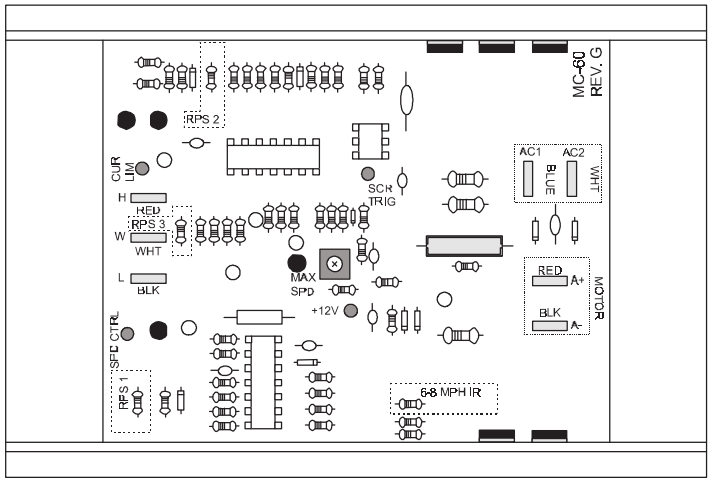
MC-60
MC-60M
MC-64
MC-67



These SCR motor controllers are physically identical. The only difference is in the components used to allow a higher Current Limit on the MC-64 and a lower Current Limit on the MC-67. The MC-60M controller is a variation of the MC-60 controller that allows a single wire harness to carry signals between the console and controller. The treadmill's reed switch plugs into the controller, then the tach signal from the reed switch and the speed control signal are sent to the console.

These controllers can be configured to operate at different speeds and with various consoles by clipping one or more resistors on the controller. Configuring the controller is done at the factory and should not be attempted in the field. *Clipping a resistor changes the part number of the controller. Always be sure to order the controller configu red correctly for the Model number treadmill you are working on by referencing the model number's part list.*

A new feature of these controllers is four troubleshooting LEDs that can be used to troubleshoot the controller when repairing a treadmill. They indicated when the controller is receiving the expected control signals and outputting the required voltages. Each LED is displayed below:

D6- Labeled SCR. Indicates that the SCR is triggering on the controller. If this light is out, no voltage will be sent to the motor. Note that this LED will vary in brightness, depending on the speed setting. If this LED does not light when the safety key is inserted and D7 is lit (indicating a speed setting other than zero MPH), the controller will need to be replaced.

D7- Labeled SPD CTRL. This LED indicates that the controller is receiving a speed signal from the console. Note that on consoles without a power board that use a speed pot, the LED will light solidly, but vary in intensity at different speed settings. On consoles that use a power board, the LED will flicker with the PWM control signal. The brightness of the LED will vary with the speed setting. *NOTE: On consoles with speed potentiometers that require a power board, this light may be seen to flicker even when speed is set to zero MPH. This is due to a small signal being sent from the console. MC-60 controllers with this console and power board configuration will have RPS 1 clipped to operate normally and keep the treadmill from running at all times.* If this LED is not lit when the speed is set above zero MPH, but D11 is, it indicates a problem with the console, power board, or wire harness.

D11- Labeled +12V. This LED indicates that the controller is outputting 12 VDC at the H spade connecto r. It should be lit at all times the controller is receiving voltage. If this LED does not light when the controller is receiving AC voltage, the controller will need to be replaced.

D16- Labeled CUR LIM. This LED lights ONLY when the amperage draw of the treadmill is nearing the current limit setting. If this LED lights frequently, it indicates a worn walking belt or board, or that the walking belt or drive belt is too tight.

Controller Voltages

Seven spade connectors are used to connect the controller to the rest of the treadmill. They are described below:

AC1- BLUE wire. 120 VAC High from the power cord or power board.
AC2- WHITE wire. 120 VAC Neutral from the power cord or power supply
A+ RED wire. 0-120 VDC to the motor. Voltage level d epends on the current speed setting.
A- BLACK wire. Ground wire for the motor and motor choke.
H- RED wire. High supply voltage for the speed control signal of 12 VDC.
W- WHITE wire. Wiper on potentiometer. 0 -12 VDC depending on the current speed setting.
L- BLACK wire. Low potentiometer. Ground wire for speed control voltage.

