Operating instructions

grafit A2

grafit A4

broncolor®
THE LIGHT

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Operating instructions

b r o n c o l o r
Grafit A2/A4

Before use

We are pleased you have chosen a broncolor Grafit A power pack which is a high-quality product in every respect. If used properly, it will render you many years of good service. Please read all the information contained in these operating instructions carefully. They contain important details on the use, safety and maintenance of the appliance. Keep these operating instructions in a safe place and pass them on to further users if necessary.
Observe the safety instructions.

Contents page

Important safety instructions 

broncolor flash light systems should exclusively be utilised for professional photo shootings by qualified personnel. Before starting up your flash light equipment read carefully all the information in your operating instruction. The safety instructions in the operating instructions must be strictly followed!

- **Read and understand all instructions before using!**
- **Remove the transport protection and the packing material**
- **Close supervision is necessary when any appliance is used near children. Do not leave the flash light appliance unattended while in use!**
- **Flash light contains, similar to sunlight, a specific portion of UV radiation!**

  The undesirable side effects on skin and eyes are considerably reduced by using flash tubes or protecting glasses with UV safety measures! Nevertheless, taking pictures at close distances with unprotected skin and eyes should be avoided! Also avoid eye contact with the light source! The maximum daily UV radiation according to IEC 60335-2-27 / DIN 5031-10 is: 50 J/m^2. This value should not be exceeded!
- **With due allowance for heat radiation, the distance between the lamp and a person or between the lamp and inflammable respectively heat sensitive surfaces should be at a minimum distance of 1 m!**
- **The power pack must be switched off to plug-in and to unplug! The lamp plugs and sockets have mechanical interlocks! When plugging in, ensure that those interlocks engage completely! To unplug, push down the locking spring below the cable guide and lift out the plug from the socket!**
- **Prior to replacing flash tubes, halogen lamps, protecting glasses or fuses, disconnect the power pack and the lamp from the power supply!**

  Prior to replacing the halogen lamp or the flash tube, the lamp should cool down for 10 min.!
- **broncolor flash light systems should only be equipped with original broncolor flash tubes, original broncolor combustible and packing material, original broncolor accessories, and also original broncolor spare parts!**
- **broncolor power packs, lamps and accessories meet an extremely high safety standard! When connecting broncolor lamps to power packs of other brands or broncolor power packs to lamp bases or accessories of other brands, integrated safety measures may become ineffective! Due to different design features and contact assignment of the lamp plugs of other brands, the user himself/herself may even be at risk. We offer no guarantee and accept no liability for damages which may be caused by this type of usage!**
- **Only lamps which are approved for operation with this power pack should be utilised!**
- **Only earthed extension cables which are approved for operation with the corresponding lamp should be utilised!**
- **To avoid the risk of fire, electric shock or injury to persons utilise exclusively the accessory recommended by the manufacturer!**

- **Check that the mains voltage corresponds to the information on the type plate of the unit!**
- **The flash light equipment is designed for use in dry conditions and in an ambient temperature from 0°C to 35°C! The flash light equipment has to be protected from wetness, condensation, from dripping and splash water, humidity, dirt, sand, metal chips and exposure to dust!**
- **Protect the flash light equipment from electromagnetic fields, shock and vibration!**
- **Protect the flash light equipment from heat and frost! If the power pack freezes continuous loss of power output and serious technical damage can result!**
- **Sudden temperature differences can cause condensation water in the unit! In such situations the equipment must stay for 1 hour in a well ventilated place to acclimatise to the new temperature before startup!**
- **Do not operate the units in an environment where there is a risk of explosion!**
- **The power pack should not be operated in or near water! Attention: high voltage!**
- **The power pack and the lamps should not be immersed in water or other liquids! It could cause an electric shock!**
- **Remove the transport protection cap on the front side of the lamp before connecting it to the power pack!**
- **For safety reasons, never operate the lamp base without the protecting glass in place! UV-coated protecting glasses or UV-coated flash tubes must be utilised as a protection against UV radiation for eyes and skin!**
- **Before operation the lamp has to be fastened on a stand or a suspension device! The lamp must be locked by tightening the mounting screw!**
- **Only sand-filled fuses of the type indicated on the safety type plate may be used! Sand-filled fuses can be identified by their opaque fuse body! With incorrect fuse protection the halogen lamp may burst!**
- **Filters or diffusors should not be fastened directly on the flash tube, halogen modelling lamp or protecting glass!**
- **Do not operate appliance with a damaged earthed cable. Cables which are damaged or twisted must be replaced!**
- **The unit must only be connected to an earthed socket, or an emergency power generator!**
- **If an extension cable is necessary, a cable with a current rating at least equal to that of the appliance should be used. Cables rated for less amperage than the appliance may overheat. When using a cable reel, it must be completely unrolled before use to prevent overheating of the cable!**
- **The unit is suitable for operation with a motor generator provided that the voltage lies within all the load conditions (including capacitive load) and within the tolerance limit of 200-264 V respectively 95-135 V! From experience this means that only electronic stabilised motor generators are to be utilised! When operating on unstabilised motor generators, voltage peaks of 300 V and more have been observed! This can lead to damages for which we assume no liability!**
- **Do not operate the lamps inside a bag or a box!**

- **The ventilation slots on the unit or on the lamp should not be covered!**
- **Pay attention when laying, clearing away or rolling up cables that the do not contact hot surfaces or parts of lamps and that they will not be tripped over by persons!**
- **Do not touch the connection socket for mains cable and lamp outlets on the power pack and do not poke in it with metal objects!**
- **Flash tubes, modelling light, halogen lamps and protecting glasses heat up to a high operating temperature, this also applies to the front side of the lamps! Therefore the attachments also assume high temperatures! Handle with care! Contact with hot components can cause injuries!**
- **Do not come into contact with glass or metal whilst operating the flash light system!**
- **Let the unit and its connected lamp base cool completely after use and before packing!**
- **Always unplug appliance from electrical socket before cleaning and servicing and when not in use! Never jerk cable to pull the plug from the socket. Grasp plug and pull to disconnect!**
- **Dropped or damaged units or lamps must be checked by a specialist before reconnection!**
- **To reduce the risk of electric shock, do not open this appliance, but take it to a qualified service person when service or repair work is required. Incorrect reassembly can cause electric shock when the appliance is used subsequently!**
- **<u>Shipping instructions Grafit A2/A4:</u>**

  Use original broncolor packing for the transport of the power pack!
- **<u>Shipping instructions lamps:</u>**

  Use original broncolor packing for the transport of the lamps. Before shipping flash tubes, halogen lamp and protection glass pack them with our protective pack material (foam plastic and transport cap). If the protective packaging material is incomplete, remove flash tube, halogen lamp and protection glass from the lamp and send them separately!

