

GM9K SERIES (INCLUDE GM9K1 / GM9K2 / GM9K3): GAS FIRED CONTROL SYSTEM



USER MANUAL -FOR OEM USE ONLY



GM9K1 / GM9K2 / GM9K3 Control Module

⚠ WARNING

Fire or explosion hazard. Attempted disassembly or repair of controls can cause property damage, severe injury or death. Do not disassemble the gas valve; it contains no serviceable components.

Read these instructions carefully. Failure to follow them could result in a fire or explosion causing property damage, personal injury, or loss of life. The product must be installed and operated according to all local regulations.

A. **BEFORE OPERATING** verify that no gas is in the area around the appliance, including near the floor.

WHAT TO DO IF YOU SMELL GAS:

- Do not light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call the gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach the gas supplier, call the fire department.

B. Use only your hand to push in or turn the gas control knobs. Never use tools. If a knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

C. Do not use this control or any gas appliance if any part has been under water or in contact with water. Immediately call a qualified service technician to replace the control system and any gas control system which has been under water or in contact with water.

D. These instructions are to be referenced as a user guide, and do not supersede appliance manufacturer's lighting instructions.

FEATURES

- Electronic ignition control system
- Ignition by supervised gas-fire pilot burner
- Support pilot flame sensing:
 - Ionization flame detection
 - Thermocouple flame detection
- Max 9 hours idle auto shutdown
- Manual control and Remote control
- Flame height adjustment
- Flexible combination of AC/DC output to control FAN, LIGHT, AUX
- Second burner control
- Thermostat function

APPLICATION

GM9K series is an electronic ignition control module for gas appliances with pilot burners, ODS systems, remote function, second burner and extra AC/DC output. Control module is a combination of control board and power board.

GENERAL NOTES

Multiple Remote Control Solutions:

- GM9K1 for Unidirectional RF (434 MHz)
- GM9K2 for Bidirectional RF (434 MHz) (Support RevoHome SYS.)
- GM9K3 for Bluetooth

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Primary source(AC):

An AC Main Adapter may be used instead of batteries. (AC source according to CSA and CE.)

Secondary source(DC):

- 4 x 1.5V "AA" Batteries. (quality alkaline recommended)
- AC to DC 6.5V 1.5A adapter.

NOTE:

- Power board needed AC power to perform all functions, while AC power lost, power board function may lost simultaneously.

SYSTEM WIRING DIAGRAM

NOTE:

“The pilot valve flame power must be limited to 250 Thermal Watt”
 This is mandatory to avoid the test to the pilot valve as safety relevant valve.

