



Wireless SQP (WSQP)

Flame Effect System

Wireless control by COBRA Firing Systems



User Manual

*Revision 03 – November 2019
(for firmware version 1.1)*

1 Maximum Flame Heights and Minimum Safety Distances

Fuel type	Canisters fired	Maximum flame height [m]	Maximum flame height [ft]	Minimum safety distance [m]	Minimum safety distance [ft]
Coloured	1	3.5	12	3.0	10
Coloured	2	4.5	15	3.0	10
Coloured	3	5.5	18	3.0	10
Coloured	4	6.0	20	3.5	12
Natural	1	4.5	15	3.0	10
Natural	2	6.0	20	3.0	10
Natural	3	7.5	25	3.5	12
Natural	4	8.5	28	3.5	12

Table 1 Maximum flame heights and minimum horizontal safety distances for bursts



Minimum horizontal safety distances presented in table 1 above serve solely as a general guideline for the usual use case. It is the **operator's responsibility** to assess the location, show scene, potential air movement and all other relevant factors to determine appropriate safety distances for their own use case. Same considerations apply to vertical safety distances.

Note: Show scene (script / firing plan) can influence the safety distance required since it determines how much heat there is and how long it has to dissipate. Long bursts or firing in quick succession would heat up the area around the machine much more than short bursts used in long separation. Thus, safety distance should be adjusted accordingly.

2 Safety Information

This information should be read and thoroughly understood before use of the Wireless SQP.

It is the responsibility of the user to be fully aware of all potential consequences and actions when using this machine.

The manufacturer cannot be held responsible for events occurring due to use of this machine by unqualified or untrained personnel.



Warning: All directions in the manual should be read thoroughly and completely understood before any attempt to use the machine.

The machine should only be operated by or under the instruction of trained personnel.

Any maintenance of the machine should only be carried out by the manufacturer or, following the written and documented approval by the manufacturer, an authorised third party.

Should there be any doubt as to the safety of operation of the machine under any circumstances, it should be taken out of service immediately.

The Wireless SQP must not be used in confined spaces, under any conditions of rain, snow or precipitation of any fluids, strong winds or moving air which could cause the flame to divert from a vertical path.

The Wireless SQP should not be subjected to temperatures below 5°C or above 45°C, nor exposed to unsheltered conditions. Note that this strict rule also applies to the canisters, which must be kept out of direct sunlight.



Warning: Failure to observe correct operating procedures may lead to serious injury, damage by fire, or explosion.



Warning: Before initial use and each subsequent operation, the Wireless SQP should be checked for functional suitability. Should any damage be noticed, or doubt regarding suitability of use occurs, it should be immediately decommissioned and isolated for service and repair.

2.1 Operational Guidance



The Wireless SQP is only suitable for indoor use, or situations that meet the same environmental conditions.



The machine must only be used vertically, secured in position, protected from unauthorised interference, impact forces and vibration.



Any installation or repositioning should only be performed when the machine is cool, disconnected from the mains supply, key and power switches are in the OFF position, and disconnected from all data communication.



Never transport or store the machine with canisters installed. Canisters should be installed as shortly prior to operation as reasonably possible and removed as soon as reasonably possible after the operation has finished.



Changing canisters should only be performed when the machine is **powered down**, the key and power switches are both in the OFF position and no other sources of ignition are present. Operator must check **no residual fluid is present or alight**.



Safety distances must be given a priority when using the Wireless SQP. This includes artists, performers, persons in both performance and audience areas, as well as surrounding flammable objects. Maximum flame heights are presented in section 1 of this manual. Operators are expected to use this information to determine appropriate safety distances.



Full risk assessments must be made before use, and all relevant emergency failure procedures must be immediately available, including qualified personnel, fire extinguishers and first aid.



All operations must undergo preliminary tests and rehearsal.



Always ensure it is possible to shut the machine down immediately in case of emergency. Use of an Emergency Stop to interrupt power supply is recommended.



Use only Le Maitre Chameleon Flame Fuel or Le Maitre Salamander Flame Fuel. Use of alternate fuels may lead to unexpected behaviour; including but not limited to ejection of unignited fuel on insertion of canister, failure to ignite fuel blast when firing or failure to shut down the flame (“sticking open”). Manufacturer will not be held responsible for unexpected behaviour if machine is ever operated with non-designated fuel; warranty will be void.



The Wireless SQP has the facility to be controlled by instruction (data) from the DMX-512 protocol. The manufacturer cannot be held responsible for incorrect application or malfunction of data sent via DMX. Should DMX isolation or other devices be required for safe operation, this will be deemed solely the responsibility of the operator.



Avoid live-wiring DMX to the Wireless SQP, i.e. do not plug in or unplug DMX cables while the controller is actively transmitting data.



The Wireless SQP is not designed for continuous sustained flame use. In order to keep the fuel canisters from overheating, short duration bursts (maximum of 5 seconds) are advised. Should conditions allow, **at their own discretion**, the operator may decide to fire longer bursts.



Should the Wireless SQP fail to fire correctly, immediately shut down the machine and allow it to cool. Ensure there is no residual flame present before investigating the problem.

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4 Product Overview

4.1 Product Description

The Wireless SQP (WSQP) is a versatile real flame effect from Le Maitre Ltd, built on the foundation of the regular wired Salamander Quad Pro (SQP). The same four-canister system allows the unit to produce flames from 3.5m to over 7m in height. The unique firing mechanism eliminates the requirement for internal valves and accumulators, minimising the risk of flammable fluid leaks. Spark ignitor, subject to automatic validation, ensures reliable fuel ignition.

The canister based design removes the requirement for bulky and expensive propane bottles and high pressure hosing, and allows for a choice of both natural and coloured fuels making the Wireless SQP ideal for any venue where propane is not permitted.

There are no visual flame differences between the regular SQP and the WSQP, however there are significant differences in power and control.

The WSQP can be operated fully wirelessly. Le Maitre has partnered with COBRA Firing Systems for its wireless communications link, and has integrated a COBRA transceiver into the machine as standard.

COBRA is an extensively tested, safe, secure and reliable wireless firing system.

The WSQP incorporates a built-in, rechargeable 12V 7Ah lead-acid battery for its power requirements, giving it over 48hrs standby time. Charging of the battery is via a built-in universal AC input charger. Simply plug your machine into a mains supply via the provided True1 connectors.

Details of the full range of Le Maitre products are available online at:

- www.lemaitreltd.com
- www.lemaitreusa.com

4.2 Features

- Flame height from 3.5m to 8.5m
- Four canister system
- Multiple colours and fuels available in separate canisters (fitting the machine with multiple fuel types possible)
- Duration: 30 seconds continuous flame or 35 fireballs per canister
- No internal valves or accumulators. Flammable fuels are only stored within the canisters themselves
- 12V rechargeable internal battery
- Internal built-in charger (Universal AC, 85-264VAC, 47-63Hz for worldwide operation, True1 connectors)
- Over 48hrs standby time per full charge
- Built in COBRA Firing Systems transceiver for completely wireless operation
- 5-channel wired DMX
- Separate 12V DC output for powering wireless DMX transceivers
- Spark ignition
- Spark ignitor validation prior to arming (spark ignitor current monitoring)
- Tilt safety switch
- Key switch for arming
- Easy to use OLED display and menu structure
- E-STOP input
- Optional: External magnetic arm indicator beacon

4.3 Specification

Power Requirements:	12V 7Ah Lead Acid Battery Universal AC, 85-264VAC, 47-63Hz (for internal charger only)
External Fusing:	N/A
Internal Fusing:	20A Yellow Automotive Blade Fuse
Fuel Capacity:	4 x 500ml Canister
Fuel Type:	Propane / Butane mix OR Ethanol / Methanol mix (colour specific)
Effect Duration:	30s continuous / up to 35 fireballs per canister
Control:	COBRA Wireless Transceiver – 18R2 (one channel, cues 1 through 15) DMX512 – 5 Channels (Arm, 4x Fire)
Wireless Frequency:	2.4 GHz spread spectrum
Wireless System Range:	300m+ direct line of site range w/ built-in link quality detection
Regulations Compliance:	Contains FCC (ID: W7Z-ICP0), CE, IC certified RF module
Range:	1,500+ ft. / 500+ m.
Dimensions (mm):	447 (H) x 330 (W) x 275 (D)
Weight:	17.6kg

4.4 Shipping Info

Each machine contains a 12V battery, road transport by UN2800, and when shipped by air there are no restrictions but package must be marked with the following:

UN2800 Batteries, Wet, Non-Spillable.

