

Sunshine Single Flame System (16L & 30L size)



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Set of Equipment Supplied

- Sunshine Single Flame System : 1
- Power Cable : 1
- DMX Signal Cable : 1 (10m)
- Gas Hose : 1 (15m)
- Funnel : 1
- Operation Manual : 1

16L

30L





Sunshine Single Flame System

Sunshine Single Flame System can fire your desired single colored flame up to 8 -10m(26-33ft) high. Using our Colorfirefly SFX fluid for colored flame effect or Isopar G or H for natural flame effect and Nitrogen Gas or compressed air as propellant , the system gives you the basic ability to shoot 1-5 pillars of a colored flame or natural flame approximately 8 ~ 10 m(26-33ft) at working pressure 2.0MPa(290psi) simultaneously.

For safety, this system has safeguard system which is composed of flame sensing rod and its flame sensing board. Without the solid pilot flame, the solenoid valves do not open and accordingly, it cannot shoot the flame. The pilot flame striking process repeats till the pilot flame becomes solid and even during the show, when the pilot flame is gone unexpectedly, the pilot re-strike resumes automatically and immediately within 0.3seconds. During this re-strike process, the valves keep closed so that no danger to shoot the flame accidentally. Also, for more safety, the system has double valves, two solenoid valves per flame jet. So, even if one of two valves is in trouble during show, the other valve secures the safety.

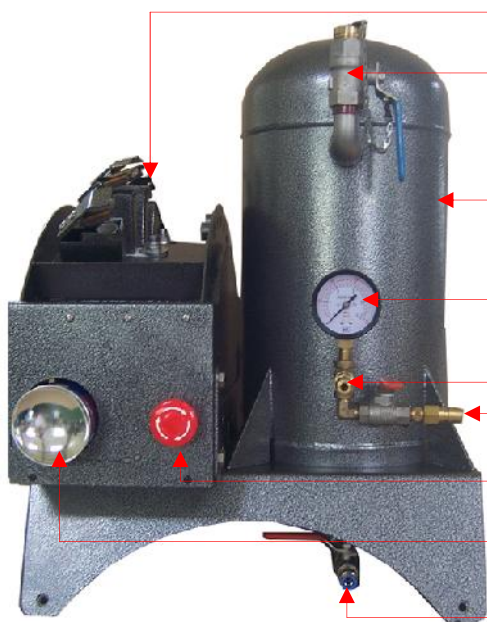
This system is controlled with standard DMX 512 controller or our Handy DMX controller.

Specification

- Power : 110VAC or 230VAC, 50/60Hz at your option
- Working Pressure : 2.0MPa(290psi) with 2.1mm flame jet for 8-10m flame height
1.5MPa(218psi) with 1.5mm flame jet for 5-6m flame height.
- Control : Our Handy DMX Controller or Standard 512 DMX Controller
- Propelling Gas : Nitrogen Gas(N2 gas) or Air compressor (recommend 25-30bar outlet pressure)
- Pilot fuel : Butane Gas Canister (Main flame is lit by pilot flame and pilot flame is lit by the HV igniter).
- Main flame source : Colorfirefly SFX fluid (Red, Green, Blue, Gold, or Purple) or Isopar G or H, IPA
- Maximum 5 flame jets can be shot simultaneously. All valves closed when power is removed.
- In case that green or blue colored flame fluid is used as fuel, the fluid hose connected from fluid tank to flame head should be replaced in 2 years. Because blue and green fluids are very aggressive and the hose can become hardened and cracked in 2 years.
- We have two versions of sunshine single flame system as follows. Only the fluid tank capacity is different

	SS with 16L Tank	SS with 30L Tank	Remarks
Size	43cm(L) x 43cm(W) x 55cm(H)	43cm(L) x 43cm(W) x 62cm(H)	
Weight	27kgs	38kgs	
Fuel Capacity	14Liter	28Liter	2L is for propellant nitrogen gas
Shots	140	280	0.5sec/shot or 5 sec/Liter
Flame Height	8-10m/2.1mm nozzle 5-6m/1.5mm nozzle	8-10m/2.1mm nozzle 5-6m/1.5mm nozzle	2.1mm nozzle installed 1.5mm nozzle is spare

Overview of System



Burner Head : Burner Head can be separated from the tanks and truss-mounted. For separation, unfasten bolts and fluid hoses.

