EZ-ZONE™ PM Controllers
Take the Pain Out of Solving Your Thermal Loop Requirements

Watlow’s EZ-ZONE™ PM panel mount controller offers control options to reduce system complexity and the cost of thermal loop ownership. You can order the EZ-ZONE PM as a PID controller, an over/under limit controller or these functions can be combined into an integrated controller. You now have the option to integrate a high amperage power controller output with a high-performance PID controller and an over/under limit controller in one space-saving, panel mount package. A number of serial communication options are available to support your connectivity needs.

Because the EZ-ZONE PM controller is highly scalable you only pay for what you need. This controller is available in 1/32 or 1/16 DIN panel mount packages. If you are looking for a PID controller, an over/under limit controller or an integrated controller, the EZ-ZONE PM will make your life easier.

Features and Benefits - Standard
Advanced PID control algorithm
- Offers TRU-TUNE™+ adaptive control to provide tighter control for demanding applications
- Provides auto-tune for fast, efficient start up
Configuration communications with software
- Saves time and improves reliability of controller setup
Factory Mutual (FM) approved over/under limit with auxiliary outputs
- Increases user and equipment safety for over/under temperature conditions
Memory for saving and restoring parameter settings
- Reduces service calls and down time
Agency approvals: UL® listed, CSA, CE, RoHS, W.E.E.E. FM, SEMI F47-0200, Class I div. 2 rating on selected models
- Assures prompt product acceptance
- Reduces end product documentation costs
P3T armor sealing system
- Complies to NEMA 4X, IP66
- Allows controller to be cleaned and washed down
- UL® 50 independent certification to NEMA 4X specification
Touch-safe package
- Increases safety for installer/operator
- Complies to IP2X requirements
Consistent Termination Labeling (CTL) connection system
- Allows removable cage clamp connectors
- Provides consistent termination labeling
EZ-KEY
- Enables simple, one-touch operation of user defined, repetitive activities
Programmable menu system
- Reduces setup time and increases operator efficiency
Three-year warranty
- Demonstrates Watlow’s reliability and product support

Features and Benefits - Optional
Integrated PID and limit controller
- Reduces wiring time and termination complexity compared to connecting discrete products
- Reduces panel space
- Reduces installation costs
- Increases user and equipment safety for over/under temperature conditions
High amperage power control output
- Drives 15 amp resistive loads direct
- Reduces component count
- Saves panel space and simplifies wiring
- Reduces cost of ownership
Current monitoring
- Detects heater current flow and provides alarm indication of a failed output device or heater load
Serial communication capabilities
- Provides a wide range of protocol choices including Modbus® RTU, EtherNet/IP™, Modbus® TCP
- Supports network connectivity to a PC or PLC
Class I div. 2
- UL® 1604 rated for use in hazardous locations
Remote set point operation
- Supports efficient set point manipulation from a remote device such as a master control or PLC
Profile capability
- Offers pre-programmed process control
- Allows ramp/soak programming with four files and 40 total steps
Retransmit
- Supports industry needs for product process recording

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Better Thermal Solutions...Faster
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E-mail: info@watlow.com

UL® is a registered trademark of Underwriter’s Laboratories Inc.
Modbus® is a registered trademark of Schneider Automation Incorporated.
EtherNet/IP™ is a trademark of Open DeviceNet Vendors Association.
Specifications

Line Voltage/Power
- 85 to 264V~(ac), 47 to 63Hz
- 20 to 28V~(ac), +10/-15 percent; 50/60Hz, ±5 percent
- 12 to 40V=dc
- 10VA maximum power consumption
- Data retention upon power failure via nonvolatile memory
- Compliant with SEMI F47-0200, Figure R1-1 voltage sag requirements @ 24V~(ac) or higher

Environment
- -18 to 65°C (0 to 149°F) operating temperature
- -40 to 85°C (-40 to 185°F) storage temperature
- 0 to 90 percent RH, non-condensing