By air are not restricted under special provision 'A67' 'IATA' & 'ICAO'

4.5 Dimensions

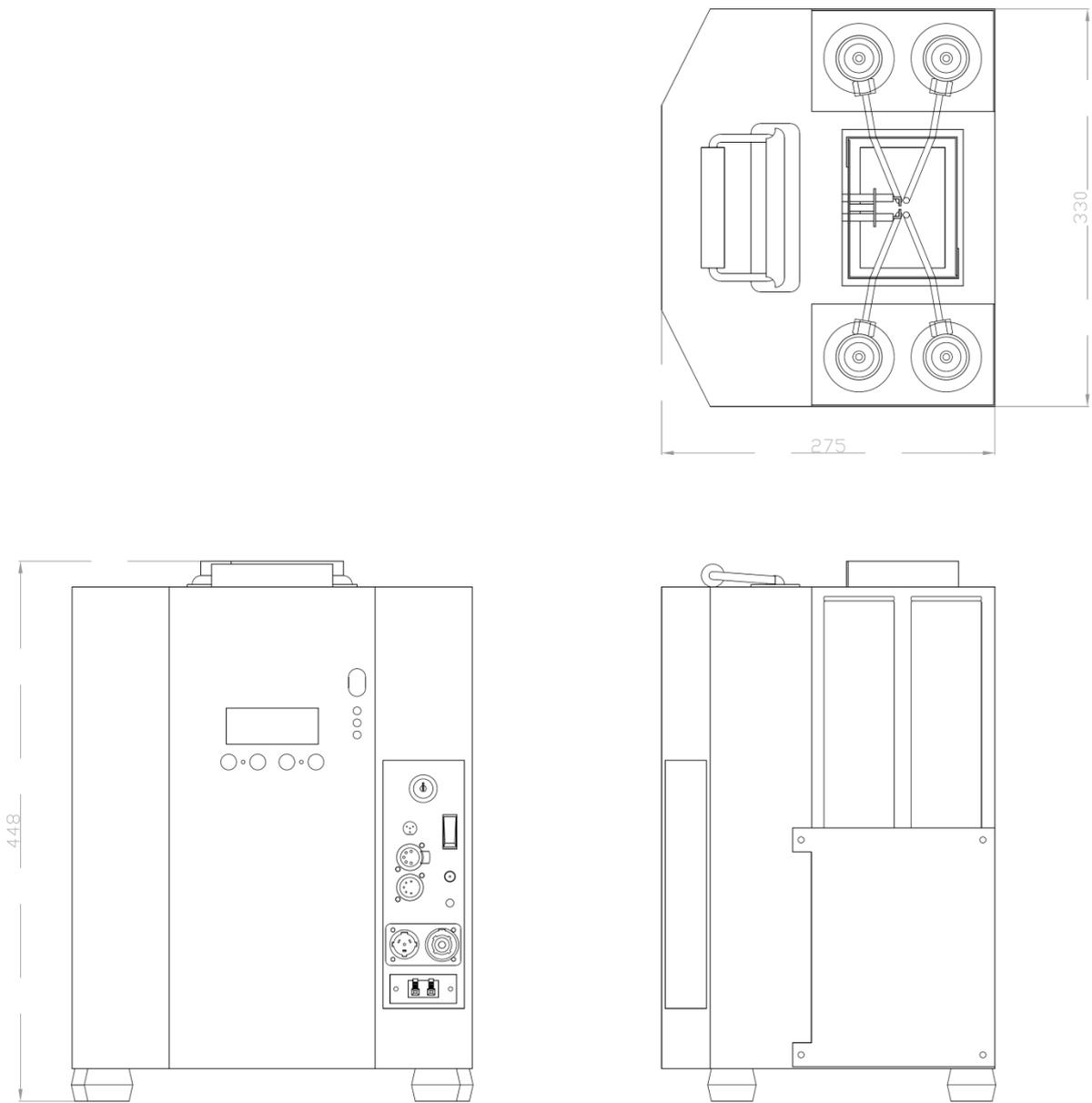


Figure 1 Dimensions of the WSQP in millimetres

4.6 Canister Numbering

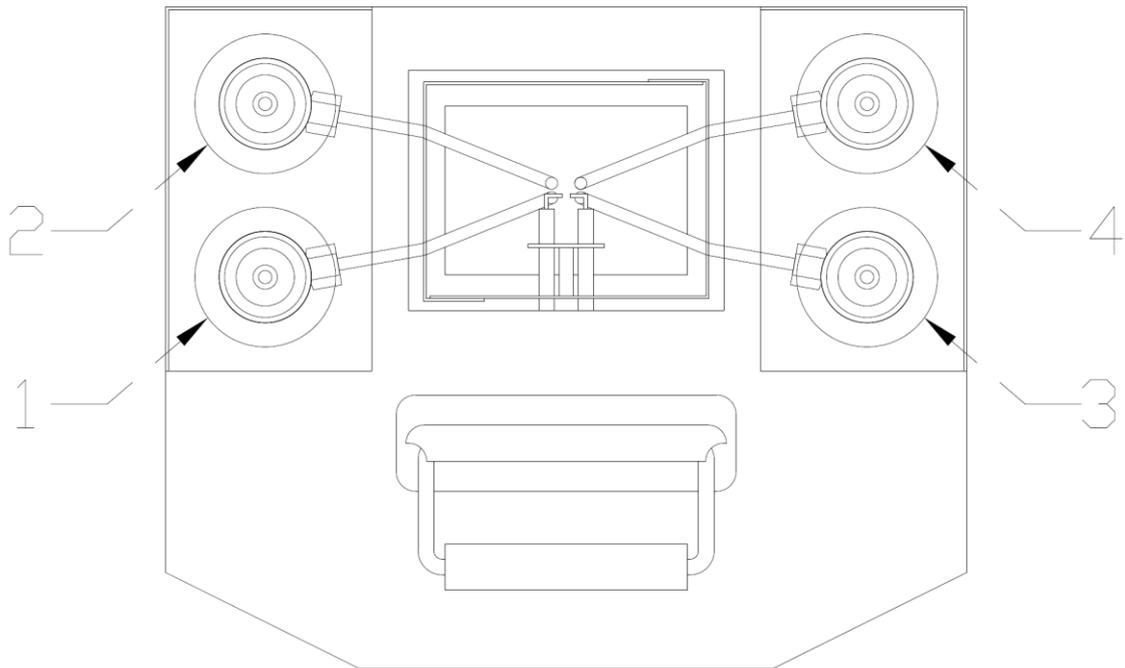


Figure 2 Top view showing canister numbering

4.7 Power Recess Panel Description

Refer to figure 3 and numbered descriptions of each item of the recess panel.

1. Key Switch

The key switch has 3 modes, TEST, OFF, and ARM. When in the off position the machine is effectively ‘off’, it is powered down apart from the power monitoring circuitry. When in TEST mode, this does not allow the machine to ever be armed regardless of the status of the COBRA/DMX inputs, useful for system setup. When in ARM mode, the machine should be considered armed and ready to fire.

2. Ext. Beacon

Plug in the optional, external, magnetic armed beacon. The external beacon mimics the ARM led and indicates the armed status of the machine to the operator in high light conditions (sunlight), regardless of the orientation of the machine.

