User Manual

Galaxis Showtechnik

PYROTEC

PFS Pocket

Firmware 1.3

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1. Safety Instructions

Date: Nov. 23rd 2017

Safety regulations for the firing of pyrotechnic effects, fireworks and aerial shells using e-matches:

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

Our general safety requirements are based upon our own experience and feedback from our customers. These rules allow the safe and successful use of all components of our wireless firing systems. With continuing development of our products, we will review and revise the safety standards and procedures accordingly.

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 and associated products.

Any technical device can potentially cause a fault. This could be encouraged through: misuse, 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 naked flames are strictly prohibited within the safety zone!

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

3. In all cases respect and follow any national legislation and codes of practice as well as the instruction manuals and data sheets relating to the pyrotechnic effects in use.

4. Make sure that no unauthorized persons are within the vicinity of the pyrotechnic effects, and the respective firing system.

5. The safety distances required by the manufacturer and authorities are to be respected. Secure the firing area so that no unauthorized persons can gain access to it.

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

7. The use of pyrotechnic effects and associated firing systems must only be used according to their defined functions.

8. The components of our firing system are to be covered or protected from burn-off cinders, debris and weather conditions where necessary. Electrical contacts should be protected from corrosion, soiling, damage, and 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 (shunted).

10. We recommend having our products inspected every one to two years. Along with the testing of the batteries, a visual test as well as a functional test will prove that the unit is functioning safely and correctly.

11. Do not use damaged or faulty equipment. If equipment is damaged or faulty, return it to the manufacturer for professional repair. Our warranty for the proper function for our equipment provides for defective parts or faulty workmanship, and does not include equipment or items that are damaged, or show signs of abuse.

12. Any changes made to the devices, or to the firing system as well as repair work on the units other than that done by the manufacturer will invalidate any warranty claims, and our products 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 that when lending or renting 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, that 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 should always be insulated. Avoid wire damage, for example through heat, cable twisting, cable pinching and burn-off cinders or through forced piercing. All cables and wiring must be checked before use to ensure that circuits are correctly wired, and within the correct resistance limits. During repeated use of wires and cables 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 BAM certification in accordance with §5 '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 physical contact of e-matches or their firing lines with other conductible materials if it is possible that either a static discharge or potential equalization can arise.

18. Make sure that no unintended firing situations can occur. Common causes can be through strong electrical, magnetic, and electromagnetic fields as well as other voltage sources.

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

20. Unintended firing can be caused by thunderstorms or the electrostatic fields built up during the approach of a thunderstorm. We recommend evacuating and securing the pyrotechnics area in this situation.

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

22. Please be aware that through your pyrotechnical effects ionized gases are created. These ions increase the conductivity within the air. This ionization process can cause an electrical arcing especially within the vicinity of high voltage overhead cables. This may lead to lethal consequences for pyrotechnicians and other persons. Please also note that wind conditions can be totally different a few metres above the ground.

23. Ensure that the firing of pyrotechnic effects can only be undertaken by the authorized pyrotechnician. Keep the firing system under lock and key when not in use, and ensure it is never left unattended during use, with the key in it! 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 within a company more than one transmitter is used or when companies exchange the units between each other.

24. By using the key code numbers 901 and 311, we are using a standard key code, which can also be found in other products. Upon customer request we are able to supply other key codes.

25. Please ensure that the relevant safety distances are met by everybody. The safety margins are to be kept in place from the beginning of the event until such time as the pyrotechnician releases the area after firing, and removal of unfired products and effects.

26. At all times first connect the e-match to a 100% non-live firing line, which is not connected to a firing unit. A pyrotechnic effect is classed as 'armed' from the time the e-match wires are connected to a firing unit. This is irrespective if the firing unit is switched on or off!

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

28. Along with sufficient lengths of firing wire you should also ensure the following:-

In the field of display fireworks: The aerial shells or mines must only be loaded after the mortar tubes have been stabilized and secured. It is only after the loading of the tubes are completed that it is permissible to connect the e-matches to their respective firing units. At all times the most important rule is to never put your head or other body parts into or over a mortar tube. This would also apply to other pyrotechnic effects.

