X2 Power Flame

Manual 2.1

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explo GmbH – Völkermarkterstraße 240, 9020 Klagenfurt am Wörthersee, Österreich
wwww.explo.at office@explo.at +43(0)463/32245

VORWORT

Dear Explo-Customer,

Please read through this document before usage of the devices. It contains many informations which will help you with using the system.



Reading through this manual will support you in a responsible use of this product.

We ask you to adhere to the safety and usage guidelines we have listed.

Should you have any questions or should any unclarities arise during the usage of the devices, that can't be answered by this manual, please do not hesitate to contact us either by mail or by phone.

We wish you a lot of fun with your new effects device.

Your Explo Team

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1 ABOUT THE X2 POWER FLAME

1.1 FUNCTION OF THE X2 POWER FLAMES

The X2 Power Flame is a special effect device, with an effect height of up to 20 meters. This flame projector is fueled with commercially available propane- / butane-gas bottles, and uses nitrogen to create the working pressure needed.

The Power Flame can be controlled via radio, or DMX, and thusly be easily integrated into automated shows.

1.2 USAGES AND POSSIBILITIES

The X2 is usable for outdoor shows, with enough space. Its work environments can range from concerts and stage shows, to special effects for carnivals or sports events.

2 COMPONENTS OF THE X2 POWER FLAMES

2.1 OVERVIEW OF THE X2 POWER FLAME FRONT PANEL



Components of the Power Flame Front Panel			
1	Key switch	6	DMX-connectors
2	Display and usage buttons	7	Nitrogen connector (old build) XLR connector (new build)
3	Antenna socket	8	Gas connector
4	Status-LEDs	9	ON switch (Power) and fuze 12VDC
5	Programming socket	10	Power connector and fuze 230VAC

2.2 OVERVIEW OF THE X2 POWER FLAME BACK



Components of the Power Flame Side panel	
1	Pressure gauge
2	Stopcock

2.3 OVERVIEW OF THE X2 POWER FLAME TOP



Components of the Power Flame top	
1	Pilot flame
2	Main nozzle
3	Pressure relief valve

2.4 OVERVIEW OF THE X2 POWER FLAME ACCESSORIES



Components of the Power Flame Accesories	
1	Gas hose
2	Nitrogen hose
3	Power cable
4	XLR connector cable
5	External connector system
6	BNC antenna
7	Pressure reducer for nitrogen

2.5 DESCRIPTION OF COMPONENTS (EFFECT DEVICE)

2.5.1 KEY SWITCH

After witching the power supply to ON via the wip switch (7), you can activate the projector with the key switch. To activate the device, only a short impulse is needed. After activation, it can be set to off again. The Power Wave will then remain on.

This has an important function during the show, in case of power loss. If the key switch is set to on, the device will start again automatically. If it is set to off however, the device will also not start again after it is supplied with power again.

2.5.2 DISPLAY AND USAGE BUTTONS

Using the display and the usage buttons, you can see the most important settings of the Power Wave, and navigate the menu. Outside the menu, some of these buttons have special functions.

Usage buttons of the X2 Power Flame	
Menu / OK	*Outside the menu* you can use this button to open the menu. *Inside the menu* it is used to confirm. *Holding it during startup:* Power Flame will start in radio receiving mode.
E / Minus	*Outside of the menu* this button currently has no function. *Inside the menu* this button is used as a minus button.
Light / Plus	*Outside the menu* you can toggle the background light of the display on and off. *Inside the menu* this button is used as a plus button.
Test / ESC	*Outside the menu* you can use this button to send a test signal to the transmitter, to check the radio connectivity (only in test mode). *Inside the menu* this button is used as an escape button. *Holding it during startup:* Power Flame will start in DMX-Mode.

2.5.3 ANTENNENBUCHSE

A fitting antenna with BNC connector can be mounted to the BNC antenna socket for radio use. We recommend the use of original antennas.The antenna is used to receive data. Pinching or breaking the antenna or its cable can lead to damages, and should therefore be avoided. During use, make sure that the antenna is safely mounted and placed upright, to guarantee the best possible radio reception.Water or moisture entering the antenna socket can drastically decrease the radio reception.

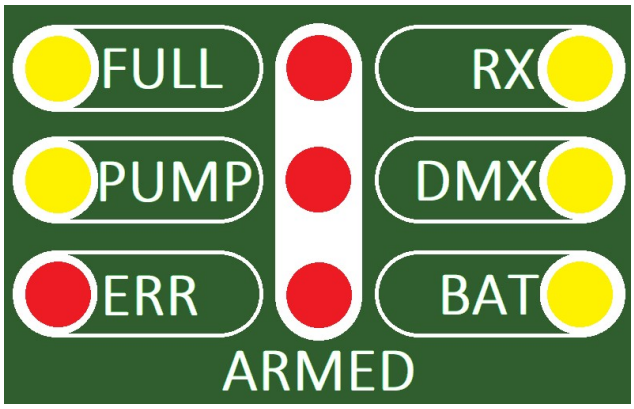
2.5.4 PROGRAMMIERBUCHSE

Combined with the bootloader programming cable (sold separately) updates of the devices software can be made by yourself.

2.5.5 STATUS-LEUCHTDIODEN

The Status LEDs can display various stati of the device.





Status-LEDs of the Power Flame	
FULL	No function
PUMP	No function
ERR	No function
RX	Will flash if a radio signal from the transmitter is being received.
DMX	If DMX is integrated and used, it will be permanently lit, and will flash if the device receives DMX signals.
BAT	Shows the current status of the power supply. If it is continuously lit, the power supply is okay. If it begins to flash, there is not enough power to supply the device. This may indicate a damaged mains power supply.
ARMED	The three middle LEDs are lit, if the device is armed. During this time, be very careful when using the device, and make sure all safety distances are adhered to.

2.5.6 DMX-ANSCHLÜSSE

Via the 3 pole XLR connectors, a DMX controller can be connected to the Power Flame. The outgoing socket can be used to forward the DMX signal to the next Power Flame.