Controls and displays

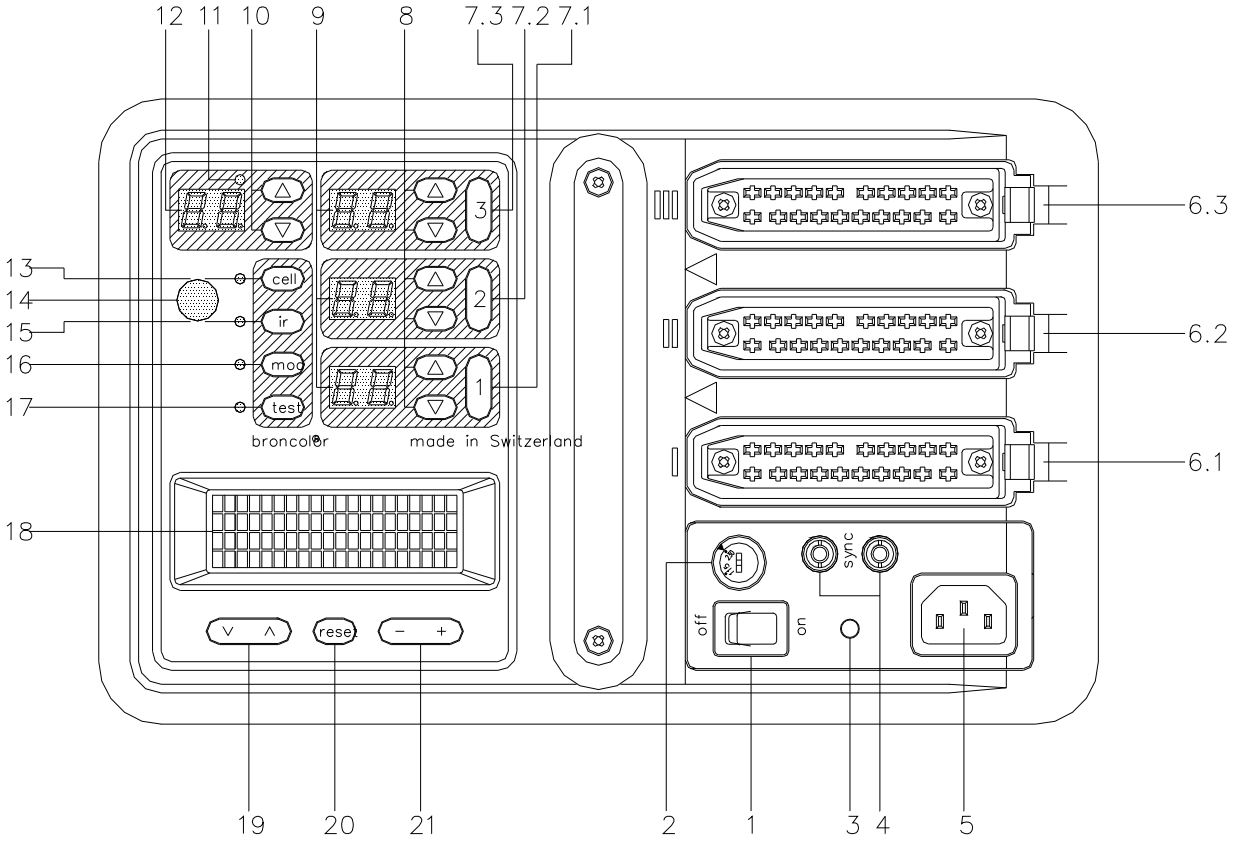
Power pack Grafit A2 art. no. 31.166.XX
Power pack Grafit A2 RFS art. no. 31.169.XX
Power pack Grafit A4 art. no. 31.176.XX
Power pack Grafit A4 RFS art. no. 31.179.XX

1. Mains switch
2. Voltage selector 110V/230V
3. Circuit breaker
4. Sync socket
5. Connection socket for mains cable

6.1 Outlet I
6.2 Outlet II
6.3 Outlet III

7.1 Lamp switch 1, on/off
7.2 Lamp switch 2, on/off
7.3 Lamp switch 3, on/off

8. Power selector per lamp +/-
9. Digital power display per lamp
10. Master power selector +/-
11. Photocell
12. Digital master power display
13. Photocell on/off
14. IR receiver cell
15. IR receiver and/or RFS-interface on/off
16. Modelling light on/off
17. Test key, ready light green
18. 4 line LCD display
19. Cursor up/down
20. Reset key
21. Auxiliary functions setting key


12
11
10
9
8
7.3
7.2
7.1
13
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cell
ir
mod
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broncolor
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1. Application Grafit A

This mains (AC-line) supplied studio flash unit is designed for professional photography only. For your safety use a three-wire extension cable when required.

2. Start up

2.1 Mains voltage / voltage selector

Set the unit to the required mains voltage by turning voltage switch (2) with a coin or screwdriver.

The unit is designed for 230 V, 120 V or 100 V according to voltage of country. If a different voltage than the original one is selected, the following limitations come into force:

230 V unit on 120 V:	Can only be operated with power up to level 9. The charging time becomes longer.
120 V unit on 230 V:	The recycling time becomes longer
100 V unit on 230 V:	The recycling time becomes longer

2.2 Earthed Mains (AC-line)

Connect unit to current supply always using earthed mains plug.

2.3 Start up

Use the mains (AC-line) switch (1) to power-up unit. During the charging process the digital master power display (12) flashes, after which, it becomes continuous.

