WATLOW®

EZ-ZONE® RM Multi-Loop Controller

EZ-ZONE® RM High-Density Modules Integrate Temperature, Process, Limit and Power Control from 1 to 152 Loops Into One System

The EZ-ZONE® RM controller family simplifies thermal system management. The EZ-ZONE RM controller family is comprised of six module types: an integrated on-off or PID control, monitoring and over/under temperature limit module, a high-density on-off or PID control module, a high-density limit only module, an input/output (I/O) expansion module, a high-density monitor/scanner module and a data logging and field communications access module. A system is configured by connecting any combination of module types to address specific application needs. The EZ-ZONE RM is extremely flexible and scalable allowing mixing and matching of I/O to configure one to 152 control loops and up to 256 monitor points.

Now Watlow's EZ-ZONE RM is available through Watlow ***SELECT***®, a program that enables you to quickly identify, configure and receive your thermal products faster and easier than ever before. Visit www.watlow.com/select to learn more.

Optional integrated controller functions can be combined or ordered in different quantities:

- PID control loops
- Over/under temperature limit control loops
- 10 and 15 ampere power output/heater driver options
- On-board data logging
- Current measurement input
- Sequencer start up and control function
- Programmable timer and counter functions
- Programmable math and logic options
- Multiple communication protocol options
- Mobile configuration with removable secure digital (SD) flash card

Benefits of using an integrated controller solution:

- Reduces wiring time and termination complexity compared to connecting multiple discrete products
- Improves system reliability
- Reduces termination and installation cost
- Eliminates compatibility issues often encountered with using various discrete components and brands
- Reduces troubleshooting time and downtime costs because the system can specifically identify any problems with a sensor, controller, solid state relay (SSR) power output or heater load
- Complete thermal solution saves engineering time and labor costs while shortening project schedules

Features and Benefits

Multiple inputs; from one to 152 PID loops of control or monitor up to 256 analog inputs

- Mix and match I/O to fit any application; from one input with two outputs to 152 analog inputs with 152 outputs, or monitor up to as many as 256 analog inputs all in one system
- Reduces cost because only required loops are purchased
- Allows a common controller platform across many design applications as both loops and outputs can be ordered in single increments

Advanced PID control algorithm

- Offers TRU-TUNE®+ adaptive control to provide tighter control for demanding applications
- Enables auto-tune for fast, efficient start-up

Communication capabilities

- Provides a range of protocol options including universal serial bus (USB) device port, Modbus® RTU, EtherNet/IP™, Modbus® TCP, DeviceNet™ and PROFIBUS

SPLIT-RAIL control

- Allows modules mounted in separate high-voltage and low-voltage cabinets to function as an integrated system
- Minimizes the length and cost of wire runs and improves system reliability by locating inputs closer to sensors and outputs closer to loads

SENSOR GUARD

- Prevents unplanned process shutdowns and product loss by switching to a backup sensor if the primary sensor fails

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Powered by Possibility

ISO 9001
Registered Company
Winona, Minnesota USA

Additional Key Functions

- Configuration communication port (standard bus)
- Removable modules and connectors
- Ring lug and front-screw terminal options
- Profile ramp soak with 400 total steps
- Retransmit and remote set point input virtually inside controller eliminating costs for input/output hardware
- User configuration settings can be stored and recalled
- Thermistor input
- Elevated operating range of 0 to 149°F (-18 to 65°C)
- UL® listed, CSA, CE, RoHS, W.E.E.E., FM, SEMI F47-0200, Class 1, Div. 2 rating on selected models

Common Specifications (Applies to all modules)

Line Voltage/Power

- 20.4 to 30.8VAC/VDC, 50/60Hz ±5%
- Any external power supply used should comply with a Class 2 or SELV rating (see specific module specification listing for max. VA power consumption)
- Data retention upon power failure via non-volatile memory
- Compliant with Semi F47-0200, Figure R1-1 voltage sag requirements

Environment

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

Functional Operating Range for RMC, RMH, RML and RMS

Type J: -346 to 2192°F (-210 to 1200°C)
Type K: -454 to 2500°F (-270 to 1371°C)
Type T: -454 to 750°F (-270 to 400°C)
Type E: -454 to 1832°F (-270 to 1000°C)
Type N: -454 to 2372°F (-270 to 1300°C)
Type C: 32 to 4200°F (0 to 2315°C)
Type D: 32 to 4200°F (0 to 2315°C)
Type F: 32 to 2449°F (0 to 1343°C)
Type R: -58 to 3214°F (-50 to 1767°C)
Type S: -58 to 3214°F (-50 to 1767°C)
Type B: 32 to 3300°F (0 to 1816°C)
RTD (DIN): -328 to 1472°F (-200 to 800°C)
Process: -1999 to 9999 units

Agency Approvals

- UL®/EN 61010 Listed, File E185611, C-UL® C22.2 #61010ANSI/ISA 12.12.01-2007 Class 1, Div. 2-Group A, B, C, D temperature code T4 (optional)
- UL® 1604 Class 1, Div. 2 (optional)
- EN 60529 IP20
- UL® 50, NEMA 4X, EN 60529 IP66; 1/16 DIN remote user interface (RUI)
- CSA 610110 CE
- RoHS by design, W.E.E.E.
- FM Class 3545 on limit control versions
- CE

Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all other EZ-ZONE products

Implicit Messaging

Number of data members accessible through implicit messaging

Protocol	RM System	RMC	RMH	RML	RME	RMS	RMA
Ethernet/IP™	100	20	40	40	20	40	20
DeviceNet™	200	20	40	40	20	40	20

User Interface

- Seven-segment LED, address/protocol indicator programmed via push button switch
- Communication activity, 2 LEDs
- Error condition of each loop, 4 LEDs
- Output status indication, 16 LEDs

Maximum System Configuration

- One access module plus up to 16 additional control or expansion modules (any combination), up to 152 loops

Mounting

- DIN-rail specification EN50022, 1.38 x 0.30 in. (35 x 7.5 mm)
- DIN-rail mounted or chassis mounted with customer supplied screws