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Pin configuration of the 3pole DMX	
Pin 1	GND
Pin 2	B
Pin 3	A

2.5.7 NITROGEN CONNECTOR/ XLR CONNECTOR

Depending on the build of the Power Flame, you can either find a connector for a nitrogen hose here (old build, as pictured), or the connector for the XLR connector cable to control the solenoid valve of the external connector system (new build).

2.5.8 GAS CONNECTOR

Here you can find the connector for the gas supply. For the old build, the gas bottle is directly connected via a gas hose. For the new build, the gas bottle is indirectly connected via the external connector system, which is connected to the gas connector with a hose.



2.5.9 ON SWITCH (POWER) AND FUZE 12VDC

Via this wip switch, you can connect or disconnect the power supply of the Power Flame. After activating the wip switch, you will also need to activate the key switch at least shortly, for the device to start. The fuze is a 10A delay fuze, for the internal 12VDC power supply.

2.5.10 POWER CONNECTOR AND FUZE 230VAC

Allows you to connect the power supply of the Power Flame. The internal mains supplies are meant for 110 VAC to 230VAC. The fuze is a 10A delay fuze for the 230VAC power supply.

2.5.11 PRESSURE GAUGE

Allows you to check the current working pressure (display of up to 16bars). When using the standard setting of the Power Flame, it should not exceed 8 bars.

2.5.12 STOPCOCK

The built in stopcock can be used to manually turn off the main nozzle and pilot flame (for example, if the output valve is stuck). This stopping function should always be accessible during the use of the device.

2.5.13 PILOT FLAME

The pilot flame is used as an ignition for the main flame of the projector. The pilot flame itself is ignited with an electrical ignition electrode.

2.5.14 MAIN NOZZLE

This is the effect output. The gas ejected from here, is ignited by the pilot flame.

2.5.15 PRESSURE RELIEF VALVE

This is the 16 bar pressure relief valve of the Power Flame. Do not open this valve manually.



The pressure relief valve must be closed completely before using the projector. Disregard might lead to damaging of the product.

2.6 DESCRIPTION OF COMPONENTS (ACCESSORIES)

2.6.1 GAS HOSE

The gas hose (5m length) is used to connect the external connector system to the projector.

2.6.2 NITROGEN HOSE

The nitrogen hose (5m length) is used to connect the nitrogen bottle (via the pressure reducer) with the external connector system.

2.6.3 POWER CABLE

The power cable (5m length) is used to supply the Power Flame with 110-230VAC.

2.6.4 XLR CONNECTOR CABLE

The XLR connector cable (5m length) is used to connect the nitrogen valve on the external connector system to the projector. All control signals from the Power Flame to the valve are made with this cable.

2.6.5 EXTERNAL CONNECTOR SYSTEM

On the input side of the external connector system, you can connect the gas bottle, and the nitrogen hose. The output is connected to the Power Flame with the gas hose to the gas connector.

Using the integrated nitrogen controller valve, the gas bottle will be pressurized with the nitrogen.

2.6.6 BNC ANTENNA

The provided antenna with BNC connector is needed to control the Power Flame via radio. It is a passive antenna with 50Ohm, ¼ Lambda (meant for 433MHz).

2.6.7 NITROGEN PRESSURE REDUCER

The provided pressure reducer is mounted to the nitrogen bottle, and be set to 10bars.



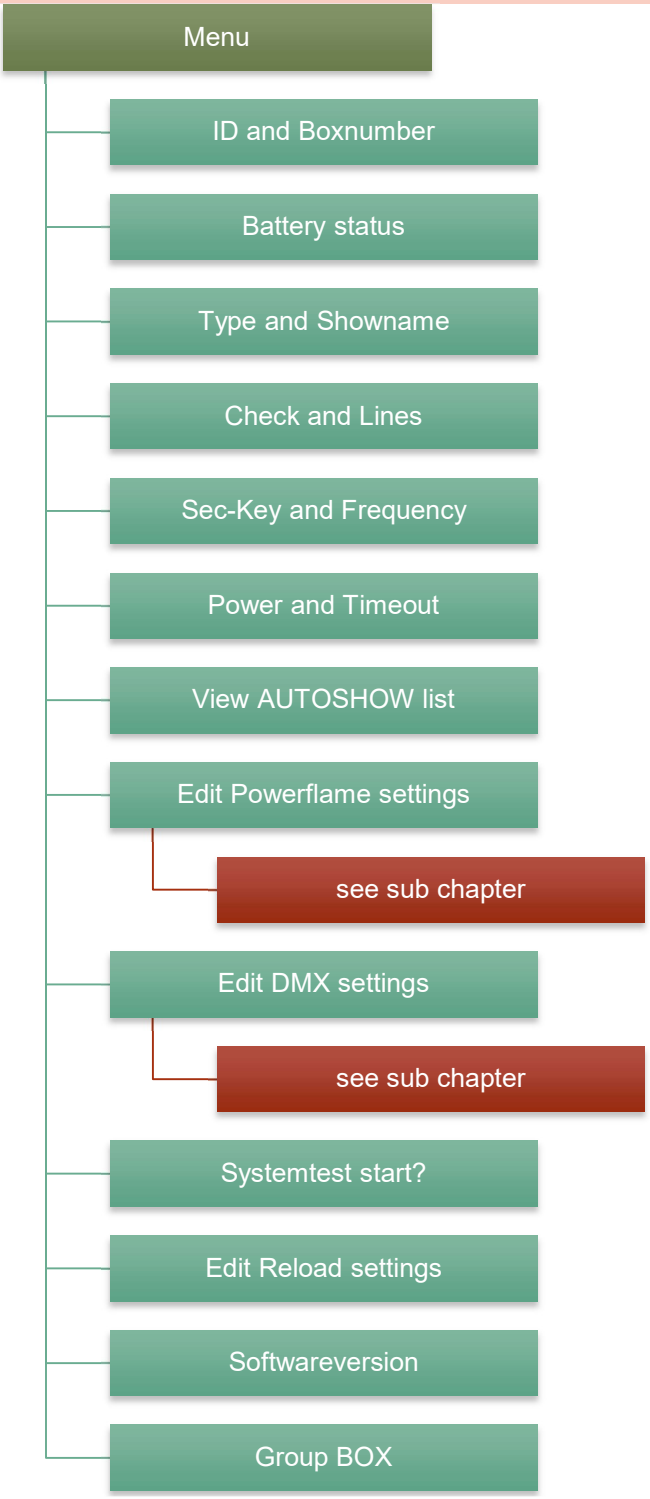
You must use a pressure reducer and set it to 10bars. If the pressure is set too high (or the pressure of the nitrogen bottle is) it may lead to damages of the connector system.

