Operating Instructions

Electronic Ballast

EB 12/18 kW
High Speed

L2.76296KH

- AutoScan -

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Electronic Ballast ARRI EB 12/18 kW High Speed

1. General Remarks

Please read the following operating instructions very carefully before using the Electronic Ballast (EB) the first time. They contain important information and instructions for the safety, use and maintenance of the appliance. For your own safety please follow all safety instructions and warnings.
Keep the operating instructions carefully in a safe place and pass them to any future owner.

2. Important Safety Instructions

2.1 Warning - High voltages inside ballast! Danger to life!
Disconnect EB from power supply before opening (pull out the line plug). Do not pull on the connection cable, but on the plug, to disconnect the EB from mains. Any repairs or changing of the line plug must only be carried out by qualified personnel or ARRI-service departments.

2.2 The line plugs must be suitable for the ballast input current (see max. current in "Technical Data", page 9). National standards must be observed.

The single conductor mains cables are marked in accordance with following code:

Ground:	green
Neutral:	white
Line:	black

Before connecting the Electronic Ballast ensure that the power supply is correctly wired. Do not use without adequate earth connection unless either an isolation transformer or an earth-leakage trip is employed.

Disconnect primary power before connecting the cable leads!

Always connect **ground first** (green), then neutral (white), then line (black).

Always use AC/DC sensitive residual current protective devices (RCD type B).

Note: In order to avoid unwanted tripping due to leaking currents and transient disturbances, care shall be taken that the collective leakage current of equipment on the load side of a residual current device is less than 1/3 of its rated residual current.

The typical leakage current of this device is 5 mA (according EN 60598-1:1996, appendix G).

2.3 Lamphead must be disconnected from Electronic Ballast or Electronic Ballast must be disconnected from mains before fitting or replacing a lamp.

2.4 The Electronic Ballast must be switched off before connecting or disconnecting either head or supply cable. Do not use other than original ARRI cables and connectors with permitted cross section of the leads. The ballast is only suitable for specified ARRI luminaires (see fig. 1, page 11). Using other than original ARRI cables or luminaires may cause injury to the user as well and/or damage to the ballast.

2.5 The Electronic Ballast satisfies the standards of the recognized state of the engineering and the pertinent safety regulation of DIN EN 60598/1 and DIN EN 60065 for electrical appliances.

2.6 Supply voltage must not exceed the ranges that are given in the "Technical Data" (see page 9). Check that the power supply voltage and wiring are suitable for the ballast to be used. Supply voltages which are greater or less than that specified for the ballast can cause injury to the user as well as damage to the ballast.
The electronic of the EB is built in a housing with protective class I and protective rate IP 22.

Ambient operating temperatures must be between -20°C and + 50°C!
Neither back and side heat sinks nor air slots for ventilation should ever be covered or obstructed.
The EB must be placed only on solid, flat and dry ground. Temperature of the ground should be less than 50°C. If the EB could slip over the ground, it must be fastened.
Protect EB against direct sunshine. Protection against rain is needed when wind pushes water drops direct into the air slots of the EB (acc. to protective rate IP22).
Do not operate the EB in high humidity (dew) or in aggressive or explosive gas-air mixtures.

2.7 The Electronic Ballast must be used only according to the directions in this "Operating Instruction". The manufacturer shall not be liable for any damages caused by unintended use or wrong operation.

2.8 The user of the Electronic Ballast is urgently requested to observe the following instructions:

- Dispose of packing material properly.
- Do not place the ballast into operation if damages are apparent.
- To assure safe operation, use EB only according to the information given in these operating instructions, connect and operate it as shown on the serial number plate.
- In case of malfunction, disconnect the EB from mains (pull out the line plug).
- Repairs, exchange of replacement parts and manipulations on the EB must be carried out by a qualified personnel or ARRI service only.
- Use only original spare parts for repairs.
- Use only original accessories.
- Make worn-out Electronic Ballasts inoperable immediately by pulling out the line plug and cutting the line cable at the ballast. Then dispose of the Electronic Ballast properly.
- Make sure that children do not operate the EB.
- Always switch off the EB and pull out line plug before you clean it or do maintenance work on it.
- Clean EB dry only or with a moist cloth. Never immerse it into water.
- Do not use the connection cables of the EB for carrying, do not pull them over sharp edges, clamp them under doors or clamp them in any other way.
- Switch off EB when it is not needed.

