HEAT VIEW
CONTROLS

TWINHEAT
USER MANUAL

Heat View Heat Treating Controls Inc.

Revision: 1.00

Creation Date: 18 February 2023

Revision Log

Revision	Description	Initial	Date
1.0	Initial Release	JB	18 Feb 2023

Table of Contents

Table of Figures

1. Introduction

This document was created to help an operator or service technician to connect and operate a TwinHEAT module manufactured by Heat View Controls inc.

The TwinHEAT module is an electrical control box that you can connect to your welder to be used to preheat the material you are going to weld to an accurate temperature. This module is a cost effective solution for weld shops to use to preheat their material in a controlled fashion without the need to purchase a full heat treating solution or to use something such as a torch to heat the material.

The TwinHEAT module uses a modified Eurotherm controller for reliable and accurate control. The Eurotherm controller is an intuitive and yet powerful controller that has been on the market for many years.

Please see the website: http://www.heatviewcontrols.com for the latest software, products and tutorial videos.

2. Electrical Specifications

Title	Value	Unit
Input voltage	100 - 230	Vac
Freq	48 – 62	Hz
Max Current Draw	1	A
Operating Temperature Range	-32F – 120F	Deg F
Thermocouple input type	K	

PLEASE NOTE: The standard Eurotherm controller is programmed to run using Fahrenheit. If you require it to work with Celsius, please let your distributor know.

3. User Interface

This section of the manual will run through the all the items on the TwinHEAT. Then the following section will cover the Eurotherm Controller's interface and buttons specifically.

The TwinHEAT unit has two electrical plates on external walls of the case. There is no need to open the lid of the plastic case to run it.

a. Power connection plate

The power connection plate is shown below. On this plate you can connect the power leads from the welder as well as the 120 Vac control power.

Figure 1: Power connection plate

The welder connection cam locks are 400A cam locks and require the correct mating female connector to get the best results from the unit. The TwinHEAT module ships out with a set of 4ft power cables for connection to the welder and a single 120 Vac cable for control power.

For replacement power cables, please contact your distributor for guidance or parts.

b. Control Plate

One the opposite side of the TwinHEAT module is the control plate. This plate holds all the controllers, the thermocouple connections and also the connection points for the resistive heating pads.

Figure 2: Control Plate

The control plate has 2 separate channels of control. The control plate lamacoid shows the division between channel 1 and 2 using the dotted line in the middle of the plate. The controls on this plate are covered in more detail here, but the interface of the Eurotherm controllers is covered in detail in the following section.

Controllers and the output lights

The image below shows the controllers and the output lights on the TwinHEAT.

- The power light (as indicated in the image) will turn on when the unit has a 110 Vac power connected to it and is supplying it with power. If this light is off, check your power cable to make sure it is still plugged in and not damaged.
- The output lights turn on whenever the specific channel is busy applying power to the heating pad. It is normal for this light to turn on and off continuously while the channel is running its heating cycle.
- The Eurotherm controllers are the controllers that will control the output power based on the measured temperature of the work piece.

