SAFEX

FLAME JET T T©

Version 3.5₂

DMX FLAME EFFECT GENERATOR
INSTRUCTION MANUAL

CE

SAFEX

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INSTRUCTION MANUAL SAFEX-FLAMEJETTT® (version 3.50)

Fig. A – View of "operation side"
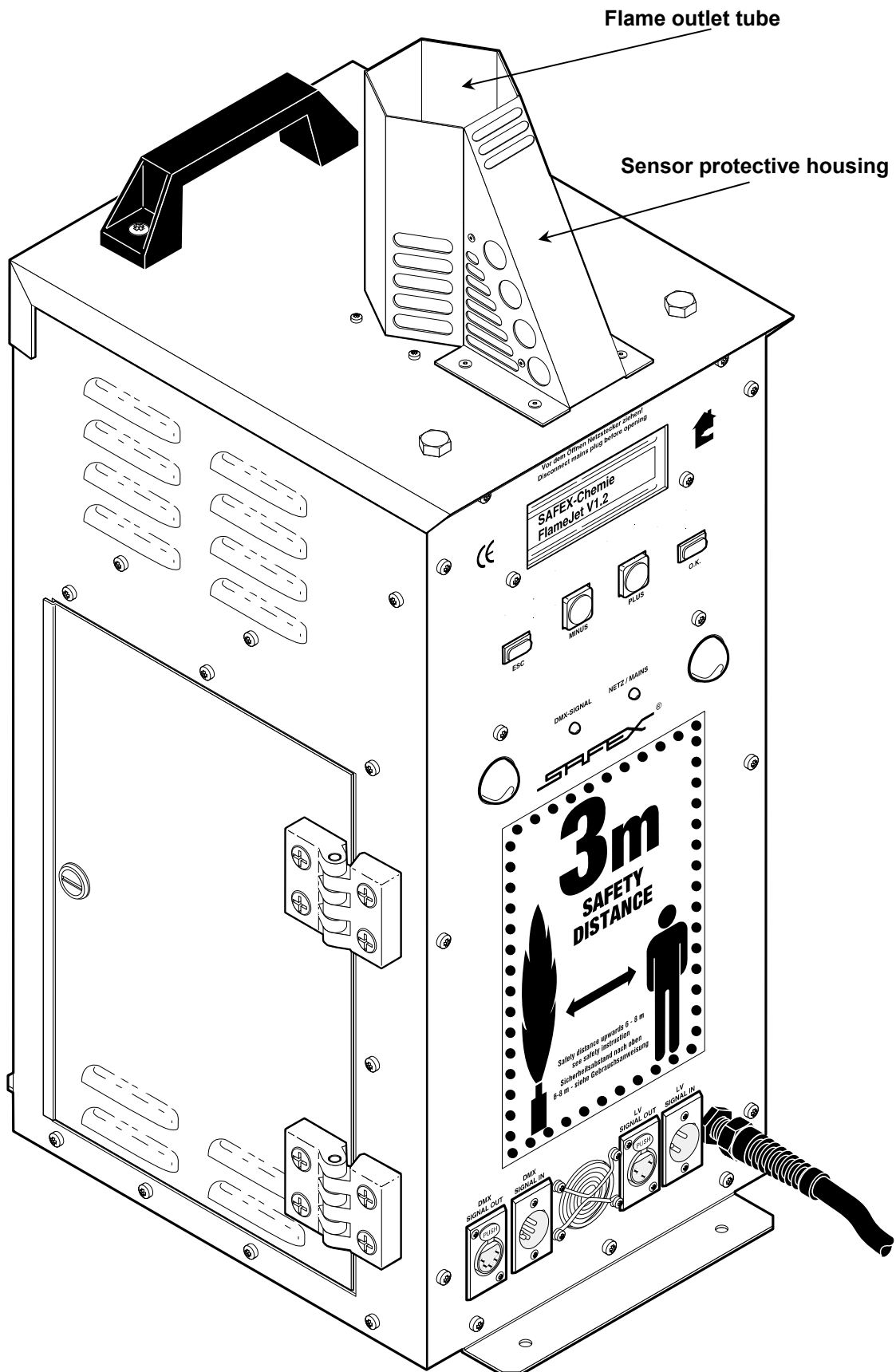
Fig. B – View of: Maintenance status "servicing of nozzle and electrodes"

Flame sensor

New electrode arrangement!
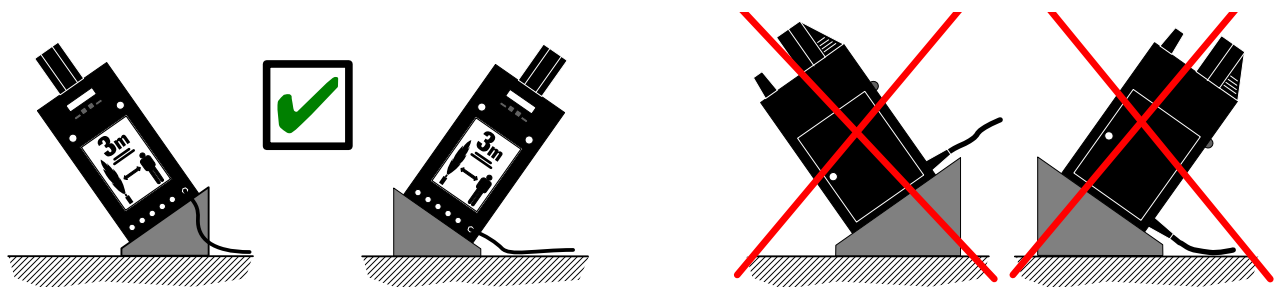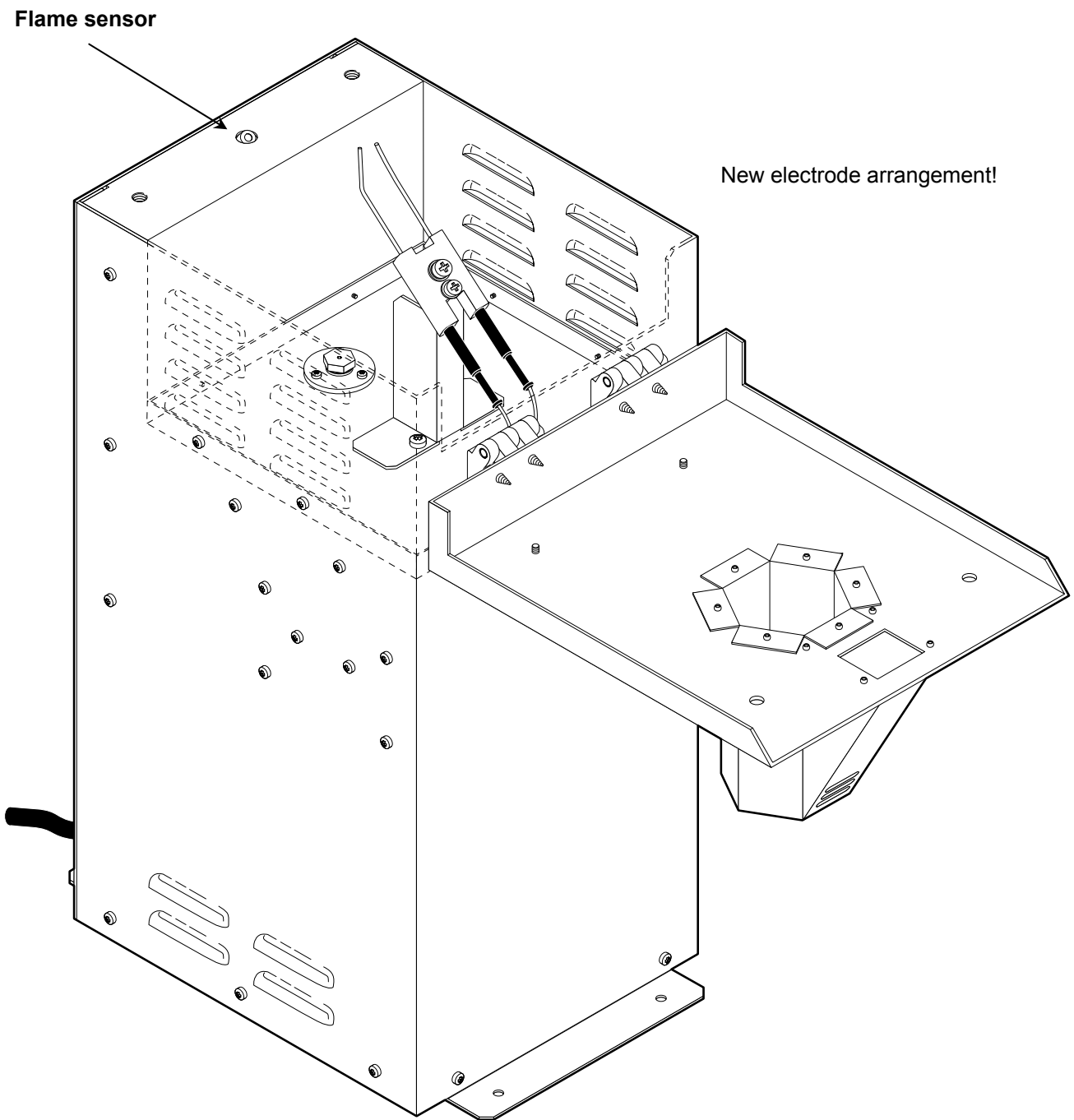
Correct and wrong positioning of the FLAMMEJETTT's for slanted flame production (s. page 29)

NOTICE ABOUT NEW SOFTWARE VERSIONS

Information for version 3.3:

- The configuration of the ignition-electrode and theirs holder has been optimised in appliance version index **"F"** (software v. 3.3 and higher). Due to this the performance when slanted flames will be produced is remarkably improved (see section SLANTWISE FLAME PRODUCTION p. 25).

- The remote control system/sockets must be selected over the menu, s. page 9. With it problems are avoided with not standard remote control leads or wrong cables.

- The system advises the cleaning of the igniting electrodes after 1500 generated flames, s. page 23.

- With attached DMX signal the system can show by using the arrow keys as additional information the **DMX signal transmission rate** arriving at the device per second **and the highest address sent by the DMX control.**

- The system reports if the flame-sensor possibly is defective.

Information for version 3.4:

- The new processor type has double memory capacity, so that now 5 display languages are contained.

- The use of a remote control system other then the preset is detected and the user will be alerted! This is serving the safety against false input-signals.

- The synchronism of all effects with "SLAVE" connected other FLAME-JETTTS is for v. 3.4 and higher ensured! For synchronism with older processor version **ask for a free update chip 3.5!**

Information for version 3.5:

- By the **option »New cartridge«** now the cartridge size can be selected. This enables the level indicator to work properly with all actual and future cartridge sizes!

- The **new option »Nozzle size«** enables the apparatus to adapt itself to the actual nozzle size, also for the internal self test.

- The **display** of the current options has been enhanced (nozzle size, remote socket etc.)

- Several safety functions have been improved, respectively enhanced to prevent operating errors and to give the user instruction for correct operation, simultaneously.

- The **sensitivity of the flame sensor** has been enhanced to prevent misinterpretation.

- In case of misfire the user is now asked to clean the electrodes and the sensor channel. By confirmation of the cleaning, the internal error counter is reset.

- The **self check has been improved.** An acoustic signal now warns the user about the test flames. Additionally the apparatus now warns in case of an interrupted self test (e.g. by disconnecting the mains). This warning is also persistent in case of disconnection of the mains.

SAFEX tries hard to approach its goal to produce the best and safest flame-effect-device. For inspiration and improvement-suggestions we are always grateful.

Schenefeld, Oct. 2008

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IN ONE WORD:

The use of a flame effect generator in meeting places, i.e. on stage or for shows involves **risks** and is therefore contingent on its responsible handling. This means that **if certain conditions/safety precautions are not** adhered to, the operation of such an apparatus or the implementation of a fire effect is associated with serious risks to the lives and health of people as well as to items of high value (buildings)!

From a safety-technical point of view, the use of the **SAFEX-FLAMEJETTT®** is therefore only justifiable if the notes on its use and safety instructions provided in this instruction manual are followed closely, the apparatus is in good condition and only operated using the intended supplies (**SAFEX-FLAMEJETTT®-CARTRIDGES**).