Accuracy
- Calibration accuracy and sensor conformity: ±0.1 percent of span, ±1°C @ the calibrated ambient temperature and rated line voltage
- Types R, S, B: 0.2 percent
- Type T below -50°C: 0.2 percent
- Calibration ambient temperature @ 25°C ±3°C (77°F ±5°F)
- Accuracy span: 540°C (1000°F) minimum
- Temperature stability: ±0.1°C/°C (±0.1°F/°F) rise in ambient maximum

Agency Approvals
- UL®/EN 61010 Listed
- UL® 1604 Class I div. 2 on non mechanical relay units
- UL® 50, NEMA 4X, EN 60529 IP66
- CSA 610110 CE
- RoHS, W.E.E.
- Limit version features FM Class 3545

Controller
- User selectable heat/cool, on-off, P, PI, PD, PID or alarm action, not valid for limit controllers
- Auto-tune with TRU-TUNE+™ adaptive control algorithm
- Control sampling rates: input = 10Hz, outputs = 10Hz
- Input and output capacity per controller type ordering information

Serial Communications
- Isolated communications
- EIA 232/485, Modbus® RTU
- EtherNet/IP™/Modbus® TCP (ODVA certified)
- Future options include DeviceNet™ and Profinet™ DP

Wiring Termination—Touch-Safe Terminals
- Input, power and controller output terminals are touch safe removable 12 to 22 AWG

Universal Input
- Thermocouple, grounded or ungrounded sensors
- >20MΩ input impedance
- 3µA open sensor detection
- Maximum of 200 source resistance
- RTD 2- or 3-wire, platinum, 100Ω and 1000Ω @ 0°C calibration to DIN curve (0.00385 Ω/°C)
- Process, 0-20mA @ 100Ω, or 0-10V=dc @ 20kΩ input impedance; scalable, 0-50mV, 0-1000Ω
- Inverse scaling

Digital Input
- Update rate 10Hz
- DC voltage
- Maximum input 36V at 3mA
- Minimum high state 3V at 0.25mA
- Maximum low state 2V
- Dry contact
- Minimum open resistance 10KΩ
- Maximum closed resistance 50Ω
- Maximum short circuit 20mA

Digital Output
- Update rate 10Hz
- Output voltage 24V, current limit, Output 6 = 10mA maximum, Output 5 = 3 pole DIN-A-MITE® or 24 mA maximum

Current Measurement
- Accepts 0-50mA signal (user programmable range)
- Displayed operating range and resolution can be scaled and are user programmable
- Requires optional current transformer

Functional Operating Range
Type J: -210 to 1200°C (-346 to 2192°F)
Type K: -200 to 1370°C (-328 to 2500°F)
Type T: -200 to 400°C (-328 to 750°F)
Type E: -200 to 1000°C (-328 to 1832°F)
Type N: -200 to 1300°C (-328 to 2372°F)
Type C: 0 to 2315°C (32 to 4200°F)
Type D: 0 to 2315°C (32 to 4200°F)
Type F: 0 to 1395°C (32 to 2543°F)
Type R: -50 to 1767°C (-58 to 3214°F)
Type S: -50 to 1767°C (-58 to 3214°F)
Type B: 0 to 1816°C (32 to 3300°F)
RTD (DIN): -200 to 800°C (-328 to 1472°F)
Process: -1999 to 9999 units

Output Hardware
- Switched dc = 22 to 32V=dc @ 30mA
- Switched dc/open collector = 30V=dc maximum @100mA maximum current sink
- Solid state relay (SSR), Form A, 0.5A @ 24V~(ac) minimum, 264V~(ac) maximum, opto-isolated, without contact suppression
- Electromechanical relay, Form C, 5A, 24 to 240V~(ac) or 30V=dc maximum, resistive load, 100,000 cycles at rated load
- Electromechanical relay, Form A, 5A, 24 to 240V~(ac) or 30V=dc maximum, resistive load, 100,000 cycles at rated load
- NO-ARC relay, Form A, 15A, 24 to 240V~(ac), no V=dc, resistive load, 2 million cycles at rated load
- Universal process/retransmit, Output range selectable: 0 to 10V=dc into a minimum 1,000Ω load 0 to 20mA into maximum 800Ω load

