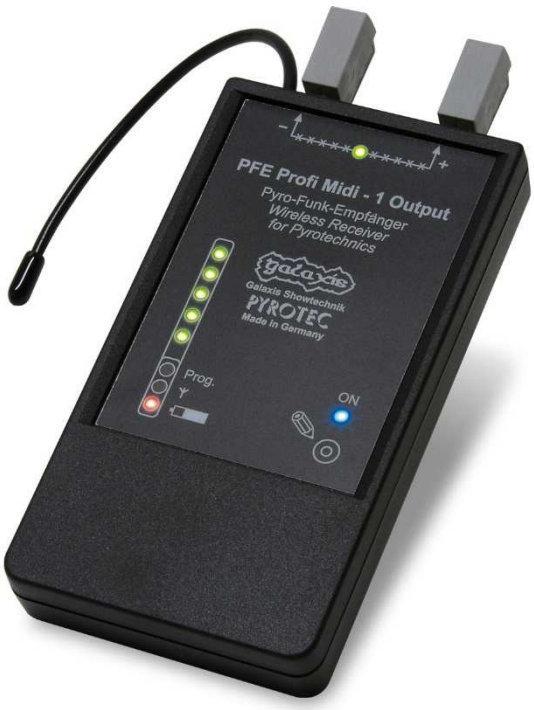
User Manual

Galaxis Showtechnik

PYROTEC

PFE Profi Midi 1 Output



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1 Introduction

1.1 Safety instructions

Observe all safety instructions in this documentation! Safety instructions warn of dangers when handling devices and provide information on how to avoid them. They are classified according to the severity of the danger and divided into the following groups:

DANGER 	Danger signals dangers for persons. If you do not follow the instructions for avoiding the hazard, the hazard will certainly result in death or serious physical injury.

WARNING 	Warning indicates dangers for persons. If you do not follow the instructions for avoiding the hazard, the hazard is likely to result in death or serious injury.

CAUTION 	Caution indicates danger to persons. If you do not follow the instructions for avoiding the hazard, the hazard is likely to result in minor physical injury.

NOTICE	Note signals dangers for objects or data. If you do not follow the instructions for avoiding the hazard, the hazard will probably result in damage to property.

TIP	A tip provides additional or supplementary information.

1.2 Requirements the operator has to fulfill and necessary qualification

This product may only be operated by persons of legal age. In Germany the user must be at least 18 years of age.

This product may only be used within the scope of a professional and occupational activity.

DANGER  2.1.1	**Unintended firing** Fatal injuries due to explosion/deflagration of pyrotechnic effects and compositions and secondary effects due to explosion (flying objects) • Handling of pyrotechnic items only by personnel qualified for the respective effect. • Intended use of the effects only. • Make sure that the required safety distance to persons is maintained. • Minimize the presence in the danger zone. • Follow all safety instructions and regulations at all times.

Make sure that all legal requirements for the performance of aerial display fireworks, stage fireworks (also known as close proximity pyrotechnics) and special effects are met in the respective country of use.

TIP	In Germany, these regulations of the employers' liability insurance association and the BAM, among others, apply: • DGUV-Vorschrift 213-049: Abbrennen von Feuerwerken • DGUV-Vorschrift 215-312: Sicherheit bei Veranstaltungen und Produktionen • BAM Py/2012/2: Leitfaden zu Sicherheitsmaßnahmen für das Verwenden von Feuerwerk der Kategorie 4

1.3 Safety Instructions

Safety instructions for the firing of pyrotechnical effects and aerial shells by using e-matches:

The following instructions are for your understanding about important and basic safety principles.

Our general safety requirements are based on our own experience plus the contact and feedback from our customers. These rules allow the safe and successful usage of all components of our wireless firing systems. With proceeding development of our products, we will continuously revise and adapt the safety standards in conclusion with your notifications and support.

The following safety instructions are part of all our operation manuals within our product range. These instructions are also available in printed form and can be downloaded via our internet homepage at any time. Please forward these instructions to any relevant persons in your company dealing with this topic.

Any technical device can potentially cause a fault. This could be encouraged through: wrong usage, unit damage, unit aging as well as the wear and tear of the unit. This fundamental thesis was the basic principle when writing these instructions.

1. Smoking or open fire is strictly prohibited within the safety zone!

2. Depending on the type, size and quantity of the pyrotechnical effects that are being used and depending on the local conditions, allocate the necessary fire prevention and first aid measurements.

3. In all cases respect and follow any national and technical regulations as well as the operation manuals respective to the pyrotechnical effects in use.

4. Make sure that non authorized persons are not within the vicinity of the pyrotechnical effects and to the respective firing system.

