

# Edge Melt Systems

Digital Controller - Flex



## Installation Manual

GSB Services, LLC

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## Foreword

All work must be done in accordance with local electrical code.



**Installation liability is solely that of the electrician.**

## Introduction

The Flex Controller is designed to be a long-lasting complement to your heat cable system. Its ability to regulate up to 4 separate circuits and have the required GFEPD optionally built in make it truly 'flexible'. The system can have up to 4 separate branch circuits each rated at up to 30 amps, 208 to 240 VAC.

This unit is the perfect option for those that want to stage their installation over several years. With the low temp cut out and temperature hysteresis, this panel will save operating costs.

The DC Flex Controller can have an optional GFEPD (AC-EPD230) unit added to each branch circuit providing the required 30mA equipment protection.

## Wall mounting

The entire installation must be **according to local code**. In the event the installation instructions in this manual conflict with local codes, the AHJ shall prevail.

Firmly attach the control panel with hardware appropriate to mounting surface. Mounting hardware is not included. Use the provided mounting flanges on the Flex Digital Controller. Do not drill through the back of the control panel enclosure to fasten.

## Circuit Breaker - 20 or 30A

It is the responsibility of the installer to provide power from a 208 or 240 VAC circuit that is current limited to a 20 or 30 Amp circuit breaker or fuse. One such line feed for each of up to four heat cable circuits. Circuit One on the DC Flex Controller also supplies the power for the controller.

## Conduit Coupling

The DC Flex can be installed with a wide variety of conduit fitting and sizes. These holes would preferably be made in the top of the enclosure so as to have an unobstructed path to the line and load terminals.

If the add on GFEPD Junction Box Option (AC-EPD 230) is used, an additional hole(s) must be drilled in the bottom of the panel.

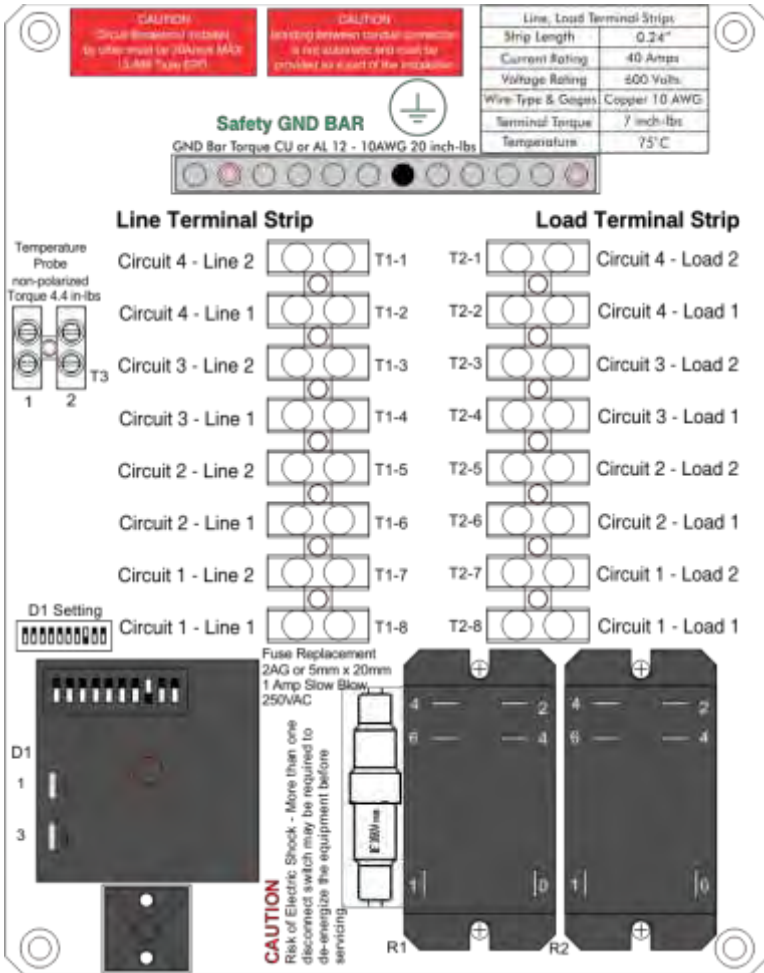
Before drilling any holes in the enclosure, **be sure to remove back panel and secure it in such a way that it cannot be damaged**. This is best accomplished by marking all holes for drilling prior to panel installation, removing the back panel while the controller is lying on its back on a stable surface, and drilling the holes.

