



# LEC

Temperature Controller



# Full Featured Hot Runner Temperature Control . . . . . . competitively priced to fit your budget



Gammaflux is proud to introduce the new LEC temperature controller. The LEC provides a true breakthrough in hot runner controller performance and affordability. No longer do you have to pay top dollar to get top hot runner temperature control. Best of all, the LEC offers field-proven Gammaflux performance and reliability.

## Control for Up To 24 Zones

Designed for smaller hot runner system applications, the LEC is offered with 2, 6 and 12 zone enclosures. A network module allows you to link two 6 or 12 zone enclosures together for up to 24 zones of control. The LEC features a modular design for simple control card removal, addition or replacement.



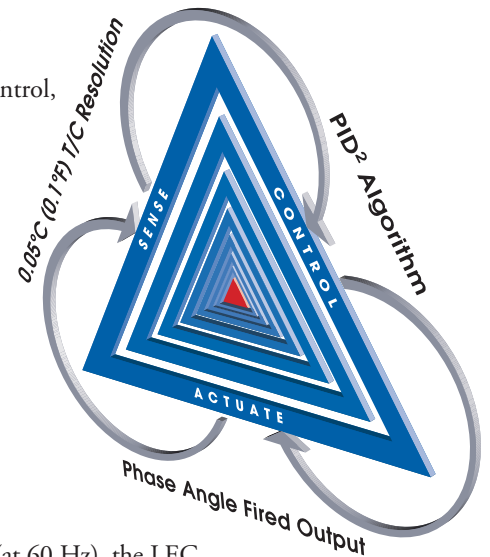
## Triangulated Control Technology™

All Gammaflux hot runner temperature controllers feature Triangulated Control Technology™. Using this unique technology, our controllers:

- 1) **Sense** – 20 times per second, Gammaflux controllers precisely measure the thermocouple;
- 2) **Control** – the proprietary self-optimizing Gammaflux PID<sup>2</sup> control algorithm adjusts if the actual temperature deviates 0.1° F (0.05° C) from setpoint. The second derivative (PID<sup>2</sup>) monitors the actual temperature rate of change. As a result, the LEC module regulates the output to the heater in advance of achieving setpoint to limit or eliminate over or undershoot.
- 3) **Actuate** – using phase angle fired output, the Gammaflux controller delivers smooth and exact power to each heater in 0.24 VAC increments for the ultimate in temperature control.

Triangulating your process with a Gammaflux controller means achieving better temperature control, that could result in:

- enhanced part quality
- reduced scrap
- improved part weight consistency
- material savings
- higher profit margins



## Protection

Closed loop wet heater bakeout - 120 times per second (at 60 Hz), the LEC module checks the heater for a short, steadily ramping up the voltage for the fastest possible time to set point. If the heater is wet or shorted, the output is adjusted within 8.3 milliseconds to protect the heater, cables and controller.

## Extensive Diagnostics

Each 6 and 12 zone LEC enclosure comes prewired, ready to accept an optional network module. With a network module, users can connect the LEC to a laptop or PC to take advantage of advanced features including; security settings, remote input, and unique Gammaflux software including Gammavision (SPC data/graphing analysis), Mold Doctor (advanced mold troubleshooting), and Field Calibrator. The network module also enables a link to plant monitoring systems.

## Two Year Warranty

Every LEC controller comes with a full 2-year warranty and is backed by the industry-leading worldwide service and support that our customers expect from Gammaflux.

# Advanced Module Settings

- (1) \* Reset advanced setup to default values
- (2) Temperature deviation alarm set point
- (3) Control algorithm setting/adjustment
- (4) Algorithm set point (view only)
- (5) Standby set point
- (6) Thermocouple pinched detection time
- (7) \* Critical over temperature alarm
- (8) \* Automatic set point limit
- (9) \* Manual set point limit
- (10) \* Boost limit
- (11) \* Initial boost set point
- (12) \* Boost time set point
- (13) \* Degree F or C selection
- (14) \* Type J or K thermocouple selection
- (15) \* Zone power status on power up
- † (16) \* Enable slaved power-up
- † (17) \* Security code level 1
- † (18) \* Security code level 2
- (19) Output module controller software version/revision
- (20) Temperature controller software version/revision
- (21) LED test
- † (22) Security level indicated/change