3. Energy control

3.1 Grafit A2/A4

Use the "+/-" keys (10) to control the flash energy (flash intensity) on both main outlets (I, II) within a range of 6 7/10 f-stops, and when including reserve lamp III within a range of 4 f-stops. A value of 10 in the display indicates maximum intensity, 3.3 resp. 6 minimum. Whole numbers are full f-stop intervals, decimals indicate 1/10 f-stop steps. Brief pressure on the "+/-" keys (7.1, 7.2, 7.3, 10) runs the power up (or down) by a 1/10 f-stop interval, prolonged pressure by a full f-stop. The display (12) then blinks until charging or discharging has stabilized the new level.

3.2 1/10 or 1/3 f-stop increments control

The fractional power level adjustment can be programmed for 1/10 or 1/3 f-stop intervals; the units are factory set to 1/10 steps. For reprogramming to 1/3 steps see chapter 7.

3.3 Individual energy distribution (Asymmetry)

The Grafit A power packs incorporate a circuit for selectively distributing the power between the lamp outlets. If outlet III is used as well, it has the highest flash energy. To ensure an optimum quality of colour temperature it is recommended to limit the maximum asymmetry of the flash power between each individual lamp outlet to three f-stops. The unit indicates this limitation if applicable.

4. Lamp outlets

Lamp outlets of the Grafit units are marked with the Roman numerals I to III.

All outlets may be switched individually (7.1, 7.2, 7.3). The LED (9) indicates the flash energy for each separate lamp. For newly connected lamps, the connection will be automatically activated.

5. Modelling light

5.1 The "mod" key (16) switches on the modelling lamps for all connected lamps. When switched on, the green LED (Liquid Electronic Display) lights up. Lamps also have an additional modelling lamp switch. You may also operate the modelling light proportionally (Chapter 5.2) and adapt it to the various maximum outputs of **broncolor** power packs.

Attention: Please ensure that the modelling light voltage corresponds with the local mains voltage.

5.2 Proportionality

In chapter 8 is an explanation of how to set the various operating modes (modelling light proportionality).

Stages prop1, prop2, prop3, prop4 and prop5 are used to adapt the modelling light brightness of power packs with different output. The setting "modelling light proportional" duly allows for the output set, the number of lamps as well as an asymmetrical energy distribution.

Proportionality is guaranteed if the identical operating mode has been set for all power packs. The higher the digit, the brighter the modelling light.

The following operating modes are possible:

"prop1" This level allows matching of the Grafit A units to the proportional control of the Pulso 8 power pack.

"prop2" Proportional modelling light - brightest level with Grafit A4.

"prop3" Proportional modelling light - brightest level with Grafit A2.

"prop4/5" If you use a power pack with less power it is known that the halogen modelling light is relatively weak and yellowish. To solve this problem the power packs have been provided with two additional proportional light levels. If the power of the Grafit A4 is lower than "8.0" and of the Grafit A2 lower than "9.0" you can increase the modelling light immensely with "prop4".

If the power of the Grafit A4 is lower than "7.0" and of the Grafit A2 lower than "8.0" you can increase the modelling light immensely with "prop5".

"P.Max." When working only with one power pack in asymmetrical operation; using the level "P.Max.", the lamp with the highest flash energy will be operated with full modelling light and the others will operate proportionally, corresponding to their selected power.

"full" All lamps with full modelling light, independent of flash output, type of power pack and output distribution.

"economy" Lighting level reduced for all lamps to reduce power consumption and extend the burning life of the tungsten-halogen lamps.

Highest possible proportionality settings when combining packs of different output:

	Nano 2 Topas A2 Grafit A2 Mobil	Nano A4 Topas A4 Grafit A4	Topas A8
Nano 2 Topas A2 Grafit A2 Mobil	P3 (or “P” when only using Nano 2)	P2	P1
Nano A4 Topas A4 Grafit A4	P2	P2 (or “P” when only using Nano A4)	P1
Topas A8	P1	P1	P1

Example 1: A power pack Grafit A2 is operated together with a power pack Topas 8. The modelling light is proportional when both are set to mode "prop1".

Example 2: A power pack Grafit A4 is operated together with a Grafit A2. The modelling light is proportional and highest possible when both are set to mode "prop2".

5.3 Reduced modelling light intensity

To avoid overloading the mains supply (AC-line), the 100-120 volt versions of the power packs reduce the modelling light intensity during charging. You can clear this factory-installed program if the power rating of the mains supply (AC-line) is sufficient - see key combinations in section 8.11 of the programming additional functions. When working with limited-power on the mains supplies (AC-line) you can also slow down the charging rate with the additional functions "slow charging" - this reduces the risk of blowing the supply fuses.

5.4 Modelling light switch on lamp

The switch on the lamps permits selective lighting control with the modelling light. To avoid damage to the lamp filament, always switch off the modelling light before moving the lamp.

6. Release and remote control

6.1 Photocell (cell)

The photocell can be switched on or off by using the "cell" key (13). If it is activated the green LED lights up.

After a flash sequence, an active photocell will be blocked and the green LED blinks. By pressing the "cell" key the cell is reactivated.

6.2 Infrared receiver (ir)

The IR receiver can be switched on or off with the key “ir” (15). If the function is active, the green display lights up.

6.3 Infrared flash channels

You can trigger Grafit A power packs from broncolor infrared transmitters. These have two different channels. Setting instructions are stated in chapter 8.

If a power pack is triggered via infrared, the flash release follows with a time delay. If the setting of the IR channel is "all" the delay is 1/1000s, if the setting is selective it is 1/500s.

Attention: when selective triggering is selected, all units in operation must be set to 1 or 2 (none on "all") and all the photocells should be switched off.

6.4 RFS interface

The RFS interface of the RFS version of the Grafit A units can be switched on or off as an additional function on the display by using the toggle key (21). (See chapter 8).

6.5 Sync socket (4)

Synchronous cables art. no. 34.111.00 or 34.112.00 may be plugged into the socket to release flashes via cable.

6.6 "Test" key (17)

This key (17) allows manual release of the power pack as soon as 70 % of the set energy is available.

6.7 Remote Control

The remote control of the power pack Grafit A is operated by the Remote Control units Servor 3 and Servor d. If the power pack is switched to "stand-by" via the remote control unit, the decimal point of the main display will blink. The power pack can be "re-activated" either by the remote control unit or by pressing any button on the front panel.

6.8 Remote control channels

Remote control by the means of servor or RFS may be performed via separate channels (studio workstations). This is explained in chapter 8.