In the field of special effects: Depending on the explosive power of the pyrotechnic effects or materials that are being used it is advisable to proceed with more care and attention (lies within the pyrotechnican'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 regulations are met and kept! Should there be any unclarified situations, then discussions with the safety authorities are to take place until everything is clarified and understood by everyone. When it comes to the safety of your projects we are available to assist you to develop a customized safety procedure.

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 must ensure that they are not stripped so far back that the exposed conductors can touch each other. Short circuits between different outputs must be avoided 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 to ensure that any unfired material can safely be located and dealt with. Before securing possible unfired effects first switch off the receivers, and then disconnect the corresponding wiring. In the field of special effects, care must be taken during disassembly of unfired effects or installations. Work must be conducted in a safe way, and must only be carried out by a competent person.

33. Make sure that only original parts (e.g. chargers, connectors, etc.) are used. Otherwise the warranty and claims under product liability will be invalidated.

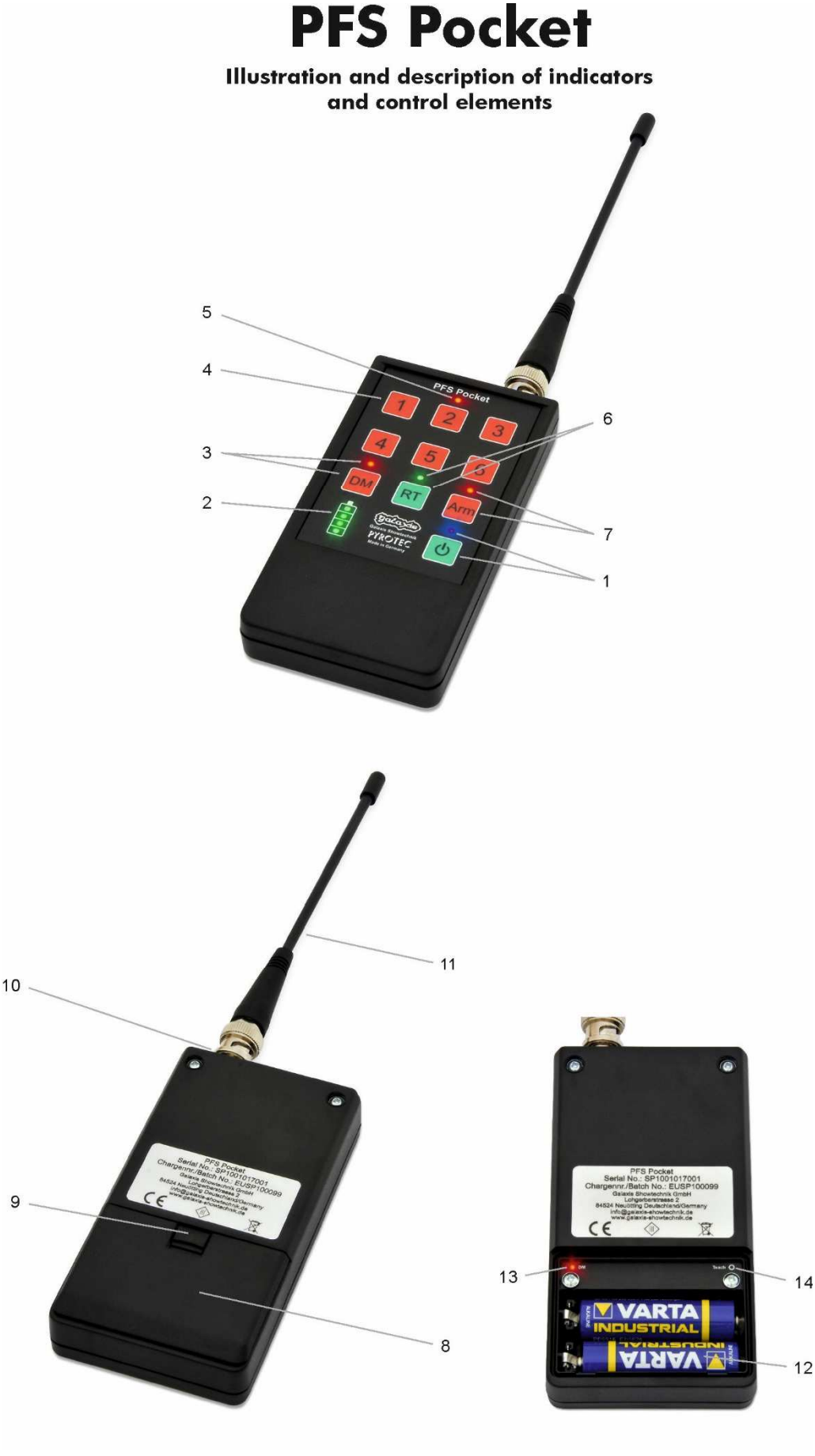
34. When using receivers inside Zarges cases it is important to ensure that the case lid (aluminum top) is closed and latched shut during the fireworks display. There is still enough space for the wires of the e-matches to go out on both sides of the case. This guarantees the safety and protection of the receiver and also prevents the top of the case opening in windy conditions.

