



# X2 Wave Flamer

Manual v1.3

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# Introduction

Please read through this set of instruction before operating your device. Much of the information is crucial to learning about and handling your system.

You should follow the mentioned safety and user guidelines closely.

If you have any questions, or are unclear on anything, please do not hesitate to contact us either by phone, or by email.

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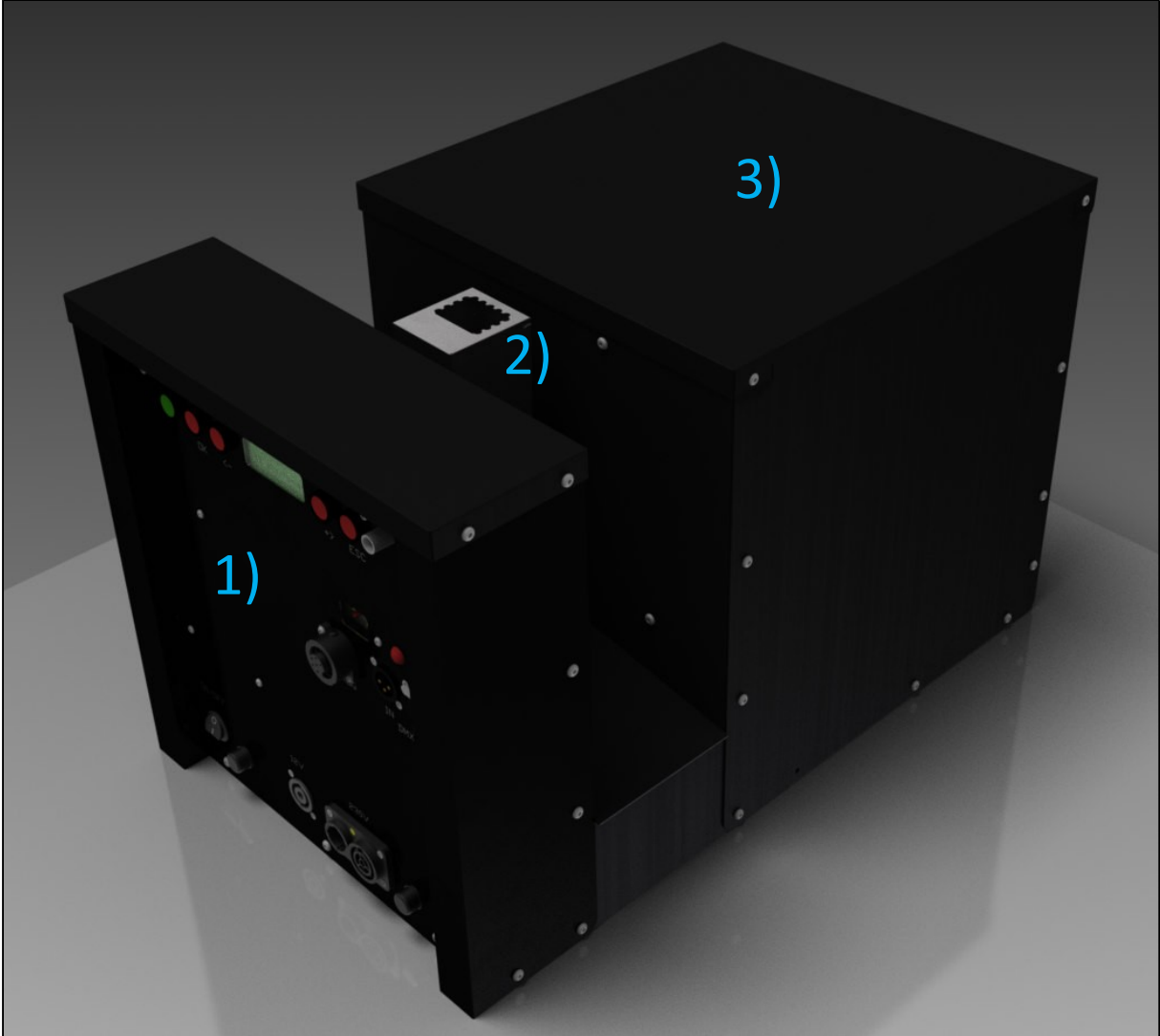
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## 2 General/Description of Components