6.9 Power pack addresses

Addresses will be assigned to each power pack for individual control. This is explained in chapter 8.

7. Flash ready signals visual/audible

7.1 The **visual ready signal** is the green LED at the "test" key (17). It lights up only when the unit is fully charged. After a flash this LED goes out and lights up again when the unit is fully charged once more.

7.2 The **audible signal** "buzzer" sounds when the power capacitors are at 100 % charge. It may be switched on or off. This is explained in chapter 8.

7.3 Audible fault signal
When the flash discharge fails, a warning signal of approx. 3 s duration will sound and the display of the relevant lamp will flash.

8. Setting additional functions

Meaning of additional symbols on display

■ Indicates that one or several additional functions are active

! Frames fault / alarm messages

* Frames help text

Suggested default value for a certain setting

Help function

Advance the cursor to the "Additional" function and press the toggle-key v or ∧ for about 2 seconds to display an explanation of the function. The text begins and ends with "*" characters. To quit the help function, press the toggle switch again.

Function

With the toggle-key v ∧ (19, on the front panel at the bottom left) the cursor can be moved up or down to select the various functions.

possible settings

With the +/- key (21, on the front panel at the bottom right) different settings can be made.

8.1 ***Lamp 3, 2, 1***

Display of the lamp power

- ***..J*** (joules)
- ***..%*** (percentage)

8.2 ***Modelling light***

Choice of the proportional level (see as well chapter 4.)

- ***prop1***
- ***prop2***
- ***prop3***
- ***prop4***
- ***prop5***
- ***P.Max.***
- ***full***
- ***economy***

8.3 ***Sequence***

In this mode you can select a number of flashes to be triggered automatically.

- ***off***
- ***2-50*** (when t 0.1 (min), and interval shorter 0,200 s only 2-15)

8.4 ***t 0.1*** (flash duration setting)

When operating lamp I or II, you can select the flash duration (t 0.1). Lamp III may not be used simultaneously. The unit always indicates the t 0.1 value of the lamp with the longest total flash duration.

- ***(min.)*** "flash duration"
  On this setting the shortest flash duration will always be selected automatically regardless of the CTC control system.

- ***(opt.)*** "flash duration"
  The most suitable flash duration will automatically be selected to obtain the optimum colour temperature.

- ***1/125*** (only Grafit A4)	w/o CTC
- ***1/250***	w/o CTC
- ***1/500***	w/o CTC
- ***1/1000***	w/o CTC
- ***1/2000***	w/o CTC
- ***1/4000***	w/o CTC
- ***1/6000***	w/o CTC

8.5 ***Interval***

This function allows to define the time between the flashes and therefore to delay the flash sequence.
The interval setting cannot be used when: charging time is long and there are unsuitable supply voltages.

- off
- "delay time" (shortest charging time - 50.00 s)

8.6 ***Delay*** of the first flash

You can delay triggering of the first flash by 0,01 s - 50,00 s.

- ***off***
- ***0,01s - 50,00 s***

8.7 ***Alternate*** (ping-pong release)

This provides the option of determining the release sequence of 2 power packs, i.e., only one power pack triggers per IR signal, while the other is at rest.
This function allows performing faster photographic sequences.

- ***off***
- ***1*** (1. unit in succession)
- ***2*** (2. unit in succession)

8.8 **Preset sequence**

Pre-programmed series of flashes with different intensity and different intervals (only outlets I+II).
If this function is switched on the following settings are blocked:
- output control
- power selector per lamp
- lamp 1-3
- modelling light
- sequence
- t 0.1
- interval
- alternate triggering of the flash

- No. 1
- No. 2
- No. 3
- etc.
- No. 16 (Details see chapter 11)

8.9 ***Charging time*** (slow charging)

In case of weak power supply lines, charging time may be extended.

- ***fast***
- ***slow***

8.10 ***Memory 1 + 2***

All setting can be stored and recalled later on.

- Press the "+" key for 2 s to store all settings (STORE)
- Press the "-" key for 2 s to recall a previously stored setting (RCL)

8.11 ***DIM***

This function dims the modelling light during the recycling time (min. 0,5 s). It allows a visual flash control and the extinction of the modelling light during sequences.

- ***ON***
- ***OFF***

8.12 ***Buzzer***

The audible signal sounds when the power capacitors are 100 % charged up. You can switch on resp. off the signal.

- ***ON***
- ***OFF***

8.13 ***IR channel***

The Grafit power packs use two different channels for selective triggering of specific power packs or groups (studio workstations).

- ***all*** (the unit will release on all IR signals)
- ***1*** (the IR transmitter must be set correspondingly)
- ***2*** (the IR transmitter must be set correspondingly)

8.14 ***IR channel / RFS interface***

With Grafit A RFS power packs the IR-channel is defined in the additional functions "IR/RF" by briefly pressing the +/- (21).
Extended pressure on the +/- key switches the RFS function on resp. off.

IR- channel
- ***all*** (the unit will release on all IR signals)
- ***1*** (the IR transmitter must be set correspondingly)
- ***2*** (the IR transmitter must be set correspondingly)

RFS- Interface
- *ON (RFS interface is switched on)*
- -- (RFS interface is switched off)

8.15 ***Studio / Gen.***

Studio = workstation
Extended pressure on of the key -/+ sets the workstation .

01/20
Servor
Enables the choice between studio 01 or 02.
RFS
Enables the choice between studio 01 to 15

power pack = power pack address
Brief pressure on the key -/+ sets the power pack address for remote control.

01/20
Servor
Enables the choice between address 01 to 08.
RFS
enables the choice between address 01 to 10

8.16 ***Flash count***

Counts the already released flashes. By pressing extensively on the -/+ key the counter can be set back to 0.

8.17 ***Total count***

Every flash discharge is counted.

8.18 ***Max. Display***

1/10 f-stop
The Grafit units can display flash output in 1/10 f-stop over a range of 6,7 f-stops. All Grafit power packs are factory-set to show values from 10 to 3.3. 10 indicates the maximum and 3.3 the minimum output level.
The display range can be shifted

- **10**
- **9**
- **8**
- **7**

downwards in order to correspond with units of different power (Grafit A2 / A4). The result will be the same number on the display for the same amount of selected power

Grafit A2	value 8	=	1600 J
Grafit A4	value 9	=	3200 J
Pulso 8	value 10	=	6400 J

10	**9**	**8**	**7**
10			
9	9		
8	8	8	
7	7	7	7
6	6	6	6
5	5	5	5
4	4	4	4
3.3	3	3	3
	2.3	2	2
		1.3	1
			0.3

1/3-f stop - ***1/3***
For the display in 1/3 steps the power range is shown +9 to -11.