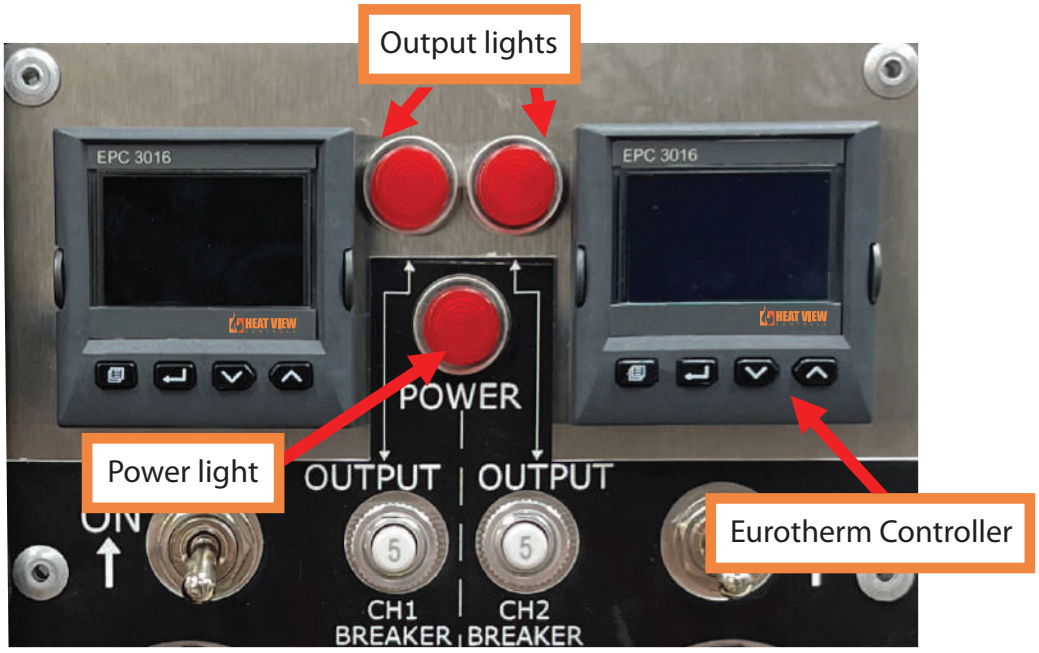

Figure 3: Controllers and output lights on the control plate

Control plate power switches and breakers

The channels control power switches are right below the controllers and are shown in the image below.

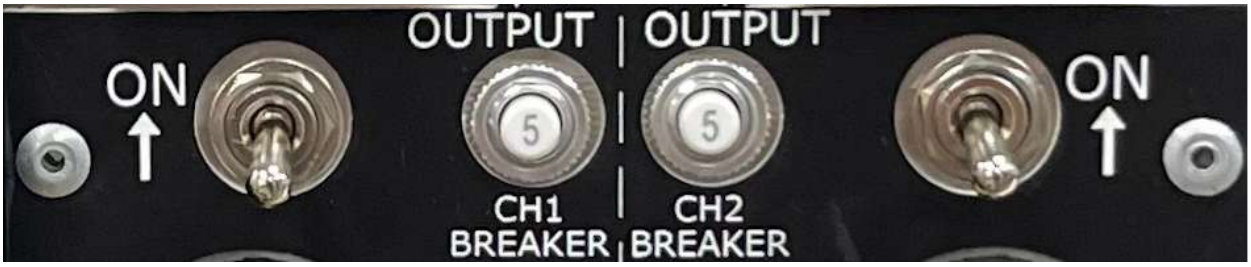

Figure 4: Channel controller power switches and breakers.

The image above shows the switches that are required to power on the desired channel. Turning on the switch for the specific channel will power up the controller and allow it to start controlling the temperature of the workpiece. When you are done running a heating cycle, simply turn this switch off to turn off the controller and hence stop any power being applied to the heating pad on the channel.

Next to the power switch is the channels electrical protection breaker. If something gets damaged inside the unit, these breakers will protect the control power for that channel.

If a breaker pops out, please contact your service contract provider to repair the issue.

Heating pad and Thermocouple connections

The lower portion of the plate has the connection points for the thermocouple on the work piece. The heating pad cam lock connection points are for the 300A twist lock connectors. These are shown in the image below.