3. Power Switch

When in the OFF position the power switch ensures that both the battery and the charger are completely isolated from the system and each other. Therefore, it needs to be in ON position for operation as well as for charging.

4. DMX in/out connectors

5 pin DMX in/out connections for DMX control.

5. 12V DC output port

Power output from the battery (potentially 11-14V) for powering wireless DMX units or any low power external DC devices. 2mm DC output port, centre positive.

6. Battery Charging LED

Illuminated when the battery is charging, goes ‘off’ when battery is fully charged.

7. Battery Charger Mains Connectors

Powers the battery charger via a True1 connector, and charges the battery whenever mains power is connected and power switch is ON.



The system **always** requires use of the internal battery; the charger alone cannot provide sufficient power for the machine. **Battery must be installed and charged** to ensure proper operation. **Firing without battery is strictly prohibited.**

8. Emergency Stop connections

The emergency stop inputs simply require a wire link (short circuit) across the two terminals. The WSQP will not switch on without this being in place and the machine will power down immediately when the connection is broken. The terminals allow for any traditional E-STOP button or relay module to be wired in. An E-STOP for multiple WSQP units should be able to disconnect red terminals from black terminals. Only terminals of the same colour may be hardwired together between units.



Always have a method of breaking this connection in case of emergency when operating the machine. Always test the operation of the E-STOP setup with WSQP.

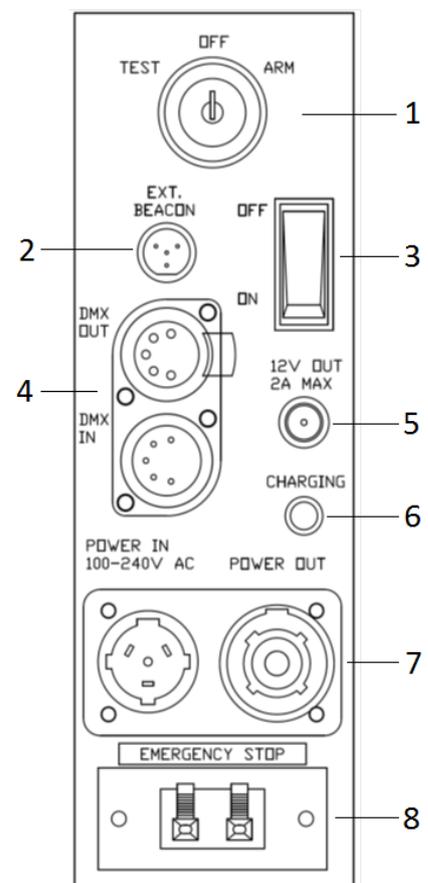


Figure 3 Wireless SQP Recess Panel

5 Operation

5.1 Getting Started

Remove the Wireless SQP from all packaging and place it on a flat, stable surface.

5.1.1 Installing the battery

If your WSQP arrived with battery packaged separately, before first use the Wireless SQP battery needs to be installed in the machine. Please follow the following procedure (screwdriver is required):

1. Gently place the machine on its back in a way that allows easy access to the underside.
2. Rectangular panel is the battery module – unscrew its four corner screws.
3. Gently slide the battery module out of the machine.
4. The battery module consists of the base and the strap – unscrew the remaining screws in the base to detach it from the strap.
5. Place the battery in the base and secure it by screwing the strap back on.
6. Find the two disconnected wires (should be attached to the top of the strap) – plug the brown one to the positive (red) terminal of the battery and the blue one to the negative (black) terminal, as seen in figure 4 below.
7. Gently slide the module containing the battery back into the machine and secure it with four corner screws.



Figure 4 Battery module with battery secured and connected

5.2 Before every use

5.2.1 Charging

WSQP is powered by a 12V sealed lead-acid battery. It is normal for such battery to take some time to settle to 'rested' voltage after charging or discharging. Thus, keep in mind that the battery voltage displayed will be a bit higher (if recently charged) or a bit lower (if recently fired) than the actual rested value.

Rested voltage for a fully charged battery is 12.8V and 11.8V for fully discharged. Machine should not be operated with rested voltage below 12.3V – battery discharged beyond this point could fail to support all functionality.



Machine will automatically shut down when battery voltage drops excessively and will not turn on if it is too low. This protects the battery from damage due to extreme discharging.

Warning: Damage may still occur if machine remains with the power switch in ON position for a prolonged period of time. Charge battery back to full as soon as possible in such cases.

5.2.2 Pre-inspection

Prior to use, the WSQP should be inspected for damage. If the unit is found to be damaged, it should be removed from service immediately, serial number noted and referred to Le Maitre for servicing and repair.

Make sure that the power lead is not plugged in, key switch and the power switch are both in the OFF position – this ensures no power is supplied to the machine.

Additionally, perform the following safety checks:

- Ensure there are no restrictions immediately on/above the flue.
- Regularly check the O-ring on the firing pin. Add Silicone grease if dry.
- Assess the effect of wind or other air current on the safety radius.
- Check the overhead height of all structures is adequate to not impede the trajectory of the flame.
- Check O-ring in canister base is present and not damaged.
- Check the spark ignitor is clean.
- Check E-stop operation results in machine shutdown

5.2.3 Installing canisters

Install four canisters of Le Maitre Chameleon Flame Fuel or Le Maitre Salamander Flame Fuel by screwing the canisters into the brass canister bases. You can use a different type of Le Maitre flame fuel for each slot. Ensure each canister is fully screwed in, however be careful not to over-tighten the canister as this risks damage to the canister, the canister base, and the seals within the canister base.

Unlike other flame effect systems, no fluid should leave the canister as it is being installed. **If escaping fluid is detected, immediately remove the canister.** If the canister itself is in good condition, the most probable cause is the tension of the spring supporting the firing pin - refer to the maintenance section 7.1.

5.2.4 Switching the machine on (start-up sequence)

Make sure the power switch is OFF. Connect the E-STOP link to the machine, which can be as simple as a wire across the terminals, or a relay contact, or whatever you are using as your emergency cut-off switch. It is recommended that use of dummy E-STOP is limited to charging and adjusting or inspecting settings. Use of proper E-STOP is strongly advised whenever firing. **Without shorting the E-STOP inputs the machine will not power on, regardless of the status of the power switch, or key switch.**

Power is supplied to the WSQP via an internal battery. The ON/OFF power switch completely disconnects the battery from the system. After connecting a valid E-STOP, **switch the power switch to the ON position.**

The key switch in the TEST position does not allow the machine to ARM, or provide power to the solenoids or spark electrode. This provides a safe mode for setup, remote syncing, as well as basic system and communication link testing.

To allow arming and firing, change the key switch to the ARM position. Ensure controls are not set to ARM when you (or any other people or flammable objects) are near a machine in this state. **When the key is turned to the ARM position, treat the machine as if it could fire at any time.**

5.3 Control Panel

The Wireless SQP is configured through an on board control panel featuring a 16x2 OLED display, 4 x indicator LEDs and 4 x multi-function buttons.