Operator Interface
- Dual 4 digit, 7 segment LED displays
- Advance, infinity, up and down keys plus an EZ-KEY programmable function key (not available in ¾ DIN)
- Typical display update rate 1Hz

DeviceNet™ is a trademark of Open DeviceNet Vendors Association.
### PID Model Ordering Information

- **Universal Sensor Input, Configuration Communications**
- **TRU-TUNE™+ Adaptive Tune, Red Green Seven Segment Displays**

#### Code Number

PM = EZ-ZONE PM controller

#### Package Size

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>⅛ DIN</td>
</tr>
<tr>
<td>6</td>
<td>⅛ DIN</td>
</tr>
</tbody>
</table>

#### Primary Function

- C = PID controller
- R = Ramp and soak
- S = Custom firmware

#### Power Supply, Digital I/O

1. 100 to 240V (ac)
2. 100 to 240V (ac) plus 2 digital I/O points
3. 20 to 28V (ac) or 12 to 40V (dc)
4. 20 to 28V (ac) or 12 to 40V (dc), plus 2 digital I/O points

#### Output 1 and 2 Hardware Options

<table>
<thead>
<tr>
<th>Output 1</th>
<th>Output 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>None</td>
</tr>
<tr>
<td>CH</td>
<td>NO-ARC 15A power control (⅛ DIN only)</td>
</tr>
<tr>
<td>CC</td>
<td>Switched dc</td>
</tr>
<tr>
<td>CJ</td>
<td>Mechanical relay 5A, Form A</td>
</tr>
<tr>
<td>CK</td>
<td>SSR Form A, 0.5A</td>
</tr>
<tr>
<td>EA</td>
<td>Mechanical relay 5A, Form C</td>
</tr>
<tr>
<td>EH</td>
<td>Mechanical relay 5A, Form C NO-ARC 15A power control (⅛ DIN only)</td>
</tr>
<tr>
<td>EC</td>
<td>Switched dc</td>
</tr>
<tr>
<td>EJ</td>
<td>Mechanical relay 5A, Form C</td>
</tr>
<tr>
<td>EK</td>
<td>Mechanical relay 5A, Form C SSR Form A, 0.5A</td>
</tr>
<tr>
<td>FA</td>
<td>Universal process</td>
</tr>
<tr>
<td>FC</td>
<td>Switched dc</td>
</tr>
<tr>
<td>FJ</td>
<td>Mechanical relay 5A, Form A</td>
</tr>
<tr>
<td>FK</td>
<td>SSR Form A, 0.5A</td>
</tr>
<tr>
<td>AK</td>
<td>None</td>
</tr>
<tr>
<td>KH</td>
<td>SSR Form A, 0.5A NO-ARC 15A power control (⅛ DIN only)</td>
</tr>
<tr>
<td>KK</td>
<td>SSR Form A, 0.5A</td>
</tr>
</tbody>
</table>

#### Additional Communication Options, Standard Bus Always Included

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>EIA 485 Modbus® RTU</td>
</tr>
</tbody>
</table>

#### Additional Options

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Standard EZ-ZONE PM face plate</td>
</tr>
<tr>
<td>12</td>
<td>Class I div. 2 (not available with mechanical relay output types) Firmware, overlays, parameter settings</td>
</tr>
</tbody>
</table>

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### EZ-ZONE PM ⅛ DIN Dimensional Drawing

![EZ-ZONE PM ⅛ DIN Dimensional Drawing](image)

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### EZ-ZONE PM ⅛ DIN Dimensional Drawing

![EZ-ZONE PM ⅛ DIN Dimensional Drawing](image)
**Limit Model Ordering Information**

- Universal Sensor Input, Configuration Communications
- Red Green Seven Segment Displays

**Code Number**

PM = EZ-ZONE PM controller

**Package Size**

- 3 = ⅛ DIN
- 6 = ¼ DIN

**Primary Function**

L = Limit controller
D = Custom firmware

**Power Supply, Digital I/O**

- 1 = 100 to 240V~(ac)
- 2 = 100 to 240V~(ac) plus 2 digital I/O points
- 3 = 20 to 28V~(ac) or 12 to 40V~(dc)
- 4 = 20 to 28V~(ac) or 12 to 40V~(dc), plus 2 digital I/O points