The very high levels of safety achieved by **SAFEX®** in the construction and development of **SAFEX-FLAMEJETTT®** cannot guarantee safe operation alone. In order to safely operate a system associated with risks, the additional **appropriate approach conforming to safety-technical guidelines must be adhered to by the user during use, maintenance and transport.**

- Therefore, please only use the effect system after you have carefully read through and understood the instructions.

- Do not instruct anyone else to use the apparatus without being sure that this person is also familiar with all aspects of its safe use and is sufficiently reliable. (Only adult, professional users should act as operators)

- If you have even the smallest doubts, then please consult an expert. At **SAFEX®** we are happy to answer your questions at any time.

- Bear in mind that the conduct of fire-hazardous actions in meeting places also requires consultation with/authorization from the body responsible for fire prevention.

Your colleagues, associates, spectators at your event, as well as the local fire service and, last but not least, your loved ones and your third-party insurance, as well as **SAFEX®** *will be thankful to you for this.*

GENERAL DESCRIPTION:

The **SAFEX-FLAMEJETTT®-EFFECT-SYSTEM** is intended for the production of **vertical and** in a restricted scope of slanted rhythmic effect-flames indoors, **but not for the production of a permanent flame** (the apparatus is not designed to simulate camp fires or open fires).

See the section on "Special uses" for its use in a slanted position or outdoors.

The system is composed of two components, the **SAFEX-FLAMEJETTT® apparatus** and the **SAFEX-FLAMEJETTT®-CARTRIDGES**, the **aerosol cartridges**. At the moment two sizes of cartridges are available: **Standard** with 500 ml und **MAXI** now with 800 ml fuel mix.

The aerosol cartridge is screwed into the receptor device with its threaded valve and thereby connected in gas-tight fashion to the atomizing system within the so-called cartridge compartment. The cartridge compartment is closed with a door, thus protecting the cartridge from external influences.

The back side (operating side) of the apparatus features a lit display exhibiting two lines, 4 programming keys, warning indicators, as well as 4 remote control jacks, a ventilation system and the power cable.

- **A remote control is always required** for the operation of the **SAFEX-FLAMEJETTT®**.

- It has been **primarily constructed for control using DMX-512** (manufacturer's setting) and requires from version 3.0 on at least two, for more complex control-tasks **3 DMX-channels.**

- However, the apparatus can also be operated using a low voltage system or using the simple **SAFEX-FLAMEJETTT® CFS-remote control system** which is available as **an optional accessory**.

The apparatus carries out an automatic self-test when it is connected to the power supply and reports its readiness for operation after approx. 20 seconds via the display. Additional it shows the selected remote control system (the chosen sockets).

There are two options available to define the production of flame effects (duration and rhythm):

- **AUTOMATIC ON** = remote control toggles only **the internal pre-programmed effect-program** ON /OFF.

The apparatus itself has different settings permitting easy pre-programming of attractive fire effect sequences **using the keys and the display**. The effect programme that has been set is then easily started or stopped using a remote control and the length and type of flame, as well as the interludes, are **fully automatic**.

- **AUTOMATIK OFF** = control of the flame effects by **external** (DMX-) **programming.**

  The **automatic effect control can be switched off** for a more complex and sophisticated "flame ballet" and all flame effects are then programmed using a DMX console (or a corresponding analogue system).

The apparatus **must always be armed 7 seconds prior to** the triggering of **the flame production** using a so-called **arming address**, after which the effects can be triggered using the (DMX-) **firing address.**

Among other errors, the apparatus detects failed ignition using special sensors, thus preventing the release of unburned fuel. Simultaneously the fluid ways and valves are tested for correct function and sealing, also during operation.

OPERATIONS (USING THE DMX CONTROL SYSTEM):

When the apparatus is (first) set up for operation, this should be done **first without the aerosol cartridge.** The apparatus should initially only be connected to a DMX remote control cable* and then to the power supply. To this end, the apparatus has a permanently connected power supply cable that is to be plugged into a standard safety contact socket (mains voltage 230 V ≈).

(For safe operation, only signal conductors that conform to the DMX 512 standard are to be employed = shielded and twisted data cables)

Based on fundamental considerations when used on stage, the apparatus should only be connected **to a power supply system that can be switched dead (current-free) immediately in the case of malfunction.** For example, this could be a simple "Schuko" multipoint connector with a two-pole mains switch that is located close to the operator in charge.

Should an electric/electronic malfunction occur using this system, then it is possible **at any point in time** to switch the apparatus dead and thereby without risk.

Correct connection to the power supply – *the triggering/control system should initially not be activated, with DMX signals etc. set to "zero"* – is indicated by the lighting up of the green LED on the back of the apparatus and the display above it.

This signals readiness by showing the program version number,

```
┌─────────────────────────┐
│ SAFEX CHEMIE            │
│ Flame Jet VX.XX         │
└─────────────────────────┘
```

then, after 2.5 sec. by showing   and then after 7.5 sec. by showing system check.

```
┌─────────────────────────┐      ┌─────────────────────────┐
│ System Check            │      │ System Check            │
│                         │      │ ■■■■■■■■■■■■■■■■■■■■      │
└─────────────────────────┘      └─────────────────────────┘
```

If a remote control is already connected and an **ARMING-signal** is transmitted **illegally/ accidentally** (e.g. if another DMX device is activated that has the same address like the preset arming address) immediately the following error message occurs, for safety reasons:

```
┌─────────────────────────┐              ┌─────────────────────────┐
│ Wrong                   │    and       │ Arming time             │
│ firing command!         │              │ expired                 │
└─────────────────────────┘              └─────────────────────────┘
```

In this case you have to

- set the corresponding DMX channel to zero, or

- unplug the DMX plug from the apparatus, or

- change the ARMING ADDRESS of the apparatus. (Like described in »Setting the DMX addresses«)

By first disconnecting the remote control plug or the mains safety is gained. Afterwards the ARMING-address can be **displayed** by use of the arrow keys **and changed** in the programming mode.

Finally the display shows the chosen remote control sockets:

```
R-Control Socket          R-Control Socket
DMX (5pol.)        or     LowVolt (3pol.)
```

In case of a connected remote control which is different to the selected remote control system an error message occurs instead:

```
Wrong remote-            preset!
control input
```

The apparatus then checks the internal pressure, (even with an empty or no aerosol cartridge the system can still have pressure!). But if the following message appears, it has to be checked if the cartridge is absent or empty:

```
No pressure!
Can empty?
```

If this is correct, this message must be confirmed by pressing the O.K. key.

Afterwards the status display shows **the options** given during the last use, for example:

```
Can cont.: min.          Can cont.: min
Flame:3 pause:4     or   auto Off FD 50%
```

```
Can size:                Nozzle size:
Standard            and  Nozzle 3
```

```
Automatic ON             SN: A 9900058
                    and  BJ:    08/2006
```

The arrow keys can be used to access further information on current settings.

(e.g. DMX addresses or temperature in the cartridge container, program version and serial number and if connected the data rate of the DMX SIGNAL and the max. received DMX address).

```
SN: A 9900058
BJ:    08/2006
```

SETTING / PROGRAMMING THE APPARATUS

The basic settings should be made first, e.g., the user language or the corresponding DMX addresses (arming-, firing- and if desired the **F**lame **D**uration **C**hannel = **FDC**).

Programming Mode

To access the **programming mode**, the two respective outside keys **"ESC"** and **"O.K."** must be pressed **simultaneously for approx. 3 seconds** until the display switches to the programming mode (2 x signalling tone).

```
programming mode
```

Once the keys have been released, the display switches to:

```
select option ↔
automatic on/off
```

and **shows always the last option selected**.

Different options can now be selected within the programming mode using the **arrow keys** (plus and minus). If, however, **no key is pressed within 30 seconds**, then the display leaves the programming mode and **returns to the standard display**.

Once **an option has been fixed** this must generally be confirmed with **"O.K."**, after which the display switches back into the options **selection** (last option), providing access to other options.

Options are **accepted immediately by the apparatus** once the **"O.K."** key has been pressed, thus making them operative. An option can be left or the programming mode can be terminated at any point in time using the **"ESC"** key. Alternatively, the apparatus will leave an option or the programming mode **of its own accord after 30 seconds** if no keys are activated during this time.

Alternatively, the programming-mode can be left (instead of using key ESC) also by the arrow-buttons selecting the option »Finish/quit«**.**

```
select option ↔
Finish/quit
```

(The apparatus can only be armed once the programming mode has been terminated!)

Setting the Display Language

The option **"language"** must first be selected if the manufacturer's setting **"German"** is to be changed to **"English"** or **»Française, Nederlands, Espanol«**.

```
select option ↔
Language
```

Chose English etc. by using the arrow keys.

```
select Language          select Language
English           or     Francaise
```

Confirm entry using the O.K. key. The following message will appear for a few seconds on the display:

```
select Language
confirmed
```

The display then switches back to the options menu.

Selecting remote control system/sockets

The device is factory set for the use with **DMX** remote control; that is for the use of the standard-compliant 5-pole sockets on the left side at the operating side.

User witch want to operate the SAFEX-FLAMEJETTT® with low voltage- (LV) remote control e. g. with the SAFEX FLAMEJETTT®-CFS remote control, have to use the 3-pole XLR sockets on the right side (LV SIGNAL IN/OUT).

For safety reasons the system shows after connecting to mains voltage which remote control input is predefined:

```
R-Control Socket         Remote Control ↔
DMX (5pol.)       or     LowVolt (3pol.)
```

In case of an already connected remote control which is different to the selected remote control system for safety reasons the following error message occurs instead:

```
Wrong remote-            preset!
control input
```

To correct this, either the correct remote control can be connected or the preset remote control socket can be changed in the programming mode.

To do this change to programming mode and select the option

```
select option ↔
R-Control Socket
```

with the arrow keys and confirm with OK. The display shows:

```
┌─────────────────────────┐        ┌─────────────────────────┐
│ Remote Control ↔        │   or   │ Remote Control ↔        │
│ DMX (5pol.)             │        │ LowVolt (3pol.)         │
└─────────────────────────┘        └─────────────────────────┘
```

The desired option must be chosen with the arrow keys **and confirmed with OK.**

```
┌─────────────────────────┐
│ Remote Control ↔        │
│ confirmed               │
└─────────────────────────┘
```

(The chosen option can be displayed at any time, too in the normal mode by using the arrow keys.)

Setting DMX Addresses

If the apparatus has not yet been set to the required DMX addresses or should these need to be changed, then select the option **"DMX addresses"** using the arrow keys

```
┌─────────────────────────┐
│ select option ↔         │
│ DMX-Address             │
└─────────────────────────┘
```

to first set the **ARMING ADDRESS**, e.g.:

```
┌─────────────────────────┐
│ Arming addr.:           │
│ 16                      │
└─────────────────────────┘
```

The available **numbers range from 1 to 512**. Choose the desired numbers using the arrow keys and confirm **with the O.K. key,** the display immediately shows then:

```
┌─────────────────────────┐
│ Arming addr.:           │
│ confirmed               │
└─────────────────────────┘
```

If the confirmation doesn't take place immediately, the appliance asks for the O.K.-confirming after some seconds:

```
┌─────────────────────────┐
│ Arming addr.:           │
│ Press OK                │
└─────────────────────────┘
```

The display then reverts back to the address setting mode, now enabling the setting of the **"FIRING ADDRESS"**. Now select the firing channel address in the same way as before, e.g.

```
┌─────────────────────────┐
│ Firing addr.:           │
│ 17                      │
└─────────────────────────┘
```

This must also be **confirmed with O.K.**.

```
┌─────────────────────────┐
│ Firing addr.:           │
│ confirmed               │
└─────────────────────────┘
```

The display then reverts back to the setting mode again, now enabling finally the setting of the **"FLAME DURATION ADDRESS"**.