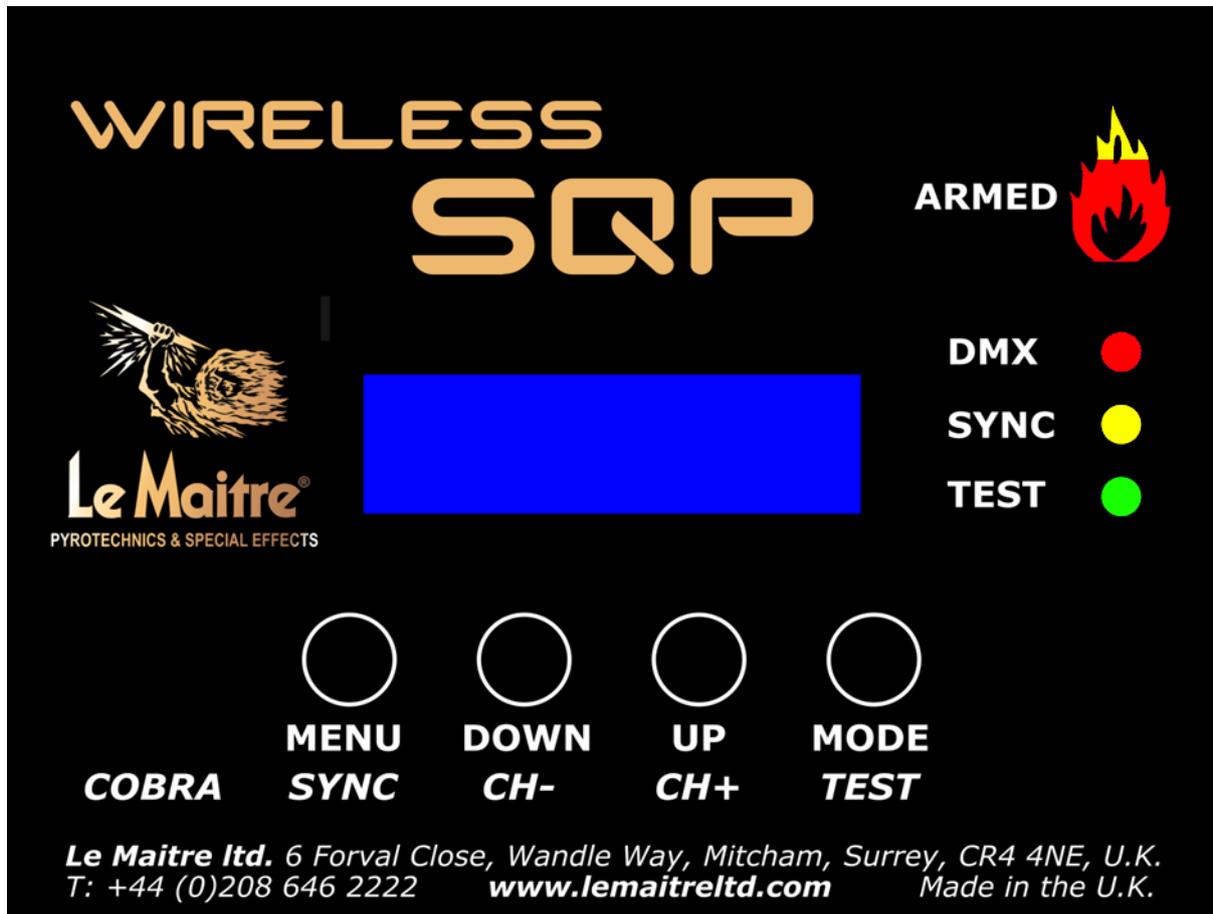


Figure 5 Wireless SQP Control Panel

5.3.1 Display

The display is an OLED 16x2 display, and provides information as to the operation and settings of the machine. OLED has a far superior viewing angle and high-light characteristics over conventional LCD displays.

5.3.2 LEDs

- ARMED
 - Illuminated solidly when armed and ready to fire. Flashes during the safety delay of the arming sequence.
- DMX
 - Illuminated solidly when DMX data is detected, and machine automatically defaults to DMX mode.
- SYNC
 - COBRA sync status LED. When the WSQP 'SYNC' LED blinks, it is responding to the remote control firing module 'SYNC' LED blinking. This indicates the two units are in constant communication.
- TEST
 - When the unit is in TEST mode, the LED will be constantly illuminated.

5.3.3 Start-up Sequence

On start-up the WSQP displays the following info in sequence:

- First screen shows key switch position, followed by the WSQP CPU firmware version.



Figure 6 Start-up screen shows key position – one of the above will display accordingly



Figure 7 Start-up screen showing WSQP CPU firmware version

- NOTE: If DMX is plugged in, the machine will default to DMX mode (M:DMX).
- Without DMX plugged in, next screen will indicate starting in COBRA mode (M:COBRA), battery voltage (B:12.8V), and then display the regular COBRA start-up sequence.
 - COBRA firmware version (e.g.: Version 6.0.1):



Figure 8 Start-up screen showing COBRA version information

- Module address: The WSQP automatically assigned module address. For example, “A18”. When first syncing a machine to the remote, the address is automatically assigned. This address is stored permanently on the machine until synced to a new remote whereby a new address is assigned.



Figure 9 Start-up screen showing COBRA address

- Self-Test: “Testing” is displayed whilst the module performs some checks.



Figure 10 Start-up screen showing COBRA self-test mode

- Finally, operating channel (0-399):



Figure 11 Final screen in COBRA mode, showing operating channel

5.3.4 Buttons

Buttons are disabled when key is in ARM position. Use TEST key position to view and adjust settings.

The buttons on the WSQP are dual purpose, and their operation depends on the display mode the system is in. By default the WSQP starts up in COBRA display mode (M:COBRA), and so when in this mode the button presses are passed directly to the COBRA transceiver and their functionality is as per standard COBRA unit.

If not in this display mode, button presses enter the menu for information and setup purposes.

1. MENU/SYNC

- When not in COBRA display mode (M:COBRA), the MENU button is used to enter the menu, and each press will cycle the menu one item further. The WSQP has a simple, double direction, numbered, circular menu. Once the end of the menu is reached, it will leave the menu and return to the MENU/MODE screen. Holding down the MENU button at any point within the menu will also leave and return back to MENU/MODE screen.



Figure 12 MENU/MODE – Enter the menu from this screen

- When in COBRA display mode, this button acts as the SYNC button for the COBRA transceiver. This button can be used to check the signal strength, and sync/un-sync the machine to the 18R2 remote. See section 5.4 below for more info.

2. DOWN/CH-

- When not in COBRA display mode (M:COBRA), the DOWN button is only used to change/modify corresponding menu settings down. It has no effect on the menu position like the MENU and MODE buttons do.
- When in COBRA display mode, it acts as the CH- button for the COBRA transceiver. Button presses change the wireless operating channel down. You can set the firing module to any channel between 00 and 99. Using the remote, you can fire any firing modules set to the same channel on the remote.

3. UP/CH+

- Similarly, the UP button is only used to change/modify corresponding menu settings up. It has no effect on the menu position like the MENU and MODE buttons do.
- When in COBRA display mode it is used to change the wireless operating channel. You can set the firing module to any channel between 00 and 99. Using the remote, you can fire any firing modules set to the same channel on the remote.

4. MODE/TEST

- Provided you are not inside the menu, pressing and holding this button down for 2 seconds will change display modes between COBRA display mode and the MENU/MODE screen.
- When not in COBRA display mode (M:COBRA), the short presses (less than 2 seconds) of MODE button, can be used to cycle the menu one item backwards. It can be used to quickly access end of the menu from MENU/MODE screen.

5.3.5 Settings Menu

The menu accessed manually on the WSQP display, is a simple, double direction, numbered, circular menu. Not all the menu items are settings, as some just contain information.

To access the menu from the COBRA display mode (M:COBRA), press and hold the MODE button for 2 seconds. That will access the MENU/MODE screen as below.



Figure 12 (repeated) MENU/MODE screen

When DMX is plugged in the MENU/MODE screen is replaced with DMX mode display (to which machine defaults after turn on). All of the button functionality is retained.



Figure 13 DMX mode screen

Once the MENU/MODE screen is shown, scroll through the menu items by pressing MENU (forwards) or MODE (backwards).

Parameters can be changed using UP and DOWN buttons. Settings are saved automatically.

The menu items are as follows:

1. **Set Safety DMX Channel**

- Set the DMX safety/arm channel of the machine.