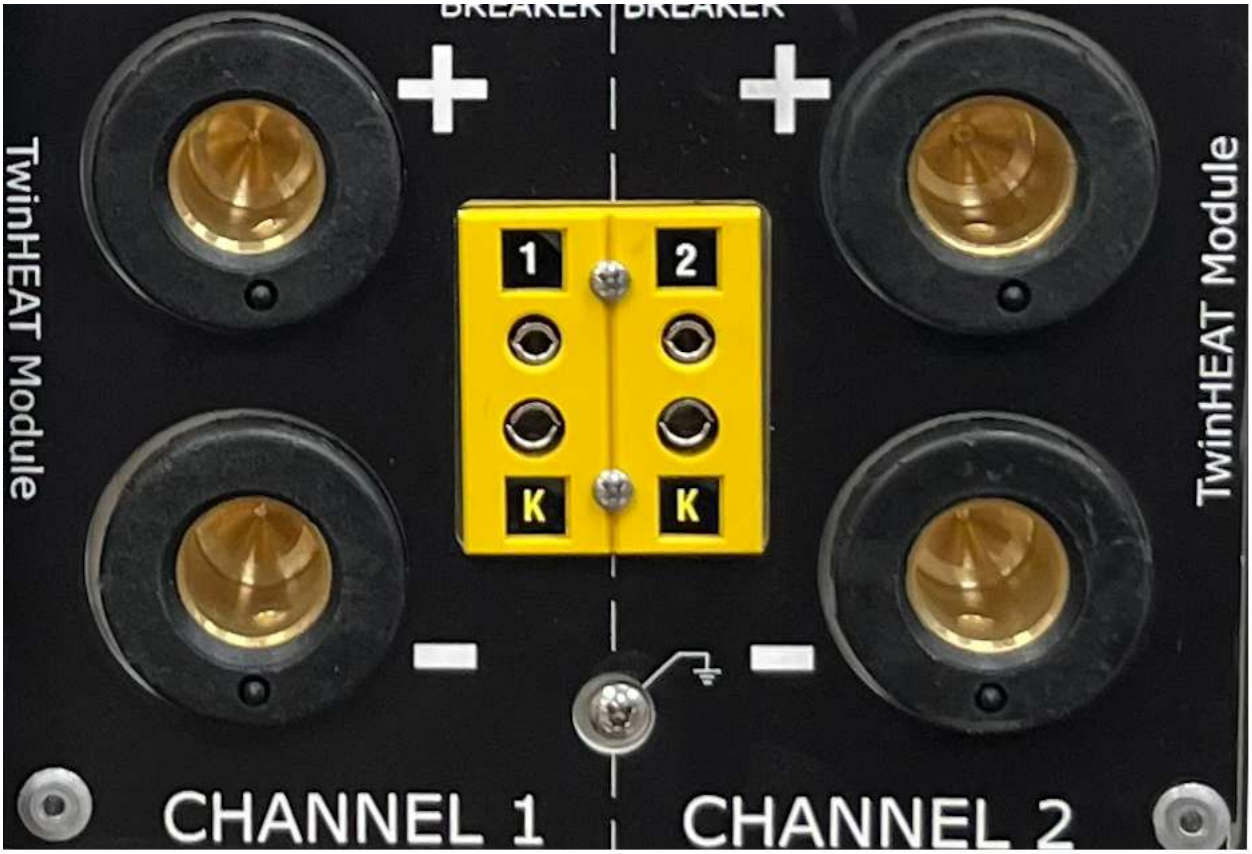

Figure 5: Thermocouple and heating pad connectors

The dual thermocouple block in the middle of the plate. The left of the TC block goes to the left controller and similarly with the right.

The ground connection with the ground symbol is internal to the unit and this screw should never be loosened.

4. Eurotherm controller

If you have never used the Eurotherm controllers before they are simple and intuitive controllers that have been simplified for the TwinHEAT module. Its interface is covered in detail here.

When you first power up a channel, the Eurotherm will boot up and will look like the image below.