Fluid Inlet Ball Valve are for charging each colored flam fluid to Each fluid tank. After charging, close valve handle and fasten caps for safety. During fluid charging, it is better to open all fluid inlet valves for easy charging with help of good air-circulation inside tanks.

Fluid Tank : The tank's capacity is 16L or 30L. You can charge maximum 14L or 28 L of fluid to each tank.

Pressure Gauge indicates the inside pressure of the tank.

N2 gas inlet valve : Plug gas hose from the gas tank to this valve.

N2 gas outlet valve : Plug gas hose from this system to the next system. When you run more than 2-4 units, you can run gas hoses in serial.

E-Stop Switch : Under emergency situation, push this button. Turn it in the direction of arrow for release.

Pilot Fuel Input : (Pilot fuel: 220gr(7.75 oz) Butane Gas cartridge... (See http://gasmate.com.au/sub_categories/32/products/61)



Drain Ball Valve are for draining the remaining fluids from tanks. Plug the supplied rubber tube in and drain the fluids after show. Except draining, keep them always close.



Pilot Cover is for protecting pilot flame. Don't touch. It is very hot during and after show till it is completely cooled down.

Pilot Tube is for protecting pilot nozzle. Inside this tube, HVAC igniter is located.

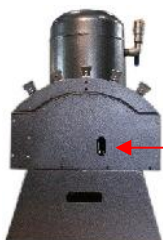
2.1mm x 5 Flame Jets are installed at the factory. If necessary, you can replace them to 1.5mm flame jets for smaller flame effects.

1.5mm x 5 flame jets are supplied as spare for smaller flame effect.

Flame Sensing Rod is installed and senses only the pilot flame of the center-located pilot.

The centered pilot flame is monitored by rod flame sensor. The other 4 pilots are not monitored by flame sensor.

This flame sensing rod is wired to the flame sensor circuit board with relay. If the centered pilot flame is not detected by the sensor, all the effect valves keep close or become close immediately. Then, retry to ignite the pilot flame and repeat till the pilot flame is detected to be solid. Then, the effect valves turns to be stand-by state for shooting. During show, at the moment that the centered pilot flame is gone accidentally, the retry to light pilot flame resumes immediately within 0.3 seconds. The other 4 pilot flames are being lit by the igniter during its whole shooting time till the pilot button is released and freed.



Hole for checking Pilot Gas canister connection.



For draining the remaining fluid from the tank, plug the supplied tube and drain fluid.