After drilling, please **clean out all debris** and reinstall the back panel. All units have been shipped in a tested and working condition. Any damage to the control panel is the responsibility of the installing electrician.

## Line and Load Wiring

The DC Flex controller must be powered from a 208 to 240 VAC circuit that is current limited to a 20 to 30 Amp circuit breaker or fuse, one such line feed for each of up to four heat cable circuits. Circuit one also supplies power to the controller.

Wire and conduit used must be consistent with local electrical codes. Note the Flex back panel is clearly marked as to where to connect the line power inputs and the heat cable load outputs.



# GFEPD 30mA (Model AC-EPD230)

These circuits must have ground fault protection with a 30mA trip current as required by the Article 426 of the NEC and the heat cable manufacturer. This is typically known as Ground Fault Equipment Protection Device.

## Circuit breaker integrated variety

GFEPD integrated circuit breakers can provide the necessary equipment ground fault protection required. These breakers must match the CB panel and be installed according to local codes. In the event the CB panel is out of date, no longer manufactured, or there is no more room in the panel, a sub panel or panel upgrade is required. Alternately, the AC-EPD230 may be used.



## Junction Box Option – AC-EPD230

One to four AC-EPD230 may be used as part of the digital controller installation. The incoming line feeds are routed through the controller enclosure directly to the GFEPD input leads, non-stripped. The GFEPD output is connected to the line input terminal.

## Wiring to the Junction Box variety GFEPD 230

The incoming line power is wire nudded to the non-stripped red and black GFI input. The GFI output, red and black striped wire are connected to the line terminals strip appropriate circuit. All GFEPD should be offset from the back of the panel by 1.5” using suitable 2x lumber sized to fit the number of GFEPD230 units installed.



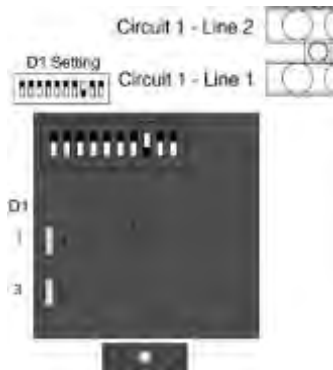
## Delay Timer

Flex has the added feature of a delay timer. The timer delays the energizing of circuits 2 and 4, relative circuits 1 and 3. The timer is adjustable from 1 to 1023 seconds. 128 seconds is the typical amount of time it takes the heat cables to come up to temperature. Start-up current draw can be quite during this heat-up period. The delay offsets the impact on the electrical system.

It is possible that site specific conditions may make it desirable to adjust this setting. To determine the total time delay, add the numbers associated with switches set in the ON position. These numbers are printed on the delay timer below the switch or can be found in the right side column in the table below.

Switch Number	Delay Value
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128
9	256
10	512

If the default factory setting is to be used, please verify the delay timer setting as 128 seconds per the illustration below. This corresponds to two minutes and 8 seconds.





# Temperature Probe

## Accuracy

There can be many features that affect the accuracy of temperature readings of your controller performs. The place where your thermistor probe is mounted may be warmer due to heat radiated from the building, solar gain, or other factors. The thermistor should always be mounted in a shaded location (preferably on the north side of the structure) and away from other sources of heat (i.e. furnace exhaust or dryer venting). The more accurately the controller reflects your site conditions, the more efficient and effective your system will be. If your temperature reading is more than 1 degree off, then follow the instructions on calibration.