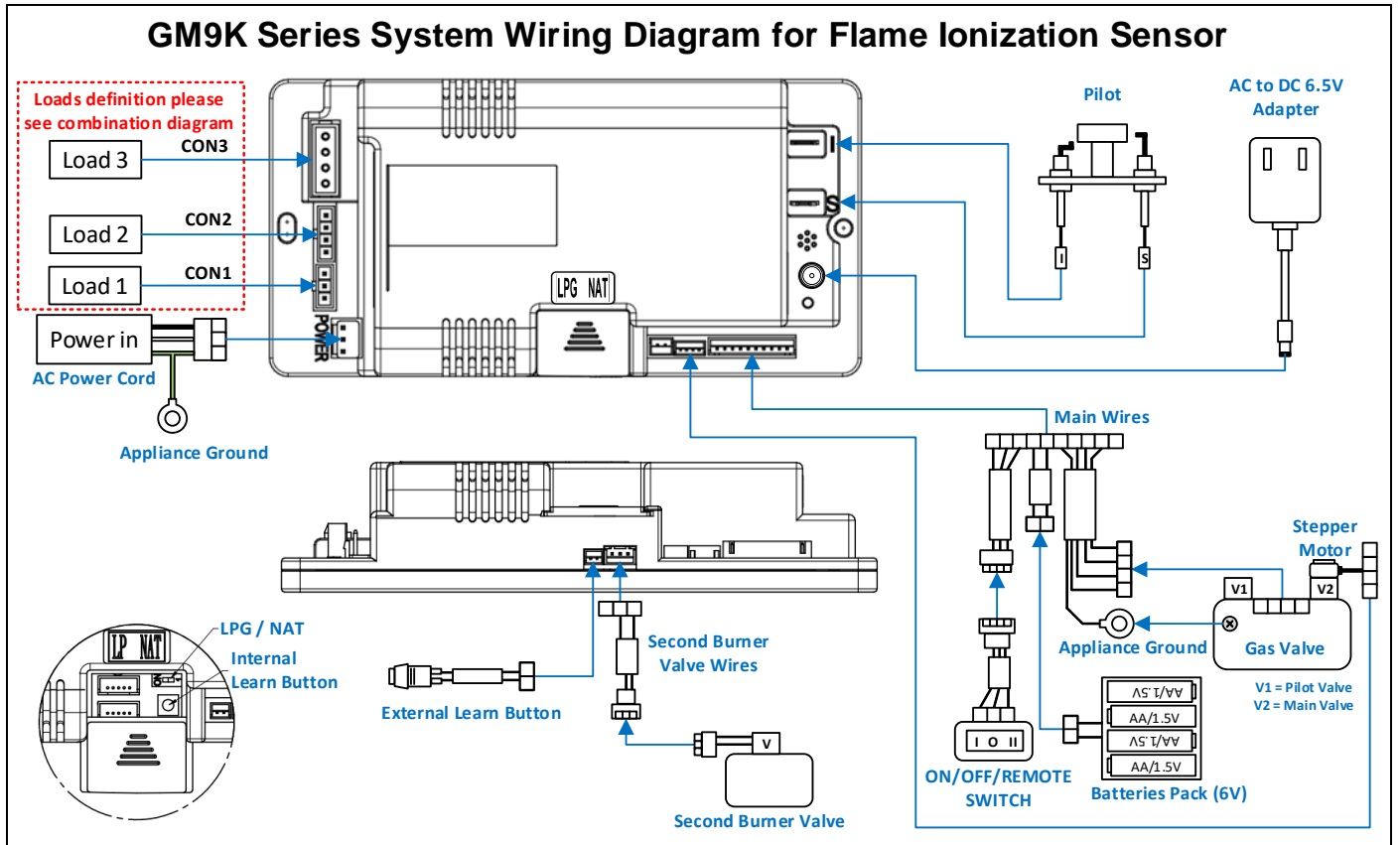


Figure 1: GM9K Series system wiring diagram for ionization sensor

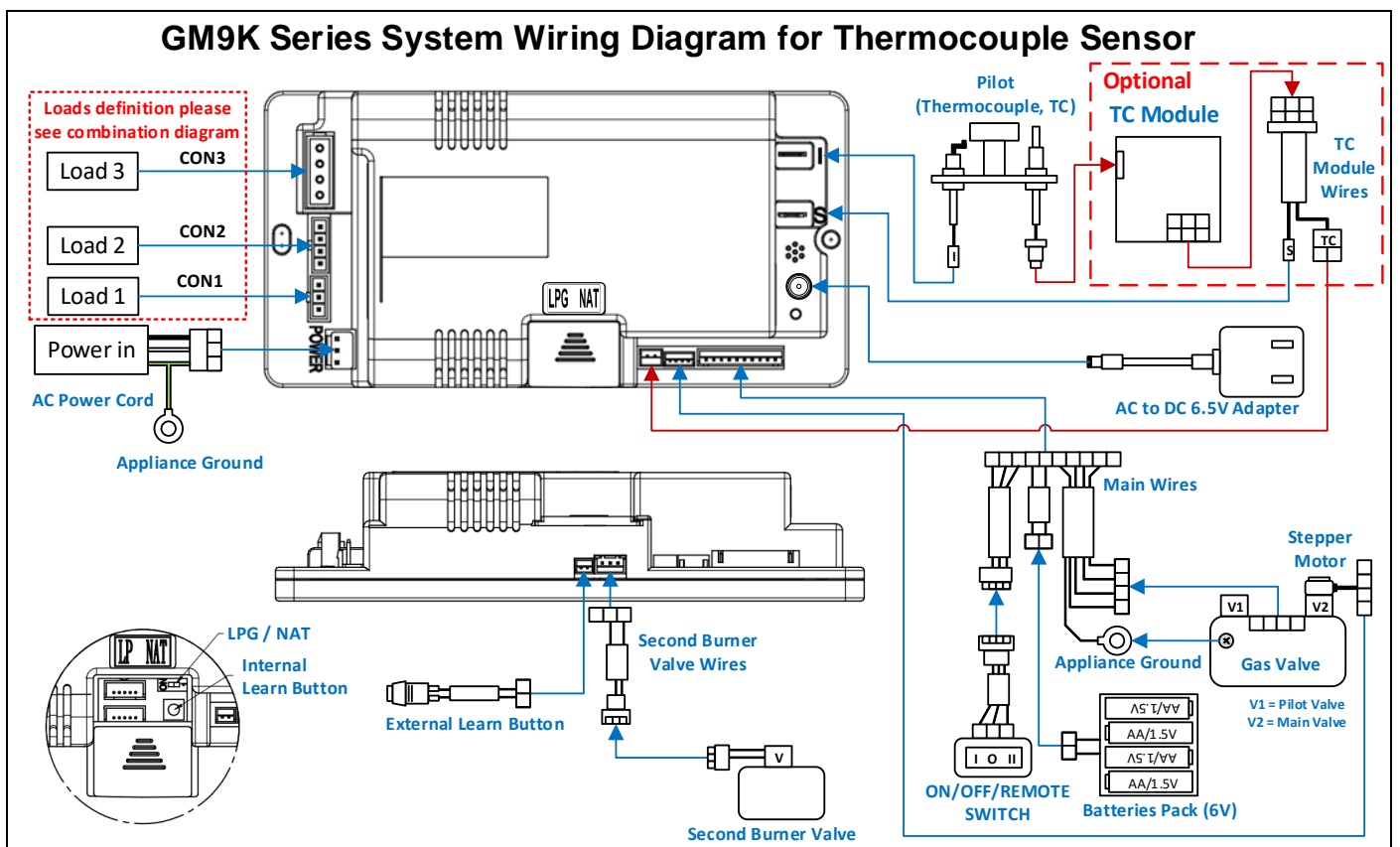
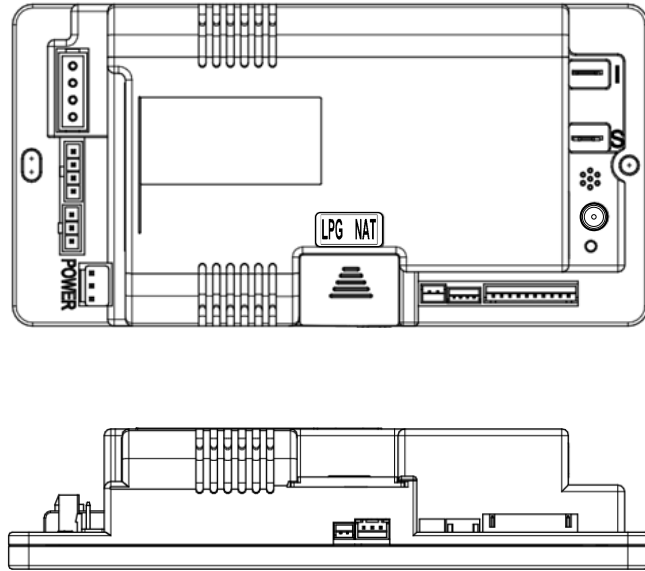


Figure 2: GM9K Series system wiring diagram for thermocouple sensor

CONTROL BOARD AND POWER BOARD CONNECTION DIAGRAM

Connection of board to board(B to B)



Connection of wire to board(W to B)

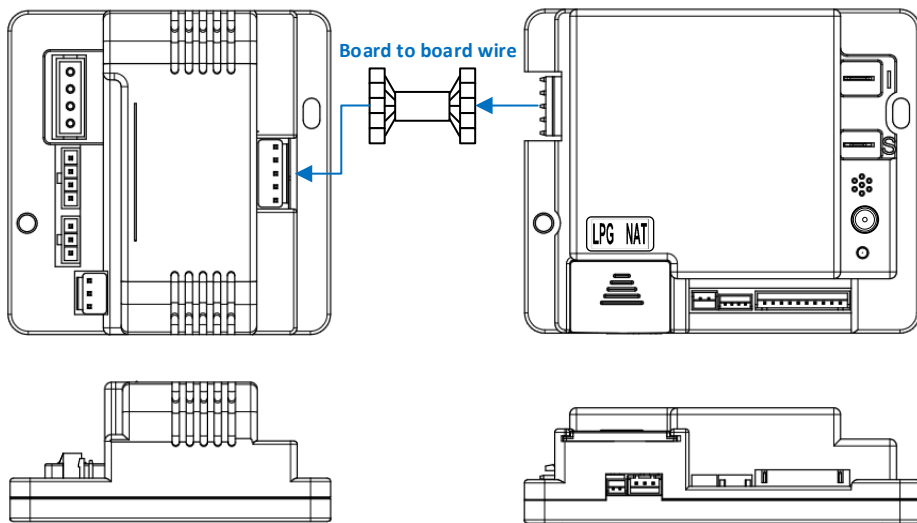


Figure 3: GM9K Series connection diagram of control board and power board

POWER BOARD COMBINATION DIAGRAM

NOTE:

Default AC output definitions of power board as below, all AC output load definitions could modified by firmware for variety applications.