2. **Set Solenoid DMX Channel**

- Set the starting solenoid DMX channel of the machine. This is the first of the four canister firing solenoids, the other solenoids will be on the next three consecutive channels.
For example: Setting this to DMX channel 2, means that CH2 fires solenoid 1, CH3 fires solenoid 2, CH4 fires solenoid 3 and CH5 fires solenoid 4.

*. **Tech Settings**

- Further (tech) settings are hidden by default, press UP button on this menu item to enable.

3. **Safety Arming Delay**

3.1. **Safety Delay (0-255s)**

- Once the controls are set to arm, the system will only allow full arming and firing capability after the adjustable Safety Delay time, which is set to 10 seconds by default.
- Note: If machine is disabled by one of the safety checks, waiting the duration of safety delay is required to re-enable. This can be triggered by the following:
 - Tilted machine or vibration (menu item 4)
 - Detecting a fault in spark ignitor operation (menu item 5)
 - Attempting to fire while in safety delay
 - Pressing any button on machine control panel while armed or in safety delay

3.2. **Delay Arming**

- This setting allows for making the safety arming delay applicable to both (default), only one or neither of the available control methods (DMX and COBRA). Note: Re-enable delay after a failed safety check (listed above) is always applicable regardless of this setting.

4. **Tilt Cutout**

- The WSQP has a safety tilt switch that will disable the machine if it is tipped beyond 40 degrees from vertical. This will prevent the machine from operating should it be knocked over. Press any button to re-enable after tilt cutout. This setting allows to disable/enable the tilt-switch if desired.
- Note: Extreme vibration can also trigger the tilt switch.
- **Warning:** The WSQP is only designed to be used in a vertical position. If the unit is to be used in any other position, it is the **sole responsibility of the user** to ensure safe operation.

5. **Spark Detect**

- The WSQP contains ignitor validation circuitry that detects a valid spark through the spark electrode. Before allowing the WSQP to arm, the machine tests the spark ignition system, and if a valid spark is not detected it disables the machine, and it will not respond to commands. Press any button to re-enable after failed spark detection.
- This setting allows to disable/enable the spark detection if desired. The purpose of “Tune next arm” is solely for troubleshooting.
- **Warning:** Manufacturer will not be held responsible for any ignition failures if feature is disabled.

6. **DMX**

6.1. **DMX Filter**

- In order to minimise the possibility of incorrect triggering of the WSQP through DMX, the signal interpretation incorporates DMX data filter. The filter works by only firing a channel if the same exact value is seen for five consecutive DMX packets. This will cause a small delay in the unit’s response to DMX commands (approximately 100ms). In practical terms, this delay should be too short to have any effect on functionality; however it is possible to disable the DMX filter if desired.
- Following modes of filter are available:
 - Disabled – DMX data filter is disabled.
 - Zero Evaluation (default) – signal treated as zero (no fire) while five consecutive DMX packets are not identical.
 - Hold Evaluation – signal treated as unchanged (can be fire) while five consecutive DMX packets are not identical, but are changing in constant direction. If the direction of change is inconsistent, signal will be treated as zero (no fire).
- **Warning:** If the WSQP is operated with the DMX filter in mode other than Zero Evaluation, the manufacturer will not be held responsible for any unexpected behaviour under DMX control.

6.2. **DMX Arm Mode**

- Unlike regular SQP the WSQP normally requires the DMX safety channel signal to be in between 70% and 90% to arm with DMX. Legacy mode in which arming is done by raising the signal to 100% as with regular SQP is also available.

6.3. **DMX Analysis**

- The WSQP has a built in DMX analyser. Press the UP and DOWN buttons to view the signal BREAK and MAB times, the refresh rate and also number of bytes in the DMX packet. This can be helpful to diagnose any DMX signal issues.

7. **Errors**

- Provides any detailed info on any error conditions seen by the system.

8. **Version**

- Provides firmware version information for both the main CPU, and the COBRA transceiver.

9. **Reset to Default**

- Provides an easy method of resetting the system to its factory default settings.

5.4 COBRA Operation – with 18R2 remote

The WSQP can be operated wirelessly with a COBRA 18R2 remote. The Wireless SQP has been designed to integrate seamlessly into the COBRA ecosystem; setup is very similar to a COBRA firing module.



Always attach antennas to both WSQP and 18R2 before COBRA operation. Extremely bad link quality may reduce responsiveness and even break communication thus disarming the machine mid-operation.

5.4.1 Arming procedure

Follow the following steps to start firing wirelessly:

1. Sync the WSQP to the COBRA remote (18R2) using the following procedure:
 - Hold down SYNC on the 18R2 remote until P displays.
 - Hold SYNC on the WSQP until P displays.
 - Press SYNC on the 18R2 and WSQP at the same time.
 - The COBRA transceiver in the WSQP will re-start.
 - Repeat for additional WSQP units or COBRA modules.
 - See www.cobrafiringsystems.com/sync
 - Re-start 18R2 remote when complete.



Once synced WSQP to a COBRA 18R2, the machine will remain synced to this controller until it is un-synced or synced to a different 18R2. Rebooting WSQP and/or resetting system settings have no effect on the sync.

2. Test range/signal strength (measure the link quality to the COBRA remote)
 - Press and release the SYNC button to display the signal strength value between 0 and -100
 - COBRA measures link quality between 0 and -100 where 0 is perfect signal strength and -100 is poor signal strength. If this value is between 0 and -75 then you will have no problem firing cues with a single button press.
 - Note: Make sure to obtain a few readings and use the average number for your reading. Higher placement of the WSQP with the best direct line of site produces the best results.
3. Set channel on WSQP
 - Set the desired operating channel on the WSQP. Different WSQP's can have the same channel if there is no need to control them separately.
4. ARM machine
 - Rotate the key switch clockwise to the ARM position and move to a safe distance.
5. Set all modules to ARM mode
 - Press remote ARM button on remote to place all systems into ARM mode.
 - Red arm LEDs on both WSQP and 18R2 start blinking. **Once they both go solid, WSQP is ready to fire.** 18R2 displays the number of awake/armed modules and WSQP machines.
 - Note: Blinking red fire LED on WSQP indicates the safety delay (adjustable via settings).
 - Note: If the red ARM ("!") LED on 18R2 does not stop blinking, a unit has the key left in the TEST position. The 18R2 will note which module address is unarmed.
 - Note: To change systems back to TEST mode, press and release the TEST button. This will also disarm the systems and display the number of modules awake/in test.



Do not attempt to manually fire or start script execution while the red ARM LED ("!") on 18R2 is still blinking. It indicates the arming procedure is still ongoing. Manufacturer does not guarantee machine responsiveness during this time.

NOTE: To un-sync the WSQP from any remote to which it is synced, hold down the SYNC Button for 15 seconds. The SYNC LED will blink 5 times when un-synced and the SYNC LED will no longer display orange. This will also reset the module addresses, thus next module synced to 18R2 will inherit an address of A00.

5.4.2 Cue to canister relationship

The 18R2 has 18 individual cue firing buttons. On the WSQP however, each cue number is “mapped” in binary to address and provide the operator the ability to use a single cue to fire a specific combination of canisters. There are 4 individually controllable canisters on a WSQP, and so there are 15 possible combinations of canisters that can be fired. See the table 2 below, which shows the cue to canister mapping - numbering according to Figure 2 (section 4.6).

		Canister Number			
		4	3	2	1
Cue Number	1	0	0	0	1
	2	0	0	1	0
	3	0	0	1	1
	4	0	1	0	0
	5	0	1	0	1
	6	0	1	1	0
	7	0	1	1	1
	8	1	0	0	0
	9	1	0	0	1
	10	1	0	1	0
	11	1	0	1	1
	12	1	1	0	0
	13	1	1	0	1
	14	1	1	1	0
	15	1	1	1	1

Table 2 Cue to canister addressing (1s represent fire orders for individual canisters)

For example:

- If you want to fire all four canisters, use cue 15.
- If you want to fire only canister 4, use cue 8.
- If you want to fire canisters 4, 2 and 1, then use cue 11.