General:
With the remote control servor 3, we recommend retaining the standard setting (maximum energy = 10) since complications in the display in the command mode "all" may arise otherwise.

8.19 ***Store Aux***

Grafit A power packs are factory-set to clear all programming function adjustments on loss of mains supply power, for whatever reason. This avoids operating errors on subsequent startup.

- ***on***
- ***off***

8.20 ***Language***

To simplify the operation, you can select your language.

- ***G***
- ***E***
- ***F***
- ***etc.***

8.21 ***Progr. Release***

Shows the software release of the EPROM.

8.22 ***Country***
The country code is for sales and service.

8.23 ***Delivery date***
First operation

8.24 ***Serial number***
For service and sales

Reset key

- When pressed briefly, the cursor jumps on the line "modelling light".
- When pressed for 2 s, the settings (sequence, t 0.1, interval, delay, alternate, preset sequence, charging time) are switched off.
- When pressed for more than 10 s, the unit is reset to the factory setting.

9. Protective facilities / Fault indication

Fault / alarm messages are framed with "!" characters on each line.

9.1 Cooling

The cooling fan switches to a higher speed after some flashes.

9.2 Thermal overheating display

To protect against overheating after extended series of flashes, the unit will power down for a number of minutes. At that stage, the following message will appear on the LCD display: "XX min. COOLING BREAK, DO NOT DISCONNECT". The cooling time is shortened if the unit remains connected and switched on.

9.3 Afterglow

In case of afterglow of an older flash tube, the LCD display will show the corresponding message.

9.4 Circuit breaker (3)

In the event of an electrical malfunction, the circuit breaker will automatically disconnect the power pack from the power source. The unit can be restarted by pressing the circuit breaker button. If it disconnects again immediately, the power pack must be serviced by an authorised technician.

10. Lamps

The following information apply to the lamp Pulso G (art. no. 32.115.XX / 32.116.XX), Unilite (art. no. 32.113.00 / 32.114.00), Pulso-Twin (art. no. 32.117.XX), Pulso 8 (art. no. 32.118.XX) and the small lamp Picolite (art. no. 32.021.XX); this is chapter 10.1 to 10.8:

10.1 Lamp Pulso G / Unilite

For thermal reasons, the flash tubes 1600 J and 3200 J are only available as uncoated tubes. Therefore those lamps must be used with a UV-coated protecting glass.

10.1.1 Replacing flash tubes

Attention: Prior to each exchange of the flash tube, the lamp must be disconnected from the power pack! Before replacing flash tubes let the lamp cool down for 10 min. !

Lamps use plug-in flash tubes.

The protection glass has a line mark and the glass rim has three notches. When pulling off the protection glass from the locking device of the lamp, the line mark must be at the top. To change the flash tube, carefully pull off the protecting glass. Pull straight, without tilting. Afterwards pull the flash tube straight along the lamp axis.

When inserting the tube, check that the ceramic base is fully pushed back in. Then the protecting glass has to be re-inserted in front of the modelling light and flash tube. When pushing the protection glass into the locking device of the lamp, the line mark must again be at the top. After the protection glass has latched into place, it must be turned slightly, to avoid it becoming detached.

Because the Pulso G and Unilite lamp can be operated with 1600 J flash tubes as well as with 3200 J flash tubes, a corresponding warning sign is supplied with each flash tube. Please stick this warning sign on the lamp plug when inserting the flash tube.

10.1.2 Replacing halogen lamps

Attention: Prior to each exchange of the halogen lamp, the lamp must be disconnected from the power pack! Before replacing halogen lamps let the lamp cool down for 10 min. !

Halogen lamps are also plug-in. Taking the service life into consideration, the halogen lamp should not be handled with bare hands. Exchange of the halogen lamp is practically identical to that of the flash tube. The Pulso G and Unilite lamp can be operated on the local mains voltage (100 V-240 V) when a halogen lamp is used which corresponds to the voltage.

10.2 Lamp Pulso-Twin / Pulso 8

The flash tubes for the Pulso-Twin and Pulso 8 are only available with a built-in protecting glass. Flash tube and protecting glass form one unit.

10.2.1 Replacing flash tubes

Attention: Prior to each exchange of the flash tube, the lamp must be disconnected from the power pack! Before replacing flash tubes let the lamp cool down for 10 min. !

Lamps use plug-in flash tubes.

When exchanging the flash tube hold it carefully on the protecting glass and pull out in axial direction. When inserting the tube check that the ceramic base is fully pushed back in.

10.2.2 Replacing halogen lamps

Attention: Prior to each exchange of the halogen lamp, the lamp must be disconnected from the power pack! Before replacing halogen lamps let the lamp cool down for 10 min. !

Halogen lamps are also plug-in or screw-in. Taking the service life into consideration, the halogen lamp should not be handled with bare hands. Exchange of the halogen lamp is practically identical to that of the flash tube.

10.3 Picolite small lamp

For thermal reasons the UV-coating is on the protecting glass and not on the flash tube.

10.3.1 Replacing flash tubes

Attention: Prior to each exchange of the flash tube, the lamp must be disconnected from the power pack! Before replacing flash tubes let the lamp cool down for 10 min. !

Lamps use plug-in flash tubes.

To change the flash tube release the spring ring and remove the protecting glass. The flash tube must be pulled out straight along the lamp axis. When inserting the tube be sure that it is fully pushed in. Finally replace the protecting glass and fasten with the spring ring.

10.3.2 Replacing halogen lamps

Attention: Prior to each exchange of the halogen lamp, the lamp must be disconnected from the power pack! Before replacing halogen lamps let the lamp cool down for 10 min. !

Halogen lamps are also plug-in. Taking the service life into consideration, the halogen lamp should not be handled with bare hands. Exchange of the halogen lamp is practically identical to that of the flash tube. The Picolite lamp can be operated on the local mains voltage (100 V-240 V) when a halogen lamp is used which corresponds to the voltage.