3. Product Description

The EB 12/18 kW High Speed is part of an optimized lighting system along with all 12 kW and 18 kW luminaires specified for operation with the EB (see fig.1, page 11)
It is suitable for both professional indoor and outdoor use (IP22 protection).

Note: The Electronic Ballast EB 12/18 kW High Speed meets the European Council Directive 89/336/EEC of electromagnetic compatibility. Over an extensive range limits of radio disturbance characteristic **B** are fulfilled. But on principle it has to be classified under characteristic **A**, group 1.

Although limits of radio disturbance characteristic **A** are prescribed for industrial areas administrative authority can allow the use of equipment with characteristic **A** in other than industrial areas.

Compared to magnetic ballasts there are a number of advantages when operating daylight-lamps with ARRI Electronic Ballasts:

- Flicker free light
- No synchronization of cameras necessary
- Typical light ripple max. 3 %
- Light intensity increased by at least 5 %
- Constant lamp power
- Constant color temperature
- Constant light quality
- Control of electric power of the lamp between 50...100%
- Variation in power supply voltage of 10% has no influence on the power of the lamp (see also "Technical Data" for limits, on page 9).
- Variation in power supply frequency of 10% has no influence on the power of the lamp
- Operating life time of the lamp increased by at least 20%
- Substantially less volume and weight compared to magnetic ballasts
- The ballast is built-in to a casing with type of protection IP22.

4. Start-up procedure

All operating controls and cable connections are arranged on the front panel (see fig. 2, page 12).

4.1 Energizing System

- Connect the properly checked daylight luminaire with head to ballast cable to electronic ballast
- Connect the electronic ballast to the power supply source.

  Caution!
  The ballast is equipped with connectors for a single pin distribution system.
  Disconnect primary power before connecting cable leads!
  Always connect **ground first** (green), then neutral (white), then line (black).
- Ensure main circuit breaker is in "ON" position
- The green LED "POWER" on front plate is lit when Line Voltage is applied and the Main Circuit Breaker is in "ON" position.
- Check earth protection: If correct, the green LED "PE" on front plate illuminates. If not, disconnect EB from mains (pull out line plug) and check power supply and socket (Ref. 2.2. on page 3)
- Press push button ‚ON' at the EB or at the head.

  Lamp will ignite after about 5 sec.
- The yellow LED "LAMP" on front plate is lit after successful ignition.
- The nominal lamp power of the connected lamp (12 or 18 kW) is detected automatically.
  Two LEDs at the ballast front are indicating the actual power mode. The EB is always starting in 12 kW mode. The electronic lamp detection is active for the first three minutes after ignition. During this period the respective power mode LED is flashing and dimming of lamp power is disabled. After warming up of lamp the detected lamp power is fixed, the respective power mode LED lights permanently and dimming is enabled.

4.2 Control of light intensity

After warming up, the light intensity of the metal halide daylight-lamp may be controlled by the dimming potentiometer (stepless). The nominal lamp power can be adjusted between 50 - 100% (left stop = MIN, right stop = MAX of power).

In the High Speed operating modes (see 4.3, page 6) the desired dimming value should always be set before searching for a non-resonant frequency.
During an automatic scan for the beginning frequency in High Speed mode "AUTOSCAN", a change of the dimming value will restart the scan process!