Configuration

The controller is configured at the factory to operate at different speeds and with different consoles. Four resistors are used to configure the controller. They are labeled RPS1, RPS2, RPS3, and 6-8 MPH. The function of each resistor is described below:

RPS1- Clipping this resistor causes the controller to operate in the same manner as the older 101757 and 108580 controllers. This allows the controller to operate with older opto-isolators on some power boards.

RPS2- Clipping this resistor lowers the Current Limit (CL) setting of the controller by approximately 2 amps.

RPS3- Clipped only for use with older treadmill consoles programmed specifically to work with the MC-30. Clipping this resistor allows the speed to be increased without first having to press another button on the console. **This resistor must not be clipped under any other circumstances.**

6-8 MPH- Clipping this resistor changes the IR Compensation from a 15 KV motor constant to a 17.6 KV motor constant. This allows the use of motors of different specifications.

MC-60 controller info on surplus center:

http://www.surpluscenter.com/item.asp?UID=20041121153238 77&item=11-2449

115 VAC / 130 VDC 8 AMP MOTOR CONTROLLER BOARD

Item# 11-2449

Our Price $29.95

Specs Sheet

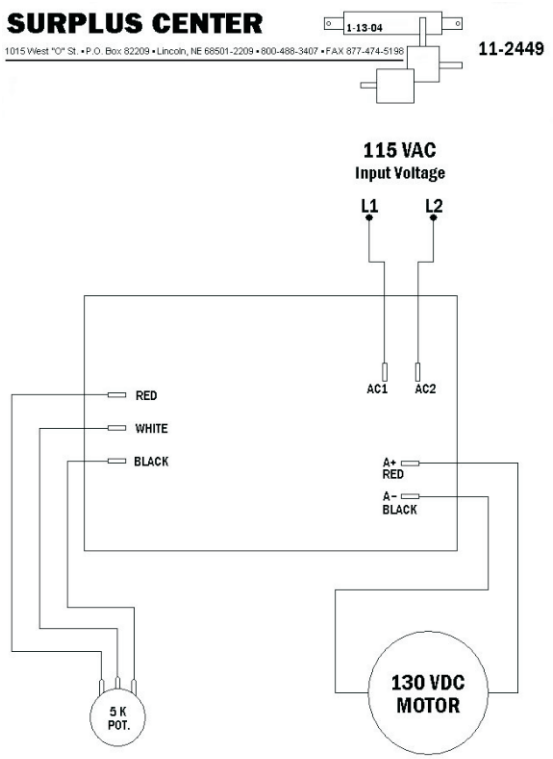
115 VAC TO 130 VDC MOTOR CONTROLLER BOARD

New motor speed controller board mounted on aluminum heat sink. Requires 5K Ohm potentiometer (not incl.). Excellent controller for regulating speed of permanent magnet motors, originally made for use in treadmills. Current limiting diode loop automatically protects controller from over-current. A motor controlled by this board must start at or near zero speed and then the potentiometer can be turned up for higher motor speed, the board will not allow the motor to be switched on at high speed.

SPECIFICATIONS

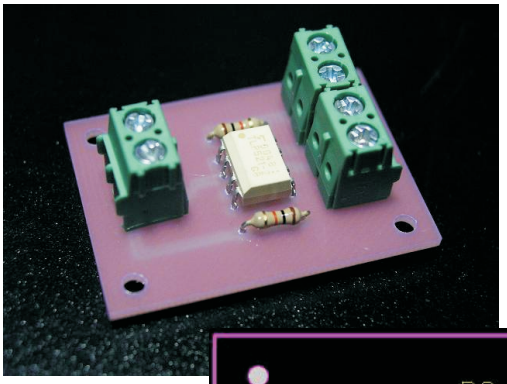
115 VAC Input
130 VDC output
8 Amps continuous DC output @ 10 Amps AC input
Four bolt base mount on 2" x 5-1/8"
Overall size 6-1/8" x 3-7/8" x 1-5/8"
Shpg. 3 lb

