tab.

A color coded key cap sticker set is provided to allow easy reference to the keys used by the control software.

System Requirements

Monitor Requirements (CRT or LCD)

Standard VGA capable 640 x 480 analog monitors or better with 15 pin High Density D-sub connector.

Keyboard Requirements

Standard 101/ 104 Key PS/2 or USB Compatible Keyboard

Optional Mouse Requirements

PS/2 or USB Compatible Mouse

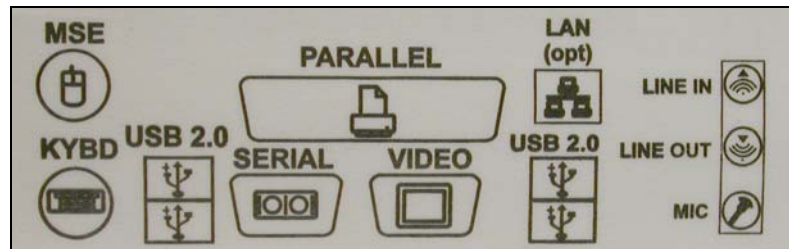
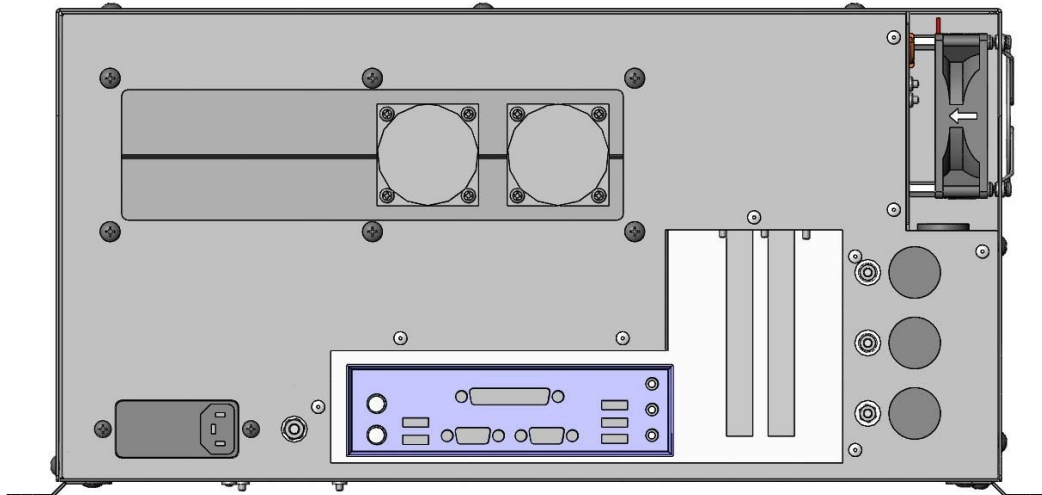
THC, Joystick & Speedpots

Optional features for two Sensor THC, one Joystick and two Speedpots are offered. Connection and operation information is provided in the Operators and Installation Guide provided with this product.

Note: Use of some monitors and other devices may require loading of a device driver for operation. Many standard device drivers are located in the C:\CABS or C:\CABS\I386 folders.

Machine Interface

The MicroEDGE™ shape cutting control is an extremely versatile product offering up to four configurable axes of motion, configurable I/O locations and three different styles of external table interface for ease of installation. The control features may also be expanded through use of optional analog and network interface cards.



The rear panel of the control has several cable connectors to connect the control to power, I/O and communication ports. These connectors are clearly labeled as to their function.

The AC power cable is inserted into the AC power connector and plugged into a standard 3-way 110 or 220 volt outlet. The control has a universal AC input power module that allows the user to plug into either voltage without changing additional jumpers. In addition, the AC Power connector contains an integral fuse receptacle and line filter.

A remote communications link can be connected to one of the two serial ports and an external ground (PE) lug for earth grounding of the unit is also provided.

Serial Port

Please refer to the Ports Information section of the Installation Guide for additional information on configuration of Serial ports for communication. Note: Serial ports for the MicroEDGE are not optically isolated. Appropriate grounding or after market port isolator or protocol converter to add optical isolation is recommended.

I/O Configuration Type “P”

The cables that connect the control to the cutting machine are attached to the I/O (Input/Output), and the DRIVE/ENCODER connectors. For the purposes of this guide Single Ended I/O is referred to as Type “P” configuration.