### 2.1 Overview X2 Wave Flamer

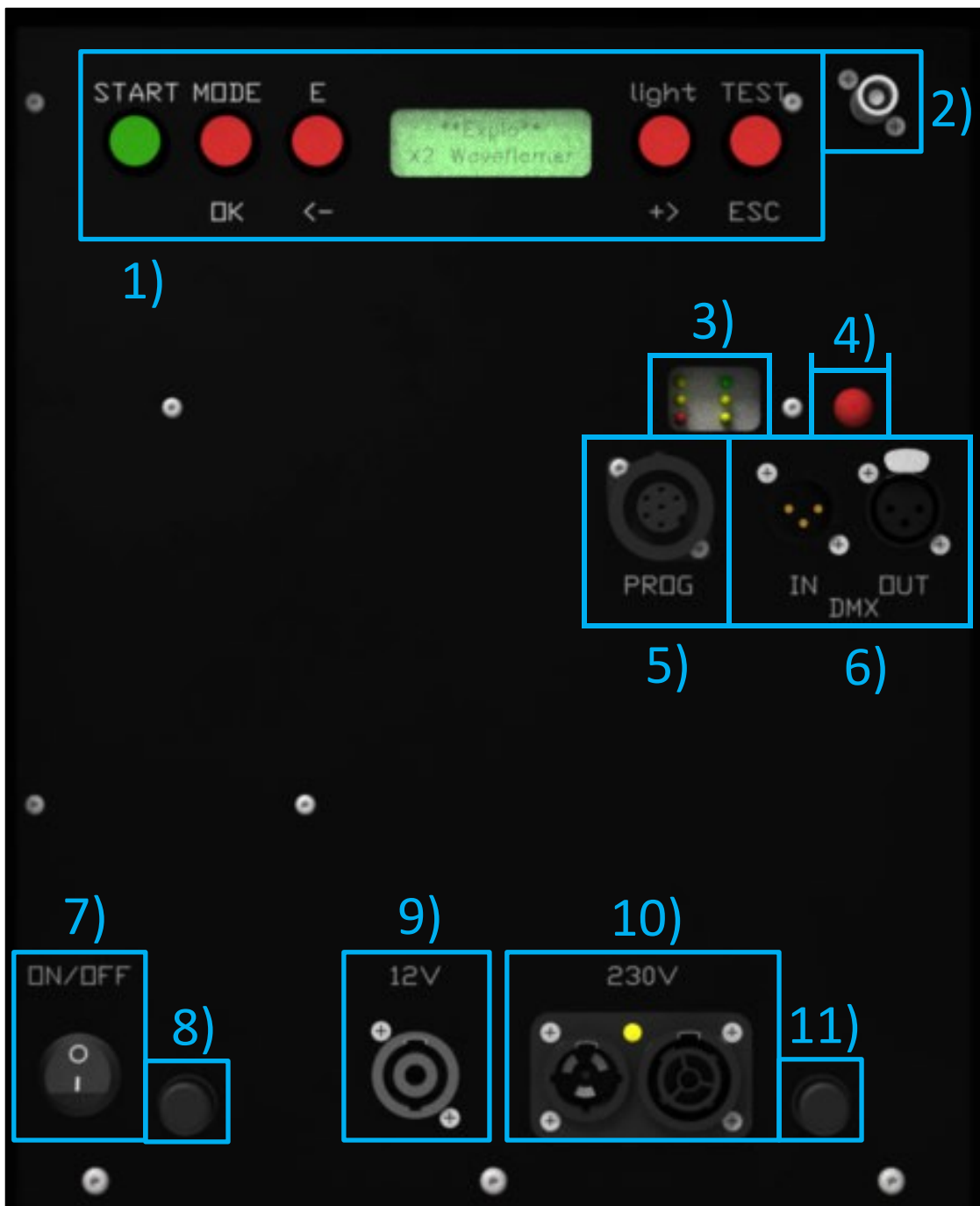


1) Controls

2) Moving Head

3) Pumping Station with  
Canister

## 2.2 Overview of the Controls



- 1) Buttons and Display
- 2) Antenna socket
- 3) Control LEDs
- 4) Status LED

- 5) Programing socket
- 6) DMX-Connectors
- 7) ON/OFF Switch
- 8) Fuse for 12Vdc


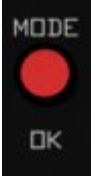
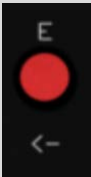


- 9) Connector for 12VDC
- 10) Connector for 230VAC
- 11) Fuse for 230VAC

## 2.3 Description of Front-Panel Components

### 2.3.1 Buttons and Display

The X2 Wave-Flamer is fitted with a two line LCD-Display, with background lighting. This display is the optical output for the Device Status, as well as the menu handling.

The following control buttons are available next to the Display:

	<b>Start-Button</b> This Button must be pushed after using the ON/OFF Switch, to activate the Device.
	<b>Mode/OK-Button</b> <i>Outside of the Menu</i> , this button can be used to access the Menu. <i>Inside the Menu</i> , this button is used to confirm.
	<b>Discharge/Minus-Button</b> <i>Outside of the Menu</i> , this Button is used to discharge the Pump (only in Test-Mode). <i>Inside the Menu</i> , this Button is used as Minus-Button.
	<b>Light/Plus-Button</b> <i>Outside of the Menu</i> , this Button toggles the background light on and off. <i>Inside the Menu</i> , this Button acts as a Plus-Button.
	<b>Test/ESC-Button</b> <i>Outside of the Menu</i> , a Test signal can be sent to the Transmitter to test the radio connectivity (only in Test-Mode). <i>Inside the Menu</i> , this Button is used as an Escape-Button.

### 2.3.2 Antenna socket

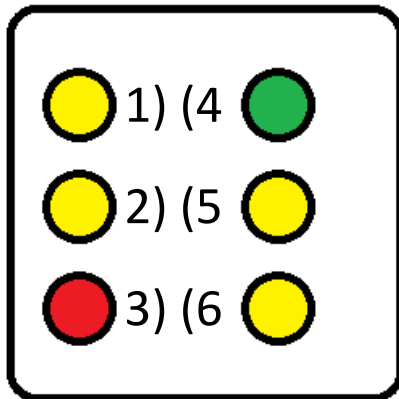
The antenna is used to receive data. To bend or clamp the antenna or antenna-cable can lead to severe damage, and should be avoided. Please make sure the antenna is mounted correctly and in an upright position during a performance, to guarantee the best possible radioconnectivity.

Wetness entering the antenna socket can drastically reduce the connectivity.



### 2.3.3 Control LEDs

The control LEDs can give you information about the status of the device.



- 1) Pump is working
- 2) Pump is at 100%
- 3) Pump Error
- 4) Battery
- 5) Radio signal
- 6) DMX

#### 2.3.3.1 Pump is working

This LED tells you if the pump is working. It should only be lit in Armed-Mode, not in Test-Mode.

#### 2.3.3.2 Pump is at 100%

This LED shows if the pump has reached the necessary pressure.

#### 2.3.3.3 Pump Error

This LED shows if there is an error at the pump. If this LED is lit, it may indicate an empty Liquid-canister. You may not use the Wave-Flamer if this LED is lit, since it may cause severe damage to the device.

#### 2.3.3.4 Battery

This LED indicates the Battery status. If it is continually alight, the voltage is okay. If it should start to flash, the device does not get enough power. If the device is powered by the 230V connection, and the LED starts to flash, this may indicate damage to one of the transformers.

#### 2.3.3.5 Radio signal

This LED flashes if the X2 Wave-Flamer receives a radio signal.

#### 2.3.3.6 DMX

If the device is fitted with DMX, and ready, this LED will be lit permanently. If the device receives DMX signals, the LED will flash for confirmation.