## Calibration

Place your thermistor probe in a glass of iced water. Make sure your probe is completely surrounded by water. Turn you controller to ECO. Iced water should read 32F degrees or slightly above. If your controller is reading warmer than that, the difference is what the calibration value is.

To calibrate, press and hold the SET button for 8 seconds until it flashes 0. Press the set button once and SP1 will display. Press the ARROW UP button successively until P1 displays. Adjust with the ARROW UP or ARROW DOWN. Use negative values for a controller that is reading warmer than actual temp. Use positive values for a controller that is reading colder than actual temp. Once the value is inputted, press set and then turn the controller off. The value is now recorded.

During the first winter, occasional confirmation of the readings against a reliable ambient temperature source is recommended to ensure the calibration adjustment is correct. Further adjustment may be required.

## Non-Polarized

The temperature probe is non-polarized, so it does not matter which wire is attached to which terminal of the T3 terminal strip.

## Mounting

Attach the cable clamp to solid point near the probe end. Use additional cable clamps as needed. Do not attach the probe end to thermally conductive material such as aluminum siding, as this will measure the siding temperature. Large thermal masses will slow the response to weather changes. Use plastic or wood blocks to isolate the probe from such materials.

## Installation Testing

### Visual Inspection

Visually inspect all connections and wiring (including junction box and heat cable power connections/end seals) to ensure proper connection and code compliance. Loose wires and poor wire nut connections can result in the non-operation of or damage to the Flex controller and heat cable system.

### Insulation resistance test (“Megger” Testing)

All heat cable circuits should be tested for insulation resistance according to the instructions from the heat cable manufacturer. The use of an insulation resistance tester (Megger Tester) is required for this. Submission of these results is a requirement for any heat cable system warranty. If the heat cables do not pass the insulation resistance test, they must be replaced or repaired before operating the system.

### Operational test

Once all components are installed and connections completed, an operation test should be completed.

Test the GFEPD (breaker or junction unit) for fault trip and reset. Using the “Max” setting, turn on the heat cable circuit and test for Amp draw. Do this for each circuit installed. Should you desire to test the controller temperature function when temperatures are well above freezing, you must adjust the set values. Using the “Eco” function, adjust the value of Set 1 above current ambient temp by more than 5F degrees. Press Set twice to return to ambient temperature reading. The first relay should trigger immediately. The second relay should trigger after 2 minutes (or current delay timer setting). Confirm relays are functioning properly.

If relays do not function properly or if Amp draw readings indicate a problem, confirm all connections inside the control panel, circuit breaker panel, and junction box locations (line voltage and heat cable). If all connections are proper and complete, contact Edge Melt Systems at 888-360-7872 for further instructions.

### Installer identification

At the completion of the installation, complete the installer information on the label on the side of the panel.

## In Service

Make sure that the breaker for the controller is in the ON position **AND** the EPD breaker or GFEPD is in the ON/RESET position as well. The circuit breaker is located in your circuit breaker panel and not in the controller itself. The AC-EPD230 is located near your Flex Controller.

Systems need to be energized several hours prior to expected snowfall. This is done by making sure there is power to your Flex Controller and then setting the switch on the controller to the Eco (Auto) or Max (Manual) position. The center position on the switch is "OFF"

"Max" operation allows the controller to turn on the cables regardless of outside temps. It operates just like a switch.

"ECO" operation reads the outside temps and turns the cables on based on the settings. Factory set points are 39F and 9F with a 4F degree hysteresis (allows for 4F degree difference when the temperature is rising above the set points). The built-in hysteresis accounts for the difference in snow/ice melting requirements between rising and lowering temps. When temps are outside of the set point range, the controller will not send power to the heat cables. This will allow for the most efficient operation of your system ensuring it is warm enough to start melting snow as it is falling. These set values are field adjustable. SEE TEMPERATURE CONTROLLER PROGRAMMING.

