

Control **G24**

The G24 Temperature Controller



The G24 Temperature Controller

Gammaflux, the world leader in temperature and sequential valve gate controllers, introduces the next generation in temperature control: the G24. Focused on the plastics industry, Gammaflux is an expert in process optimization. The G24 is everything you would expect in a next generation control system from Gammaflux:

- Easier to Use (New Mold Wizard)
- Less Expensive
- Smaller
- Faster
- More Flexible/Standardization
- Improved Interlocks
- Mold Doctor®
- Early Material/Plastic Leak Detection
- 5 Year Warranty*

Partnership

Most Gammaflux temperature controllers are used on hot runner injection molding applications. However, they are also frequently used for controlling thermoset, liquid injection molding (LIM), reaction injection molding (RIM), injection blow molding, extrusion blow molding, blow molding conditioning stations, thermoforming, profile extrusion, sheet extrusion and other dynamic applications. Each of these processes requires a temperature controller. If the temperature controller fails, the process either stops or is crippled. When selecting a temperature control supplier, you are selecting a partner who is critical to your product and profitability.



Triangulated Control Technology®

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

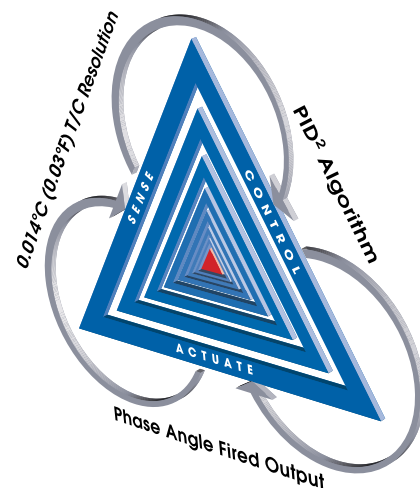
Sense – Twenty (20) times per second, Gammaflux controllers precisely measure the temperature.

Control – The proprietary self-optimizing Gammaflux PID² control algorithm adjusts if the actual temperature deviates 0.03°F (0.014°C) from set point. The second derivative (PID²) monitors the actual temperature rate of change. As a result, the output to the heater is regulated in advance of the typical proportional band to limit or eliminate over and undershoot.

Actuate – Using phase angle fired output (0.1% resolution; 1000 steps), the Gammaflux controller delivers smooth and exact power to each heater for the ultimate in temperature control.

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

- Enhanced part quality
- Reduced scrap
- Improved part weight consistency
- Material savings
- Higher profit margins



Power Priority®

“Low mass”, or extremely small hot runner nozzles are a unique challenge to control. To smooth the power and the melt heat history, Gammaflux created Power Priority®. Power Priority® smooths the power output to individual zones. Users have the option to manually apply a Power Priority® set point from 1 (light) to 4 (heavy), providing unparalleled control for applications where it is most needed.

Protection

Closed loop wet heater bakeout - 120 times per second (at 60 Hz), the G24 module checks the heater for a short. If the heater is shorted, the output is adjusted within 8.3 milliseconds to protect the heater, cables and controller.

Reliability

Gammaflux products lead the market in reliability. The expected life is 10 – 15 years based on the quality of heater electrical maintenance. Some Gammaflux controllers have been in continuous operation for 25+ years.

Easier to Use (New Mold Wizard)



Best industry practices and actual operation are often not the same. The G24 is designed to be understood with 5 minutes of training, and programmable to automatically operate according to the industry's best practices. The Gammaflux New Mold Wizard effortlessly guides the user through (1) zone identification and group creation, (2) setpoint entry, (3) monitor zone configuration, (4) sophisticated mold startup functions, (5) advanced zone monitor functions, (6) heating the mold and (7) saving the menu. During this process the software automatically tunes each zone, engages the plastic leak detection alarm, sets the imminent heater failure alarm and saves everything back to the mold menu automatically after the "good parts" button is confirmed by the operator. The Wizard makes everyone a controller configuration expert.

Less Expensive

By leveraging the global electronics supply chain with new components that take the place of multiple previous components, Gammaflux has been able to reduce the price of the G24 product line in relation to existing Gammaflux products. Gammaflux, long known as the reliability and control leader in the industry, combines a competitive price with superior performance in the G24 controller.

Smaller

Each control module has a 15 or 30 amp per zone output rating. Up to 24 zones can be placed in a single control block. When compared to the Gammaflux TTC product line, this specific 128 zone controller has a 48% smaller footprint.

Faster

The G24 utilizes industrial USB connectivity for up to a 0.1 second screen update rate. Streaming real-time control numbers to the screen allows the user to better see what is happening inside the tool so they can diagnose difficult to understand issues.

More Flexible/Standardization

The standard two zone 15 amp per zone output module easily controls both tip and manifold zones making the controller easy to use across a range of molds for effortless production scheduling. The G24 is even able to control up to 30 amp zones with a 15 amp module by restricting the maximum output to 15 amps using our RMS limiting feature. Standardizing with Gammaflux allows you to pick the best manifold supplier for your specific application. Choosing a combined controller/manifold package will inevitably result in multiple control brands to support and learn.

Improved Interlocks

The tools of today are far more sophisticated and sensitive than the tools of yesteryear. Machine interlocks ensure bad parts are not produced and catastrophic damage is avoided. The G24 makes the interlocking task easier than ever with on-screen interlock signal inversion and manual testing signals to speed setup.

Mold Doctor®

Automate your mold troubleshooting with Mold Doctor®. Elusive problems that appear suddenly and without changes to the process can be diagnosed with a quantitative thermodynamic zone analysis.

