

Operation Manual

Galaxis Showtechnik

PYROTEC

Software V 2.0d



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Introduction:

Thank you for purchasing our PYROTEC system, which will enlarge your creativity and will satisfy your needs by its high quality and outstanding reliability.

With the opportunity to change the software of the devices they will always be up to date.

Prior to using the system the user is kindly requested to thoroughly read the operation manual and comply with it in all sections.
This is the fastest way to become familiar with the system.

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What is different between the PYROTEC-system and others ?

1. Our systems operates in a frequency range that is far away from other bands like air, sea, taxi, citizen, weather or radio stations. All these applications are situated below our range. Satellites and mobile phones are using higher frequencies than we do. Atmospheric interference only occurs in the low frequency range.
2. We use highly developed transmitter and receiver modules. They have been designed especially for applications which require reliability as for telemetry, medical devices for wireless control and regulation, alarm and security systems. Their deviation in frequency vs. temperature is extremely low, too. Therefore, the selectivity of the receivers can be increased and present carriers nearby the used frequency have no effect.
3. A lot of control information (40-bit-CRC) transmitted in a serial data transmission guarantees extremely high security, which makes false ignitions impossible. In case of a slight discrepancy during transmission or proofing of the data the order will not be carried out.
4. Every sold system is given a unique code, which is part of the transmitted data. Therefore, interference between two systems - operating closely together - is not possible. Additionally the systems are spread over 32 different frequencies.
5. With the reception range test the user is able to prove the actual system range at any time. The remaining range is displayed from 0 to 100% in steps of 5%.
6. The antennas of the devices are removable for easy transportation. To improve the radio range from 200 to 800 meters a special antenna is obtainable.
7. The time between pressing the fire-button and the actual ignition is extremely short (0.05 seconds) and you won't realise any delay.
8. Every component of the system is equipped with an accumulator (rechargeable battery). Therefore, there are no limits in mobility.
9. A high-power accumulator delivers up to 50 Ampere and because of its high capacity an operation period of 40 hours is possible. When treated correctly the accumulator can be charged up to 1,000 times. After usage the manufacturer replaces the accumulator and cares for recycling of the old one. The estimated usage time is 6 years.
10. Devices measure the charging level of the accumulators and warn the user if the level drops below 30%. The actual charging level and lifetime of the accumulator is displayed, too.
11. A decisive advantage of this system is that every PFE Profi contains a high power accumulator, which is located close to the electric matches. Therefore great losses due to long cable runs do not occur.

12. Overcharging and damaging of the accumulator by leaving it connected with the charging unit is impossible. An intelligent circuit guarantees 100% availability of the accumulator.
13. Every device contains a modern microprocessor which can be replaced for software updates. Thus the latest level of development can be reached at any time.
14. All switches, push buttons and displays are illuminated providing excellent operation even in difficult conditions. Additionally a gooseneck-lamp can be plugged in at the transmitter to light up the place of work.
15. To program the receivers a magnetic pen is used. Because of this only authorised personnel is able to change parameters. Buttons which endanger unintentional actuation and failure can be cancelled completely.
16. To exclude unauthorised use every device is equipped with a key switch. An additional key switch activates the ignition mode of the transmitter.
17. Every output of the receivers can be patched with any ignition channel. Because of this the outputs can be programmed in the order of ignition.
18. The output terminals are gilded to provide durable protection against corrosion and guarantee reliable operation.
19. The amount of matches ignited at the same time is not limited by using any number of receivers. The maximum amount of effects ignited separately is 999.
20. Every output of a receiver can ignite up to 20 electric matches at the same moment. For critical applications consult the ignition power diagrams which inform you how many matches are possible at a specific cable length and conductor diameter.
21. Every output is monitored exactly and a correct or faulty electrical connection is displayed. As soon as you have clamped in a match you can prove the connection by an indicator after enabling the test function. The test current through the match is very low and does not endanger an ignition.
22. The sensitive electronic parts are completely covered with a protective layer of varnish to limit the influence of humidity, dust, and aggressive substances.
23. The case of the devices consists of tough anodised aluminium. This provides mechanical stability and allows no corrosion.
24. We use electronic parts from manufacturers which are known for outstanding quality like Hewlett Packard, Infineon, Philips, Microchip, etc.

Operation of the PFS Profi, PFE Profi with 3/10 Outputs:

This section describes the standard devices of the PYROTEC family.
 The power receivers and miniature receivers will be explained later.

Galaxis PYROTEC PFS Profi

Control elements



PFS Profi control elements:

- | | | |
|----|---|--|
| 1 | Key switch 'Ein' = On | With the supplied key, you can switch the device on or off. |
| 2 | Key switch 'Zündmodus Ein' = Ignition mode On | This key switch prevents usage by unauthorised persons. Only when switched on an ignition is possible. |
| 3 | Socket 'Antenne' = Antenna | Plug in the supplied antenna here. |
| 4 | LED 'Akku leer / Laden' = Akku empty / Loading | LED flashes red if the accu is discharged below 30%. LED lights green if the accu is being charged. |
| 5 | Switch 'Leuchte Ein' = Lamp on | By pressing the button, the gooseneck-lamp is turned on or off. |
| 6 | Socket 'Leuchte' = Lamp | Insert the supplied gooseneck-lamp in this socket to light up your place of work. Press the unclamp key to remove the lamp. |
| 7 | Key 'Up' | Every time you press this button, the ignition channel will increase (+1). If the key is actuated for some seconds, the ignition channel will increase automatically. |
| 8 | Key 'Down' | Every time you press this button, the ignition channel will decrease (-1). If the key is actuated for some seconds, the ignition channel will decrease automatically. |
| 9 | LC-Display | Displays the ignition channel or the information of the menu. |
| 10 | Key 'Feuer' = Fire | If the ignition mode is activated and you press this button, the actual ignition channel will be transmitted and a connected electric match will be fired if the receiver is programmed with this channel. No ignition is possible with channel 0. |
| 11 | Key 'Reichweitentest' = Radio range Test | By pressing this button, a radio range test will started. All receivers within reception range will display the range remaining. The range test is only possible if the transmitter is not in the ignition mode. |
| 12 | Key 'Mode' | By pressing this button you will enter the menu, but only if the ignition mode is inactive. |
| 13 | Socket 'Ladebuchse' = Charging Input | This is the connection to the charging unit to recharge the accumulator. |

Operation of the transmitter PFS Profi:



After switching on the device by the key switch, the first information displayed is the software version, here 2.0d. Afterwards the normal mode will be entered. Keys that do have a function in the current mode will be lit, keys without a function in the current mode remain dark.



After switching on the transmitter, ignition channel 0 is displayed. This channel cannot start any ignition to prevent unintended ignitions.

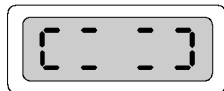
By pressing the keys 'Up' and 'Down' you can increase or decrease the ignition channel. By pressing them for a longer time, the channel increases or decreases automatically.

After more than 50 increments or decrements the speed of counting up or down will increase. You will experience the same when programming the ignition channels of the receivers.

Note: To change the ignition channel in steps of 100 keep the button 'up' or 'down' pressed and then press 'mode'.

By pressing the button 'Reichweitentest', a radio range test will be start. This is only possible if the normal mode is active. In this case, the receivers will display the remaining range of reception in percentage. If they are out of range, they will not display any results of the test.

During the range test the display of the transmitter shows:



A result of 30% or higher is sufficient. The results are displayed about 10 seconds by the receivers. You can look up the results later, by a certain task in the receiver's menu. There is more information in the section 'Operation of the receiver'.

To light up your place of work insert the supplied gooseneck-lamp into the socket 'Leuchte'. Press the unclamp key to remove the lamp.

To switch the lamp on or off press the button 'Leuchte Ein'.

Please note that the lamp consumes a lot of power so continuous operation will reduce operation time.

The LED 'Laden / Akku leer' is illuminated green if the device is being charged and flashes red if the accu has been discharged below 30%. In this case, you will hear an acoustic signal, too, but only if the ignition mode is inactive. To charge the device connect the socket on the backside of the device with the charging unit. You can charge the device as long as you want without any danger of damaging the accu because a special circuit prevents overcharging.

You will achieve 100% charging-level at any time when you charge the devices permanently when not in use.

The socket 'Antenne' is the connector for the supplied antenna.

Insert this antenna completely into this socket and turn it 90 degrees clockwise.

To remove the antenna press it towards the front panel and turn 90 degrees counter-clockwise.

To enter the menu, press the button 'Mode' when the device is in normal mode.

First, the accu capacity is displayed:



In this case, the remaining capacity is 85%. This menu item can be compared to the fuel display of a car. In this example, the tank is almost full. If the result decreases below 30% you should charge the accu again otherwise the accu might be damaged because of deep discharge.

By pressing the button 'Mode' again, you can read the result of the accu power test in the display ('AL' = 'Akku Leistung' = 'Accu power'):



Here the accu has 90% of its maximum power. During the power test the accu has been discharged with a high current for a short time and the changing of its voltage has been measured to calculate its inner resistance, which influences the maximum short circuit current. The figure is expressed as a percentage. You can compare this test with the power-testing stand of a car. With the last litre of petrol in your car you can drive at top speed but if the engine has only 30% of its usual power something is wrong.

If the device has been charged completely and the result of 'AL' is still below 60% the accu may have been damaged by deep discharge and should be replaced.

Note: If you enter the menu during charging of the device the AC- and AL-result cannot be measured and you see the following text displayed:



'LADE' means 'Loading' and reminds you that the device is being charged currently and a measurement is not possible now.

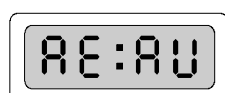
Note: The accumulators used in our devices are very powerful and can be discharged with a very high current. The only thing that damages them easily is deep discharge. It reduces lifetime and maximum current output.

The charging circuit has been designed for a mild charging process to ensure the maximum lifetime of the accumulators. A completely discharged accumulator will be charged in about 14 hours. The more the accumulator is charged before connecting with the charging unit, the shorter the required charging time.

If the accumulators are charged continuously, the charging circuit compensates the losses by self-discharging. Therefore, the accumulators keep 100% of their stored energy and are always at your disposal with maximum power. No overcharging will occur.

Note: The energy-costs of charging the device permanently are very low.

By pressing the button 'Mode' again, you call up the next menu item 'Automatisch Erhöhen' (AE) = 'Increase automatically'. You may read the following symbols in the display:



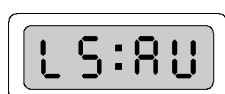
'AU' means 'Aus' = 'Off' and informs you that the function is inactive. By pressing the buttons 'Up' and 'Down' you can change the setting between On (EI) and Off (AU). If you have enabled this function (EI), the ignition channel will be increased (+1) after each ignition in the ignition mode.



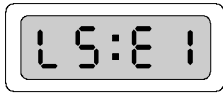
In this example, the function has been enabled. By pressing 'Up' or 'Down' you can disable the function again.

Note: The setting of 'AE' will be stored in the memory and will be pre-set when using the device the next time.

By pressing 'Mode' you enter the menu item 'LS' = 'Lautsprecher' = 'Loudspeaker'. The display shows:



The abbreviation 'AU' = 'Aus' = 'Off' is displayed and means that the loudspeaker is turned off. Use this setting if the acoustic signals would be disturbing in your application. By pressing 'Up' or 'Down' you can change the setting. 'EI' = 'Ein' = 'On' means that the loudspeaker will operate.



In this example, the loudspeaker has been enabled. You will hear the acoustic signals of the device. By pressing 'Up' or 'Down' you can disable the sounds again.

Note: The setting will be stored in the memory and will be pre-set for the next time you use the device.

Warning: Please mind the fact that an acoustic signal will warn you not to discharge the accumulator to a greater extent. If you disable the sounds, you have to rely completely on the optical warning.

By pressing 'Mode' again, you will leave the menu. Afterwards you will be back in the normal mode.

By activating the key switch 'Zündmodus Ein' = 'Ignition mode on' you will enter the ignition mode. Because of safety reasons the key can only be removed if the switch is in off-position.

After a short acoustic signal the key 'Reichweitentest' = 'Radio range test' is not lit any more because this function will not be available in the ignition mode.

When pressing the button 'Feuer' = 'Fire' an ignition signal will be transmitted to the receivers. After a short delay of 0.05 seconds, all outputs, which have been programmed with the same ignition channel, will be activated. You will not realise this short delay.

During transmission the button 'Feuer' = 'Fire' is not lit. As soon as the key is illuminated again the transmitter is ready and you can select another ignition channel with 'Up' and 'Down' and start the next ignition by pressing 'Feuer' = 'Fire'.

If you have activated the function 'AE' = 'Automatisch Erhöhen' = 'Increase automatically' the next ignition channel will be increased automatically. This way you can better concentrate on firing the effects.

By turning the key switch 'Zündmodus Ein' = 'Ignition mode on' in off-position you will leave the ignition mode. During installation of the effects, you should always carry the key with you to prevent usage of the transmitter by unauthorised persons.

Note: By pressing the button 'Mode' you can easily jump to another channel area. When you press this button, you will jump to ignition channel 990. The next time you press the button you jump back to the original ignition channel. This way you can quickly reach the channels of a spare firing program if some effects may not have fired.

By selection of channel 980 in the spare channel mode, you may fire up to 19 spare effects.

Spare channel 990 is pre-set after switching on the transmitter.

Increasing the ignition channel automatically is available in the spare mode, too.

By setting the key switch 'Ein' = 'On' in off-position you turn off the device.

It is advisable to turn the transmitter off after usage to avoid unnecessary discharging of the accumulator.

The extension 'Auto fire' of the PFS Profi (optional):

This useful function enables you to fire your show automatically with predefined delays between the ignitions. Perfect combinations of fireworks and music are possible that way.

The programmed delays will be stored in the memory of the transmitter even if you switch the device off. This program may be recalled or changed as often as you like.

Please see our price-list for this optional function.

The first step is the programming of the delays into the memory.

Switch on the transmitter and press 'Mode' at the same time.

After the 'start messages' the following information will be displayed:



Here you can choose with the buttons 'Up' and 'Down' if an existing program in the transmitter's memory should be erased or not. As shown in the example the program won't be erased and can be edited afterwards.

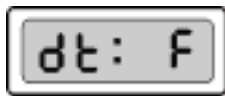


In this case, the memory will be erased after you press the button 'Mode'. This will take about 10 seconds.

After you have pressed 'Mode', you may enter a new program or edit the old one. We begin with the delay between the ignition of channel 1 and channel 2. The ignition channel will be displayed unless you press the 'Mode' button. In this case the programmed delay time will be displayed.



At the beginning channel 1 will be displayed. By pressing the buttons 'Up' and 'Down' you can choose the desired channel.

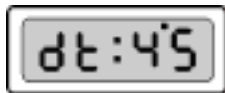


If you press 'Mode' and keep this key pressed the programmed delay time will be displayed. 'dt' means 'delay time'. In this case no delay time has been programmed yet.

'F' means that later during automatic firing the transmitter will wait until the user presses the 'Fire' button. You may use this function 'Wait until fire-button is pressed' several times in your program if you do not want to ignite all channels automatically. If you press the button 'Up' or 'Down' you can change the delay time. This requires that the 'Mode' button is still pressed.

Always program the delay time between the chosen channel and the following. For example if you have programmed a delay time of 5 seconds to channel 7 then between the ignition of channel 7 and 8 the device will wait 5 seconds.

Channel 1 will be fired immediately after starting the automatic firing mode and because of this there is no opportunity to program any delay.



Here a delay time of 4.5 seconds has been selected. The dot in the upper right section is the decimal point. The shortest delay time is 0.4 seconds, the longest is 99 seconds. From 0.4 to 9.9 seconds you can determine the delay in steps of 0.1 seconds. Delays of more than 10 seconds can be selected in steps of 1 second. Between 0.4 and 99 seconds the function 'F' will appear. To store a new entry or a change it is necessary to press the button 'Fire'.

As soon as you release the key 'Mode' the ignition channel will be displayed again.

This way you can program all the delay times. If you have finished the entries you can leave this mode by turning the device off and on.

Note: If you delete the memory all delays will be set to the function 'F'. That means that the transmitter will always wait for you to press the button 'Fire'.

Note: If you press the button 'Range Test' while editing the delay times (keep 'Mode' pressed) the delay will be set to 15 seconds. This makes programming of certain delays faster. After that you have to press 'Fire' for storing your entry, too.

If you want to start with the previously written program, turn the transmitter on and depress the button 'Fire' during that. You will enter the normal mode afterwards.

As soon as you enter the ignition mode, the following will be displayed:



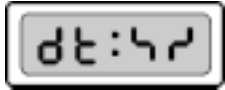
By pressing the button 'Fire', the automatic ignition will be started. If you press this button, channel 1 will be fired immediately. As long as you remain in the automatic firing mode the button 'Fire' will flash.



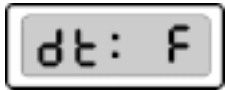
Then you will see a countdown timer which displays the remaining time for the next ignition. In this example after 9.3 seconds the next channel will be fired.