10.4 Cooling fan

A cooling fan in the lamp cools the flash tube and modelling lamp. It also runs when the modelling lamp is turned off.

10.5 Thermal protection

The lamps have been fitted with an automatic thermal protection. Should the lamp overheat (e.g. by impeding the flow of cooling air), the modelling light is shut off. Nevertheless you may continue producing flashes. The Picolite, however, has an additional thermal protection which limits the number of flashes.

10.6 Lamp plugs

The lamp plugs and sockets have mechanical interlocks to prevent inadvertent disconnection. When plugging in, ensure that those interlocks engage completely. To unplug, push down the locking spring below the cable guide and lift out the plug. The power pack must be switched off to plug in and to unplug.

10.7 Light shapers (reflectors, area lamps etc.)

Pulso G, Unilite, Pulso-Twin, and Pulso 8 lamps have a bayonet fitting to attach light shapers providing a 360° rotation facility for the mounted accessory.

The small lamp Picolite has an integrated reflector and its own small sized accessories. With the Pulso adapter (art. no. 33.501.00) light reflectors and area lamps from the Pulso and Unilite lamps can be utilised.

10.8 Fuses

Only sand-filled fuses of the type indicated on the type plate may be used; otherwise the halogen lamp may explode.

11. Preset sequence (preprogr. series of flashes)

Table 1:
Grafit A2 with one lamp + Grafit A4 with one or two lamps

number	1. flash delay	energy	2. flash delay	energy	3. flash delay	energy	4.flash delay	energy
1	0s	*7.2*	0.02s	*8.2*				
2	0s	*7.2*	0.04s	*8.2*				
3	0s	*7.2*	0.08s	*8.2*				
4	0s	*7.2*	0.16s	*8.2*				
5	0s	*7.2*	0.02s	*7.2*	0.04s	*8.2*		
6	0s	*7.2*	0.04s	*7.2*	0.08s	*8.2*		
7	0s	*7.2*	0.08s	*7.2*	0.16s	*8.2*		
8	0s	*7.2*	0.16s	*7.2*	0.32s	*8.2*		
9	0s	*5.2*	0.02s	*6.2*	0.04s	*7.2*	0.06s	*8.2*
10	0s	*5.2*	0.04s	*6.2*	0.08s	*7.2*	0.12s	*8.2*
11	0s	*5.2*	0.08s	*6.2*	0.16s	*7.2*	0.24s	*8.2*
12	0s	*5.2*	0.16s	*6.2*	0.32s	*7.2*	0.48s	*8.2*
13	0s	*5.2*	0.02s	*6.2*	0.06s	*7.2*	0.14s	*8.2*
14	0s	*5.2*	0.04s	*6.2*	0.12s	*7.2*	0.28s	*8.2*
15	0s	*5.2*	0.08s	*6.2*	0.24s	*7.2*	0.56s	*8.2*
16	0s	*5.2*	0.16s	*6.2*	0.48s	*7.2*	1.12s	*8.2*

Table 2:
Grafit A2 with two lamps

number	1. flash delay	energy	2. flash delay	energy	3. flash delay	energy	4. flash delay	energy
1	0s	*7.2*	0.02s	*8.2*				
2	0s	*7.2*	0.04s	*8.2*				
3	0s	*7.2*	0.08s	*8.2*				
4	0s	*7.2*	0.16s	*8.2*				
5	0s	*7.2*	0.02s	*7.2*	0.04s	*8.2*		
6	0s	*7.2*	0.04s	*7.2*	0.08s	*8.2*		
7	0s	*7.2*	0.08s	*7.2*	0.16s	*8.2*		
8	0s	*7.2*	0.16s	*7.2*	0.32s	*8.2*		
9	0s	*6.1*	0.02s	*6.1*	0.04s	*7.1*	0.06s	*8.1*
10	0s	*6.1*	0.04s	*6.1*	0.08s	*7.1*	0.12s	*8.1*
11	0s	*6.1*	0.08s	*6.1*	0.16s	*7.1*	0.24s	*8.1*
12	0s	*6.1*	0.16s	*6.1*	0.32s	*7.1*	0.48s	*8.1*
13	0s	*6.1*	0.02s	*6.1*	0.06s	*7.1*	0.14s	*8.1*
14	0s	*6.1*	0.04s	*6.1*	0.12s	*7.1*	0.28s	*8.1*
15	0s	*6.1*	0.08s	*6.1*	0.24s	*7.1*	0.56s	*8.1*
16	0s	*6.1*	0.16s	*6.1*	0.48s	*7.1*	1.12s	*8.1*

These diagrams are provided as an explanation of table 1

Delay since moment of triggering

Nr.	0.00s	0.02s	0.04s	0.06s	0.08s	0.10s	0.12s	0.14s	0.16s	0.18s	0.20s	0.22s	0.24s	0.26s	0.28s	0.30s	0.32s	0.34s	0.36s	0.38s	0.40s	0.42s	0.44s	0.46s	0.48s	0.50s	0.52s	0.54s
1	7.2	8.2																										
2	7.2		8.2																									
3	7.2				8.2																							
4	7.2								8.2																			
5	7.2	7.2	8.2																									
6	7.2		7.2		8.2																							
7	7.2				7.2				8.2																			
8	7.2								7.2								8.2											
9	5.2	6.2	7.2	8.2																								
10	5.2		7.2		7.2		8.2																					
11	5.2				6.2				7.2				8.2															
12	5.2								6.2								7.2								8.2			
13	5.2	6.2		7.2				8.2																				
14	5.2		6.2				7.2								8.2													
15	5.2				6.2								7.2															
16	5.2								6.2																7.2			