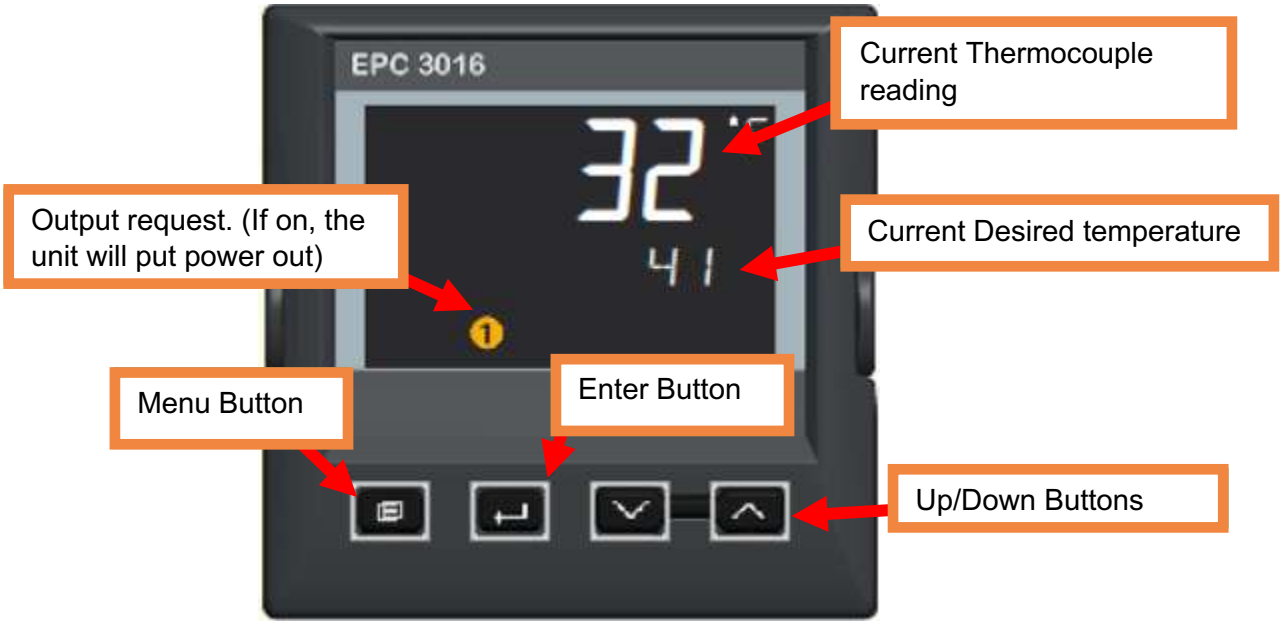

Figure 6: Eurotherm user interface

If a Thermocouple is plugged in, the unit will show the current temperature that the thermocouple is measuring in the top right hand of the screen. The units are programmed to start up in auto mode and to run all the time. So, the system will try and ramp up the temperature of the work piece from initial thermocouple reading to the desired set point.

c. Changing the running parameters

To control the heating parameters, follow the steps outlined below:

Pause/Run control

Press the 'Enter' button on the front of the controller to scroll through the running parameters until you see the section Pause. The first parameter to come up from the home screen will be the Pause/Run option as shown in "Figure 7: Pause/Run screen in the parameters menu."

If you press the enter button too many times and pass by this option you can simply keep pressing it until you come back to this screen.

When on this menu press the up or down arrow to change the paused state. The state is saved immediately and applied to the system.

When the unit is paused the output power will be turned off the heat cycle will be paused. To get the system running again, simply come back to this parameter and change it from Yes to No.

Figure 7: Pause/Run screen in the parameters menu.

Ramp/Rate parameter

To change the rate at which the workpiece will be heated at to reach the setpoint, simply press the enter button until it reached the “Rate” parameter. Once on this screen you can simply change the rate by press and holding in the up or down arrow to the desired value. The rate is in **deg/hour**.

This value is applied and stored in the controller as it is changed, so once it is set you can either leave the controller and it will return to its home screen after a few seconds or you can press the enter button until it returns there.

Figure 8: Rate parameter screen.

Setpoint parameter

To change the final setpoint (the temperature the controller will heat the workpiece to and will hold it at), simply press the enter button until you arrive at the screen with the text “ESP”. Once there, simply press and hold the up and down arrows to set your desired final temperature.

The setpoint screen is shown in the image below. In the image below the final temperature the workpiece will be held to is 400 degF.

This value is applied and stored in the controller as it is changed, so once it is set you can either leave the controller and it will return to its home screen after a few seconds or you can press the enter button until it returns there.

Figure 9: Setpoint running parameter

Auto/manual mode parameter

To take the controller out of running mode (Auto mode), press the enter button until you see the parameter called A-M. Once on this screen you can use the up and down arrows to change the system from Auto to Manual and back.

This value is applied and stored in the controller as it is changed, so once it is set you can either leave the controller and it will return to its home screen after a few seconds or you can press the enter button until it returns there.

Figure 10 :Auto/Manual parameter

Once the system is in Manual mode, the output will be turned on and off at a constant interval, but the output will remain on for given percentage of time that is shown on the screen. So, looking at the image below, the unit will have the contactor on for 90% of the time and off for 10% of the time, regardless of the temperature of the work piece or even if the thermocouple is plugged in.