DMX Screen
Power SW
Power Cord Connection
3 Pin XLR

Warnings

- ❖ This system is intended to provide a colored or general flame special effect. As with all potentially dangerous special effects, the operator should be in full view of the systems at all times during operation.
- ❖ The system's flame height is 8 ~ 10m(26-33ft). Appropriate clearance for flame and its heat is required.
- ❖ Under the rainy or strong-windy weather, do not use the system.
- ❖ Don't shoot flames toward people or any flammable objects. Place the system on flame resistant surface and secure safe distance as follows : minimum 4.5m(15ft) from the audience, 8m(27ft) from either side and 15m(50ft) to the ceiling for indoor use. When using on the grass or artificial grass, put the flame proof carpet (size: 5m x 5m) down and place the system onto that carpet. If not, the grass can be damaged by the heat of the flames.
- ❖ Keep always a security guard around the propelling media (Gas tank, etc) and isolate it from ordinary people.
- ❖ Understand completely how to operate and control the system before using.
- ❖ Always keep the working pressure stipulated in this manual. Working pressure is the most important factor for the best show and for the safety. Always abide by the working pressure.
- ❖ Always check any leakage of gas and fuel for the system, hoses and tanks before using.
- ❖ Also, check all the power and signal cables if there is any damage or trouble before using.
- ❖ During transportation and storage, remove all the fuels and pressure from the system.
- ❖ Under emergency situation, push E-stop or turn off power switch of system and close main valve of gas tank. For safety, make your own secondary E-stop power cable, connect all the systems power to it and under emergency, turn off this E-stop power cable.
- ❖ If you cannot stop the burst-out of flame due to effect valve's trouble, close the main valve of gas tank and open drain valve of regulator adapter in order to discharge N2 gas or pressure from the fluid tank.
- ❖ Do not touch pilot covers during and just after the show. They are very hot and you can be injured. Wait till the pilot covers are completely cooled down and then touch the burner head.
- ❖ Do not open the main valve of N2 gas tank before the completion of fluid charging and do not disconnect the gas hose before the pressure is discharged from the fluid tank and hose completely.
- ❖ Do not disconnect hose from system or Nitrogen gas tank while gas and pressure remains inside hoses. The pressurized Nitrogen gas bursts out from hoses and causes risk of injury or trouble of hose couplers.
- ❖ When fluid remains below 2 liter inside the tank, some unburnt fluid can be fallen out and it makes the ground wet so that it could pose fire risk. So, always pour 2 liter or more fluid basically into the tank than the fluid quantity you want to shoot. For example, if you want to shoot 8liter, it is better for you to charge 10 liter or more.
- ❖ Please charge the fluid below 14L(16L tank capacity) or 28 liter(30L tank capacity). The remaining space of the tank is for Nitrogen gas. If it is over-charged, the fluid overflows through the gas pipe lines and gas inlet valve of fluid tank. When you charge the fluid into the tank, please confirm beforehand that the gas hose is not connected to the gas inlet valve and drain valves are completely closed.
- ❖ When charging fluid into tanks, open all the fluid inlet valves and gas inlet valves till the completion of fluid charging for easy air-circulation. If not, fluid could be bumped out from the fluid inlet ball valve.
- ❖ Do not use DMX signal cable which is weak to Noise matter. Use always same brand and same specification of the dmX signal cable supplied by us.

System Requirements

The system requires working pressure of 2.0MPa(290psi) with 2.1mm flame jet and 1.5MPa(218psi) with 1.5mm flame jet. Nitrogen gas can provide this pressure constantly. One Nitrogen Gas tank(40 liter) can charge 4 units constantly during whole show.

CAUTION : Never provide pressure lower than 1.0MPa(145psi) and higher than 2.5MPa(365psi) to the system. If the delivery pressure from the gas tank is over 2.5MPa(365psi), install a pressure regulator between the system and gas tank and set the delivery inlet pressure below 2.5MPa(365psi).

For operating the system, you have to prepare i) Nitrogen Gas as propelling media with pressure regulator, or Air Compressor, which can supply the delivery pressure of 2.5 ~ 3.0MPa with pressure regulator. ii) main fuel (SFX fluid or Liquid fuel), iii) Butane canister for pilot fuel and iv) DMX controller.

Propelling Media & Fluid

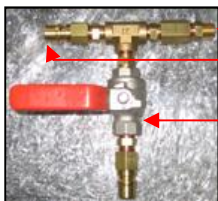
Propelling Media

Sunshine Single Flame System needs a propelling media to pressurize the fluid inside the tank and shoot the flame up to 8-10m. For supplying the stable and high pressure, Nitrogen Gas or compressed air is perfect, because they are neutral and non-toxic. This gas or compressed air as propellant plays a role to shoot the fluid through flame jet with high speed and spray it into the air.

Nitrogen Gas (Don't use liquid Nitrogen type)

The pressurized Nitrogen Gas inside the tank or cylinder has very high pressure(15MPa or 3,000psi more or less). If this high-pressurized gas is supplied to the system directly, gas hose and fluid tank become destroyed. So, the nitrogen pressure regulator should be installed at the outlet of nitrogen gas tank and the delivery pressure should set at 2.0MPa for 2.1mm flame jet before you open the main valve of nitrogen gas tank. One N2 gas tank(40-50L size) can supply the stable pressure to 4 units of Sunshine Single System. The system needs 2.0MPa(290psi) pressure as working pressure. However, if you connect 3-4 units to one nitrogen gas tank, it is better to set the delivery pressure at 2.3MPa for quick charging to those multi units. For selecting correct Nitrogen Pressure Regulator, please refer to following website. Below model is perfect as regulator. <http://www.harrisproductsgroup.com/equipment/regulatorInfo.asp?ID=25HVAC> (Model No. : 25-500C-580)

For connecting gas hose to pressure regulator, you need the following adapter.