By pressing the button 'Range test' the device will display the next channel. In this case it is channel 2. As long as you press this key you will see the next channel to be fired in the display.



If the device is in countdown-view you will see this symbol in the display when an ignition takes place. After that the timer will be displayed again.



If the function 'Wait until fire-button is pressed' has been programmed the following will be displayed. Only if you press the button 'Fire' the next channel will be fired and the automatic ignition will continue.

At the end you can leave the automatic firing mode by switching off the ignition mode. If you activate the ignition mode again you may start another execution of the automatic fire program.

You may use the functions described below to interfere in the automatic firing:

Ignition of a spare channel: By pressing and keeping pressed the buttons 'Up' or 'Down' you will see channel 990 in the display. By pressing 'Fire' this channel will be ignited. Afterwards the channel will be incremented to 991 automatically. This way you can fire the spare channels 990 to 999 during the execution of an automatic program. The ignition of spare channels has no effect on automatic timing because the transmission time of the additional ignition commands will be calculated in the following delay.

Stop: If you press 'Mode' the countdown timer will be stopped until you release this key again. The ignition of the following channels will happen later.

Immediate ignition: If you press the button 'Fire' the current channel will be ignited immediately. Afterwards the following ignitions will be executed as programmed but earlier.

Emergency off: You can stop the automatic firing at any time by switching off the firing mode. Stepping processes will be stopped, too, as described in section 'Emergency off function'.

The integrated chip card reader of the PFS Profi (optional):



If your transmitter is equipped with the optional chip card reader you will find it on the left panel of the case. With the chip card reader you have the opportunity to store automatic firing programs on a chip card and load them back into the transmitter's memory later.

This way you can store any number of programs which is interesting for frequently used applications.

To use the chip card reader switch on your transmitter. Access to a chip card is only possible in the normal mode.

Insert the card into the slot with printed side on the top in direction of the arrow.

Please use only the original cards of Galaxis Showtechnik. All other cards will possibly not work or might be damaged.

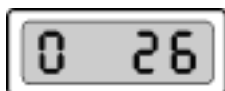


As soon as the card has been inserted completely and has been proved valid this card symbol in the left section of the display flashes three times.



After that you can determine the read/write-direction by pressing the keys 'Up' or 'Down'. If the segments move towards the card symbol the data of the transmitter's memory will be written to the card's memory.

Any information on the card will be overwritten. If the segments are moving away from the card the data of the card will be written to the transmitter's memory. In this case the data in the transmitter's memory will be overwritten.



After you have confirmed the read/write-direction by pressing 'Mode' you will see a counter in the display which will count up to 999.

This process will last for approximately 20 seconds.



Successful copying of data will be shown on the display this way.

The correctness of the copy is guaranteed by a check sum.



Here an error has occurred. Remove the card and start a new attempt.

Make sure that you use a valid card and that it is inserted correctly.

If you use a defective or invalid card or you remove the card during access the process will be stopped. In this case you will see the error message. Then copying will not be executed or only to a certain extent.

As soon as you remove the card you will return to the normal mode.

Interface extension of the PFS Profi (optional):



If your transmitter is equipped with the optional interface extension the right panel of the case will contain the following connectors:

- XLR, 5 connectors, female, DMX input
- XLR, 5 connectors, female, DMX output
- Sub-D, 25 connectors, female, multifunctional interface

The pinning of the multifunctional interface is not the same as the pinning of any commonly used interface. Never connect it to e.g. the LPT1 of a personal computer or other devices.

The multifunctional interface contains:

- RS-485, used for DMX-512 etc.
- RS-232, used for interfacing with personal computers
- I²C-Bus
- some unused data lines for future applications
- GND
- +5VDC
- +12VDC

Operation with DMX-512:

Contrary to the DMX-512 standard we use a female connector as an input to guarantee that the DMX data is not affected by electrostatic discharges due connector pins that can be touched.

So maybe you have to manufacture an adapter cable. The signals of DMX are assigned to the pins according to the DMX standard.

Pins 4 and 5 are connected between input and output to provide compatibility to 'talk back' protocols. The metal casing of the DMX terminals is connected together, too.

The PFS Profi supports also the newer DMX-1990 standard.

According to the DMX standard a signal pause of up to 1 second is allowed.

To ensure fast error detection in the DMX data for our application a maximum signal pause of 10 ms is possible. That means that if there is no data transmission for more than 10 ms e.g. if the cable connection is interrupted the transmitter will leave the DMX mode and start again (reset).

To control the transmitter with DMX-512 simply insert it into the already existing DMX line. The signal at the transmitter's output is always the same as the signal at the input, even if the transmitter is turned off.

Always use shielded connection cables which are suitable for DMX signals.

A termination resistor of 120 Ohm between the signal + and - at the last device in the DMX line is strongly recommended.

The transmitter's DMX interface is completely insulated. The load on the bus by the transmitter's interface is as low as it is known from other high-class DMX devices.

So the transmitter is definitely no 'Direct-On-Line opto insulator'- or 'DOL'-device with high bus load.



If your transmitter is equipped with the optional interface extension the transmitter shows this for two seconds after displaying the software version.

You'll find the following item in the menu:



'IF' means Interface. A value of 0 indicates that the interface is not used. By pressing the keys 'Up' and 'Down' you can change the value and activate DMX-512 with 1 or RS-232 (V24) with 2.



If you have selected operation with DMX you have to determine a start address between 1 and 512 after you have pressed mode. Use the keys 'Up' and 'Down' for this purpose. The start address will be stored in the transmitters memory. In this example a start address of 145 has been programmed.

Note: Before the DMX mode it is being activated it is recommended to establish all electrical connections and ensure that a DMX signal is present. If the transmitter detects that no signal is present it will cancel the interface activity and restart itself (reset) as soon as you leave the menu.

After you've left the menu you'll see a flashing dot in the transmitter's display if the interface is active.

When operating in DMX mode the transmitter responds to the programmed channel (start address). A value of 199 or more will result in an ignition if the ignition mode has been enabled.

After that the ignition channel will be incremented automatically so that the next channel can be fired under DMX control. If the transmitter is operated in normal mode the current ignition channel will not be fired but also incremented.

For another ignition the value of the selected DMX channel must fall below 200.

This means that the transmitter only responds to positive crossings of the signal value 199 and unintended ignitions of several channels by a constant high signal value over 199 are prevented.

This way you can program a firing script with your DMX console.

You can interfere manually at any time:

| | | |
|-----------------|---|---|
| 'Feuer' (Fire) | = | manual firing |
| Up | = | increment current channel manually |
| Down | = | decrement current channel manually |
| Mode | = | switch over to the spare channel section / back |
| firing mode off | = | stop DMX ignition |

You can stop the DMX interface by entering the menu or by switching the transmitter off and on.

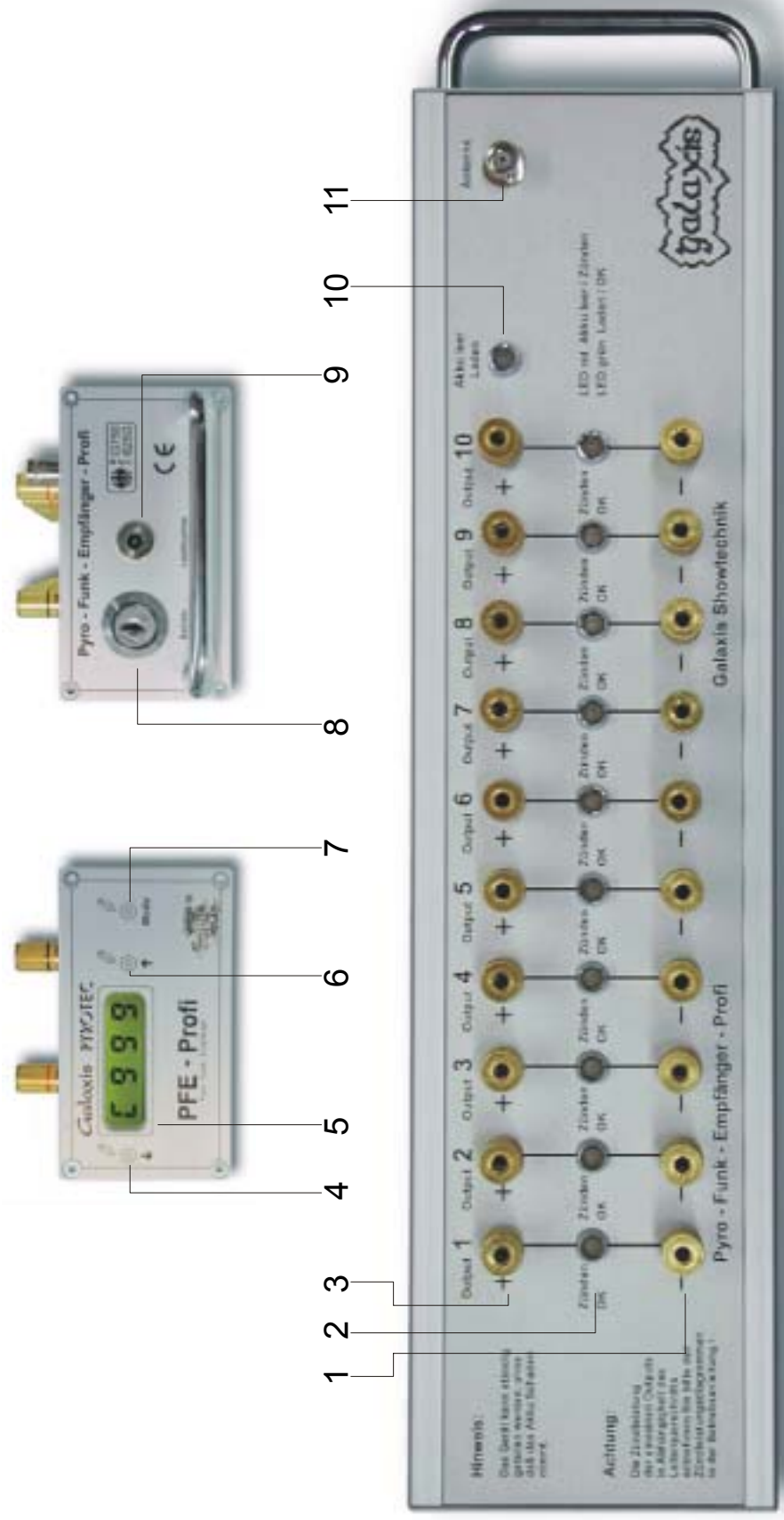
Operation with RS-232 (V24):

For operation with the RS-232 it is necessary that a protocol has been defined. So far users did not give us detailed information on how they could use the RS-232 for their specific application. If you need RS-232 control over the transmitter, please contact us to develop a practicable protocol.

The transmitter's hardware enables communication by the following signals: RXD, TXD, RTS, CTS; All standard transfer rates can be used.

Galaxis PYROTEC PFE Profi with 10 Outputs

Control elements



Control elements of the PFE Profi with 10 Outputs:

- | | | |
|----|---|---|
| 1 | Clamps '- Output 1-10' | Negative clamps of the outputs 1-10. |
| 2 | LEDs 'Zünden / OK' = Ignition / OK | Lights red when output is active (ignition) and lights green when the electric connection with a match is OK if the menu item LEdS is active or when a radio range test is in progress. |
| 3 | Clamps '+ Output 1-10' | Positive clamps of the outputs 1-10. |
| 4 | Magnetic sensitive area 'Down' | By pointing to this area with the magnetic pen the parameter of the current menu item will decrease. If you point on this field for a longer time the parameter will decrease automatically. |
| 5 | LC-Display | Displays the current information. |
| 6 | Magnetic sensitive area 'Up' | By pointing to this area with the magnetic pen the parameter of the current menu item will increase. If you point on this field for a longer time the parameter will increase automatically. |
| 7 | Magnetic sensitive area 'Mode' | By pointing to this area, you will enter the menu. If you point to this field for a longer time, you enter the different menu items automatically. At the end you will be back in the receive mode again. |
| 8 | Key switch 'Ein' = On | With the supplied key you can turn the receiver on and off by this switch. |
| 9 | Socket 'Ladebuchse' = Charging Input | This is the connection to the charging unit to recharge the accumulator. |
| 10 | LED 'Akku leer / Laden' = Akku empty / Loading | LED flashes red if the accu is discharged below 30%. LED lights green if the accu is being charged. |
| 11 | Socket 'Antenne' = Antenna | Plug in the supplied antenna here. |

Operation of the PFE Profi with 3/10 Outputs:

After switching on the receiver with the key switch, the first information displayed is the software version, here 2.0d. Afterwards the receive mode will be entered.

In this mode, four segments in a row move in the display and transmitted radio signals will be analysed.

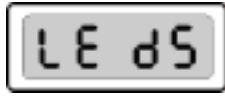


By pointing on the field 'Mode' with the supplied magnetic pen, you will call up the menu. With every activation of the field 'Mode', you will enter the next menu item. Permanent pointing to this field calls up the items step by step.

Always remember to leave the menu after that because as long as the menu is present no reception takes place.

The first menu item is 'LEdS' = 'Leuchtdioden' = 'Light Emitting Diodes'. Here the OK-LEDs show the result of the continuity test.

The display shows:



In the case of connection with an electric match without a lighting LED of the corresponding output you must check the electrical contacts. Maybe the match is out of order, too.

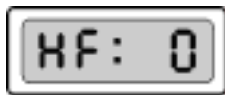
The second item is 'AC' = 'Accumulator capacity'.

The function is the same as described in chapter 'Operation of the transmitter'.

The next item is 'AL' = 'Akku Leistung' = 'Accumulator power'.

The function is the same as described in chapter 'Operation of the transmitter'.

After activating 'Mode' again, the following information is shown on the display:



During this menu item the level of the high frequency signal is measured and displayed in %. 'HF' means 'Hochfrequenz' = 'High frequency'. If 0% is being displayed, there is no radio signal present. A result up to 15% is not problematic.

Values over 15% cause a radio range reduction. This menu item should warn you if radio interference occurs.

Maybe you would like to try the following experiment:

When you come with the antenna of the receiver closer to a personal computer and the receiver displays the menu item 'HF' you will experience that the measured signal level is increasing because of the emitted radio signals of the computer.

Depending on the quality of the computer's shielding values up to 50% are possible.

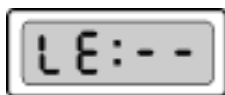
After some tests you will find out that higher 'HF'-values are only displayed in high 'electrically contaminated' environment.

Note: While a radio range test is in progress or the transmitter is in the ignition mode a radio signal is present. Be aware of this fact because otherwise you may misinterpret the signal of your own transmitter as radio interference.

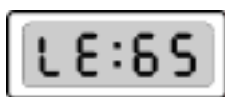
By activating 'Mode' again you enter the menu item 'LE' = 'Letztes Ergebnis' = 'Last result'. Here the last result of a range test will be displayed. This might be useful if you set up the system by yourself because the receivers display the results only for about 10 seconds. Of course, one person is not able to check the results of several receivers during this short period.

How to proceed:

- Switch on all receivers and start a radio range test on the transmitter
- Call up the menu of every receiver and read the result of the test (menu item 'LE')
- After this, you may start a new test



When the receiver shows this, no result is in the memory because it has been checked already or the receiver has been out of range during the test or no range test was started since operation.



Here the result is 65% of the maximum radio signal. Results below 30% are critical. In this case see explanations in the section 'Reception range and its improvement'.

Note: After stepping through the menu the result of the menu item 'LE' will be erased to ensure that this value will not be displayed again although the receiver is out of range.

Please erase all values of all receivers before a new radio range test so that the old results will not be displayed again !

The next menu item is 'LS' = 'Lautsprecher' = 'Loudspeaker' and has the same function as you know from the transmitter. Please see section 'Operation of the transmitter'.



After activation of 'Mode' the menu item 'CL' = 'Clear' will be displayed. The receiver is able to store the output programming in its memory so that it is present again after switching the device on and off. With 'Up' and 'Down' you can select between 'EI' = 'Ein' = 'On' and 'AU' = 'Aus' = 'Off'. If you select 'EI', the information in the memory will be erased and if you select 'AU', the output program will be the same as the old one. Of course, you can change it afterwards.

After leaving the menu item 'CL', you will enter the programming part of the menu. Here you can assign an ignition channel for every single output. The corresponding red LED of each output will light up, too, but an ignition will not occur.



In this example the output has not been programmed yet. With 'Up' and 'Down' you can assign an ignition channel between 1 and 999. By a longer activation of 'Mode', the value will increase or decrease automatically.

Note: You can program all ignition channels by radio signal. Simply select the desired channel at the transmitter and the press the key 'Reichweitentest' = 'Range test'.

After this, you will enter the programming of the next output by activation of 'Mode'. Again, you may assign an ignition channel. Continue with programming of the other outputs as your application requires.

After you have programmed output 10 (output 3 when assuming a device with 3 outputs), you will leave the menu by activating 'Mode'. Then the device is receiving again. A long acoustic signal informs you that the programming has been stored.

