Salamander Quad Pro

Flame Effect System

User Manual

Version 1.0 – May 2014

Maximum Flame Heights

Coloured Fluid:
1 Canister: 3.5m / 12ft
2 Canisters: 4.5m / 15ft
3 Canisters: 5.5m / 18ft
4 Canisters: 6m / 20ft

Natural Fluid:
1 Canister: 4.5m / 15ft
2 Canisters: 6m / 20ft
3 Canisters: 7.5m / 25ft
4 Canisters: 8.5m / 28ft

Safety Information

This information should be read and thoroughly understood before use of the Salamander Quad Pro.

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 after the manufacturer's strict approval.

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

The Salamander Quad Pro must not be used in confined spaces, under any conditions of rain, snow or precipitation of any fluids, or moving air which will cause the flame to divert from a vertical path.

The Salamander Quad Pro should not be subjected to temperatures below 5°C or above 45°C, nor exposed to unsheltered conditions.

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

Warning: Before initial use and each subsequent use, the Salamander Quad Pro should be checked for functional suitability. Should any damage be observed or doubt about suitability of use occur, it should be immediately decommissioned and held for service.

Operational Guidance

⚠ The Salamander Quad Pro 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 and all data communication.

⚠ Changing canisters should only be performed when the machine is powered down, the HSI is cool, and no other sources of ignition are present.

⚠ Safety distances must be given a priority when using the Salamander Quad Pro. This includes persons in the performance area, and surrounding flammable objects. Maximum flame heights are presented in 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 should have undergone 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 mains supply is recommended.

⚠ Use only Le Maitre Chameleon Flame Fuel or Le Maitre Salamander Flame Fuel. Use of alternate fuels might lead to unexpected behaviour.

⚠ The Salamander Quad Pro is controlled by instruction 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 the responsibility of the operator.

⚠ Avoid live-wiring DMX to the Salamander Quad Pro, ie. do not plug in or unplug DMX cables while the controller is actively transmitting data.

⚠ The Salamander Quad Pro is not designed for continual flame use. It is intended for short duration bursts, ie. maximum duration of 5 seconds.
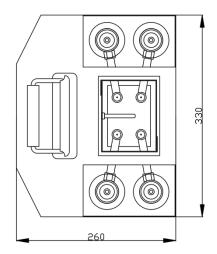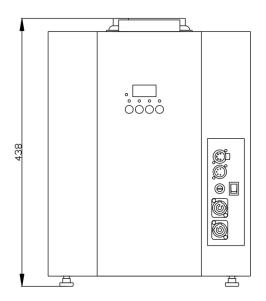
⚠ Should the Salamander Quad Pro fail to fire correctly, immediately shut down the machine and allow it to cool before investigating the problem.
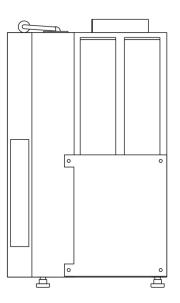
Contents

Features and Dimensions

Dimensions in millimetres.

Product Overview

Product Description

The Salamander Quad Pro is a versatile new real flame effect from Le Maitre Ltd. The four-canister system allows the unit to produce flames from 3m to over 7m in height. The unique firing mechanism eliminates the requirement for internal valves and accumulators, minimising the risk of flammable gas leaks, and a robust hot surface igniter ensures reliable flame ignition.

The canister based design removes the requirement for bulky and expensive propane bottles and high pressure hosing, and allows for a choice of fuels making the Salamander Quad Pro ideal for any venue where propane is not permitted.

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

> www.lemaitreltd.com   and   www.lemaitreusa.com

Features

- Flame height from 3.5m to 7.5m
- Four canister system
- Multiple colours and fuels available
- 30 seconds continuous flame or 35 fireballs per canister
- No internal valves or accumulators; flammable fuels are only stored within the canisters themselves
- DMX operation
- Robust hot surface ignitor
- Ignitor current monitoring
- Tilt safety switch

Specification

Power Requirements (EU):	230VAC, 50Hz, 400W
(US):	120VAC, 60Hz, 400W
External Fusing (EU):	3.15AT
(US):	6.3AT
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:	DMX512 – 5 Channels (Igniter, 4x Fire)
Dimensions (mm):	433 (H) x 330 (W) x 260 (D)
Weight:	16kg

Operation

Getting Started

Remove the Salamander Quad Pro from all packaging and place on a flat, stable surface.