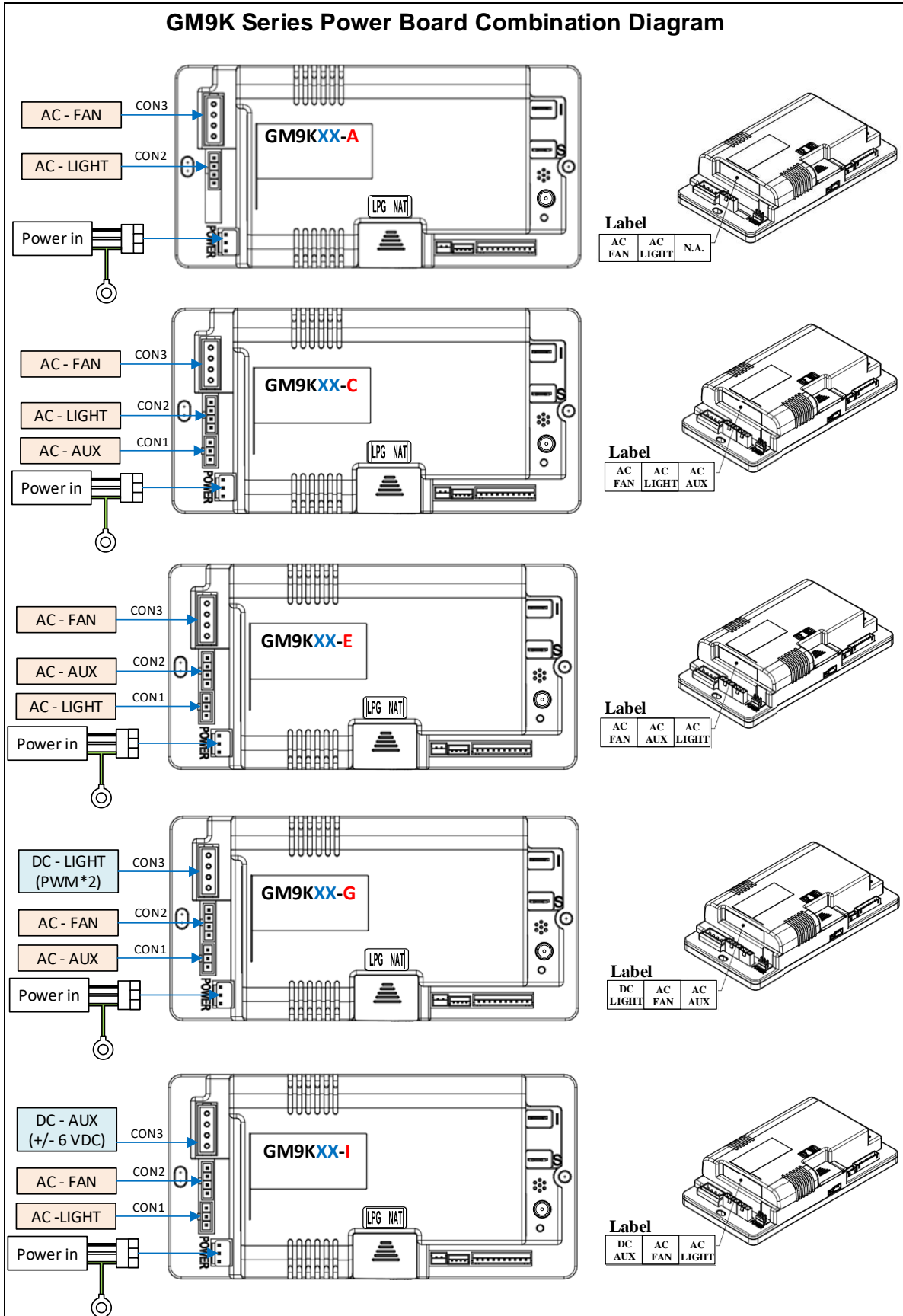


Figure 4: GM9K Series power board combination diagram

NOTE:

Default AC output definitions of power board as below, all AC output load definitions could be modified by firmware for variety applications.