Wiring Termination—Touch-Safe Terminals

- Right angle and front screw type terminal blocks (slots A, B, D, E)
- Input, power and controller output terminals, touch safe, removable, 12 to 30 AWG

Programmable Application Blocks

Compare

- Greater than, less than, equal, not equal, greater than or equal, less than or equal

Counters

- Counts up or down, loads predetermined value on the load signal. Output is active when the count value equals or exceeds predetermined target value

Linearization

- Interpolated or stepped relationship

Logic

- And, nand, or, nor, equal, not equal, latch, flip flop

Math

- Average, process scale, deviation scale, differential (subtraction), ratio (divide), add, multiply, absolute difference, min., max., square root, sample and hold, altitude and dew point

Process Value

- Sensor backup, average, crossover, wet/dry bulb, switch over, differential (subtraction), ratio (divide), add, multiply, absolute difference, min., max., square root, altitude, visala and dew point

Special Output Function

- Compressor – turns on-off compressor for one or two loops (cool and dehumidify with single compressor)
- Motorized valve – turns on-off motor open/closed outputs causing valve to represent desired power level
- Sequencer – turns on-off up to four outputs to distribute a single power across all outputs with linear and progressive load wearing

Timers

- On pulse – produces an output of fixed time on the active edge of timer run signal
- Delay – output is a delayed start of timer run and off at same time
- One shot – oven timer
- Retentive – measures timer run signal and output on when accumulated time exceeds target

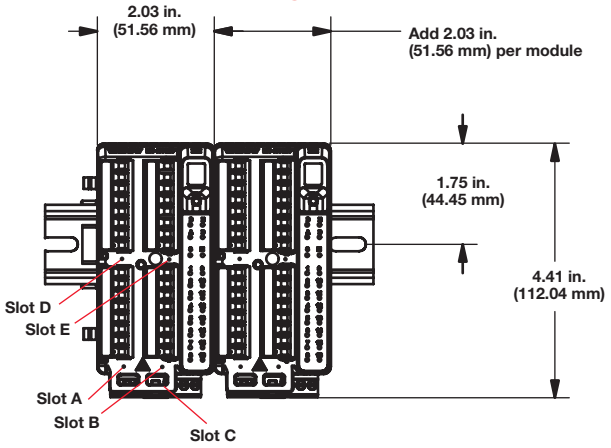
Variable

- User value for digital or analog variable

EZ-ZONE RM Family Comparison

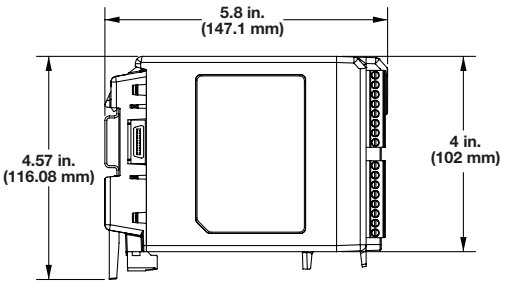
	Control Module	High-Density Control Module	High-Density Limit Module	Expansion Module	High-Density Scanner Module
Number of modules per system	1 to 16	1 to 16	1 to 16	1 to 16	1 to 16
Number of PID loops per module	1 to 4	4, 8, 12 or 16	0	0	0
Number of limit loops per module	1 to 4	0	4, 8 or 12	0	0
Number of monitoring points per module	1 to 3	0	0	0	4, 8, 12 or 16
Mechanical relays per module	1 to 8	4 or 8	4, 6 or 8	4, 8 or 12	4 or 8
Digital I/O points per module	6	6 or 12	6 or 7	6, 12, 18 or 24	6, 7 or 12
Actions (events) per module	8	24	16	8	16
Alarms per module	8	24	16	8	16
Compare per module	4	24	16	8	24
Counters per module	4	24	16	8	24
Linearization per module	4	24	16	8	24
Logic per module	16	24	16	16	24
Math per module	8	24	16	8	24
Process value per module	1 to 4	4, 8, 12 or 16	4, 8 or 12	0	4, 8, 12 or 16
Special output function per module	4	0	0	4	0
Timers per module	4	24	16	8	24
Variable per module	16	24	16	16	24

Dimensional Drawings

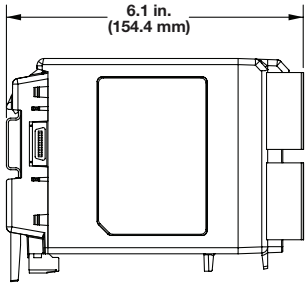


Connector Type	Module Depth in. (mm)
Standard (Right Angle)	5.8 (148)
Straight (Front Screw)	6.1 (155)
Ring Terminal	6.5 (166)

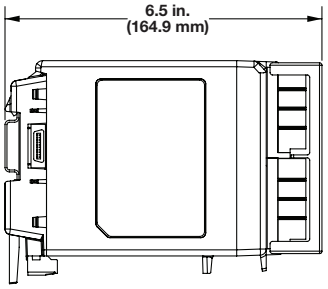
Standard Connectors



Front-Screw Connectors



Ring Terminal Connectors



Control Module Specifications (RMC)

(Select an RMC module for 1 to 4 loops of control.)

Line Voltage/Power

- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a Class 2 or SELV rating

Controller

- User-selectable heat/cool, on-off, P, PI, PD, PID or alarm action, not valid for limit controllers

Process PID or Over-temperature Limit Mode Options

- Auto-tune with TRU-TUNE+ adaptive control
- Control sampling rates: input = 10Hz, output = 10Hz (non-divisional)

Isolated Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all other EZ-ZONE controllers
- Optional EIA 485, Modbus® RTU

Profile Ramp and Soak (RMC only, not available with high-density controller)

- Profile engine affects one to four loops
- 25 profiles and 15 sub-routines, 400 steps total

Calibration Accuracy

- ±0.1% of span, ±1°C. See user manual for details.