Early Leak Detection

When material/plastic leaks into the mold it occupies a former air space. Eliminating the air space creates a heat sink to the surrounding mass. In automatic mode, the controller increases the power to compensate for the loss in heat. The New Mold Wizard automatically sets the watt baseline and engages the alarm after the "good parts" part button is confirmed by the operator. Precisely measuring the actual wattage can be the difference between a short trip to the tool room or weeks of lost production.

5 Year Warranty*

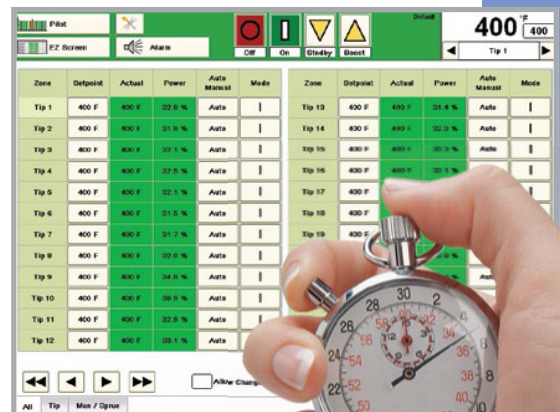
Every G24 controller comes with a full 5-year warranty and is backed by the industry-leading worldwide service and support that our customers expect from Gammaflux.



128 zones
96 cavity

Delta: 150 amp
Wye: 70 amp

Width: 20in / 50.8cm
Depth: 23in / 58.4cm
Height: 50.25in / 127.6cm



*2 year warranty on the touch screen interface

G24
Easy to Use

Standard Configurations

Control Blocks

Half size control block
 12 zones (15 amp per zone)
 Maximum zones and circuit breaker
 shown for each enclosure

Control Blocks

Full size control block
 24 zones (15 amp per zone) or
 6 zones (30 amp per zone)
 Maximum zones and circuit breaker
 shown for each enclosure

Options

Remote Mount Touch Screen
 21 feet, 6.4 meters or 42 feet, 12.8 meters
Daisy Chain
 Link multiple enclosures



M
 12 zones
 Delta: 50 amp
 Wye: 30 amp



T1
 24 zones
 Delta: 100 amp
 Wye: 60 amp



T1
 24 zones
 Delta: 150 amp
 Wye: 80 amp



T2
 48 zones
 Delta: 100 amp
 Wye: 60 amp



T2
 48 zones
 Delta: 200 amp
 Wye: 100 amp



MS
 12 zones
 Delta: 50 amp
 Wye: 30 amp



S1
 24 zones
 Delta: 100 amp
 Wye: 60 amp



S2
 48 zones
 Delta: 100 amp
 Wye: 60 amp



S2
 48 zones
 Delta: 200 amp
 Wye: 100 amp



S3
 72 zones
 Delta: 200 amp
 Wye: 100 amp

Standard Circuit Breakers

| Enclosure | 30 | 50 | 60 | 70 | 80 | 100 | 125 | 150 | 200 | 250 | 300 |
|-----------------------|--------|--------|-----|--------|-----|--------|--------|--------|--------|-------|-------|
| M or MS | D or W | Delta | | | | | | | | | |
| S or T short top | D or W | D or W | Wye | Delta | | Delta | | | | | |
| S1 or T1 tall top | | D or W | Wye | Delta | Wye | Delta | Delta | Delta | | | |
| S2, S3 or T2 tall top | | D or W | Wye | Delta | Wye | D or W | Delta | Delta | Delta | | |
| D tall top | | D or W | Wye | D or W | | D or W | D or W | D or W | D or W | Delta | Delta |



Machine Mount

Compatible Enclosures
T1, T2, T3 and T4



D2

96 zones
Delta: 300 amp
Wye: 200 amp



D3

144 zones
Delta: 300 amp
Wye: 200 amp



D4

192 zones
Delta: 300 amp
Wye: 200 amp

Cable Hanger

Cable Hanger

The optional cable hanger can be added to any G24 controller. Constructed of steel this durable double sided cable holder eases controller storage and transport.



Transformers

Transformers

Optional 480 VAC to 240 VAC Delta/Delta three phase 2:1 step down transformers are available. The smaller transformer pod can contain a 15, 30 or 45 kva transformer. The larger transformer pod can contain a 75 or 112 kva transformer. Each transformer pod is detachable, has forced air cooling and an independent circuit breaker.



New Mold Wizard



Startup Wizard

Existing Mold

Select a Menu

- Default.mnu (2013-07-26 5:12 PM)
- Default_1.mnu (2013-07-26 5:16 PM)
- Mold 1628.mnu (2012-11-16 1:41 PM)
- Mold 45828.mnu (2012-10-16 10:14 AM)

Menu Selected: Default.mnu

New Mold Wizard

Start the Mold Wizard

Step 1 - Identify Zones in the Mold
 Step 2 - Enter Setpoints
 Step 3 - Setup the Monitor Zones
 Step 4 - Setup the Mold Startup Functions
 Step 5 - Setup the Zone Monitor Functions
 Step 6 - Heat the Mold
 Step 7 - Save a Menu

Automatically Turn the Zones
 Automatically Engage the Zone Leak Detection
 Automatically Engage the Heater Failure Detection

Tool Room

Mold Doctor®

Wiring Analysis
Thermodynamic Analysis
Fault Analysis
Historical Mold Performance

Main Screen

Min Alarm: 81 F

Tip 1

Tip 1: 81 F, Tip 2: 81 F, Tip 3: 81 F, Tip 4: 81 F, Tip 5: 81 F, Tip 6: 81 F, Tip 7: 81 F, Tip 8: 81 F, Tip 9: 81 F, Tip 10: 81 F, Tip 11: 81 F, Tip 12: 81 F, Tip 13: 81 F, Tip 14: 81 F, Tip 15: 81 F