Connect this part to the pressure regulator.
Connect gas hose to this plug.

This Drain Valve is used for draining gas inside the hose and the system.



Nitrogen Gas Bottle

Instead of Nitrogen Gas, you can use the air compressor which can supply the compressed air of 2.0MPa.

2.5 or 3.0MPa pressure-deliverable air compressor would be perfect. You can regulate the delivery pressure with installing pressure regulator at the outlet of the air-compressor like the nitrogen gas pressure regulator.

FLUID as main fuel

We designed and formulated the colored flame fluid for our flame systems. We have been applying our colored flame fluid to our flame system longer than 5 years. So, our colored flame fluid is best-matched with our flame systems. Also, recently, we used ISOPAR G or H to our flame systems for natural flame effect. This Isopar G or H is formulated and supplied by ExxonMobil Chemicals. Also, Isopropyl alcohol can be used for indoor flame effect.

Except the above two fuels, don't use other type of fuel to this system. We cannot guarantee that the other fluids or other brand color flame fluids has no negative effect to the systems. The available colored flame SFX fluid supplied by us is RED, GREEN, GOLD, BLUE, ORANGE and PURPLE. Our SFX Fluid is classified as Flammable Liquid and its classification is CLASS 3, UN1993.

Pilot Fuel for pilot flame

220-250gr butane canister with siphon is used as pilot flame fuel.

(see http://www.amazon.com/Sunmax-SM-101-Butane-Fuel-Cannister/dp/B000I1XYYA/ref=pd_sbs_sg_2)

At cold weather, this butane is not well-gasified. Under cold weather, make butane canister warm and use it.

Always use new butane canister for strong pilot flame at the show. Weak pilot flame may not light the far-outside flame jets. Try to keep strong pilot flame regardless of cold weather or outdoor for best flame effect.



Operating Procedure

How to set the system;

- Locate the system and N2 Gas tank at the safe place. Install pressure regulator to N2 gas tank.
- Please confirm that main valve of nitrogen gas tank and handle of pressure regulator are closed tightly and completely. (Always check the close/open direction of pressure regulator handle. Generally, it is the opposite to main valve of gas tank)
- Disable the system electrically by pushing E-stop switch or turn off the power switch.
- Close the drain ball valve of fluid tank and open the fluid inlet ball valve and gas outlet ball valve before fluid charging.
- Use funnel for fluid charging. Do not charge over 14liter(16L tank capacity) or 28liter(30L tank capacity) into a single tank. After fluid charging, close fluid inlet ball valve and then screw the cap into the fluid inlet ball valve.
- Then, load butane canister to the burner head. Insert it to the pilot fuel input and turn it right with pushing.
- Connect power code and DMX signal cable to the system. And set the starting address of each system.
- Then, connect gas hose to the gas tank and then the system..
- After all the gas hose connection is made, slowly open the main valve of the gas tank and then, set the delivery pressure at 2.0MPa(290psi) for 2.1mm flame jets or 1.5MPa(218psi) for 1.5mm flame jets by opening the handle of pressure regulator bit by bit and very slowly. Do not set the delivery pressure over 2.0MPa. If 3 units or more units are connected to one gas tank, you can set the delivery pressure at 2.3MPa(330psi) for quick nitrogen gas charging to each system during shooting. Check pressure gauge of each sunshine system if the gauge indicates 2.0MPa(290psi).
- After nitrogen gas charging, please check if there is any leakage of gas or fluid or pilot gas.
- When everything is okay and safe to shoot the flame, release E-Stop Switch and turn on power switch of each system.
- You can shoot the flames from flame jet No. 1 to 5 simultaneously. Or you can make various combinations of flame jets shooting (eg. flame jet No. 1 and No. 4, No.1, No. 3, and No. 5. No. 1, No. 2, No. 3 and No. 5, etc)
- Notice : 0.3 second per shot or longer is recommended. Too short shot can make some fluid residue around flame jets. Also, the last 2 liters remained can make the unburnt fluid get shot together. This is caused by the lack of enough remaining fluids inside the tanks. So, for preventing this case, charge 2 liters or more than your planned and designed fluid quantity.
- After the show, firstly close the main valve of nitrogen gas tank and then close the regulator's handle. Then, disable the system electrically. Then, for removing remaining gas inside the tank and hose, open drain ball valve of regulator adapter or fluid inlet ball valve bit by bit. Keep your body and face far away from the gas-drain direction.
- After completely removing gas inside the system and hoses and then, disconnect all the hoses and cables, pilot gas. Lastly, plug the supplied tube for drain into the drain valve of the system and drain remaining fluid from each tank.
- After drain, close fluid inlet ball valve, gas outlet valve and cover the fluid inlet valve with cap.
- Don't touch pilot flame areas, covers and heads. It could be very much hot and you can be damaged and injured. After it is cooled down completely, then, touch the pilot areas if necessary.
- Always, remove all the gases and fluids from the systems and hoses after use. Color Flame SFX Fluid is aggressive and can make the system rusty. So, before storage, always wipe out the systems clean with wet towels. Then, store it into the road case always.