3 MENU ITEMS

The menu of the Power Flamer can be opened in test-mode with the Mode/OK button. The navigation through the menu is done with the Plus and Minus button. The Mode/OK button allows you to confirm. Exiting the menu can be done with the Test/ESC button.

The menu will close automatically after a minute of inactivity.

3.1 MAIN MENU



3.1.1 ID AND BOXNUMBER



Shows you the ID number (line 1) and the Box number (line 2) of the device.

3.1.2 BATTERIESTATUS



Shows the battery status in volts. The normal value is at 14 to 14,2V.

3.1.3 TYPE AND SHOWNAME



Shows you the type of the product as it will be listed in the device list of the transmitter (line 1), as well as the name of the show currently saved on the device (line 2).

3.1.4 CHECK AND LINES



Shows you the Checksum of the device (line 1) and the number of ignition cues the current show has for the device (line 2).

3.1.5 SEC-KEY AND FREQUENCY



Allows you to see the set Secure-Key (line 1) and the set frequency of the internal radio module (line 2).

3.1.6 POWER AND TIMEOUT



Here you can see the set radio power of the radio module (line 1) and the time after which the show will stop if no transmitter signal is received (line 2).

3.1.7 VIEW AUTOSHOW LIST



Shows all ignition lines used by the device, if an AutoShow has been created.

3.1.8 EDIT POWERFLAME SETTINGS



Here you can edit different settings of the projector. See the corresponding sub chapter.

3.1.9 EDIT DMX SETTINGS



Allows you to change the DMX settings of the projector. See corresponding sub chapter.

3.1.10 SYSTEMTEST



This menu item is used to start various system internal tests. You should only make these after consulting us beforehand.

3.1.11 EDIT RELOAD SETTINGS



Allows you to change various settings about the building of pressure in the system. We recommend to only change these settings after consulting our personnel.

3.1.12 SOFTWAREVERSION



Shows the current software of the device. A regular checking and updating of the software is highly recommended. You can find further informations for this at the end of this manual.

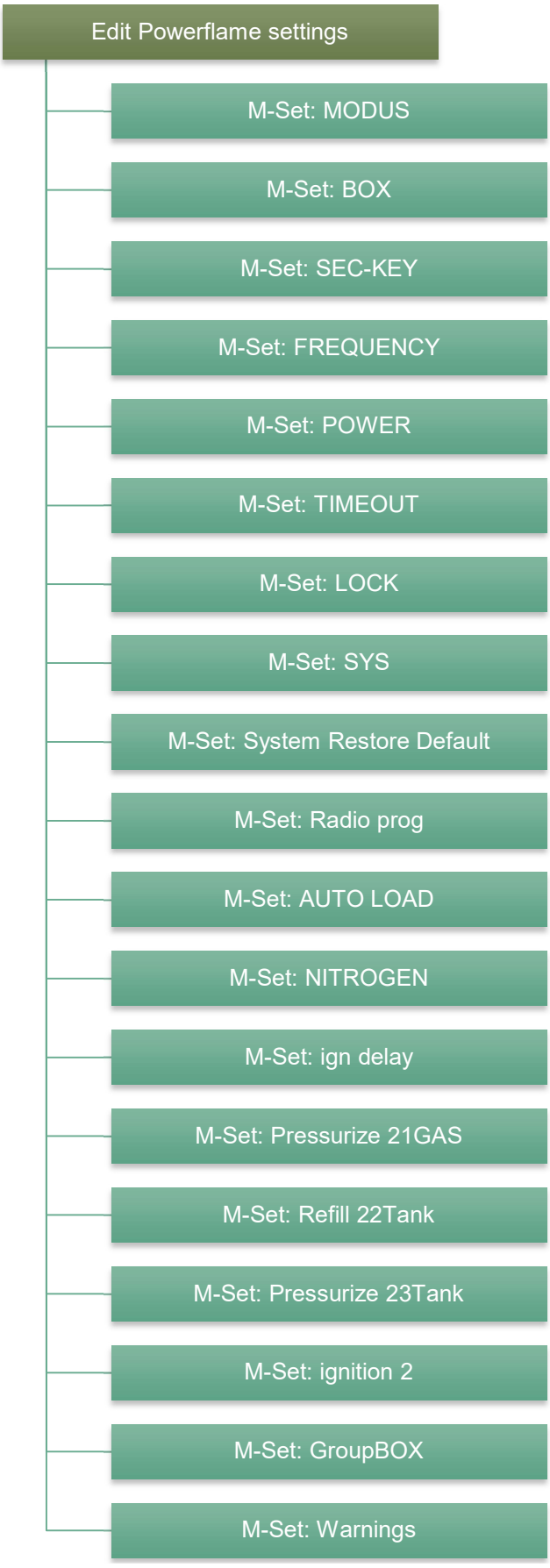
3.1.13 GROUP BOX



Shows the set Group box numbers. With the Mode/OK button you can switch to the next two Group box number.

This option can only be used for manual ignition signals or for control with the PC-mode (ShowPlayer software) via box- and channelnumber. Automated shows (AutoShow/ ShowCreator) and PC control with an internal TimeCode do not allow for the usage of the Group box numbers set.

3.2 POWERFLAME SETTINGS



3.2.1 M-SET: MODUS

Allows you to set the device into test-, armed- or sleep-mode.

3.2.2 M-SET: BOX

Allows you to set the main box of the device from 1-198.

3.2.3 M-SET: SEC-KEY

Allows you to set the Secure-Key of the device (Standard 139). The Secure-Key can be used to encrypt the radio transmission within a systemaddress seperately. Transmitters can only control devices set to the same Secure-Key.