### 2.3.4 Status LED

Optional Status LED. In the current version of the device, it is not used.

### 2.3.5 Programing socket

This socket is used to program the device.

### 2.3.6 DMX-Connectors

Optional connectors to control the device via DMX.

### 2.3.7 ON/OFF Switch

ON/OFF Switch of the X2 Wave-Flamer. To activate, the "Start"-Button must also be pushed.

### **2.3.8 Fuse for 12VDC**

Fuse (10A delay) to protect internal electronics.

### **2.3.9 Connectors for 12VDC**

Connector for an external supply with 12VDC.

### **2.3.10 Connectors for 230VAC**

Connectors for a supply with 230V.

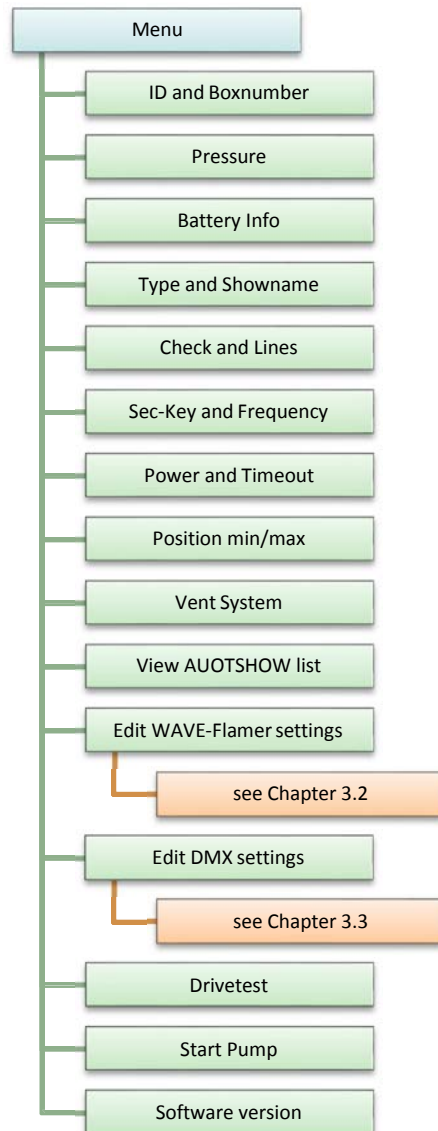
### **2.3.11 Fuse for 230VAC**

Fuse (10A delay) to protect the device.

### 3 Menu items

The menu can be entered by use of the Mode/OK-Button.

#### 3.1 Main menu



##### 3.1.1 ID and Boxnumber



Here you can see the ID-Number (line 1) and Boxnumber (line 2) of the device.

### 3.1.2 Pressure

```
PRESSURE 99% |  
3.22sek u97%
```

Shows the current pressure (100% = 10bar) of the device (line 1). In the second line, you can see the time (in sec) it took the device to reach the maximum pressure of 10bar, as well as the lowest value the pressure sank to after reaching 100% (u97% means, the device sank to 97% of the maximum pressure).

### 3.1.3 Battery Info

```
Bat12: 13.81V  
Bat24: 27.74V
```

Shows the voltage value of the 12V-supply (line 1), as well as the 24V-supply (line 2).

### 3.1.4 Type and Showname

```
TYP: RXGAS  
SHOW: new_show
```

Displays the Type of product, as it is named in the device-List of the transmitter (line 1), as well as the name of the show that is currently saved onto the transmitter (line 2).

### 3.1.5 Check and Lines

```
CHECK: 1182  
LINES: 3/15
```

Shows the checksum of the device (line 1) and the number of ignition lines of the Show that correspond to the device (line 2).

### 3.1.6 Sec-Key and Frequency

```
SEC-KEY: 139  
FREQ: 6
```

Show the used Secure-Key (line 1) and the chosen frequency of the integrated radio module (line 2).

### 3.1.7 Power and Timeout

```
POWER: 10  
TIMEOUT:30sek
```

Tells you the set radio strength (line 1) and the time, after which the show will stop when there is no incoming signal from the transmitter (line 2).

### 3.1.8 Position min/max

```
POS Min:1  
POS Max:15
```

Shows the minimal, and the maximum positions the device may use.


### 3.1.9 Vent System

```
Vent System  
ready? <--
```

This menu item can be used to vent the system. By pushing Mode/OK, you can access a sub menu, where you can make the discharge (see graphic below).

```
Hold PLUS and  
MINUS for vent <
```

If both the Plus and Minus Buttons are pushed simultaneously, the device will begin the discharge.

 <p><b>WARNING</b></p>	<p>Before venting, the pump must be activated manually (see 3.1.14). During the venting, no persons may hold clothing, and/or body parts over the head of the device.</p>
---	---

### 3.1.10 View AUTOSHOW list

```
View AUTOSHOW  
list
```

Shows every ignition line in the show that is used by this device.

### 3.1.11 Edit WAVE-Flamer settings



Edit WAVE-Flamer  
settings

Allows you to change settings of the device. See Chapter 3.2.

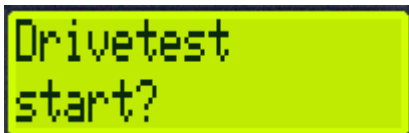
### 3.1.12 Edit DMX settings



Edit DMX  
settings

Allows you to change the DMX settings. See Chapter 3.3.

### 3.1.13 Drivetest



Drivetest  
start?

Allows you to start the "Drivetest". This Test checks if all angles can be reached by the moving head in a given timeframe. If it doesn't reach a position within the limit, it will lead to a timeout, and an error. This test is relevant if you use external batteries, whose voltage is already below the optimum value (see 3.1.3), and you still wish to check if all positions can be reached fast enough.

By pushing Mode/OK you enter a sub menu, in which the "Drivetest" can be started.




Press PLUS for  
start Drivetest

If the Plus-Button is pushed in this menu, the Drivetest will be started. During the Test, all Positions (except for Position 8, or 0°) are driven to. After the last Position has been reached (Position 15) the number of errors from 0 to 14 are displayed (see graphic below).