5. The safety boundary distances required by the manufacturer and authorities are to be respected. Secure the area so that non authorized persons cannot gain access to the same.

6. The operation manuals and safety instructions of the pyrotechnical manufacturers must be observed at all times. If in doubt these must be discussed with the relevant safety organisations.

7. The usage of pyrotechnical effects as well as the respective firing systems are only allowed to be used according to it's defined function.

8. The components of our firing system are to be covered or encased against burn-off cinders or weather conditions where necessary. Electrical contacts should be protected against corrosion, soiling and damage plus they should be cleaned regularly.

9. The contacts of the pyrotechnical articles or their e-matches, which have not yet been connected, must always be short circuited.

10. We recommend to have our products inspected every one to two years. Along with the testing of the rechargeable battery, a visual test as well as a functional test will prove that the operational safety standards are still met.

11. Do not use damaged equipment. If a damage is found, immediately send the device back to the manufacturer for professional repair. Our warranty for the proper function for our equipment is only for components of our system, which have no damage.

12. Any changes in the devices or to the firing system as well as repair work on the units other than that through the manufacturer will invalidate any warranty claims and our product liability will be void. Should repair of the units be necessary, then we do require a detailed report of the problem.

13. Please make sure when lending or renting out the equipment, that no damage has occurred during the rental period of the units. Advise your staff, that it is very important to report any possible damage of the units immediately. Customers, which have borrowed or rented the equipment are hereby informed, that it is their duty to report any damage found or suspected on the unit when returning such.

14. Wire connections from the firing device to the e-matches are always to be insulated. At the same time avoid wire damage, for example through heat, cable twisting, cable pinching and burn-off cinders or through forced piercing. All cables must be checked before each use on it's faultless construction. When using used wires we do recommend a continuity and short circuit test between each insulated connection before using it again.

15. The firing of igniters in accordance with 'SprengG' (i.e. German explosive law) is not allowed with our products. For this purpose only firing units with a special certification in accordance with 'SprengG' or equivalent are allowed. The same applies to high explosives.

16. Avoid unintended firing through electrostatic charging. When using e-matches, make sure that you only use those types which are protected against unintended firing through electrostatic discharges. The e-matches that you use should also have a BAM certification or equivalent.

17. Avoid possible or even physical contact of the e-matches or their firing lines with other conductible materials if the possibility is given that either a static discharge or potential equalization can arise.

18. Make sure that no unintended firing possibilities are given. Commonly caused either through strong electrical, magnetic, electromagnetical fields as well as other voltage sources.

19. An often underestimated risk are unintended firings due to live contacts found as charging contacts on mobile phones, walkie talkies as well as rechargeable battery driven tools. Even when due care and attention is taken, a battery pack or similar can be a hazard when dropped especially when live contacts are revealed.

20. Unintended firing can be caused by thunderstorms or the electrostatic fields during the drawing up of a thunderstorm. We recommend clearing and securing the area in question.

21. Another possible danger for unintended firings are potential equalization currents. Be aware that these currents may occur in between conductive building segments themselves or between these conductive segments and earth potential. Neither e-matches nor wiring should come in contact with such segments.

22. Please be aware that through your pyrotechnical effects ionized gases are created. The thereby produced ions increase the conductivity within the air. This ionization process can cause an electrical arcing especially within the vicinity of high voltage overland cables. This may lead to

lethal consequences for the pyrotechnicians and other persons. Please note that wind conditions can be totally different a few meters above the ground.

23. Please assure that the firing can only be initiated through the pyrotechnician. Keep firing system under lock and key! Within our safety concept, all firing systems are set with individual codes, which inhibit unintended and accidental firing through third parties. If requested we can also supply systems with the same coding. This may be necessary if in a company more than one transmitter is used or when companies exchange the units between each other.

24. With our using the key code numbers 901 and 311, we are using a standard key code, which can also be found in other products. On a customer's request we can also supply other key codes.

25. Please ensure that the relevant safety distances are met by everybody. The safety margins are to be kept as from the beginning of the project until the pyrotechnician releases the area after firing and containment of unfired effects and shells.

26. Connect at all times first the e-match to a 100% non-live firing line, which is also not connected to a firing unit. A pyrotechnical effect is given from the time onwards as 'armed' when the e-match wires are connected to the firing unit. This is independent if the units are on or off!

27. In the interest of your own safety and protection of the devices always use a sufficient length of firing wire.

28. Along with a sufficient length of firing wire you should ensure also the following:

In the field of display fireworks: The fireworks shells are only allowed to be loaded after the mortars have been stabilized and secured. Only after loading it is then allowed that the e-matches are connected to the respective firing units. At all times the most important rule is to never put your head or other part of the body into or over the mortar opening. This would also apply to other pyrotechnical effects.