The system should be left on while there is snow on the roof. This allows for the prevention of ice formation from melted snow. Snow can melt from temperatures fluctuating above and below freezing, heat loss from the home/business, and/or solar gain.

The system may be turned off using the switch on the controller while there is snow on the roof depending on how much melting is occurring. This is at your peril.

The system may be turned off when temperatures rise above 35 degrees (this allows for the slower warm up of roof and gutter surfaces) or is below 5 degrees (depending on the level of heat loss and snow build up on your roof). This is at your peril.

If your system is left off while snow and/or ice accumulates, it may clear once the system is turned on. This is entirely dependent on weather conditions. Failure of the system to recover entirely if the system is left off while snow and

ice accumulate is the responsibility of the owner. Systems may be turned off when no snow is on the roof. You must remember to turn the systems back on once snow is expected.

## Temperature Controller Programming

The Temperature Controller is shipped preconfigured so that further programming is not required. **Your controller is shipped with the preprogrammed set points of 39°F and 9°F.** The temperature probe has been calibrated to the controller at the factory. Occasionally, small adjustments may need to be made to the turn on or turn off set point temperatures.

The operational concept is that above 35°F snow will melt without applying heat. Below 5°F snow will not melt if no heat is applied and can remain in this state until the outdoor temperature rises above 9°F. At that point, the controller re-energizes the heat cable system. Additionally, as ambient temps rise above freezing, surface temps react less quickly. The 4F degree hysteresis allows for the cables to be turned off when the ambient temperature rises above 39°F.

The Temperature Controller is configured for Set 1 to turn on the heat cables when outdoor temps fall below 35°F and of when temps rise above 39°F. Set 2 is programmed to turn off the heat cables when temps fall below 5°F and on when temps rise above 9°F. These set points are field adjustable to allow for regional differences and heat loss considerations. For areas where deep snow loads can create insulating factors, the low temp set point should be adjusted down accordingly to account for heat loss melting at lower temps.

To change set point values, turn the controller to the “Eco” mode and press “Set”. The first setting will blink. Using the arrow buttons, adjust up or down to the desired setting. Once the desired setting is confirmed (or if no adjustment is being made to Set 1), press the set button. The next setting (Set 2) will come up. Using the arrow buttons, adjust up or down to the desired setting. Press the set button once again and the current temp reading will display. Your new settings are now programmed into the controller.

## Limited Warranty

Eco controllers are warranted against defects in workmanship and materials for two years from the date of sale. This warranty does not apply to damage resulting from accident, misuse, or alteration nor where connected to voltage that is more than 5% above the configured operating voltage, nor to equipment improperly installed, wired, or maintained in violation of the Operating Guide. No other written or oral warranty applies. No employee, agent, dealer, or other person is authorized to give any warranties on behalf of GSB Services, LLC. Units returned for warranty repair cannot be modified from original shipped condition other than feeder holes for wiring. The customer shall be responsible for all costs incurred for the removal or reinstallation and shipping of the product for repairs. Within the limitations of this warranty, inoperative units should be returned, freight prepaid, to GSB Service LLC, and that GSB Services LLC IS NOT RESPONSIBLE FOR DAMAGES OF ANY KIND, INCLUDING INCIDENTAL AND CONSEQUENTIAL DAMAGE. Some states do not allow the exclusion of or limitation of incidental or consequential damages so the above exclusion may not apply to you. The warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