All Tip Man-Sprue Monitor

Launch

2 Set

4 Program

6 Heat

Startup Wizard

Mold Startup Wizard Zone Analysis

Step 1/7

Start the Zone Analysis

Zone analysis is complete.

| # | Zone | Heat Status | Actual Value | Peak Amps | Peak Watts | Zone Type | Comments |
|-----|---------|-------------|--------------|-----------|------------|-----------|----------|
| 121 | Tip 121 | Off | 80F | 6.39 A | 96 W | Tip | OK |
| 122 | Tip 122 | Off | 81F | 6.40 A | 96 W | Tip | OK |
| 123 | Tip 123 | Off | 80F | 6.39 A | 96 W | Tip | OK |
| 124 | Tip 124 | Off | 79F | 6.40 A | 96 W | Tip | OK |
| 125 | Tip 125 | Off | 81F | 6.39 A | 96 W | Tip | OK |
| 126 | Tip 126 | Off | 80F | 6.40 A | 96 W | Tip | OK |
| 127 | Tip 127 | Off | 80F | 6.39 A | 92 W | Tip | OK |
| 128 | Tip 128 | Off | 82F | 6.39 A | 96 W | Tip | OK |
| 129 | Sprue | Off | 84F | 7.62 A | 1,829 W | Sprue | OK |
| 130 | Man 1 | Off | 83F | 7.82 A | 1,877 W | Man | OK |
| 131 | Man 2 | Off | 81F | 7.80 A | 1,870 W | Man | OK |
| 132 | Man 3 | Off | 85F | 7.95 A | 1,908 W | Man | OK |
| 133 | Man 4 | Off | 84F | 7.83 A | 1,880 W | Man | OK |
| 134 | Man 5 | Off | 84F | 7.55 A | 1,813 W | Man | OK |

1 Learn

3 Protect

5 Predict

Startup Wizard

Setpoint Table

Step 2/7

| Zone | Tip 1 | Tip 2 | Tip 3 | Tip 4 | Tip 5 | Tip 6 | Tip 7 | Tip 8 | Tip 9 | Tip 10 | Tip 11 | Tip 12 | Tip 13 | Tip 14 | Tip 15 |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| Setpoint | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Manual % SP: 0.0

Is Manual: ☐ Locked: ☐ Value: 79.7 Deviation: 79.7

Enter Temperature Setpoint

Tip 1

Upper Limit: 750

Entry Was: 0 4 0 0

Lower Limit: 0

Send SP to the 'All' Group
 Send SP to the 'Tip' Group
 Send SP to the 'Man-Sprue' Group
 Send SP to the 'Monitor' Group

Send SP to Tip 1

Cancel

Allow Changes

All Tip Man-Sprue Monitor

Startup Wizard

Monitor Zones

Step 3/7

Zone: Monitor 1

Is a Monitor Zone: ☒

Temperature Value: 82

Test for High Alarm: ☒

High Alarm Setpoint: 100

Test for Low Alarm: ☒

Low Alarm Setpoint: 40

In Alarm: ☐

Monitor Zones Alarm Setup:

☐ Alarm Only

☐ Activate Standby for the 'Remote Standby' group when a Monitor Zone Alarm is detected

☒ Turn Off all of the zones in the controller when a Monitor Zone Alarm is detected

☒ Include Monitor Zone Alarms in the 'OK to Run' output

Monitor Zone Alarm Delay Time (sec): 20

Allow Changes

All Tip Man-Sprue Monitor

Startup Wizard

Mold Startup Functions

Step 4/7

Sequence Start ☒ Even Heat ECO Startup ☒

Sequence Cool ☐ Even Cool ☐

Sequence Start is a function that will automatically turn ON groups of zones in a programmable sequence. The function can contain 1-4 stages. A stage is enabled with the use of the checkbox by the name of the stage.

Sequence Cool is a function that will automatically turn OFF groups of zones in a programmable sequence. The function can contain 1-4 stages. A stage is enabled with the use of the checkbox by the name of the stage.

Even Heat is a function that forces all zones in the selected group to stay within 20F (11C) of the coldest zone in that group during start-up. This is commonly used to bring tips up to temperature along with the slowest manifold zone, thereby ensuring that the tips are not at setpoint for a long time waiting for the manifolds to come up to temperature. The zones will remain in Even Heat until they are within 20F (11C) of their final setpoint. A selection of '...' will disable the Even Heat.

Even Cool is a function that will automatically lower the temperature setpoints of all of the zones in the selected group. All zones in the selected group will stay within 20F (11C) of the hottest zone in that group during cool down. All of the manual zones in the Even Cool group will be turned off when the function is started. All of the zones in the system will be turned off when all of the zones in the Even Cool group are lower than the completion point.

Startup Wizard

Mold Monitor

Step 5/7

Heater Watt Monitor:

☒ Enable Watt Alarm (Plastic Leak Detection)

Tolerance to apply to High Watt Alarm Outpoints: +10%

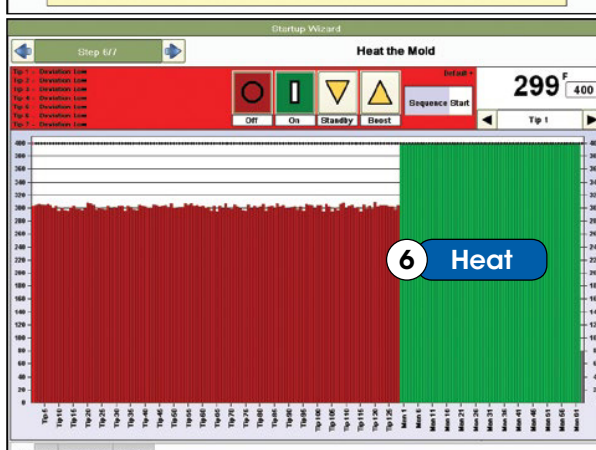
☒ Automatically Setup the Watt Alarm Monitor (Plastic Leak Detection) After the Zones have Heated