In the field of special effects: Depending on the explosiveness of the pyrotechnical effects or materials that are being used it is advisable to proceed with higher care and attention (lies within the pyrotechnician's responsibility) and this could include for example a short circuit bridge over the contacts of the e-match to prevent unintended firing. Also it is possible to make a physical switch breakage in the firing line, which is only then closed when all safety instructions are met and kept! Should there be any unclarified situations, then discussions with the safety authorities are to be taken until all is clear for everyone. When it comes to the safety of your projects we are at all times at your disposal to develop a customized safety concept.

29. Make sure the devices are switched off before connecting the e-matches.

30. When stripping the cable insulation of the igniters and connecting them, you have to make sure that they are not stripped so long so that the conductors can touch each other. Short circuits between different outputs must be avoided by all means because this may cause unwanted firings.

31. When checking the various system parameters as well as during firing, nobody is allowed within the danger zone.

32. After the effects have been fired, an ample amount of time should be given before disassembling the pyrotechnical setup. Before securing

possible unfired effects first disconnect the corresponding wiring and then switch off the receivers. Especially in the field of special effects, during the installation special care should be taken of how to disassemble unfired effects or installations in a safe way.

33. When using receivers inside of Zarges cases it is important to make sure that the top case (aluminium top) is closed during the fireworks display. The lashes of the bottom case have to be locked to the top case. There is still enough space for the wires of the e-matches going out on both sides of the case. This guarantees the safety and protection of the receiver and also prevents opening of the top case due to windy conditions.

34. Read the user manual of all devices completely and follow all given instructions. Teach your staff and everyone in your company who will work with the devices.

35. Only use original accessories. Otherwise, the safety of the equipment cannot be guaranteed. Further information can be found in the chapter 'Accessories' in the respective user manuals.

The most current version of the safety instructions is always available in the download section of our website: www.galaxis-showtechnik.de

1.4 Application fields

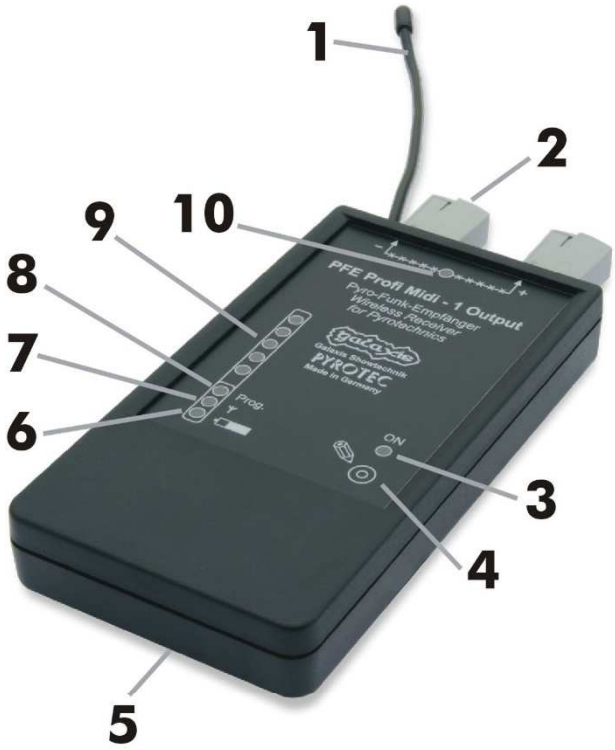
The receiver PFE Profi MIDI 1 Output has solely been designed for the firing of non-hazardous indoor effects like candles and ice fountains on tables or other gastronomical applications. This area is also known as 'Table top pyro'. Another application is the firing of illumination products or bengal torches outdoors. In this case the device must be protected against moisture. The user has to make sure that persons and property is not endangered at any time.

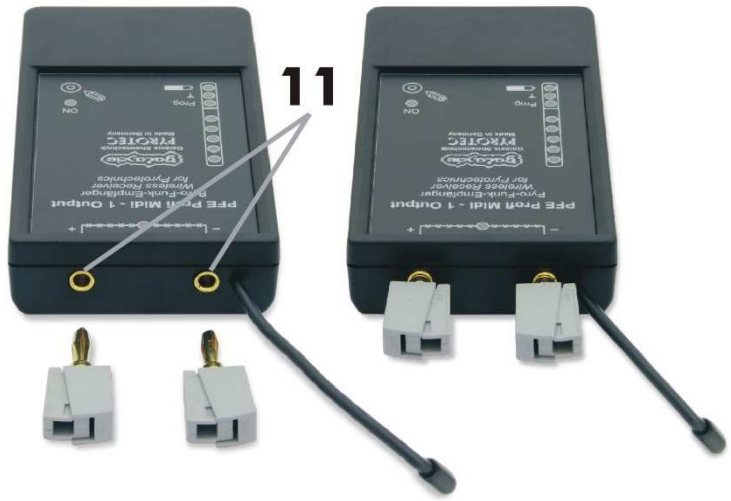
Please follow all relevant safety instructions for the usage of pyrotechnical firing equipment and the specific laws of the country where you are using indoor effects.