Note: If you activate 'Mode' continuously you will step through all menu items automatically. This is the most comfortable way to check the settings without changing them. Finally, when you have reached the programming of output 10 (output 3 when using a device with 3 outputs) and you remove the magnetic pen the receiving mode will be entered again.

To charge the receiver, connect the supplied charging unit with the socket 'Laden' on the back of the device. The charging does not depend on the operation of the device.

As soon as charging is in progress the LED 'Laden / Akku leer' lights up green.

This LED stays on continuously even if the accu is fully charged.

This LED flashes red if the accumulator has been discharged below 30%.

In addition you will hear an acoustic signal, but only if the transmitter is in the normal mode.

To avoid any damage by deep discharge you should charge the accumulator as soon as possible.

An AC-value below 5% indicates that prolonged operation will reduce the lifetime of the accumulator by deep discharge.

The stepping extension of the PFE Profi (optional):

Fundamentally, every receiver can be equipped with the stepping function.

For this task, send your devices to the manufacturer.

This only take a few days. Our price list informs you about the costs of the updates.

With this useful function, it is possible to simulate e.g. machine gun fire with some report effects. In addition, you may fire elements of a front piece one after another.

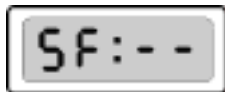
In any case, several ignition pulses will be put out with a predefined delay between them.

If you use a receiver with 10 outputs, it is up to you if you use every output for stepping or only some of them. If you have activated the stepping function, you have to use at least the first 3 outputs for the stepping task. When the receiver with 3 outputs is being used, you can only choose if the stepping function is active for all outputs or not.

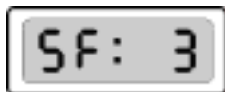
Fundamentally the stepping function begins with output 1.

The following explanations refer to a receiver with 10 outputs.

Is a receiver equipped with a stepping function the following will be displayed after the menu item 'LE':



'SF' means stepping function. The two bars inform you that this function is inactive. If you choose this setting, the outputs can be programmed as usual. The following menu item would be programming of output 1 to 10.



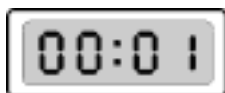
When you tip onto the field 'Up' with your magnetic pen the figure 3 will appear. Simultaneously the red LEDs of the outputs 1 to 3 will be illuminated. This means that the device will use these outputs for stepping. All the other outputs may be programmed as usual.

With 'Up' and 'Down' you can choose values between 3 and 10 or deactivate the stepping function. Depending on the current setting the red LEDs will signal the outputs used by the stepping function.

This way you can choose the outputs that are used for the stepping function.



If you have activated the stepping function and actuated 'Mode', the following will be displayed and no LED will light up. This menu item is called step channel. Here you can choose which ignition channel will trigger the stepping function. The three bars signal that no channel has been programmed yet. Program the desired channel with 'Up' and 'Down'.



If you have closed the menu item 'SC' with 'Mode', this will appear in the display. Here you can precisely adjust the delay time between the ignitions. The digits represent:

10 sec. / 1 sec. / 0.1 sec. / 0.01 sec.

That means:

10:00 = 10 sec., 01:00 = 1 sec., 00:10 = 1/10 sec., 00:01 = 1/100 sec.

This way you can adjust delays between 1/100 and 99 seconds.

The accuracy varies because it does not make sense to adjust in steps of 1/100 seconds if delays are longer:

Between 00:01 and 00:99 in steps of 1/100 sec.,

between 01:00 and 09:90 in steps of 1/10 sec.,

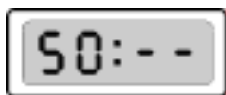
between 10:00 and 99:00 in steps of 1 sec.

The red LEDs will flash one after another with the speed of the current delay.

In addition, you hear a short acoustic signal every step to give you an imagination of the current speed setting.

The speed that you program here is used later when the stepping function will be triggered.

While editing this menu item, the colon in the display flashes.



With another activation of 'Mode', you reach the menu item 'SO'. This abbreviation means step offset. If you use more than one receiver with an enabled stepping function you can define the number of steps this device will wait until it starts with its stepping function. If you use two receivers with 10 outputs to fire 20 airbursts, you will program the same step channel and the same delay. The device that starts with the ignition has to be programmed with 'SO:--' and the other one with 'SO:10'. Up to 99 offset steps are possible.



If you have set SF to a value between 3 and 9 you have now, after the previous menu item, the option to program the remaining outputs with ignition channels for conventional use. In the example you have the possibility to program at least one output. The corresponding red LED will light up. After another activation of 'Mode' you may program the next output or leave the menu if there is nothing more to program.



If you have programmed the value 10 in the menu item 'SF' and you have activated 'Mode' at the previous menu item then you have left the menu by reading this in the display. Now the device is in receiving mode again. Programming of the stepping function has been quit and the segments start to move.

Of course, you can enter the menu again edit the settings.

If you use a receiver with 3 outputs, you have the choice to use all of them the conventional way or by the stepping function. The menu explained above will be altered accordingly.

Both, the programmed ignition channel and the parameters of the stepping function are stored in the receiver's memory. These settings will be at your disposal the next time you turn the devices on. By activation of the menu item 'CL', the parameters of the stepping function will be erased, too.

Notes:

- The stepping function can be triggered as often as you like by repeatedly firing the step channel. A new trigger is only possible if an old one has been executed completely. This way, a delay by several trigger signals is prevented.
- It is possible to use more than one receiver with the stepping function. If they have been programmed with the same step channel, they will start with the stepping task simultaneously.
- Programming these receivers with the same delay time will result in absolute simultaneous ignitions.
- After pressing the button 'Feuer' = 'Fire' the first step output will be ignited immediately if you have not programmed any step offset in the menu. The following ignitions will happen with the programmed delay.
- If you have programmed a delay time higher than 0.18 seconds, the receiver is able to fire conventionally programmed outputs during a stepping process. Therefore, you do not have to wait until the stepping process is finished.
- When you have programmed a conventional output to the same channel as the stepping function, this output will be fired simultaneously with the first output of the stepping function.
- As long as the stepping process is continuing 'STEP' will be shown in the display of the receiver:



This is a warning that the stepping process is in progress. During a stepping process, other ignition commands will be carried out but not displayed because this information has no priority.

- You will see the display shown above always after switching on the receiver after displaying the software version. By this, you can easily determine if a receiver is equipped with the optional stepping function.

The function 'Emergency off' provides the opportunity to stop a stepping process at any time by turning the key switch 'Zündmodus Ein' = 'Ignition mode' in off-position. The stepping process will then stop immediately. Even if you turn the key switch in on-position again, the stepper will not start. Only by a new ignition command with the step channel the stepping process will start again with the first output.

Warning: The function 'Emergency off' is only active when you have programmed a delay time higher than 0.18 seconds. When using shorter delays the stepping process will be finished before the stop command arrives because of the low human reaction. To transmit a command from the transmitter to the receiver it takes about 0.05 seconds.

Adjusting the ignition characteristic:

You may adjust the ignition characteristic by the following:

1. Prevent simultaneous activation of more than one output

In some applications electric matches may become a short circuit after ignition. If you fire numerous matches one after another in a short period of time e.g. when using the stepping extension a strong current will flow through already fired matches. This is lowering the power which is necessary for the following ignitions.

Therefore it is advisable to ensure that only one output is active. If you point the magnetic pen to the field 'Up' while switching on the receiver you will set this ignition characteristic.

As soon as an additional ignition channel will be fired the 'old' ignition will be cleared. This guarantees full power for the 'new' ignition.

Be aware of the fact that very short ignition times may occur if you are using fast step ignitions.

The setting will be present the next time of operation again. Activate 'Up' once again while switching on the receiver to change to the default setting.

2. Shortening ignition time

If you want to control for example a smoke machine via a relay or the solenoid valve of a lycopodium flame pot with the devices it makes sense to shorten the ignition time. The default setting is 2.6 seconds. If you fire the previously programmed output the relay will be active for a minimum of 2.6 seconds. To shorten the ignition time activate 'Mode' while switching on the device. Now the ignition time is shortened by a great extent. You may fire the same channel again and again to ensure permanent operation. A short time after the last ignition the output will be cleared.

The setting will be present the next time of operation again. To get the default setting activate 'Mode' once again while switching on the receiver.

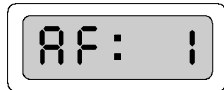
The function 'Deep discharge recording':

All receivers PFE Profi 3/10 and Power are equipped with this function.

Deep discharging can damage the accumulators. This function warns the operator if a failure of an accumulator because of deep discharge damages may occur.

As soon as an accumulator of a receiver is being discharged below 10.5 Volt for longer than ca. 2 minutes, this event is stored in the receiver's memory. Voltages below 10.5 Volt mean deep discharge and an AC-value of 0% will be displayed in the receiver's menu.

The next time you switch on the receiver the following warning will be displayed:



AF is the abbreviation for 'Accumulator failure'. The figure in the right part of the display is the number of deep discharge events. Simultaneously you will hear a shrill acoustic interval signal. After some seconds the device will switch back to the receiving mode as usual.

If this warning occurs, please send the device to the manufacturer to have the accumulator tested. If the capacity of the accumulator has decreased it has to be replaced.

Up to 9 deep discharge events can be recorded. Only the manufacturer can reset it. This way you can prove if third persons (like staff or customers who have rented your system) have deep discharged the accumulators.

Note: This warning is only shown on the display if a deep discharge has been detected. Voltage losses because of high output current during ignition will be ignored.

Setting up the devices:

1. Planning your show:

Set up a show plan. A well-designed plan helps you to build up the system in a short time and to improve the result of your show. During the planning period you determine the order of the ignition channels, which will be programmed later.

Think of the new possibilities, of a wireless system, like effects on moving objects, on ropes high in the air, on vehicles, ships, aircraft.

2. Setting up the receivers:

Position the receivers and switch them on. Normally they are placed on a horizontal surface. If you want to fix them in a truss system or something else, you can use cable ties, which are drawn through the bow on the receiver's back. These cable ties are cheap, very loadable and easily removable.

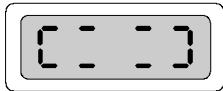
Note: To hide the devices or to protect them from dust, sparks and humidity you can cover them.

Warning: The cover must consist of a nonconductor, otherwise the radio signals are blocked and the receiver cannot detect the transmitter's information. Do not use any kind of metal casing as a cover. The higher the receivers are positioned, the better the radio reception is.

3. Setting up the transmitter and testing the reception range

Position the transmitter in the place, in which it will be used for ignition later.
A radio range test can be started if all used receivers are switched on.
Switch on the transmitter and press the button 'Reichweitentest' = 'Radio range test'.
All receivers, which are able to receipt the transmitter's signal, display the test result for 10 seconds. The result is the remaining radio range in percentage.

During the radio range test this is displayed
by the transmitter:



by the receiver for example:



Check if all of the devices have received the test signal.

The displayed result should be 30% or higher. Is this not the case please see section 'Reception range and its improvement'.

Please mind the fact that every additional change of position of any device can influence radio reception and therefore the range conditions. Large changes on the place of ignition such as building up massive requisites may affect radio reception in a negative way. In this case, start a new radio range test to ensure that results have not decreased.

If you build up the system without an assistant, the menu item 'LE' will be very helpful to read the results of the last range test. Please see section 'Operation of the receiver'.

4. Connecting the electric matches, parallel and serial circuit:

Connect PFE Profi with the electric matches. Pay attention to sufficient cable cross-sections. In doubts, we recommend the use of the ignition power diagrams that are printed in the appendix of this manual. These have been determined by numerous tests and calculations particularly for this system.

It is not allowed to connect an electric match to the PFE Profi without using the appropriate adapter. The matches or adapters are connected to the gilded clamps of the receiver by short wires. There is no need to worry about the polarity.

You may either insert the wires with removed insulation into the cross drilling of the clamps or into the vertical drilling of the 4mm-banana plugs.

After connection of the effects, you will activate the OK-LEDs with the magnetic pen. If a LED is not illuminated either the match or the wiring is faulty. After checking all, you will leave the menu.

Note: If you start a radio range test at the transmitter the OK-LEDs will be activated as long as the receiver is displaying the result of the test. This way, you can activate the OK-LEDs from distance.

Parallel or serial circuit of electric matches:

By using the serial circuit, you can connect the matches and check the correct connection immediately by activating the OK-LEDs of the receiver. If you disconnect any single match, the corresponding green OK-LED will stop to shine.

If you use the parallel circuit it is necessary to check each single match with its wiring. For this task activate the OK-LEDs of the receiver and connect the different matches one after another. Check if the LED lights up every time.

If you clamp more than one effect together, a faulty match or wiring will not be detected because of the conductive connection of the other match.

Therefore, use the way of checking the matches one after another as mentioned above to ensure the ignition of all effects.

The receiver may be used with both circuit methods, however as you know from other ignition systems there are advantages and disadvantages to consider.

Parallel circuit

Advantages:

- up to 20 electric matches for each output are possible
- most reliable method

Disadvantages:

- more wiring required
- not so convenient to check

Serial circuit

Advantages:

- simple wiring
- convenient to check

Disadvantages:

- only up to 7 electric matches are possible because of resistance addition of the single matches

Note: To fire a great number of electric matches with one output you can connect up to 20 serial circuits of 7 matches to it. By this up to 140 matches can be fired !
Do not use different types of electric matches in a circuit.

5. Programming the receivers:

It is useful to assign the ignition channels from 1 to 999 to the various outputs of the receivers in the same order as they will be ignited later. On your show plan, you have already set the order of the ignition channels so you will program your receivers within a few minutes.

Please follow the instructions regarding the programming described in section 'Operation of the receiver PFE Profi with 3/10 Outputs' of this manual.

If you assign the same ignition channel to more outputs even on more than one PFE Profi, all these outputs will be activated at the same time when the transmitter will send this ignition channel.

The consequence of this is a quasi-parallel circuit without connecting the matches together.

Advantage: When you want to ignite two or more effects over a great distance you can use several PFE Profi programmed with the same ignition channel. If you use for example two receivers, the double ignition power will be at your disposal.

6. Ignition of the electric matches:

Ignite the effects by switching on the PFS Profi, setting the desired channel with the keys 'Up' and 'Down', and activating the ignition mode with the key switch 'Zündmodus'.

After that the button 'Feuer' = 'Fire' will be illuminated.

If you press the button 'Fire', all outputs, which have been programmed to the selected ignition channel, will be fired immediately.

The delay time between pressing this button and ignition is shorter than 0.05 seconds - you will not notice any delay. During that, several complete sets of data will be received and decoded by the receiver. Only if this information is complete and several checks of data are true the outputs will be activated.

The ignition channel 0 is automatically being programmed to the receiver's after deleting it's memory.

If you try to ignite channel 0 **no ignition command will be sent** to avoid unintended ignitions of outputs that have not been programmed yet.

If you pause with ignition, it is recommended to cancel the ignition mode with the key switch of the transmitter. For safety reasons the key can only be removed in off-position.

This avoids the use by unauthorised persons or accidental firing.

Galaxis PYROTEC PFE Profi POWER

Control elements



The device has two clamps for connection of the firing cable to the high power output. You know all other control elements already from the other receivers.

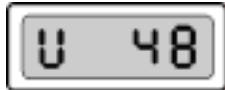
Programming:

A stepping extension is obtainable for this receiver.

Even if this device has one output only you can chain it in a stepping process by using the menu item 'Step Offset'.

According to your expectations you'll find an opportunity to program the output with the desired ignition channel in the menu.

Use the following menu item to program the ignition voltage:



With 'Up' and 'Down' you can choose between the following:

48/60/100/200/300 or 400 Volts. Finish your setting with 'Mode'.

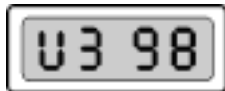
The value will be stored in the receiver's memory and will be present the next time you switch the device on.

The setting is active as soon as you leave the menu. Depending on the selected voltage it takes up to 20 seconds until the capacitor is charged completely.

This time is required after switching the receiver on, too.

By activating 'Down' in the receiving mode you can read the actual voltage.

You may see the following in the display:



A voltage of 398 Volts is shown.

Apparently the setting is 400 Volts. A tolerance of +/- 1% is normal.

Please mind that the maximum operation time of the device depends on the selected ignition voltage.

The higher the ignition voltage the more often the capacitor needs recharging to cover losses by selfdischarging. This fact reduces the operation time:

| Ignition voltage | Operation time |
|------------------|----------------|
| 48V | 35h |
| 60V | 32h |
| 100V | 30h |
| 200V | 25h |
| 300V | 18h |
| 400V | 16h |

Safety notes:

This device ignites matches with voltages which can be dangerous for human beings.

Fundamentally the maximum voltage without any danger is 60 Volts.

Make sure that nobody is in contact with the output clamps or cables anytime before firing the ignition channel. Please mind that contact could be caused e.g. by metal parts of your equipment or heavy rain, too.

As the operator you are responsible that nobody gets hurt due to high voltage as you are responsible for your pyrotechnic effects.