Universal Input

- Thermocouple, grounded or ungrounded sensors
- >20MΩ input impedance
- Max. of 2kΩ source resistance
- RTD 2- or 3-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve (0.00385Ω/Ω/°C)
- Process, 0-20mA @100Ω, or 0-10VDC @ 20kΩ input impedance; scalable, 0-50mV
- Potentiometer: 0 to 1,200Ω
- Inverse scaling
- Current: input range is 0 to 50mA, 100Ω input impedance Response time: 1 second max., accuracy ±1mA typical

Thermistor Input

- 0 to 40kΩ, 0 to 20kΩ, 0 to 10kΩ, 0 to 5kΩ
- 2.252kΩ and 10kΩ base at 77°F (25°C)

Digital Input

- Update rate 10Hz
- Max. input 36VDC at 3mA
- Min. high state 3VDC at 0.25mA
- Max. low state 2V

Dry Contact Input

- Update rate 10Hz
- Min. open resistance 10kΩ, max. closed resistance 50Ω

Current Measurement Input

- Accepts 0-50mA signal (user programmable range)
- Displayed operating range and resolution can be scaled and are user programmable

Output Hardware

- Switched dc:
  - Max. 32VDC open circuit
  - Max. current 30mA per single output
  - Max. current 40mA per paired outputs (1 & 2, 3 & 4, 5 & 6, 7 & 8)
- Open collector:
  - Max. 30VDC @ 100mA
- 6 digital inputs/outputs:
  - Switched dc, max. 20VDC @ 40mA, 12VDC @ 80mA
  - Open collector, max. 32VDC @ 1.5A, max. 8A per 6 outputs combined
- SSR, Form A, 1A at 50°F (10°C) to 0.5A at 149°F (65°C), 0.5A @ 24VAC min., 264VAC max., opto-isolated, without contact suppression
- Electromechanical relay, Form C, 5A, 24 to 240VAC or 30VDC max., resistive load, 100,000 cycles at rated load, requires a min. load of 20mA at 24V, 125VA pilot duty
- Electromechanical relay, Form A, 5A, 24 to 240VAC or 30VDC max., resistive load, 100,000 cycles at rated load, requires a min. load of 20mA at 24V, 125VA pilot duty
- NO-ARC relay, Form A, 15A @ 122°F (50°C), 85 to 264VAC, no VDC, resistive load, 2 million cycles at rated load
- Universal process/retransmit, output range selectable:
  - 0 to 10VDC ±15mV into a min. 1,000Ω load with 2.5mV nominal resolution
  - 0 to 20mA ±30µA into max. 800Ω load with 5µA nominal resolution
  - Temperature stability is 100ppm/°C

Control Module Ordering Information

Requires 24 to 28VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

WATLOW SELECT

Part Number

①② EZ-ZONE Rail Mount	③ Control Module	④ Input 1 Primary Function	⑤ Output 1 and 2 Hardware Options	⑥ Input 2	⑦ Output 3 and 4 Hardware Options	⑧ Input 3	⑨ Output 5 and 6 Hardware Options	⑩ Input 4	⑪ Output 7 and 8 Hardware Options	⑫ Connector Style/Custom Product	⑬ Enhanced Options	⑭⑮ Additional Options
RM	C											

④ Input 1 Primary Function

1 =	Control with universal input
2 =	Control with thermistor input
3 =	Ramp/Soak control with universal input **(R/S applies to all loops in module)**
4 =	Ramp/Soak control with thermistor input **(R/S applies to all loops in module)**
5 =	Limit with universal input **(only valid Output 1 and 2, options will be B, F, L)**
6 =	Limit with thermistor input **(only valid Output 1 and 2, options will be B, F, L)**
7 =	Current transformer input **(not valid Output 1 and 2, options are A, B, N, P, R, S, T)**
9 =	Custom

⑤ Output 1 and 2 Hardware Options

	Output 1	Output 2
A =	None	None
B =	None	Mechanical relay 5A, Form A
U =	Switched dc/open collector	None
D =	Switched dc/open collector	NO-ARC 15A power control
E =	Switched dc/open collector	Switched dc
F =	Switched dc/open collector	Mechanical relay 5A, Form A
G =	Switched dc/open collector	SSR Form A, 0.5A
H =	Mechanical relay 5A, Form C	None
J =	Mechanical relay 5A, Form C	NO-ARC 15A power control
K =	Mechanical relay 5A, Form C	Switched dc
L =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
M =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
N =	Universal process	None
P =	Universal process	Switched dc
R =	Universal process	Mechanical relay 5A, Form A
S =	Universal process	SSR Form A, 0.5A
T =	None	SSR Form A, 0.5A
Y =	SSR Form A, 0.5A	NO-ARC 15A power control
Z =	SSR Form A, 0.5A	SSR Form A, 0.5A

⑥ Input 2

A =	None
1 =	Control with universal input
2 =	Control with thermistor input
5 =	Limit with universal input **(only valid Output 3 and 4, options will be B, F, L)**
6 =	Limit with thermistor input **(only valid Output 3 and 4, options will be B, F, L)**
7 =	Current transformer input **(not valid Output 3 and 4, options are N, P, R, S)**
R =	Auxiliary 2nd input (universal input)
P =	Auxiliary 2nd input (thermistor input)

⑦ Output 3 and 4 Hardware Options

	Output 3	Output 4
A =	None	None
B =	None	Mechanical relay 5A, Form A
U =	Switched dc/open collector	None
D =	Switched dc/open collector	NO-ARC 15A power control
E =	Switched dc/open collector	Switched dc
F =	Switched dc/open collector	Mechanical relay 5A, Form A
G =	Switched dc/open collector	SSR Form A, 0.5A
H =	Mechanical relay 5A, Form C	None
J =	Mechanical relay 5A, Form C	NO-ARC 15A power control
K =	Mechanical relay 5A, Form C	Switched dc
L =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
M =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
N =	Universal process	None
P =	Universal process	Switched dc
R =	Universal process	Mechanical relay 5A, Form A
S =	Universal process	SSR Form A, 0.5A
T =	None	SSR Form A, 0.5A
Y =	SSR Form A, 0.5A	NO-ARC 15A power control
Z =	SSR Form A, 0.5A	SSR Form A, 0.5A