The unit is not intended for use in aerial or display fireworks (categories 3 and 4).

Nor may explosives or high explosives be fired under any circumstances. Specially certified firing systems must be used for this purpose.

2 Illustration





2.1 Description of indicators and control elements

1	Antenna	
2	Firing output	Insert quick-fastening clamps here
3	LED indicator 'Operation'	Flashes in blue color while the device is in operation
4	Sensor field 'On'	To control the device with the magnetic pen
5	Battery compartment	The battery compartment is on the bottom side of the receiver. Move the small slider to open and close it.
6	LED indicator 'Battery'	Flashes in red color as a warning that the battery level is low. Is continuously lit in red color when the battery level is being displayed on the LED.
7	LED indicator 'Range Test'	Is lit in green color when the result of the range test is being displayed on the LED bar.
8	LED indicator 'Programming Mode'	Is lit in yellow color when a programming mode is active. There are two different programming modes: Teach in to the system ID of the transmitter and programming of the firing channel.
9	LED bar indicator	Five green LEDs display the result of the range test and the battery level. The more LEDs the higher the result.
10	LED 'Output'	This bicoloured LED displays the status of the firing output: 1. The flashing in green color is the continuity test. On for a long period = no continuity On for a short period (short flashes) = firing line has continuity 2. The LED is lit in red color when firing.
11	Sockets for firing output	Quick-fastening clamps or banana plugs are to be inserted here.

3 Basic operation of the device

3.1 Insertion of batteries, power supply, operation time

First you have to insert new batteries. Please mind correct polarity. Open the battery compartment, insert the batteries and close the lid again afterwards.

You should remove the batteries if you do not use the device for a longer time.

The maximum operation time is approx. 20 hours.

WARNING  2.1.6	**Leaking batteries or moisture in the device** Leaking batteries or moisture in the device may trigger firings. • The device must be protected against moisture. • Do not use the device after ingress of moisture. • If batteries have leaked, send the device to the manufacturer for repair. • Follow all safety instructions and regulations at all times.

3.2 Operation, switching on and receiving mode

To switch on the device activate the sensor field 'On' for a short period of time. The blue LED above the sensor field is lit. You may remove the magnetic pen once you see this blue LED. After that the blue LED is flashing. The device is in receiving mode.

In addition you see the LED 'Output' flashing in green color. Please see the section 'Continuity test' for more detailed information regarding this.

There is a capacitor in the device to store the firing energy. This capacitor is being charged with approx. 20 Volts all the time during operation. Right after switching the device on the charging level may be too low until the maximum level is reached after approx. 30 seconds.

Due to that you need to wait at least this time until the capacitor is completely charged.

3.3 Displaying the battery status

After activating the sensor field 'On' for several seconds with the magnetic pen the red LED 'Battery' is lit. The LED bar with up to five green LEDs is lit simultaneously.

The more green LEDs are on the higher the remaining capacity of the inserted batteries is.

The following rule of thumb applies:

✱✱✱✱✱	approx. 100% remaining capacity	up to 20 h operation time left
✱✱✱✱	approx. 80% remaining capacity	up to 16 h operation time left
✱✱✱	approx. 60% remaining capacity	up to 12 h operation time left
✱✱	approx. 40% remaining capacity	up to 8 h operation time left
✱	approx. 20% remaining capacity	up to 4 h operation time left

The mentioned values for the operation time can only be achieved if high quality alkaline cells with a capacity of at least 2,700 mAh are being used. In addition, an e-match must be connected during operation (less power consumption due to the flashing LED of the continuity test function).

3.4 Batteries, operation time and battery monitoring

Some commercially available alkaline batteries show a strong decline of power if used in cold environments. If you use the device at low temperatures, approx. below +10°C, we recommend to use AA lithium batteries. These batteries have also a voltage of 1.5 Volts.

Once the device is switched on the batteries are constantly being discharged. The operation time is approx. 20 h if alkaline batteries of high quality are being used.

If the batteries are discharged so that the remaining energy is approx. 30% of the initial level an optical warning signal will be given. The red LED 'Battery' is flashing in this case.