**Output 1 and 2 Hardware Options**

<table>
<thead>
<tr>
<th>Output 1</th>
<th>Output 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>AJ = None</td>
<td>Mechanical relay 5A, Form A</td>
</tr>
<tr>
<td>CJ = Switched dc/open collector</td>
<td>Mechanical relay 5A, Form A</td>
</tr>
<tr>
<td>EJ = Mechanical relay 5A, Form C</td>
<td>Mechanical relay 5A, Form A</td>
</tr>
</tbody>
</table>

**Additional Communication Options, Standard Bus Always Included**

- A = None
- 1 = EIA 485 Modbus® RTU

**Additional Options**

- AA = Standard EZ-ZONE PM face plate
- Firmware, overlays, parameter settings

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**Typical Block Diagrams**

**EZ-ZONE PM PID Model**

Controller Power

- 15 Ampere Control Output
- Alarm

Heater

- Branch Fuse

Process Sensor

**EZ-ZONE PM Limit Model**

Controller Power

- Limit Power
- Branch Fuse

Heater

- Branch Fuse

External Temperature Controller

External Limit Contactor

**EZ-ZONE PM Integrated PID Model**

Controller Power

- Digital Inputs: Reset Limit
- Idle Set Point

15 Ampere Control Output

Heater

- Branch Fuse

Computer

Digital Inputs: Limit Output

Process Sensor

Limit Sensor
### Integrated PID Controller Model Ordering Information

- Universal Sensor Input, Configuration Communications
- TRU-TUNE™ Adaptive Tune, Red Green Seven Segment Displays

#### Code Number

`PM` = EZ-ZONE PM controller

#### Package Size

6 = ¾ DIN

#### Primary Function

- **C** = PID controller
- **R** = Ramp and soak
- **S** = Custom firmware

#### Power Supply, Digital I/O

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 to 240V~(ac)</td>
</tr>
<tr>
<td>2</td>
<td>100 to 240V~(ac) plus 2 digital I/O points</td>
</tr>
<tr>
<td>3</td>
<td>20 to 28V~(ac) or 12 to 40V= (dc), plus 2 digital I/O points</td>
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</table>

#### Output 1 and 2 Hardware Options

<table>
<thead>
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<th>Output 1</th>
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<tbody>
<tr>
<td>CA =</td>
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<td>NO-ARC 15A power control</td>
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<tr>
<td>CC =</td>
<td>Switched dc</td>
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<tr>
<td>CJ =</td>
<td>Mechanical relay 5A, Form A</td>
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<tr>
<td>CK =</td>
<td>SSR Form A, 0.5A</td>
</tr>
<tr>
<td>EA =</td>
<td>None</td>
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<tr>
<td>EH =</td>
<td>NO-ARC 15A power control</td>
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<tr>
<td>EC =</td>
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<td>EJ =</td>
<td>Mechanical relay 5A, Form A</td>
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<tr>
<td>EK =</td>
<td>SSR Form A, 0.5A</td>
</tr>
<tr>
<td>FA =</td>
<td>Universal process</td>
</tr>
<tr>
<td>FC =</td>
<td>Switched dc</td>
</tr>
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<td>FJ =</td>
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<td>FK =</td>
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<td>KH =</td>
<td>SSR Form A, 0.5A</td>
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</tbody>
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#### Additional Communication Options, Standard Bus Always Included

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<th>Code</th>
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<tbody>
<tr>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>EIA 485 Modbus® RTU</td>
</tr>
<tr>
<td>2</td>
<td>EIA 232/485 Modbus® RTU</td>
</tr>
<tr>
<td>3</td>
<td>EtherNet/IP™/Modbus® TCP</td>
</tr>
<tr>
<td>5</td>
<td>DeviceNet™ (future option)</td>
</tr>
<tr>
<td>6</td>
<td>Profinet (future option)</td>
</tr>
</tbody>
</table>

#### Auxiliary Control Functions

- **A** = None
- **R** = Remote set point input
- **T** = Current transformer input (not valid Output 3 and 4 selections = FA, FC, FJ and FK)
- **L** = Integrated limit controller with universal input (only valid Output 3 and 4 selections = CJ, EJ and AJ)