⑧ Input 3

A =	None
1 =	Control with universal input
2 =	Control with thermistor input
5 =	Limit with universal input **(only valid Output 5 and 6, options will be B, F, L)**
6 =	Limit with thermistor input **(only valid Output 5 and 6, options will be B, F, L)**
7 =	Current transformer input **(not valid Output 5 and 6, options are N, P, R, S)**
R =	Auxiliary 2nd input (universal input)
P =	Auxiliary 2nd input (thermistor input)

⑨ Output 5 and 6 Hardware Options

	Output 5	Output 6
A =	None	None
B =	None	Mechanical relay 5A, Form A
U =	Switched dc/open collector	None
D =	Switched dc/open collector	NO-ARC 15A power control
E =	Switched dc/open collector	Switched dc
F =	Switched dc/open collector	Mechanical relay 5A, Form A
G =	Switched dc/open collector	SSR Form A, 0.5A
H =	Mechanical relay 5A, Form C	None
J =	Mechanical relay 5A, Form C	NO-ARC 15A power control
K =	Mechanical relay 5A, Form C	Switched dc
L =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
M =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
N =	Universal process	None
P =	Universal process	Switched dc
R =	Universal process	Mechanical relay 5A, Form A
S =	Universal process	SSR Form A, 0.5A
T =	None	SSR Form A, 0.5A
Y =	SSR Form A, 0.5A	NO-ARC 15A power control
Z =	SSR Form A, 0.5A	SSR Form A, 0.5A

⑩ Input 4

A =	None
1 =	Control with universal input
2 =	Control with thermistor input
5 =	Limit with universal input **(only valid Output 7 and 8, options will be B, F, L)**
6 =	Limit with thermistor input **(only valid Output 7 and 8, options will be B, F, L)**
7 =	Current transformer input **(not valid Output 7 and 8, options are N, P, R, S)**
R =	Auxiliary 2nd input (universal input)
P =	Auxiliary 2nd input (thermistor input)

⑪ Output 7 and 8 Hardware Options

	Output 7	Output 8
A =	None	None
B =	None	Mechanical relay 5A, Form A
U =	Switched dc/open collector	None
D =	Switched dc/open collector	NO-ARC 15A power control
E =	Switched dc/open collector	Switched dc
F =	Switched dc/open collector	Mechanical relay 5A, Form A
G =	Switched dc/open collector	SSR Form A, 0.5A
H =	Mechanical relay 5A, Form C	None
J =	Mechanical relay 5A, Form C	NO-ARC 15A power control
K =	Mechanical relay 5A, Form C	Switched dc
L =	Mechanical relay 5A, Form C	Mechanical relay 5A, Form A
M =	Mechanical relay 5A, Form C	SSR Form A, 0.5A
N =	Universal process	None
P =	Universal process	Switched dc
R =	Universal process	Mechanical relay 5A, Form A
S =	Universal process	SSR Form A, 0.5A
T =	None	SSR Form A, 0.5A
Y =	SSR Form A, 0.5A	NO-ARC 15A power control
Z =	SSR Form A, 0.5A	SSR Form A, 0.5A
C =	6 digital inputs/outputs **(valid option only if Input 4 selection = A)**	

⑫ Connector Style/Custom Product

A =	Right angle screw connector (standard)
F =	Front screw connector (slots A, B, D and E only)
S =	Custom

⑬ Enhanced Options

A =	Standard bus
1 =	Standard bus and Modbus® RTU 485 (selectable via dipswitch)

⑭⑮ Additional Options

Firmware, Overlays, Parameter Settings

AA =	Standard
AB =	Replacement connectors hardware only for the entered part number. Additional cost for the model can be disregarded as you are only ordering replacement connectors.
12 =	Class 1, Div. 2 (not available with integrated limit controller or mechanical relay options)
XX =	Custom

High-Density Control Module Specifications (RMH)

(Select an RMH module for 4 to 16 loops of control.)

Line Voltage/Power

- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a Class 2 or SELV rating

Controller

- User-selectable heat/cool, on-off, P, PI, PD, PID or alarm action, not valid for limit controllers

Process PID Options

- Auto-tune with TRU-TUNE+ adaptive control
- Control sampling rates: input = 10Hz, output = 10Hz (non-divisional)

Isolated Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all other EZ-ZONE controllers
- Optional EIA 485, Modbus® RTU

Calibration Accuracy

- ±0.1% of span, ±1°C. See user manual for details.

Universal Input

- Thermocouple, grounded or ungrounded sensors
- >20MΩ input impedance
- Max. of 2kΩ source resistance
- RTD 2-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve (0.00385Ω/Ω/°C)
- Process, 0-20mA @100Ω, or 0-10VDC @ 20kΩ input impedance; scalable, 0-50mV

Thermistor Input

- 0 to 40kΩ, 0 to 20kΩ, 0 to 10kΩ, 0 to 5kΩ
- 2.252kΩ and 10kΩ base at 77°F (25°C)

High Accuracy Thermocouple Input

- Thermocouple, grounded or ungrounded sensors
- 15nA open sensor detection
- Temperature stability ±10PPM/C
- Response time: 1 second max.

Digital Input

- Update rate 10Hz
- Max. input 36VDC at 3mA
- Min. high state 3VDC at 0.25mA

Dry Contact Input

- Update rate 10Hz
- Min. open resistance 10kΩ, max. closed resistance 50Ω

Output Hardware

- 6 digital inputs/outputs:
  - Switched dc, max. 20VDC @ 40mA, 12VDC @ 80mA
  - Open collector, max. 32VDC @ 1.5A, max. 8A per 6 outputs combined
- Electromechanical relay, Form A, 5A, 24 to 240VAC or 30VDC max., resistive load, 100,000 cycles at rated load, requires a min. load of 20mA at 24V, 125VA pilot duty

Tri-Process (Three universal process/retransmit outputs)

- Output range selections: 0 to 10VDC into a min. 4KΩ load
- 0 to 20mA into max. 400Ω load

Quad SSR

- Four SSRs at 2A each. SSRs are grouped in 2-pairs with each sharing a common. See table below.