This third DMX-Address is then necessary, if not the flame and pause values defaulted in the Automatic mode will be used, but by DMX-programming very short flame effects, e.g. fireballs (shorter than 0.4 sec.) should be generated. For longer flame effects the address can also be set to 0 = "OFF". See for this section PRODUCING THE EFFECT FLAMES + USER-DETERMINED DMX EFFECT PROGRAMMING)

Adjust again the desired numbers with the arrow keys, e. g.:

```
┌─────────────────────────┐
│ FDC address: 22         │
│                         │
└─────────────────────────┘
```

Confirm this with **O.K.**

```
FDC address:
confirmed
```

The display then shows the successfully set addresses once again:

```
Arming-Addr.: 16
Firing-Addr.: 17
```
```
FDC address: 22
```

and returns then automatically into the programming mode for further option-settings.

Automatic Setting ON/OFF

The automatic return to the options mode now allows you to switch the **"AUTOMATIC" MODE** for the flame effects on or off.

```
select option ←→
automatic on/off
```
```
Automatic on ?
ESC=Off OK=On
```

By pushing the ESC or OK- key select the desired option. The display immediately shows the corresponding result on the programming mode:

```
Automatic on ?
→ Automatic on
```
```
Automatic on ?
→ Automatic off
```

If the programming mode has been left, the standard display shows:

with automatic system **OFF** e. g.**:**   with automatic system **ON** e. g.:

```
Can cont.: min
auto Off FD 50%
```
or
```
Can cont.: ▓▓▓▓▓
Flame:5 pause:10
```


Automatic Mode ON

A choice can be made between small, very short fireballs or a longer lance like darting flame through the determination of two parameters, namely the length of flame production and the time lapse between them, the interval ("FLAME" and "PAUSE"). The type of flame effect is determined by the length of the flame impulse (7 shorter, preset impulse times are available besides a free setting up to 10 sec.).

If the interval is set to infinity (value ∞) and only the length of the flame impulse is entered, then only one flame of the desired length or shape is produced upon activation of the firing channel. The flame signal must be triggered again to repeat the production of the same kind of flame. If, however, a time interval (10 shorter time intervals and infinity are available) is set, then the apparatus automatically repeats the flame effect **after the interval that has been set** and for as long as the firing channel is activated.

Setting of Flame Duration

The length or duration of the flames can be set to between 1 and 7. With the standard nozzle nr. 3 the lowest **value 1** produces a **short, relatively round flame**, the highest **value 7** a **longer, high darting** or columnar flame **that lasts for approx. 0.9 seconds**.

```
select option ←→
Flame/pause
```

The **"FLAME VALUE"** is set by means of the arrow keys in the same way as the addresses and then confirmed with O.K.

```
Flame value:
4
```
```
Flame value:
Press OK
```

```
┌─────────────────────────┐   ┌─────────────────────────┐
│ Flame value:            │   │ Flame value:      4     │
│ confirmed               │   │ Pause value:      3     │
└─────────────────────────┘   └─────────────────────────┘
```

Setting the Interval

The length of the interval between the individual flames determines the strength of effects. Therefore, the **"PAUSE VALUE"** should be set next. The selection of 10 time intervals and infinity is available.

Pause value 1 is a **very short interval, value 10** represents the **longest interval** between the individual flames (see also table in the section: "User-determined effect control").

The value **"infinity ∞"** is also available in addition to the fixed pause values. This is a special feature that **prevents the flame effect from being repeated**, i.e. the **interval is, as it were, infinitely long**. To repeat the flame effect that has been set like this, **the firing signal must be switched off and then on again** for this setting.

For all pause values (1 to 10), the flame effect is automatically repeated in accordance with the pause value so long as the firing signal is active!

In programming mode by the option:

```
┌─────────────────────────┐
│ select option ←→        │
│ Flame/pause             │
└─────────────────────────┘
```

the pause value is adjusted by the arrow keys

```
┌─────────────────────────┐   ┌─────────────────────────┐
│ Pause value:            │   │ Pause value:            │
│ 6                       │   │ Press OK                │
└─────────────────────────┘   └─────────────────────────┘
```

and confirmed with O.K. Now the system displays:

```
┌─────────────────────────┐   ┌─────────────────────────┐
│ Pause value:            │   │ Flame value:      4     │
│ confirmed               │   │ Pause value:      3     │
└─────────────────────────┘   └─────────────────────────┘
```

Once the basic settings have been made for the apparatus, it should be disconnected from the mains and the **SAFEX-FLAMEJETTT®-CARTRIDGE** inserted.

INSERTION OF THE FLAMEJETTT®-CARTRIDGE (aerosol cartridge)

Attention, important note:

*The **SAFEX-FLAMEJETTT®** is **designed to be used exclusively with SAFEX-FLAMEJETTT®-CARTRIDGE aerosol cartridges (Type 4S13.xx)**.*

*These contain a special combustible fuel mixture and have a release valve that is technically __not identical to usual gas cartridges__. **Gas cartridges** not only produce **no** effect with the **SAFEX-FLAMEJETTT®**, but can also **be damaged** when they are screwed into the **SAFEX-FLAMEJETTT®** and subsequently **not be gas-tight** (danger of escaping gas and potentially an explosion)!*

The **SAFEX-FLAMEJETTT®-CARTRIDGE** (Standard*) has a volume of [650] 500ml and contains approx. 306,5 g of combustible fuel mixture. It is furnished with a protective cap for the protection of the release valve. This cap must be **removed only immediately prior to insertion** of the aerosol cartridge into the apparatus.
(*Alternatively the MAXI-CARTRIDGE with now [800] 720 ml = 441 g combustible fuel mixture is available)

The **cartridge is only to be inserted into the apparatus when it is switched off** (none of the light-emitting diodes functional).

To do this open the door on the side of the apparatus *(turn the slit in the lock to a vertical position using a coin or a wide screwdriver),* press a **SAFEX-FLAMEJETTT®-CARTRIDGE** that has had the plastic protective cap removed and with the threaded valve pointing upwards against the cartridge stop (V-shaped guidance plate) and screw into the brass-coloured cartridge receptor (see also Figure 1).

Fig. 1 **Fig. 2**
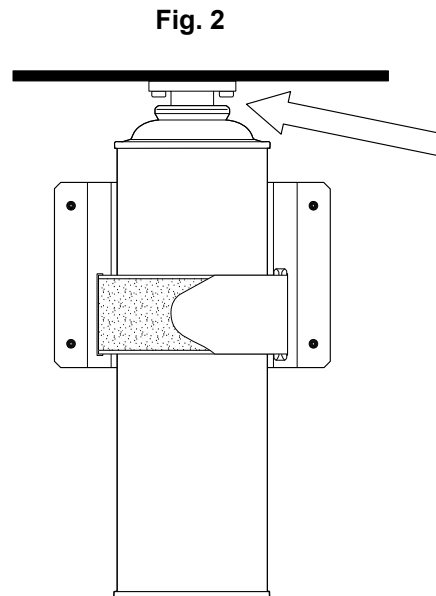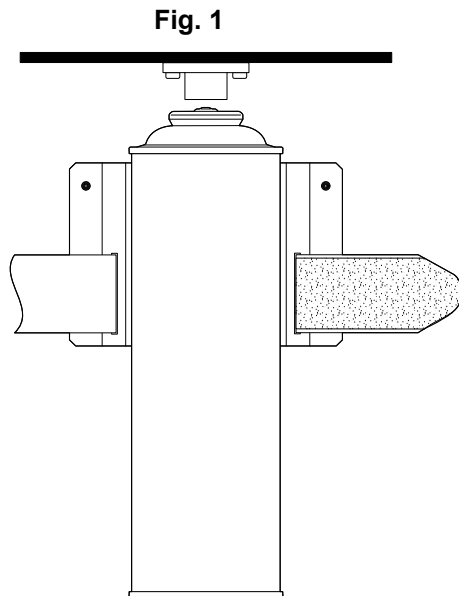
Several turns are required to screw the cartridge in and while it should be **hand-tightened, it must be screwed in to the point where there is substantial resistance.** As a rule, no fuel/gas mixture escapes during this procedure.

It is important to ensure that the **cartridge valve is free of dirt, fluff or dust** and the same applies to the cartridge receptor in the apparatus. It is therefore recommended that an empty cartridge is left in the receptor when the apparatus is not in use to prevent it from getting dirty.

Once the cartridge has been screwed in, it should be tightly fastened to the guidance plate using Velcro tape in the manner of a belt in order to secure it for transport.

Test for Gas-Tightness

For safety reasons, the cartridge container door should be left open and a check carried out after about 3 minutes to ensure that the connection between the aerosol cartridge and the apparatus is gas-tight. This can be conducted **using a gas detection device** or a **foaming spray solution** (see section on "SAFETY INSTRUCTIONS AND EQUIPMENT").

As gas detection devices are quite sensitive, the **check should be conducted a few minutes after** the cartridge has been inserted to ensure that any small quantities of gas mixture that might have escaped have become volatilized. This is the only way of distinguishing between a continuous lack of gas-tightness and the escape of a small amount of gas during the changing of cartridges.

Close the door after the aerosol cartridge has been inserted to protect it from external influences!

SWITCHING ON AND OPERATION

The apparatus is operational once the aerosol cartridge has been inserted. The apparatus is only to be used by an adult, responsible person who is familiar with it and its operation.

Programming for New Cartridge

Connect the apparatus to the power supply for this step. When a **new, completely full aerosol** cartridge is inserted, it makes sense to signal this to the apparatus via its fitted microcomputer and using the programming mode (see section on "SETTING/PROGRAMMING THE APPARATUS").

To do this, select **"NEW CAN"** using the PLUS or MINUS key in the programming mode and confirm with the O.K. key.

```
select option ⟷        New Can ?
New Can                Press OK
```

Now the system asks for the cartridge size:

```
┌──────────────────────┐
│ Can size?            │
│ Standard OK? →       │
└──────────────────────┘
```

In case that the given size matches the cartridge size, confirm with the O.K. button. Now the display shows:

```
┌──────────────────────┐
│ Can size?            │
│ confirmed            │
└──────────────────────┘
```

In case that the sizes doesn't match, select the correct size by the arrow keys and confirm your selection with the O.K. button. Afterwards the system confirms:

```
┌──────────────────────┐
│ Can contend:100%     │
│                      │
└──────────────────────┘
```

(In Version 3.5 the new developed SAFEX®-SUPER-FLAMEJETTT-CARTRIDGE with approx. 1l combustible fuel mixture is already taken to account. It will be available in the second half of 2008, prospectively.)

The apparatus can then use this information to gauge the approximate level or consumption of the fuel mixture and this is **indicated continuously on the display**.

The user is shown a bar chart that indicates instantly whether sufficient fuel remains for his effects. However, this feature only functions properly after a full cartridge has been inserted or the partially emptied cartridge **is still in the apparatus** when it is used next or has been returned to the corresponding apparatus.

EXAMPLE: Cartridge content 100% (5 bars in chart)

```
┌──────────────────────┐          ┌──────────────────────┐
│ Can cont.: ■■■■■      │    or    │ Can cont.: ■■■■■      │
│ Flame:5 pause:10     │          │ automatic off        │
└──────────────────────┘          └──────────────────────┘
```

If the cartridge is almost empty, i.e. residual pressure is all that remains, then the display will show:

```
┌──────────────────────┐
│ Can cont.: min.      │
│ Flame:3 pause:4      │
└──────────────────────┘
```

Only when the apparatus detects that **no cartridge** is connected, or one that is completely empty and not under pressure, will it display:

```
┌──────────────────────┐
│ No pressure!         │
│ Can empty?           │
└──────────────────────┘
```

DMX Connection Indicator

Once a DMX connection has been established after connection to the power supply, the yellow light-emitting diode lights up. This indicates that a DMX carrier signal is present. For a few seconds, the display automatically shows the numbers of the arming-adress, the flame triggering- and the flame duration address last set.

```
┌──────────────────────┐    ┌──────────────────────┐
│ Arming-Addr.: 16     │    │ FDC address: 22      │
│ Firing-Addr.: 17     │    │                      │
└──────────────────────┘    └──────────────────────┘
```

This information can also be obtained at any time from the standard display by using the arrow keys. The data transfer rate also can be displayed in addition in the display as special information by means of the arrow keys.

The yellow light-emitting diode blinks when a signal is sent to one of the DMX addresses that have been set. Reception of the firing signal can be tested in this way, for example, even when the apparatus is not armed. (The two large warning LED's also blink when the arming address is sent).