Prior to use, the Salamander Quad Pro should be inspected for damage. If the unit is found to be damaged, it should be removed from service immediately, and referred to Le Maitre for servicing and repair.

Install four canisters of Le Maitre Chameleon or Salamander flame fuel by screwing the canisters into the brass canister bases. 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 gas should leave the canister as it is being installed. If escaping gas is detected, immediately remove the canister. The most probable cause is the tension of the spring supporting the firing pin. Refer to the Maintenance instructions for correct adjustment of this spring.

Power is supplied to the Salamander Quad Pro via the blue Neutrik PowerCon socket. A suitable mains cable fitted with a blue PowerCon plug must be used to connect the Salamander Quad Pro to a mains supply. The white PowerCon socket is a mains through connector allowing multiple Salamander Quad Pro to be powered from a single mains supply.

⚠️ **Please note:** The blue Powercon must only ever be used as a mains input, and the white Powercon must only ever be used as a mains through / output.

⚠️ **Please note:** Electrically, the Salamander Quad Pro's fuse and power switch are located <u>after</u> the mains through socket. This means the mains through socket will always be live while the Salamander Quad Pro is connected to a live mains supply, even if the unit is switched off, or the fuse has blown.

Control Panel

The Salamander Quad Pro is configured through an on board control panel featuring a 3 x 7-Segment LED display, 5 x indicator LEDs and 4 x multi-function buttons.
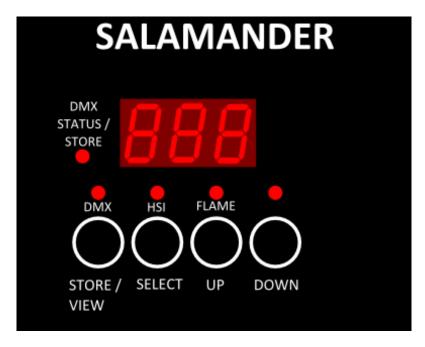

Figure 2: Salamander Quad Pro Control Panel

DMX Operation

The Salamander Quad Pro can only be operated through DMX-512. Five channels are required – one channel activates the HSI, the remaining four channels each operate one firing solenoid.

Two independent addresses can be set. The first address is for the HSI channel, the second address is the first of four fire channels. The three remaining fire channels will be the three consecutive channels.

For Example:

HSI – Channel 12. FLAME – Channel 2. HSI will be activated by channel 12. The fire channels will be 2, 3, 4 and 5.

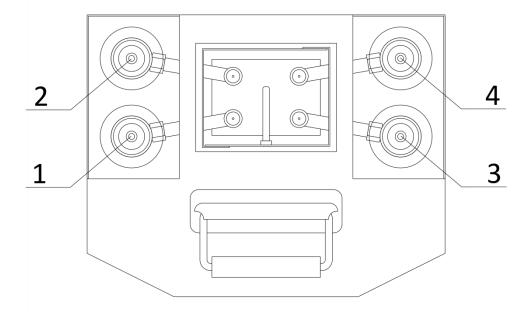The order of the canister channels can be seen in Figure 3.

Figure 3: Salamander Quad Pro Canister Numbers

The display will show the DMX value received (0-255) on the fire channel. The HSI will be activated when the HSI channel is raised above 50% (128). At this point, a timer will activate, preventing the unit from being fired until the HSI has had time to reach full temperature. While the timer is active, the 3 digit display will flash. When the display stops flashing, *rdy* will be displayed. The unit is now ready to fire.

When a Fire channel is raised above 50%, a solenoid forces a plunger into the fuel canister, opening the canister valve and allowing the pressurised fluid 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. 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.

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

⚠️ **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.