Ambient Temp.	Maximum Current Per Relay	
	1 Quad SSR Card	More than 1 Quad SSR Card
-18 to 20°C	2A	1.5A
20 to 65°C	1A	0.75A

High Accuracy Table

Input Type	Max. Error	Typical Error	Accuracy Range Low	Accuracy Range High	Units
K	±1.2	±0.6	-100	800	Deg C
J	±1	±0.5	-100	800	Deg C
T	±1.1	±0.4	-100	400	Deg C
N	±1	±0.5	-100	800	Deg C
E	±1	±0.5	-100	800	Deg C
R	±2.8	±2.1	-50	1760	Deg C
S	±2.1	±1.6	-50	1760	Deg C
B	±1.5	±1	400	1800	Deg C
C	±3.2	±1.6	0	2000	Deg C

Specified accuracy is dependent on the following:

- Thermocouple resistance < 250Ω
- Unit Ambient 25°C
- Unit is within 1 year of the manufacturing date
- Unit is at steady-state conduction
- Unit has inherited cold junction calibration offsets: A calibration file from a unit within a similar environment has been applied.

High-Density Control Module Ordering Information

WATLOW SELECT

Requires 24 to 28VAC/VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

①② EZ-ZONE Rail Mount	③ Control Module	④ Connector Style/Custom Product		⑤ Slot A	⑥ Slot B	⑦ Slot D	⑧ Slot E		⑨ Future Option	⑩ Enhanced Options	⑪⑫ Additional Options
RM	H		-					-	A		

④	Connector Style/Custom Product
A =	Right angle screw connector (standard)
F =	Front screw connector (slots A, B, D and E only)
S =	Custom

⑤	Slot A
1 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with control loops
2 =	4 thermistor inputs with control loops
4 =	4 high accuracy thermocouple inputs with control loops (defaults to Type K)

⑥	Slot B
A =	None
1 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with control loops
2 =	4 thermistor inputs with control loops
4 =	4 high accuracy thermocouple inputs with control loops (defaults to Type K)

⑦	Slot D
A =	None
1 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with control loops
2 =	4 thermistor inputs with control loops
4 =	4 high accuracy thermocouple inputs with control loops (defaults to Type K)
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
L =	4 SSR's at 2A each. SSR's grouped in 2-pairs with each pair sharing a common

⑧	Slot E
A =	None
1 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with control loops
2 =	4 thermistor inputs with control loops
4 =	4 high accuracy thermocouple inputs with control loops (defaults to Type K)
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
L =	4 SSR's at 2A each. SSR's grouped in 2-pairs with each pair sharing a common

⑩	Enhanced Options
A =	Standard bus
1 =	Standard bus and Modbus® RTU 485 (user-selectable)

⑪⑫	Additional Options
Firmware, Overlays, Parameter Settings	
AA =	Standard
AB =	Replacement connectors hardware only for the entered part number
XX =	Custom

High-Density Limit Module Specifications (RML)

(Select an RML module for 4 to 12 safety limits.)

Line Voltage/Power

- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a Class 2 or SELV rating

Isolated Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all other EZ-ZONE controllers
- Optional EIA 485, Modbus® RTU

Calibration Accuracy

- ±0.1% of span, ±1°C. See user manual for details

Universal Input

- Thermocouple, grounded or ungrounded sensors
- >20MΩ input impedance
- Max. of 2kΩ source resistance
- RTD 2-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve (0.00385Ω/Ω/°C)
- Process, 0-20mA @100Ω, or 0-10VDC @ 20kΩ input impedance; scalable, 0-50mV

Thermistor Input

- 0 to 40kΩ, 0 to 20kΩ, 0 to 10kΩ, 0 to 5kΩ
- 2.252kΩ and 10kΩ base at 77°F (25°C)

High Accuracy Thermocouple Input (For high accuracy specifications reference High Accuracy table on page 6)

- Thermocouple, grounded or ungrounded sensors
- 15nA open sensor detection
- Temperature stability ±10PPM/C
- Response time: 1 second max.

Digital Input

- Update rate 10Hz
- Max. input 36VDC at 3mA
- Min. high state 3VDC at 0.25mA

Dry Contact Input

- Update rate 10Hz
- Min. open resistance 10kΩ, max. closed resistance 50Ω

Output Hardware

- 6 digital inputs/outputs:
  - Switched dc, max. 20VDC @ 40mA, 12VDC @ 80mA
  - Open collector, max. 32VDC @ 1.5A, max. 8A per 6 outputs combined
- Electromechanical relay, Form A, 5A, 24 to 240VAC or 30VDC max., resistive load, 100,000 cycles at rated load, requires a min. load of 20mA at 24V, 125VA pilot duty

High-Density Limit Module Ordering Information

Requires 24 to 28VAC/VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

WATLOW SELECT

Part Number

①② EZ-ZONE Rail Mount	③ Limit Module	④ Connector Style/Custom Product		⑤ Slot A	⑥ Slot B	⑦ Slot D	⑧ Slot E		⑨ Future Option	⑩ Enhanced Options	⑪⑫ Additional Options
RM	L		-					-	A		

④ Connector Style/Custom Product	
A =	Right angle screw connector (standard)
F =	Front screw connector (slots A, B, D and E only)
S =	Custom

⑤ Slot A	
4 =	4 high accuracy thermocouple inputs with limits (defaults to Type K)
5 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with limit control loops
6 =	4 thermistor inputs with limit control loops

⑥ Slot B	
A =	None
4 =	4 high accuracy thermocouple inputs with limits (defaults to Type K)
5 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with limit control loops
6 =	4 thermistor inputs with limit control loops

⑦ Slot D	
A =	None
4 =	4 high accuracy thermocouple inputs with limits (defaults to Type K)
5 =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) with limit control loops
6 =	4 thermistor inputs with limit control loops
J =	4 mechanical relay 5A, Form A
C =	6 digital I/O*

⑧ Slot E	
J =	4 mechanical relay 5A, Form A
B =	1 digital input and 2 mechanical relays, 5A (1 Form A and 1 Form C)*

⑩ Enhanced Options	
A =	Standard bus
1 =	Standard bus and Modbus® RTU 485* (user-selectable)

⑪⑫ Additional Options	
Firmware, Overlays, Parameter Settings	
AA =	Standard
AB =	Replacement connectors hardware only for the entered part number.
XX =	Custom

* Reset limits via digital input, EZ key on RUI or communications commands

Expansion Module Specifications (RME)

(Select an RME module for additional inputs and outputs and higher amperage outputs.)