Heater Resistance Monitor:

☒ Enable Heater Resistance Monitor (Predict Heater Failure)

☒ Automatically Setup the Resistance Monitor (Predict Heater Failure) After the Zones have Heated

☒ Automatically Save Auto-Select Tuning to the Tuning Outpoint After the Zones have Heated



Startup Wizard

Save the Menu

Step 7/7

Select a Menu

- Mold 1745C.mnu (2013-07-26 5:58 PM)
- Default.mnu (2013-07-26 5:52 PM)
- Default_1.mnu (2013-07-26 5:46 PM)
- Mold 1628.mnu (2012-11-16 1:41 PM)
- Mold 45828.mnu (2012-10-16 10:14 AM)

New Menu Name: Mold 1745C.mnu

Save Menu

Making Good Parts? ☒ Confirm

Yes No Cancel

Mold Doctor®

Troubleshoot Your Mold

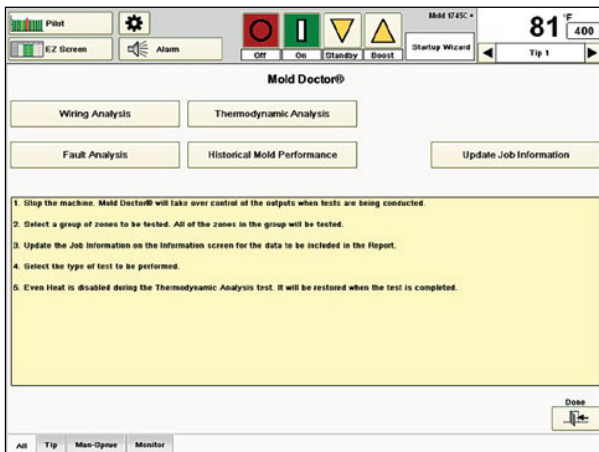
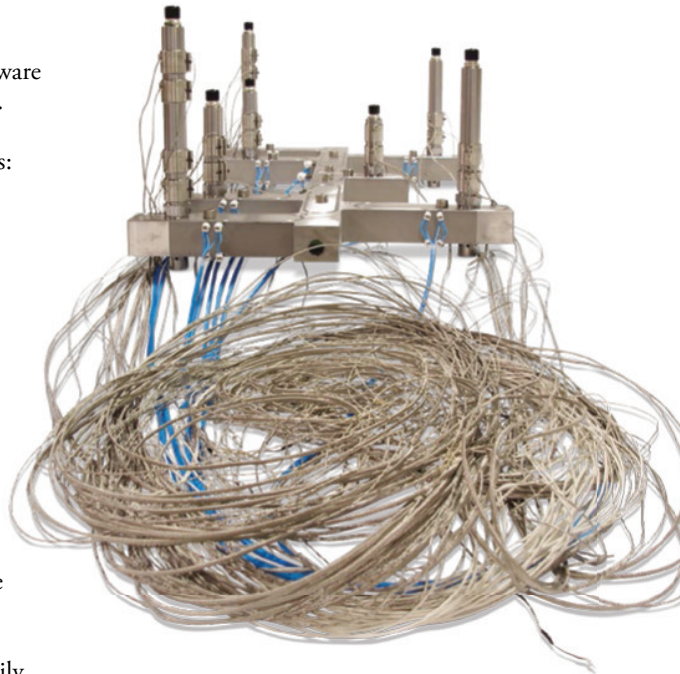
Mold Doctor® is an off-line (tool room), advanced troubleshooting tool consisting of four diagnostic tests:

Wiring Analysis: checks the wiring of the tool. The software clearly tells the user of miswired zones and how to fix them.

Fault Analysis: quickly identifies the following problems: thermocouple open, thermocouple reversed, thermocouple pinched, open fuse, heater short/wet, heater open, uncontrolled output and ground fault.

Thermodynamic Analysis: automatically heats all selected zones to 400° F (204° C) and cools to 330° F (165° C). During the heating and cooling process Mold Doctor® records critical information and reports to the user. Compare like zones against one another; major differences in the four key areas (resistance, power consumption, heating and cooling rates) will point you towards a solution. Once the tool is qualified, save a thermodynamic analysis as your known “good parts” baseline. Future problems will be easy to diagnose using the historical mold performance tool.

Historical Mold Performance: allows the user to easily compare a known “good” thermodynamic analysis baseline to the current “suspect” thermodynamic analysis. Intuitively troubleshoot your mold with hard data.