⚠️ **Please note:** After the Salamander Quad Pro has been fired, there can occasionally be seen a small flickering flame within the flue. This is produced by residual fuel in the nozzle vaporising after the Fire channel has been released. This is expected in normal operation, however, if the effect is not desirable, it can be minimised by gently warming the fuel canisters prior to use. This increases the volatility of the fuel, allowing it to vaporise more rapidly.

Set-Up

The Salamander Quad Pro is programmed for operation through the control panel (see above). This must be carried out with all DMX cables unplugged.

When powered up, *doF* will flash. This is short for DMX OFF.

Setting DMX Channels:

Press the SELECT button. The HSI indicator LED will light up, and the currently selected HSI channel will be displayed. Use the UP / DOWN buttons to cycle through DMX channels. When the desired channel is selected, press STORE / VIEW to save the setting.

Press SELECT again, and the FLAME indicator LED will light up. This is the first Fire channel. Select the desired channel and save it as above. Pressing SELECT again will return to the DMX status display.

Advanced Settings

tEC Menu

The Salamander Quad Pro's *tEC* menu can be accessed by pressing and holding STORE / VIEW and UP at the same time. *tEC* will be displayed, followed by the HSI delay value (*dXX.*) The fourth LED on the control panel (above the DOWN button) will be lit while in the *tec* menu (referred to from here on as the *tEC* LED.)

The first position in the *tEC* menu is the HSI delay setting. Press SELECT to access the other items in the menu: DMX Filter and Tilt Lock. Pressing SELECT a third time will return to the DMX Status Display.

HSI Delay

HSI Delay setting is indicated by the *tEC* and DMX LEDs.

dXX will be displayed, where *XX* is a value between 00 and 30. This value is the approximate HSI delay in seconds. It can be set to the nearest second by the UP and DOWN buttons, and saved by pressing STORE / VIEW. The default setting is 10 seconds.

Care should be taken when adjusting the HSI Delay. If it is set too short, the HSI might not have time to reach full temperature when the Salamander Quad Pro is fired. This can result in the fluid failing to ignite.

In addition, if the HSI Delay is reduced to 0, the HSI will not activate. This allows the firing system to be tested without the HSI active.

DMX Filter

DMX Filter is indicated by the *tEC* and HSI LEDs.

In order to minimise the possibility of incorrect triggering of the Salamander Quad Pro through DMX, the software contains a DMX data filter. This will cause a small delay in the unit's response to DMX commands (approximately 75ms.) 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 this is desired.

⚠️ **Warning:** If the Salamander Quad Pro is operated with the DMX filter disabled, the manufacturer will not be held responsible for any unexpected behaviour under DMX control.

The DMX filter has two settings: Filter ON (*F-1*) and Filter OFF (*F-0*)

Press UP to turn the filter ON, and DOWN to turn the filter OFF. This setting it stored automatically.

Tilt Switch

The Salamander Quad Pro contains a safety tilt switch that will disable the unit if it is tipped beyond 40 degrees from vertical. This will prevent the unit from operating should it be knocked over. It is possible to disable this tilt-switch if desired.

⚠   **Warning:** The Salamander Quad Pro 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.

The Tilt Lock has two settings: Tilt Lock ON (*t-1*) and Tilt Lock OFF (*t-0*)

Press UP to turn the Tilt Lock ON, and DOWN to turn the Tilt Lock OFF. This setting it stored automatically.