DMX Operation

The control is made by standard DMX 512 controller or our Hand DMX controller. Each System has 5 channels for main flame and One channel for pilot flame. For convenience, Pilot channel can be allocated to 6th channel at our factory. You can set starting Address and it will be displayed on DMX screen.

Different pilot flame channel setting of each system.

Example 1) System No. 1. (STA 1)	System No. 2 (STA : 7)	System No. 3(STA. 13)
Channel 1 : Flame Jet 1	Channel 7 : Flame Jet 1	Channel 13 : Flame Jet 1
Channel 2 : Flame Jet 2	Channel 8 : Flame Jet 2	Channel 14 : Flame Jet 2
Channel 3 : Flame Jet 3	Channel 9 : Flame Jet 3	Channel 15 : Flame Jet 3
Channel 4 : Flame Jet 4	Channel 10: Flame Jet 4	Channel 16 : Flame Jet 4
Channel 5 : Flame Jet 5	Channel 11: Flame Jet 5	Channel 17 : Flame Jet 5
Channel 6 : Pilot Flame	Channel 12: Pilot Flame	Channel 18 : Pilot Flame

The same pilot flame channel of each system

Example 2) System No. 1. (STA 1)	System No. 2 (STA : 7)	System No. 3(STA. 12)
Channel 1 : Pilot Flame	Channel 1 : Pilot Flame	Channel 1 : Pilot Flame
Channel 2 : Flame Jet 1	Channel 7 : Flame Jet 1	Channel 12 : Flame Jet 1
Channel 3 : Flame Jet 2	Channel 8 : Flame Jet 2	Channel 13 : Flame Jet 2
Channel 4 : Flame Jet 3	Channel 9: Flame Jet 3	Channel 14 : Flame Jet 3
Channel 5 : Flame Jet 4	Channel 10: Flame Jet 4	Channel 15 : Flame Jet 4
Channel 6 : Flame Jet 5	Channel 11: Flame Jet 5	Channel 16 : Flame Jet 5

* You can set the pilot flame channel of each system as the same regardless of each system's starting address.



- Control Panel
- DMX Screen : display starting address of the system.
- Fuse installed inside here
- 3 pin XLR : pin no. 1-ground, 2- data minus(-), 3- data plus(+)

When you use your own dmx signal cable you should always check pin numbers of XLR connection. If it does not match with the above pin number, it can cause noise matter and the system can mal-function)

Handy DMX Controller (DMX 512 protocol) is for simple control of the system.