Set individually by zone

\* Network module distribution or value applies to both zones on the module

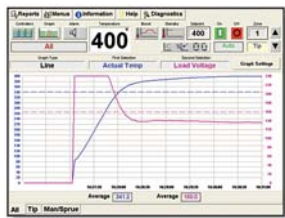
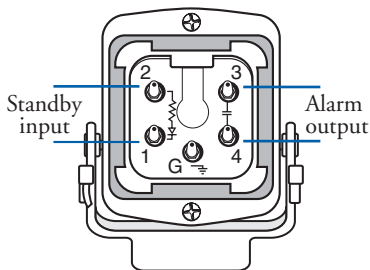
† Network module required



# Network Module Features

- 🔄 Manages information for 1 or 2 enclosures
- 🔄 Slaved Power Up – evenly heats all zones to setpoint
- 🔄 Security Levels – Supervisor, Operator and Lockout
- 🔄 Remote Input – Programmable Inhibit or Standby
- 🔄 Alarm Output – when any alarm is active
- 🔄 \* Gammavision – SPC data/graphing
- 🔄 \* Mold Doctor – Advanced troubleshooting
- 🔄 \* Field Calibrator – Thermocouple offsets
- 🔄 Link to plant monitoring system or machine

\* Laptop/PC required



Display

Actual Row

Setting Row

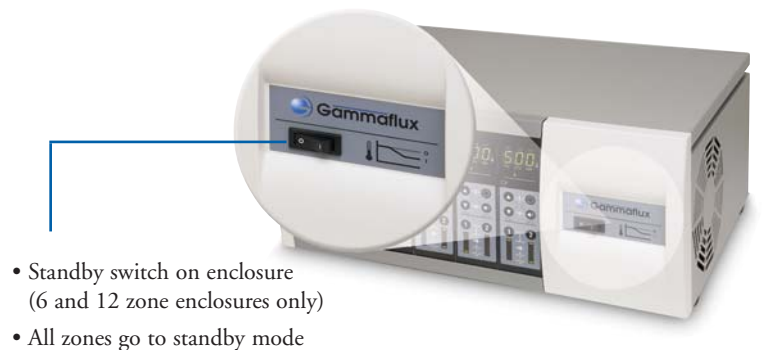
Entry Area

Zone Select

Zone Status

Zone ID

	Thermocouple Open
	Thermocouple Pinched
	Thermocouple Reversed
	Degrees C
	Type K Thermocouple
	Uncontrolled Output
	Open Fuse
	Shorted Heater
	Open Heater
	Alarm Status
	Actual Temperature
	Actual % Output
	Actual Current (Amps)
	Automatic/Manual Mode
	Manual % Output Set Point
	Automatic Set Point
	Select
	Enter
	Increment (Up)
	Decrement (Down)
	Power "On"
	Power "Off"
	Standby
	Boost
	First Zone (Zone 1)
	Second Zone (Zone 2)



Since 1966 GAMMAFLUX has been the premier manufacturer of temperature control systems for hot runner injection molders. In addition to producing the most advanced temperature control and tool fault detection systems in the marketplace, our technology is available in a variety of temperature controllers that can accommodate any budget.

## LEC Specifications



### Performance

Thermocouple Calibration Accuracy	0.2°F (0.1°C)
Control Accuracy	+/-1°F (+/-0.5°C)
Heater Short Detection Time	8.3 msec. or 120 times per second at 60 Hz
PID <sup>3</sup> Algorithm Execution Time	50 msec. or 20 times per second
Tuning	Automatic, self optimizing, manual override
Manual Mode	Power compensation for incoming voltage variation
Degree F or C	Field selectable
Operating Range	0 - 932°F (0 - 500°C)
Output Range	0 - 240 VAC, Phase angle fired, 1000 steps
Standby Temperature	User selectable, 0 - 932°F (0 - 500°C)
Remote Input (Network Module required)	24 or 120 VAC/VDC Programmable inhibit or standby

### Input Specifications

Thermocouple	Type J standard, Type K selectable (Grounded thermocouples only)
Cold Junction Compensation	Internal to enclosure
External Resistance	10 Meg. Ohms
Temp. Variation due to T/C Length	None