If an **ARMING signal** is transmitted **illegally/ accidentally** already during connection to the mains (e.g. if another DMX device is activated that has the same address like the preset arm address) immediately the following error message occurs, for safety reasons:

```
during ARMED
disabled
```

```
Arming time
expired
```

PRODUCING THE FLAME EFFECTS:

Arming of the Apparatus

Note: The apparatus can only be armed once the **programming mode has been terminated**!

The arming address must be switched to 100 % on the DMX control console either manually or program-technically at least **7 seconds prior to the desired effects**. This armed status is retained by the apparatus for 3 minutes, even if no flames are triggered.

However, if **during this time no effect** is triggered via the firing address, **the apparatus "disarms"**, independent of whether the control signal is still "set" to 100%. The display shows:

```
Arming time
expired
```
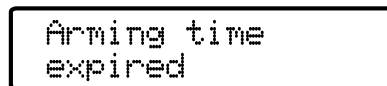
This safety precaution is intended to ensure that the apparatus is not maintained in the armed mode over lengthy periods of time without flames being produced. There is the possibility that any protocol / or electronic signalling malfunction could trigger flames when the apparatus is armed. Therefore, even if he does not (initially) wish to trigger any effects, the person responsible for the effects **must monitor the apparatus for at least 3 minutes after the apparatus has been armed**, as the apparatus is now in active mode and therefore poses a risk.

This status is signalled **on the back of the apparatus by clearly visible blinking signals** that indicate the impending fire effect to everyone present on stage.

For this reason, the apparatus must only be armed and maintained in this status when the person responsible for ignition is in such a position that he **can see directly** that there are no people, flammable materials or any other "hazardous circumstances" in the vicinity of the apparatus being controlled by him.

The 3 minute limit is set back to "zero" after the triggering of each flame, such that the apparatus remains **armed for a further 3 minutes**. If, therefore, continual flame effects are produced or the intervals between them are less than 3 minutes, then the apparatus **remains armed until it is either disarmed after the final effect or another 3 minutes** have elapsed.

The arming of the apparatus and the connected visible blinking signals thus provide a relatively high level of safety during its operation.

When the apparatus is armed there is **no access to the programming mode** for security reasons, the display shows in the case of an attempt:

```
during ARMED
disabled
```
and
```
Arming time
expired
```

and "disarms" itself. The user can rearm the apparatus only by switching the arming channel »OFF« and »ON«.

Triggering of Flames in the Automatic Mode:

Triggering of the flame effects pre-set on the apparatus is accomplished by activation the firing address to at least 70%. A FLASH-key is to be preferred to a fader for short effects. In accordance with the operator's wishes, the firing signal can, of course, also be set to a particular sequence via a program, including multiple signals with interruption*.

(Interruptions of more than 3 minutes also require disarming and re-arming the apparatus at the right point in time via the program.)

In cases where a pause value of 1 to 10 has been set during programming for FLAMEJETTT®, the flame effect is repeated for as long as a (DMX) firing signal is queued.

The **triggering of flame effects during the 7 second arming of the apparatus is rejected**. However, if the firing signal remains active, then the effects commence as soon as the 7 seconds have passed.

However, if the firing signal is **already active <u>prior</u> to arming**, then it **is always rejected, even after** the lapse of the 7 second arming of the apparatus! The display shows then:

```
Wrong
firing command!
```

When using programmed control, the **firing signal** should therefore not be sent **until 7 seconds after arming**!

If a shorter firing signal is, e.g., sent via a flash key as a set flame value in the automatic mode, then the flame is only produced so long as the firing signal is active, i.e. potentially shortened. If another flame is triggered immediately afterwards via a flash key, **then this overrides the pre-set interval and the flame is ignited immediately.**

In this way, it is possible to produce shorter flame and interval rhythms that override the pre-set (longer) flame and pause values using, e.g., a flash key, as **any interruption of the firing signal is setting it back to the start point of the programmed value**.

Triggering of Flames with Automatic System turned OFF:

The before described conditions also apply in principle with the automatic system turned off where flame length, duration and pause will be determined by DMX-programming.

The features of this mode are explained in detail in section USER-DETERMINED DMX-EFFEKT PRO-GRAMMING.

Rehearsal Obligation:

In accordance with generally accepted standards, stage effects are associated with risks, in particular fire and pyrotechnic effects must be **rehearsed together with everyone involved** in an event.

The rehearsal should initially be carried out by the person responsible for the effects alone, without participation from third parties. This person must be sure that the fire effects will pose no danger to the surroundings (decorations, parts of the building etc.) once the apparatus has been set up appropriately in accordance with the required safety distances.

A distance of **4.5 m constitutes the minimum safety distance for spectators** (uninvolved in the event) from hazardous actions (see also section on "SAFETY INSTRUCTIONS AND EQUIPMENT").

The event must be rehearsed if associates (artists, models, extras, technicians etc.) are in the vicinity of the effect apparatuses, **to check whether the fire effects are tenable during the event from a fire-prevention perspective**.

Above all, the following must be considered:

● **Associates' movement sequences,**

● possible **ease of flammability of the costumes**, wigs and masks in cases where associates are within a dangerous distance of the effect apparatuses. *(Note: costumes, wigs, masks and props do not have to be designed to have low flammability because regional rules don't require this)*

● **props** such as flags, accessories made of feathers or tulle, cheerleader pom poms etc., that could easily catch fire.

The sequence and times for the effects as well as the required **safety distances are to be carefully discussed** by the people responsible for the effects and everyone else involved and, if necessary, should be rehearsed several times. If it emerges that certain scenes cannot be safely implemented in connection with the flame effects, **then they should possibly be left out**.

USER-DETERMINED DMX EFFECT PROGRAMMING:

(Automatic: OFF)

With DMX programming the most various flame effects, practically whole flame shows can completely be designed externally whose possibilities can be increased further by use of several more apparatus.

The following functions are available or respectively must be set:

Arming Channel:

Additional safety installations are integrated into the controls, among others the **Arming Mode,** with the aim of increasing security against programming or protocol errors. This is required for all program-controlled, risk-associated systems, as theoretically possible programming errors and the associated risk of dangerous erroneous triggering must be considered.

The reason for the presence of the arming channel is to ensure that the effect apparatus **is only active for the shortest possible time period** in which a triggering of effects is possible. **This interval must be monitored by the operator.**

The arming address is to be set digitally on the **SAFEX-FLAMEJETTT**® display as described in section "SETTING / PROGRAMMING THE APPARATUS" and can be valid for one or more apparatuses. (Set level always to 100 % for activation)

For performances where several FLAMEJETTTS are used, **one** address is recommended for all active apparatus so that they can get armed and unarmed at the same time. If some FLAMEJETTTS, however, will be used only for a special period or at places with special problems, it can be advisable to give them separate arming addresses, which will be activated only very briefly for safety reasons.

In case that the arming channel is **already active** (set to 100 %) **during engaging** the apparatus, this is **not accepted** and the display shows an error message. This message tells the user to set the arming channel to 0 %. Therefore the apparatus shall be **switched on with the arming channel set to 0 %.** After this, the apparatus can be **armed if required**. This has to be taken to account for user programming.

At this point it shall be pointed out once again that the person responsible for the effects must have access at any time to an automatic control as well as if necessary also to the net supply if a danger situation at the site of the effect equipment arises.

Flame Duration Channel (FDC):

Some DMX controller/desks allow only **comparatively slow signal changes (<** 12 Hz), short fireballs, however, require an on-period of 0.04 seconds only. Therefore the flame duration/flame time for such effects can be adjusted now in version 3.0 with an extra DMX Flame Duration address.

The FDC-Address is to be set digitally on the **SAFEX-FLAMEJETTT**® display as described in section "SETTING / PROGRAMMING THE APPARATUS" and can be valid for one but also for more apparatuses too; if e.g. there flame duration shall be absolutely synchronous.

The **flame duration** is to be set with the **level of the channel in 10 % steps.** The corresponding time-values respectively the resulting effects are explained precisely in **table 1** in the following section FLAME AND INTERVAL DURATIONS:

Unlike **the firing** signal the **flame duration signal or its level can be set active at any time;** therefore already **before arming the device or before triggering a flame**, since this signal determines merely the length of the flame duration but is not responsible for there triggering.

Insofar **a change of the flame time respectively its level** can be programmed **into an igniting break** so that e.g. the next triggering can produce a longer or shorter flame. (*Important: The firing signal must be at least activated as long as the planned flame duration*)

The **shortest** adjustable flame duration is **0.04 sec. = 10%** - **level.**

In the standard display the actual level will be shown behind the abbreviation **FD** (= **F**lame **D**uration) in % values, e. g.:

```
Can cont.: ██████
auto Off FD 50%
```

Firing Channel:

The firing-Address is to be set digitally on the **SAFEX-FLAMEJETTT®** display as described in section "SETTING / PROGRAMMING THE APPARATUS" and can be valid for one but also for more apparatuses. For activation **a signal level of at least 70 %** is required.

The flame triggering with the firing signal can be carried out in 2 different methods:

- **The flame duration channel is activated**; the flame duration is adjusted with a level value between 10 % and 70 %!

    A firing signal triggers in this configuration the flame (duration adjusted with the **FDC**) just **once.** (*The igniting signal must line up at least) just as long as the scheduled flame duration.*

    A **repetition** of the flame is carried out **only if the firing signal is switched OFF and ON** again. With this method the repeating rate, that is the pause between two flames has to be determined. D The minimum interval between two flames must, however, **be min. 100 ms.**

    Settings like the flame duration signal are **always worked off completely** by the **system** before a (if necessary programmed) change is accepted. An exception are the firing- or arming signals, there turning off leads immediately to a stop of all effects!

- **The flame duration channel is not activated (FDC address = 0):**

    Every flame is triggered by the activation of the igniting signal and stopped again by it's deactivation. With this method programming is much more simple, but very short flame effects (e.g. little fireballs), however, can not be achieved with some DMX controllers.

Use of Several SAFEX-FLAMEJETTT's® Simultaneously:

If several FLAMEJETTTS are used at the same time, every apparatus can be provided as well with an own flame duration channel address with a different level value if effects with different lengths should be produced.

It is then possibly required **to coordinate** the **ON-time of the firing address** with **the longest flame duration setting** or to assign a **separate firing address** to every device. (with correspondingly ON-time). This enables the production e.g. of so called LA OLA WAVES or exciting temporal alternating flame effects etc.

*NOTE: For the use of several devices at the same time **the usual slave cables** are intended. They must be led from the **DMX OUT socket** to the **DMX IN socket** of the next device. These **slave cables** should certainly correspond to the **DMX 512 standard!***

*Due to fundamental safety considerations SAFEX-FLAMEJETTTS® should be **connected only together but not be used with** other effect equipment in one » DMX connection chain «.*

Limitation of Firing Time

The **SAFEX-FLAMEJETTT®** is constructed as a flame effect apparatus and not to produce flames of long duration. **Flame duration is therefore set** to a maximum of **10 seconds**.

Flames of longer duration produced using the FLAMEJETTT® are of only limited attraction with regard to their effect, which is also continually reduced in intensity over time. Short flame balls and darting flames of approx. 0.2 to 3 seconds are most effective when repeated at more or less short intervals.

FLAME AND INTERVAL DURATIONS:

Following the flame and pause times in **the automatic mode** are described as well as level values which will produce similar flame and pause times with **DMX programming**.
(Intermediate values, e.g. 23 % or 26 % will be rounded up or off to the full decimal value)

Table 1 shows what kind of effect flames will be achieved with which settings:

DMX-Flame Duration Level		Automatic Value		Sec.		Effect
10 %	corresponds	No. 1	corresponds	0,04	=	small fireball
20 %	corresponds	No. 2	corresponds	0,08	=	medium fireball
30 %	corresponds	No. 3	corresponds	0,12	=	large fireball
40 %	corresponds	No. 4	corresponds	0,18	=	small darting flame
50 %	corresponds	No. 5	corresponds	0,3	=	medium darting flame
60 %	corresponds	No. 6	corresponds	0,5	=	large darting flame
70 %	corresponds	No. 7	corresponds	0,9	=	long, large darting flame
≥ 80 %	Constant flame, restricted to max. 10 seconds					

Table 2 explains the **pause times in the automatic mode;** it serves also as a **suggestion for the DMX-programming.** *(The minimum interval between two flames must be min. 100 ms.)*

Interval	1	corresponds to	0.4	seconds
Interval	2	corresponds to	0.6	seconds
Interval	3	corresponds to	0.8	seconds
Interval	4	corresponds to	1	second
Interval	5	corresponds to	1.25	seconds
Interval	6	corresponds to	1.5	seconds
Interval	7	corresponds to	2	seconds
Interval	8	corresponds to	2.5	seconds
Interval	9	corresponds to	3.5	seconds
Interval	10	corresponds to	5	seconds
Interval	"infinite"	corresponds to	Infinite interval duration	

SAFETY INSTRUCTIONS AND EQUIPMENT

The use of real flame effects in meeting places requires high levels of safety precautions. Safety is only partially guaranteed by the construction of the apparatus, the remainder is contributed by the user through appropriate operation and handling.