The information provided here is the basic information for connection of the shape cutting control to the cutting table. Each machine interface will vary slightly based on the cutting table configuration and features. Additionally, I/O pinout information may vary slightly based on the configuration of the selected I/O and their locations. Changes to the I/O configuration may be made in the password protected I/O screen. All controls are shipped with the default selection of Inputs and interface locations for the selected control Interface (I/O) configuration. Installation and service should only be performed by a qualified service technician.

I/O Connector

The I/O connector is a standard sex circular CPC connector from AMP. This connector was specifically chosen for its rugged industrial design and its metal insulation characteristics for EMI/RFI noise immunity.

In the single ended I/O scheme, a ground is provided on the I/O pin. In the double-ended approach, both the positive and negative pins for each I/O point are provided to the user. The advantage to single ended I/O is that it takes one pin for each point versus two for the double-ended I/O scheme, thus increasing the total number of I/O points available to the user.

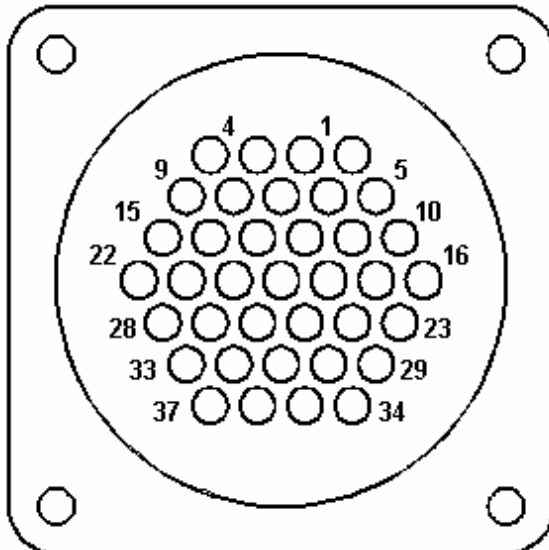
I/O Mating Connector

Connector AMP #208470-1

Backshell AMP #208945-8

Sockets (16-18 ga) AMP #66101-3

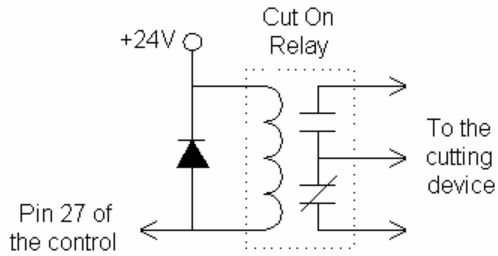
Sockets (20-24 ga) AMP #66105-3



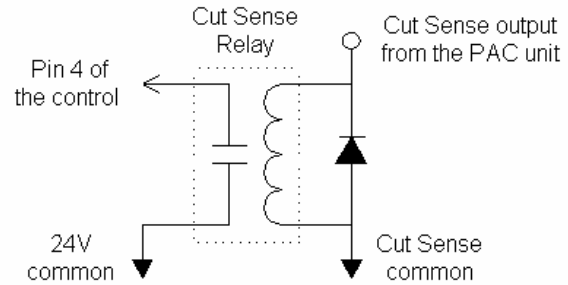
I/O Configuration Type "P" (Single Ended I/O)

Connecting single ended I/O to the control. These examples assume a +24V power supply has been connected across pins 34 and 36 of the control, or that the optional internal +24V power supply has been installed.