| Zone | Run Status | Actual Value | Heater Ohms | Heater Watts | @400F Watts | @400F Percent | Heating Rate F/min | Cooling Rate F/min | Comments |
|---------|------------|--------------|-------------|--------------|-------------|---------------|--------------------|--------------------|----------|
| Tip 110 | OK | 80F | 666 | 95 | 30 | 31.3 | 32.92 | 14.94 | OK |
| Tip 117 | OK | 79F | 628 | 92 | 30 | 32.4 | 31.96 | 15.23 | OK |
| Tip 118 | OK | 80F | 667 | 95 | 32 | 33.6 | 32.63 | 16.17 | OK |
| Tip 119 | OK | 80F | 624 | 93 | 31 | 33.4 | 32.09 | 16.66 | OK |
| Tip 120 | OK | 80F | 681 | 96 | 30 | 31.9 | 33.08 | 15.39 | OK |
| Tip 121 | OK | 80F | 612 | 94 | 30 | 31.6 | 32.48 | 14.93 | OK |
| Tip 122 | OK | 81F | 610 | 95 | 29 | 36.7 | 32.83 | 14.39 | OK |
| Tip 123 | OK | 80F | 611 | 95 | 29 | 31.8 | 32.89 | 14.74 | OK |
| Tip 124 | OK | 81F | 610 | 95 | 32 | 33.6 | 32.88 | 15.82 | OK |
| Tip 126 | OK | 80F | 611 | 95 | 31 | 32.6 | 32.45 | 15.41 | OK |
| Tip 126 | OK | 79F | 619 | 95 | 30 | 32.1 | 32.41 | 15.34 | OK |
| Tip 127 | OK | 80F | 628 | 92 | 31 | 33.6 | 31.76 | 16.64 | OK |
| Tip 128 | OK | 79F | 612 | 94 | 31 | 32.7 | 32.73 | 16.79 | OK |
| Spurn | OK | 82F | 32 | 1,809 | 312 | 17.1 | 12.82 | 2.21 | OK |
| Man 1 | OK | 79F | 21 | 1,877 | 294 | 15.7 | 13.29 | 2.25 | OK |
| Man 2 | OK | 79F | 21 | 1,872 | 297 | 17.9 | 12.96 | 2.26 | OK |
| Man 3 | OK | 79F | 30 | 1,908 | 308 | 16.1 | 13.28 | 2.46 | OK |
| Man 4 | OK | 78F | 21 | 1,888 | 295 | 15.7 | 13.11 | 2.32 | OK |

Calibration

Calibrate your controllers in house quickly, easily and without a calibration technician. Establish a thermocouple source equivalent to the controller. The difference between the calibrator value and the control screen is the calibration error. The Calibration software corrects the error with an accuracy of $\pm 0.2^\circ \text{F}$ ($\pm 0.1^\circ \text{C}$).

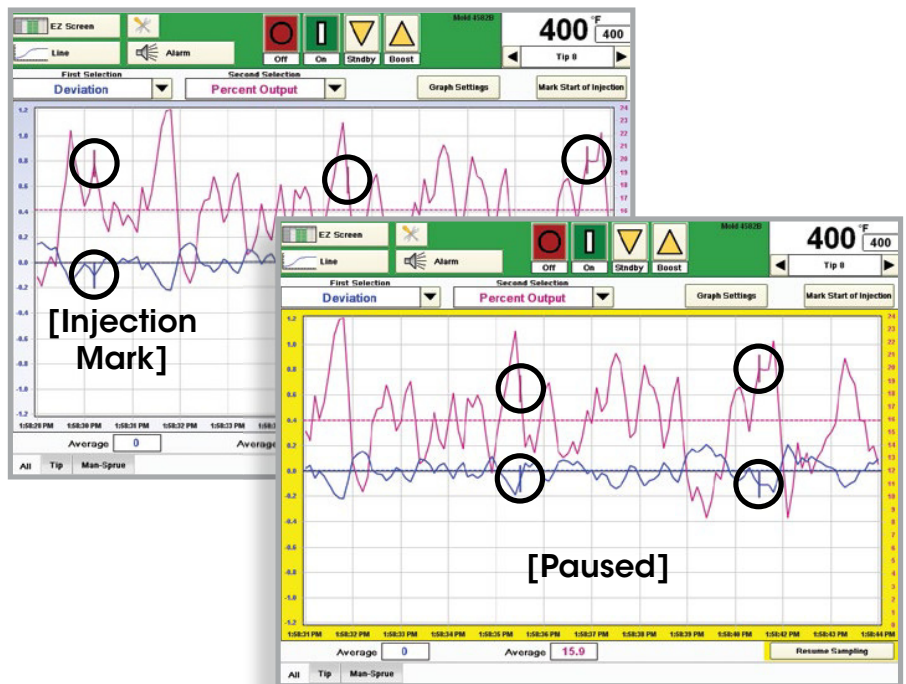
24

Mold Doctor®

Faster (0.1 sec Screen Updates)

Gammavision®

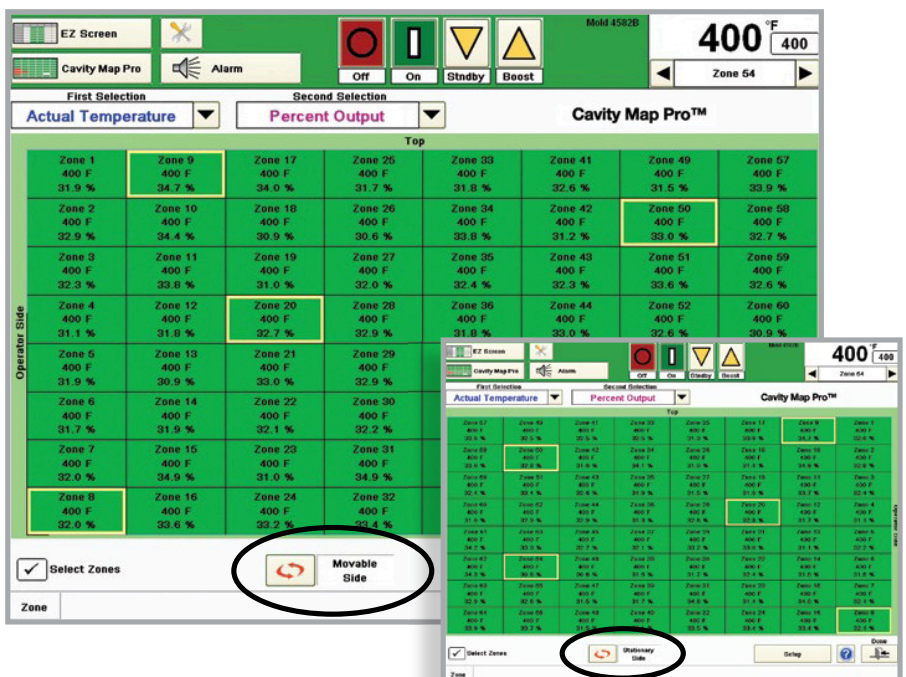
Gammavision® chart recorder and statistical analysis software allows the user to record the performance of their hot runner tool, print reports to the USB drive or watch databases of production runs on-screen with our playback mode. Pause live action on the line graph and manually or automatically place injection marks on the screen for in-depth analysis.