1. Only **operate the apparatus when** it has been **well maintained, so that it conforms to regulations**. Signs of unsafe operation are damage, noises indicative of the apparatus not being gas-tight, malfunction during prior use and **"malfunction" indicators** on the display. Such apparatuses are to be sent to and checked by a recognized servicing agent or the manufacturer!

2. To ensure safe operation even when **l**ow **v**oltage remote controls are being used, **only signal conductors** conforming to the DMX 512 standard are to be employed, i.e. shielded and twisted data cables.

   Due to general safety considerations **SAFEX-FLAMEJETTT's®** should only be used together and **not be operated together with other apparatuses on the same control circuit** in order to avoid any interference, e.g., from non-standard or defective apparatus conditions.

3. Operation is only permitted **using the SAFEX-FLAMEJETTT®-Cartridges/aerosol cartridges** (type 4S13.xx) specifically developed for the purpose. For this cartridges the standard nozzle nr. 3 is intended. Lower flame effects can be created with nozzle nr. 1 (see section on „CHANGING NOZZLES"). The apparatus is fitted with nozzle no.3 by the manufacturers.

Stable Positioning

4. The apparatus must be **stably positioned in a suitable location**. Stable means that **the apparatus is secured against falling over** and cannot topple over under any circumstances. There are **plates** (side booms) on its base permitting **secure attachment** to the supporting surface by screwing or nailing

down. Careful securing using gaffer tape may also be sufficient as long as the operator is sure that the apparatus cannot be shifted from its position by, e.g., moving stage installations or people.

The apparatus can be set up on the floor of the meeting place/stage, or also in a raised position on podia, columns or crossbeams (see also section on "SPECIAL USES"), so long as it is possible to ensure that it cannot fall over and its position remains unchanged. In such situations, the apparatus is to be secured as described above.

5. The apparatus is intended for **vertical, upwards flame effects**, or for **an inclination of max. 45°.** With a slanted flame expulsion **however** special conditions have to be **met,** see for this section »SPECIAL USES«.

Tilt Sensor

6. The apparatus is fitted with a **tilt sensor** that immediately **switches off all flame functions and <u>disarms</u> the apparatus if it falls over**. This safety precaution ensures that even in case of the apparatus falling over, no uncontrolled flame direction can occur. When the tilt sensor is triggered, the apparatus must be returned to its upright position and re-armed before it renews flame production.

Therefore, the apparatus must always be secured to a flat, solid surface (securing to crossbeams, slopes etc. is essentially possible, see also section on "SPECIAL USES").

Safety Distances

7. **A suitable location** is a position that cannot be reached by uninvolved participants (spectators)* and is sufficiently far away from flammable objects above it and beside it.

   - A **lateral safety distance of 2.5 m** from the usual flameproof stage installations is required **for vertical flame ejection** and must be increased to 3 m if draughts are expected. The safety distance **above the apparatus should be a minimum of 6 m for materials of low flammability and a minimum of 8 m for normally flammable materials**.

   - With **a slanted flame expulsion** the safety distances must be extended **in flame expulsion direction depending on** the inclined position, required values can be found in **table 3** in the section » SPECIAL USES «.

   - *A **minimum safety distance to spectators of 4.5 m** is recommended in cases where no measures have been taken to prevent access by unauthorized individuals.

   - **As a rule, easily inflammable materials** or objects **should generally not be located in proximity to fire effects** and are usually prohibited from meeting places.

8. **Associates** (technicians, artists) are to be instructed

   - to maintain a **minimum lateral safety distance of 3.0 m or with slanted flame output the distances given in table 3 in** section » SPECIAL USES « and that the apparatus has blinking signals on its back that indicate impending flame effects.

   - **The safety distance to people is to be substantially increased as necessary if they are wearing, e.g., easily inflammable costumes, wigs or props!**

   - **No people should ever be present** in the **direction of flame ejection** or above the flame emission site (hexagonal tube) and it is also important to ensure that unauthorized people are prevented from touching the tube or changing the settings on the apparatus using the keys.

   - In case that somebody illegally tries to manipulate the settings by **pressing the keys when** the apparatus is **armed the apparatus will disarm itself instantaneously for safety reasons.** To rearm ARMING has to be switched OFF and ON again.

9. **Never cover the apparatus,** ensure that no **foreign bodies** enter into the flame emission site, guarantee that the **flame that has been set can exit from the apparatus unhindered!**

Foreign bodies entering into the apparatus (confetti etc.) can potentially cause damage, but also be **ejected from the apparatus as burning particles**.

Operation in Conjunction with Stage Pyrotechnics etc.

10. Simultaneous **use of the FLAMEJETTT® in conjunction with stage pyrotechnics or other fire effects** is regarded as unproblematic so long as the **cartridge container is closed properly,** the **stage pyrotechnics/flame effects are mounted according to regulations and required safety distances**

to the **FLAMEJETTT's® are maintained.** In all cases, it is important to ensure that no noticeable heating of the cartridge takes place in the apparatus.

11. To monitor this, the **temperature in the cartridge container** can be shown on the display by using the arrow keys!

Operation in Conjunction with Ground Fog.

12. **The simultaneous use of the SAFEX-FLAMEJETTT's® together with ground fog, produced by CO2 gas, dry ice or liquid nitrogen** is only unproblematic **if** such fogs which displace atmospheric oxygen are enclosing the devices approx. **up to half of its height** only**.** If these fogs reach **the igniting** chamber, however, this can lead to **igniting failures with ejection of unburned fuel,** because such ground fogs suffocates flames.

The Person responsible

13. The person responsible for the fire effects **should only trigger the flames when he is in such a position that he can see all active effect apparatuses directly** and is therefore sure that all safety measures are being adhered to.

Emergency Shutdown System

14. **Furthermore, he or she must have** direct access to the arming system **on the remote control** <u>and</u> **to the** mains "EMERGENCY SHUTDOWN" system **so he can disarm the apparatuses in potential cases of danger.** The possibility of immediate switching off must be available for a fire effect system, should, e.g., electronic malfunctions remove all control over the apparatuses or the (automatic) remote control systems.

   This can be guaranteed **by direct access to the arming facility** if all apparatuses are controlled through the same arming address. Otherwise, the **EMERGENCY SHUTDOWN system** must permit immediate interruption of the power supply to the effect apparatuses.

Gas-Tightness Check

15. Correct insertion of the **SAFEX-FLAMEJETTT®**-Cartridge aerosol cartridge is also of prime importance to safety. The cartridge must be screwed into the receptor device such that it is gas-tight. Even if the receptor device is secured against leaks, it is recommended that the connected cartridge is checked for possible escaping gas with a gas detector (gas sniffle pen) a few minutes after the new aerosol cartridge has been inserted. (See also section on "GAS DETECTION DEVICE")

   ● Any hissing or escaping liquid is an indicator of a leak and will require checks or removal of the apparatus from operation.

Aerosol Cartridge

16. Commercially available propane-butane gas cartridges as used for soldering tools and heating appliances are **never suitable for use in the SAFEX-FLAMEJETTT®.** Their use instead of the correct SAFEX-FLAMEJETTT®-Cartridges 4S13.xx represents **an inappropriate and highly negligent behaviour.**

   Simple gas cartridges not only result in useless effects, but also represent a hazard, as the **SAFEX-FLAMEJETTT®** cartridge release valves are constructed in a technically different manner. The **SAFEX-FLAMEJETTT®** cartridge receptor device **can potentially damage unsuitable cartridges which may then leak as a result and lead to the danger of fires or explosions due to the escaping gas.**

17. It is essential that the **SAFEX-FLAMEJETTT®** cartridges remain **undamaged*** and are screwed in so that the connection is not soiled by fluff or suchlike. *(Noticeably dented or rusty aerosol cartridges, or those that have been damaged in a similar fashion, are prohibited from sale or use by [German] law)

Excess temperature warning

18. For cases of emergency, the **SAFEX-FLAMEJETTT®** is fitted with a **temperature monitoring system for the aerosol cartridge** or the cartridge container. The apparatus **issues a loud signal tone** that increases in intensity with increasing temperature if the temperature in the vicinity of the cartridge rises for any particular reason. The apparatus switches the flame function off and issues a continuous warning tone if the safety temperature of approx. 50°C is exceeded in the cartridge container. The tone continues for as long as the temperature remains excessive.

SAFETY CHECK LIST:

Operation of the **SAFEX-FLAMEJETTT®** is only permitted when the following conditions are fulfilled and the following measures have been taken:

1. The apparatus is **used with the permitted fuel supply, the SAFEX-FLAMEJETTT®-CARTRIDGE (aerosol cartridge).**
   (Gas cartridges produced by other manufacturers are unsuitable and represent inappropriate and hazardous use).

2. **The gas-tight insertion of the aerosol cartridge has been checked.**

3. The apparatus has been **secured** on a no more than normally flammable surface *(nailed, screwed, carefully taped down)* such that it **cannot fall over** and the hexagonal flame ejection opening is oriented **vertically upwards**.

4. The **lateral safety distance of at least 2.5 m** to materials/installations of low flammability **is maintained** or extended to 3.5 m for normally flammable materials or extended as deeply recommended for slanted use in **table 3**.
   (Easily flammable materials/installations are not located nearby during flame effect production – usual stage installations are flameproof or at least characterized by low flammability)

5. The **safety distance of a minimum of 6 m** to flameproof materials/parts of installations/constructions on the ceiling **above the apparatus** is maintained or extended to 8 m for normally flammable materials.
   (Easily flammable materials/installations are not located above the effect apparatus)

6. A **safety distance** of 4.5m is designated for those **uninvolved in the event/spectators**.

7. The person responsible for the triggering of the effect flames is informed of all safety-technical requirements and the programme for the event and has **direct view to the FLAMEJETTT® apparatuses** during firing and has direct access to an **emergency power shutdown**.

8. The **participating associated parties** (artists/technicians etc.) are **informed** of the **extent and timing of the production of flame effects**, as well as of the signalling facility on the back of the apparatus when it is armed. **Appropriate safety distances have been agreed on and rehearsed**.

9. The effect apparatuses **are only armed** for impending flame effects and are subsequently continually monitored after the flame effects are finished until they have been disarmed or disconnected from the power supply.

10. The apparatuses employed are otherwise used **in accordance with the instruction manual** and the safety regulations and guidelines laid out therein and **have been checked and well maintained**.

11. The **use of these effects has**, if required, been **authorized** by the responsible authority. (In meeting places: fire brigade or the fire safety officer and the person having the householder's rights)

*SAFEX® recommends that a copy of this checklist or a comparable checklist signed by a person responsible is submitted to the fire safety officer or the authorizing office **as an aid in reaching their decision**.*

MAINTENANCE AND SERVICING:

The apparatus requires **maintenance at regular intervals** which must be carried out by a technical specialist (qualified person).

The internal system only suggests on the display screen, if necessary the conduction of self-tests and the cleaning of the igniting electrodes etc. (after 1500 flames).

```
selftest
necessary!
```
or
```
Ignit. electrode
clean. necessary
```

The operator of the apparatus is responsible for ensuring through regular checks that he is convinced that the apparatus is functioning impeccably from a safety-technical perspective. Frequent maintenance is necessary, for example, when the apparatus is used a lot or operated in particularly dirty surroundings (e.g. with confetti rain etc.).