Output tied to external Cut On

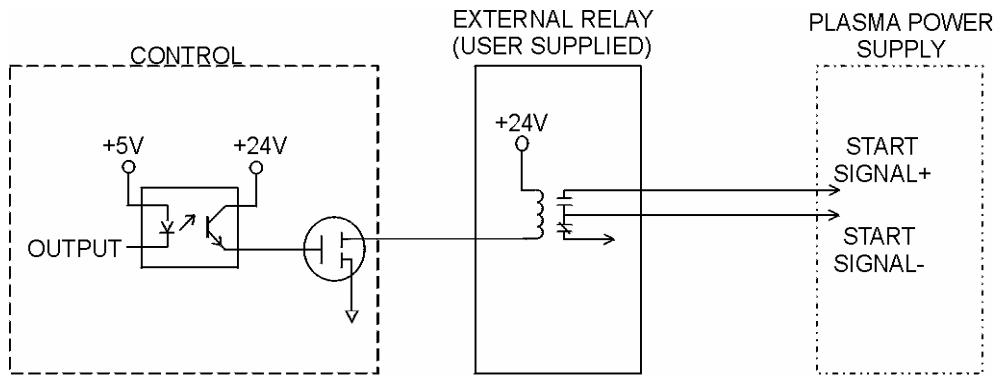


Input tied to Cut Sense Relay

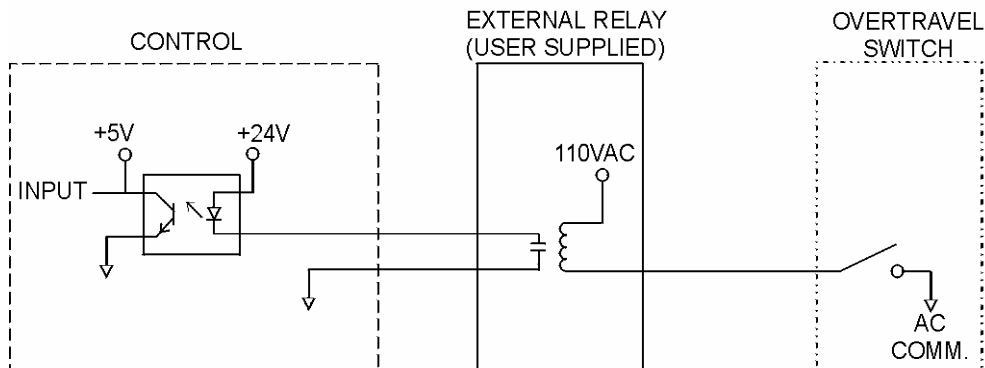


Examples of possible circuits

Output



Input



Single Ended I/O Pinout

The Single Ended I/O offers 12 outputs which are rated at 24VDC for up to 1-amp loads and 12 inputs rated for 24VDC.

Pin	I/O	Description
1	Input 1	Torch Up Sense
2	Input 2	Torch Down Sense
3	Input 3	Preheat Sense or X -Overtravel Switch
4	Input 4	Cut Sense
5	Input 5	Tracer on Path or Z Home Switch
6	Input 6	Spare or Y -Overtravel Switch
7	Input 7	Spare
8	Input 8	Spare or Remote Pause
9	Input 9	X Home Switch
10	Input 10	X Overtravel Switch or X +Overtravel Switch
11	Input 11	Y Home Switch
12	Input 12	Y Overtravel Switch or Y +Overtravel Switch
13	N/C	No Connection
14	+24 VDC	+ I/O Power Supply
15	+24 VDC	+ I/O Power Supply
16	N/C	No Connection
17	24V Common	I/O Power Supply Common
18	24V Common	I/O Power Supply Common
19	N/C	No Connection
20	N/C	No Connection
21	Output 1	Torch Up
22	Output 2	Torch Down
23	Output 3	Ignition Control
24	Output 4	Torch Height Disable/Dual Grid Control
25	Output 5	CNC/Tracer
26	Output 6	Marker Enable
27	Output 7	Cut Control
28	Output 8	Spare
29	Output 9	Spare or Low Preheat
30	Output 10	Preheat Control
31	Output 11	Key Press Indicator or Motion Indicator
32	Output 12	Spare or Plasma Select
33	I/O Shield	Chassis Ground
34	+24 VDC	+I/O Power Supply
35	+24 VDC	+I/O Power Supply
36	24 V Common	I/O Power Supply Common
37	24 V Common	I/O Power Supply Common

Drive/Encoder Connector

The Drive/Encoder connector is a reverse sex circular CPC connector from AMP. This connector was specifically chosen for its rugged industrial design and its metal insulation characteristics for EMI/RFI noise immunity.

NOTE: For optimum noise immunity, cable shields may be tied externally to the control enclosure or to the metal AMP connectors.