3.2.4 M-SET: FREQUENCY

Allows you to change the frequency of the internal radio module (Standard 6, changeable from 1-14, 21, 22 and 23).

3.2.5 M-SET: POWER

Allows you to change the radio modules power output (Standard 10).

3.2.6 M-SET: TIMEOUT

Allows you to set the time, after how many seconds the receiver will the stop the internal synchronization after the transmitter has stopped sending signals (In seconds from 6 to 99seconds, standard 30sec).

3.2.7 M-SET: LOCK

Allows you to lock the receiver menu. Also allows you to set the code needed to unlock the menu.

3.2.8 M-SET: SYS

Allows you to change the systemaddress of the receiver.

3.2.9 M-SET: SYSTEM RESTORE DEFAULT

This menu item allows you to reset the device to factory settings, and deletes the show.

3.2.10 M-SET: RADIO PROG

Allows you to set whether the device can be programmed via radio (ON). If this option is set to "OFF", the device can't be saved onto the transmitter.

3.2.11 M-SET: AUTO LOAD

Allows you to decide if the device may charge automtically after an ignition. Usually, this option is set to ON.

If the Auto Load option is set to OFF, the device will pressurize only after receiving a signal to do so. Even after an ignition, like with channel 2 (Main flame with 0,5sec.), after which the device would usually charge again, it won't do so with the Auto Load set to off. Charging would need to be done manually, like using channel 26 (start charging routine).

3.2.12 M-SET: NITROGEN

Here you can set whether you want to use nitrogen to pressurize the system (ON), or not (OFF).

If it is set to OFF, then the Power Flame will only use the pressure of the gas bottle itself. This can lead to variations in the flame height, or general usage of the Power flame, due to the pressure of the gas bottle, and if it should be too low.

3.2.13 M-SET: IGN DELAY

Allows you to set the delay between the pilot flame, and the main flame. The standard setting is 500ms. We recommend changing this value only after consulting with our personnel.

3.2.14 M-SET: PRESSURIZE 21GAS

This setting is currently irrelevant to the user. It should be left at the standard value of 5sec.

3.2.15 M-SET: REFILL 22TANK

This setting is currently irrelevant to the user. It should be left at the standard value of 5sec.

3.2.16 M-SET: PRESSURIZE 23TANK

This setting is currently irrelevant to the user. It should be left at the standard value of 5sec.

3.2.17 M-SET: PRESSURIZE 23TANK

This setting is currently irrelevant to the user. It should be left at the standard value of 5sec.

3.2.18 M-SET: GROUPBOX

This sub menu allows you to set up to ten different group boxes. The group box is a box number allowing you to control the device with manual ignitions in addition to its regular main box number.

Since all devices with the same box number will ignite at the same time, this allows for easy setting of device groupings for manual ignitions.



3.2.18.1 EXAMPLE



	A	B	C
Main box	10	11	12
Group Box 1	15	15	15
Group Box 2	16	16	17
Group Box 3	18	17	18

In the example above, every Power Flame has its own main box. This is the standard box number of the device, which allows for manual and automatic ignitions.

In addition, group boxes can be assigned, allowing for manual control. This way, ignitions of box 15, will activate all devices at the same time. Box number 16 will only activate device A and B.

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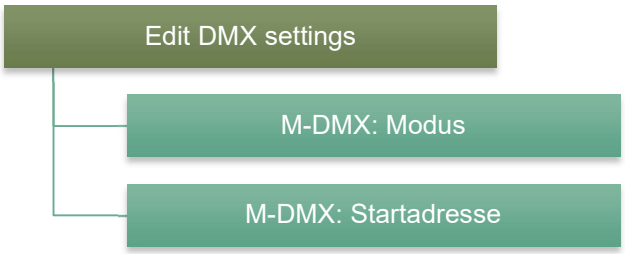


Group boxes can only be used for manual control, and can't be used in automated shows.

3.2.19 M-SET: WARNINGS

Allows you to set if the Power Flame should give you warnings (ON), or not (OFF). We recommend leaving this option set to ON, since the warnings cancel the use of the Power Flame, but can give you important feedback about the status of the device.

3.3 DMX-SETTINGS



3.3.1 M-DMX: MODUS

Allows you to toggle the DMX-mode of the device "ON" or "OFF".

3.3.2 M-DMX: STARTADRESSE

Allows you to set the starting address of the first DMX channel from 1 to 507 (Standard 1). The five followong channels are always reserved for the different DMX functions.

3.4 RELOAD SETTINGS



The adjustable values in the Reload-Settings should only be changed after consulting our personnel. Should these values have been changed, you can find the standard values in the brackets above.

4 PREPARATION BEFORE AND AT THE SHOW LOCATION

4.1 PLANNING THE SHOW

A successful show begins with planning. We recommend giving some thought to these points:

Planning checklist
Is the use of the Power Flame allowed at the location?
Can the neccessary safety distances be adhered to?
How many devices can and do I want to use?
Optional: Planning an automated show (only for radio control).

4.2 PREPARING THE DEVICES FOR THE SHOW

In order for the gas hose not to be forgotten in storage, we recommend to check for the following, before driving to the location:

Checklist for the show preparation
Do I have the correct amount of devices with me?
Do I have enough gas- and nitrogen hoses with me?
Do I have all power cables with me?
Do I have all external connectors with me?
Are the ignition electrodes clean and in the correct position?
Do I need further accessories? (connection cables?)
Do I have the needed controllers with me and programmed?
Do I have enough gas- and nitrogen bottles with me?

If these questions can be answered with YES, you are one step closer to a successful show.

4.3 VERWENDUNG UND POSITIONIERUNG DER GASFLASCHEN

The general safety guidelines for the usage with gas, as well as the instructions on the safety datasheet of the used gas are to be adhered. Generally propane is heavier than air, so it should not be used in unventilated areas, ground indents (deeper than 30cm) or near waste pipes. Especially near cellars, an ignitable gas-air mixture can appear. Only use CO^2 extinguishers to extinguish flames.