Maintenance is necessary also after an emergency shutdown with repeated ignition failures, display shows:

```
┌─────────────────────────┐   ┌─────────────────────────┐
│ Failure,                │   │ maintenance             │
│ no ignition             │   │ required                │
└─────────────────────────┘   └─────────────────────────┘
```

Ignition-failures are normally based on **soiled, sooted or bent electrodes or contamination of the sensor or the sensor duct** in the sensor protective housing. The flame-sensor is defective only in very rare cases! (Check with manual self-test)

(These failure message can be cancelled by unarming and the key O.K. If, however, no maintenance takes place and the failure still exists, the message appears again and again!)

Cleaning the Electrodes, the Ignition Chamber and the Sensor Channel:

Depending on the frequency with which the apparatus is used, regular cleaning of the ignition electrodes and the ignition chamber to remove dirt (soot) and possibly also fuel deposits will be required. The presence of large amounts of fuel residues in the ignition chamber is indicative of malfunction and in such cases the apparatus always must be serviced.

● To do this, disconnect the apparatus from the power supply and unscrew the two hexagonal bolts located on the top. Then open the hinged top part towards the front. This provides internal access to the ignition electrodes, emission nozzle and emission shaft.

A. The **ignition electrodes and the flame emission shaft must be cleaned regularly**, the electrodes in such a way that their position does not get bent! (See Fig. 3 + 4, indicating the correct positional information). A soft cloth and some cleaning agent/spray cleaner or a fine brass brush should be used for cleaning.

Fig. 3   **Fig. 4**
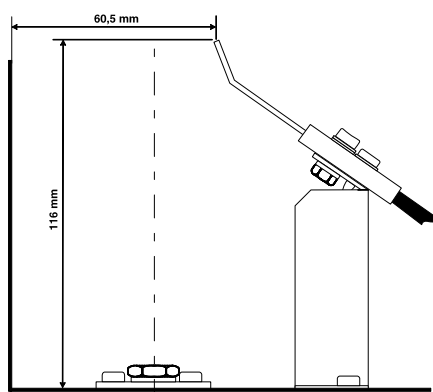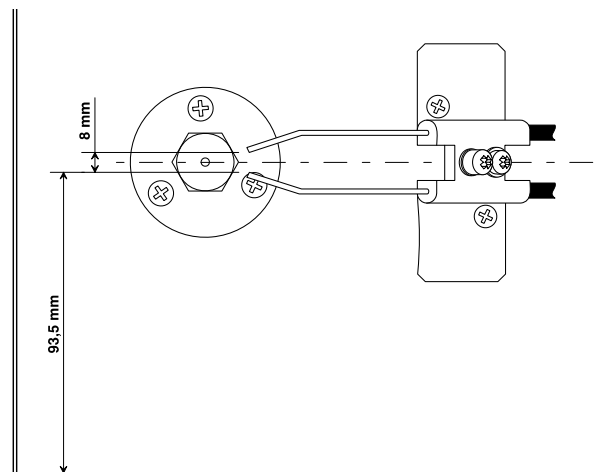
Lateral view   **View from above**

B. In addition to the electrodes, the **entire ignition chamber and the flame shaft** (hexagonal tube) should be **cleaned of sooty deposits etc.**, as well as **the slanted sensor duct in the protective housing too**. If the ducts inside is severely corroded and not sufficient reflective, there must be affixed a reflective metallic foil which can be requested free of costs from SAFEX.
(Alternatively can be ordered the sensor protective housing with the duct made from stainless steel as a spare part, completely in- and outside metallic blank).

C. The below attached **flame sensor** (see Fig. B) should also be **wiped off carefully** with a cloth or a Q-tip but that has been very lightly oiled.

● There should be no foreign bodies in the ignition chamber (confetti, dust, bits of cloth etc.). To finalize maintenance, the solid holder for the hexagonal, chrome-plated nozzle should be checked in case it has become loose due to vibration. It should not be loose, but hand-tightened. (Sealing of the nozzle is guaranteed by a special copper ring that is not to be removed):

● Under no circumstances should the apparatus be operated before the upper **combustion chamber has been completely closed with the two bolts** (danger - high voltage 5000 V)

If the cleaning of the electrodes etc. has been carried out, this should be selected in the programming mode and confirmed with OK, so that the request for cleaning further does not appear and the control count starts from the beginning.
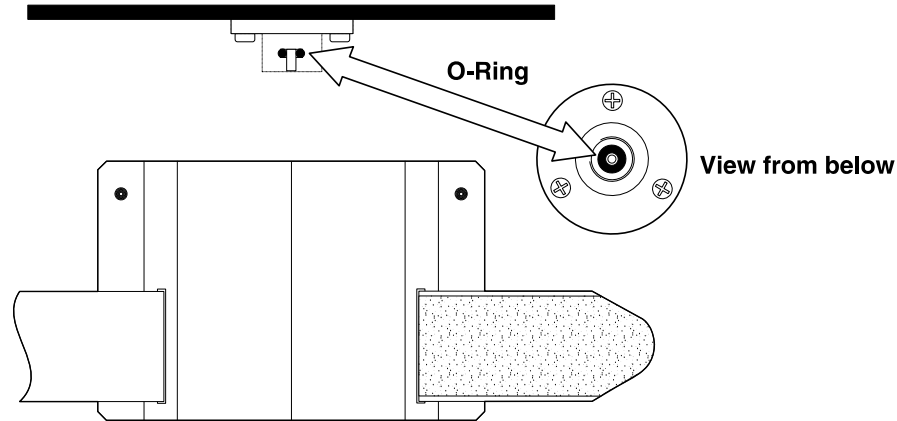
```
select option↔          and    Ign. electrode
clean electrode                cleaned? OK=Yes
```

- The presence of the **o-ring in the cartridge receptor** (see Fig. 5) must be regularly checked on. To do this, look diagonally upwards into the cartridge receptor (a torch will help) or use a mirror.

  The o-ring **must be present** and appear undamaged to the naked eye!

Fig. 5

O-Ring

View from below

- Checks on safe functionality should be carried out regularly, however, a manual self-test should be conducted in a suitable venue **at least every 6 months** (See also section on "MANUAL SAFETY TEST")

  The **FLAMEJETTT®** suggests carrying out this safety test on the display if imperfections occur repeatedly. The suggestion takes place in bigger intervals at first, if the test is not executed, the display more and more frequently "jostles", until only the message "self-test necessary" is been shown.

  This test should be carried out as soon as possible. In cases where the apparatus is used heavily, e.g., on a daily basis, the self-test should be carried out more frequently and on a routine basis, if necessary every week.

MANUAL SAFETY TEST

The **SAFEX-FLAMEJETTT®** is constructed to self-check the gas-tightness of all gas/fuel lines and valves as well as safe flame production. Even **during normal operation, the apparatus constantly checks itself for safety**.

However, should a full safety check not be possible within a defined period of use due to operation times and type of operation, or a malfunction occurs repeatedly then the internal processor will instruct the operator via the display to **carry out the manual self-test**:

1. The self test does **only make sense** if the apparatus respectively the **electrodes**, the **combustion chamber** and the **sensor channel** had been **cleaned up carefully** and the distance of the electrodes has been checked.

2. To do this, set the apparatus up in a secure location where the production of flames poses no danger (e.g. in a location already checked for use).

   Important: During the self-test, **after an acoustic signal**, **a small flame is produced twice within the first minute** and the safety distance should therefore be adhered to!

3. Check the cartridge contents and if necessary insert a **SAFEX-FLAMEJETTT®** aerosol cartridge that is filled to a minimum of approx. 20%.

4. Make the apparatus operational (power connection and remote control) and select the manual safety test on the apparatus using the programming mode (press ESC and O.K. keys for 3 sec.).

```
 select option ↔
 self test
```

```
 Start self test      firing for 3 sec
 by arming + then
```

At a safe distance, start the manual safety test by arming the apparatus **within 2 minutes** and then 7 seconds later through **a continuous firing impulse of 3 seconds in duration**, ensuring that no unauthorized persons enter into the danger area around the apparatus.

The start is indicated by an acoustic **signal tone** and the display reports:

```
 self test
 starts
```

After 10 seconds, the display shows the following message:

```
 selftest running
 phase 1/14
```

Following this, all functions relevant to the safety of the apparatus are tested in 14 steps, requiring approximately **21 minutes**.

ATTENTION: **A total of two flames are produced** during the first 4 steps! **Before each flame an acoustic signal warns about the imminent danger!**

If the self-test is not started within 2 min. using the remote control, then the display shows the following message:

```
 self test
 interrupted
```

5. The apparatus reports a successful self-test acoustically with a signal tone repeated 5 times, as well as on the display:

```
 Test successful!
```

6. The display shows the following in cyclical fashion:

```
 Valves + seals       No
 checked!             failures!
```

The display shows this message until the O.K. key is pressed and then returns to the standard menu.

7. In cases where the self-test cannot be carried out due to, e.g., an interruption to the power supply, disarming of the apparatus or if the aerosol cartridge is empty, the display reports the following:

```
 incomplete           repeat
 self test            self test?
```

This message is persistent, which means that it will also be shown after disconnecting the mains. Thus the user is informed about an incomplete self test after reconnecting the apparatus to the mains. He can restart the self test **or reject it** by the ESC key.

8. Possible malfunctions that are detected are also shown on the display and must be repaired by authorized servicing agents (see also "MALFUNCTION REPORT").

USE OF THE GAS DETECTION DEVICE

Modern electronics have led to the development of highly sensitive test devices for combustible gases, e.g., in the form of a so-called gas sniffle pen for propane-butane gas. The test device GD3000, Conrad-Electronic, - www.conrad.com - article no. 126503-59, has proven suitable. The correct connection for the **SAFEX-FLAMEJETTT®-CARTRIDGE** should be checked with this device or something similar and the entire apparatus should occasionally also be checked, e.g., after "rough usage or transport".

1. This check should not be carried out any earlier than 3 to 5 minutes after a new **SAFEX-FLAMEJETTT®-CARTRIDGE** has been inserted into the apparatus, allowing possible micro quantities of gas that may have escaped when the cartridge was screwed in to become volatilized.

2. Prepare the sniffle pen for operation in accordance with its instruction manual (remove protective cap, activate device) and check the transition between cartridge and receptor device in the cartridge container (see arrow in Figure 2). The sniffle pen indicates the presence of gas with a signal tone.

3. In cases where the sniffle pen indicates a propane-butane leak after the prescribed 3 to 5 minutes, the test should be repeated once more 3 minutes later. (An erroneous report is possible if some of the combustible fuel mixture accumulates around the neck of the cartridge during its insertion or removal). If necessary, the cartridge and receptor device should be cleaned with absorbent paper and the testing process repeated.

EMERGENCY SHUTDOWN / MALFUNCTION REPORTS:

To provide protection from dangerous situations, the **SAFEX-FLAMEJETTT®** is fitted with various emergency switching off functions and with a warning feature for cases of over-heating.

Switching off in cases of serious malfunction:

The apparatus switches itself and **flame production off** permanently in the case of a **serious** malfunction. This is also indicated by rhythmic blinking of the display with details of the malfunction reason and the request for the execution of the self-test:

***Example*:**

```
┌─────────────────┐   ┌─────────────────┐
│ serious leakage │   │ self test abso- │
│ at input valve  │   │ lutely necessary│
└─────────────────┘   └─────────────────┘
```

Important: All malfunction indications have to be taken seriously, but it is **appropriate, at first** to carry out **the manual self-test**, to check whether the malfunction report appears once more. (see section »MANUAL SAFETY TEST «)

Access to the manual safety test is archived with the programming mode [press left and right button for about 3 sec.]

However, **maintenance measures** such as cleaning the electrodes, elimination of foreign objects or dirt from the igniting chamber etc. should be **sensibly executed before the test!** (See section MAINTENANCE AND SERVICING)

If the apparatus was switched off after the malfunction report, the **device** reports after a restart again, **the error message and the request** for the **self-test.** The manual safety test should be carried out at the latest now.

The manual self-test checks carefully the seal tightness and function of the valves as well as the fluid paths.

If at **the end** of **the manual self-test** is announced that there are no faults, you can assume that a previous malfunction report was a unique process, which has not happened again or was caused due to oversensitivity or outer influences like dirt etc. (Confirm message with OK-key).