A ignition voltage of 400 Volts may be lethal for a human being !

If you decrease the ignition voltage in the menu the device will discharge the capacitor's voltage to the desired value after leaving the menu. While discharging the receiver will display the actual voltage.

As soon as the selected voltage has been reached the device will enter the receiving mode.

By this method it is guaranteed that only the selected voltage will be used for firing.

Ignition power:

For this device we recommend serial circuits only.

The maximum ignition power depends on the selected ignition voltage, the wire used and its length, the resistance of the matches.

It is possible to measure ignition power with the maximum total resistance of a serial circuitry of electric matches.

| Ignition voltage | Maximum resistance for electric matches of type 'A' / maximum number of matches | Maximum resistance for electric matches of type 'U' / maximum number of matches |
|------------------|---|---|
| 48 V | 50 Ω / 25 | 22 Ω / 22 |
| 60 V | 65 Ω / 32 | 30 Ω / 30 |
| 100 V | 115 Ω / 57 | 56 Ω / 56 |
| 200 V | 240 Ω / 120 | 133 Ω / 133 |
| 300 V | 365 Ω / 182 | 190 Ω / 190 |
| 400 V | 490 Ω / 245 | 266 Ω / 266 |

When calculating the number of matches the resistance of the wiring was disregarded !
In most applications with serial circuits and high ignition voltage this can be done.

Fundamentally this equation applies:

$$\text{Ignition current [A]} = \text{Ignition voltage [V]} / (\text{Resistance of the application } [\Omega] + 10 \Omega)$$

If the result is higher than 0.8 Ampere when using matches of type 'A' or higher than 1.5 Amperes when using matches of type 'U' the ignition will work.

By measuring the total resistance of your serial circuitry you can determine if the ignition current is sufficient. With the use of this method the wiring resistance is taken into consideration.

The resistance of 10 Ohm in the formula has to be added because this is the 'inner' resistance of the PFE Profi Power. Therefore the maximum ignition current is 40 Ampere.

Operation of the miniature receiver with 1 Output:

This section describes the special features of the miniature receiver with 1 Output and is only an addition.

This receiver has been designed especially for application in theatres and for special effects.

It should not replace the other receivers at all, but enlarge the spectrum of this system.

This device is perfect if there is only limited space for installation of pyrotechnics for example when dealing with effects on actors.

The weight of the receiver is so small that it is possible to install it into a model aeroplane.

Technically it is a completely different power supply.

The used alkaline cell of type 'N' may be deterrent because most people can not imagine that this small battery can provide enough power for a reliable ignition.

Without special electronic circuits this is certainly true.

There are two circuits built in the miniature receiver which raise the battery voltage.

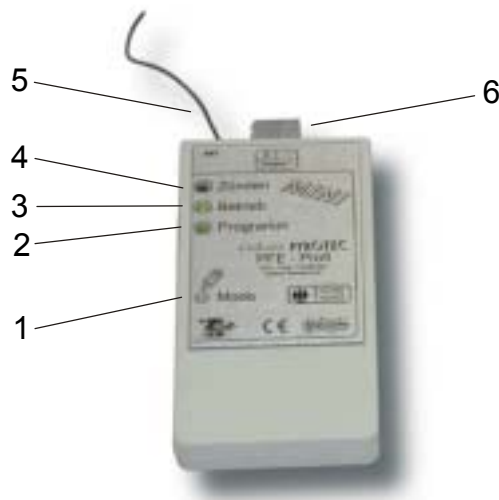
For the operation of the processor and the radio data receiver 5 Volts are generated and the ignition capacitors are charged with 10 Volts.

Due to an operation down to a battery voltage of 0.4 Volts the energy in the cell is used completely. The supply of enough ignition voltage is guaranteed all the time.

We recommend the use of a new battery every time you operate the receiver, because of the relatively high current consumption.

Please do not use other battery types than the recommended one. This one has been selected because it provides the longest operation time.

Control elements:



- | | | |
|----------|--|--|
| 1 | Sensor 'Mode' | This is the sensitive area for the magnetic pen |
| 2 | LED yellow 'Programm' = 'Program' | Signals the program mode |
| 3 | LED green 'Betrieb' = 'Operation' | Signals operation and result of continuity check |
| 4 | LED red 'Zünden' = 'Ignition' | Signals if the output is active |
| 5 | Antenna | external wire antenna |
| 6 | Clamp | |

You will find on the back side of the device:

- | | |
|---------------|--|
| Screws | To change the battery open the screws, lift off the back of the housing, replace the battery, mind polarity , close housing and fasten screws again |
|---------------|--|

Switching on and programming:

First make sure that you have inserted a new battery.

To switch on the device point to the field 'Mode' with the magnetic pen for about half a second. Both, the green and the yellow LED are flashing. The yellow one will stop flashing after 10 seconds.

Only as long as the yellow LED is flashing you can program the receiver with the range test function of a transmitter.

To program a receiver switch on your transmitter and keep it in normal mode. Select the desired ignition channel at the transmitter and then switch on the receiver. After that you press the key 'Reichweitentest' = 'Range test' at the transmitter while the yellow LED flashes at the receiver. In this case the yellow LED will be active as long as the range test lasts. This shows you that the receiver has programmed the desired channel into its memory. This setting will be present the next time of operation again. Even if you remove the battery this information will not be deleted.

Additionally the green LED signals if a electric match is connected or not. Please see section 'Continuity check' below.

After switching on the device the green and yellow LEDs are flashing alternately. By this you can distinguish the program mode and the battery low warning which will be explained later.

Continuity check:

The green LED is flashing all the time to signal operation. When no match is connected to the output the LED is flashing with a long bright and a short dark period. As soon as a match is connected and the contact is faultless the LED will flash with a short bright and a long dark period.

Range test:

A range test may be started as soon as the program mode which has been described above is over. Press the button 'Reichweitentest' = 'Range test' at your transmitter. If the receiver was able to decode this signal the green LED 'Betrieb' = 'Operation' will light for a longer period of time. Then the result of the test will be displayed by this LED. Every flash means 10%. By counting the flashes you get the test result.

If the green LED flashes for example 8 times after the first and a bit longer bright period when the test was started then the result is 80%.

As you already know from the other receivers you should achieve at least 30% for reliable operation. After the flash signals and the end of the range test the receiver will enter normal mode again.

Ignition and ignition power:

The ignition power is limited to one electric match. You may use matches of type 'A' or 'U'. Connect the match to the output clamps. With the supplied tool you can open the clamping mechanism. Insert the tool into the provided bracket of the clamp and then push it backwards. The mechanism will open and you can insert the wire.

If you fire the programmed channel at the transmitter and the receiver is switched on the output will be active and the red LED 'Zündung' = 'Ignition' will start to light for about 2 seconds.

After switching on the receiver and after each ignition it takes up to 5 seconds until the maximum ignition voltage is reached.

Be aware to use short ignition wires to ensure reliable ignition.

Recommended battery, operation time, battery low warning:

We recommend a battery from Varta. You can purchase this type from us (please see price list). Other types do not reach the capacity and would result in shorter operation time.

With the Varta battery operation time is about 2 hours.

We recommend the replacement of the battery every time you use the device to prevent an almost flat battery from causing ignition problems.

If the remaining energy in the battery decreases below 30% the yellow LED 'Programm' = 'Program' will start flashing synchronously with the green LED 'Betrieb' = 'Operation' as a battery low warning. If you want to use the receiver any longer a replacement is necessary. The battery low warning will not function during the first 20 seconds of operation.

Do not use rechargeable batteries with this device. The capacity and nominal voltage is insufficient to provide a reasonable operation time.

Please mind polarity when inserting the battery.

Switching off:

If you activate the field 'Mode' with the magnetic pen for about half a second the device will be switched off. In this state the power consumption is extremely low. You may keep the battery in the device for months without any significant discharging. Nevertheless it is advisable to remove the battery when the device will not be used for a longer period of time to avoid damages by battery leakage.

Operation of the miniature receiver PFE Profi with 5 Outputs:

This section describes the special features of the miniature receiver PFE Profi 5 and is intended as an addition. This device is a receiver that has been designed especially for the use in the areas theatre and special effects. Its purpose is not to replace the other receivers, but to open up new applications.

Technically viewed it contains a completely different power concept.

The used AA-cells may be deterrent for some people because they cannot imagine that they provide enough power for a reliable ignition.

Without any technological support this is certainly true. Therefore the miniature receiver contains two circuits that increase the battery voltage. For the operation of the processor and receiver module 5 Volt are produced and for the charging of the ignition capacitors 30 Volt are produced.

Please note that there is a charging capacitor for each output to prevent the short circuit of an output from affecting the ignition power of the next output.

The stored energy in the AA-cells is utilised completely.

The device operates down to a voltage of 0.4 Volt per cell. The full ignition power is at your disposal in the complete range of cell discharge.

The integrated opportunity of ignition with acoustic signals (ignition by microphone) is a valuable feature for the realistic simulation of body hits. Due to arming this function by a radio signal, maximum safety is provided.

Of course you can adjust the microphone sensitivity in a wide range.

Note: To design the device as user-friendly as possible only ignition channels from 1 to 99 can be programmed. The channels from 100 to 999 will be ignored during programming and firing.

Description of the control elements:



- | | |
|--|---|
| 1 LC-display | Displays all information and is readable in all light situations due to illumination during menu or after each activation of 'Mode'. |
| 2 Hole with internal microphone behind it or socket for external microphone | Please direct the opening to the acoustic source. A free line of sight is advantageous. If your device has been equipped with an external microphone plug it in here. |
| 3 Output terminal | Clamp wires of the electric matches with the supplied clamping tool here. The front panel shows channel assignment of the terminal. |
| 4 Sensor field 'Mode' | This is the sensitive area for the magnetic pen. |

On the back of the device you'll find:

Battery container To change batteries open cap by unlocking the catch. Insert new batteries and pay attention to right polarity. Put on the cap again and lock it with the catch.

Belt clip (optional) Use this clip to fasten the device in a convenient way.

Optionally the device may be equipped with an external wire antenna.

Switching on and normal mode:

Prior to operation ensure that good batteries are inserted.
Never use two different battery types or differently discharged cells.

```
RX5
Galaxis
PYROTEC
```

To switch the device on activate 'Mode' with the magnetic pen.
You see this start message in the display.

```
Software
Version
2.0d
```

Soon after that the software version will be displayed.

```
12345|AC:85%
      |SF: 0%
-    |RW: ?%
```

Then you see this display of the normal mode.

The remaining battery capacity is displayed for example as 'AC:85%'. AC = 'Akkumulator Capazität' = 'Accumulator capacity'.

Please note that this result relates to a temperature of 20 degrees centigrade and depends on ambient temperature. When operated at temperatures

below 0 degrees centigrade it is possible that a fully charged battery is displayed with 70% because its voltage is lower than at room temperature.

A line below the signal strength of an interfering carrier on the used radio frequency is displayed.
SF = 'Störfeldstärke' = 'Interfering signal strength'. In this example there has been no signal detected and 0% is displayed. Values below 30% are unproblematic.

In the display's bottom line the result of a range test will be shown.
'RW' = 'Reichweitentest' = 'Range test'. In this example, no range test has been executed and therefore no result can be displayed.

In the top line you read '12345'. This marks the columns of the outputs 1 to 5 to enable displaying of control symbols.

On the left side of the bottom line a bar is moving forth and back. This demonstrates that the device is in reception mode.

After switching on the ignition capacitors will be charged. After about 30 seconds this charging progress is finished. The capacitors will be recharged in predefined intervals. So if you wait the first 30 seconds you will never have to worry about insufficient charging.
After editing the menu and after an ignition a new charging process will be initiated.

```
12345|AC:85%
***  |SF: 0%
-    |RW: ?%
```

If you clamp on a match and the electric contact is faultless then you'll see a star symbol below the corresponding output number.

In this example the outputs 1, 2, 3 have been connected with an electric match properly.

```
12345|AC:85%
***  |RWTEST
-    |RW: 70%
```

After initiation of a range test the result will be displayed like that.

'RWTEST' = 'Reichweitentest' = 'Range test'.

In the bottom line the result - in this case 70% - will be displayed.

```
12345|AC:85%
***  |SF: 0%
-    |RW: 70%
```

After the test the result remains in the display until a new test will be initiated or you enter the menu. Before each range test the result should be deleted (by entering the menu) to prevent the old result from pretending sufficient range.

```
12345|AC:85%
***  |ZMODUS
-   |RW:70%
```

If you enter the transmitter's ignition mode 'ZMODUS' will be displayed. 'ZMODUS' = 'Zündmodus' = 'Fire mode'.

```
12345|AC:85%
■**  |CH: 17
-   |RW:70%
```

If you fire an ignition channel it will be displayed like that. If an output has been programmed with this channel it will be ignited. A box as a symbol for ignition will appear in the column of this output. In this example output 1 will fire the matches.

Note: If you want to read the display in darkness a short activation of 'Mode' will illuminate it for a certain period of time.

The menu:

Note: All settings of the menu are stored and will be present the next time of operation. Each change of settings will be stored when leaving the menu. If you enter the menu the display will be illuminated continuously until you leave it.

If you activate 'Mode' for a longer time you'll enter the menu.

```
----Menü----
Ausschalten
oder weiter
```

First you have the opportunity to switch the device off or to continue with menu editing. 'Ausschalten oder weiter' = 'Switching off or continue'. If you activate 'Mode' for a short time you'll continue. If you activate 'Mode' for a longer time you'll switch off the device.

```
----Menü----
Batt./Akku
Alkali (27h)
```

You have activated 'Mode' for a short time and now you have reached this menu item. Here you can determine the used type of battery. This is necessary because calculation of the AC-result depends much on the used battery type and it's discharge curve.

If you activate 'Mode' for a short time you'll proceed without change.

If you activate 'Mode' for a longer time you'll change the battery type between the following: Alkaline, NiCd, NiMH. The maximum battery lifetime will be displayed in brackets.

```
----Menü----
Lautsprecher
Ein
```

The next item enables the user to turn the internal loudspeaker respectively its acoustic signals on or off. 'Lautsprecher' = 'Loudspeaker'. This comes in handy when these signals are disturbing. In this case you have to navigate through the menu without the support of these signals. A long activation of 'Mode' changes the setting and a short one skips to the next menu item.

```
----Menü----
Betriebsart
Funk-Zündung
```

Now you have to determine the operation mode. You can opt between these ones: 'Betriebsart Funk-Zündung' = 'Operation mode wireless ignition' or 'Betriebsart MIC-Zündung' = 'Operation mode microphone ignition'. A long activation of 'Mode' changes the setting and a short one skips to the next menu item.

```
----Menü----
Betriebsart
MIC-Zündung
```

In this example the microphone ignition mode has been selected.

The following section describes the configuration of the wireless ignition mode. The parameters of microphone ignition will be explained later.

```
----Menü----
CH-Speicher
beibehalten
```

First you have the opportunity to delete the programmed ignition channels or to edit the already programmed channels.

'CH-Speicher beibehalten' = 'Do not delete channel memory'.

If you activate 'Mode' for a longer time the following appears:

'CH-Speicher löschen' = 'Delete channel memory'.

A short activation of 'Mode' skips to the next menu item.

Please note that if you have selected to delete the channel memory only the programming of the channels for wireless ignition will be erased because this is the menu for ignition by radio.

The settings of the microphone ignition will remain unchanged.

```
----Menü----
Kanalprogr.
Output 1: --
```

Now you can assign an ignition channel to output 1 if desired.

'Kanalprogr. Output 1' = 'Programming channel of output 1'.

In the example no channel has been programmed yet because you see '--'

instead of the channel. To change the channel starting with 1 simply activate

'Mode' for a longer time and put the magnetic pen away if the desired channel

has been reached. The programming with the magnetic pen is a little complicated so you may program the channel by radio. Simply turn on your transmitter, select the desired channel in normal mode and start a range test. The receiver decodes the channel information and after a moment the programming appears in the display. You may program the output again and again. If you set the transmitter to channel 0 and start a range test the programming of the edited output will be erased and '--' will be displayed. If you do not have your transmitter at hand, you will always have the opportunity to program the channel with the magnetic pen.

```
----Menü----
Kanalprogr.
Output 1: 37
```

Channel 37 has been assigned to output 1 here. If you are content with this setting activate 'Mode' for a short time and you'll reach programming of output 2. If you have programmed all outputs you'll find yourself back in normal mode and may begin with ignition.

If you have had selected the microphone ignition mode the menu will be adapted in the following way:

```
----Menü----
CH-Speicher
beibehalten
```

You know this menu item already. But now if you select 'löschen' = 'delete' the only parameter which will be deleted is the channel which arms the microphone ignition. The programming will not change and will have no effect on microphone ignition. The other parameters of microphone ignition (level and rate) won't be deleted, too.

```
MIC-Zündung
freischalten
mit Kanal:--
```

Now you have to determine the channel that will arm the ignition by microphone later.