Since the Power Flame uses the liquid phase of the gas, the usage of gas bottle with riser pipes is needed. The bottles themselves need to be placed atop firm ground, and be protected against accidental tipping.

4.4 USAGE AND POSITIONING OF THE DEVICES

The Power Flame may only be used outside. The X2 Power Wave must be placed on firm, even ground.

Generally the Power Flame must have enough distance to all living beings and objects, so that they may not be harmed or endangered by the use of the projector. The manufacturer recommends a distance of 5m in a radius around the device, and at least 20m in height to all objects and persons. Generally the distances provided by local authorities and safety personnel are to be adhered. Also note the direction of the wind when setting up your devices.

For positioning it is recommended to have the front panel face away from the audiences side.

Between the gas bottle and the Power Flame, a height difference of 25m can be made. When positioning the devices at a heightened elevation, we recommend the use of a CO2- extinguishing system directly at the device.



The Power Flame may only be used outside!

4.5 CONNECTING GAS AND NITROGEN

First, you should connect the gas hose and the gas bottle to the external connector system. The gas bottle connector is a Euro-connector with 30mm wrench width. Note that it has a left thread.

Next you can connect the nitrogen bottle via the pressure reducer (set to 10bars) and nitrogen hose with the connector system. The prepared connector system can now be connected to the Power Flame using the gas hose. Please that both the gas- and nitrogen bottle should be closed.

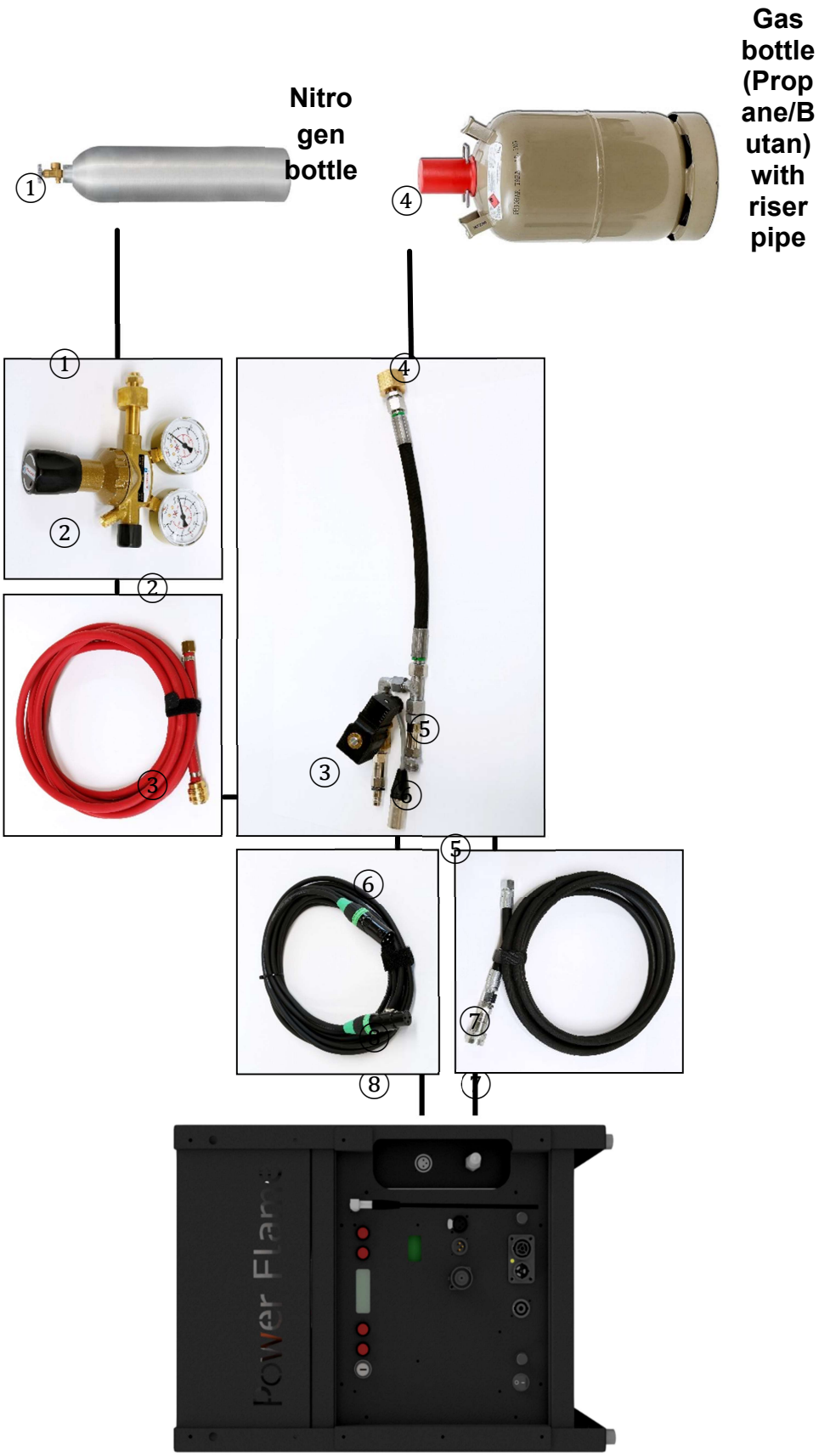
Then you can connect the solenoid valve of the connector system with the XLR connector at the Power Flame, using the provided cable.

We recommend checking the leak tightness of the whole build.



Hoses and XLR cables should be placed in such a way, that no one may stumble over them.

4.6 SETUP (GRAPHICAL DISPLAY)



4.7 POWER SUPPLY

Using the provided power cable, the X2 Power Flame can be connected to the 100V-240VAC power supply. Please note that every projector has a power consumption of 200W. The power supply should be suitable for the number of devices used. Should you use your selfmade, or store bought power cables, make sure the cable diameter is is at least 1,5mm².

With a strong lead acid battery and a sinus inverter the X2 Power Flame can also be powered without the need of a grid supply. We recommend using a separate sinus inverter with at least 500W per X2 Power Flame.