Line Voltage/Power

- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a Class 2 or SELV rating

Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all other EZ-ZONE products

Wiring Termination—Touch Safe Terminals

- Right angle and front-screw type terminal blocks (slots A, B, D, E)
  - Input, power and controller output terminals, touch safe, removable, 12 to 30 AWG
- Ring lug terminal blocks (slots A and D only)
  - Input, power and controller output terminals are touch safe and removable

Digital Input

- Update rate 10Hz
- Max. input 36VDC at 3mA
- Min. high state 3VDC at 0.25mA

Dry Contact

- Min. open resistance 100kΩ
- Max. closed resistance 50Ω

Output Hardware (6 digital inputs/outputs)

- Update rate 10Hz
- Switched dc
  - Output voltage 20VDC max.
  - Max. supply current source 40mA at 20VDC and 80mA at 12VDC
- Open collector
  - Switched voltage max. 32VDC
  - Max. switched current per output 2.5A
  - Max. switched current for all six outputs combined 10A

Dual Solid State Relay

- Two SSR board option, Form A, 10A max. each SSRs combined @ 24VAC min., 264VAC max., opto-isolated, without contact suppression, max. resistive load 10A per output at 240VAC, max. 20A per card at 122°F (50°C), max. 12A per card at 149°F (65°C)

Four Mechanical Relay

- Four electro mechanical relays, Form A, 5A, 24 to 240VAC or 30VDC max., resistive load, 100,000 cycles at rated load. Requires a min. load of 20mA at 24V, 125VA pilot duty

Tri-Process (Three universal process/retransmit outputs)

- Output range selections: 0 to 10VDC into a min. 4KΩ load
- 0 to 20mA into max. 400Ω load

Quad SSR

- Four SSRs at 2A each. SSRs are grouped in 2-pairs with each sharing a common.

Ambient Temp.	Maximum Current Per Relay	
	1 Quad SSR Card	More than 1 Quad SSR Card
-18 to 20°C	2A	1.5A
20 to 65°C	1A	0.75A

Expansion Module Ordering Information

Requires 24 to 28VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

①② EZ-ZONE Rail Mount	③ Expansion Module	④ Connector Style/Custom Product		⑤ Slot A	⑥ Slot B	⑦ Slot D	⑧ Slot E		⑨ Future Option	⑩ Enhanced Options	⑪⑫ Additional Options
RM	E		-					-	A		

WATLOW SELECT

④ Connector Style/Custom Product	
A =	Right angle screw connector (standard)
F =	Front screw connector (slots A, B, D and E only)
R =	Ring lug connector **(if ordered then slots B and E must be =A)**
S =	Custom

⑤ Slot A	
A =	None
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
K =	2 SSRs, Form A, 10A max. each **(if ordered, then slot B must be =A)**
L =	4 SSR's at 2A each. SSR's grouped in 2-pairs with each pair sharing a common
T =	Quad inputs for external current transformers. Can do single-phase system measurement for all hardware outputs ordered within the expansion module.

⑥ Slot B	
A =	None
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
L =	4 SSR's at 2A each. SSR's grouped in 2-pairs with each pair sharing a common
T =	Quad inputs for external current transformers. Can do either single-phase or three-phase system measurement for all hardware outputs ordered within the expansion module.

⑦ Slot D	
A =	None
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
K =	2 SSRs, Form A, 10A max. each **(if ordered, then slot E must be = A)**
L =	4 SSR's at 2A each. SSR's grouped in 2-pairs with each pair sharing a common
T =	Quad inputs for external current transformers. Can do either single-phase or three-phase system measurement for all hardware outputs ordered within the expansion module.

⑧ Slot E	
A =	None
C =	6 digital I/O
F =	3 universal process/retransmit outputs
L =	4 SSR's at 2A each. SSR's grouped in 2-pairs with each pair sharing a common
T =	Quad inputs for external current transformers. Can do either single-phase or three-phase system measurement for all hardware outputs ordered within the expansion module.

⑩ Enhanced Options	
A =	Standard bus
1 =	Standard bus and Modbus® RTU 485

⑪ Additional Options	
Firmware, Overlays, Parameter Settings	
AA =	Standard
AB =	Replacement connectors hardware only for the entered part number. Additional cost for the model can be disregarded as you are only ordering replacement connectors.
12 =	Class 1, Div. 2 (not available with integrated limit controller or mechanical relay options)
XX =	Custom

High-Density Scanner Module Specifications (RMS)

(Select an RMS module for 4 to 16 auxiliary analog inputs.)

Line Voltage/Power

- Power consumption: 7 W, 14VA
- Any external power supply used should comply with a Class 2 or SELV rating

Isolated Serial Communications

- All modules ship with standard bus protocol for configuration and communication with all EZ-ZONE controllers
- Optional EIA 485, Modbus® RTU

Calibration Accuracy

- ±0.1% of span, ±1°C. See user manual for details.