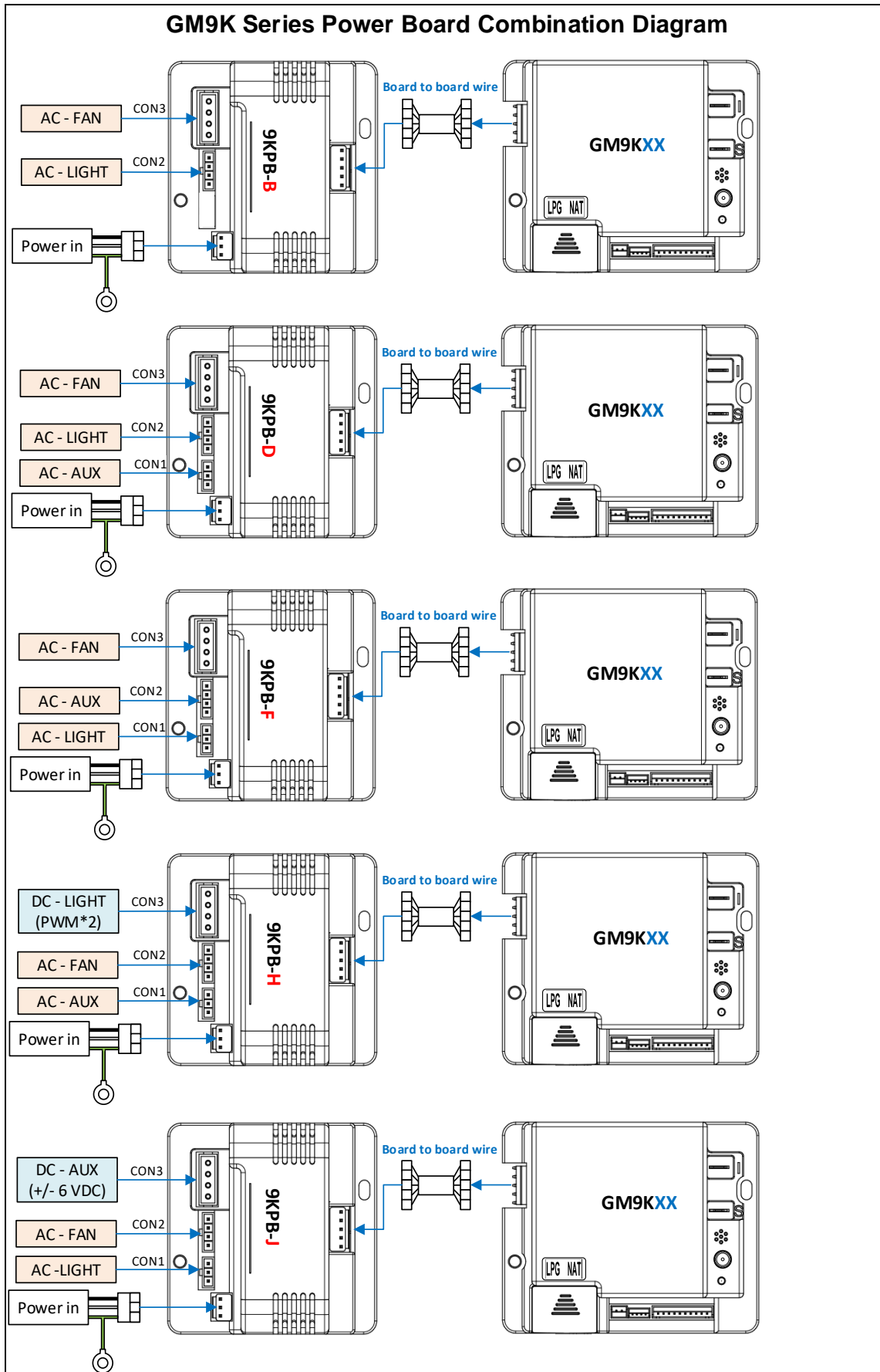


Figure 5: GM9K Series power board combination diagram (Wire to Board)

GM9K SERIES PRODUCT COMBINATION

Example: Product GM9K2B-A = Control board “2B” + Power board “A”

NOTE:

- B is abbreviation of Board
- W is abbreviation of Wire

TABLE1. GM9K SERIES PRODUCT COMBINATION LIST					
NO.	Product Name	Control Board Code Number	Power Board Code Number	Connection	Remark
1	GM9K1A-A	1A	A	B to B	
2	GM9K1B-A	1B			
3	GM9K1C-A	1C			
4	GM9K1D-A	1D			
5	GM9K2A-A	2A			
6	GM9K2B-A	2B			
7	GM9K2C-A	2C			
8	GM9K2D-A	2D			
9	GM9K1A-C	1A	C		
10	GM9K1B-C	1B			
11	GM9K1C-C	1C			
12	GM9K1D-C	1D			
13	GM9K2A-C	2A			
14	GM9K2B-C	2B			
15	GM9K2C-C	2C			
16	GM9K2D-C	2D			
17	GM9K1A-E	1A	E		
18	GM9K1B-E	1B			
19	GM9K1C-E	1C			
20	GM9K1D-E	1D			
21	GM9K2A-E	2A			
22	GM9K2B-E	2B			
23	GM9K2C-E	2C			
24	GM9K2D-E	2D			
25	GM9K1A-G	1A	G		
26	GM9K1B-G	1B			
27	GM9K1C-G	1C			
28	GM9K1D-G	1D			
29	GM9K2A-G	2A			
30	GM9K2B-G	2B			
31	GM9K2C-G	2C			
32	GM9K2D-G	2D			

GM9K SERIES (INCLUDE GM9K1 / GM9K2 / GM9K3) USER MANUAL - FOR OEM USE ONLY

NO.	Product Name	Control Board Code Number	Power Board Code Number	Connection	Remark
33	GM9K1A-I	1A	I	B to B	
34	GM9K1B-I	1B			
35	GM9K1C-I	1C			
36	GM9K1D-I	1D			
37	GM9K2A-I	2A			
38	GM9K2B-I	2B			
39	GM9K2C-I	2C			
40	GM9K2D-I	2D			
41	GM9K1E-B	1E	B	W to B	
42	GM9K1F-B	1F			
43	GM9K2E-B	2E			
44	GM9K2F-B	2F			
45	GM9K1E-D	1E	D		
46	GM9K1F-D	1F			
47	GM9K2E-D	2E			
48	GM9K2F-D	2F			
49	GM9K1E-F	1E	F		
50	GM9K1F-F	1F			
51	GM9K2E-F	2E			
52	GM9K2F-F	2F			
53	GM9K1E-H	1E	H		
54	GM9K1F-H	1F			
55	GM9K2E-H	2E			
56	GM9K2F-H	2F			
57	GM9K1E-J	1E	J		
58	GM9K1F-J	1F			
59	GM9K2E-J	2E			
60	GM9K2F-J	2F			
61	GM9K1E	1E	N.A.		
62	GM9K1F	1F			
63	GM9K2E	2E	N.A.		
64	GM9K2F	2F			
65	GM9K2G	2G			

GM9K SERIES (INCLUDE GM9K1 / GM9K2 / GM9K3) USER MANUAL - FOR OEM USE ONLY

NO.	Product Name	Control Board Code Number	Power Board Code Number	Connection	Remark
66	GM9K3A-A	3A	A	B to B	
67	GM9K3B-A	3B			
68	GM9K3C-A	3C			
69	GM9K3D-A	3D			
70	GM9K3A-C	3A	C		
71	GM9K3B-C	3B			
72	GM9K3C-C	3C			
73	GM9K3D-C	3D			
74	GM9K3A-E	3A	E		
75	GM9K3B-E	3B			
76	GM9K3C-E	3C			
77	GM9K3D-E	3D			
78	GM9K3A-G	3A	G		
79	GM9K3B-G	3B			
80	GM9K3C-G	3C			
81	GM9K3D-G	3D			
82	GM9K3A-I	3A	I		
83	GM9K3B-I	3B			
84	GM9K3C-I	3C			
85	GM9K3D-I	3D			
86	GM9K3E-B	3E	B	W to B	
87	GM9K3F-B	3F	D		
88	GM9K3E-D	3E			
89	GM9K3F-D	3F	F		
90	GM9K3E-F	3E			
91	GM9K3F-F	3F	H		
92	GM9K3E-H	3E			
93	GM9K3F-H	3F	J		
94	GM9K3E-J	3E			
95	GM9K3F-J	3F	N.A.		
96	GM9K3E	3E			
97	GM9K3F	3F			

GM9K SERIES (INCLUDE GM9K1 / GM9K2 / GM9K3) USER MANUAL - FOR OEM USE ONLY

Table 2 and table 3 are optional features list of control board and power board. (●: Selected feature)

NOTE:

Default AC output definitions of power board as below, all AC output load definitions could be modified by firmware for variety applications.