In the case of doubt a second manual safety test can be carried out to check the result once again. **The device deletes the error messages after a successful / fault-free safety test permanently.**

If the manual self-test shows, however, that **furthermore there is a malfunction**, **a repair or once more maintenance** has to be **absolutely** carried out before the device is put again into operation.

```
┌─────────────────┐   ┌─────────────────┐
│ maintenance     │   │ repair          │
│ required        │   │ required        │
└─────────────────┘   └─────────────────┘
```

Confirm this message definitely with the OK key too!

An **error report can be deleted** after maintenance or repair or after net interruption by pressing the O.K. key each time **after the following queries.**

```
is repair
been made?
```
```
is repair been
really made?
```

If the error report is annulled with an actually present malfunction, however without the problem being remedied, of course the error report will be shown again, if the device notices the error again after renewed putting into operation.

Failure Indications:

- **Failure message** if the system recognizes that **no pressure** via the cartridge solenoid valve is detected. Normally the can is indeed empty. In very rare cases, with a defective or extremely cold aerosol can, there is a lack of pressure. Also the aerosol can valve or the internal pressure switch could be defective. If a new, warmed up can of approx. 15° C does not solve the problem, please run a manual test!

```
No pressure!
Can empty?
```

- **Emergency shutdown due to severe leaks** from the valves or fuel lines. Display screen:

```
serious leakage
at input valve
```
```
serious leakage
at nozzle valve
```
```
self test abso-
lutely necessary
```

- **Emergency shutdown after multiple ignition failure.** The flame sensor switches the firing procedure off if it detects that ignition of the fuel has failed. The apparatus generally switches to malfunction if this problem repeats itself several times, display screen:

```
Failure,
no ignition
```
```
maintenance
required
```

These failure message can be cancelled by unarming and the key O.K. If, however, no maintenance takes place and the failure still exists, the message appears again and again!

Ignition problems are normally caused by **dirty, scooted or bended electrodes** which have then to be cleaned (See chapter Maintenance and Servicing under A).

The message may also mistakenly happen due to pollution and coverage of the sensor by water drops, foreign matter etc. or because of carbon fouling, dirtiness respectively lack of refection of the internal inclined sensor duct next to the hexagonal flame outlet tube. (See section "Maintenance and Care" under B + C)

Only in very rare cases the flame sensor itself is defect (check with manual self-check).

- **Emergency shutdown due to pressure switch malfunction.** Display screen during manual self test:

```
Pressure sensor
defect
```
```
repair
required
```

- **Emergency shutdown due to multiple detection of small leaks** (also for extended burning of the effect flame), display screen:

```
slight leakage
at input valve
```
or
```
slight leakage
at nozzle valve
```

```
┌─────────────────────┐
│  self test abso-    │
│  lutely necessary   │
└─────────────────────┘
```

● **Temporary shutdown if the apparatus falls over or is no longer firmly placed on a base**. The apparatus is fitted with a switching facility that immediately switches it off if it threatens to fall over or is not properly fixed to a base.

   (The temporary emergency switching off can be revoked by the operator if he correctly fixes the apparatus to the base and re-arms it (see "SAFETY INSTRUCTIONS" → tilt protection switch)

```
┌─────────────────────┐
│  Failure, device    │
│  is tilted          │
└─────────────────────┘
```

● **Emergency shutdown and malfunction alarm** if the **temperature in the cartridge container is too high.** (Aerosol cartridges should not be heated to above 50°) In cases where overheating occurs, e.g., due to a wrongly placed floodlight or even a fire, the apparatus initially turns the flame effect function off above 40°C and additionally produces a rhythmic, loud signal tone.

   If the temperature increases further, then the signal tone increases to a shrill constant tone at approx. 50°C. This also serves to alert, e.g., the emergency services.

```
┌─────────────────────┐
│  Dangerous tempe-   │
│  ratur around Can   │
└─────────────────────┘
```

The temperature in the cartridge container can be displayed using the arrow keys during normal operation, e.g.:

```
┌─────────────────────┐
│  Temperature in     │
│  can compart:22°C   │
└─────────────────────┘
```

● Malfunction message in **manual self-test** if the system recognizes **that the flame sensor does not work faultlessly.**

```
┌─────────────────────┐
│  flame sensor       │
│  defect             │
└─────────────────────┘
```

The device must be subjected to a repair!
(This message occurs during manual self-test if the sensor is really defective. In other cases of misfire a soiling of the sensor or the ignition equipment is mostly the cause.)

● **Temporary shutdown,** if the appliance recognizes, **that the arming mode at the remote control / the DMX-control desk** (by mistakes, dangerous!) **already was switched on,** before the appliance was turned on and has finished its system-check.

```
┌─────────────────────┐
│  Arming time        │
│  expired            │
└─────────────────────┘
```

This is prevented for security-reasons since **arming is only allowable**, if all security-measures are checked and kept around the appliance. For reset **turn of** the arming mode **at the remote control.**

● **Temporary shutdown,** if the device recognises a **pressed key while being armed** (dangerous action against the rules):
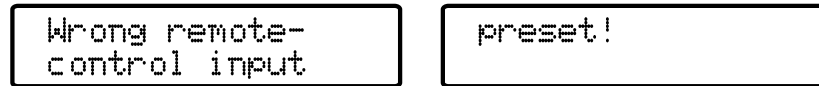
```
┌─────────────────────┐        ┌─────────────────────┐
│  during ARMED       │  and   │  Arming time        │
│  disabled           │        │  expired            │
└─────────────────────┘        └─────────────────────┘
```

For **reset** switch apparatus to "disarmed".

- **Temporary shutdown,** if the apparatus detects **a remote control different to the preset remote control type**:

```
Wrong remote-          preset!
control input
```

When a remote, different to the selected remote control type, is plugged-in an error message occurs. In that case, the correct remote control input should be used or selected in programming mode.

SPECIAL USES:

Slanted Flame Production:

> **IMPORTANT**: If slanted flames should be generated, the appliance can be tilted only to the sides, therefore only over the two sides to the right or left, **not** however over the back side (Display-side) and **not** even over the front-side (side with the SAFEX-FLAMEJETTT®-Logo)*.

In a certain scope slanted flames can be produced as an original effect with the **SAFEX-FLAMEJETTT®** in that the device is inclined side-ways. This is made possible now due to the improved igniting electrodes. The possibility of the slanting position is, however, limited by physical qualities of aerosol-cans also of the flames itself. A horizontal or downward inclined flame generation with the standard **SAFEX-FLAMEJETTT®** model is not possible until on further.

The production of very small, shortly ongoing flame balls (flame value 1) is **recommendable only at light inclination up to approx. 15°!** (Spraying clouds which are small and released slanted are not only difficult to ignite but tend also to unsatisfactory combustion.)

But attractive **flame effects** can be produced, however, **from flame value 2 up to a deviation of the perpendicular up to 45°.**

For this the device must be fastened in a suitable way on a slanted platform stable enough that it can not overturn with the complete platform and the tilt sensor on the bottom of the device is operated by the platform.

At a slanted position it must be additionally taken into account that the **lateral safety distance** must be **enlarged in** the **inclination direction.** An expansion of the safe distances upwards as well as to operating or the front side is normally not required.

*A slant-position of the appliance in others than lateral direction leads internally to **soot deposing on the igniting electrode insulator, it becomes conductive through this** with the consequence of igniting failures.*

For older FLAMEJETTT's an Upgrade-Pack is available, with which the ignition-electrode can be optimized also for these appliances!

Table 3 lists the minimum safe distances proven by the manufacturer and recommended for the use of the **SAFEX-FLAMEJETTT®** (from version 2.x on) with an inclined installation on the floor.

Flame value	DMX Level Value	Duration	Effect	Maximal[2] inclination	Safety distance[1] in slanted direction
Automatik 1	10%	0,04 Sek.	small fireball	15° sideways	2,5 m - **3,0 m** (3,5 m)
Automatik 2	20%	0,08 Sek.	medium fireball	45° sideways	2,5 m - **3,0 m** (3,5 m)
Automatik 3	30%	0,12 Sek.	large fireball	45° sideways	2,5 m - **3,0 m** (3,5 m)
Automatik 4	40%	0,18 Sek.	small darting flame	45° sideways	2,5 m - **3,0 m** (3,5 m)
Automatik 5	50%	0,3 Sek.	medium darting flame	45° sideways	2,5 m - **3,0 m** (4,0 m)
Automatik 6	60%	0,5 Sek.	large darting flame	45° sideways	2,5 m - **3,0** m (4,0 m)
Automatik 7	70%	0,9 Sek.	long, large darting flame	Not recommend.	2,5 m - **3,5 m** (4,0 m)
Automatik ∞	≥ 80 %	Constant flame, restricted to max. 10 seconds		Not recommend.	2,5 m - **4,5 m**

The recommended safe distances **in** inclination direction apply **to persons and flameproof objects and materials in draft-free interiors.**

- With **maximum inclination, the bold printed value after the hyphen is valid,** with less inclination as the maximum-value is applicable suitable adjusted inter-value or the minimum-value of 2,5 m.

- The **values** in **brackets** are applicable as the extended minimum distance **for normally inflammable objects,** rooms with draft as well as **for participating persons which wear easily inflammable garments,** masks, props etc. Uninvolved (spectators) should keep principally 4.5 m of distance provided that (technical) measures do not effectively prevent an access to the danger area.

- The safe distances must be extended if necessary e.g. if there is a risks that due to artistic actions associates could not keep the distances correctly.

- The safety distances into **others than inclination direction** is at least **2.5 m** to the side, upwards 6 m, as well as 8 m for normal inflammables. (The safety-distance <u>opposite</u> to the inclination-direction can be reduced to approx. 1 m - 1.5 m for flameproof objects and instructed associates according to the inclination of the flame in the other direction)

    [1] *The minimum safety distance is the border to the danger area; every under run is connected with a risk.*

    [2] *For flame effects with (time-) values 1 an inclination of more than 15° is not recommended because a reliable ignition of the flame-effects then not ensured any more. An inclination of more than 45° should not be carried out in any case.*
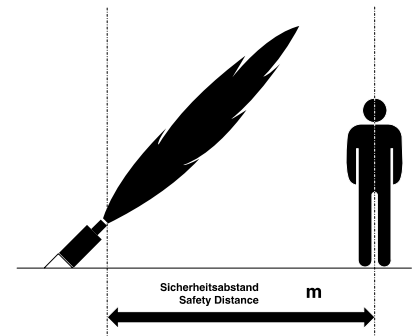
Mounting on Trusses or Operation in an elevated Position.

The **SAFEX-FLAMEJETTT**® can basically also be operated in an elevated position so long as the safety distance above it is adhered to.

A mounting plate with suitable tube clamps is required for mounting of the apparatus on a truss. The apparatus can be screwed onto the panel using the attachment plates. It is important to ensure that the tilt sensor is maintained in the correct position to prevent a malfunction report.

For this way of installation the rules and safety distances for using the apparatus on the floor already described in this instructions also apply analogously; if necessary also those for a additional slanted flame production.

If the installation takes place in such height that no persons can get into the danger area of the device, it is justifiable to apply the safety-distances only towards materials and inflammable objects.

Use Outdoors:

The apparatus is primarily designed for the use indoors.

Its operation outdoors is possible, but the apparatus has no special water/rain protection features and the opening from which the flames are issued is located on its top, above the high-voltage ignition electrodes.

Drops of water may bridge the electrodes, thus preventing the production of an ignition flame. Furthermore, the printed circuit board in the apparatus may get saturated with water or be destroyed. Electrical safety may be compromised by the entry of large quantities of water/rain (short-circuiting, mains voltage dispersion)

The **SAFEX-FLAMEJETTT®** should therefore be used outdoors only in dry weather and on a dry surface.

Water drops directly on the flame sensor lead also to fail detection and error messages. The device before all kinds, therefore must protect against splash water and used outdoors only in dry weather on a dry surface.

The effect of flames produced in broad daylight is not particularly dramatic; however, the flames are impressive outdoors at night.

LV (ANALOGUE) REMOTE CONTROLS:

The apparatus is prepared by the manufacturer for remote control via DMX 512. Three of the 5 poles in the 5-pole XLR-jacks are in use, conforming to DMX standards.