Even when the batteries become weak the firing power is not impaired. The capacitor is still being charged completely.

At the end of the battery life the device switches itself off.

3.5 Switching off

To switch off the device manually use the magnetic pen and activate the sensor field 'On' for a short period of time (approx. half a second). After removing the pen the device powers down and all LEDs are off. You should remove the batteries if you do not use the device for a longer time.

If you have no magnetic pen at hand you may remove one of the two batteries for a short time to turn off the device as well.

After firing the devices powers down automatically to prevent the batteries from being unnecessarily discharged.

3.6 Teach-In of the device to a controller PFC Advanced, PFS Profi or PFS Pocket

The device offers a teach-in mode.

The device has been programmed to your system ID before shipment so that it will only respond to your controller.

Each system has its customer specific system ID. Only devices with the same system ID can be operated together.

To teach-in the receiver to any other controller proceed this way:

First you have to select the correct radio channel. If a PFC Advanced is being used you can do this in the submenu 'Radio channel management' under 'Select the radio channel for this controller'. Select radio channel 41 here. If you are using a PFS Profi the radio channel can only be selected by the manufacturer. If your PFS Profi is not transmitting on radio channel 41 (434.075 MHz) this receiver cannot be controlled. The frequency of the PFS Pocket can be changed in the submenu 'Special Functions'.

Make sure that the receiver is switched off. Switch on the controller. When using a PFC Advanced call up the menu 'Transmit System ID'. If your PFC has an old firmware version without this function you can perform the same teach-in procedure as described below for the PFS Profi. A PFS Profi is operated in manual firing mode, firing mode off (disarmed).

Switch on the receiver by activating the sensor field 'On' for approx. ten seconds until the yellow LED 'Programming Mode' is lit. Before that the blue LED 'On' is active continuously.

Remove the magnetic pen. The yellow LED 'Programming Mode' is flashing now. The device is in teach-in mode which is not limited to a certain period of time.

To perform the teach-in with a PFS Profi activate the firing mode at the controller. In this moment a command with the code is being sent and the yellow LED for the programming mode is on for some time until it is turned off. The receiver changes to receiving mode. It has been successfully taught to the system ID of the controller.

If using a PFC Advanced activate the function 'Transmit System ID'.

If using a PFS Pocket navigate into the submenu 'Special Functions' and press the 'DM' button.

The device stores this information permanently so that the programming is still present after switching the receiver off and on again or if the batteries have been removed.

You should program the required firing channel right after the teach-in sequence and test if the device correctly responds to the firing commands.

By a short activation of the sensor field 'On' you can quit the teach-in mode and switch the device off.

3.7 Programming of a firing channel

The device has been programmed to the default setting before shipment which is firing channel 1.
To program a firing channel proceed this way:

Switch on your transmitter PFS Profi or PFC Advanced. Operate the transmitter in manual firing mode, with the key switch 'firing mode' in off position.

Select the firing channel to be programmed by using 'Up' and 'Down' or the keypad at the transmitter.

If using the PFS Pocket navigate into submenu 'Special Functions'. Here you can use the firing channel buttons 1-6 to address a firing channel into the PFE Profi Midi 1.

Switch on the receiver as usually and remove the magnetic pen from the sensor field.

After that activate the sensor field 'On' for at least 10 seconds. First the device will display the battery status on the LED bar. This will vanish and shortly after that the yellow LED 'Program Mode' will be lit. Only now you may remove the magnetic pen from the sensor field.

You see a LED chaser on the LED bar. This informs you that the device is in the firing channel program mode. In addition, the yellow LED 'Program Mode' is on. This mode is temporary. If no programming command is being received the device changes to the normal receiving mode after some time.

Program the required firing channel by pressing the key 'Range Test' at your PFS Profi, PFS Pocket or by pressing the key 'Wireless Programming' at your PFC Advanced. This key is labelled in the LCD with an antenna symbol and the tag 'Prog.'.

As soon as the command has been received all five green LEDs of the bar are flashing several times. The device is storing the channel information permanently. The programming will be present again if the device is being switched off and on again or if the batteries have been removed.

After that the device returns to the receiving mode.

By sending a firing command you can check if the device responds. Naturally you have to ensure that no effect e.g. at another receiver is being fired unintentionally when doing so.

TIP	The device will also fire if a firing command is being sent while the programming mode is active.

4 Radio range

The maximum radio range that can be achieved with this device strongly depends on the conditions of the individual application.

The following general rule applies: The higher the antenna is positioned the better the reception is.

The alignment of the antenna is important, too. Due to the fact that the transmitter antenna is mounted vertically the receiver's antenna should be aligned vertically as well. Furthermore, it should protrude without being covered by the housing.