Energy / time

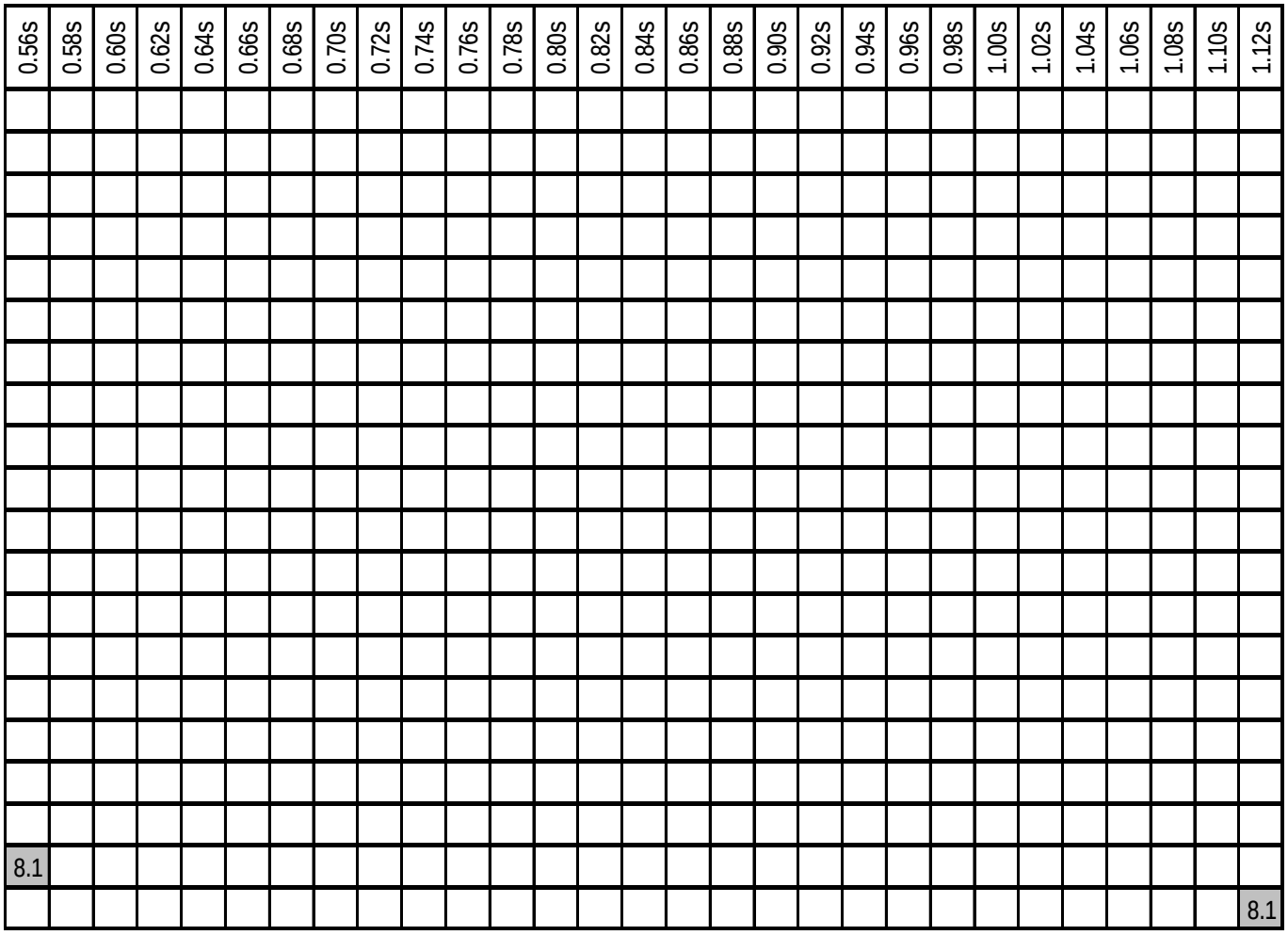
0.56s	0.58s	0.60s	0.62s	0.64s	0.66s	0.68s	0.70s	0.72s	0.74s	0.76s	0.78s	0.80s	0.82s	0.84s	0.86s	0.88s	0.90s	0.92s	0.94s	0.96s	0.98s	1.00s	1.02s	1.04s	1.06s	1.08s	1.00s	1.12s
8.2																												
																												8.2

These diagrams are provided as an explanation of table 2

Delay since moment of triggering

Nr.	0.00s	0.02s	0.04s	0.06s	0.08s	0.10s	0.12s	0.14s	0.16s	0.18s	0.20s	0.22s	0.24s	0.26s	0.28s	0.30s	0.32s	0.34s	0.36s	0.38s	0.40s	0.42s	0.44s	0.46s	0.48s	0.50s	0.52s	0.54s
1	7.2	8.2																										
2	7.2		8.2																									
3	7.2				8.2																							
4	7.2								8.2																			
5	7.2	7.2	8.2																									
6	7.2		7.2		8.2																							
7	7.2				7.2				8.2																			
8	7.2								7.2								8.2											
9	6.1	6.1	7.1	8.1																								
10	6.1		6.1		7.1		8.1																					
11	6.1				6.1				7.1				8.1															
12	6.1								6.1								7.1								8.1			
13	6.1	6.1		7.1				8.1																				
14	6.1		6.1				7.1								8.1													
15	6.1				6.1								7.1															
16	6.1								6.1																7.1			

Energy / time


0.56s
0.58s
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0.64s
0.66s
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0.70s
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0.74s
0.76s
0.78s
0.80s
0.82s
0.84s
0.86s
0.88s
0.90s
0.92s
0.94s
0.96s
0.98s
1.00s
1.02s
1.04s
1.06s
1.08s
1.10s
1.12s
8.1
8.1