35. Read the instruction manuals of all the equipment completely and follow all the instructions. Everyone in your company who will work with the equipment must receive information, instruction, training and supervision with regards to the safe use of the equipment.

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

PFS Pocket

Illustration and description of indicators and control elements



3. Description of indicators and control elements

1	Main switch and LED "On"	Switching the PFS Pocket on or off. The blue LED shows the status.
2	Battery status	Four green LEDs indicate the battery status in 25% increments.
3	Button and LED "Dead Man"	Dead-Man-Button and red LED "Dead Man".
4	Firing button firing channel 1	Fires channel 1. The buttons for firing channels 2 to 6 are in the upper area of the front panel and indicated with their specific number.
5	LED "Fire"	Ignites when a firing command (channel 1 to 6) is transmitted.
6	Button and LED "Range Test"	Initiates a radio range test. During the radio range test the LED is illuminated.
7	Button and LED "Arm"	Button to activate and deactivate the firing mode. If the firing mode is activated, the LED is illuminated.
8	Battery Cover	The batteries are located in this compartment under the cover.
9	Battery Cover Lock	With this lock the battery cover is secured into position.
10	Antenna socket	The antenna will be connected to the BNC connector.
11	Antenna	Standard antenna.
12	Batteries	After removing the battery cover, the batteries as well as the indicators and control elements become accessible.
13	Magnetic sensor and LED "DM"	With this magnetic sensor the deadman function can be enabled or disabled. The dedicated LED is illuminated red if the deadman function is enabled.
14	Magnetic sensor "Teach"	When this magnetic sensor is activated with a magnetic pen, the device can be taught-in to a different system ID.

4. Compatibility

The controller PFS Pocket can control all devices of the PYROTEC family, this includes "Profi" and "Advanced" series. The PFS Pocket is unidirectional only. This means, that the bi-directional functions of the PFE Advanced Receiver will not be received and processed by the PFS Pocket.

5. Area of application

This device was developed for sending ignition commands to pyrotechnics, and display fireworks, via a Galaxis Profi or Advanced Receiver and also to G-Flames. The triggering of magnetic valves, relays and other special effect devices is also possible. Every other application must have written approval from the manufacturer. The PFS Pocket needs to be protected from moisture and humidity.

Please read the safety instructions section relating to pyrotechnics at the beginning of this manual as well as the safety instructions relating specifically to the PFC Pocket.

6. Switching on and switching off

To switch on the PFS Pocket, depress the On/Off button for a short time (approx. 1 sec.). The LED "On/Off" is then illuminated constantly in blue to indicate that the unit is on.

After switching on, the device will be in normal mode. The firing mode is switched off.

The PFS Pocket can only be switched off when the firing mode is switched off. ("Arm" LED off). To switch off the device, depress the "On/Off" button for a short time (approx. 1 sec.). The blue LED will go out to signify that the unit is switched off.