'MIC-Zündung freischalten mit Kanal' = 'Arm microphone ignition with channel'

Please note that you may also program a channel that is used as an ignition channel with another receiver. In this case firing a match and arming of ignition by microphone would be simultaneous.

```
MIC-Zündung
freischalten
mit Kanal: 1
```

Channel 1 has been programmed here. This is useful if you work with a single receiver. Again you may opt between the use of the magnetic pen or the programming by radio signal.

You'll skip to the next menu item in the usual way.

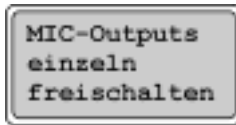
```
MIC-Outputs
alle sofort
freischalten
```

Here you have to decide if all outputs will be armed at once or if each output will have to be armed one after another.

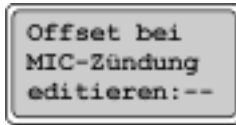
'MIC-Outputs alle sofort freischalten' = 'Arm microphone outputs all at once' or

'MIC-Outputs einzeln freischalten' = 'Arm microphone outputs one after another'.

Use 'all at once' for more than one ignition in a short period of time like the simulation of a machine gun and 'one after another' to arm each single output for example to simulate some body hits in a longer period of time. By this practice the time a match is armed is reduced to a minimum to provide maximum safety.

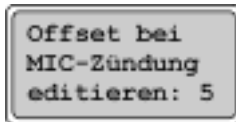


If possible choose 'one after another' because with this setting the armed time is shorter in most cases.
Program the arming characteristic as desired and skip to the next menu item.

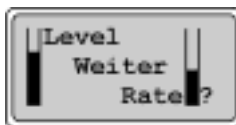


Here you may select an offset when using microphone ignition.
'Offset bei MIC-Zündung editieren' = 'Edit offset of microphone ignition'.
Offset means that a predefined number of acoustic signals will be counted down until the receiver will actually start with ignition when further signals will be detected. This is necessary for example to generate 10 body hits

with 2 receivers. Then you'll program the offset of the first receiver to 0, which means '--' in the display and the second receiver to offset 5. You may edit the offset with the magnetic pen or by radio signal.

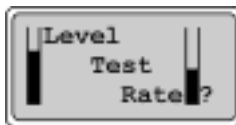


In this example an offset of 5 acoustic signals has been programmed.
Skip to the next menu item if you have finished.



After the offset, you have to adjust the sensitivity of acoustic event detection.
You have entered a submenu. Two different parameters that are displayed as bar diagrams provide optimum adaptation and test: level and rate.
In the centre of the display you read the title of the submenu item.

'Weiter' = 'Continue'. With a short activation of 'Mode' you'll leave the entire menu without any change to the sensitivity parameters. With a longer activation of 'Mode' you'll skip to the next item of the submenu. The question mark informs you that no test with an acoustic event has been initiated.



You have activated 'Mode' for a longer time and have reached the item 'Test'.
In this section only the editing and test function is described. Please refer to the chapter 'Function of level and rate when operating with microphone ignition' for detailed explanation. A short activation of 'Mode' will initiate a test. With a long one you'll skip to the next item of the submenu.



If you have started a test 'Scan' will be displayed.
The processor of the device scans the signal of the microphone now.
If there is an acoustic event with sufficient level the actual rate will be counted and displayed as a T-bar on the right edge afterwards.
Then the question mark will vanish.



See this example. An acoustic event has been detected.
Its rate was quite higher than demanded.
This test result is ideal for a selective detection of the microphone signal.



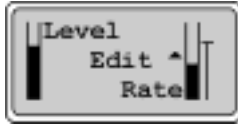
This result would not have led to an ignition because of the insufficient rate of the acoustic event. You would have to decrease the demanded level to ensure a higher rate. To decrease the demanded rate would also lead to an ignition.
Generally it is advisable to reduce the level before the rate is reduced below one third of the full scale. If possible the demanded rate should be half and the actually achieved rate of the event should be in the upper third of the full scale.



If you have activated 'Mode' for a longer time during the item 'Test' or 'Scan' you'll be able to increase the demanded signal level.
'Edit' is displayed in the middle and an arrow signals the direction of change.
With short activation of 'Mode' you can increase the level.



If you activate 'Mode' for a longer time you can decrease the level.
The arrow points in the opposite direction now.
Short activation of 'Mode' will decrease the demanded level.



With the next longer activation of 'Mode' you will also be able to change the demanded rate. It comes in handy that the result of a test is displayed even now. So you can easily change the rate according to the result.



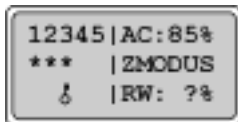
Finally you have the opportunity to decrease the demanded rate after another long activation of 'Mode'.
With the next long activation of 'Mode' you'll find yourself at the beginning of the submenu: 'Weiter' = 'Continue'. You may leave the menu with a short or start a test or make some changes in parameters with a long activation of 'Mode'.

The process of an ignition by microphone:



After leaving the menu in the operation mode microphone ignition you see for example this display. Instead of the moving bar the symbol of a key has appeared. This means that the receiver waits until arming.

If you have not programmed an ignition channel for arming it will be impossible to start signal detection. The firing of ignition channels which have been programmed to the outputs in wireless ignition mode - so that they are still stored in the receiver's memory - will have no effect. Only if you select the wireless mode of operation these ignitions will be carried out. Vice versa the channel for arming the microphone ignition will be without an effect then.



If the transmitter is in the fire mode, 'ZMODUS' = 'Fire mode' will be displayed. Now select the channel that you have programmed as the channel to arm the receiver's microphone ignition.

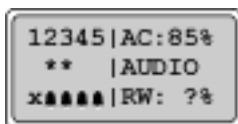
If you have programmed 'Arm all at once' the following will happen:



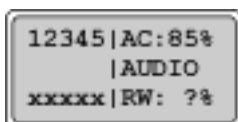
After firing the arming channel you see for example this in the display. All outputs have been armed at once. Therefore the symbol of a bell appears for all outputs. This symbol informs you that these outputs are armed for ignition by microphone. 'AUDIO' indicates that the analysing of the microphone signal is in progress. The order of ignitions is always 1-2-3-4-5.



An acoustic event has been detected, level and rate have been reached, and therefore output 1 is active now. The 'x' in the bottom line indicates that this output has been ignited already. The next event will fire output 2. Please note that if you have programmed any offset this will be counted down before any ignition will happen. Afterwards ignitions will follow one after another every time an acoustic event will be detected.



Now the device waits until a new event will occur. The resistance of the fired match of output 1 has become infinite.



Here all outputs have been fired. Further events won't have any effect. By stepping through the menu you can begin with microphone ignitions once more.

If you have programmed 'Arm one after another' the following will happen:

```
12345|AC:85%
***  |AUDIO
#0000|RW: ?%
```

After firing the arming channel only one bell symbol at output 1 will be displayed. The order of ignitions is 1-2-3-4-5 again. The key symbols at the outputs 2 to 5 inform you that after firing of output 1 a new arming is necessary for each output.

```
12345|AC:85%
■**  |ZMODUS
♩    |RW: ?%
```

An acoustic event with enough level and rate has been detected and therefore output 1 is active. At the same moment, the receiver waits until the next arming will be received and the key symbol moves forth and back. After each arming the ignition will happen as soon as the programmed offset has been counted down.

```
12345|AC:85%
**   |ZMODUS
♩    |RW: ?%
```

The box symbol for ignition has vanished and because of the infinite resistance of the fired match of output 1 the star symbol has vanished, too.

```
12345|AC:85%
**   |AUDIO
x#000|RW: ?%
```

You have armed the next output. Output 1 has been fired already. The next time an acoustic event will be detected output 2 will be fired. To fire the outputs 3 to 5 you have to fire the arming channel again and again.

```
12345|AC:85%
      |AUDIO
xxxxxx|RW: ?%
```

All outputs have been fired. The device waits until you enter the menu by activating 'Mode'. If you then leave the menu you'll be able to begin again with microphone ignition.

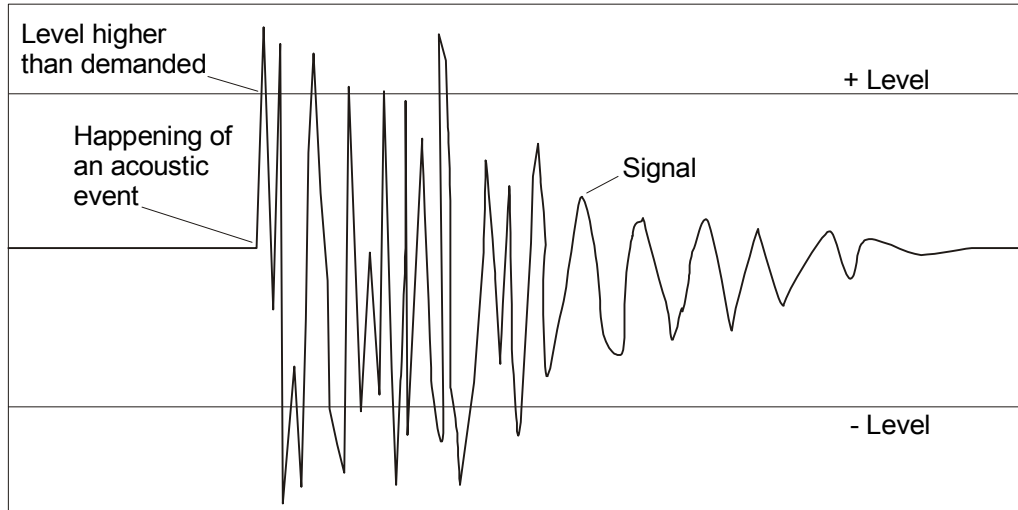
Note: As soon as 'AUDIO' is being displayed the signal of the microphone will be analysed and therefore it is not possible to update the AC value and the star symbols because the processor needs full computing power for this task. Accessing the display during that would cause detection gaps. Only when firing or arming the information will be updated. But this characteristic won't lead to any problem because the user won't stand near to the receiver during microphone ignition and therefore cannot read the information on the display anyway. Furthermore the duration of active microphone ignition is relatively short in most cases. This note is for your understanding and that you won't be surprised if you clamp in a match during audio processing and no star symbol will appear.

Note: You may stop the microphone ignition any time by entering the menu. After leaving the menu you will find yourself back in the microphone ignition mode provided that you have not changed the mode of operation in the meantime.

Function of level and rate when operating with microphone ignition:

For your better understanding we want to explain the technical background.

During microphone ignition the signal is scanned 12,000 times per second. If there is a loud acoustic event (bang) the signal shape may look like that:



The level is the demanded distance from the zero line the signal has to reach to trigger further analysis at all. Both, positive and negative level crossings are considered (+ Level and - Level). The example above contains 15 crossings of the demanded level. So this is a rate of 15. In the receiver's display each crossing is represented by one pixel.

If you want the receiver to distinguish between actual acoustic events and other interfering sounds this will be achieved by setting the level to a value that the resulting rate will be in the upper third of the scale.

The demanded rate should be programmed with a certain distance below the actual one for example half of the full scale. Please check if the programming is optimal by several tests. Please note that outdoors the situation may be completely different from indoors although the distance between the source of the event and the microphone is the same. Generally it is advisable to test the performance every time the surroundings have changed.

The lower the demanded level and rate the more likely that other sounds may initiate an ignition.

Please direct the microphone to the source of the sound to ensure optimum performance. Direct line of sight is advantageous, too.

Examples of different sound events:

Fundamental rule: Set the demanded level first, then start a test, make some changes on this setting if necessary, program the demanded rate with a certain distance below the actual one.

As soon as the actually achieved rate is higher or the same as the demanded one an ignition will happen.

The bang of a model gun with a calibre of 6 mm in a normally furnished room of ca. 40 m³ with a distance of 5 m can be detected like that:



The demanded level has been programmed to maximum.

The test results in full-scale or almost full-scale rates.

To provide maximum safety the demanded rate can be programmed a little bit higher than half of full scale.

Loud clapping in front of the microphone results in low rates, but the rate of the bang won't be reached.

If the room is more angular and the distance is about 12 m you may experience that the following setting will lead to optimum performance:



The demanded level and rate have been decreased.

The test results in a high rate. Loud clapping in front of the microphone won't initiate an ignition.

If bangs from a far distance should fire the match indoors the following may be advantageous:



The demanded level and rate have been decreased again.

The test results in a high rate, but loud clapping in front of the microphone causes an ignition sometimes.

If it is desired that clapping or a bang from a great distance outdoors should fire the match the following setting will probably fit:



The demanded level and rate have been reduced enormously.

The achieved rate is in the lower third. Loud sounds from the surroundings will probably fire the match also.

Safety notes when operating with microphone ignition:

The manufacturer refuses any responsibility for any damages and any claims that have been caused by microphone ignitions - intended and unintended ones.

The detection of acoustic events has been improved to fire when the sound of a bang (shot) arrives. But it is impossible to exclude unintended triggering by other sounds especially if the device has been programmed too sensitive.

Furthermore we recommend shortening of the armed time to a minimum. Never fire effects that may cause injury or damage if fired unintentionally. The safety distances have to be kept all the time.

Touching of the microphone, vibrations of the case, wind, shocks from hard objects against the case, sudden changes of atmospheric pressure and others cause strong signal levels on the microphone that may cause ignitions even if the device has been programmed insensitive.

Magnetic and/or electromagnetic fields of every kind may cause interference to the microphone signal that may result in an unintended ignition. For that reason for example mobile phones must not be operated around the receiver during microphone signal analysing.

If you use the external microphone please mind the fact that it must not be plugged in or unplugged during armed operation, because the 'plop' on the microphone signal will cause an ignition even if the level and the rate have been programmed to maximum.

The stepping extension (optional):

To use the stepping extension it is necessary to select the wireless ignition mode. After that erase the memory of the receiver.

All settings may be done by radio with the help of the transmitter's range test function.

```
----Menü----  
Step-Start ?  
Kanal:  --
```

This menu item will appear after the item 'Do not delete / Delete memory' if your device has been equipped with the optional stepping extension. 'Step-Start ? Kanal' = 'Step start ? channel'.

Here you can determine if you want to use the stepping extension and if yes, which channel should be used to start it. The stepping extension operates always with the outputs 1 to 5. If you skip this item without programming a channel you will have the opportunity to assign the ignition channels conventionally.

```
----Menü----  
Step-Start ?  
Kanal:  1
```

In this example channel 1 has been programmed to start the stepping extension. Activate 'Mode' to continue.

```
----Menü----  
Step-  ▼▼  
zeit:  00:00
```

After you have programmed the channel for triggering you are forced to determine the time delay between the step ignitions. If you have deleted the memory you will see this display. 'Stepzeit' = 'Step delay'.

The default value after memory delete is 00:00. The first two figures are seconds the last two are tenth and hundredth seconds.

The two arrows indicate that you will edit the first figures.

The stepping delay cannot be programmed with the magnetic pen because of its complexity.

Assuming that you set the transmitter to channel 12 and you release a range test then '12:00' will appear in the display which represents a delay of 12 seconds.

10:00 = 10 seconds

01:00 = 1 second

00:10 = 1/10 second

00:01 = 1/100 second

It is possible to overwrite the programmed delay time again and again.

You can program a new delay time every time you enter the menu.

```
----Menü----  
Step-  ▼▼  
zeit:  00:00
```

If you want to use a delay shorter than a second activate 'Mode' and you will see this in the display. The arrows mark the last two figures. With the range test of the transmitter you can program the desired delay time.

```
----Menü----  
Step-  ▼▼  
zeit:  00:14
```

In this example, a delay time of 0.14 seconds (= 140 milliseconds) has been programmed. With any activation of mode, you will reach the next menu item.

A delay time of 00:00 must not be used. In this case you cannot leave this menu item until you have programmed a delay that differs from 00:00. You may program any delay from 0.01 to 99.99 seconds.

3. NiCd-batteries (Nickel-Cadmium)

| | |
|-----------------------|--|
| Advantages: | - cheap - well available - very often rechargeable |
| Disadvantages: | - low capacity = short operation time - strong memory effect, that means high loss in capacity when charged without complete discharging before - fast self-discharging, use soon after charging |
| Environmental aspect: | very problematic |

We do not recommend this battery type but we have listed it because some users may have some cells and charging equipment of this kind which they might want to use.

4. NiMH-batteries (Nickel-Metal-Hydride)

| | |
|-----------------------|--|
| Advantages: | - very often rechargeable - no memory effect - high capacity compared to other rechargeable types |
| Disadvantages: | - more expensive - some self-discharging, use within 10 days after charging - mostly available only in specialised shops |
| Environmental aspect: | not problematic |

Conclusion:

We only recommend NiMH- or alkaline batteries of well-known manufacturers. Testing of lots of different batteries resulted in some good ones which you find in our price list. We recommend NiMH batteries for frequent use and carrying some alkaline ones for unexpected projects.

Ignition power:

Due to a high ignition voltage of 30 Volts the maximum amount of matches ignited is higher in serial than in parallel circuitry.

Sufficient conductor cross-section provided the maximum amount in parallel circuitry is 6 matches of type 'A' or 3 matches of type 'U'.