12. Technical data

	Grafit A2 (art. no. 31.166.XX)	**Grafit A4** (art. no. 31.176.XX)
Flash energy	1600 J	3200 J
f-stop at distance of 2 m (6 1/2 ft.), 100 ISO, reflector P70	64 2/10	90 2/10
Flash duration t 0.1 (t 0.5)	1/150 - 1/6000 s (1/450 - 1/10000 s) Flash duration and energy automatically regulated for optimum colour temperature. Flash duration can be preselected.	1/80 - 1/6000 s 1/240 - 1/10000 s)
Charging time (for 100 % of selected energy)	Version 1: 0.03 - 1.3 s (230 V) Version 2: 0.03 - 1.6 s (120 V) Version 3: 0.03 - 2.2 s (100 V) Can be switched to slow charging mode for low-amperage power outlets	Version 1: 0.04 - 2.6 s (230 V) Version 2: 0.04 - 3.2 s (120 V) Version 3: 0.04 - 2.2 s (100 V)
Ready display	Visual and audible (can be switched off); signals when 100 % of selected energy is reached	
Lamp outlets	2 main connectors with flash cut-off and 1 reserve connector	
Power output distribution	Symmetrical and variable asymmetrical	
Controls	Illuminated silicone keyboard, resistant to dust and scratches. Wireless remote control of all functions with infrared Servor e, alternatively, can be controlled with PC and Macintosh®.	
Control range	6 7/10 f-stops for main connectors, 4 f-stops for reserve connector, in 1/10 or 1/3 f-stop intervals Displayed simultaneously in joules and f-stops, joules switchable to percentage	
Colour temperature	CTC (Colour Temperature Control) for uniform colour temperature over the whole control range	
Modelling light	Halogen, max. 3 x 650 W at 200 - 240 V Halogen, max. 3 x 300 W at 100 - 120 V Proportional to flash energy and “full” and “low” settings. Proportionality adjustable to other broncolor power packs and their various output ranges	
Additional functions	Flash sequences, triggering delay, selectable flash duration, slow charging, ping-pong release, stroboscopic effects with one or more power packs, choice of two infrared channels; etc. User-friendly menu-driven design. Menu text available in multiple languages (German, English, French, etc.)	
Flash release	Manual release button, photocell (can be switched off) infrared receiver, sync cable, FCM 2, IRX2	
No. of sync sockets	2	
Stabilized flash voltage	+/- 0.5 %	
Standards	UL 122, EC standard 73/23, 89/336 and 99/5UL 122	
Power requirements	Version 1: 220 – 240 V / 50 Hz, switchable to 120 V / 60 Hz, current consumption 10 A, longer series with shorter charging times 16 A. Version 2: 110 – 120 V / 60 Hz, switchable to 230 V / 50 Hz, current consumption 15 A. Version 3: 100 V / 50 Hz, switchable to 230 V / 50 Hz, current consumption 15 A.	
Dimensions	288 x 180 x 311.5 mm	288 x 180 x 407.5 mm
Weight kg	8	11

13. Grafit A RFS / Grafit A plus

The power packs Grafit A are also available as an unit version with integrated 10 channel RFS interface (**R**adio **F**requency **S**ystem). Each channel (Studio) can control up to 15 units. This interface allows remote control respectively flash releases by radio via transmitter RFS as well as by means of a transceiver RFS via PC or Macintosh computer. When controlling via screen, 4 storage spaces for different lighting situations are at your disposal.

13.1 Modification to Grafit A RFS

There is the possibility, to modify the Grafit A power packs later on with a RFS interface. The modification will be made by the customer service centre of our broncolor agency in your country.

13.2 Grafit A plus

Because of the laws in some countries, the use of the broncolor radio system is not allowed. Therefore the Grafit A power pack is also available in the version Grafit A plus (that means with cable remote control). Besides the cable connection between the power pack and the computer, the application with RFS is almost identical.

Attention: there is no camera transmitter available for Grafit A plus!

13.3 Technical data

	Grafit A RFS (art. no. 31.169.XX / 31.179.XX)	**Grafit A plus**
Flash release	Transmitter RFS, transceiver RFS (besides the options in chapter 12)	Analogue chapter 12
Remote control	- With integrated 10 channel RFS interface (**R**adio **F**requency **S**ystem) for the remote control of the unit by radio via transceiver RFS from PC- or Macintosh computer. Each channel (Studio) can control up to 15 units. - With IR-manual remote control servor d for the control of the main functions of the Grafit A.	-. With integrated interface for the remote control of the unit by cable from PC or Macintosh computer. Each channel (Studio) can control up to 15 units. - With IR- manual remote control servor d for the control of the main functions of the Grafit A
Operational distance outdoors	Up to 50 m	Length of the connection cable from the computer to the unit: 5 m Length of the connection cable between the units: 2,5 m
Operational distance in closed rooms	Up to 30 m	See above
Range	Up to 300 m	See above
Number of sync sockets	1 (instead of the second sync socket there is the radio antenna)	1 (the second sync socket is configured as connection for the computer cable)

13. Technical data **(continuation)**

Standards	UL 122, EC-standards 73/23, 89/336 und 99/5	
	ERM	EN 300 220-1,-3
	EMC	EN 301 489-1,-3 EN 60950 EN 50371 FCC Part 15 This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) This device must accept any interference received, including interference that may cause undesired operation. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Subject to change in the interest of product enhancement.

14. Guarantee

All **broncolor** power packs, lamps, monolights and accessories have a high quality standard. We offer a 2-year factory guarantee from the date of purchase (for the first owner) on the aforementioned units, except for flash tubes, halogen lamps, protecting glasses, cable, batteries, rechargeable batteries and textiles.

Faults resulting from non-observance of safety instructions, incorrect handling, use of accessories of another manufacturer or unauthorised intervention/modification are excluded
from the factory guarantee. We assume no liability for damages resulting from non-observance of the safety instructions, incorrect handling, use of accessories of another manufacturer or unauthorised intervention/modification.

In case of technical problems please contact immediately the nearest authorised **broncolor** service station.

June 2008

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VISATEC
kobold

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KONFORMITAETSERKLAERUNG
DECLARATION OF CONFORMITY
DECLARATION DE CONFORMITE

Wir / We / *Nous* :

Bron Elektronik AG, Hagmattstrasse 7, CH-4123 Allschwil, Schweiz

erklären in alleiniger Verantwortung, dass das Produkt
declare under our sole responsibility that the product
déclarons sous notre seule responsabilité que le produit

broncolor Grafit A2, Grafit A4

auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder normativen Dokument(en) übereinstimmt:
to which this declaration relates is in conformity with the following standard(s) or other normative document(s):
auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou autre(s) document(s) normatif(s):

VDE 0882	**EN 55014**	**EN 300 220-1, -3**	**EN 301 489-1, -3**
VDE 733.1	**EN 60950**	**EN 50371**	

gemäss den Bestimmungen den Richtlinien:
following the provision of the Directives:
conformément aux dispositions des Directives:

73/23/EEC 89/336/EEC 99/5/EEC 96/EEC 95/EEC

Ort und Datum der Ausfertigung:
Place and date of issue:
Lieu et date:

Allschwil, 09.08.2006

Name und Unterschrift des Befugten:
Name and signature of authorised person:
Nom et signature du signataire autorisé:

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Marcel Griessmann
Technical Manager

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