7. Displaying the battery status and maximum operation time

The battery power remaining is shown using four green LEDs in the lower left corner. The battery display shows the remaining energy in 25% increments.

The display works correctly, irrespective of whether Alkaline or NiMH batteries are being used.

The maximum operating time in normal operation is 38 h for alkaline batteries and 20 h for NiMH batteries. In firing mode it is 15 h for alkaline batteries and 8 h for NiMH batteries.

8. Range test function

With the firing mode off, briefly depress the button "RT" (Range Test). The LED "RT" is illuminated green and the signal will be transmitted. Devices, that receive this signal, show the remaining range as a % on their LC display.

This process takes approx. 10 seconds. After that the LED ceases and the device reverts back into normal mode.

9. Switching the firing mode on and off (Arming the PFS Pocket)

To activate the firing mode, press the "Arm" button. After successfully switching on the firing mode, the device will confirm this with an acoustic signal and the LED above the button "Arm" is illuminated constantly in red.

To switch off the firing mode, press the "Arm" button again. The PFS Pocket reverts back into normal mode, and the red LED will no longer be illuminated.

If the deadman function is enabled, the red LED "DM" blinks while the firing mode is activated. This tells you that ignition commands can only be sent when the button "DM" is pressed.

When switching off the firing mode at the PFS Pocket the device sends a signal to all receivers. Currently active stepping sequences and all probably active outputs are terminated on devices of the Advanced series. Devices of the Profi series show a different reaction depending on the programmed step delays. Further information is given in the user manuals of these devices. For the correct function of this command it is necessary that the receiving device is within range and that the command is being received flawlessly.

10. Switching on and off the deadman function

Deadman means that this button (DM) must be held depressed at the same time as the firing channel button is depressed, in order to transmit an ignition signal. The deadman button will avoid unwanted or accidental pressing of firing buttons and subsequent unwanted ignitions.

To switch this function on or off, please make sure the device is in normal mode. Remove the battery cover and activate the magnetic sensor "DM" with a magnetic pen.

If the LED adjacent to the magnetic sensor lights red, the deadman function is activated.

After this replace the battery cover.

As an indication that the deadman function is activated, the LED "DM" flashes when the firing mode is activated. This informs the user that ignition commands can only be sent if the deadman button is pressed simultaneously to the Channel Firing button selection.

11. Transmitting firing commands

First activate the Firing Mode with the button "Arm" when the PFS Pocket is in normal mode. Press (if necessary) the button "DM" (Deadman) and activate the specific firing button 1 to 6. The different firing buttons fire the particular firing channel. Firing button 1 fires channel 1, firing button 2 fires channel 2, etc.

The Fire LED on the top of the front panel flashes for a short time in red when a firing command is transmitted.

12. Special functions

This chapter explains the special functions of the PFS Pocket, and how to access them.

12.1. Accessing the submenu "Special functions"

The special function menu is accessed as follows:

- Switch off the device
- Hold down the "On/Off" button for more than 5 seconds until the LED "On/Off" is no longer illuminated, then release the "On/Off" button
- The LED "On/Off" will flash

Now the following special functions can be configured:

12.2. Acoustic Signals

When pressing the button "Arm", the acoustic signals can be switched on or off. If you can hear no acoustic signal after pressing "Arm", the acoustic signals are then deactivated. Vice versa you can hear an acoustic signal.

12.3. Transmitting System ID and Teaching in devices

When pressing the button "DM" devices can be taught in to the PFS Pocket. Devices, like the PFE Advanced 10 Outputs, G-Flame, PFE Profi Audio, etc. can be taught in to the device ID of the PFS Pocket.

12.4. Setting the radio channel (Frequency) manually

To change the radio channel of the PFS Pocket, press the button "RT". The device switches in the mode "Setting the frequency manually". As acknowledge the green LED "RT" flashes.

Now the radio channel can be set by using the buttons "2" and "3". In the beginning the radio channel is set to 0 and the button "2" indicates the decade while the "3" indicates the unit position. When for example the button "2" is pressed four times and the button "3" seven times, so radio channel 47 is selected. To save and end the frequency setting, simply press the button "RT" again. If you entered a wrong radio channel, you have to start over again. The highest selectable radio channel is 69. If the device has a US radio module built in, the frequency setting remains the same, but the button "1" is then used for the hundreds as 359 radio channels can be selected.