### Electrical

Input Voltage	180 - 265 VAC Delta/Wye
Frequency	47 - 53 Hz, 57 - 63 Hz
Ambient Temperature Range	32 - 115°F (0 - 45°C)
Humidity Range	10 - 95% non-condensing
Output Module Rating	240 VAC; 2 zone - 15 amps/zone 3600 watts/zone
Communications Electrical Standard	RS-232 standard, RS-485 selectable

### Connections

Standard enclosure (2 zone)	HBE16 dual latch (combination power and thermocouple)
Standard enclosure (6 and 12 zone)	(2) HBE24 dual latch (one power, one thermocouple)
Standard tool end of cable	HA4 (2 zone only), HBE10, HBE16, HBE24, DME <sup>®</sup> (PIC/MTC5, 8 & 12), HBE48, or flying leads
Thermocouple cables	Choose between stranded (stack mold or high stress applications), and solid core (basic applications)
Custom enclosure	DME <sup>®</sup> (two HD25) or HBE48
Custom tool end of cable	Contact Gammaflux with your requirements

### Additional Customization

Input power cable	12 ft. (3.6m) standard, 15, 20 and 30 ft. (4.5, 6.1, and 9.1m) lengths available
Length of mold power and T/C cables	15 ft. standard (4.5m), 20 and 30 ft. (6.1, 9.1m) lengths available
Circuit breaker	Select the circuit breaker to meet your requirements

### Performance Standards

U.S., Canadian and International	CE Mark; I.E.C. 801-1, 801-2, 801-3, 801-4 * Safety UL-508, UL-873 and CSA
----------------------------------	---

\*Designed to meet

### Physical Specifications

	Height (inches/millimeters)	Width (inches/millimeters)	Depth (inches/millimeters)	*Weight (pounds/kilograms)
2 Zone Enclosure	9/229	13/330	16/406	23/10
6 Zone Enclosure	9/229	13/330	16/406	28/13
12 Zone Enclosure	9/229	19/483	16/406	43/20
24 Zone Stacked Enclosure	18/457	19/483	16/406	86/36

\*Weight includes maximum amount of output modules, excludes cables  
Specifications subject to change without notice  
DME<sup>®</sup> is a registered trademark of D-M-E Company



### Global Headquarters

Gammaflux L.P.  
113 Executive Drive  
Sterling, VA 20166, USA  
Toll - Free (800) 284-4477, or  
Tel. +1-(703) 471-5050  
Fax +1-(703) 689-2131  
eMail info@gammaflux.com  
[www.gammaflux.com](http://www.gammaflux.com)

### European Headquarters

Gammaflux Europe GmbH  
Bahnstrasse 9a  
D-65205 Wiesbaden-Erbenheim,  
Germany  
Tel. +49-(0)-611-973430  
Fax +49-(0)-611-9734325  
eMail info@gammaflux.de  
[www.gammaflux.de](http://www.gammaflux.de)

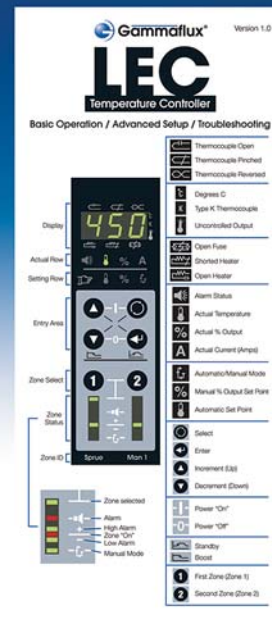
### Asia-Pacific Headquarters

Gammaflux Asia-Pacific  
Penguin Mura B202  
Nishi Kiwa-ku, Osawa  
Yamaguchi, Ube 755-0151  
Japan  
Tel./Fax +81-(836) 54-4369  
eMail gammafluxjpn@  
gammaflux.com

## Summary

- Gammaflux Reliability
- Easy to Use
- Gammaflux Control
- Extensive Diagnostics
- Time Saving Features
- Material Saving Features
- Security
- Competitively Priced

## User's Card



Step by step user's card eases system operation and are available in a variety of languages.

### Your Local Representative