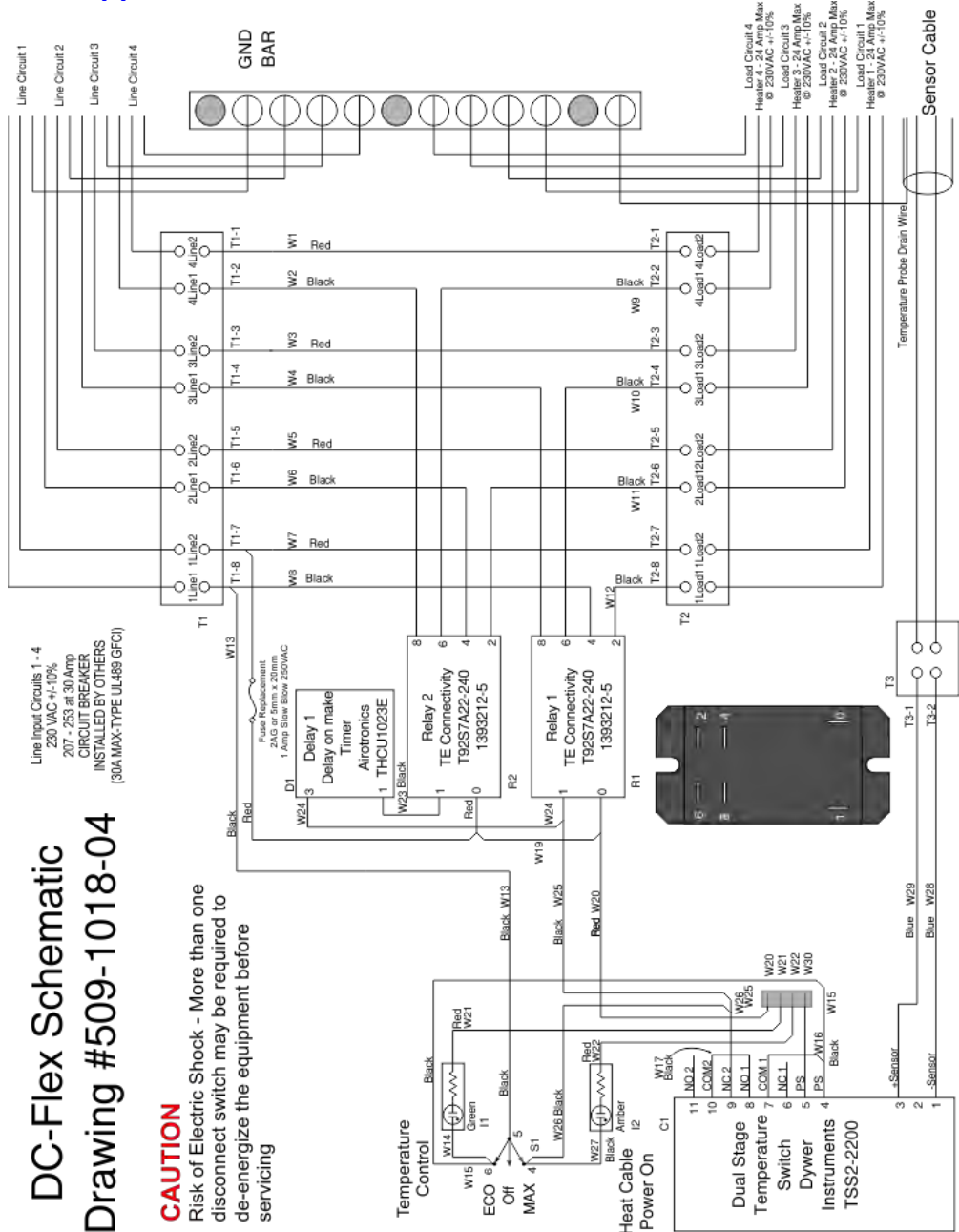
# Appendix - Schematic

## DC-Flex Schematic Drawing #509-1018-04

Line Input Circuits 1-4  
230 VAC +/-10%  
207 - 253 at 30 Amp  
CIRCUIT BREAKER  
INSTALLED BY OTHERS  
(30A MAX-TYPE UL489 GFCI)

### CAUTION

Risk of Electric Shock - More than one disconnect switch may be required to de-energize the equipment before servicing



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