Note: The radio channel will always be set to 0 when accessing this menu! It is mandatory to select a radio channel.

General notes regarding radio frequencies

European Version (and also various other countries):

There are 70 different frequencies available between 433.0500 MHz and 434.7750 MHz in steps of 25 kHz. Normally you should use the frequency that has been assigned to you by the manufacturer, you should only switch to another radio frequency if your selected frequency is occupied.

The frequency 433.9250 MHz (radio channel 35) and the two neighboring channels should not be used. This is a heavily used standard frequency and radio interference is likely to occur.

In the countries Azerbaijan, Georgia and Russia the European harmonization standards have not been completely implemented so far. If you have an application in these countries, please ask the

manufacturer or the appropriate authorities in the specific countries if license exempt use is possible, or if you can apply for a license, or if use is totally prohibited.

Other regulations may apply in non-European countries. Please ask the manufacturer if you need more information about the use of frequencies. Most non-European countries allow the frequencies used by us. For customers in the USA and Canada we provide devices with a different frequency range. Please see below "Version for USA/Canada".

Version for USA/Canada

There are 360 different frequencies available between 458.0000 MHz and 462.4875 MHz with a channel spacing of 12.5 kHz.

You need to choose a frequency which allows nationwide use and which is exempt from any duties. More information can be obtained from frequency coordinators, the authority in charge of frequency allocation, or the manufacturer. Even if the duty-free and nationwide use of specific frequencies is possible, you have to register as a user with the FCC before operating the devices. We can provide the contact details of a competent frequency coordinator who will support you in this process, upon request

Alternatively you can apply for a license. In this case you will get a frequency assigned by a frequency coordinator. The disadvantage of a license is that the use of the assigned frequency is only allowed in a certain region. You are allowed to use this frequency in a specific radius only. Any use outside of this radius demands an additional license, except if you are using a nationwide frequency (see above).

The highest available radio channel is 359. The selection of the number "3" on the hundreds is only possible if no inadmissible values form. For example: Forming radio channel 383 from 283 by pressing the arrow button "Hundreds +1" is not allowed. Select a value from 0 to 5 in the tens before selecting the value 3 in the hundreds.

Attention: Two or more systems which are only differing in the programmed RF channel and are in relative proximity (within radio range) of each other, must not be operated. In this case there is no safety with regard to unintended firings. To safely operate two or more systems in relative proximity, in addition to having different radio frequencies, they should also have different system ID’s. These can be assigned by the manufacturer, or the operator using a PFC Advanced Controller.

12.5. PFS Pocket teach in and receiving radio command "Change Radio channel"

Please note information under 12.4. General notes for frequency using.

To teach the PFS Pocket to another controller, for example to split systems or for rental purposes, proceed as follows: First briefly actuate the "Teach" magnetic sensor under the battery compartment cover with the magnetic pen. The blue info LED now lights up continuously. Now send the teach-in protocol within three seconds by pressing the "Transmit System ID" button on the PFC.

After "Teach" has been actuated on the PFS Pocket, the device also reacts to the radio command "Set radio channel, not device-specific" from the PFC Advanced if this command is received within three seconds. If the command "Set radio channel, device-specific" is received, it is always ignored by the PFS Pocket, since the PFS Pocket does not have a device number.

For a successful procedure of these actions, the radio channel of the PFS Pocket must be known.

Note: To make sure that only the frequency of the PFS Pocket will be changed, you should switch off all other devices, otherwise they will change their frequency as well! If this is intended, of course the devices can be left switched on.

12.6. Programming the firing channel of "Profi" devices

By pressing the firing keys 1-6 a programming command with firing channel information in the range of 1-6 can be sent to devices of the Profi series. This function is identical to the programming button in the manual firing mode of the PFC Advanced. By doing so e.g. the firing channel of the PFE Profi Midi 1 Output can be programmed with the PFS Pocket.