TABLE2-1. CONTROL BOARD COMBINATION LIST														
Control Board Features \ Code	GM9K													
	1A	1B	1C	1D	1E	1F	2A	2B	2C	2D	2E	2F	2G	
1. Remote Module	Unidirectional RF (434MHz)						Bidirectional RF (434MHz)						N.A.	
2. Connection Method	B to B (JP3)				W to B (CON7)		B to B (JP3)				W to B (CON7)			
3. Control Board Firmware	Firmware 1						Firmware 1						Firmware 2	
4. Second Burner (Related Circuit)	●	●			●		●	●			●			
5. DC JACK (DC1)	●		●		●	●	●		●		●	●	●	

TABLE2-2. CONTROL BOARD COMBINATION LIST						
Control Board PCB Features \ Module	GM9K					
	3A	3B	3C	3D	3E	3F
1. Remote Module	Bluetooth (2.4GHz)					
2. Connection Method	B to B (JP3)			W to B (CON7)		
3. Control Board Firmware	Firmware 1					
4. Second Burner (Related Circuit)	●	●			●	
5. DC JACK (DC1)	●		●		●	●

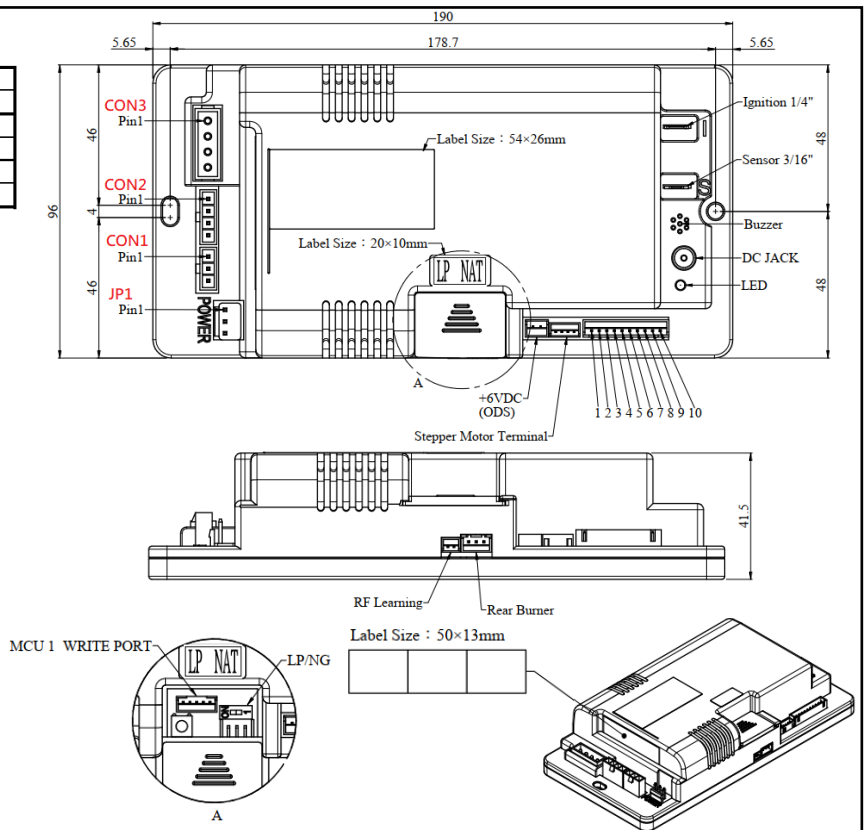
TABLE3. POWER BOARD COMBINATION LIST												
Features \ Code	Power Board										Pitch (mm)	PIN
	A	B	C	D	E	F	G	H	I	J		
1. Connection Method	B to B (O/P)	W to B (CON8)	B to B (O/P)	W to B (CON8)	B to B (O/P)	W to B (CON8)	B to B (O/P)	W to B (CON8)	B to B (O/P)	W to B (CON8)	3.96	5P
2. [CON3]	AC - FAN						DC - LIGHT		DC - AUX		5.08	4P
3. [CON2]	AC - LIGHT				AC - AUX		AC - FAN				4.2	4P
4. [CON1]	N.A.		AC - AUX		AC - LIGHT		AC - AUX		AC - LIGHT		4.2	3P
5. Mounted resistance												
6. Power Board Firmware	Firmware 1				Firmware 2		Firmware 3		Firmware 4			

TABLE6. TERMINALS DESCRIPTION

PB PIN (INPUT)	AC (120 / 240 VAC)			DC (6VDC)
PIN \ CON PORT	CON1	CON2	CON3	CON3
PIN 1	AC-L	AC-L	AC-L	DC-M1
PIN 2	EARTH	AC-N	AC-N	DC-M2
PIN 3	AC-N	EARTH	EARTH	DC-V+
PIN 4	X	N.C.	N.C.	DC-GND

PB PIN (OUTPUT)	AC (120 / 240 VAC)
PIN \ CON PORT	JP1
PIN 1	AC-L
PIN 2	AC-N
PIN 3	EARTH

CB PIN	DC
PIN \ CON PORT	DESCRIPTION
PIN 1	REMOTE
PIN 2	COM (OFF)
PIN 3	MANUAL (ON)
PIN 4	BATTERY- (GND)
PIN 5	BATTERY+
PIN 6	MAIN VALVE
PIN 7	GND (PILOT/MAIN)
PIN 8	PILOT VALVE
PIN 9	GND (VALVE BODY)
PIN 10	N.A.



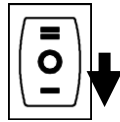
N.C. = Not Connection
N.A. = Not Available

OPERATION

Using the ON/OFF/REMOTE Switch to change system operation mode on Manual, Power OFF and Remote.

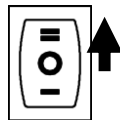
Manual Mode:

Switch from O to I as Manual mode, system will execute ignition process and remote function will disable on this mode.



Remote Mode:

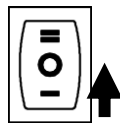
Switch from O to II as Remote mode, system standby and waiting remote signal.



NOTE: On this mode system can do pairing between control module and remote handset.
(See SETTING THE ELECTRONICS CODE)

Power OFF:

Switch to O as Power OFF, system and main gas valve shutdown.



SETTING THE ELECTRONICS CODE

(First time use only)

A code is selected automatically for all GRAND MATE electronics from among 65,000 random codes available. The control module had to learn the code of the handset:

- Switch from O to II as Remote mode. (see Figure 6)
- Press control module's learn button (see Figure 7 or 8), an acoustic signal and green LED flashing.
- Within the subsequent 10 second press any button on the remote handset until you hear two (2) beep confirming the code is set.