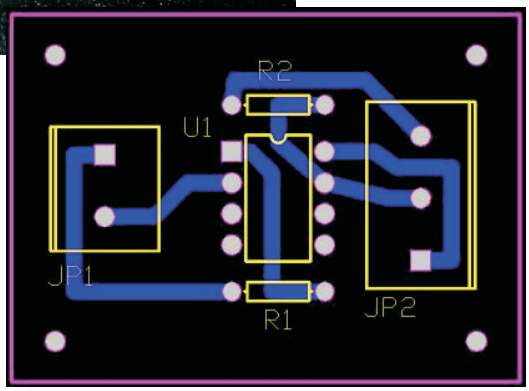
Wiring

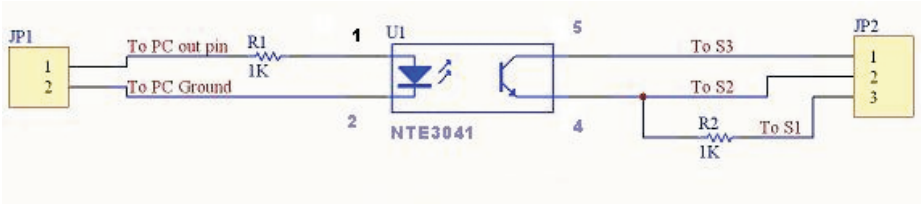


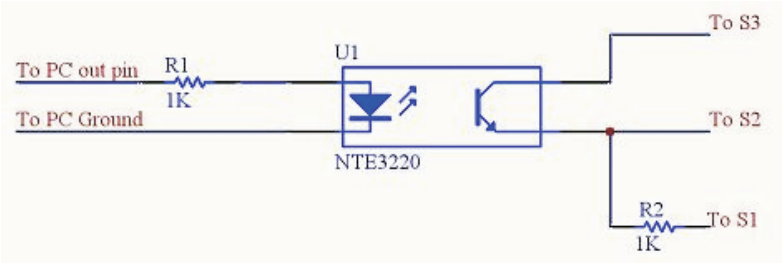
PWM control mod:

Most of the imformation was posted by Jroque on:
http://www.cnczone.com/forums/showthread.php?t=8579









Jp2 - 651-1935174 *****Terminal block, 3 pins
Jp1 - 651-1935161 *****Terminal block, 2 pins
U1 - 526-NTE3220 *****Optoisolator
R1,R2 - 291-1K *********Resistors, 1K ohm (on minarik) on Mc-60 probably need other values or resistor byppass

Hi there. Here's a quick diagram on how to connect the **Minarik DC controller (some things can be used as a guide on MC-60)** to the PC parallel port using an optoisolator and two resistors.
WARNING: There's significant voltage potential on the ground terminal of that controller. If you connect the ground of the controller to the common ground on your PC you might see sparks fly, blown fuse, burnt brain and your stock portfolio will tank. In other words: BE CAREFUL!
I chose the optoisolator below after scientifically researching the many options and finally opening my drawer and grabbing the first one I saw. Any number of other optos will work. I'm not even sure what the current potential is on the controller side of the circuit so that 1000 ohm resistor value might need changing. Mine worked good though.

The setup is as follows:
1. Config your PC controller (ie: Mach2) to it outputs step and direction or PWM on an output pin. I picked pin 17 on my parallel port
2. Connect the optoisolator as per diagram while power is OFF, please. If you mount the parts on a PCB and put it inside a little box, better.
3. Issue a "go spindle" command and set the speed to maximum. In my case with Mach2 I entered S8200 and M3. My motor will spin at 8,200 RPM.
NOTE: use a plastic tweaker or insulated screwdriver to adjust the board in the following steps.
4. Set the "Max" potentiometer on the controller board fully CW (max) and slowly move it CCW until the motor starts dropping off speed. Move it back up a bit so the motor reaches max speed again but don't move it beyond that.
5. Set the spindle speed to 0. In my case in Mach2 I entered S0.
6. Set the "Min" pot fully CW and slowly move it CCW until the spindle stops. Make sure you give it a hair more in the CCW direction so to be sure the spindle does stop when commanded to do so.
That's it! My PC now controls the spindle speed via software and it tracks to actual RPM fairly well. My minimum speed is around 80 RPM which is great for drilling tough stuff.

Excellent Jon. Based on the PDF you should connect the optoisolator circuit like this:
H to pin 1 on JP2 ("Collector" on the opto chip)
W to pin 2 on JP2 ("Emitter" on opto chip)
L to pin 3 on JP2 (through R2 and to "Emitter" on opto chip)
The doc doesn't say much about the input current so I would keep R2 in there or even move it to pin 1 so it limits current in case W draws in too much.