The radio signals should not be shielded by any conductive material, e.g. cables, around the antenna.

A radio range of 500 m is possible with this device outdoors if conditions are good.

The actual conditions in practical installations may be different than the ideal ones, resulting in lower range. Especially a missing free line of sight or obstacles like reinforced concrete walls lead to a considerably reduced radio range.

By performing a radio range test you get a result as a percentage value and if necessary you can take rather simple measures to improve the reception considerably.

The radio range that can be achieved depending on the conditions is:
Outdoors: 150 ... 500 m
Indoors: 50 ... 200 m, in large venues and with free line of sight also much more

4.1 Radio range test

As soon as the device is in receiving mode you may invoke a radio range test any time.

Make sure that all conditions are similar to the situation when the device will be used later when firing and start the test at your controller.

If the device received the test command the green LED 'Range Test' will be on. That is the indicator with the antenna symbol next to it. The result is being displayed on the LED bar simultaneously.

As a rule of thumb, the following applies:

✱✱✱✱✱	approx. 90% of the maximum field strength
✱✱✱✱	approx. 70% of the maximum field strength
✱✱✱	approx. 50% of the maximum field strength
✱✱	approx. 30% of the maximum field strength
✱	approx. 10% of the maximum field strength

A result of two LEDs (i.e. 30%) is sufficient for a good radio contact.

The displayed result can also be understood as remaining radio range. That means if you see three LEDs (i.e. 50%) you can approx. double the distance until the signal becomes too weak for reception.

5 Establishing the connecting between the output and the e-matches, quick-fastening clamps

In general, the e-matches are only to be connected when the device is switched off. By this practise there is no danger if the controller is not supervised.

As soon as an e-match is connected and during establishing the connection as well the device and the attached pyrotechnical effects are to be treated as 'armed' and therefore handled with maximum caution. Depending on the individual application, safety measures that are within the sole judgement of the user are to be met before that moment.

Insert the supplied quick-fastening clamps into the sockets on the front side. These clamps are not isolated because of the pin. In general, any usage with voltages higher than 60 Volts is prohibited. Furthermore, the item may only be used together with the products of the manufacturer.

If the clamp is squeezed the mechanism opens and you can insert a solid or stranded wire and clamp it. In case of wear and tear the quick-fastening clamps can easily be replaced. These quick-fastening clamps are only obtainable from Galaxis Showtechnik GmbH.

Alternatively, banana plugs may be used with the sockets, too.

If you want to fire more than one e-match we always recommend to connect them in series because this circuitry provides better testing.

When you are not sure if a circuit of several e-matches can be fired reliably you should test it several times.

6 Continuity test (OK test)

After connecting the e-matches you can easily check if the firing line has continuity.

Switch on the device. The output LED is flashing in receiving mode in green color.

If the LED is on for a long period of time the output is open (i.e. high resistance).
If the LED is on for a short period of time the output has continuity respectively the firing line has a low resistance.

TIP	The device cannot distinguish between an e-match and a short circuit.

7 Firing, firing parameters and firing power

7.1 General information

The battery voltage of approx. 3 Volts is being used to internally generate a firing voltage of 20 Volts. A capacitor is being charged with this voltage. The maximum firing power is at your disposal after an operation time of approx. 30 seconds.

WARNING  2.1.2	**Unintentional triggering of an effect** Technical faults could possibly trigger firings. • Only connect the effects when the device is switched off. • Follow all safety instructions and regulations at all times.

The firing output is protected against short circuits and cannot be damages by overload conditions.

No error-prone and shock-sensitive relays are being used for switching the output power. Instead solid-state transistors ensure reliable and safe operation.

The following types of e-matches are most commonly used in Europe: Type 'A' with an all fire current of 0.8 Amperes and type 'U' with an all fire current of 1.5 amperes.

7.2 Serial circuitry

Up to 10 e-matches can be fired if connected in series. In this case it does not matter if igniters of type 'A' or 'U' are being used.

With serial circuitry you should pay attention that only igniters of the same type are being connected together.

7.3 Parallel circuitry

Up to 10 e-matches of type 'A' or 5 e-matches of type 'U' can be fired if the igniters are connected in parallel. Especially if the individual firing lines are not connected directly at the device but a common line is being used then you have to ensure that the cross-section of the cable is sufficient.

7.4 Mixing serial and parallel connection

Normally you should not mix these connecting methods because it is difficult to determine if all e-matches will fire.

7.5 Firing duration

Fire the firing channel which you have programmed to the device at your controller.

Once the command has been received the device fires the output. It will active for 2.6 seconds. During that period of time the output LED is lit in red color.