Drive/Encoder Mating Connector and Cable

Connector AMP #208472-1

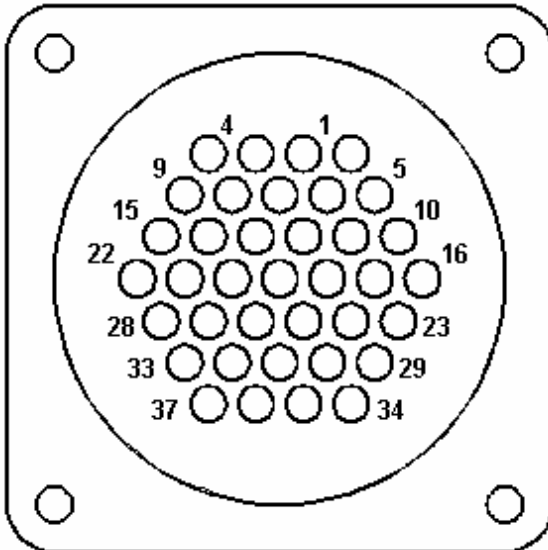
Backshell AMP #208945-8

Pins (16-18 ga) AMP #66099-3

Pins (20-24 ga) AMP #66103-3

Cabling: Use Belden # 9504 or equivalent for encoder signals

Cabling: Use Belden # 9501 or equivalent for drive signals

**Axes Assignments****Axes**

1 (X)

2 (Y)

3 (Z)

4 (W)

Axes Assignment

Transverse or Rail

Transverse or Rail

Dual Gantry, CBH or THC

CBH or THC

Drive/Encoder Pinout

Pin	Description
2	Encoder Power Supply Input (+5V or +12V*)
3	Encoder Power Supply Common
7	Encoder Power Supply Shield
8	

*NOTE: For Rev A + B MCC's +12V Encoders require a switch to be set on the interface board.

X Axis	Y Axis	Description
4	1	Encoder Power Output
8	6	Encoder Power Common
9	5	Encoder Channel A input
14	11	Encoder Channel /A Input
15	10	Encoder Channel B Input
21	17	Encoder Channel /B Input
22	16	Encoder Channel Z Input
28	23	Encoder Channel /Z Input
13	12	Encoder Shields
24	26	Drive Enable In (relay contact)
25	27	Drive Enable Out (relay contact)
37	34	Drive Power Input (+12 or +15)
33	29	Servo Output ($\pm 10V$)
32	30	Drive Power Common
36	35	Drive Power Input (-12 or -15)
20	18	Servo Output Common
19	31	Drive/Servo Shield

Drive/Encoder Pinout (For 3 and 4 Axes units)

Pin	Description
2	Encoder Power Supply Input (+5V or +12V)
3	Encoder Power Supply Common
7	Encoder Power Supply Shield

Z Axis	W Axis	Description
4	1	Encoder Power Output
8	6	Encoder Power Common
9	5	Encoder Channel A input
14	11	Encoder Channel /A Input
15	10	Encoder Channel B Input
21	17	Encoder Channel /B Input
22	16	Encoder Channel Z Input
28	23	Encoder Channel /Z Input
13	12	Encoder Shields
24	26	Drive Enable In (relay contact)
25	27	Drive Enable Out (relay contact)
37	34	Drive Power Input (+12 or +15)
33	29	Servo Output ($\pm 10V$)
32	30	Drive Power Common
36	35	Drive Power Input (-12 or -15)
20	18	Servo Output Common
19	31	Drive/Servo Shield

I/O Configuration Type “M” (Double Ended I/O)

The double ended I/O configuration of the control provides additional flexibility in connecting to external devices. These I/O points allow the user to separate the control voltages for each I/O point. Meaning, there is no common tie between each point as with the single ended I/O scheme. No power is required to be brought into the control. Pins 34-37 are provided for the optional internal +24V supply should the user want the power supply integrated into the control.

Double Ended I/O Pinout

The Single Ended I/O offers eight outputs which are rated at 24VDC for up to 1-amp loads and eight inputs rated for 24VDC.