Universal Input

- Thermocouple, grounded or ungrounded sensors
- >20MΩ input impedance
- Max. of 2kΩ source resistance
- RTD 2-wire, platinum, 100Ω and 1000Ω @ 32°F (0°C) calibration to DIN curve (0.00385Ω/Ω/°C)
- Process, 0-20mA @100Ω, or 0-10VDC @ 20kΩ input impedance; scalable, 0-50mV

Thermistor Input

- 0 to 40kΩ, 0 to 20kΩ, 0 to 10kΩ, 0 to 5kΩ
- 2.252kΩ and 10kΩ base at 77°F (25°C)

High Accuracy Thermocouple Input (For high accuracy specifications reference High Accuracy table on page 6)

- Thermocouple, grounded or ungrounded sensors
- 15nA open sensor detection
- Temperature stability ±10PPM/C
- Response time: 1 second max.

Digital Input

- Update rate 10Hz
- Max. input 36VDC at 3mA
- Min. high state 3VDC at 0.25mA

Dry Contact Input

- Update rate 10Hz
- Min. open resistance 10kΩ, max. closed resistance 50Ω

Output Hardware

- 6 digital inputs/outputs:
  - Switched dc, max. 20VDC @ 40mA, 12VDC @ 80mA
  - Open collector, max. 32VDC @ 1.5A, max. 8A per 6 outputs combined
- Electromechanical relay, Form A, 5A, 24 to 240VAC or 30VDC max., resistive load, 100,000 cycles at rated load, requires a min. load of 20mA at 24V, 125VA pilot duty

High-Density Scanner Module Ordering Information

WATLOW SELECT

Requires 24 to 28VAC/VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

①② EZ-ZONE Rail Mount	③ Scanner Module	④ Connector Style/Custom Product		⑤ Slot A	⑥ Slot B	⑦ Slot D	⑧ Slot E		⑨ Future Option	⑩ Enhanced Options	⑪⑫ Additional Options
RM	S		-					-	A		

④ Connector Style/Custom Product	
A =	Right angle screw connector (standard)
F =	Front screw connector (slots A, B, D and E only)
S =	Custom

⑤ Slot A	
4 =	4 high accuracy thermocouple inputs (defaults to Type K)
R =	4 universal inputs (T/C, RTD 2-wire, 0-10VDC, 0-20mA) without control loops
P =	4 thermistor inputs without control loops

⑥ Slot B	
A =	None
4 =	4 high accuracy thermocouple inputs (defaults to Type K)
R =	4 universal inputs (T/C RTD 2-wire, 0-10VDC, 0-20mA) without control loops
P =	4 thermistor inputs without control loops

⑦ Slot D	
A =	None
4 =	4 high accuracy thermocouple inputs (defaults to Type K)
R =	4 universal inputs (T/C RTD 2-wire, 0-10VDC, 0-20mA) without control loops
P =	4 thermistor inputs without control loops
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
L =	4 SSR's at 2A each. SSR's grouped in 2-pairs with each pair sharing a common

⑧ Slot E	
A =	None
4 =	4 high accuracy thermocouple inputs (defaults to Type K)
R =	4 universal inputs (T/C RTD 2-wire, 0-10VDC, 0-20mA) without control loops
P =	4 thermistor inputs without control loops
B =	1 digital input and 2 mechanical relays, 4A
C =	6 digital I/O
F =	3 universal process/retransmit outputs
J =	4 mechanical relay 5A, Form A
L =	4 SSR's at 2A each. SSR's grouped in 2-pairs with each pair sharing a common

⑩ Enhanced Options	
A =	Standard bus
1 =	Standard bus and Modbus® RTU 485 (user-selectable)

⑪⑫ Additional Options	
Firmware, Overlays, Parameter Settings	
AA =	Standard
AB =	Replacement connectors hardware only for the entered part number
XX =	Custom

Access Module Specifications (RMA)

NOT FOR NEW DESIGNS

(Select an RMA module for communication protocol options.)

Line Voltage/Power

- Power consumption: 4 W, 9VA
- Any external power supply used should comply with a Class 2 or SELV rating

Isolated Serial Communications

- All modules ship with standard bus protocol for configuration and communication connection to all EZ-ZONE products

Additional Communication Options

- EIA 232/485, Modbus® RTU
- EtherNet/IP™, Modbus® TCP, 10 BASE-T/100 BASE-TX
- DeviceNet™
- PROFIBUS DP
- USB, controller recognized as a device

Note: If an access module is present, all other modules must have Modbus® disabled in order to achieve communications with all of the modules.

For new applications requiring Ethernet gateway, data logging and auto-configuration of EZ-ZONE RM systems see the RMA PLUS™

Click here or search for RMA/RMA PLUS Comparison Chart on our website.

RMA PLUS Remote Access Module Offers Plug and Play Access to the Powerful EZ-ZONE RM Family

Features and Benefits

Plug and play access to EZ-ZONE RM family

- Integrates easily into existing systems

Built-in Ethernet switch

- Eliminates the need to provide a switch for small systems
- Offers port mirroring for troubleshooting
- Protects from broadcast and multicast storms

Integrated USB connection

- Provides easy connection from PC with no converter
- Ensures real-time communication from software packages

Modbus® TCP and Modbus® RTU

- Allows users to build tables based on individual needs
- Connects to third-party and legacy devices

Data logging

- Offers users the opportunity to log any data point in the system

Access Module Ordering Information

NOT FOR NEW DESIGNS

WATLOW SELECT

Requires 24 to 28VDC power supply, includes communication port for configuration with EZ-ZONE configurator and PC.

Part Number

①② EZ-ZONE Rail Mount	③ Access Module	④ Connector Style		⑤ Future Option	⑥ Comms. Options	⑦ Discontinued Options[1]	⑧ Discontinued Options[2]		⑨⑩ Future Options	⑪⑫ Additional Options
RM	A		-	A		A	U	-	AA	

④	Connector Style
A =	Right angle screw connector (standard)
F =	Front screw connector (slots B, and E only)
S =	Custom

⑥	Communications Options
A =	None
2 =	Modbus® RTU 232/485
3 =	EtherNet/IP™, Modbus®/TCP
5 =	DeviceNet™
6 =	PROFIBUS DP

⑪⑫	Additional Options
Firmware, Overlays, Parameter Settings	
AA =	Standard
AB =	Replacement connectors hardware only for the entered part number. Additional cost for the model can be disregarded as you are only ordering replacement connectors.
12 =	Class 1, Div. 2 (not available with integrated limit controller or mechanical relay options)
XX =	Custom

[1]Option: B for battery backup and real time clock is no longer available.