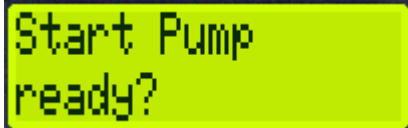


P14:20 P15:14  
Time error: 0

Errors at the Drivetest can be a sign for weak batteries. During sequences, you may be facing longer times because of this.

 <p><b>WARNING</b></p>	<p>While the Drivetest is being made, no objects may be placed in the movement zone of the Swivel Head, and the Head itself may not be touched.</p>
---	---

### 3.1.14 Start Pump



Start Pump  
ready?

Allows you to start the pump manually, and pumping of up to 100%. By pressing Mode/OK you can enter the sub menu, allowing you to start this procedure.



Press PLUS for  
Pump SYSTEM

If the Plus-Button is pushed, the system will start pumping (until 100% are reached).

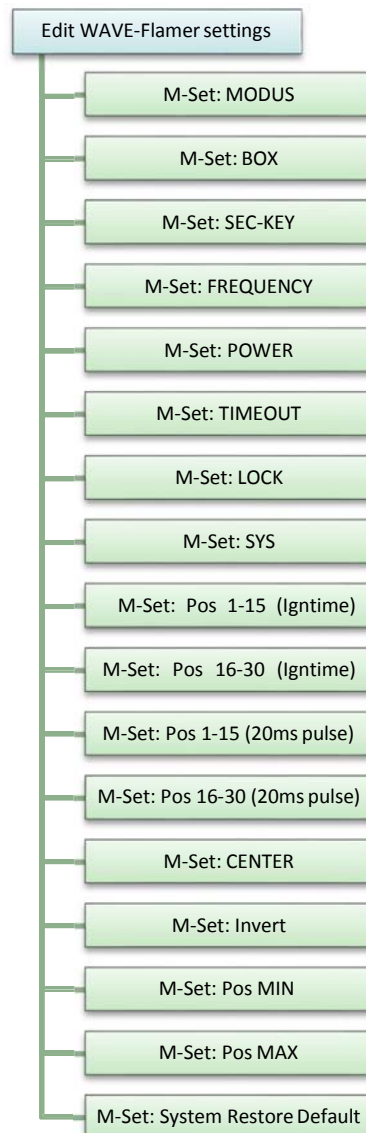
### 3.1.15 Software version



Version  
WaveFlamer v1.13

Shows the Software version currently on the device.

## 3.2 WAVE-Flamer Setting



### 3.2.1 M-Set: MODUS

Allows you to switch Modes between Test, Armed, or Sleep.

### 3.2.2 M-Set: BOX

Allows you to change the Boxnumber of the device.

### 3.2.3 M-Set: SEC-KEY

Allows you to change the Secure-Key of the device (Standard 139). The Secure-Key can be used to encode the radio transmittance inside a given System-address. Transmitters can only control devices set to the same Secure-Key.

### 3.2.4 M-Set: FREQUENCY

Allows you to change the Frequency (Standard 6).

### 3.2.5 M-Set: POWER

Allows you to change the strength of the radio module (Standard 10).



### 3.2.6 M-Set: TIMEOUT

Allows you to change the value of time, after which the device stops playing the show, if it does not receive a synchronization signal from the transmitter (set in steps of seconds from 1 to 99, standard 30). The timeout should never be below 6, since the transmitter send the synchronization signal only every 5 seconds.

### 3.2.7 M-Set: LOCK

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

### 3.2.8 M-Set: SYS

Allows you to change the System-address of the receiver.

### 3.2.9 M-Set: Pos 1-15 (Igntime)

This value should not be changed (a future Update will make use of this menu item, standard 40).

### 3.2.10 M-Set: Pos 16-30 (Igntime)

This value should not be changed (a future Update will make use of this menu item, standard 340).

### 3.2.11 M-Set: Pos 1-15 (20ms pulse)

This value should not be changed (a future Update will make use of this menu item, standard OFF).

### 3.2.12 M-Set: pos 16-30 (20ms pulse)

This value should not be changed (a future Update will make use of this menu item, standard ON).

### 3.2.13 M-Set: CENTER


Allows you to change the position of the middle (Position 8, 0°) a few degrees to the right or left (Standard acc. to factory settings). This may be useful if the device cannot be placed completely horizontal.

### 3.2.14 M-Set: Invert

If this is set to "ON", all positions (see 4.1.2) are mirrored (15↔1, 14↔2, 13↔3, 12↔4, 11↔5, 10↔6, 9↔7, 8=8).

### 3.2.15 M-Set: Pos MIN

Allows you to set from which position (1 to 15) the device may use certain sequences. Positions below the set one will not be used.

 <p><b>WARNING</b></p>	Wave-Sequences are exempt from this.
---	--------------------------------------

### 3.2.16 M-Set: Pos MAX

Allows you to set from which position (1 to 15) the device may use certain sequences. Positions above the set one will not be used.

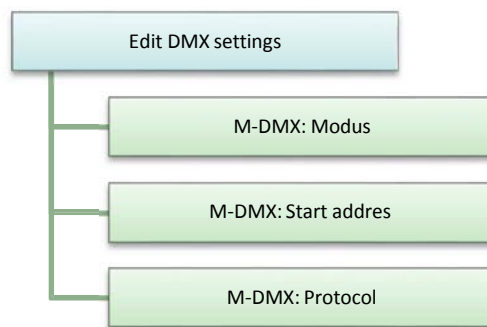


Wave-Sequences are exempt from this.

### 3.2.17 M-Set: System Restore Default

Allows you to return the device to factory settings, and delete the show.

## 3.3 DMX-Settings



### 3.3.1 M-DMX: Modus

Allows you to change the DMX-Mode between ON and OFF.

### 3.3.2 M-DMX: Startaddress

Allows you to set the address of the starting DMX-channel from 1 to 507 (Standard 1). The starting address is also used for Pyrodigit (maximum value 16, values higher than this will be set to 16 automatically when using the Pyrodigit-protocol).