When using the serial circuitry the conductor cross-section may be smaller (at least 0.25 mm²). You may ignite up to 16 matches of type 'A' or 'U'.

Note: If you want to ignite a very high amount of matches it is possible to program all outputs of the device to the same channel and fire the maximum amount per output. By this method the receiver ignites up to 80 matches in 5 serial circuits of 16 matches.

Operation of the charging unit:

This device offers fastest possible charging processes (NiMH with 1,600 mAh within 2.5 hours) with optional discharge process prior to charging which prevents memory effects.

Whether the cells will be charged or not can be determined by the following:

- At first insertion of cells, then plugging the unit into a power socket:
The device will start with discharging if at least one cell is not completely discharged already.
Afterwards the cells will be charged.
- At first plugging the device into a power socket, then insertion of cells:
The device starts with charging immediately.

A red and a green LED are displaying current operation modes:

- red LED is active continuously = discharge is in progress
- green LED is active continuously = charging is in progress
- green LED is flashing = unit has switched to trickle charge

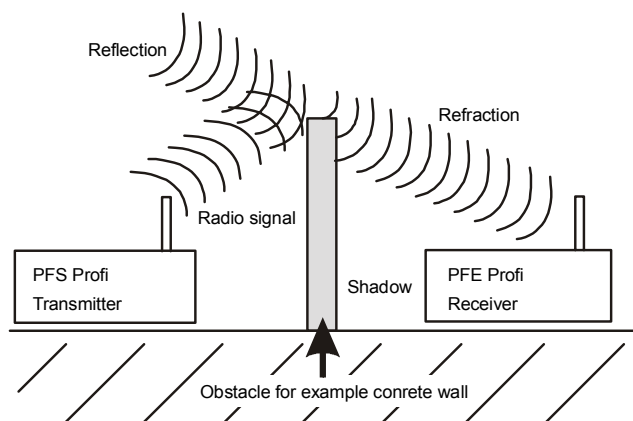
During trickle charge losses because of self-discharging are compensated permanently. You may leave the cells in the charging unit for an infinite period of time without any danger of damaging. Furthermore by this practice you have completely charged cells at hand all the time. After removing the cells from the unit you should use them within some days because of self-discharge effects.

When using this charger you may charge any number from 1 to 4 cells. The mixed charging of NiCd- and NiMH-types is possible, too.

Never try to charge other batteries than specified.

Radio range and its improvement:

The radio range of the devices is at least 200 meters if the standard antenna is being used. The frequencies used by us are so high that the radio waves are spread almost like light. This is called a quasi-optical characteristic. Consequently, obstacles between transmitter and receiver cause shadows, refraction, and reflection.



The intensity of this influence depends on the kind of material. Radio waves pass wood and stone nearly unhindered. Steel concrete and metal hinder the radio waves. In general, the reception behind an obstacle is possible because of reflection and refraction. See illustration above. Only in borderline cases, these rules will affect reception.

To exclude all possibilities a radio range test is recommended. If the result is insufficient, the position of the receiver should be changed until the range test result increases. Often a small change of the position will have this effect.

Please consider the hints given above regarding the rules of physics.
Reception in a metal casing is hardly possible because the radio signal cannot reach the antenna.
A hole of at least 70 cm in the housing is required for reception.

Note: Best reception characteristic is obtained by vertical alignment of the antenna at the PFE Profi.
The higher the devices are positioned, the better the reception.

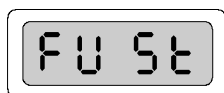
If the range of the system is insufficient for your application, you can replace the standard antenna with the high gain antenna 'Supersan 70'. This antenna must point with the arrow printed on it to the PFS Profi. The range increases to more than 800 meters.

In this context, we want to point out that the main rule of pyrotechnics has to be considered:

The firing area has to be clearly viewable from the point of ignition.

The function 'Radio interference':

The receivers are monitoring their operating frequency continuously.
Radio interference is present if the signal power of an external carrier is higher than 30% compared to 100% signal power of the own transmitter and if this situation lasts for longer than 15 seconds. It is not important if the interference is present for 15 seconds continuously or merely occasional.
In other words, every interference is counted and if the total time of interference increases up to 15 seconds a 'Radio interference'-warning will be displayed:



This text ('FUSt' is the abbreviation for 'Funkstörung' which means 'Radio interference') will flash in the displays of the receivers. Additionally the illumination of the display will flash.

If this warning occurs, do not panic. Please try to determine if the receiver has been positioned near to a strong source of radio interference.

By stepping through the menu with the magnetic pen, you will clear this warning.
The device is ready for ignition even if you do not clear this warning signal.

Warning: If you switch on a receiver while the transmitter is operating in ignition mode the receiver will display a radio interference warning after a short time. This is because the transmitter is distributing a continuous carrier in this mode. Every time the transmitter changes from normal to ignition mode, a signal is sent to the receivers that an intentional continuous carrier will be transmitted. Now, if the receiver has been switched on after that command this carrier is interpreted as external radio interference.

Radio interference and its possible causes:

Every radio transmission operates based on a nonexclusive transmission medium.
That means other users may use the same frequency if they are authorised to do so and the devices have the required approvals. This may block the transmission.
An unintentional ignition is prevented by sophisticated protection functions like proving a complex set of bits several times by using CRC (cyclic redundancy checksum).

The used transmitter modules in this frequency range have a very low radiated RF-power so that influences to our system from distances over 500 meters can be almost excluded.
Another source of influence can be faulty devices that are transmitting interfering carriers on our frequency.

If there is really an interfering carrier, the worst-case result is that no ignition happens. The danger of unintended ignitions is virtually nil by using the extremely complex 40 bit wide CRC algorithms.

'CRC' is a sophisticated cyclic redundancy checksum, which is used to exclude unintentional changes when transmitting data. Operation of the system near to wireless devices like commercial, taxi, sea, air, citizen band, military, railway radio sets is possible without any interference because of the different frequency ranges. In addition, cell phones and their stations cause no problems. Atmospheric interference from thunderstorms does not interfere because of the used frequency modulation (FM).

This system meets highest standards of safety because

- it is equipped with high-class UHF radio modules
- transmitter and receiver are operating with narrow frequency modulation (NFM)
- all systems are spread over 32 different frequencies
- frequency modulation provides exclusion of atmospheric interference
- the immunity against high power carriers on other frequencies is very high
- each system communicates with a unique ID-number to prevent the interference between systems of different customers
- so-called manchester coding is used
- a special transmission protocol with 40-bit-wide CRC is used, which provides matchless safety proved by scientific analysis

Operation time:

The information in this section relates only to the receivers PFE Profi 3/10 and Power.

After switching on the receiver, the accumulator supplies continuously power to the circuit. If the accumulator has been charged completely, after 40 hours of operation about 30% of energy remains in the accumulator.

When an operation time longer than 40 hours is required, you can charge the accumulator during operation. By this method, the receiver can be operated for an infinite period.

The operation time of the PFE Profi Power strongly depends on the selected ignition voltage. Please see section 'Operation of the PFE Profi Power with 1 output'.

The transmitter can be operated about 8 hours if the accumulator has been charged completely. If you switch on the supplied gooseneck-lamp, the time of operation will decrease to 3 hours.

The maximum operation time of the transmitter can be prolonged by permanent charging. Infinite operation is not possible as the current consumption is higher than the charging current.

Storage:

If you want to store the devices for a longer time without charging, please pay attention to the following:

- Switch off the devices
- Charge the devices completely (at least 14 hours) before long periods without charging
- Recharge the accumulators every 6 months in order to compensate losses by self-discharge; if this does not happen damages by deep discharge may occur
- To ensure reliable accumulators read the accumulator test results repeatedly

Maintenance:

Except from cleaning and charging the devices no maintenance is necessary.
If an accumulator is dead, please send the device to the manufacturer for replacement.

Cleaning:

For cleaning purposes, use only a damp cloth and a mild household detergent.
Never use acid detergent or any kind of solvent for cleaning.
Please take care for clean electrical contacts.
If a key of the transmitter has become dirty, lift off the actuation plate carefully with a screwdriver for cleaning the mechanic inside.

Warranty:

Our systems are subject to strict quality control.
However, should one device function improperly during normal use, you are protected by our 24 month warranty.

We will repair any defects free of charge in workmanship or material, provided the device is returned unopened and not tampered.
Accumulators are excluded from warranty because damages by deep discharge cannot be proofed afterwards.
Every accumulator has been tested with regard to power and capacity before shipment.

Damage due to dropping or incorrect handling is not covered by the warranty.
If the device shows failure following expiry of warranty, we will offer you a quick and economical repair.

Disclaimer:

The devices have been developed only for the purpose of ignition of electric matches in the section of pyrotechnics. Other applications should be discussed with the manufacturer.

A case beyond our influence excludes liability and therefore any claim for damages is not possible.
The devices have been thoroughly developed, tested, and manufactured.

Numerous tests and practical experience have proved their absolute reliability, even when operated under difficult conditions.

Please take care of the hints listed in this manual like coverage against humidity if you are using the devices outdoor.

Approval:

The devices are approved for legal operation in most European countries.
ETS 300-220 standard is fulfilled.

Please contact the manufacturer for details regarding legal operation outside Germany.

Technical Data:

Common data applying to all devices:

| | |
|---------------------------|---|
| Radio transmission method | FM narrow band, radiated power 10 mW, wavelength 70 cm, 32 different frequencies, receiver type: double-superheterodyne |
| Protocol parameter | PCM, about 2,000 bps |
| Temperature range | -10 to +50 degrees centigrade |
| Humidity | 10 - 90% rH |

Dimensions and weight:

| | |
|--|--------------------------|
| PFS Profi | 303-98-210 mm / 2.775 kg |
| PFE Profi 3 Outputs | 103-86-210 mm / 1.500 kg |
| PFE Profi 10 Outputs | 103-86-430 mm / 2.275 kg |
| PFE Profi Power 1 Output | 103-86-210 mm / 1.470 kg |
| PFE Profi miniature receiver with 1 Output (including battery) | 16-46-85 mm / 75 g |
| PFE Profi miniature receiver with 5 Outputs (including alkaline batteries, without clip) | 65-23-133 mm / 192 g |

Power supply and charging concept:

| | |
|---|---|
| PFS Profi, PFE Profi 3/10/Power | 12 V, 2 Ah, lead gel, PYROTEC charging device |
| PFE Profi miniature receiver with 1 Output | 1 pcs. Varta type 'N' alkaline, only battery operation possible |
| PFE Profi miniature receiver with 5 Outputs | 2 pcs. of size 'AA'; NiCd, NiMH or alkaline, PYROTEC charging device or others customary in trade |

Ignition voltage and current / capacity of ignition capacitors / ignition energy:

| | |
|---|--|
| PFE Profi with 3 or 10 Outputs | 12 V, max. current 50 A, cont. current 17 A |
| PFE Profi Power with 1 Output | 48/60/100/200/300/400 V, max. current @ 400 V: 40 A, 400 µF ignition energy @ 400 V: 160 mC |
| PFE Profi miniature receiver with 1 Output | 10 V, 420 µF, 4 mC |
| PFE Profi miniature receiver with 5 Outputs | 30 V, 470 µF, 12 mC |

Maximum operation time of the devices:

| | |
|---|---|
| PFS Profi | 8 h without lamp, 3 h with lamp |
| PFE Profi 3/10/Power | 40 h |
| PFE Profi miniature receiver with 1 Output | 2 h with Varta alkaline cell of type 'N', (when operated with external power supply much longer, for example 16 h with an alkaline cell size 'AA') |
| PFE Profi miniature receiver with 5 Outputs | with alkaline batteries: 27 h, with NiMH batteries: 16 h, with NiCd batteries: 10 h |

Radio range:

| | |
|---|--|
| PFE Profi 3/10/Power | with standard antenna: 200 m, with Superscan 70: 800 m |
| PFE Profi miniature receiver with 1 Output | 120 m |
| PFE Profi miniature receiver with 5 Outputs | with internal antenna: 70 m, with external antenna: 150 m |

Charging unit for PFS Profi, PFE Profi 3/10/Power:

| | |
|------------------------------------|--|
| Line voltage | standard 230 VAC, international version also available: 90-250 VAC 50/60 Hz including socket adapters for USA, GB, Europe and Australia |
| Power consumption | from 4,2 to 8,7 W; depending on charging current |
| Required time for full charging | 14 h, no overcharging possible |
| Dimensions | W-H-D 57-95-85 mm |
| Weight | 0.372 kg |

Charging device for 4 'AA' cells:

| | |
|------------------------------------|--|
| Line voltage | 230 VAC |
| Power consumption | 11 W |
| Required time for full charging | 1-2,5 h depending on battery capacity |
| Dimensions | W-H-D 70-118-86 mm |
| Weight | 0.370 kg |
| Charging technique | selectable discharge process with 200 mA, charging with 500 mA, prevention of overcharging with timer and ΔU , charging of NiCd and NiMH cells possible |

Supplied accessories (please see also price list / specification):

| | |
|---|--|
| PFS Profi | 1 standard antenna 2 keys 1 charging unit 2 magnetic pens 1 gooseneck-lamp 1 operation manual |
| PFE Profi 3/10/Power | 1 standard antenna 2 keys 1 charging unit |
| PFE Profi miniature receiver with 1 Output | 2 tools for clamps 2 alkaline cells Varta size 'N' |
| PFE Profi miniature receiver with 5 Outputs | 2 tools for clamps 2 alkaline cells size 'AA' |

Application of ignition power diagrams:

By the use of our ignition power diagrams, you can check if a parallel or serial circuit of electric matches will work properly.

The ignition power diagrams relate only to the receivers with 3 or 10 outputs of the PYROTEC system and are not transferable to other products.

During calculation of these diagrams, we assumed the use of a standard electric match, which will ignite reliably at a current of 800 mA (electric match of type 'A'). Furthermore, all electric contacts have to be faultless and the system has to be installed correct with copper wire.

If you now want to find out if your application works, proceed like this:

Determine which wire you are using. Please take care of the difference between conductor diameter and conductor cross-section! The manufacturers of cable as a rule only specify the conductor cross-section in mm² or another unit.

When you have no information about the cable you are using, simply measure the diameter of the wire. The diagrams show both, diameter and cross-section.

Now you can determine which of the diagrams is meeting your application.

The following circuit types separate the diagrams: serial circuitry 1-7 matches, parallel circuitry 2-10 matches and parallel circuitry 11-20 matches.

By using wire with 0.16 mm² an ignition of more than 10 matches in parallel circuitry is not possible because of the high resistance of the wire.

The maximum number of matches in parallel circuitry is 20, limited by accumulator power.

Furthermore, the maximum number of matches in serial circuitry is 7 because the resistance of each electric match is added up to a total resistance that limits the current to an insufficient value.