Please note: With this control scheme there is no reason to ever use more than one cue at any time. WSQP will fire only according to the last pressed cue regardless of whether the previous one is still active (held down) or not. A cue needs to be deactivated (released) before using it again. For example: If you are doing a burn from canister 3 (using cue 4) and wish for canister 1 to join in for a double canister burn, you need to activate cue 5 and release cue 4. Activating cue 1 and holding them both active would result in simply switching from canister 3 to canister 1.

5.4.3 Efficient canister sharing

This method of addressing is especially useful for scripting purposes, and is important to keep in mind when designing a show using the COBRA scripting functionality.

Each canister provides roughly 30 seconds of flame time, and as such a designer needs to be mindful that they must balance usage of the fuel for their show to get the most out of a set of canisters.

As an example, imagine a show has flame height restrictions which limit the usage to only 2 canisters at any one time; it makes sense to evenly spread the use of the canisters to get the maximum flame time out of the 4 canisters.

So for four consecutive bursts of 2 canisters, instead of just using cue 3 for all four bursts, rather do two bursts using cue 3 (canisters 1 and 2 firing), and the last two bursts using cue 12 (canisters 3 and 4 firing).

5.4.4 COBRA Show Scripting

For the WSQP, it is possible to upload several predefined scripts onto the 18R2. As with regular COBRA scripting, scripts can include everything from multiple mini-scripts (e.g. quick chases) to much larger and longer shows. You can also create "step scripts" which require the user to manually press the STEP button to jump to the next event.

Use event time to time to time firing, channel to select machine and cue for canister combination. COBRA has changed their scripting format of the end result csv file by adding a "Fire Time" column. This makes scripting for a flame machine easy to understand because it adds variable and configurable firing durations for each event (particular cue activation).

Table 3 below shows an example cobra.csv file showing two scripts that could be uploaded to an 18R2 remote. The first script is triggered by pressing cue 16, and the second script triggered by pressing cue 17. Notice the fire time column is a new addition to the v5 scripting, which adds a duration time value for each event. Together with the canister addressing, this makes planning and scripting shows simple and efficient.

Please note that if a starting trigger button cue is used for your script that is within cue's 1-15 on the same trigger channel as a machine channel, then that cue cannot be fired manually. It is solely used as the script trigger. Only one script can be running simultaneously. Scripts can be triggered in any order and any number of times.

#fire-time testing					
0	16		0		
#Event Time	Channel	Cue	Description	Disable Group Number	Fire Time
00:00:01s	0	1	Canister 1 10ft 0.5s		0.5
00:00:02s	0	2	Canister 2 10ft 0.5s		0.5
00:00:03s	0	4	Canister 3 10ft 0.5s		0.5
00:00:04s	0	8	Canister 4 10ft 0.5s		0.5
00:00:05s	0	1	Canister 1 10ft 1.5s		1.5
00:00:07s	0	2	Canister 2 10ft 1.5s		1.5
00:00:09s	0	4	Canister 3 10ft 1.5s		1.5
00:00:11s	0	8	Canister 4 10ft 1.5s		1.5
00:00:13s	0	1	Canister 1 Quick burst		0.1
00:00:14s	0	2	Canister 2 Quick burst		0.1
00:00:15s	0	4	Canister 3 Quick burst		0.1
00:00:16s	0	8	Canister 4 Quick burst		0.1
00:00:18s	0	15	All 4 - 1sec 25ft finale		1
#Trigger Channel	#Trigger Button	#Confirmation Button	#Return Channel		
0	17		0		
#Event Time	Channel	Cue	Description	Disable Group Number	Fire Time
0:00:00.0s	0	1	Canister 1 Red 10ft		0.5
0:00:00.5s	0	2	Canister 2 Natural 10ft		0.5
0:00:01.0s	0	4	Canister 3 Green 10ft		0.5
0:00:05.0s	0	10	Canister 2+4 Natural 15ft		0.5
0:00:10.5s	1	15	2nd machine all 4 - 25ft		1.5
end					

Table 3 Example csv file with two scripts

For more information please contact Le Maitre Ltd or COBRA Firing Systems.

5.4.5 Manual Firing

Manual firing (without use of script) is also possible. Set the appropriate 18R2 channel to control the selected WSQP unit. Pressing and holding down cue button on armed 18R2, causes the WSQP to fire the corresponding canister combination for the duration the button is held down for.

5.5 DMX Operation

The WSQP can be operated through DMX-512. Five channels are required – one channel is a safety channel, the remaining four channels each operate one firing solenoid.

Two independent addresses can be set. The first address is for the safety channel, the second address is the first of four fire channels. The three remaining fire channels will be the three consecutive channels. See section 5.3.5 for more details.

To arm the machine (in default arm mode), the safety channel must be set to a value between 70-90%. This range is different to the regular SQP, but is considered a safer method of arming as it is a 'deliberate' range and not a value which can easily happen during a failure condition.

For example:

Safety - Channel 12. Solenoid/flame – Channel 2. Arm the machine by setting CH12 to 70-90%. The fire channels will be 2, 3, 4 and 5.

The order of the canister channels can be seen in Figure 2 (section 4.6).

Once the safety channel is within the range of 70-90%, the ARM flame LED will start to flash whilst the safety timer is counting down. During this safety delay, the unit is prevented from firing. Once the timer has elapsed, and the ARM LED goes solidly 'on', the unit is ready to fire.

When a solenoid/fire channel is raised above 50%, a solenoid forces a plunger into the fuel canister, opening the canister valve and allowing the pressurised fuel to escape via the output nozzle located at the base of the flue.

It is recommended that the fire channel is activated with the 'flash' buttons present on most DMX controllers. This allows for greater control over the effect produced. A brief activation of the channel (0.5 – 1s) will produce a short-duration fireball effect. A longer activation will produce a tall 'tongue' of flame.

Any number of fire channels can be activated simultaneously resulting in firing from the corresponding canisters. Firing multiple canisters at the same time will result in a taller, broader flame. Please see the maximum flame heights presented at the start of this manual for more information.

5.6 Shutdown

Each of the following steps disables the machine. The order presented is for a recommended normal shutdown procedure. In case of an emergency always perform the easiest, safest and quickest step available first.

1. Disarm via the control system – set safety DMX channel value to 0 if using DMX or press “TEST / DISARM” button on 18R2 if using COBRA.
2. Activate E-STOP by ensuring there is no connection between E-STOP terminals and confirm the unit is no longer powered (display and all control panel LEDs are off).
3. Switch the power switch to the OFF position.
4. Turn the key switch to OFF position.

5.7 Final Notes

It is recommended that operators of the Wireless SQP take some time to familiarise themselves with the effects produced in order to achieve the best results.

It is advised each show design is tested before an event.

In case of any doubts and/or questions regarding the Wireless SQP and/or its operation please contact Le Maitre.



Warning: A firing solenoid should never be continuously activated for more than 30 seconds. Keeping a solenoid powered for extended periods risks damage to the solenoid coil.

5.8 External magnetic arm indicator beacon (Optional)

The external beacon is an optional accessory for WSQP. It mimics the ARM led and indicates the status of the machine. The beacon can be magnetically attached anywhere on the WSQP making it easy to determine from any direction whether the machine is armed, about to arm or disarmed. The indication is bright and easily visible in high light conditions (sunlight). See 4.7 for where to connect the beacon.

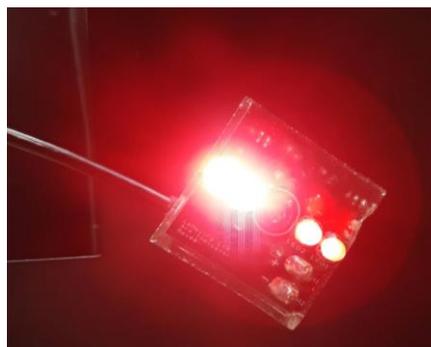


Figure 14 Bright alternating flashing of the beacon indicates the machine is armed.