### 3.3.3 M-DMX: Protocol

Allows you to select between using DMX 512 or the Pyrodigit-protocol.

## 4 Handling the X2 Wave-Flamer

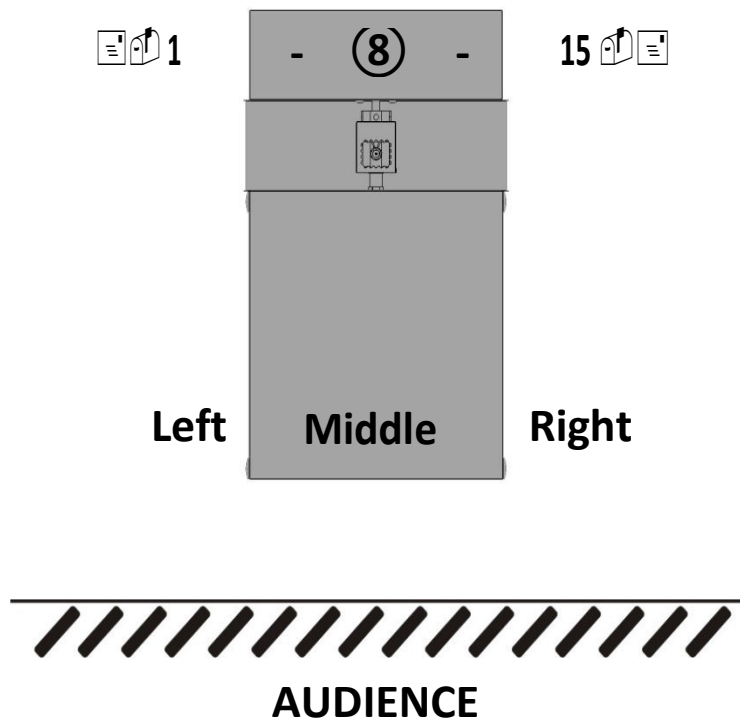
### 4.1 General

#### 4.1.1 Definition of the audience-side

Opposite of the control panel side, is the audience-side of the device. This is the side the audience should be seeing during the show.

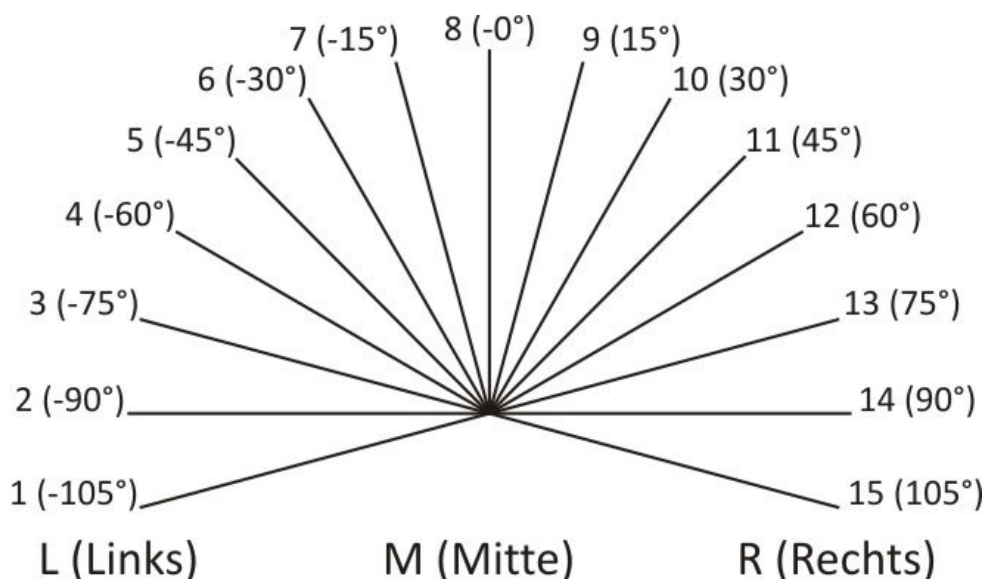
All Sequences and Positions have been made from this point of view. All important Positions for the device from 1 to 15 (see 4.1.2) as well as the movement labels left, middle and right, are only correct, if the device has been placed in this way. The following graphic shows the X2 Wave-Flamer from above, and is meant to give you an idea of the labeling.

Furthermore, a correct positioning ensures that all control LEDs are facing away from the audience, and do not bother the viewer.



#### 4.1.2 Definition of Positions

Contrary to the control via DMX, only certain positions can be accessed, except for Waves. All in all, a spectrum of  $210^\circ$  ( $\pm 105^\circ$ ) can be used. This spectrum was separated into 15 positions in steps of  $15^\circ$  for the control via radio. These 15 positions were numbered from 1 to 15, and the middle, vertical position (Number 8) defined as  $0^\circ$ . The following graphic depicts the single positions as seen from the audience side.



### 4.1.3 Drivetimes for the Autoshow

If you wish to make a flameshow that is synchronized to the music, the drive times between single ignitions must be calculated. For the V1 version, the drivetime to the next ignition is entered as a rise time. In the X2 version, the device automatically drives to the next angle of ignition, and waits there until the ignition is made. Between the ignitions, you always need to enter a higher time distance than drive time.

Angle	Drivetime
-105°	170 ms
-90°	150 ms
-75°	130 ms
-60°	110 ms
-45°	90 ms
-30°	70 ms
-15°	50 ms
0°	0 ms
15°	50 ms
30°	70 ms
45°	90 ms
60°	110 ms
75°	130 ms
90°	150 ms
105°	170 ms

#### Example Autoshow V1 or normal ignition

Channel 1 is being ignited. After the Wave Flamer has received a signal it moves to the -105° angle. This takes 170 milliseconds. After this drive, the ignition starts for about 0.11 seconds. After this, the Flamer moves to the middle position (0°) again.

#### Example Autoshow X2

Channel 1 is being ignited by use of the Autoshow. Since the Show has been pre-programmed onto the Wave Flamer, it moves automatically to the next angle of -105°. You do not need to enter a rise time during show creation. After this drive, the ignition is being made for about 0.11 seconds. Afterwards, the Flamer drives to the next angle used in the Autoshow.