A small hand will appear on the screen to indicate this, as shown in the image below.

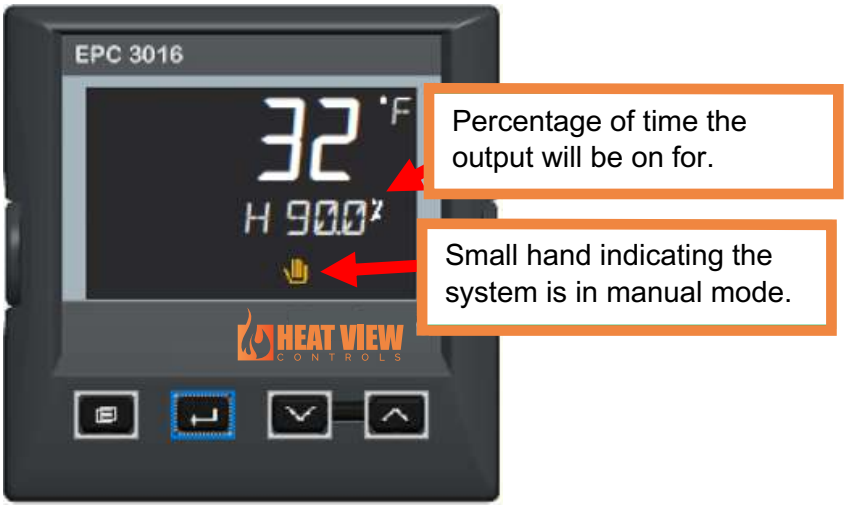

Figure 11: Manual mode hand indicator

5. Troubleshooting

This section will try to cover all the items that could potentially go wrong with your TwinHEAT. If you ever find a situation that is not covered in this section and you do not know how to recover from it, please contact your distributor for support.

a. Eurotherm not turning on

If there is text or numbers on the display of the Eurotherm, then it most likely does not have power.

Solution 1: To solve this, make sure that you have a good, undamaged power cord plugged in a 110 Vac power source and that it is securely plugged into the connector shown in “Figure 1: Power connection plate” above. This should make the “Power Light” shown in “Figure 3: Controllers and output lights on the control plate” turn on. If this light does not turn on, you will need to check your power cable or the 110 Vac to make sure that is all good.

Once the “Power Light” is on, you can simply turn on the power switch that is just below the controller. This switch is shown in “Figure 4: Channel controller power switches and breakers.” above. If this does not solve the issue, please try the next solution.

Solution 2: If the power switch is on and the TwinHEAT’s power light is on and the Eurotherm is not powering up, you will need to check the pop-out breaker just next to the power switch to make sure the breaker has not tripped. If it has, then try to push it back in. If the breaker will not reset, then contact your distributor for service and support.

If the power light is on, the switch is turned on and the breaker has not popped out and the Eurotherm controller does not boot up and show text and numbers on the screen, then you will need to contact your distributor for support.

b. TC Open

If you have a message scrolling across the Eurotherm controller that says “TC Open”, then the thermocouple has opened, or it is not securely plugged into the correct TC Port. If this message scrolls across the screen, then the controller will not put any power out to the work piece unless in manual mode.

Solution: To correct this situation, check to make sure the thermocouple is correctly connected to the workpiece if it is welded in place. If it is a thermocouple that is twisted and strapped in place, make sure it is still twisted correctly. You will need to check all your connections and make sure the thermocouple connector is securely pushed into the correct side of the thermocouple jack on the control plate of the TwinHEAT module. Once the thermocouple is closed correctly you will need to wait for 2-3s before the unit will recognize this and will start running again.

c. Everything is powered but the output will not turn on

If everything is connected correctly and the output will not turn on, then it can be one of two items that prevent the output from tuning on.

Solution 1: The controller will only turn on the output if it calculates that heat is needed based on the ramp rate and the final setpoint. If the unit is first turned on, the controller will measure the temperature of the workpiece for a few seconds to determine if it is current heating up by itself or if it needs heat applied to it to start the cycle. So give it a minute or two based when first powered up before expecting the output to turn on (it could start sooner, but when first starting, have patience and it will run).