6 Troubleshooting

Problem	Cause	Action
No power or display	No power	<p>Possible solutions:</p> <ul style="list-style-type: none"> • Make sure an E-STOP is connected • Plug in power cord, if the machine turns on and charging LED lights up let the battery charge to full (12.8V rested) before using the machine. Disconnect power cord before attempting other solutions. • Ensure battery is connected properly (see section 5.1.1) • Check the internal fuse (automotive yellow fuse on the power PCB below the motherboard). Replace if necessary <p>Once solved, follow the start-up sequence in section 5.2.4. Give the machine a few additional seconds to start up.</p>
	Faulty display	Contact Le Maitre.
Not arming	Incorrect DMX channel	Set to correct DMX channel. Refer to 5.3.5
	COBRA control not synced	Re-sync to controller. See 5.4.1
	Attempting to fire during safety delay	Wait till safety delay has elapsed before firing.
Firing solenoid not activating	Safety Delay has not elapsed	Wait until arm indicator stops flashing. The LED will stop flashing when the Wireless SQP is ready to fire.
	Incorrect DMX channel	Set to correct DMX channel. Refer to 5.3.5.
Firing solenoid activating, but no gas released	Empty canister	Replace canister.
	Canister nozzle damaged	Replace canister.
	Firing pin sticking	Remove firing pin and clean or replace O-ring. Refer to Maintenance instructions in 7.1.
	Firing pin too low.	Increase firing pin height. Refer to Maintenance instructions in 7.1.
Gas released, but failing to ignite	Insufficient air-flow.	Make sure there are no air flow restrictions under or over the machine.
	Firing pins need lubricating.	Refer to Maintenance instructions in 7.2.2.
	Insufficient or no spark	See "No spark detection" below.
	Other	Contact Le Maitre.

No response from unit	Tilt lock-out engaged	Position on a level surface and re-enable unit.
	DMX signal not received	Check DMX controller and test cables.
	Control not synced	Re-sync to controller and check link strength. See 5.4
Gas leaking when canister is installed	Firing pin too high.	Reduce firing pin height. Refer to Maintenance instructions.
No spark detected	Spark electrode dirty	Refer to Maintenance instructions in 7.3
	Re-tuning needed	In the settings menu set 5. Spark Detect to "Tune next arm" and arm the machine. If tuning is successful (spark error is not triggered) the setting will automatically return to "Enabled".
	Electrode connection problem	Check connections from spark electrode to ignition coil. Check resistance between spark electrode and module output (HT lead).
	Spark detection module connection problem	Ensure spark detection module (small PCB above the ignition coil) is connected properly – blue wire to electrode, green-yellow wire to machine body (case), orange and white wires to SPARK DETECT socket on the motherboard.
	Faulty spark present	Remove all canisters. Disable spark detection. Arm and check the spark electrode inside flue to see if spark is generated between electrodes. If spark runs along one of the electrodes to machine body refer to 7.3.
	Ignitor electrodes out of alignment or otherwise damaged	Contact Le Maitre.
Machine disarms unexpectedly	Tilt lock-out engaged	Position the machine on a level, protect it from vibration and re-enable unit.
	Control panel buttons pressed while armed	This is a safety feature. Do not press any buttons while machine is armed. Disarm Wireless SQP before approaching.
Er1 displays in COBRA mode	Contamination of motherboard/COBRA module interface	Open top lid. Unplug red COBRA module from motherboard (careful not to damage the antenna wire). Clean the interface header pins on both boards from both sides of the board (preferably with pressurised air). Reassemble.

If you encounter issue not listed, advised solution does not help and/or you have any questions please contact Le Maitre Ltd.

7 Maintenance



Please note: While the Wireless SQP contains several components that have been designed to be user-serviceable, the maintenance procedures described in this section should only be performed by qualified personnel. The manufacturer cannot be held responsible for events occurring due to incorrect maintenance of the machine.



Please note: All the procedures described in this section should be performed with the Wireless SQP isolated from any power supply, E-STOP removed, both power switch and key switch in OFF positions, after the unit has been allowed to cool for at least 10 minutes. Sub-section 7.4 is exempt from these restrictions.



Please note: Always ensure all canisters have been removed from the machine prior to performing any maintenance.

The Wireless SQP features two service panels secured by 4xM4 bolts. Removal of these service panels allows access to the majority of user-serviceable components within the WSQP:

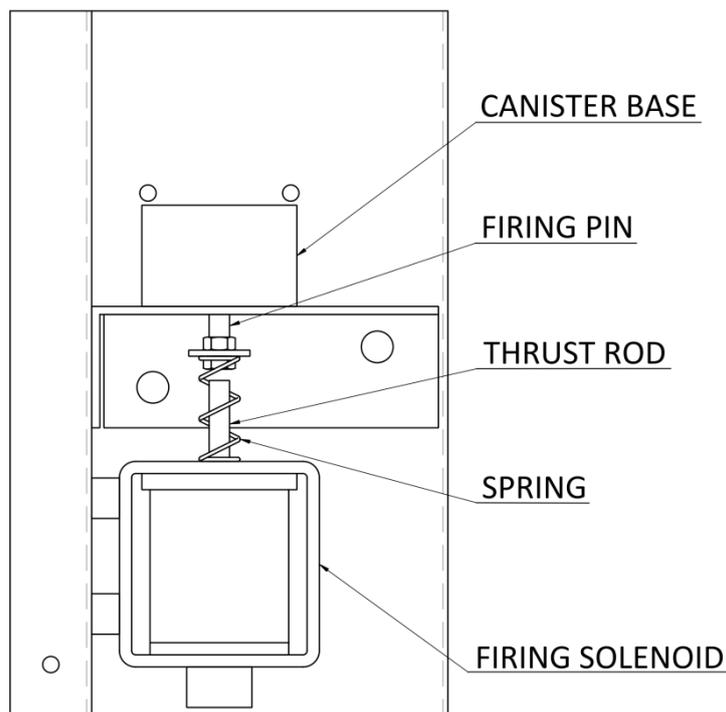


Figure 15 Firing Mechanism



Please note: If the machine is opened beyond the service panels the motherboard and power board (PCBs behind the front panel) should be cleaned (preferably with pressurised air) before closing the machine.

7.1 Firing Pin Adjustment

While the firing solenoid is not active, the firing pin should not protrude above the top surface of the canister base:

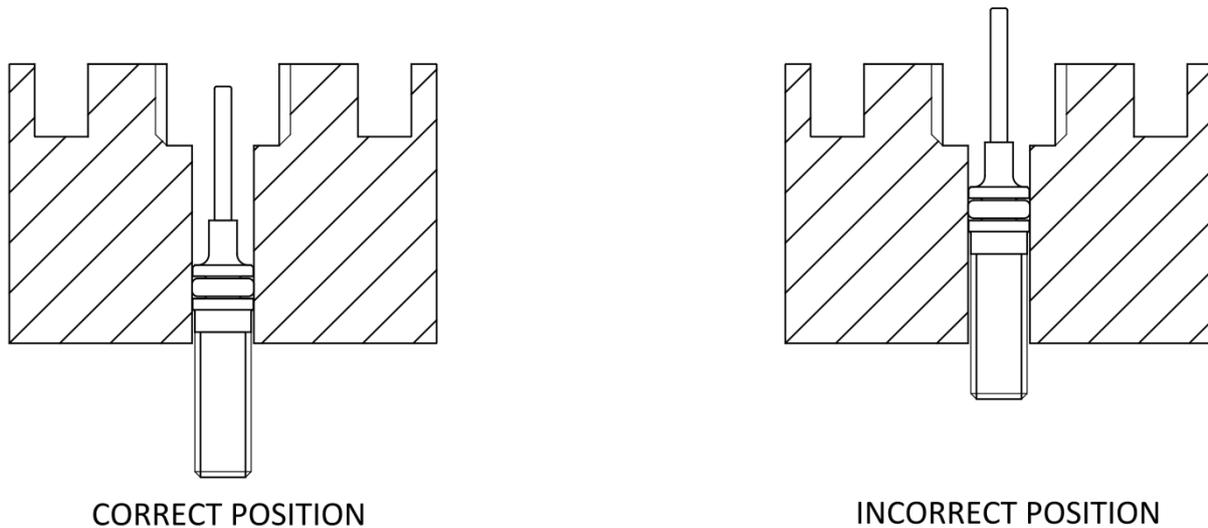


Figure 16 *Correct and Incorrect firing pin positions*

If the pin protrudes above the top surface of the canister base, this might lead to the pin opening the canister valve as a canister is installed, causing gas to be released.