The firing delay is approx. 1/20 second.

As soon as you switch on the device and an e-match is connected to the output you have to ensure that there is no unintentional firing due to unauthorized personnel or carelessness. Make sure that the controller is kept in a safe place and that the keys are removed as soon as a receiver is in operation.

TIP	Immediately after firing the output the devices power down automatically to prevent the batteries from being discharged unnecessarily.

8 Notes regarding the housing and the protection against humidity and moisture

The device is not waterproof. Protect it against moisture and water. In case of moisture ingress or if the batteries have leaked out the device is no longer allowed to be used.

WARNING  2.1.6	**Leaking batteries or moisture in the device** Leaking batteries or moisture in the device may trigger firings. • The device must be protected against moisture. • Do not use the device after ingress of moisture. • If batteries have leaked, send the device to the manufacturer for repair. • Follow all safety instructions and regulations at all times.

Opening the housing by removing the screws is prohibited. Only the manufacturer is allowed to repair the device.

9 Cleaning and Maintenance

Use a piece of cloth that was moistened with water and at most with dishwashing agent, for cleaning the device. Strong detergents and abrasives could damage the surfaces. Keep all electrical contacts always clean.

In general, the PFE Profi Midi 1 Output needs no special maintenance if used properly. But we recommend to send the receiver every one or two years to the manufacturer to have all functions tested.

10 Warranty

The warranty period is 24 months. If there is any defect during in this period please pack the device properly and send it to the manufacturer with carriage paid to have it repaired free of charge. Please do not forget to attach a description of the symptoms, which have occurred.
Warranty is excluded if the device was damaged due to wrong usage or excessive stress.
Unauthorized repairs and the use of non-original parts will void all warranty, guarantee and product liability claims with immediate effect.

11 Damages caused by misusage, maloperation, malfunction

The devices have been solely designed for firing of harmless pyrotechnical effects like ice fountains during indoor events. Discuss all other applications with the manufacturer before usage and inquire written permission. In case that one of the events stated above has happened we are only liable if the causation was within our range of influence. The devices have been developed, manufactured and tested to the best of our knowledge and belief.

Especially the user's work must comply with the safety instructions at all times.

Please follow the instructions given here e.g. regarding protection against water and moisture ingress.

12 Quick reference, the most important facts on a single sheet

Basic requirement: Transmitter/Controller PFS/PFS Pocket/PFC operating on frequency 434.075 MHz (i.e. radio channel 41)

Batteries: 2 pcs. Alkaline 1.5 Volts, size AA

Switching on: Short activation of sensor field 'On', devices starts, receiving mode
Switching off: Short activation of sensor field 'On'

How to determine the battery status:
Activate the sensor field 'On' for several seconds while the device is in receiving mode. The LED 'Battery' goes on and the LED bar shows the battery level.

✱✱✱✱✱	100%
✱✱✱✱	80%
✱✱✱	60%
✱✱	40%
✱	20%

Teach-in of the device:
Set your controller to radio channel 41 (434.075 MHz). The frequency of the PFS Profi can only be changed by the manufacturer. Receiver is switched off. Activate sensor field 'On' and keep it activated until the yellow LED 'Programming' goes on. Operate PFS Profi in manual firing mode and then activate the firing mode or if PFC Advanced is being used press 'Transmit System ID' in the corresponding submenu of the menu 'System ID Management'. If using the PFS Pocket use the button 'DM' in the submenu 'Special Functions'.

Programming of the firing channel:
Switch on the controller and select the required firing channel in the manual firing mode. Receiver is in normal operation mode (receiving mode). Activate the sensor field 'On' until the yellow LED 'Programming' goes on. Press the button 'Range Test' at the PFS Profi or 'Wireless Programming' at the PFC Advanced. If using the PFS Pocket use the firing channels 1-6 in the submenu 'Special Functions'.

Range test:
Start the test at your controller. The LED 'Range Test' goes on and the test result is being displayed on the led bar:

✱✱✱✱✱	90%
✱✱✱✱	70%
✱✱✱	50%
✱✱	30%
✱	10%

Continuity test:
LED 'Output' is on for a long period of time = firing line is open, no continuity
LED 'Output' is on for a short period of time = firing line has continuity

Low battery indicator:
If the battery level is less than 30% the LED 'Battery' begins to flash as a warning signal.