4.8 FINAL CHECK BEFORE THE SHOW

Before the show, the following should be checked once more:

Checklist before the Show
Have I made a test run?
Are all safety distances adhered?
Is the system leak tight?
Is a CO2 fire extinguisher ready for emergencies?
Can all Power Flamers be used permanently?
Can I cut the power to the devices immediately in an emergency?
Optional: Are further gas bottles ready?
Optional: Are all actors informed?
Optional: Take note of the fire detectors and extinguishers on location.

4.9 ACTIVATION

To activate the device, you must first put the wip switch itno its ON position (Labeled "I"). Next you can turn the key switch 90° right, to fully activate the device. If the key switch remains activated, the device will start normally in its last configuration after a temporary power loss. If you do not wish to use this feature, you can turn the key back to its previous setting.

After activation, the gas bottle will automatically be pressurized with the nitrogen (NG will be shown in the first line of the display).



Expert hint: If you hold the Mode/OK button during startup, the device will start in radio mode. With a held Test/ESC button the DMX mode will be activated.

4.10 MAIN DISPLAY

After activation, the following will appear on the display, showing the most important informations.



Line 1 will show the Device number, as well as the current mode of the device. Further to the right you will see if a valve is activated (N = nitrogen valve, G = gas valve, T = tank valve)

Line 2 shows the set main box number, and the pressure in bars. Should an error occur during the use, a warning will also appear here (Warning 1-4).

5 FUNCTION TESTS BEFORE THE SHOW

Before usage, different aspects of the projector should be checked. Detailed informations for the needed controls can be found in the correlating chapters of the control options.

The following steps should be taken to make the test run:

Testroutine before use	
1	Prepare the device as mentioned in previous chapters.
2	Note safety hints.
3	Check if the pressure relief valve is closed.
4	Switch the device armed. (Check pressurization)
5	Ignite pilot flame (Check pilot flame)
6	Make a test shot. (Check main flame)
7	Check afterburn of the pilot flame.
8	Set device back in test mode.



The device should not be used further if the pilot flame does not ignite.

6 CONTROLING THE POWER FLAME - GENERALS

Generally, the X2 Power Flame has been fitted with a radio module which allows for control with an Explo transmitter. Ideally a TX2-70K, which features 10 spare buttons that can be freely programmed.

Via the built in 3 pole XLR connectors, the Power Flame can be controlled with a fitting DMX controller.

A benefit of the radio control is the fast execution of the predefined sequences, that can't be done via DMX. This is due to the time needed for the DMX signals to be interpreted by the machine. Furthermore, the device can be easily added into a show and synchronized with other Explo devices.

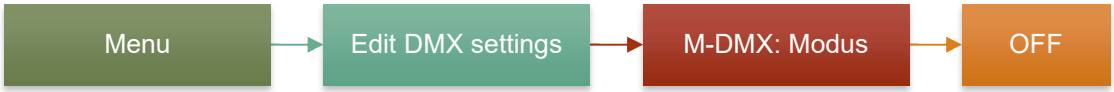
7 MANUAL CONTROL VIA RADIO

The Power Flame features a predefined set of sequences (see **attachment 1 - List of sequences**), which allow for direct use of several sequences via box and channel numbers.

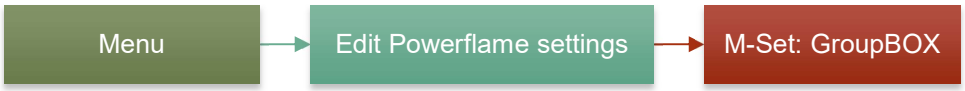
A detailed guide on how to send manual ignition signals can be found in the manual of the X2-series.

7.1 PREPARING THE MANUAL IGNITION MODE

In order for the X2 Power Flame to be able to receive igniion signals via radio control, the DMX mode must be deactivated. After switching the DMX mode off, a restart of the system is neccessary.



Further, in the GroupBOX menu you can check if the group box numbers needed for the show have been assigned:





In manual ignition mode, the Power Flame will accept any ignition command on its assigned Group box number.

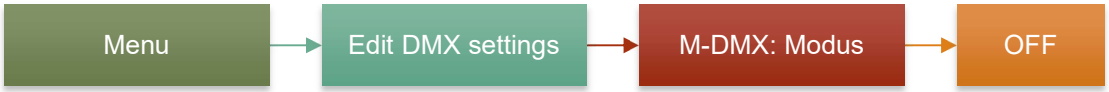
8 AUTOMATIC CONTROL VIA RADIO (AUTOSHOW)

In a fully automated show (AutoShow) you can use the predefined ignitions according to the list of sequences (see **Attachment 1 - List of sequences**). Further there is a possibilty to change the opening times of single ignitions and sequences.

Programming an automated show can be done either in the free software **AutoShow** or the separately sold software **ShowCreator X2**. We generally recommend the use of the Showcreator, since it shows you an overview of your music, and allows for perfectly timed ignitions.

8.1 PREPARING THE AUTOMATIC IGNITION MODE (AUTOSHOW)

In order for the X2 Wave Flamer to be able to receive igniion signals via radio control, the DMX mode must be deactivated. After switching teh DMX mode off, a restart of the system is neccessary.



8.2 INSERTING IGNITIONS INTO THE SHOW

The ignitions for the Power Flame can be easily added by using the Box- and Channel number. You must always use the main box of the device. For further informations about adding devices into your automatic show, please consult the ShowCreator / AutoShow manual.



In automatic ignition mode, the Power Flame will only accept ignitions made on its main box.



When first switching to armed, the usage pressure of the device will build. This can take up to 4 minutes. This should be taken into account during show design. If needed, the transmitter should be set armed earlier.

8.3 TRANSFERRING THE SHOW TO YOUR DEVICES

A detailed guide on how to transfer a show to your transmitters and receivers can be found in the X2-series manual. Note: A show created in the ShowCreator must be transferred to the transmitter via the **AutoShow X2**.

9 CONTROL VIA DMX

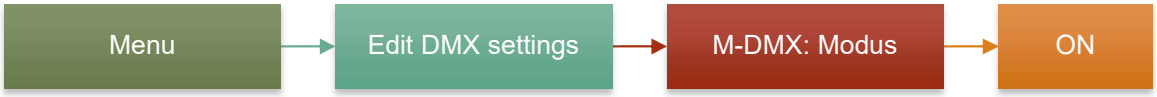
The Power Flame can be controled via DMX 512 as standard. This needs 4 DMX- channels.