- Free voltage, 3 XLR pin, 6 Channels, Flash Mode and can set the starting address.
- Flash Button has two functions of Flash and Swing.
Flash is only while you touch the button, the flame comes out.
Swing is when you push one button, the flame comes out and when you push another button, the flame moves to that channel.
- Programm : You can program very simple scene and store to Scene 1 or Scene 2. For example, push Program button and then push CH1, 2, 3, 4, and 5, and then push Scene 1 button. This scene is stored at Scene 1. There is no function to erase the memorized scene. Just overwrite on it if you need another new scene.
- When you turn on pilot flame or spark ignition, just push the pilot or spark channel button before you use flash function.

How to set the starting address ;

- Push flash button for 3 seconds or longer, then you can see the flash button
- Button No. 1 is hundred digit and Button No. 2 is ten digit and Button No. 3 is one digit
- For example, to set the starting address 128, push Button No. 1 one time, push Button No. 2 two time and push Button No. 3 eight time. You can see 128 on DMX address screen.



This controller is separate sale. It is not included to the set of the system.

DMX Operation

- How to set Starting Address

The control is made by standard DMX 512 controller or our Hand DMX controller. Each System has 5 channels for main flame and one channel for pilot flame. For convenience, Pilot channel is allocated to 6th channel at our factory