Firing power and firing parameters:
max. 10 e-matches of type 'A' or 'U' in series connection
max. 10 e-matches of type 'A' or max. 5 e-matches of type 'U' in parallel connection
Maximum resistance if e-matches of type 'A' are being used in series connection: 20 Ohms
Maximum resistance if e-matches of type 'U' are being used in series connection: 10 Ohms
Firing voltage: approx. 20 Volts

Maximum operation time: 20 h

Firing: LED 'Output' is lit in red color, device automatically powers down immediately after firing

Protect the device against moisture. Read the user manual completely and mind all safety instuctions.

13 Technical data

Radio parameters	Frequency Band: 433.05 - 434.79 MHz Channel Spacing: 25 kHz Number of radio channels: 1 Frequencies: default and fixed: 434.075 MHz available upon request: 434.600 MHz or 434.700 MHz Modulation: FM narrow band Frequency Shift: +/- 3 kHz Radio equipment class according to 2014/53/EU (RED): 1 Radio equipment type: non-specific short range device, receiver Receiver Category according to ETSI EN 300 220 V3.1.1: demanded by the application: 3 (lowest performance level) fulfilled by the device: 1 (best performance level) The receiver category indicates how well the device can still receive radio protocols when strong signals are present on frequencies below and above the used frequency (blocking). Receiver Principle: Double superheterodyne Receiver Sensitivity: -119 dBm @ 12 dB SINAD Wave Length: 70 cm Wire antenna, permanently installed: Center Frequency: 434 MHz Radiation Pattern: omnidirectional Radiator Length: Lambda/4, not coiled Antenna Gain: 0.00 dBd, 2.15 dBi
Protocol parameters	simplex, PCM with Manchestercoding, Checksum: 40 Bit CRC, data rate approx. 2,500 bps
Temperature range	Transport und storage: -30 to +70°C Operation: -20 to +65°C The maximum temperature difference between devices must not exceed 60 K in order to enable unimpaired radio communication.
Humidity	10 - 90% rH, no condensation
Allowable altitudes above sea level	Storage and transport: -500 to 12,500 m Operation: -500 to 4,000 m
Protection class	III

Dimensions and weight:
65 x 21 x 120 mm without quick-fastening clamps
65 x 21 x 145 mm with quick-fastening clamps
160 g including batteries

Power supply: 2 x AA batteries with 1,5 Volts

Operation time: approx. 20 h if alkaline batteries with 2,700 mAh are being used

Firing power and firing parameters:
max. 10 e-matches of type 'A' or 'U' in series connection;
max. 10 e-matches of type 'A' or max. 5 e-matches of type 'U' in parallel connection;
Firing delay: approx 1/20 second;
Maximum resistance if e-matches of type 'A' are being used in series connection: 20 Ohms;
Maximum resistance if e-matches of type 'U' are being used in series connection: 10 Ohms;
Firing voltage: approx. 20 Volts;
Capacity of firing capacitor: 2,200 µF;
Firing energy: 44 mC

Supplied accessories, included in delivery:
1 User manual
2 Quick-fastening clamps

To operate the device a magnetic pen is required which is included in the delivery of the controllers and is available as accessory part, too.

14 Compatibility and Firmware Revision History

The device can be controlled with these transmitters:

- **PFC Advanced, firmware V2.6BX or later**
  It is required that radio channel 41 (434.075 MHz) has been selected. The user can choose this channel in the menu 'Radio Channel Management'. The device is only able to receive commands and due to that remote data requests are not possible.
- **PFS Profi, firmware V2.0d or later**
  It is required that the device is operated on radio channel 41 (434.075 MHz). The radio channel can only be determined by the manufacturer.
- **PFS Pocket**
  It is required that radio channel 41 (434.075 MHz) has been selected. The user can choose this channel in the menu 'Radio Channel Management'.

The firmware of the devices is continuously developed. Information about changes between different firmware versions is available on request. Please inform us about the version you are currently using. We will then send you an easy-to-understand extract from the firmware revision history.

15 Accessories

Below is a list of original accessories that can be obtained from the manufacturer or authorized distributors at any time. The device may only be operated with these original accessories. Otherwise, all claims arising from warranty, guarantee and product liability will become void with immediate effect.

Item No.:	Description
1311	Magnetic pen
1927	Power Pack
1391	Quick-fastening clamp

16 CE marking

This device is marked with the CE logo:

Each device accompanied by an EU Declaration of Conformity.

17 Address of the manufacturer and contact details for requesting an EU declaration of conformity

Galaxis Showtechnik GmbH
Lohgerberstr. 2
84524 Neuötting
Germany

Tel.: +49 / 8671 / 73411
Fax: +49 / 8671 / 73513

Homepage: www.galaxis-showtechnik.de
E-Mail: info@galaxis-showtechnik.de

Please use these contact details if you want to request an EU declaration of conformity.

Each device accompanied by an EU Declaration of Conformity.