12.7. Leaving the submenu "Special functions" and displaying the firmware version

To return to "normal" mode, again press the "On/Off" button. The PFS Pocket will exit the submenu and return to normal mode.

When doing so the device indicates the firmware version by flashing LEDs in the battery indicator. First the first digit of the version is displayed. With V1.3, the lowest LED lights up briefly. This corresponds to 0001 binary and this again equals 1 decimal. Then the two lower LEDs light up briefly for the second digit of the version number. This is 0011 binary and this corresponds to 3 decimal. The version number 1.3 results from the values 1 and 3.

13. Radio range

The radio range depends a lot upon environmental conditions. With an uninterrupted line of sight the radio range of this device is approx. 800 m.

14. Maintenance

In general the PFS Pocket does not need any specific maintenance when used thoroughly. However we recommend sending the device back to the manufacturer every 1 to 2 years for a general check of all device functions.

15. Warranty

The warranty period is 24 months.
If there is any defect during 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 that have occurred. Warranty is invalid if the device has been damaged due to misuse, or abuse.

16. Protection against moisture and humidity

This device is not waterproof. Always protect it from moisture, humidity and water.

17. Damages caused by malfunction, misuse, abuse or neglect

This device has been designed for the firing of pyrotechnical effects only (Stage / Aerial Displays / SFX). Discuss all other applications with the manufacturer before use. In the case that one of the events stated above had happened we are only liable if the defect was due to faulty workmanship or component parts. The devices have been developed, manufactured, and tested to the best of our knowledge and belief.

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

Extensive testing has proven that the system is reliable, even if used in difficult conditions.

Please follow the instructions in section 16 regarding protection against moisture and humidity.

18. Technical Datasheet

General data:

Radio parameters EU version	Frequency Band: 433.05 - 434.79 MHz Maximum radio-frequency power transmitted: <=10 mW Channel Spacing: 25 kHz Number of radio channels: 70 (433.050 - 434.775 MHz) Modulation: FM narrow band Frequency Shift: +/- 3 kHz Duty Cycle: <10% Radio equipment class according to 2014/53/EU (RED): 1 Radio equipment type: non-specific short range device, transmitter and receiver (Transceiver) Receiver Category according to ETSI EN 300 220 V3.1.1: demanded by the application: 3 (lowest performance level) fulfilled by the device: 1.5 (second-best performance level) Receiver Principle: Double superheterodyne Receiver Sensitivity: -119 dBm @ 12 dB SINAD Wave Length: 70 cm Standard antenna included in delivery: Center Frequency: 434 MHz Radiation Pattern: omnidirectional Radiator Length: Lambda/4, not coiled Antenna Gain: 0.00 dBd, 2.15 dBi
Radio parameters US version	Frequency Range: 458 - 462.5 MHz License: FCC Part 90, FCC-ID: V9X-LMD400R Maximum radio-frequency power transmitted: <10 mW Channel Spacing: 12.5 kHz Number of radio channels: 360 (458.0000 - 462.5000 MHz) Modulation: FM narrow band Frequency Shift: +/- 3 kHz Receiver Principle: Double superheterodyne Receiver Sensitivity: -119 dBm @ 12 dB SINAD Wave Length: 65 cm Standard antenna included in delivery: Center Frequency: 460 MHz Radiation Pattern: omnidirectional Radiator Length: Lambda/4, not coiled Antenna Gain: 0.00 dBd, 2.15 dBi
Protocol parameters	half-duplex, PCM with Manchester coding, 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
Protection class	III

Dimensions (L x W x H) and weight, each without antenna:
65-22-133 mm; 165 g including alkaline batteries

Power supply:
2 x AA batteries, either alkaline batteries with 1.5 Volts or NiMH rechargeable batteries with 1.2 Volts

Supplied accessories, included in delivery:
1 User manual
1 Standard antenna
1 Magnetic pen
2 Alkaline cells size AA

19. CE marking of the EU version

The EU version of this device is marked with the CE logo:

CE

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

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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.