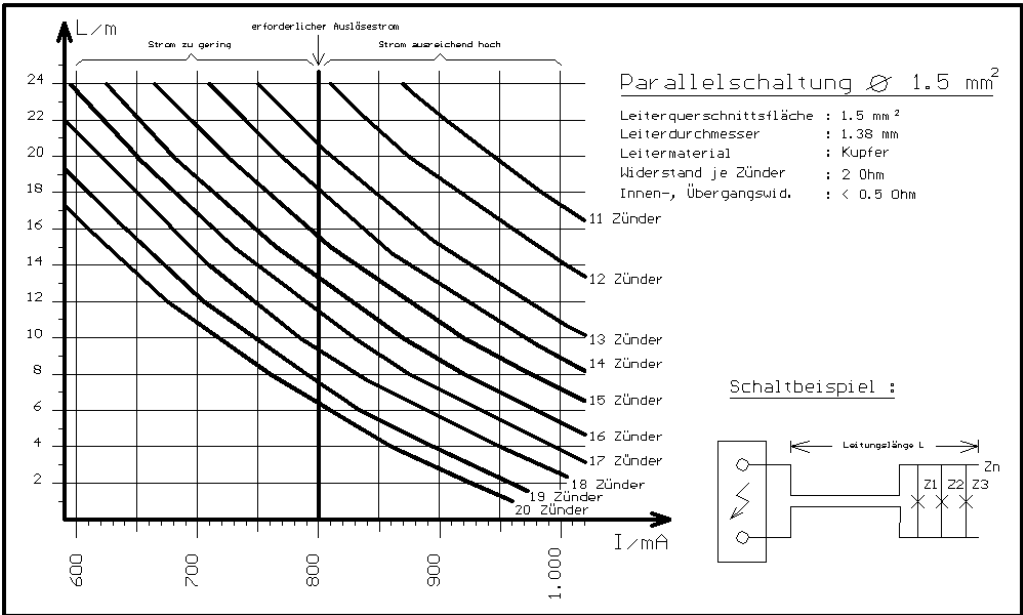
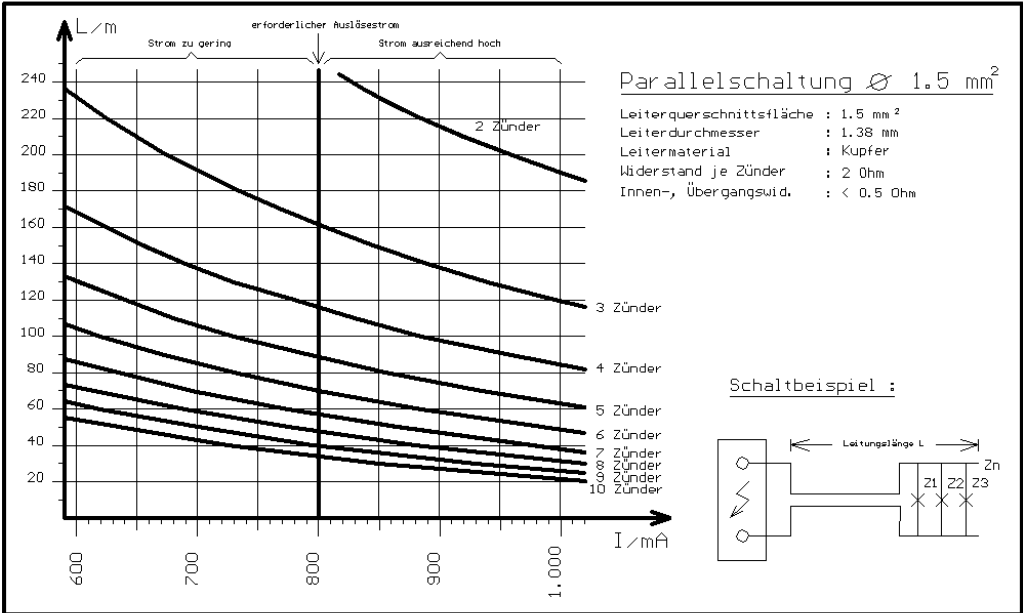
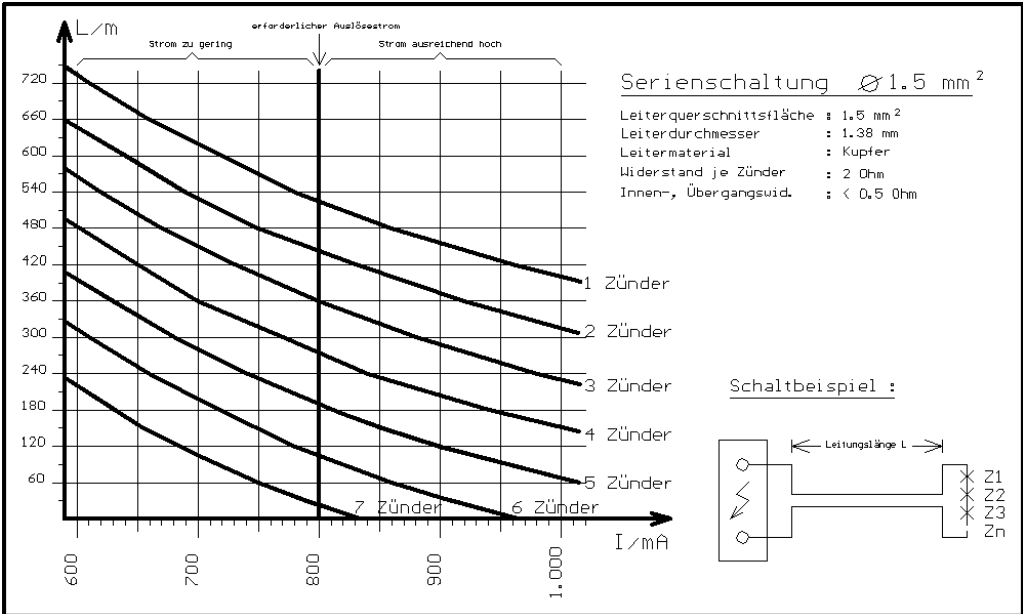
For every amount of matches, you will find a curve in the diagram.

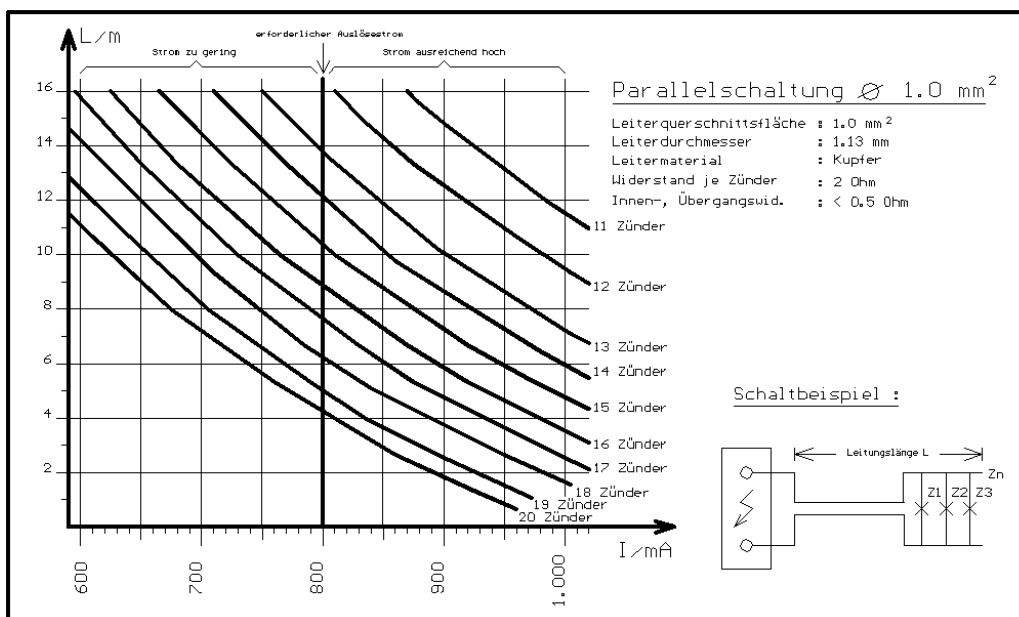
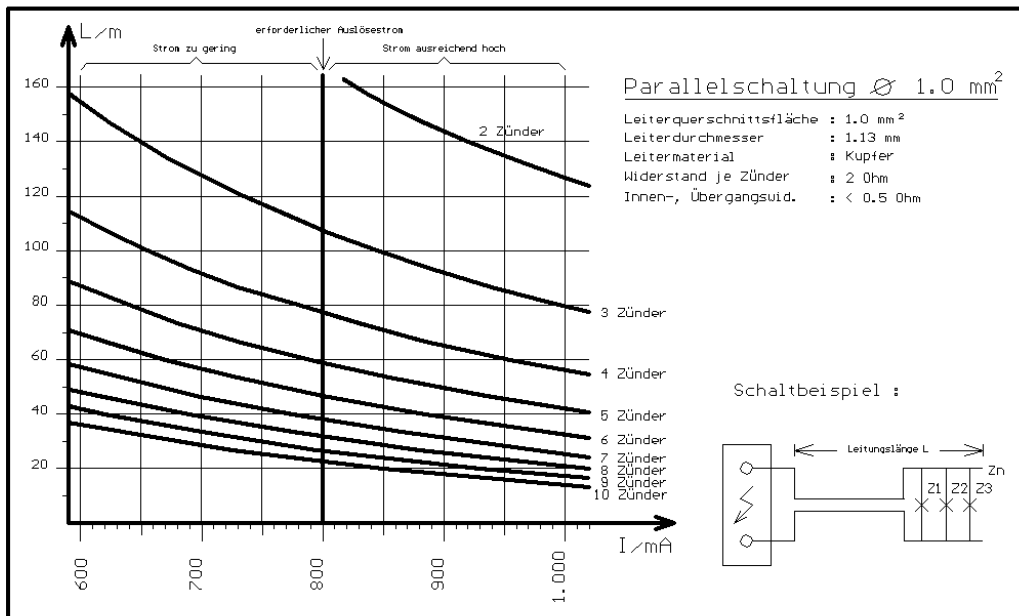
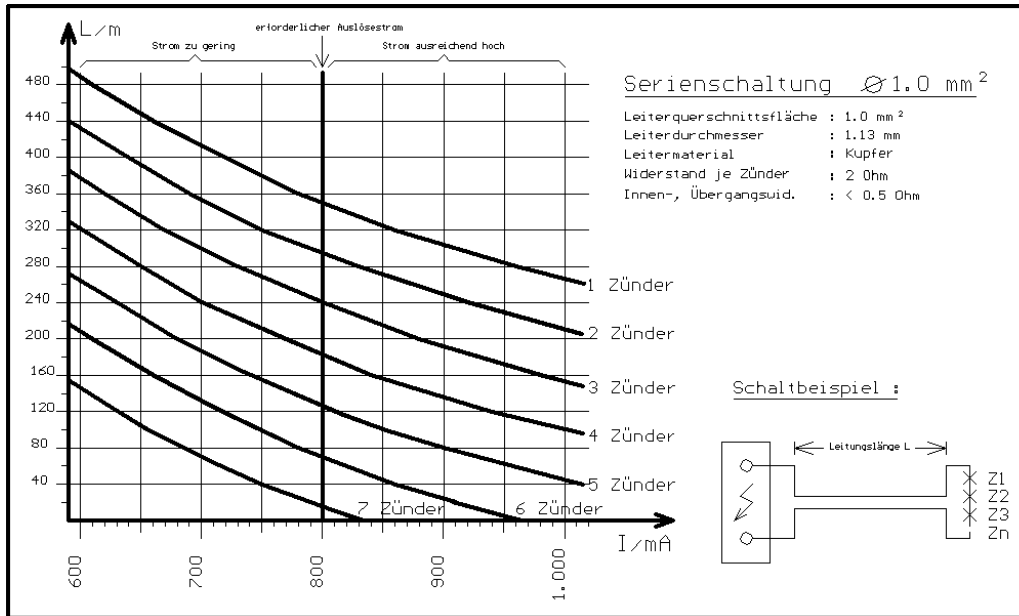
In the middle of the diagram, there is a vertical line, which indicates the minimum required current of 800 mA. On the vertical axis, you can read the maximum cable length in meter at the crossing of the curve with the vertical line of 800 mA.

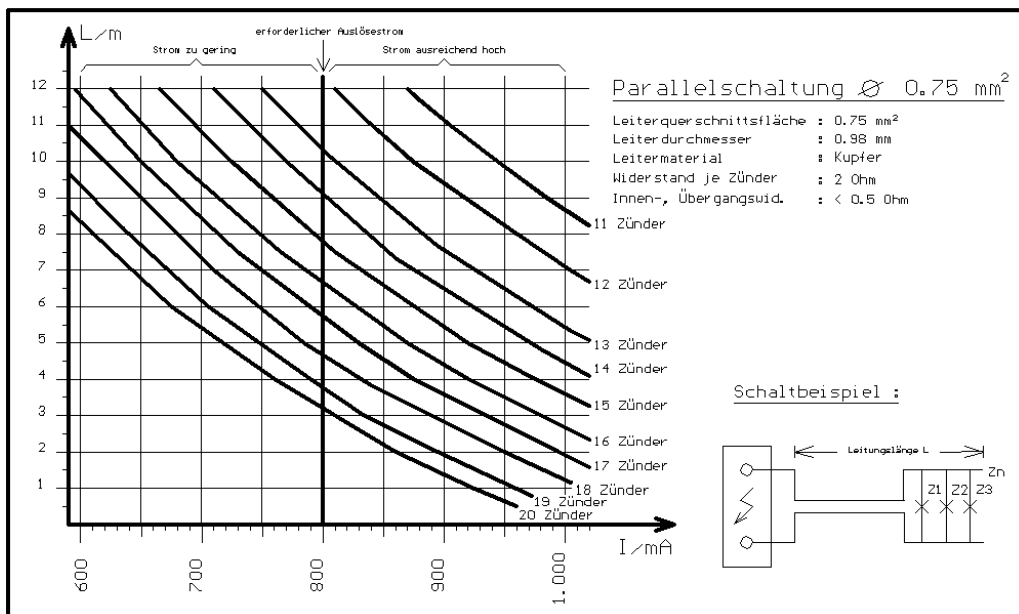
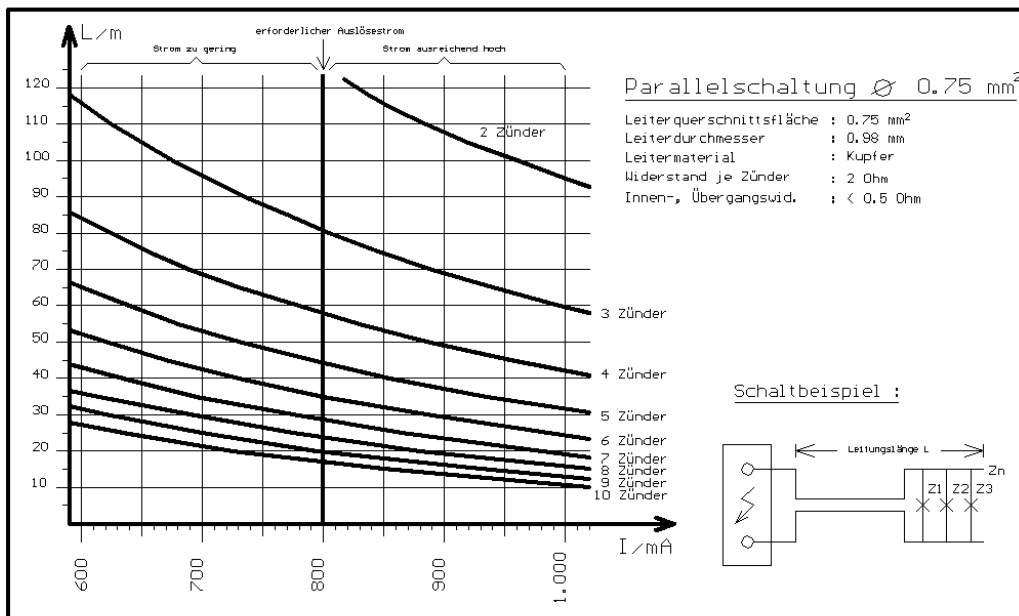
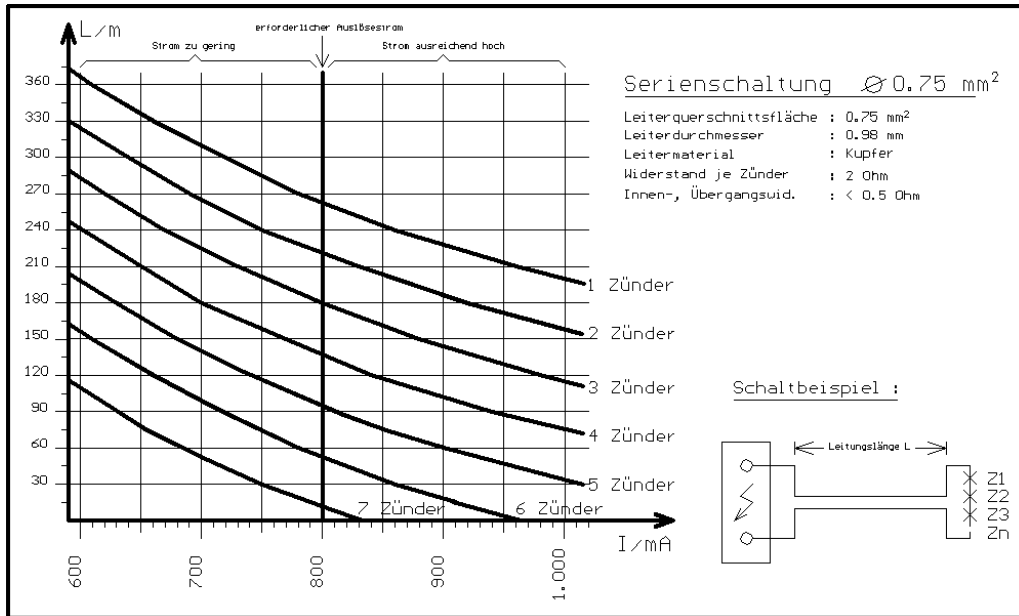
This cable length includes distances there and back.