NOTE: This is a one time setting only, and is not required when changing the batteries in the remote or control module.

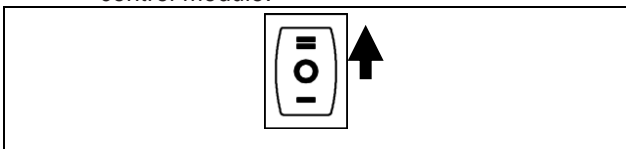


Figure 6: Switch to remote mode

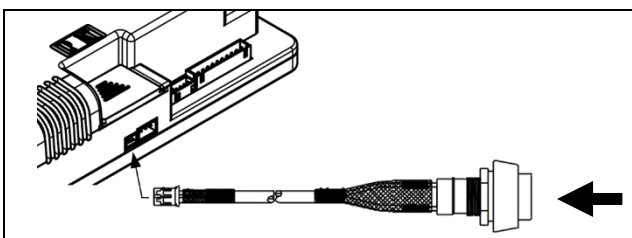


Figure 7: Control module's external learn button

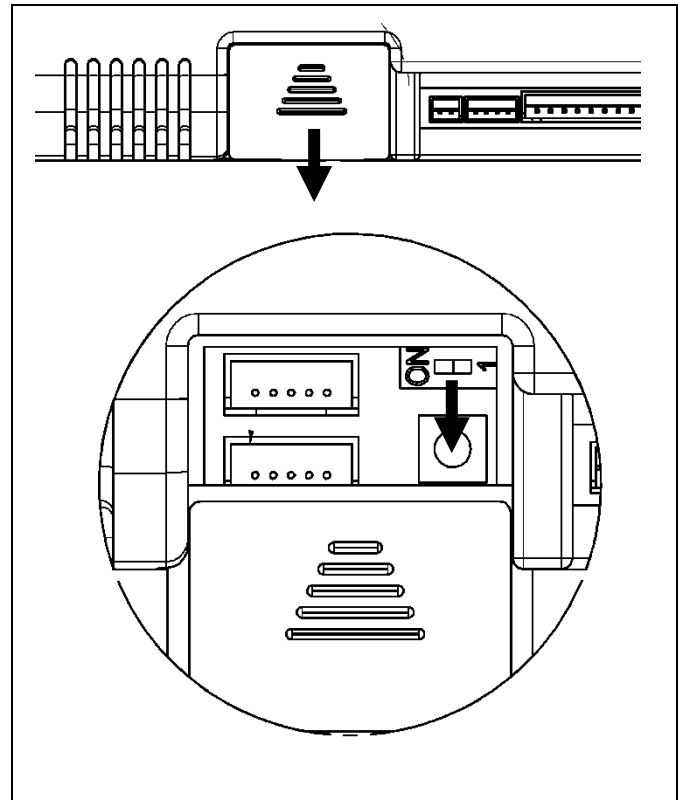


Figure 8: Control module's internal learn button

SYSTEM SPECIFICATIONS

TABLE 4. SYSTEM SPECIFICATIONS		
Item	Description / Values	Remarks
Type number/model reference	GM9K1 & GM9K2 Series	
Mode of operation	Non Permanent (Max 9 hours)	
Rated supply voltage	AC : 240VAC / 50 Hz for CE Mark DC : 6.5V by adapter	
	AC : 120VAC / 60 Hz for CSA Mark DC : 6.5V by adapter	
Power board maximum rated output power	450W / 240 VAC / 1.875 Amp for CE Mark	Using 3.15 Amp fuse
	450W / 120 VAC / 3.75 Amp for CSA Mark	Using 5 Amp fuse
Power board maximum rated output power of each AC channel	150W / 240 VAC / 0.625 Amp for CE Mark	Using 1.6 Amp fuse
	150W / 120 VAC / 1.25 Amp for CSA Mark	Using 3 Amp fuse
Protection class of enclosure	IP-00 for incorporation	⚠ WARNING Installation environment required to keep away from water or moist
Range of ambient temperatures	-20°C to 80°C (-4°F to 176°F)	
Start-gas(Pilot) valve output rating	DC : 0.28 V~ 2.0 V	
Main-gas(Main) valve output rating	DC : 0.28 V~ 2.0 V	
Second burner valve output rating	DC : +6VDC / -6VDC (Pulse signal)	
Pre-purge or Waiting time	11 Sec (Waiting time)	Interval between powered and ignition
First safety time	60 Sec	
Flame failure response time	3 Sec	
Time to achieve safety shut down	0.2 Sec	
Time to achieve lockout	0.2 Sec	
Number of ignition attempts	1	
Sparking frequency range	6 Hz to 9 Hz	
Sparking voltage range	18 kV to 20.7 kV	
Software class	Class C	