To make the use of the SAFEX-FLAMEJETTTs®, however, possible to users who do not have a DMX 512 control unit, the device is equipped since series V. 2.5. with 2 additional LV-remote control sockets. These are destined for the connection of user's own low voltage (LV) remote controls.

➜ The 3-pole LV-sockets are only **active/usable when this is preset with the programming mode.** (see section »Selecting remote control system/sockets« page 9)

The simplest form of remote control for the **FLAMEJETTT®** therefore consists of a cable* with a push button for the firing procedure and a switch for arming, at the other end of which there is a **3-pole XLR plug,** the poles of which must be used in accordance with the following shown circuit diagram (Fig. 8).

*(To ensure safe operation, only cables **that are similar to the standard for DMX 512, i.e. shielded and twisted data cables**, should also be used for operation with **l**ow **v**oltage remote controls.)*

Fig. 8	**Fig. 8 a**
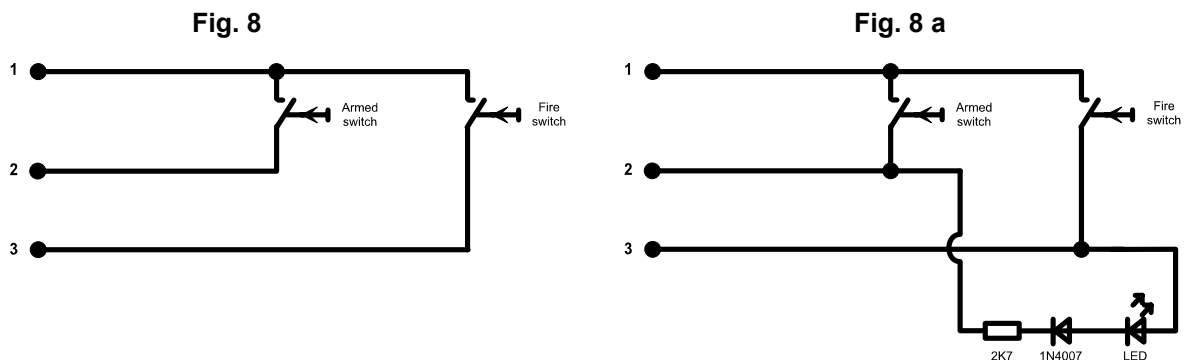
(Fig. 8a shows what is basically the same circuit diagram with an additional light-emitting diode)

The internal voltage of approx. 16 V= **cannot** be used to operate switches or signal lights and **cannot be replaced by external voltage.**

The signal controlling the opening of the fuel valves internally in the apparatus is generated by the switching operation and is maintained for as long as the switching contact is closed*.
(The maximum duration for flames of 10 seconds can also not be exceeded using this procedure)

However, if the apparatus' automatic mode and flame times are set to values between 1 and 7, production of the flame effect is only in accordance with the value set and it is subsequently stopped, even if the signal remains active.

If a pause / interval value is simultaneously set for the flame effect on the display, then the flame effect is automatically repeated so long as the remote control signal is still active.

Pre-setting of the **SAFEX-FLAMEJETTT's®** for the flame impulse and pause means these effects can thus be called up by activating the switching contacts.

If safe components are used for such remote controls (see above), then a remote control system is achieved that additionally needs to be protected from the dangers of erroneous triggering by ensuring that the **trigger push button is inaccessible to unauthorized persons.**

Slave cables that are used for user's own remote controls in accordance with Figs. 8, 8a or 9 or in connection with the **SAFEX-FLAMEJETTT®-REMOTE CONTROL** type **CFS** must, however, to be contacted in accordance with Fig. 8 or 9, and should be used only for the connection of **SAFEX-FLAME-JETTT's®**!

OTHER DIGITAL REMOTE CONTROLS:

Program-controlled LV- remote controls are also usable; e.g. with 0 to 10 V by means of a PC etc. and two potential-free relays. See Fig. 9 as well as the comparable section "DMX - EFFECT-PROGRAMMING"

Fig. 9: Control of the apparatus using 3-pole plug and two relays.

View from soldering side
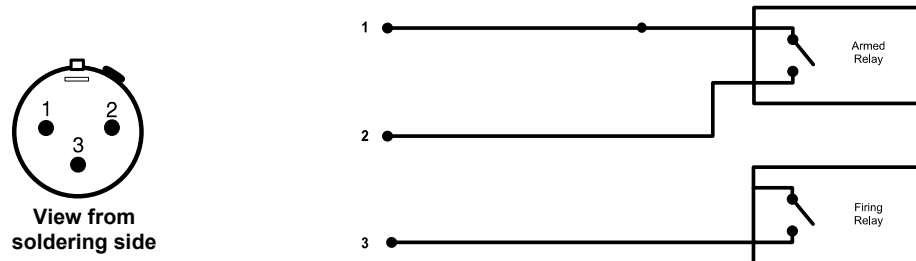
CHANGING NOZZLES

The **SAFEX-FLAMEJETT®** is fitted with a replaceable nozzle.

Nozzle no. 3 (manufacturer's standard) is best suited to standard operation with the **SAFEX-FLAME-JETT®-Cartridge** type 4S13.xx. However, **SAFEX®** can supply changeable nozzles with a smaller diameter (number 1) if flame height is to be reduced or restricted. The standard nozzle can be replaced with these and ensure that a certain flame height cannot be exceeded.

To do this, open the upper portion of the apparatus, as described for maintenance and servicing (do not forget to disconnect from the power supply), unscrew the nozzle with an Allen key and screw the new nozzle back in the same way (Attention: Do not forget the new or as good as new gasket, hand tighten the nozzle).

Close the apparatus properly before re-connecting to the mains!

Afterwards the nozzle change has to be programmed in program mode, as follows. This enables the apparatus to take the new nozzle in to account for self-test and the status display:

```
Wähle Option: ←→
Düsengrösse
```

Again the option has to be confirmed by pressing the O.K. button, the correct nozzle has to be chosen by the arrow keys and confirmed with the O.K. button.

```
Düsengrösse:          Düsengrösse:
Düse 3 mm OK? ←→   or  Düse 1 mm OK? →
```

Subsequently the apparatus confirms the change. (*In the version 3.5 SAFEX ® has already considered other nozzle sizes for new developments, at the moment, nevertheless, these are not available!*)

TRANSPORT AND STORAGE

Transport:

Aerosol cartridges are pressurized gas containers and, as such, are subject to a variety of European and national regulations:

The **SAFEX-FLAMEJETT®**-Cartridge/aerosol cartridges comply with these regulations. Therefore, the get-out clauses contained in the law for the transport and storage of small quantities can be taken advantage of:

Pressurized gas containers up to a maximum of 1 litre in volume can be packed in a robust cardboard box weighing up to a total of 30 kg brutto and can be transported by road (car/truck) without adherence to specific hazardous goods transport regulations, provided the packaging is marked with the (white) LQ sticker depicted in the following with the UN number 1950 and measuring 10 x 10 cm.

UN
1950

(ADR [2005], Chapter 3.4, number 3.4.3 in connection with Table 3.4.6 Code LQ 2)

The prohibition of loading this cargo onto the same vehicle as pyrotechnic items in accordance with ADR number 7.5.2 is also not applicable to this type of transport! **However, the packing of pyrotechnic items and pressurized gas containers in the same box is prohibited.**

The **FLAMEJETTT**® apparatus itself can also be transported by road (car/lorry) with a correctly inserted aerosol cartridge if packed in a robust cardboard box or transport box *(ADR, part 1, chapter 1; no. 1.1.3.1 para. b)*

ATTENTION: This simplified regulation is **only valid for transport by road** in Europe according to ADR. **Under no circumstances is it valid for transport by air or sea**. These modes of transport are governed by substantially stricter hazardous goods transport regulations that can be obtained from the relevant regulatory bodies.

Classification of the aerosol cartridge according to UN regulations:

ADR/RID class 2 no. 5 F - UN no. 1950 PRESSURIZED GAS CONTAINERS/AEROSOL, flammable

The **aerosol cartridges must therefore be packed separately from the apparatus in regulation packaging** for transport by **air or sea** and must be correctly marked when sent off for transport. This equipment is not permitted as passenger hand luggage on aeroplanes, but only as freight, and must be packed by an authorized company!

Storage of the aerosol cans

Simplified regulations are also valid for the storage of small quantities in **Germany:**

(Abbreviated excerpt)

Definitions and requirements in accordance with the "Technical Guidelines on Pressurized Gases" TRG 300 (17.8.1996):

⇨ **Storage rooms:** Rooms in which the area occupied by pressurized gas containers is no greater than 20 m² and that are used for the storage of pressurized gas containers.

These are thereby storage locations outside the sales rooms, in which limited quantities of aerosol cartridges (also together with other goods) are stored.

Storage not subject to authorization on an area of 20 m² is sufficient for most users, as the number of cartridges packed in units for distribution and stacked on an area of 20 m² is dependent only on the height of the stack and can, for example, amount to several 1000 units if shelving is used.

A detailed overview of the regulations can be obtained upon request from SAFEX® or can be downloaded from the SAFEX® homepage »www.safex.de«.

Storage, supply and sales room requirements:

● Heating of the cartridges to **above 50°C** must be prevented!

● Pressurized gas containers are **not to be stored or made ready** in passages or thoroughfares, stairwells, corridors of buildings or floors, or attics.

● Cartridges that are **leaking or otherwise defective** are prohibited from sale or use.

● The rooms must fulfil the usual planning control legal requirements,

● they must be **sufficiently well ventilated** and

- organized such that they can be safely and rapidly vacated in the case of danger (**emergency exits must be accessible**).

- **A fire extinguisher** filled with at least six kilos of extinguisher must be located next to each door, in sales rooms and in the vicinity of each sales stand.

- Packing units must be **stacked safely so they cannot topple over**,

- **Storage with pyrotechnic items is forbidden** (separate rooms).

Technical data: (version 3.5)

Manufacturer's settings:

Remote control sockets:	**DMX 5-pol.**
Automatic:	**ON**
Flame:	**3**
Interval:	**4**
DMX arming address:	**16**
DMX firing address:	**17**
DMX flame duration address:	**0 = OFF**
Nozzle:	**no. 3**
Language:	**German**

```
SN: A 9900058
BJ:   08/2006
```

Year of construction/ series-number: *Can be displayed in the standard mode with the arrow keys*.

Ambient temperature:	**from 5 °C to approx. 45 °C (Storage max - 10°C)**
Application area:	**dry indoor rooms**
Electrical data:	230 V AC / 50 Hz; 6.6 W (stand-by) 60 W active
Length:	**330 mm** (including cable sleeve support)
Width:	**221** mm (entire width)
Height:	**530** mm (including emission tube)
Weight:	**9.2 kg** (empty) 9.62 kg with aerosol cartridge
Remote control connection:	**5 -pole XLR**, 1 x IN, 1 x OUT **3 -pole for analogue remote control**, 1 x IN, 1 x OUT
Power supply	3 m rubber cable with Schuko plug, fixed connection
Remote control:	**DMX 512** or **SAFEX-FLAMEJETTT® remote control** type **CFS** alternative via two potential-free relays (for max. 16 V DC)
Flame duration:	max. **10 seconds**
Fuel:	**SAFEX-FLAMEJETTT®-CARTRIDGE** (aerosol can type 4S13.xx) **SAFEX-FLAMEJETTT® -MAXI-CARTRIDGE** (Type 4S13.xx)

Consumption: One **FLAMEJETTT®**-Cartridge can produce

- approx.   **450 fire balls** (automatic value: 1)
- or approx. **180 fire balls**
- or approx. **120 short darting flames** at approx. 3 m
- or approx. **70 long darting flames** at 3.5 - 4 m in height.

With the MAXI-CARTRIDGE with 800 ml fuel approx. 44 % more flames can be produced!

Optional accessories:	**SAFEX-FLAMEJETTT® remote control** type CFS
Special accessories:	**Nozzle for reduction of the flame height (nr. 1)**

Often a failure of the sensor is caused by debris covering the sensor or by strong fouling / scooting of the **slant sensor channel** [besides the hexagonal flame channel]. The inside of the sensor channel should also be <u>cleaned carefully</u>!