Cavity Map Pro™

Cavity Map Pro™

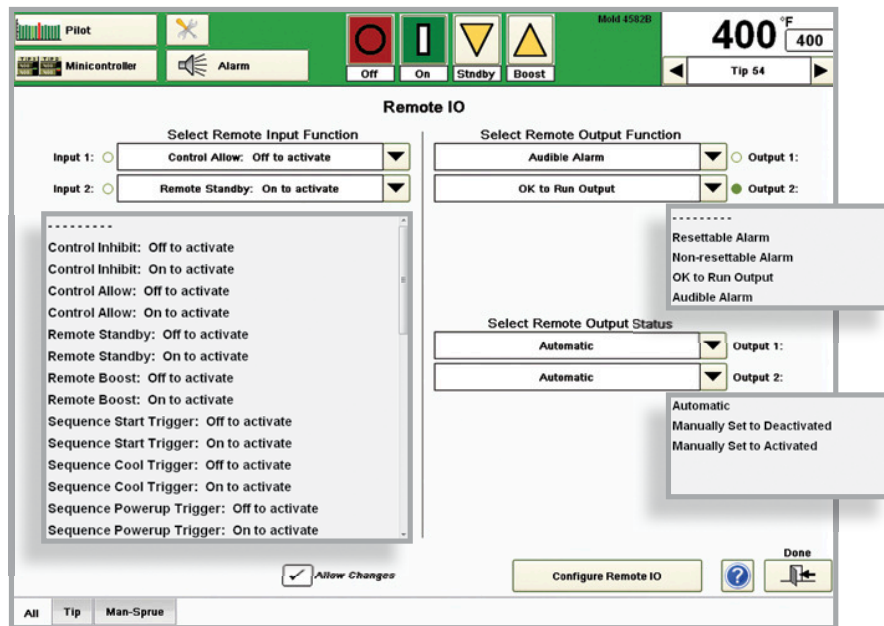
Quickly create a cavity map that is saved with the mold menu. The on-screen tools allow the user to create common tip layout patterns instantly. Select zones to study closer and flip the image to quickly identify which zone/cavity to change or investigate.



"Lights Out" Molding

Improved Interlocks

The tools of today are far more sophisticated and sensitive than the tools of yesteryear. Machine interlocks ensure bad parts are not produced and catastrophic damage is avoided. The G24 makes the interlocking task easier than ever with on-screen interlock signal inversion and manual testing signals to speed setup.



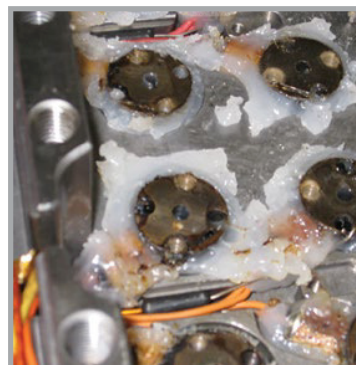
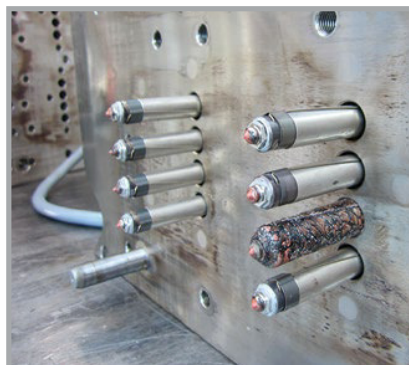
Early Leak Detection

Leak Detection Example Picture

The photo to the right is a picture of an actual leak that was detected early by the Gammaflux watt/leak alarm. As you can see the material started leaking out the backside of the tip but did not make it to the wires. Once the wires are coated in plastic the heater, thermocouple or both will need to be replaced. Detecting leaks early not only saves money but also speeds the mold back into service.