Mode Select Up

Pilot or Ignition CH No.
DMX Connection State
Starting Address



Photo 1



Photo 2

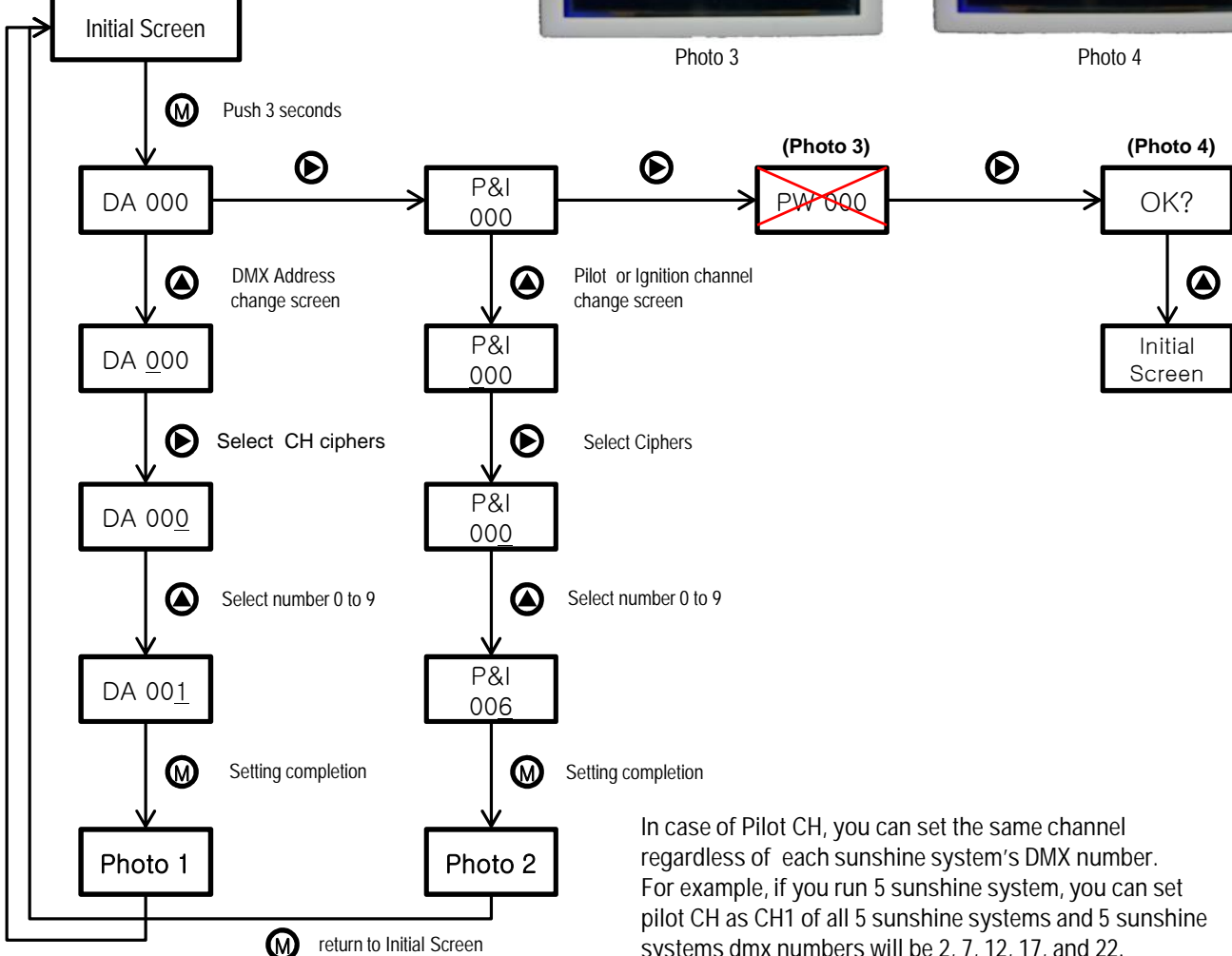


Photo 3



Photo 4

Mode Setting



In case of Pilot CH, you can set the same channel regardless of each sunshine system's DMX number. For example, if you run 5 sunshine system, you can set pilot CH as CH1 of all 5 sunshine systems and 5 sunshine systems dmx numbers will be 2, 7, 12, 17, and 22.

Maintenance

Maintenance

- After the show, remove pilot gas canister, all the pressure and fluid from the system completely and close all ball valves.
- SFX Fluid can rust the system. After using, wipe out fluids from the system with wet naps or paper towel and cleaning solution. After show, ensure that main fuels and Pilot fuel were removed from each system. If not, the life of system might be getting shorter, because vapor of SFX Fluid may damage the system.
- Keep out of reach of the children and don't allow unqualified person to touch the system.
- Store the system in clean, dry and cool area away from flammable or heat sources.
- Don't allow the dust or foreign objects to enter to the system and especially to the fluid inlet ball valves. These objects can block the effect valves and cause its mal-function.
- When you charge the fluid into the tank, use your own filters in order that foreign objects or dirties should not be flown to the fluid tank. The foreign objects and dirties can be jammed inside the solenoid valves and cause the malfunction of the solenoid valves.
- Check periodically the tubing, hoses, cables and gas piping, if they are damaged.

Trouble Shooting

1. Pilot flame

- Butane Gas for pilot flame is not gasified well at -0.5°C (31.1°F) or below. In this case, make it warm and use it. If possible, during winter season, please use butane gas canister designed for winter season. In case that you use the cold butane gas at the cold weather or the used butane canister, in which small gas remains, the pilot flame can become weak and the weak pilot flame may not light the main flame jets located at both ends.
- In case of no spark, check the distance of igniter and pilot tube. If igniter is bent, located far from pilot tube or too close to it, keep proper distance. Also, check the transformer, ignition cable and its harness.
- Even if the igniter issues spark, some pilot flames cannot light. Pilot flame nozzles may be clogged with some dusts. Blow out the dusts with air-gun of air-compressor. Also, if the only centered pilot flame lights and the other 4 pilot flames do not light, the flame sensing rod may not sense the pilot flame properly. The main reason that the rod cannot sense the pilot flame is that the power board is broken or that the flame sensing rod may not secure the proper distance from pilot cover. Check if the sensing rod is contacting the pilot cover or other outer case or if the sensing rod is too close or too far from them.

2. Control Trouble

- When DMX signal works normally, the Starting Address number is displayed in FND firmly after 3 times flashing. If there is any continuous flickering of the number, DMX signal is not transmitted to the system from the controller. Check DMX cable, its input and output and DMX Board.
- When you run two or more units, always check if you set the starting address correctly.
- Please avoid to run DMX signal cable together with high voltage power cable for preventing from "Noise".