If the work piece is hotter than the current desired temperature from the controller, the output will not turn on as to not overheat the material. The image below shows where to find the current temperature and the desired temperature on the controller.

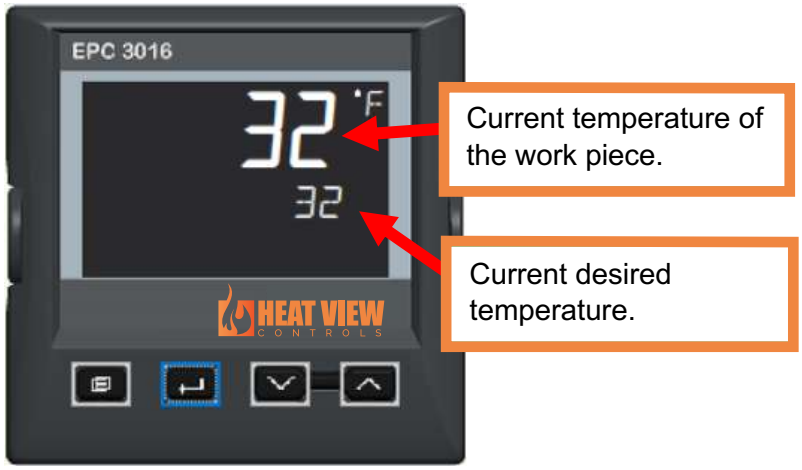

Figure 12: Current temperature vs. the desired temperature on the controller

If the desired temperature is below the value you set for the final setpoint and it is not increasing, then navigate to the “Rate” parameter and increase this to a suitable rate. If it is at the final setpoint temperature it will hold here and the output will not turn on unless the workpiece temperature starts to drop below this value.

Solution 2: The final item that will stop the system from putting power out is if the thermocouple is open. See the previous troubleshooting note on open TC’s to solve this. It will show a message on the screen saying “TC Open” if this is the cause.

d. System is running but the workpiece in not heating up

If everything is connected and the Eurotherm controller is calling for power and after a few minutes (when the workpiece should have started heating) you do not see its temperature rising then the power from your welder is not being applied to the heating pad.

Solution 1:Make sure that the power cables between your welder and the TwinHEAT module are connected securely and the welder is set to apply power to the TwinHEAT.

Solution 2: Make sure that the heating pad is connected correctly to the channel outputs. The image below shows the correct way to connect a heating pad to Channel 1 on the TwinHEAT.

Solution 3: If connected correctly, make sure that the heating pad is not burnt out and it allows current to flow through it. To check the current flow, use a multimeter and look at the amperage flowing through any of wires going to the heating pad.