Pin	I/O	Description
1	Input 1 +	Torch Up Sense
2	Input 1 -	Torch Up Sense
3	Input 2 +	Spare
4	Input 2 -	Spare
5	Input 3 +	Preheat Sense
6	Input 3 -	Preheat Sense
7	Input 4 +	Cut Sense
8	Input 4 -	Cut Sense
9	Input 5 +	Spare
10	Input 5 -	Spare
11	Input 6 +	Limit Switch
12	Input 6 -	Limit Switch
13	Input 7 +	Torch Down Sense
14	Input 7 -	Torch Down Sense
15	Input 8 +	Spare or Remote Pause
16	Input 8 -	Spare or Remote Pause
17	Output 1 +	Torch Up
18	Output 1 -	Torch Up
19	Output 2 +	Torch Down
20	Output 2 -	Torch Down
21	Output 3 +	Ignition Control
22	Output 3 -	Ignition Control
23	Output 4 +	Torch Height Disable/Dual Grid Control
24	Output 4 -	Torch Height Disable/Dual Grid Control
25	Output 5 +	CNC
26	Output 5 -	CNC
27	Output 6 +	Marker Enable or Beeper or Motion Indicator
28	Output 6 -	Marker Enable or Beeper or Motion Indicator
29	Output 7 +	Preheat Control
30	Output 7 -	Preheat Control
31	Output 8 +	Cut Control
32	Output 8 -	Cut Control
33	I/O Shield	Chassis Ground
34	+24 VDC	+I/O Power Supply
35	+24 VDC	+I/O Power Supply
36	24 V Common	I/O Power Supply Common
37	24 V Common	I/O Power Supply Common

Drive/Encoder Connector

The Drive/Encoder connector is a reverse sex circular CPC connector from AMP. This connector was specifically chosen for its rugged industrial design and its metal insulation characteristics for EMI/RFI noise immunity.

NOTE: For optimum noise immunity, cable shields may be tied externally to the control enclosure or to the metal AMP connectors.

Drive/Encoder Mating Connector and Cable

Connector AMP #208472-1

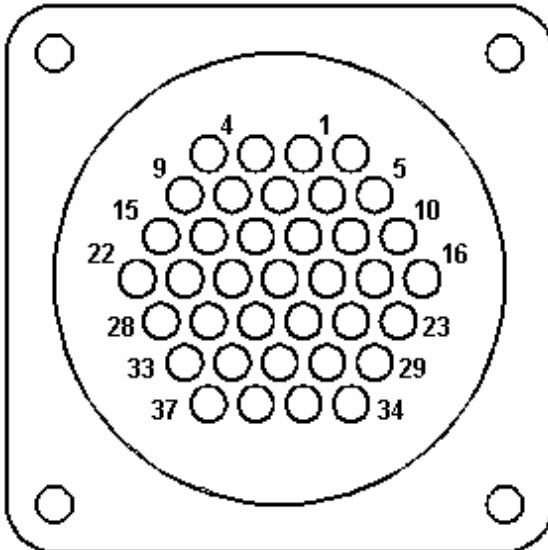
Backshell AMP #208945-8

Pins (16-18 ga) AMP #66099-3

Pins (20-24 ga) AMP #66103-3

Cabling: Use Belden # 9504 or equivalent for encoder signals

Cabling: Use Belden # 9501 or equivalent for drive signals

**Axes Assignments****Axes**

1 (X)

2 (Y)

Axes Assignment

Transverse or Rail

Transverse or Rail

Drive/Encoder Pinout

Pin	Description
2	Encoder Power Supply Input (+5V or +12V*)
3	Encoder Power Supply Common
7	Encoder Power Supply Shield
24	Watchdog Normally Open Contacts
25	Watchdog Common

***NOTE:** For Rev A + B MCC's +12V Encoders require a switch to be set on the interface board.

X Axis	Y Axis	Description
4	1	Encoder Power Output
8	6	Encoder Power Common
9	5	Encoder Channel A input
14	11	Encoder Channel /A Input
15	10	Encoder Channel B Input
21	17	Encoder Channel /B Input
22	16	Encoder Channel Z Input
28	23	Encoder Channel /Z Input
13	12	Encoder Shields
37	34	Drive Power Input (+12 or +15)
33	29	Servo Output ($\pm 10V$)
32	30	Drive Power Common
36	35	Drive Power Input (-12 or -15)
20	18	Servo Output Common
19	31	Drive/Servo Shield

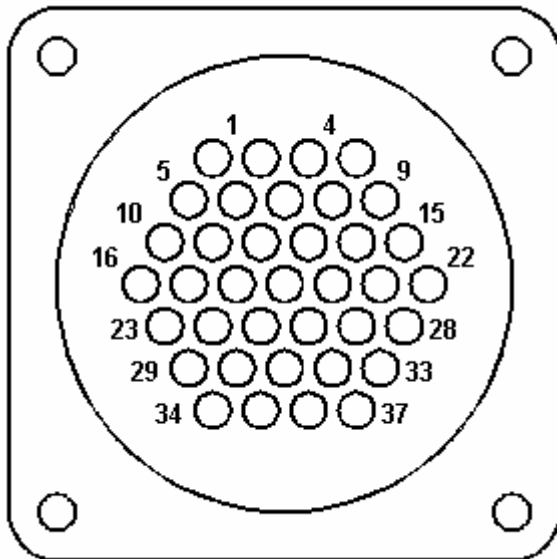
I/O Configuration Type “B”