#### Output 3 and 4 Hardware Options

<table>
<thead>
<tr>
<th>Output 3</th>
<th>Output 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA =</td>
<td>None</td>
</tr>
<tr>
<td>AJ =</td>
<td>Mechanical relay 5A, Form A</td>
</tr>
<tr>
<td>AK =</td>
<td>SSR Form A, 0.5A</td>
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<td>CA =</td>
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<tr>
<td>EA =</td>
<td>Mechanical relay 5A, Form C</td>
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<tr>
<td>EC =</td>
<td>Switched dc</td>
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<tr>
<td>EJ =</td>
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<td>FJ =</td>
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<tr>
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</tr>
<tr>
<td>KK =</td>
<td>SSR Form A, 0.5A</td>
</tr>
</tbody>
</table>

#### Future Options

- **AA** = Standard EZ-ZONE PM face plate
- 12 = Class I div. 2 (not available with integrated limit option "L" or mechanical relay output types)
- Firmware, overlays, parameter settings
Enhanced Limit Model Ordering Information

- Universal Sensor Input, Configuration Communications
- Red Green Seven Segment Displays

**Code Number**

PM = EZ-ZONE PM controller

**Package Size**

6 = ¾ DIN

**Primary Function**

L = Limit controller
D = Custom firmware

**Power Supply, Digital I/O**

1 = 100 to 240V~(ac)
2 = 100 to 240V~(ac) plus 2 digital I/O points
3 = 20 to 28V~(ac) or 12 to 40V= (dc)
4 = 20 to 28V~(ac) or 12 to 40V= (dc), plus 2 digital I/O points

**Output 1 and 2 Hardware Options**

<table>
<thead>
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<th></th>
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</tr>
</thead>
<tbody>
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<td>None</td>
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<tr>
<td>EJ</td>
<td>Mechanical relay 5A, Form C</td>
<td>Mechanical relay 5A, Form A</td>
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</tbody>
</table>

**Additional Communication Options, Standard Bus Always Included**

<p>| | |</p>
<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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<tr>
<td>1</td>
<td>EIA 485 Modbus® RTU</td>
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<td>6</td>
<td>Profinet DP (future option)</td>
</tr>
</tbody>
</table>

**Output 3 and 4 Hardware Options**

(If communications options 2 thru 6 were ordered above, then option AA must be ordered here)

<table>
<thead>
<tr>
<th></th>
<th>Output 3</th>
<th>Output 4</th>
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<tbody>
<tr>
<td>AA</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>AJ</td>
<td>None</td>
<td>Mechanical relay 5A, Form A</td>
</tr>
<tr>
<td>AK</td>
<td>None</td>
<td>SSR Form A, 0.5A</td>
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<tr>
<td>CA</td>
<td>Switched dc/open collector</td>
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</tr>
<tr>
<td>EA</td>
<td>Mechanical relay 5A, Form C</td>
<td>None</td>
</tr>
<tr>
<td>EC</td>
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<td>Switched dc</td>
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<td>KK</td>
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</tr>
</tbody>
</table>

**Future Options**

**Additional Options**

AA = Standard EZ-ZONE PM face plate
Firmware, overlays, parameter settings

Your Authorized Watlow Distributor Is:

To be automatically connected to the nearest North American Technical and Sales Office call:

1-800-WATLOW2

International Technical and Sales Offices: Australia, +61-3-9335-6449 • China, +86-21-3950-9510 • France, +33 (0) 3073-2425 • Germany, +49 (0) 7253-9400-0 • Italy, +39 (0) 2 458-8841 • Japan, +81-3-3518-6630 • Korea, +82-2-575-9804 • Malaysia, +60-3-7980-7741 • Mexico, +52 (442) 217-6235 • Shanghai, +86-21-3950-9504 • Singapore, +65-6773-9469 • Spain, +34 91 675 1292 • Sweden, +46 35-27-11-66 • Taiwan, +886-7-288-5168 • United Kingdom, +44 (0) 115-964-0777