## 4.2 Control via X2-Transmitter

To control the devices via radio connection, please read the instruction manual provided with the transmitter.

### 4.2.1 Sequence list

The X2 Wave-Flamer has a number of pre-made sequences, allowing you to access certain sequences with the right channel and Boxnumber. Below, you can find the different set sequences and single ignitions. Important: The times are only guaranteed if the device is supplied with 230VAC. When using (empty) Batteries, these values may change.

#### 4.2.1.1 Single ignitions

Channel	Ignition	Ign.Time	Description	Movement	Time
1	-105°	110ms(40)	Single Ignition short flame		0,11 Sec.
2	-90°	110ms(40)	Single Ignition short flame		0,11 Sec.
3	-75°	110ms(40)	Single Ignition short flame		0,11 Sec.
4	-60°	110ms(40)	Single Ignition short flame		0,11 Sec.
5	-45°	110ms(40)	Single Ignition short flame		0,11 Sec.
6	-30°	110ms(40)	Single Ignition short flame		0,11 Sec.
7	-15°	110ms(40)	Single Ignition short flame		0,11 Sec.
8	0°	110ms(40)	Single Ignition short flame		0,11 Sec.
9	15°	110ms(40)	Single Ignition short flame		0,11 Sec.
10	30°	110ms(40)	Single Ignition short flame		0,11 Sec.
11	45°	110ms(40)	Single Ignition short flame		0,11 Sec.
12	60°	110ms(40)	Single Ignition short flame		0,11 Sec.
13	75°	110ms(40)	Single Ignition short flame		0,11 Sec.
14	90°	110ms(40)	Single Ignition short flame		0,11 Sec.
15	105°	110ms(40)	Single Ignition short flame		0,11 Sec.
16	-105°	410ms(340)	Single Ignition long flame		0,41 Sec.
17	-90°	410ms(340)	Single Ignition long flame		0,41 Sec.
18	-75°	410ms(340)	Single Ignition long flame		0,41 Sec.
19	-60°	410ms(340)	Single Ignition long flame		0,41 Sec.
20	-45°	410ms(340)	Single Ignition long flame		0,41 Sec.
21	-30°	410ms(340)	Single Ignition long flame		0,41 Sec.
22	-15°	410ms(340)	Single Ignition long flame		0,41 Sec.
23	0°	410ms(340)	Single Ignition long flame		0,41 Sec.
24	15°	410ms(340)	Single Ignition long flame		0,41 Sec.
25	30°	410ms(340)	Single Ignition long flame		0,41 Sec.
26	45°	410ms(340)	Single Ignition long flame		0,41 Sec.
27	60°	410ms(340)	Single Ignition long flame		0,41 Sec.
28	75°	410ms(340)	Single Ignition long flame		0,41 Sec.
29	90°	410ms(340)	Single Ignition long flame		0,41 Sec.
30	105°	410ms(340)	Single Ignition long flame		0,41 Sec.

### 4.2.1.3 Stepp-Sequences

Channel	Ignition	Description	Movement	Time
31	Stepp from 1-15	Steppsequence short flame	L -> R	2,4 Sec.
32	Stepp from 15-1	Steppsequence short flame	R -> L	2,4 Sec.
33	Stepp 5 > 8 > 11	Steppsequence short flame	L -> R	0,58 Sec.
34	Stepp 11 > 8 > 5	Steppsequence short flame	R -> L	0,58 Sec.
35	Stepp 6 > 10	Steppsequence short flame	L -> R	0,39 Sec.
36	Stepp 10 > 6	Steppsequence short flame	R -> L	0,39 Sec.
37	Stepp 4 > 6 > 8 > 10 > 12	Steppsequence short flame	L -> R	0,9 Sec.
38	Stepp 12 > 10 > 8 > 6 > 4	Steppsequence short flame	R -> L	0,9 Sec.
39	Stepp 8 > 6 > 10 > 4 > 12	Steppsequence short flame	M > L > R > L > R	1 Sec.
40	Stepp 8 > 10 > 6 > 12 > 4	Steppsequence short flame	M > R > L > R > L	1 Sec.
41	Stepp from 1-15	Steppsequence long flame	L -> R	6,89 Sec.
42	Stepp from 15-1	Steppsequence long flame	R -> L	6,89 Sec.
43	Stepp 5 > 8 > 11	Steppsequence long flame	L -> R	1,48 Sec.
44	Stepp 11 > 8 > 5	Steppsequence long flame	R -> L	1,48 Sec.
45	Stepp 6 > 10	Steppsequence long flame	L -> R	0,99 Sec.
46	Stepp 10 > 6	Steppsequence long flame	R -> L	0,99 Sec.
47	Stepp 4 > 6 > 8 > 10 > 12	Steppsequence long flame	L -> R	2,4 Sec.
48	Stepp 12 > 10 > 8 > 6 > 4	Steppsequence long flame	R -> L	2,4 Sec.
49	Stepp 8 > 6 > 10 > 4 > 12	Steppsequence long flame	M > L > R > L > R	2,53 Sec.
50	Stepp 8 > 10 > 6 > 12 > 4	Steppsequence long flame	M > R > L > R > L	2,53 Sec.

### 4.2.1.4 Wave-Sequences

Channel	Ignition	Description	Movement	Time
51	Wave 5 --> 11	Wavesequence middle	L -> R	1,79 Sec.
52	Wave 11 --> 5	Wavesequence middle	R -> L	1,79 Sec.
53	BIG WAVE 1 --> 15	Wavesequence long	L -> R	3,93 Sec.
54	BIG WAVE 15 --> 1	Wavesequence long	R -> L	3,93 Sec.
55	Wave 8 --> 1	Wavesequence middle	M -> L	2,26 Sec.
56	Wave 8 --> 15	Wavesequence middle	M -> R	2,26 Sec.
57	Wave 1 --> 8	Wavesequence middle	L -> M	2,26Sec.
58	Wave 15 --> 8	Wavesequence middle	R -> M	2,26 Sec.
59	Wave 8 -->11	Wavesequence short	M -> R	1,19 Sec.
60	Wave 8 --> 5	Wavesequence short	M -> L	1,19 Sec.
61	Wave 5 --> 8	Wavesequence short	L -> M	1,19 Sec.
62	Wave 11 --> 8	Wavesequence short	R -> M	1,19 Sec.