The illustration below shows the control back panel in a Type “B” I/O configuration. The cables that connect the control to the cutting machine are attached to the OXY FUEL and PLASMA (Input/Output), DRIVE connector, X ENCODER and Y ENCODER interface connectors.

This shape cutting control interface has been specifically designed and configured to connect to a Burny 3 or Burny 5 style wire harness system without modification. Outputs are relay contact rated at 1 amp at 120 VAC. Inputs are optically isolated and can operate at 24 – 120 VAC/DC.

Oxy Fuel and Plasma Connectors

The Oxy Fuel and Plasma connectors are standard sex circular CPC connectors from AMP.



I/O Mating Connectors

Connector AMP #206150-1

BackShell AMP #206138-1

Sockets (16-18 ga) AMP #66101-3

Sockets (20-24 ga) AMP #66105-3

Oxy Fuel Pinout

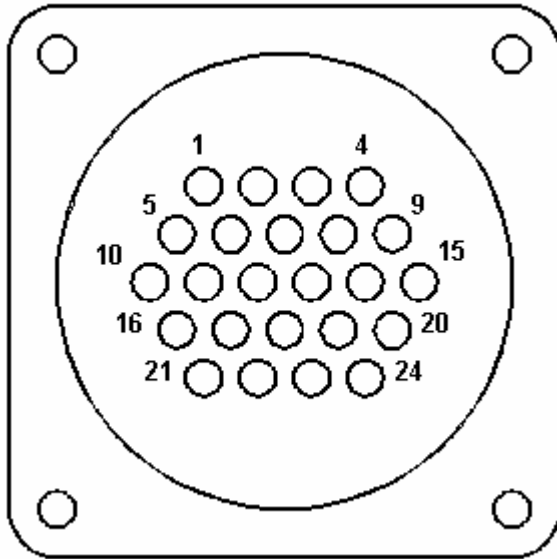
Pin	I/O	Description
10	Input	Oxygen Cut Sense
23	Input	Oxygen Cut Sense
11	Input	Program Inhibit
24	Input	Program Inhibit
3	Output NO	Oxygen Enable
4	Output COM	Oxygen Enable
8	Output NC	Oxygen Enable
32	Output NO	Oxygen Start
37	Output COM	Oxygen Start
36	Output NC	Oxygen Start
21	Output NO	Preheat
22	Output COM	Preheat
28	Output NC	Preheat
9	Output NO	Plate Marker No. 1
15	Output COM	Plate Marker No. 1
14	Output NC	Plate Marker No. 1
1	115 V Hot	I/O Power Supply
18	I/O Shield	Chassis Ground
19	I/O Shield	Chassis Ground
34	115V Neutral	I/O Power Supply Common

Plasma Pinout

Pin	I/O	Description
5	Input	Plasma Select
18	Input	Plasma Select
16	Input	Arc On Sense
29	Input	Arc On Sense
2	Output NO	Plasma Enable
3	Output COM	Plasma Enable
4	Output NC	Plasma Enable
22	Output NO	Plasma Start
21	Output COM	Plasma Start
15	Output NC	Plasma Start
37	Output NO	Plasma Height
36	Output COM	Plasma Height
35	Output NC	Plasma Height
26	Output NO	Plate Marker No. 2 or CNC Tracer
20	Output COM	Plate Marker No. 2 or CNC Tracer
13	Output NC	Plate Marker No. 2 or CNC Tracer

Drive Connector

The Drive connector is a standard sex circular CPC connector from AMP.



NOTE: For optimum noise immunity, cable shields may be tied externally to the control enclosure.