9.1 PREPARING THE DMX-MODE

Check the settings for the DMX starting address. This is the address of the first channel used:



Next, DMX control must be activated:



9.2 DMX-CHANNELS

The following 4 DMX channels are used to control the Power Flame via DMX. Since the full spectrum of the channels is used (0-255), the Master knob of the DMX controler should be set to 100%.

DMX channels (DMX 512)		Used DMX-values
Channel 1 (Starting adress + 0)	Ignition	≤ 253 = no ignition 254 and 255 = ignition
Channel 2 (Starting adress + 1)	Opening time	0 = 0,5 Sec 255 = 2,5 Sec (between freely assignable)
Channel 3 (Starting adress + 2)	Ignition mode	0-84 = Pilot flame without main flame 85-170 = ignition with charging 171-255 = ignition without charging
Channel 4 (Starting adress + 3)	Usage mode	< 50 = Test mode 50-200 = Armed mode > 200 = Test mode

9.2.1 CHANNEL 1: IGNITION

The first channel (Starting adress +0) initialises the ignition. If the value of 253 has been reached, an ignition is made. The value of this channel must fall below 254, before another ignition can be made with the values 254 and 255.

	Ignition	
DMX-value	0 to 253	254 to 255
Ignition	Device won't ignite	Device ignites

9.2.2 CHANNEL 2: OPENING TIME (STARTING ADRESS +1)

The second channel (Starting adress +1) determines the opening time of the ignition. The opening time can be set from 0,5s to 2,5s. This setting has no further impact if channel 3 has been set to pilot flame without main flame.

The following formula can be used for the opening time t[ms] (the opening time must be between 500ms and 2.500ms):

$$\text{DMX value} = (t\text{-}500) / 7{,}843$$

	Opening time						
DMX-value	0	1	2	3	…	254	255
Opening time	500ms	~508ms	~516ms	~523ms		~2.492ms	2.500ms

9.2.3 CHANNEL 3: IGNITION MODE (STARTING ADRESS +2)

The third DMX channel is the ignition mode. Here you can set what type of ignition should be made. You can select the ignition of the pilot flame without the main ignition, as well as the complete ignition, either with or without charging afterwards.

	Ignition mode		
DMX-value	0 to 84	85 to 170	171 to 255
% Value	0%	50%	100%
Mode	Only pilot flame	Ignition with charging	Ignition without charging

9.2.4 CHANNEL 4: USAGE MODE (STARTING ADRESS +3)

The fourth DMX channel is the usage mode. It allows you to set whether the device is armed (DMX value 50-200). The other DMX values define the test mode. Important: The device can only ignite in armed mode.

	Mode		
DMX-value	0 to 49	50 to 200	201 to 255
% Value	0%	50%	100%
Mode	Test-Mode	Armed-Mode	Test-Mode



When first switching armed, the device will pressurize. This can take up to 4 minutes.

9.3 IGNITING THE DEVICE BY USE OF DMX

In DMX mode, the device can ignite as follows:

Test pilot flame	
1	Deactivate ignition. (CH1 = 0)
2	Select ignition mode (CH3 = 0 to 84)
3	Turn device armed. (CH4 = 50 to 200)
4	Activate ignition. (CH1 = 254 or 255)

Main ignition (with charging)	
1	Deactivate ignition. (CH1 = 0)
2	Select ignition mode (CH3 = 85 to 170)
3	Select opening time (CH 0 to 255)
4	Turn device armed. (CH4 = 50 to 200)
5	Activate ignition. (CH1 = 254 or 255)

Main ignition without charging (last ignition)	
1	Deactivate ignition. (CH1 = 0)
2	Select ignition mode (CH3 = 171-255)
3	Select opening time (CH 0 to 255)
4	Turn device armed. (CH4 = 50 to 200)
5	Activate ignition. (CH1 = 254 or 255)

10 DISMANTLING AFTER THE SHOW

After the show, we recommend taking the following steps:

Dismantling after the show	
1	Close nitrogen and gas bottles.
2	Empty Power Flame by making ignitions, without charging afterwards.
3	Once no flame is being created, set the Power Flame to test mode, and wait another minute, since some afterburn is possible.
4	Switch offPower Flame.
5	Disconnect power cable from the Power Flame.
6	Disconnect nitrogen and gas bottles.

11 STORAGE AND MAINTENANCE

The X2 Power Flamers surfaces should be cleaned after every show. A normal cleaning cloth and grain alcohol can be used to clean all outer components until no dirt is visible.

If soot settles on the ignition electrodes, they can be cleaned carefully using an old toothbrush. The cables of the electrodes should be checked periodically for any obvious damages.



The X2 Power Flame should never be stored under pressure, or in armed mode.

12 SAFETY

The Power Flame features multiple safety functions, that prevent the device from being damaged, and allow the user to adhere to specific safety measures, to protect persons and objects from harm. Further, any rest risks can be mostly prevented by adhering to the recommendations made in this manual. The following safety hints should be adhered to in any case.

12.1 SAFETY FUNCTIONS

12.1.1 STOPCOCK

Using the built in stopcock you can stop the gas supply to the device at any time manually.

12.1.2 WATCHDOG-TIMER

An internal watchdog-time constantly checks the function of the processor. Should it be Yesmmed during any ignition routine or similiar, a safety interruption of the device will occur, before a reset.

12.1.3 AUTOMATIC SAFETY CHECKS

Automatic safety checks after startup and during usage, check the device for any errors. For example, it will check whether the head is blocked (drivetest) or if the system has a leak.

12.1.4 ARMING THE DEVICE

The device can be turned armed by radio. Therefore it isn't necessary for persons to linger in the closer vicinity of the device, to arm it for use.

12.1.5 POWER OUTAGE

In case of a power outage, the device will interrupt running sequences and the show. After switching it back on again, it will do the usual startup, as long as the key switch was in the ON position. It will start in the previus mode, meaning that a device that was turned armed before the power outage, will also start up in armed mode again.