3. Main Flame Trouble

- If any of fluid fall-out around the system is there, working pressure is not enough or too short shot might be the reason.
- Accidentally, some foreign objects can block the orifice of solenoid valves. In this case, fluid continues to sneak out or be shot because solenoid valves cannot be closed completely. Immediately close fluid supply ball valves and remove the pressure from gas hoses and the systems by opening the drain valve of gas regulator. Then, break down the valves and remove the foreign objects.
- There is very rare case that some foreign objects block flame jets. In this case, that flame jet's flame might be smaller than others. After loose the flame jets, remove the foreign objects.
- When the main flame is lower and weaker than normal without special cause, the filter might be jammed with dirties. In this case, pull out the filter, clean it and re-install it. The jammed filters can block the flow of fluid from the tank to the burner head.

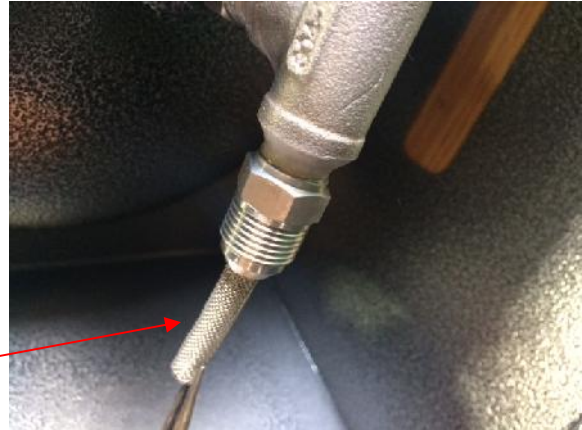
How to clean the filter

We recommend that you need to clean up the filter every 6months because it can be polluted with foreign objects and dirties after using the system. Otherwise it causes reduced the flame height or liquid fallouts due to depressurization

1.



2.

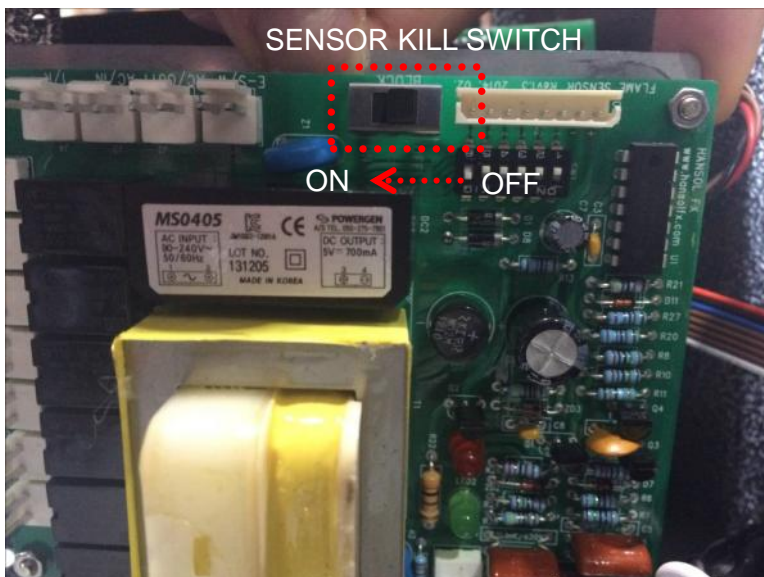


Filter is inside here

Flame Sensor Troubleshooting(only temporal)

When the flame sensor(power board) does not work, only the middle pilot flame works (sparking continues) and the other 4 pilot flame do not light and you cannot shoot the flame. In order to shoot the flames under that circumstance, you need to kill flame sensing function.

There is flame sensor kill switch on power board as the following photo.



1. Turn on Flame Sensor Kill switch on power board.
2. Then turn on the pilot flames. You can see all 5 pilot flames light.
3. Then, you can shoot the flame under this condition.
4. But the flame sensor function is killed so that the fuel liquid can be shot without pilot flames accidentally.

This is the temporal solution. Eventually, you need to replace the broken power board to new power board for safety.