The relaxed position of the firing pin can be changed by adjusting the position of the two M5 plain nuts and the washer on the firing pin shaft. Winding this assembly further up the pin will reduce the height of the pin while it is in a relaxed state.

To perform this adjustment:

1. Depress the spring.
2. Using an 8mm spanner, wind the nuts up the firing pin shaft one at a time.
3. When the pin is in the desired position, tighten both nuts against the washer.

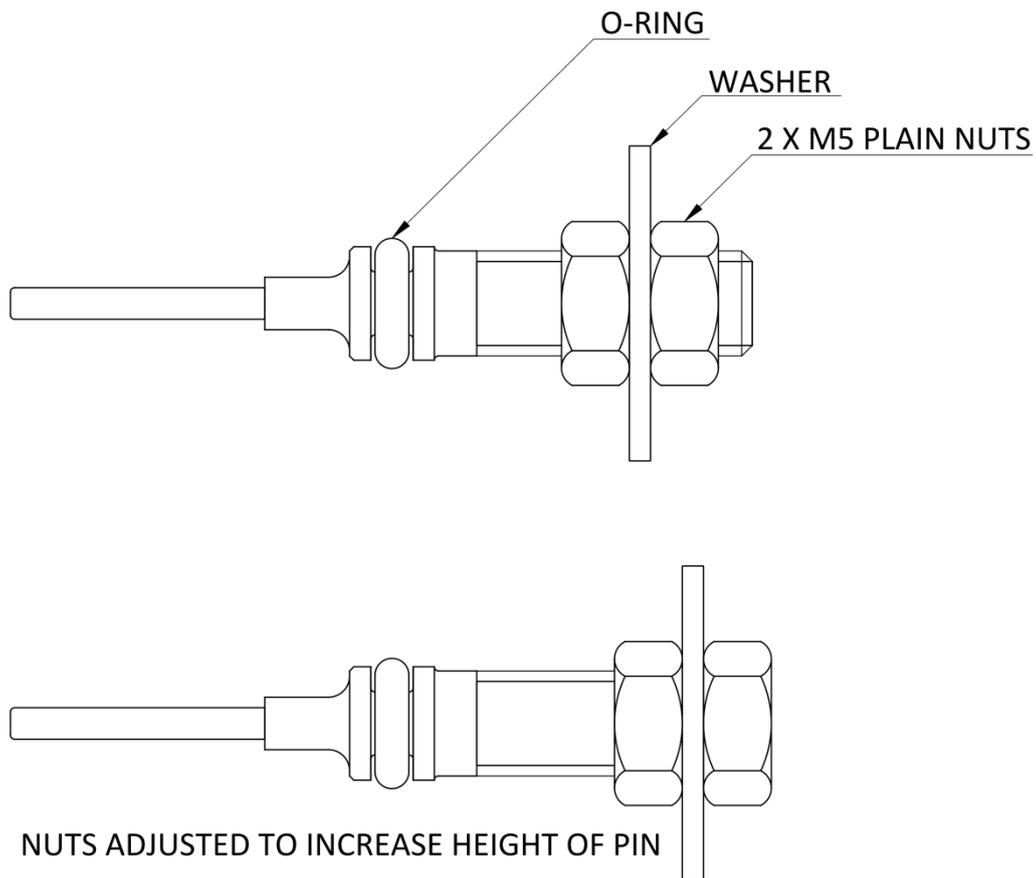


Figure 17 *Firing pin assembly and adjustment*

7.2 O-Ring Replacement

The Wireless SQP contains two user-replaceable O-Rings in each canister base.

One is located at the base of the thread in the brass canister base.

The other is located on the firing pin.

7.2.1 Canister base O-Ring

The canister base O-Ring should be inspected **every time the canister is changed**. If the rubber appears worn, frayed or split, the O-Ring should immediately be replaced. It might be necessary to cut the O-ring out of the canister base using a small blade such as a scalpel.

The replacement O-Ring can simply be pressed into place.

7.2.2 Firing pin O-Ring

It is recommended that the firing pin O-ring is periodically examined for damage. Checking the O-ring every 6-12 canisters is usually appropriate, however this will vary based on the precise operating conditions of the unit.

In addition, if the Wireless SQP fails to fire correctly, or the response when firing is delayed or 'sticky', the firing pin O-ring must be cleaned or replaced.

To access the firing pin O-ring:

1. Remove the rubber plug from the base of the Wireless SQP.
2. Remove the thrust rod from the solenoid by sliding it out the base of the unit, through the unplugged hole.
3. Remove the spring from the firing mechanism.
4. The firing pin can now be removed from the bottom of the brass base.

If the O-ring appears worn, frayed or split it must be replaced. The O-ring should be cut off the firing pin with a sharp blade such as a scalpel, taking care not to scratch the firing pin itself. A new O-ring should be eased into place from the top end of the pin. Do not push the O-ring over the thread on the firing pin.

A chemically inert lubricant such as general purpose silicone grease must be applied to the O-ring before the pin is replaced. A thin layer should be applied to the O-ring, and any excess should be wiped away.

When the O-ring has been replaced, re-install the firing pin.



Please note: Under no condition should the firing pin be pushed up out of the top of the canister base. This will force the firing pin O-ring across the canister base's side opening, damaging the rubber and compromising the seal created.



Please note: If the WSQP is to be operated exclusively with coloured fluid (Red or Green) the pin O-ring must be inspected after at most 12 canisters per base.



Warning: Failure to apply lubricant to the O-ring may result in the pin sticking. This can lead to a delay in firing or shutting off, non-ignition conditions, and reduce the life of the O-ring.

7.3 Cleaning of spark electrode

The spark electrode inside the flue can get dirt and deposit build-up on it. This build-up can be conductive, and hence affect the spark, which in turn could affect ignition and potentially cause non-ignition events, if the spark detection circuitry fails to disable the machine prior to arming.

The electrode should be cleaned after every use (allow machine to cool down first).

To clean the spark electrode turn machine off (no power supply connected, E-STOP removed, both power switch and key switch in OFF positions), and wipe down electrode with a cloth or tooth brush to clean any deposits off. Thin flexible wire brush can be used for more persistent residue.

Be careful not to exert significant twisting torque or force along the electrodes, as this could damage the spark ignitor.

7.4 Preserving battery lifetime

Battery should be fully discharged (11.8V rested) and charged again to full (12.8V rested) every three to six months, when machine is in use.

Battery should be charged at least once every six months, when machine not in use (in storage).

8 Contact Details

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9 Warranty

The Le Maitre Wireless SQP is sold with a two year's warranty, which includes parts and labour from the date of purchase. This warranty covers manufacturing defects, providing that the unit has been regularly serviced by an authorized agent and has only used genuine Le Maitre Canisters.

Le Maitre Ltd considers all of its products to be safe for use in the application it was intended. Le Maitre Ltd takes no responsibility for misuse or incorrect use. Always refer to the equipment owner's manual for proper use, and be aware of local legislation governing the products use.

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