Actual Leak Detected with Alarm



Too Late – Example

Detailed Controller Comparison

| | LEC | TTC | Touch Screen Choice G24 Mini | G24 Full |
|--|-----|---------|---------------------------------|----------|
| Core Description | | | | |
| Temperature control | ■ | ■ | ■ | ■ |
| Temperature control - maximum zones | 24 | 280 | 48 | 480 |
| Sequential valve gate control - integrated option | | ■ | | |
| Sequential valve gate control - outputs | | 8/16/32 | | |
| 5 year warranty (2 years on touch screen interface) | ■ | ■ | ■ | ■ |
| Modular design | ■ | ■ | ■ | ■ |
| Controller warm up time - instant | ■ | ■ | ■ | ■ |
| If interface fails – the controller still controls | ■ | ■ | ■ | ■ |
| Emergency interface - use a Windows® computer | XP | XP | XP or 7 | XP or 7 |
| Automatic/manual control | ■ | ■ | ■ | ■ |
| Zone “on”, “off” and “locked off” | ■ | ■ | ■ | ■ |
| Set points in tenths | | ■ | ■ | ■ |
| Adaptive PID² control algorithm with Power Priority® | ■ | ■ | ■ | ■ |
| Algorithm is executed 20 times per second | ■ | ■ | ■ | ■ |
| Extended tuning ranges (fast/slow) | ■ | ■ | ■ | ■ |
| Output resolution 0.1% | ■ | ■ | ■ | ■ |
| Output attenuation - maximum output (1% increments) | | | ■ | ■ |
| RMS limit to module max. - control larger heaters | | | ■ | ■ |
| Phase angle firing (1000 Steps; 0.1%) | ■ | ■ | ■ | ■ |
| Wet heater bakeout | ■ | ■ | ■ | ■ |
| Power compensation in manual mode | ■ | ■ | ■ | ■ |
| Degree F/C | ■ | ■ | ■ | ■ |
| Thermocouple J/K | ■ | ■ | ■ | ■ |
| Thermocouple (T/C) filtering - none | ■ | ■ | ■ | ■ |
| T/C resolution 0.03° F (0.014° C) over full scale | ■ | ■ | ■ | ■ |
| T/C calibration accuracy 0.2° F (0.1° C) over full scale | ■ | ■ | ■ | ■ |
| Operating temperature 32-122° F (0-50° C) | ■ | ■ | ■ | ■ |
| Input power 180-265 VAC; 480 VAC optional | ■ | ■ | ■ | ■ |
| Delta/wye convertible option | ■ | ■ | ■ | ■ |
| Circuit breaker sized to load - TTC/G24 - 300 amp maximum | ■ | ■ | ■ | ■ |
| Actual Values | | | | |
| Actual temperature | ■ | ■ | ■ | ■ |
| % Output | ■ | ■ | ■ | ■ |
| Deviation from set point | | ■ | ■ | ■ |
| Amps (resolution 0.01 amps) | ■ | ■ | ■ | ■ |
| Volts | | ■ | ■ | ■ |
| Watts | | ■ | ■ | ■ |
| Kilowatt monitor (instant, average, max., min.) | | | | ■ |
| Ohms | | ■ | ■ | ■ |
| Alarms | | | | |
| (+) High temperature (adjustable; 20° F [10° C] default) | ■ | ■ | ■ | ■ |
| (-) Low temperature (adjustable; 20° F [10° C] default) | ■ | ■ | ■ | ■ |
| Thermocouple open (remembered % output) | ■ | ■ | ■ | ■ |
| Thermocouple reversed | ■ | ■ | ■ | ■ |
| Thermocouple pinched (adjustable time) | ■ | ■ | ■ | ■ |
| Open fuse | ■ | ■ | ■ | ■ |
| Shorted heater/wet | ■ | ■ | ■ | ■ |
| Programmable heater short threshold (amps) | | | ■ | ■ |
| Open heater | ■ | ■ | ■ | ■ |
| Uncontrolled output (relay power cut off) | ■ | ■ | ■ | ■ |
| Heater resistance monitoring (predict failure) | | ■ | ■ | ■ |
| Heater wattage monitoring (detect leaks) - auto calc. | | ■ | ■ | ■ |
| Ground fault detection | | | ■ | ■ |
| Critical over temperature alarm (adjustable) | ■ | ■ | ■ | ■ |
| Temperature monitoring (J/K) with programmable action | | ■ | ■ | ■ |
| Alarm history - zone alarms | | ■ | ■ | ■ |
| Alarm history graph - zone alarms | | | | ■ |
| Zone alarm configure - “none”, “flasher”, “flasher & contacts” | | | ■ | ■ |
| Alarm history - system and status | | | ■ | ■ |

| | LEC | TTC | Touch Screen G24 Mini | Choice G24 Full |
|--|------|-------|-----------------------------|-----------------------|
| Operational Features | | | | |
| Menu storage | | 1000+ | 40 | 1000+ |
| Menu "auto save" (optional) | | | | |
| Programmable groups | | | | |
| Instant grouping | | | | |
| Sequence Start (up to 4 stages with delay timers) | | | | |
| Sequence Cool (up to 4 stages with delay timers) | | | | |
| Sequenced Power Up - manual activation | | | | |
| Boost (selectable time/amount) - Automatic mode | | | | |
| Boost (selectable time/amount) - Manual mode | | | | |
| Trim | | | | |
| Even Heat (controlled heating - 20° F [10° C] max. variance) | | | | |
| Even Cool (controlled cooling - 15° F [7° C] max. variance) | | | | |
| Automatic set point limit | | | | |
| Manual set point limit | | | | |
| Security levels | | | | |
| Security level customization (4 levels) | | | | |
| On power up "on" or "off" ("ask" touch screen only) | | | | |
| Auto load manual remembered % output | | | | |
| Operator identification | | | | |
| Tool graphics with real time data overlay | | | | |
| Cavity Map Pro® with "mirror" button | | | | |
| Thermocouple "rewire" | | | | |
| Copy Output | | | | |
| Standby timer until system "off" | | | | |
| PDF writer | | | | |
| PDF viewer - import or export files | | | | |
| USB port | | | | |
| On-line help | | | | |
| Software Features | | | | |
| New Mold Wizard | | | | |
| Maximum screen update rate (in seconds) | 6 | 0.5 | 1 | 0.1 |
| E-Z Screen - 5 minutes to train | | | | |
| Gammavision® (SPC data/graphing) | | | | |
| Pause line graph with "injection marks" (manual and automatic) | | | | |
| Instant data reporting (hours) | / 24 | 24 | 24 | 48 |
| Data report storage (up to 1 year) - pdf format | | | | |
| Mold Doctor® (advanced troubleshooting) | | | | |
| Calibration (0.2° F [0.1° C] accuracy over full scale) | | | | |
| On screen printing | | | | |
| Print to USB drive | | | | |
| Networking (Ethernet IP) - stream .csv file - bidirectional | | | | |
| Remote troubleshooting/operation | | | | |
| Field software identification of enclosure connectors and pins | | | | |
| Time and date change during operation | | | | |
| Touch screen calibration during operation | | | | |
| On-screen keyboard for Windows® tasks | | | | |
| Find this module LED | | | | |
| Daisy chain enclosures | | | | |
| Inputs (24 VDC required) | | | | |
| Standby | | | | |
| Material protection | | | | |
| Inhibit/Allow | | | | |
| Sequence Start | | | | |
| Sequenced power up | | | | |
| Remote boost | | | | |
| Mold ID - 63 combinations - auto menu load | | | | |
| Sequence Cool | | | | |
| Even Cool | | | | |
| Water flow interface | | | | |
| Chiller interface | | | | |
| Barrel temperature interface | | | | |
| Dryer interface | | | | |
| Auxiliary interface | | | | |
| External manifold leak detect (Airtect) | | | | |
| Outputs | | | | |
| Resettable alarm output | | | | |
| Non-resettable alarm output | | | | |
| "OK to Run" output with status page | | | | |
| Audible alarm | | | | |
| Manual activation/deactivation to speed interlock setup | | | | |