OPERATING SEQUENCE

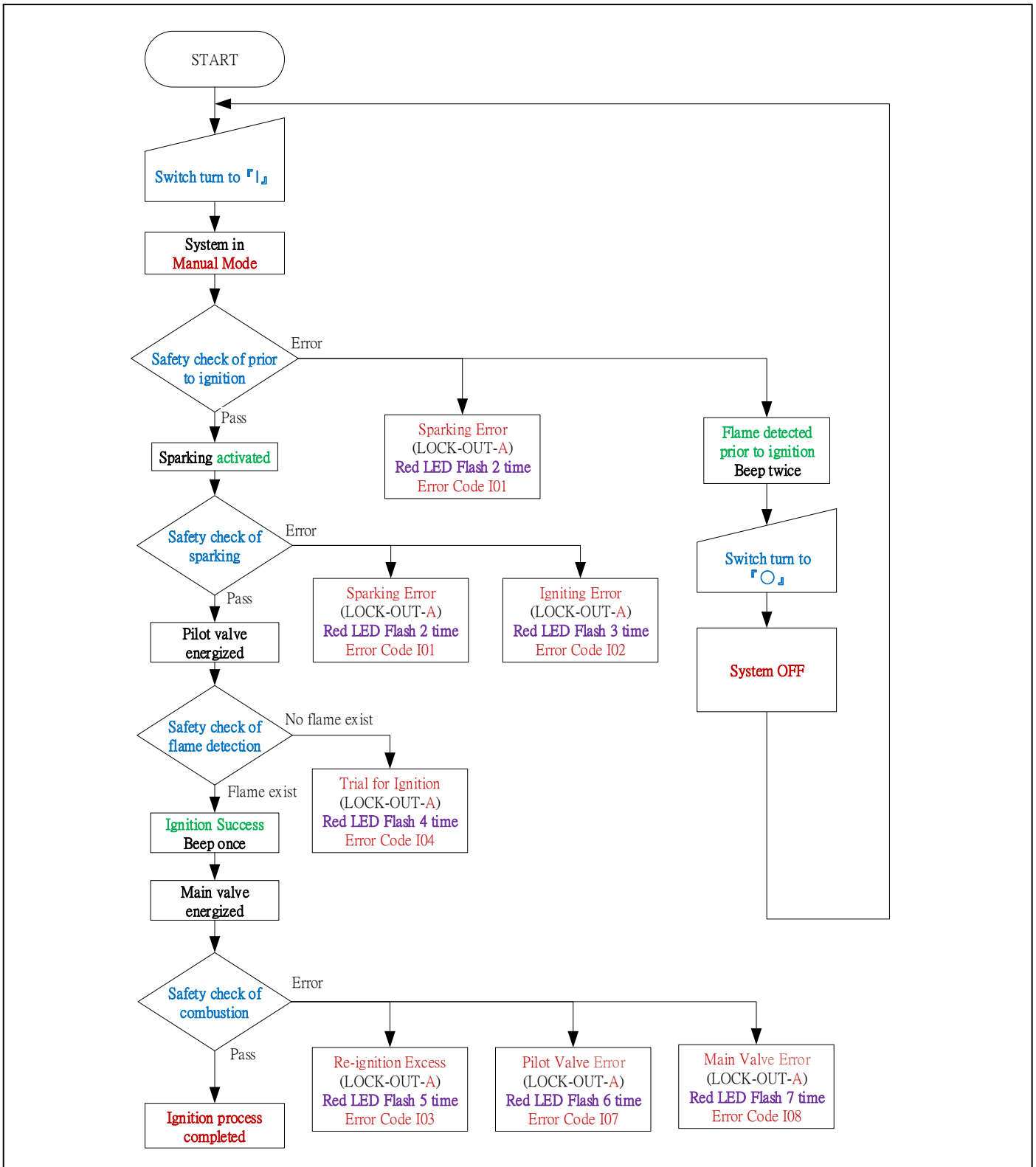


Figure 9: Manual mode operating sequence.