[2]Options: A, B, Y and D for auto-backup, mobile data, USB device and data logging are no longer available.

Contact your Watlow representative for replacment product options.

Compatible Accessories

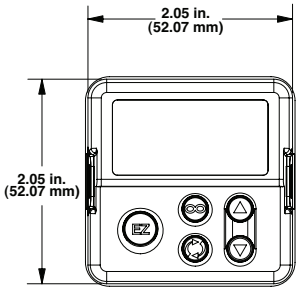
Specifications for Basic Remote User Interface (RUI) EZKB Operator Interface

- Dual 4 digit, 7 segment LED displays
- Forward, backward, up and down keys plus a customer programmable function key - EZ key
- Typical display update rate: 1Hz
- Agency approved to IP65/NEMA 4X
- Standard bus ships with all units. Options: EIA 232/485 Modbus® RTU, EtherNet/IP™/TCP Modbus® or DeviceNet™, PROFIBUS DP

Line Voltage/Power

- 100 to 240VAC, +10/-15%; (85-264VAC) 50/60Hz, ±5%
- 24VAC/VDC, +10/-15%; 50/60Hz, ±5%

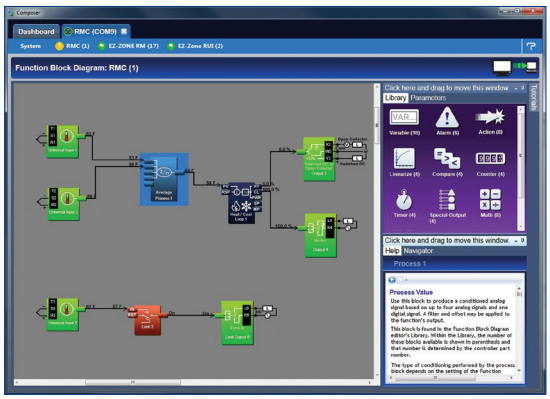
Basic RUI



Front View

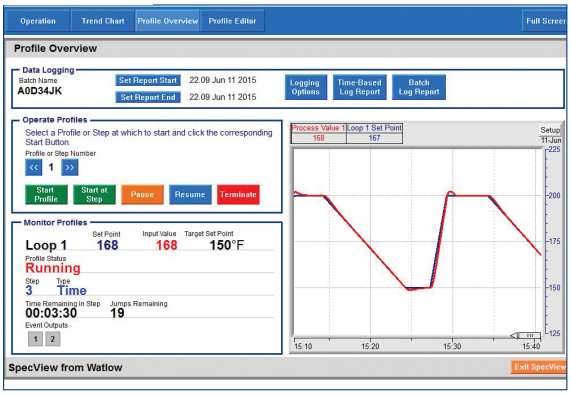
Depth Dimensions for RUI: long case 4 in. (101.6 mm), short case 2.33 in. (59.10 mm)

COMPOSER®



COMPOSER® is Watlow's new, easy-to-use software for configuring and customizing controllers. Use it to optimize Watlow's F4T and EZ-ZONE® PM and RM controllers for specific applications. Task-specific views simplify all aspects of commissioning new controllers including managing the inputs and outputs from pluggable flex modules, setting up functions such as control loops and alarms and creating and editing profiles. COMPOSER software is included on the "Watlow Support Tools" DVD and available for download at www.watlow.com.

SpecView



SpecView is designed for industrial users and includes features such as data logging, trending and support for bar code readers and touch screens. Errors are reduced for any process by creating application-specific screens. The software provides a historical replay option, easy-to-use recipe features and remote access options, including LAN, internet and modem.

Operator Interface Terminals (OIT)

Silver Series EM touch screen operator interface terminals provide a customizable user interface, email event notifications and log and graph data for Watlow controllers and other devices. A Silver Series EM operator interface terminal paired with Watlow controllers is the perfect solution for your industrial process or machine control application.

Compatible Accessories (continued)

Power Supplies

- AC/DC power supply converter 90-264VAC to 24VDC volts.
- P/N 0847-0299-0000 – 31 W
- P/N 0847-0300-0000 – 60 W
- P/N 0847-0301-0000 – 91 W

EZ-ZONE RM Product Documentation

- User's manual – electronic DVD P/N 0601-0001-0000
- Table of manuals in various languages (see below)

User Documentation	RMC	RMH	RML	RME	RMS	RMA
English	0600-0070-0000	0600-0074-0000	0600-0075-0000	0600-0073-0000	0600-0071-0000	0600-0072-0000
German	0600-0070-0001	0600-0074-0001	0600-0075-0001	0600-0073-0001	0600-0071-0001	0600-0072-0001
Japanese	0600-0070-0002	0600-0074-0002	0600-0075-0002	0600-0073-0002	0600-0071-0002	0600-0072-0002
Korean	0600-0070-0003	0600-0074-0003	0600-0075-0003	0600-0073-0003	0600-0071-0003	0600-0072-0003
French	0600-0070-0004	0600-0074-0004	0600-0075-0004	0600-0073-0004	0600-0071-0004	0600-0072-0004
Italian	0600-0070-0005	0600-0074-0005	0600-0075-0005	0600-0073-0005	0600-0071-0005	0600-0072-0005
Spanish	0600-0070-0006	0600-0074-0006	0600-0075-0006	0600-0073-0006	0600-0071-0006	0600-0072-0006
Chinese	0600-0070-0007	0600-0074-0007	0600-0075-0007	0600-0073-0007	0600-0071-0007	0600-0072-0007

Your Authorized Watlow Distributor Is:

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France	+33 1 41 32 79 70	**Japan**	+81 3 3518 6630	**Spain**	+34 91 675 1292
Germany	+49 7253 9400 0	**Korea**	+82 2 2169 2600	**Taiwan**	+886 7 288 5168
				UK	+44 115 964 0777