- Limited feature
 Touch screen or laptop required (LEC)
 Windows XP® and Windows 7® are registered trademarks of Microsoft Corporation

Performance

| | |
|---|---|
| Thermocouple Calibration Accuracy | 0.2°F (0.1°C) |
| Control Accuracy (steady state) | ± 0.1°F (± 0.05°C) |
| Heater Short Detection Time | 8.3 msec. or 120 times per second at 60 Hz |
| PID ² Algorithm Execution Time | 50 msec. or 20 times per second |
| Tuning | Automatic, self optimizing, manual override |
| Manual Mode | Power compensation for incoming voltage variation |
| Degrees 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 | 24 VDC |

Input

| | |
|-----------------------------------|------------------------------------|
| Thermocouple | Type J standard; Type K selectable |
| 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 (phase voltage) |
| Frequency | 47-53 Hz, 57-63 Hz |
| Ambient Temperature Range | 32-122°F (0-50°C) |
| Humidity Range | 10-95% non-condensing |
| Output Module Rating | 240 VAC; 2 zone - 15 amps/zone 3600 watts/zone 240 VAC; 1 zone - 30 amps/zone 7200 watts/zone |
| Communications Electrical Standard | Industrial USB 2.0 |

Performance Standards

| | |
|-----------------------------------|---|
| U.S., Canadian and International: | CE Mark; EMC: IEC 61000 - (6-2, 6-4, 4-2, 4-3, 4-4, 4-5, 4-6, 4-11) |
| *Designed to meet | Safety* IEC 61010, UL-508, UL-873 and CSA |

Languages

English, Deutsch, Français, Czech, русский, Italiano, Español, Portuguese,
日本語, 中文, 영어

Physical

| | *Height (inches/millimeters) | Width (inches/millimeters) | Depth (inches/millimeters) | *Weight (pounds/kilograms) |
|-----------------------------|---------------------------------|-------------------------------|-------------------------------|-------------------------------|
| M enclosure | 20.00/508 | 10.00/254 | 12.50/318 | 50.0/22.7 |
| MS enclosure | 36.50/927 | 23.00/584 | 20.00/508 | 75.1/34.1 |
| T1 enclosure - short top | 21.25/540 | 10.00/254 | 23.00/584 | 75.1/34.1 |
| T1 enclosure - tall top | 25.75/654 | 10.00/254 | 23.00/584 | 80.1/36.3 |
| T2 enclosure - short top | 32.00/813 | 10.00/254 | 23.00/584 | 130.4/59.1 |
| T2 enclosure - tall top | 36.50/927 | 10.00/254 | 23.00/584 | 135.4/61.4 |
| S1/S2 enclosure - short top | 35.00/889 | 20.00/508 | 23.00/584 | 139.4/63.2 |
| S1/S2 enclosure - tall top | 39.50/1003 | 20.00/508 | 23.00/584 | 144.4/65.5 |
| S3 enclosure - tall top | 50.25/1276 | 20.00/508 | 23.00/584 | 199.7/90.6 |
| D2 enclosure - tall top | 39.50/1003 | 20.00/508 | 23.00/584 | 243.6/110.5 |
| D3 enclosure - tall top | 50.25/1276 | 20.00/508 | 23.00/584 | 343.2/155.7 |
| D4 enclosure - tall top | 61.00/1549 | 20.00/508 | 23.00/584 | 442.8/200.9 |



Height and weight excludes screen.
Specifications subject to change without notice.



Global Headquarters

✉ Gammaflux L.P.
113 Executive Drive
Sterling, VA 20166, USA
☎ (800) 284-4477, or
☎ +1-(703) 471-5050
☎ +1-(703) 689-2131
✉ info@gammaflux.com
www.gammaflux.com

European Headquarters

✉ Gammaflux Europe GmbH
Bahnstrasse 9a
D-65205 Wiesbaden-Erbenheim,
Germany
☎ +49-(0)-611-973430
☎ +49-(0)-611-9734325
✉ info@gammaflux.de
www.gammaflux.de

Asia-Pacific Headquarters

✉ Gammaflux Japan
Yamaguchi, Ube, Japan
☎ +81-(836) 54-4369
Gammaflux India
☎ +91 9961922888
✉ asia-pacific@gammaflux.com