12.2 SAFETY RECOMMENDATIONS

The following safety recommendations are not compulsory, contrary to the previous ones, but should still be adhered to if possible.

12.2.1 EMERGENCY SHUT OFF

We generally recommend to use the devices with 230VAC mains voltage, and add an emergency shut off switch into the supply line, to switch them off at any time.

Optionally, a DMX switchbox, which controls the 230VAC power line, can be used as a DMX capable emergency shut off.

12.2.2 INTERRUPTING AN AUTOSHOW

To interrupt an AutoShow, the Wave Flamer must receive a "Pause", "Disarm" or "Test" signal.

12.2.3 CO2 EXTINGUISHING SYSTEM

As a further safety measure, the Power Flame can be fitted with a CO2 extinguishing system. It should be positioned in a way, that the main nozzle and pilot flame of the Power Flame are being doused during an activation.



12.3 GENERAL SAFETY HINTS

The device may only be used if it is in a proper state and well maintained. Defective devices must be checked and repaired by teh manufacturer, or other authorized person. Under no circumstances may defective devices be used.

After longer storage, the Power Flame should be checked for function and leak tightness before usage.

The devices are to be placed atop firm ground. It should be placed horizontally on the floor, and be protected against tipping.

Should any flammable materials be close to the flame direction, we recommend checking the safety distances with the local authorities and fire department.

After turning the device on, no persons may linger in the vicinity of it. All persons taking part in the show (Helpers, actors,...) are to be informed about the safety distances and basic functions of the device.

The person in charge of the devices control must have a clear sight of them at any time. Ideally via a direct line of sight, alternatively however via cameras. This person is in charge of making sure the safety distances are adhered to at any time during the show, and be able to interrupt it if needed.

If controlled via DMX, we recommend the use of an own DMX universe for the Power Waves (separating Light and effect devices).

12.4 RECOMMENDED SAFETY DISTANCES

Direction	Recommended distance
To the roof	20m (66ft)*
In a radius around the effect	5m (16,5ft)*

*) The noted safety distances are in relation to any flammable objects or the audience.

For non flammable objects, and for actors/techniciany this distance can be reduced.

When used by trained pyrotechnical personnel, the safety distance above can be reduced further, while still considering dangers and risks.

The above safety distances are recommendations. For the positioning and calculation of the distances, the user is responsible in the end. We recommend talking to someone in charge of fire safety at the location.

The safety distance should definitely be adhered to if easily flammable objects are in the direction of the ejection

13 TECHNICAL DATA

X2 Power Flame	
Measurements	405x405x566mm
Weight	25kg (without accessories)
Power supply	100VAC-230VAC / 200W
Case	Stainless steel
Fuel	Propane-/Butane gas (Bottle with riser pipe)
Radio range	800m
Effect height	Up to 16m

14 ACCESSORIES (SOLD SEPARATELY)

Optional accessories for the Power Flame	
Power connecting cable	To lead power through to the next device. Available in all lengths.
Emergency shut off	Emergency shut off switch for immediate interruption of the power supply.
Bootloader-cable	Programming cable to update the devices firmware.
Protective cover	To protect the device from splashing water.

15 DISPOSAL



This device may not be disposed of in your normal trash, in accordance with the european WEEE-guidelines. Please dispose of this device ina collecting centre for electrical devices.

Alternatively you can send your old devices to us, for a disposal free of charge.

Should you have any further questions about the correct disposal, we remain at your service.

16 SOFTWARE UPDATES

Software updates can be found at the corrsponding product site on our homepage:

http://www.explo.at/

Steps to make a software update	
1	Download the bootloader software (or alternatively the AutoShow software for the X2-series) and the drivers for the programming cable, and install them. The necessary files can be found at: https://www.explo.at/en/software/gerate-programmierung/bootloader-software.html The driver differentiates between 32-Bit (Installer x86) and 64-Bit (Installer x64) Windows systems. The type used can be found at "System".
2	Download the update file from the product page. The download link can be found under the Download header at the end of the page: https://www.explo.at/de/effektgeraete/gas/x2-Power-flame.html
3	Select the correct COM-port in the bootloader software. The COM-port can be found in the windows device manager at "Connections (COM & LPT)". The correct COM-port should be displayed as "Silicon Labs" or "Silabs", when the driver has been correctly installed.
4	Connect the X2 Power Flame by use of the bootloader cable with your PC/Notebook.
5	Open the update file with the bootloader software (File >Select File).
6	The Power Flame must be switched off.
7	Start the transfer in the bootloader softwaren (File > Upload).
8	Switch on the Power Flame, and wait until the status bar of the programming (green bar) has been fully filled. Should the green status bar not appear, it may indicate a faulty connection between the Power Flame and Computer.
9	After the update, check the software number in the menu of the device.

ATTACHMENT 1 – LIST OF SEQUENCES

After using the channels marked in red, the gas tank will automatically recharge.

Channel	Description	Time	Recharge
1	Pilot flame	1 Second	
2	Main flame with recharge	0,5 Seconds	Yes
3	Main flame with recharge	1 Second	Yes
4	Main flame with recharge	1,5 Seconds	Yes
5	Main flame with recharge	1,5 Seconds	Yes
6	Main flame with recharge	1,5 Seconds	Yes
7	Main flame with recharge	1,5 Seconds	Yes
…			
11	Pilot flame	1 Second	
12	Main flame without recharge	0,5 Seconds	No
13	Main flame without recharge	1 Second	No
14	Main flame without recharge	1,5 Seconds	No
15	Main flame without recharge	1,5 Seconds	No
16	Main flame without recharge	1,5 Seconds	No
17	Main flame without recharge	1,5 Seconds	No
…			
21	Pressurize gas bottle with nitrogen		
22	Fill gas into tank		
23	Fill nitrogen into tank (only old Power Flame)		
24	Shot without ignition		
25	Interrupt recharge		
26	Start recharge		



When using channel 24, the content of the tank will be ejected without an ignition. The gas will be ejected as is. This function may only be used in a fitting environment.