Troubleshooting

Problem	*Cause*	*Action*
Fuse or circuit breakers blowing when HSI activated	Too many Salamander Quad Pros on single supply	Assign HSIs different DMX channels and stagger activation
	Faulty HSI	Refer to Maintenance instructions / contact Le Maitre
	HSI element in contact with chassis	Return to correct position. HSI might need to be replaced.
HSI not heating	HSI Delay set to 0	Set HSI Delay to above 0 (10 is recommended) Refer to Set-Up Instructions.
	Incorrect DMX channel	Set to correct DMX channel. Refer to Set-Up
HSI stuck in heating delay (display constantly flashing)	HSI disconnected	Re-connect HSI. Refer to Maintenance instructions / contact Le Maitre.
Firing solenoid not activating	HSI still heating	Wait until HSI is fully heated. The display will stop flashing when the Salamander Quad Pro is ready to fire.
	Incorrect DMX channel	Set to correct DMX channel. Refer to Set-Up instructions.
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.
	Firing pin too low.	Increase firing pin height. Refer to Maintenance instructions.
Gas released, but failing to ignite	Cans too cold.	Warm cans with hot air or a water bath before use. Approx. 30°C is recommended.
	Insufficient air-flow.	Raise the unit from the ground by increasing the height of the adjustable feet.
No response from unit	Tilt lock-out engaged	Position on a level surface and turn unit off and on again.
	DMX signal not received	Check DMX controller and test cables.
Gas leaking when canister is installed	Firing pin too high.	Reduce firing pin height. Refer to Maintenance instructions.

Maintenance

⚠️ **Please note:** While the Salamander Quad Pro 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 this machine.

⚠️ **Please note:** All the procedures described in this section should be performed with the Salamander Quad Pro isolated from any power supply, after the unit has been allowed to cool for at least 10 minutes.

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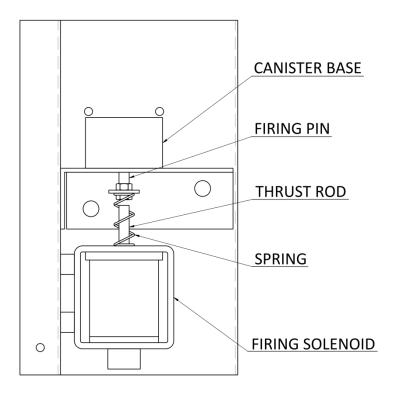

Figure 4: Salamander Quad Pro Firing Mechanism

Firing Pin Adjustment

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

CORRECT POSITION   INCORRECT POSITION
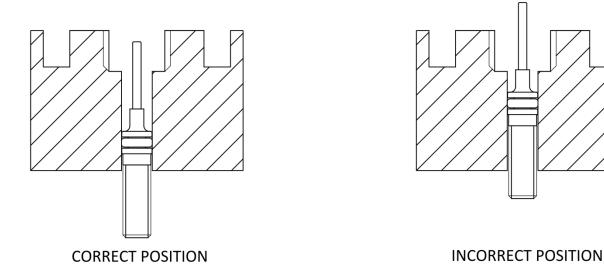
Figure 5: Correct and Incorrect firing pin positions

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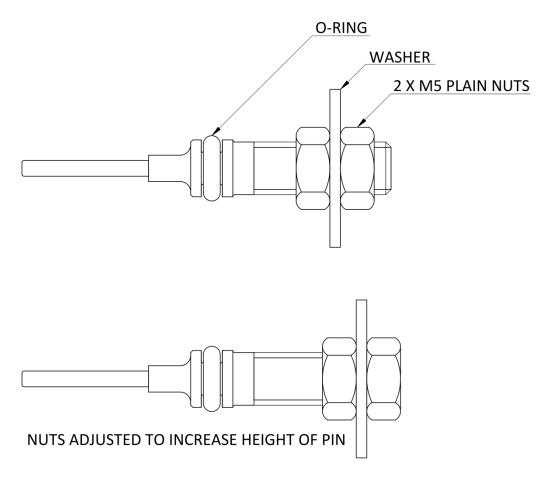3. When the pin is in the desired position, tighten both nuts against the washer.

Figure 6: Firing pin assembly and adjustment

O-Ring Replacement

The Salamander Quad Pro 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.

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.

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 Salamander Quad Pro 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 Salamander Quad Pro.
2. Remove the thrust rod from the solenoid by sliding it out the base of the unit, through the un-plugged 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 if 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 Salamander Quad Pro is to be operated exclusively with coloured fluid (Red or Green) the pin O-ring <u>must</u> 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, and reduce the life of the O-ring.

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Warranty

The Le Maitre Salamander Quad Pro is sold with a one 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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