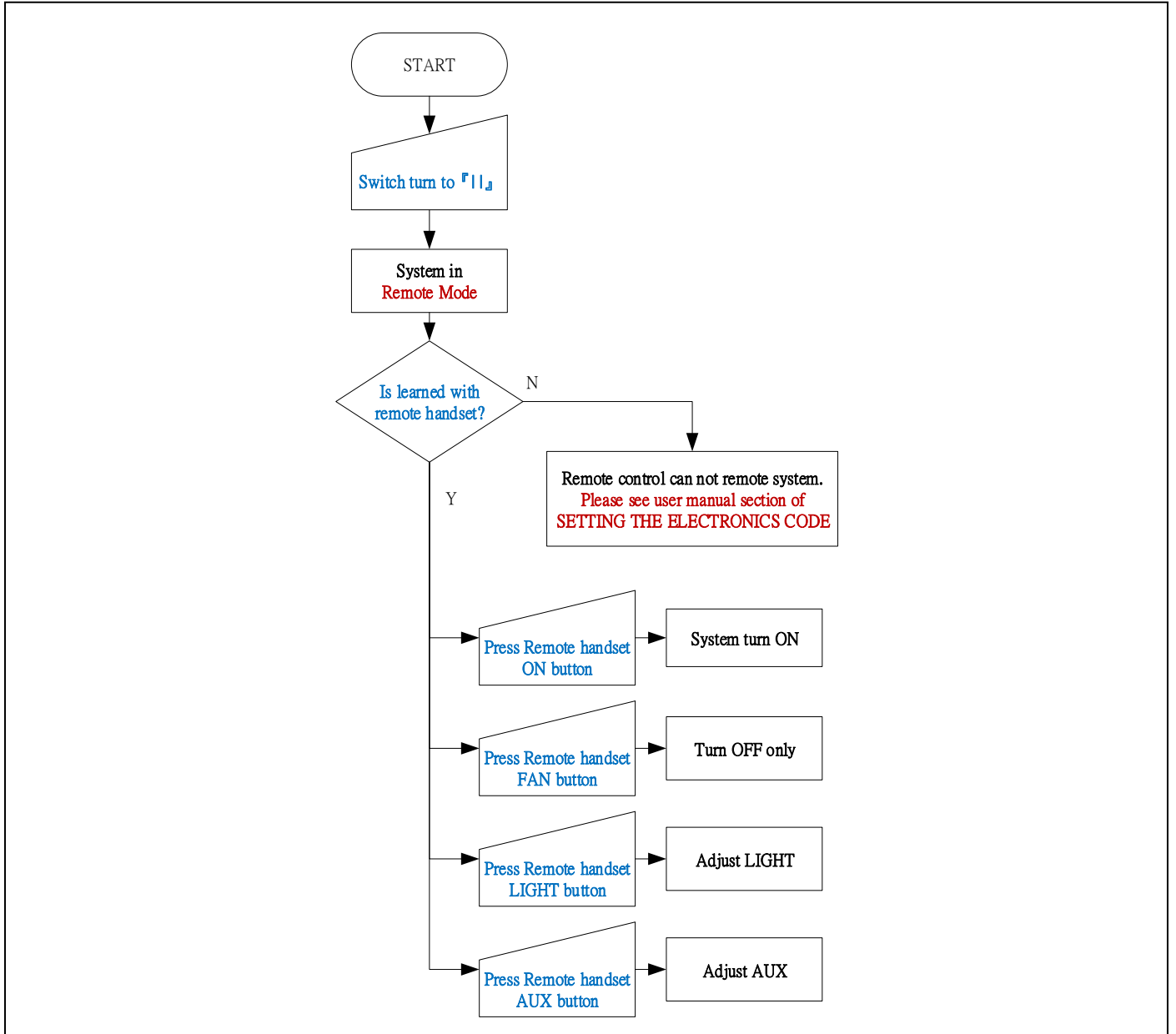


Figure 10: Remote mode operating sequence part 1 of 2

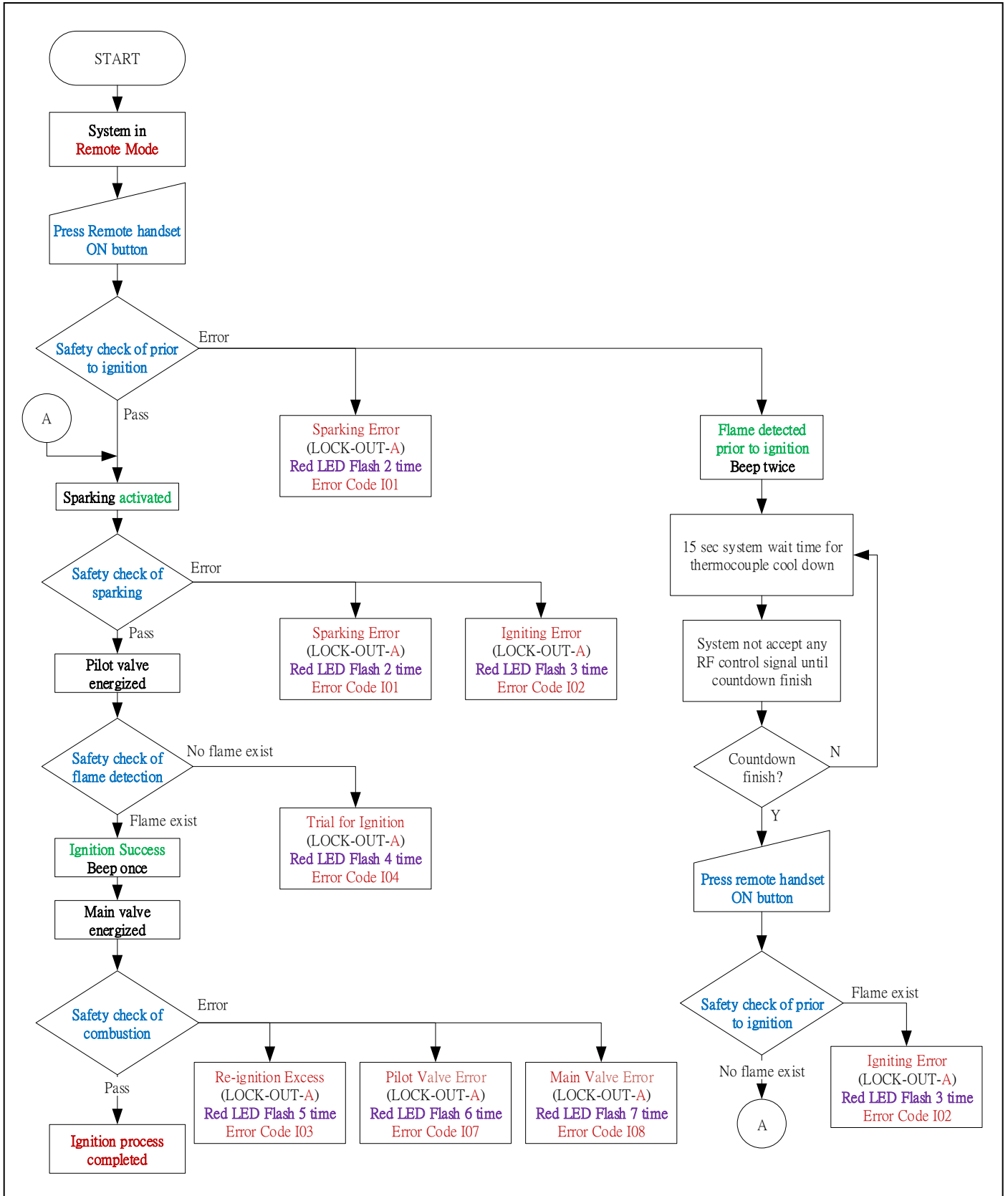


Figure 11: Remote mode operating sequence part 2 of 2

ERROR CODE TABLE

TABLE 5. SYSTEM ERROR CODE LIST			
Error	LED Signal	Item	Potential Causes
I01	Red LED Flash 2 time	Sparking Error	Ignition device failure.
I02	Red LED Flash 3 time	Igniting Error	1. Abnormal flame signal. 2. Abnormal valve feedback signal.
I03	Red LED Flash 5 time	Re-ignition Excess	1. Low input gas pressure. 2. Wrong gas type. 3. Valve failure. 4. Flame rod carbon buildup.
I04	Red LED Flash 4 time	Trial for Ignition	1. No gas supply. 2. Ignitor wiring connection failure. 3. Flame rod connection failure. 4. Earthing connection failure. 5. Wrong gas type. 6. Ignitor bent. 7. Flame rod carbon buildup. 8. Valve inactive. 9. Low output gas pressure.
I07	Red LED Flash 6 time	Pilot Valve Error	1. Abnormal signal of pilot valve. 2. Pilot valve malfunction.
I08	Red LED Flash 7 time	Main Valve Error	1. Abnormal signal of main valve. 2. Main valve malfunction.
C01	Green LED Flash 1 time	MCU setting failure	MCU Setting Failure.
C02	Green LED Flash 2 time	MCU EEPROM failure	MCU EEPROM Failure.
C03	Green LED Flash 3 time	MCU RAM failure	MCU RAM Failure.
C04	Green LED Flash 4 time	MCU ROM failure	MCU ROM Failure.
C05	Green LED Flash 5 time	MCU I/O failure	MCU I/O Failure.
C06	Green LED Flash 6 time	MCU MUX failure	MCU MUX Failure.
C07	Green LED Flash 7 time	MCU CLOCK failure	MCU CLOCK Failure.
C08	Red LED Flash 1 time	LPG/NAT Switch Failure	LPG/NAT Switch Failure.
C09	Green LED Flash 9 time	Wrong Procedure	Wrong Procedure
C10	Green LED Flash 10 time	Stack Overflow	Stack Overflow
C13	Flash LED of Red 1 time and Green 3 time	MCU Decoder Failure	MCU Decoder Failure
C14	Flash LED of Red 1 time and Green 4 time	MCU Store Data Error	MCU Store Data Error
Status	Green LED Flashing 10 Sec	RF learning	Learning RF within Green LED flashing 10sec, it will beep twice after learned successful.

Warning

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and**
- (2) this device must accept any interference received, including interference that may cause undesired operation.**

Notice:

Any changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class

B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.**
- Increase the separation between the equipment and receiver.**
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.**
- Consult the dealer or an experienced radio/ TV technician for help.**

Warning

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:

- (1) this device may not cause interference, and**
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.**

This Class B digital apparatus complies with Canadian ICES-0003.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et**
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.**

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. The antenna should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet appareil est conforme aux limites d'exposition aux rayonnements de la

IC pour un environnement non contrôlé. L'antenne doit être installé de façon

à garder une distance minimale de 20 centimètres entre la source de rayonnements et votre corps.

L'émetteur ne doit pas être colocalisé ni fonctionner conjointement avec à

autre antenne ou autre émetteur.

FCC:

Notice:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

ISED(IC):

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

**(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.**

French:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.