### 4.2.1.5 Additional Sequences

Channel	Ignition	Description	Movement	Time
63	Stepp 2 > 14	Steppsequence short flame	L -> R	0,48 Sec.
64	Stepp 14 > 2	Steppsequence short flame	R -> L	0,48 Sec.
65	Stepp 2 > 14	Steppsequence long flame	L -> R	1,23 Sec.
66	Stepp 14 > 2	Steppsequence long flame	R -> L	1,23 Sec.

### 4.3 Control via DMX 512

Optionally, the X2 Wave-Flamer can be controlled by DMX 512. 6 DMX channels are needed.

#### 4.3.1 DMX-Channels

The following 6 DMX-Channels are needed for the X2 Wave-Flamer:

- Channel 1: Angle (Starting address)
- Channel 2: Speed (Starting address +1)
- Channel 3: Ignition (Starting address +2)
- Channel 4: Opening Time (Starting address +3)
- Channel 5: Program (Starting address +4)
- Channel 6: Mode (Starting address +5)

##### 4.3.1.1 Channel 1: Angle (Starting address)

The angle is the first channel (=starting address). It defines to which angle the head of the Flamer will move to. The angle can be chosen anywhere between -105° to +105° (DMX-value 0 to 255).

Since the DMX-value itself can only be a whole number, some angles must be rounded up.

The calculated DMX-value for an angle of 0° is 127.5 (rounded up 128). Using this value, the following formula can be used to calculate all other angles  $\varphi$  (in degrees). Please always note the prefix of the angle:

$$\text{DMX Value} = 127,5 + (\varphi \cdot 1,2143)$$

To calculate a DMX value in percent, the following formula must be used:

$$\% \text{ Value} = \text{DMX value} \cdot (100/255)$$

Below you can find some examples for the DMX value of an angle.

Channel	Angle	DMX	DMX (%)
1	-105°	0	0%
2	-90°	18	7%
3	-75°	36	14%
4	-60°	54	21%
5	-45°	73	28%
6	-30°	91	35%
7	-15°	109	42%
8	0°	128	50%
9	15°	146	57%
10	30°	165	64%
11	45°	183	71%
12	60°	201	78%
13	75°	219	85%
14	90°	237	92%
15	105°	255	100%

#### 4.3.1.2 Channel 2: Speed (Starting address +1)

The second channel (starting address +1) defines the speed of the device. It can be set anywhere from DMX value 0 to 255. (Standing still to full speed).

The speed is in relation to time, and not power. This leads to a better synchronization of the Flamers. This setting is not affected by "Fading", since a synchronization can only be measured from a distance of about 8-9 DMX values (Channel1).

#### Example of a constant Wave

1. Drive to starting point(CH1 Angle = 0, CH2 Speed = 255, Ch3 Ignition = 0)
2. Once the starting point has been reached, set CH2, speed (Ch1 Angle = 0, CH2 Speed = 50, Ch3 Ignition = 0)
3. Set end point and ignition (CH1 Angle = 255, CH2 Speed = 50, Ch3 Ignition = 255)
4. The device will now make a constant move to the end point and ignites.

If the Flamer should fade, you must set a DMX-value of 255.

	Speed		
DMX-value	0	1 to 254	255
Speed	stop	Incremental of speed	Max. Speed



#### 4.3.1.3 Channel 3: Ignition (Starting address +2)

The third channel (starting address +2) activates the actual ignition. If the DMX value on this channel is higher than 253, the projector will ignite. The DMX-value of this channel must fall below 254, before an ignition can be made again with the values 254 and 255.

	Ignition	
<b>DMX-value</b>	0 to 253	254 and 255
<b>Ignition</b>	Device won't ignite	Device ignites

#### 4.3.1.4 Channel 4: Opening time (starting address +3)

The fourth channel (starting address +3) indicates how long the opening time should be. The opening time can be selected in steps of 10ms, to 2540ms (2,54s) using the DMX-values from 0 to 254.

The DMX-value 255 allows a permanent ignition. This ignition ends if the value drops below 254, at the latest after 2,5 seconds.

The following formula can be used to calculate the opening time t[ms]:

$$\text{DMX value} = t / 10$$

	Opening time						
<b>DMX-value</b>	0	1	2	3	...	254	255
<b>Opening time</b>	0ms	10ms	20ms	30ms	...	2540ms	permanent

#### 4.3.1.5 Channel 5: Program (Starting address +4)

The fifth channel (starting address +4) allows you to ignite one of the predefined sequences. Three DMX-values can be used for one of the ignition channels from the sequence list (see 4.2.1). The values 0 to 2 are unused; the first sequence (Ignition channel 1) starts with the DMX values 3 to 5.

The following formula can be used:

$$\text{DMX value} = 2 + \text{Channelnumber} \cdot (255/100)$$

The following formula can be used for the % value:

$$\% \text{ value} = \text{Channelnumber}$$

	Program / Ignition channel						
<b>DMX-value</b>	0 to 2	3 to 5	6 to 7	8 to 10	11 to 12	...	179 to 181
<b>% value</b>	0	1	2	3	4	...	70
<b>Ign. channel</b>	N/A	1	2	3	4	...	70

#### 4.3.1.6 Channel 6: Mode (Starting address +5)

The sixth DMX channel is the Handling Mode. It allows you to set the device into Armed-Mode (DMX-value 50 to 200). The other DMX values are the Test-Mode. Important: The device can only make ignitions in Armed-Mode.