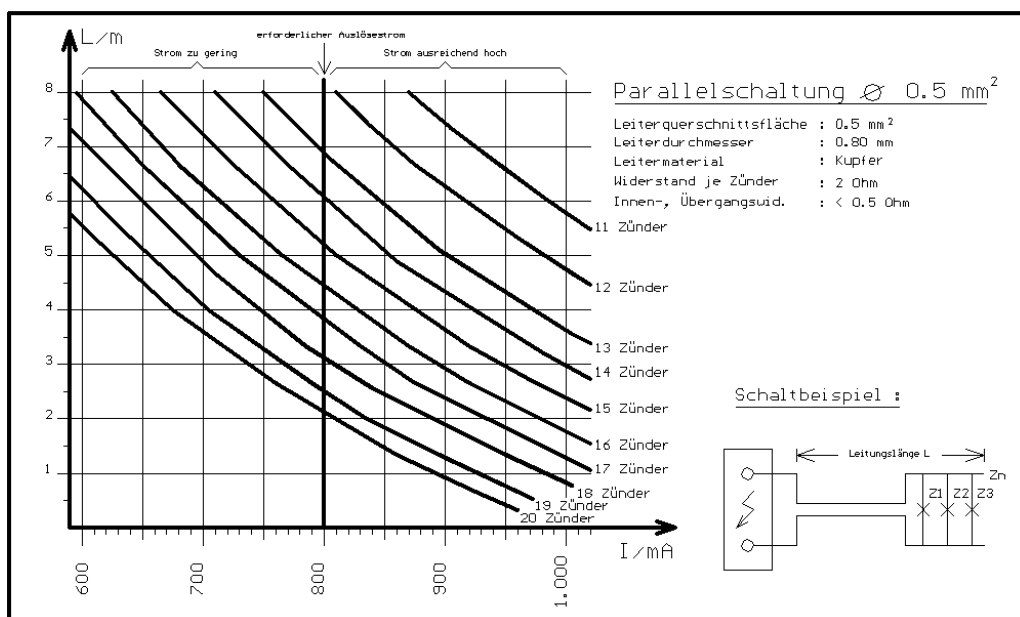
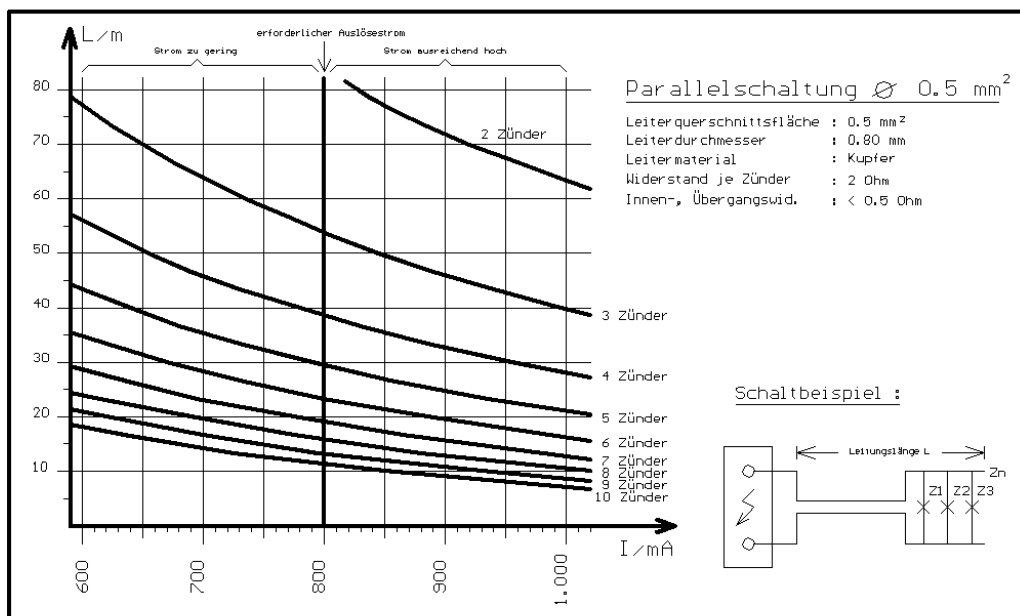
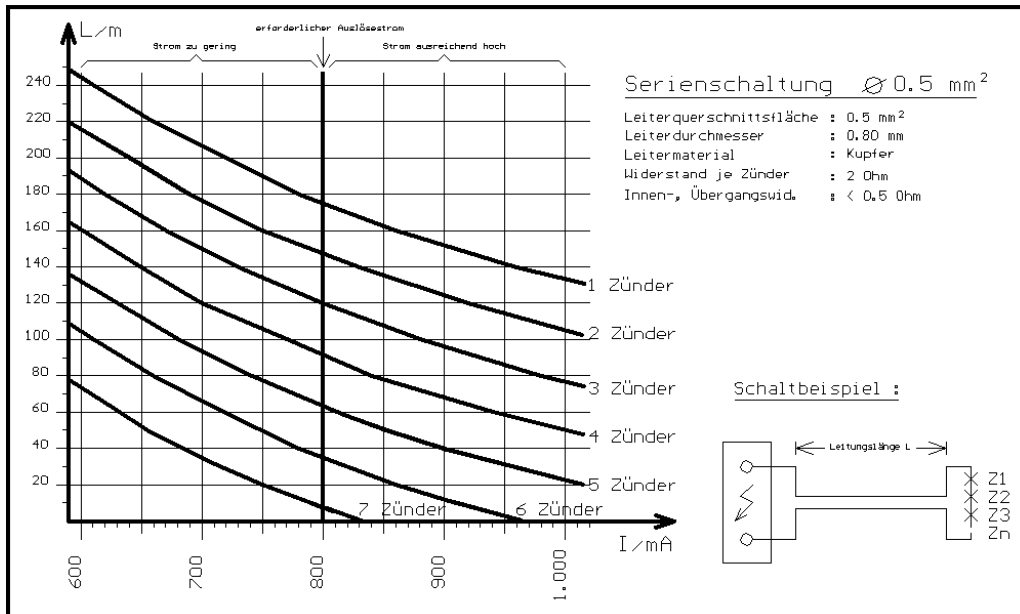
Quick language reference for the ignition power diagrams:

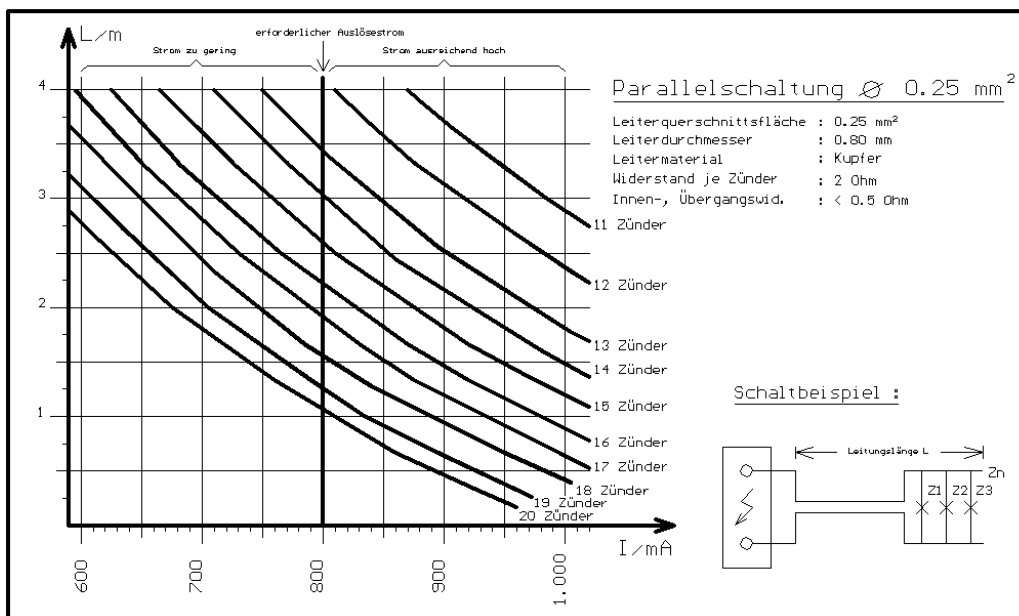
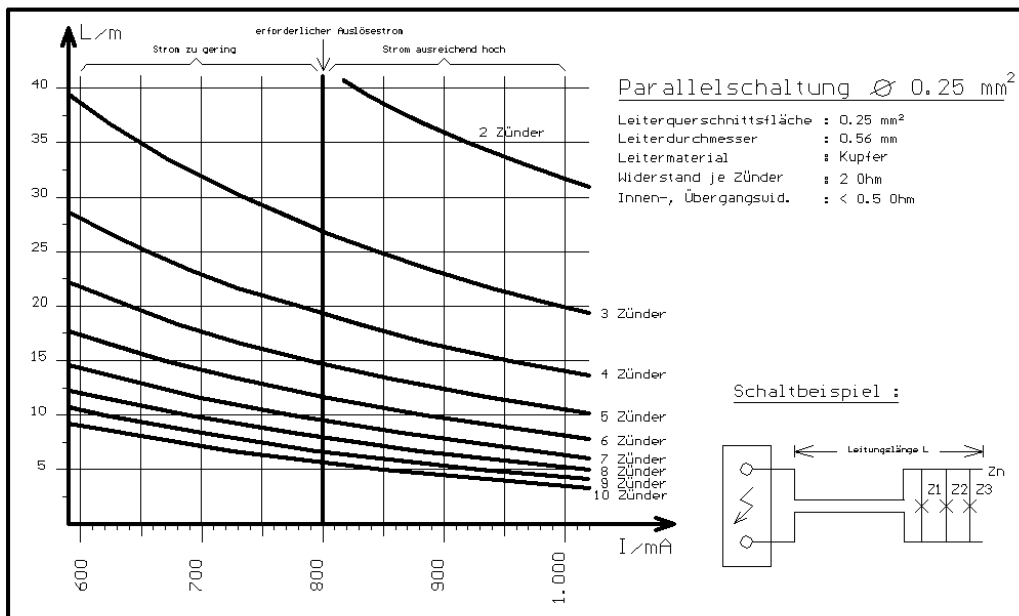
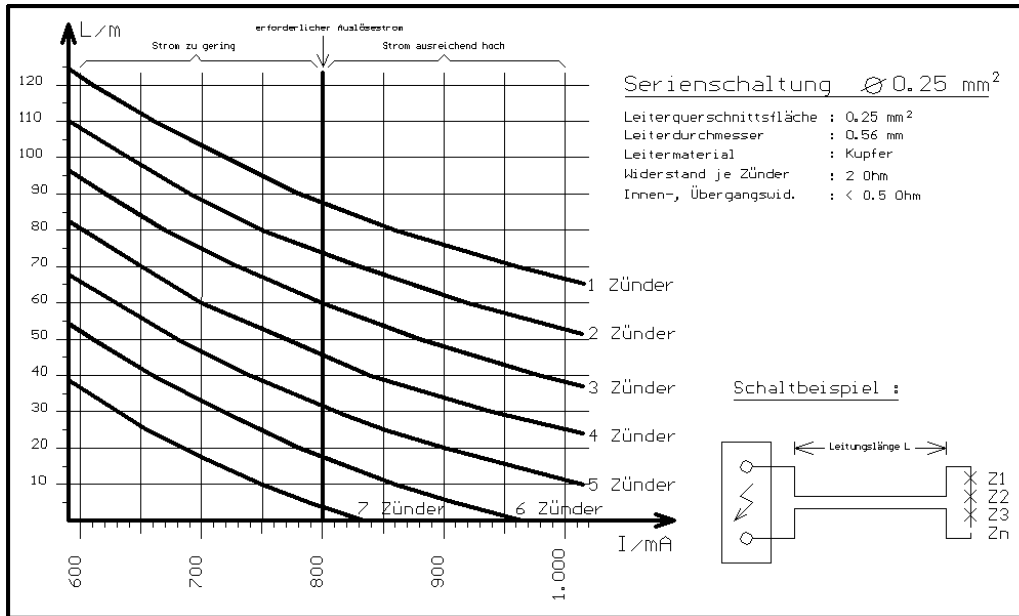
| | |
|----------------------------|--|
| L/m | cable length in meters |
| I/mA | current in mA which will flow through each match |
| 'Zünder' | electric match |
| 'Strom zu gering' | current insufficient |
| 'Strom ausreichend' | minimum current for reliable ignition |
| 'Strom ausreichend hoch' | current higher than sufficient |
| 'Serienschaltung' | serial circuitry |
| 'Parallelschaltung' | parallel circuitry |
| 'Leiterquerschnittsfläche' | conductor cross-section |
| 'Leiterdurchmesser' | conductor diameter |
| 'Leitermaterial' | conductor material |
| 'Kupfer' | copper |
| 'Widerstand je Zünder' | resistance of each electric match |
| 'Innen-, Übergangswid.' | inner plus transition resistance |
| 'Schaltbeispiel' | wiring example |
| 'Leitungslänge L' | cable length L |
| Z1, Z2, Z3, Zn | match 1, match 2, match 3, ... |

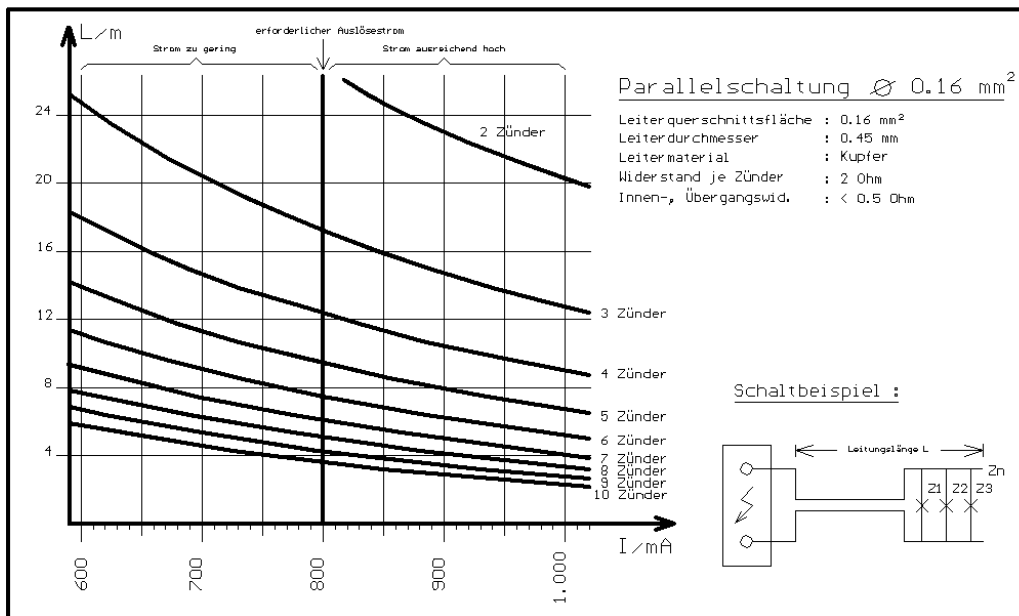
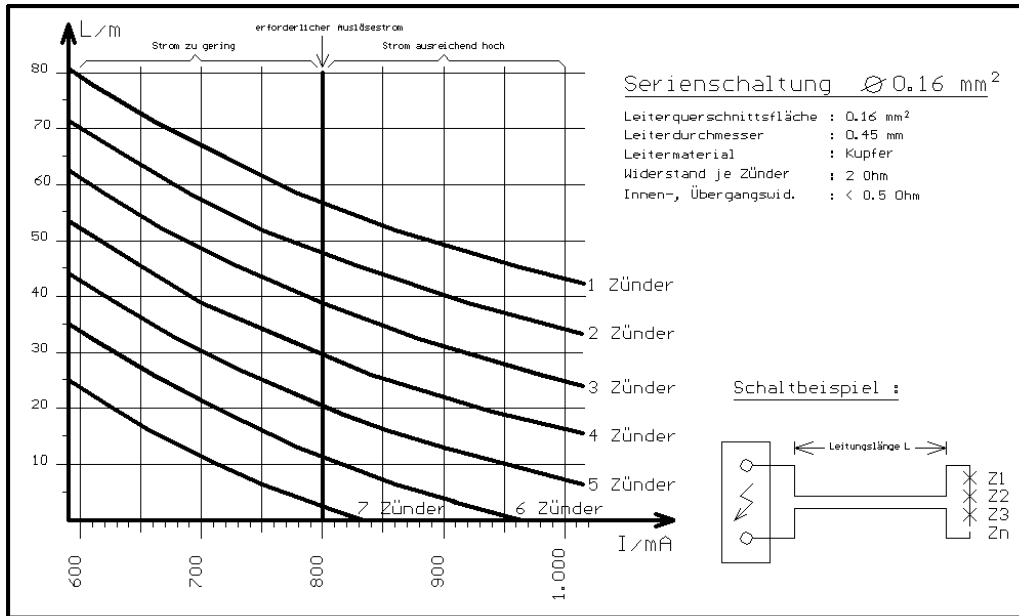






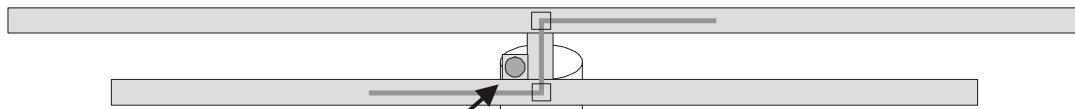








Usage of the high gain antenna Superscan 70



The arrow on the top of this cap must point to the transmitter.

Top view:

Plug in the receiver's connection cable into the socket under the orange cap.

The shorter bar of the antenna must be at the transmitter's side.

Superscan 70

Distance up to 800 m

This antenna must be used always at the receiver and not at the transmitter !
By this practice best results in range improvement are guaranteed.
In some countries usage may be illegal, please contact us for more details if operated outside Germany.

← Mount this plastic rod on a negative output terminal of the receiver.

By using the terminal for this purpose you loose it as a terminal for clamping wires.
All negative terminals are connected together internally so you can work around this problem by clamping the wire into another negative terminal.