Drive Mating Connector and Cable

Connector AMP #206837-1

Backshell AMP #206138-1

Sockets (16-18 ga) AMP #66101-3

Cabling: Use Belden # 9501 or equivalent for drive signals

Axes Assignments

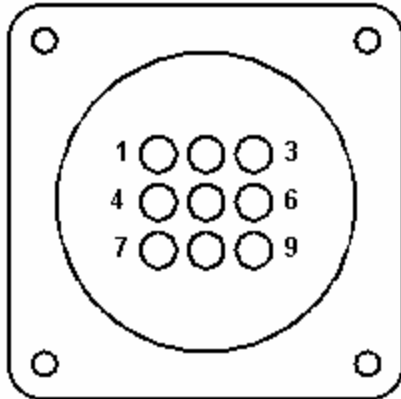
Axes	Axes Assignment
1 (X)	Transverse or Rail
2 (Y)	Transverse or Rail

Drive Pinout

Pin	Description
7	X Reference +
6	Y Reference +
9	Reference Common
12	Reference Shield
20	Remote Pause
8	Watchdog Normally Open Contacts
13	Watchdog Common

Encoder Connectors

The Encoder connectors are a standard sex circular CPC connector from AMP.



NOTE: For optimum noise immunity, cable shields may be tied externally to the control enclosure.

Encoder Mating Connectors and Cables

Connector AMP #206708-1

Backshell AMP #206966-1

Sockets (20-24 ga) AMP #66105-3

Cabling: Use Belden # 9504 or equivalent for encoder signals

Encoder Pinout

Pin	Description
7	Power Output
1	Power Common
8	Channel A input
3	Channel /A Input
9	Channel B Input
5	Channel /B Input
6	Channel Z Input
2	Channel /Z Input
4	Shields

THC and Joystick Interface

I/O Configuration Type “P” controls have dedicated connectors for THC 1, THC and Joystick / Speedpots.

Series 1 PCI Analog Card

Note: The Analog Card will be designated as PCI-AIC Rev A in the Control Information Diagnostic screen.

Board Marking PCI Analog 1 Part # PCBS-0074

THC 1

Pin #	Designation	Description
1	Common	Common
2	Input 5 +	Nozzle Contact Sense + (Relay Contact)
3	Input 5 –	Nozzle Contact Sense - (Relay Contact)
4	Output 1 +	Nozzle Contact Enable + (Relay Contact)
5	Output 1 –	Nozzle Contact Enable - (Relay Contact)
6	Analog Input 1 +	THC +
7	Analog Input 1 –	THC –
8	Output 2 +	Hold Ignition (Relay Contact)
9	Output 2 –	Hold Ignition (Relay Contact)
	Ground Stud	Shield

Mating Connector

Connector AMP #206708-1

Backshell AMP #206966-1

Sockets (20-24 ga) AMP #66105-3

Cablings: Use Belden # 9504 or equivalent

THC 2

Pin #	Designation	Description
1	Common	Common
2	Input 6 +	Nozzle Contact Sense + (Relay Contact)
3	Input 6 –	Nozzle Contact Sense – (Relay Contact)
4	Output 3 +	Nozzle Contact Enable + (Relay Contact)
5	Output 3 –	Nozzle Contact Enable – (Relay Contact)
6	Analog Input 2 +	THC +
7	Analog Input 2 –	THC –
8	Output 4 +	Hold Ignition (Relay Contact)
9	Output 4 –	Hold Ignition (Relay Contact)
	Ground Stud	Shield

Mating Connector

Connector AMP #206708-1

Backshell AMP #206966-1

Sockets (20-24 ga) AMP #66105-3

Cablings: Use Belden # 9504 or equivalent

Joystick

Pin #	Designation	Description
1	Input 1	Joystick UP
2	Input 2	Joystick DWN
3	Input 3	Joystick LT
4	Input 4	Joystick RT
5	Common	Common
6	Analog Input 3 +	Speed Pot 1
7	Analog Input 3 -	Speed Pot 1
8	Analog Input 4 +	Speed Pot 2
9	Analog Input 4 -	Speed Pot 2
	Ground Stud	Shield

Note: Joystick inputs are activated by passing the Common signal (pin 5) to the desired input. Analog inputs for the speedpots are rated at 0 - +10VDC

Mating Connector

Connector AMP #206708-1

Backshell AMP #206966-1

Sockets (20-24 ga) AMP #66105-3

Cabling: Use Belden # 9504 or equivalent

THC and Joystick Cable Grounding

Cable shields should be tied to the external PE studs for optimum noise immunity.

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Addendum

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