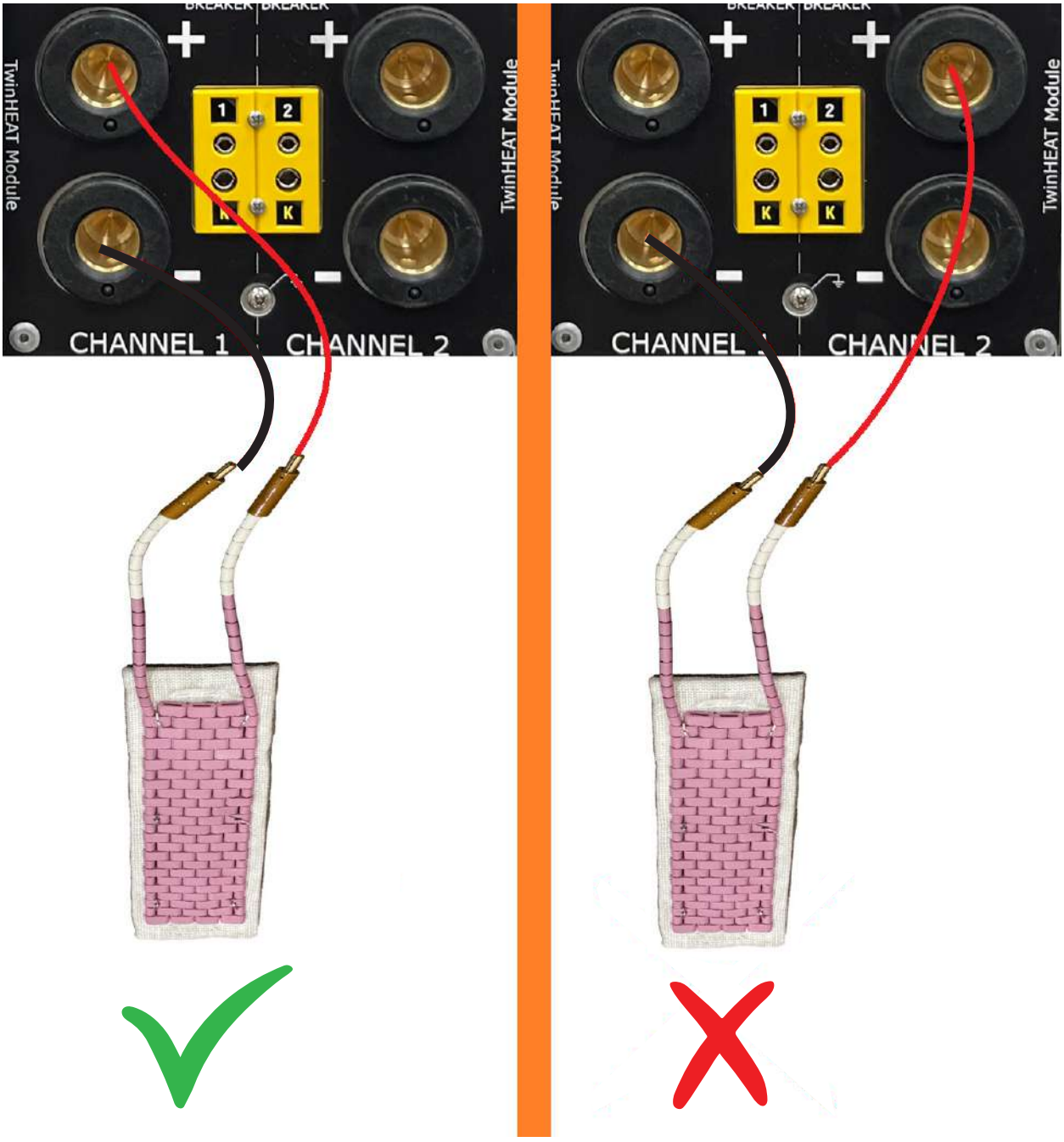

Figure 13: Correct way to connect a heating pad

6. Quick guide to your first heat cycle using a TwinHEAT

This section covers the simple steps to setting up your first heat cycle using the TwinHEAT module straight out of the box from the factory.

1) Remove the TwinHEAT module from all packaging and place it on a secure flat surface.
2) Connect the two power cables to your welder and then connect them to the twist lock connectors on the power plate of the TwinHEAT module.
3) Connect the 110 Vac power cable between the TwinHEAT and the wall outlet.
4) Connect your heating pad to the control plate of the TwinHEAT unit.
5) Connect your Thermocouple line to the workpiece and then to the TwinHEAT unit. Make sure that the Thermocouple and heating pad are connected to the same channel on the control plate of the TwinHEAT module.
6) Now that everything is connected, turn on the power switch to the channel's Eurotherm (where the power switches are shown in "Figure 4: Channel controller power switches and breakers.")
7) Wait a few seconds for the Eurotherm to power up and show a screen with the 2 temperatures on it (the current measured temperature and also the desired temperature) as shown in "Figure 12: Current temperature vs. the desired temperature on the controller".
8) Press the Enter Button on the face of the Eurotherm until you see the text "Rate" as shown in "Figure 8: Rate parameter screen." Then use the up and down arrows to set the rate you want to heat the work piece up at.

Please note that the rate is in **deg/hour**.

9) Now press the Enter button on the face of the Eurotherm controller until you see the text "ESP" and use the up and down arrows to set this temperature to the temperature you want heat the work piece to.
10) Finally set your welder to apply its power to the TwinHEAT module and wait for it to heat up your workpiece.