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

#### 4.3.2 Steps to use the device with DMX-protocol

1. Set angle to 0° for safety reasons (Channel 1 to DMX-value 128)
2. Turn device Armed (Channel 6 to DMX value 50 to 200)
3. Select opening time of ignition or sequence ( Channel 4 or channel 5)
4. Select angle (Channel 1)
5. Activate ignition (Channel 3 to DMX value 254 or 255)
6. Deactivate ignition (Channel 3 to DMX value below 254)

**Note:** When using sequences, do not activate Sequences and ignitions at the same time. First choose a sequence, then make an ignition 40ms later

In rare cases the Flamer might not ignite otherwise.

## 5 Safety

The X2 Wave-Flamer has many safety functions that protect the device from damages, and allow the user to make special safety preparations to avoid personal or property damage. You should follow all instructions set in chapter 5.3.

### 5.1 Safety functions

#### 5.1.1.1 Double solenoid valve

The device features two serial solenoid valves. Besides the standard Flame valve, an extra safety valve has been built into the device. Without electrical ignition, the valves cannot open.

#### 5.1.1.2 Mechanical Stop

A mechanical stop in both movement directions hinders the device from reaching any angles over 120° in both directions.

#### 5.1.1.3 Automatic Safety tests

Automated safety tests after switching on the device, as well as while it's running, test the system for a variety of errors. For example, a test is made whether the moving head is blocked in any way (Drivetest), or if the system has a leak.

#### **5.1.1.4 Deactivating single angles**

The X2 Wave-Flamer makes it possible to block certain angles before the show, so they cannot be driven to. This allows you to reduce any risk of damaging objects in certain angles beforehand.

#### **5.1.1.5 Turning armed**

The device can be turned armed by radio signal. Therefore, it is not necessary for any persons to linger in the devices vicinity to activate it.

Only after the device has been turned armed, will the pressure be built up. The pressure is constantly checked.

#### **5.1.1.6 Power outage**

In case of a power outage, the Device will cancel a currently running Sequence. After turning it on again, it will start the usual starting tests.

## **5.2 Safety hints**

The following Safety hints must not necessarily obeyed, but should be followed if possible.

### **5.2.1 Emergency stop button**

It is recommended to power the devices via a 230VAC power grid, and install an emergency stop button into the power cable, to make it possible to turn the device off at anytime.

### **5.2.2 Drip pan**

If the device is placed atop flammable material, or the floor must be protected, we recommend the use of a drip pan, to be placed underneath the device. The pan should collect any leaking fluids, and protect the floor.

The pan should measure at least 60x40 cm with a depth of 5cm.

### **5.2.3 Collection canister**

An alternative to the drip pan is a collection canister, into which the plastic canister is placed when filled. Such a Stainless Steel canister will be available as an accessory in the future.

### **5.2.4 Abort an Autoshow**


To abort an Autoshow, the Flamer must receive a Pause-, Disarmed-, or Test Signal. During a predefined sequence however, no signals will be received. To ensure complete safety, you should send Test signals until the flamer no longer ignites and/or lower the Timeout (see 3.2.6).

## **5.3 Safety notes**

The device may only be used when it is in maintained and working condition. Faulty devices must be checked and repaired by the manufacturer, or an official service person. Under no circumstances must faulty devices be used.

After longer storage, the devices should be checked for function, and leak tightness.

The devices must be placed atop firm ground. The device should be horizontal to the floor, and be proofed against unintentional tipping. When using a tripod, it must also be proofed against tipping.

 <p><b>IMPORTANT</b></p>	<p style="text-align: center;"><b><u>Needed Safety distances</u></b></p> <p><b>At least 15m in all projection directions of the device</b> <b>At least 5m to the other sides of the device</b></p>
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Should flammable Materials be near the ejection directions of the flamer, we recommend checking these with the local security personnel and fire fighters.

After turning the device on, no persons may linger in their vicinity anymore. All persons that are part of the show (Actors, etc...) should be informed about the safety distances, and basic functions of the device.

During the show, it is possible that small amounts of fluid can fall back to the floor. These dissipate mostly before reaching the floor however, and thus are not dangerous.

The person responsible for the control of the devices must always have clear view of these. Ideally by direct sight, or alternatively via cameras. This person must be aware of the safety distances during

The show, and be able to abort the show immediately should there be danger.

When using DMX, we recommend using an own DMX-universe for the Wave-Flamer (Separating lights and devices).

Preemptively, you should always have a CO2 fire extinguisher and an extinguishing blanket near you. Take special care when filling the devices Fluid tank. Keep the fluid away from heat, hot surfaces, sparks, open fire and other ignition sources. Do not smoke!

## 6 Technical Data

Size:	560 x 330 x 360 mm (WxDxH)
Weight:	25kg (without liquid)
Usable Angles:	±105° (210° total)
Fuel:	Bioethanol 100%, Isopropylalcohol, Isobar-H, N-Butanol
Discharge rate:	ca. 50ml / Second
Flame height:	ca. 10 Meter (no wind)
Fill:	10 Liters
Power supply:	230VAC / 350W
Safety distance:	15m in all discharge directions (especially flammable items) 5m in front and behind the Flamer
Tripod:	Tripod connector 35-36mm min. 50kg load

## 7 Safety hints

The device may only be used if it is good operating condition. Defective devices must be checked and repaired either by the manufacturer, or an official partner. Under no circumstances may defective devices be used.

The devices must be placed safely on an adequate place. The device should be placed horizontally on the ground if possible.

The named safety distances and usage hints from the manual are to be adhered.

After switching the device on, no persons may linger in the danger area of the device, including all possible discharge locations. All persons working in the show are to be informed about safety distances, dangers and functions of the device.

The person responsible for controlling the Flamer should always have a direct line of sight to the device. This person must see to it that the safety distances are kept during the show, and be able to abort the show if there is danger.

When using DMX, we recommend using an own universe for the X2 Wave-Flamer, separating Lights and devices.

To extinguish, use a CO2 fire extinguisher, and keep an extinguishing blanket ready. When filling the Liquid into the Device, be very careful. Keep fuel away from heat, hot surfaces, sparks, open flames and other ignition possibilities. Do not smoke!