4.3 Operating Modes

The ballast can be operated in three fundamentally different modes:

Low Noise, **Flicker Free** and **High Speed**

These modes can be selected by using the "F-Mode" button (see fig. 2, page 12). To change the operating mode the button must be pressed at least twice. After the first operation, the LED of the actual mode starts flashing and thus indicates that the operating mode can be changed now. The next push to change the operating mode must take place within 2 seconds.
The ballast is switched to the selected mode only after the warm-up phase of the lamp (about 3 minutes). During the warm-up phase, the lamp is always operated in the "75 Hz ⎍" mode. Moreover dimming of the lamp is deactivated to allow the electronic detection of the power of the inserted lamp. The power indicator LED next to the lamp connector is flashing to indicate the warm-up phase.

1. Low Noise

When metal halide daylight lamps are operated flicker-free some noise may occur, due to the special square-wave operation of the lamp

In the position "50/60 Hz" (red LED indication) the noise will be substantially reduced, the amount depending on the lamp, in some cases even to almost zero.

The light, however, is **NOT** flicker free any more.

When operating in this mode, the same limitations for speed of camera and/or shutter angle apply as for magnetic ballasts operated at 50 Hz (25 fps) or 60 Hz (30 fps). All other advantages of the electronic ballast will apply as before!

The actual frequency is displayed at the LED display. The frequency can be changed between 50 Hz and 60 Hz by holding down the "F-Mode" button for about 5 seconds.

2. Flicker Free

In the position "75 Hz ⎍" (green LED indication), the electronic ballast will operate flicker-free. The metal halide lamp is operated at 75 Hz square-wave current and gives out a constant light.

This mode is designed for flicker-free operation at standard film speed (25 fps / 30 fps)

3. High Speed

In the "High Speed" positions (white LED indications) the electronic ballast will operate flicker free in high-speed mode. The metal halide lamp is operated at about 1000 Hz square wave current and gives out a constant light.

This mode is specially designed to achieve high resolution pictures when using digital cameras with high frame rates.

With some lamp types resonance phenomena can cause visible instabilities of the arc when operated at 1000 Hz. Variation of the output frequency avoids this resonance phenomenon and stabilizes the arc.

Since the dimming of lamp power influences the resonance frequencies, the desired dimming value should always be set before searching for a non-resonant frequency!

To operate the lamp at a resonance free frequency the ballast provides three different methods:

a) MAN

In the "MAN" position the resonant-free frequency can be adjusted manually. The "MIN / MAX" frequency knob can be used to set the frequency in the range of 900 Hz (min) to 1200 Hz (max). The frequency is displayed at the LED display.

b) AUTO MAN

In the "AUTO MAN" position the initial frequency is adjusted manually by use of the "MIN / MAX" frequency knob. During operation, the electronic ballast constantly analyzes the lamp current to detect beginning resonances. In this case the frequency will be automatically readjusted to stay in the resonance-free range.

c) AUTOSCAN

In the "AUTOSCAN" position, the search for a non-resonant operation frequency is done fully automatic. After the warm-up phase of the lamp, the electronic ballast is automatically searching for an initial frequency that operates the lamp quietly. This scan process may take up to four minutes. While the scan is running, the "AUTOSCAN" LED flashes and the actual frequency is displayed at the LED display.

During the automatic scan for the initial frequency a change of the dimming value will restart the scan process!

During following operation, the ballast continuously analyzes the lamp current to detect beginning resonances. In this case, the frequency is automatically readjusted to stay in the resonance-free range.

Note: If in doubt, the flicker analyzer P.R.O.F. can be used to check the light to be flicker-free or not within a few seconds.

4.4 Remote Control DMX-512

Switching the Ballast on/off and dimming of lamp power can be controlled by a remote control according DMX-512 standard.

One channel is used for dimming the ballast, the second channel is used for switching the ballast on and off. The address of the dimming channel is indicated by the LED display at the front plate of the ballast. The address for the on/off channel will be the dimming address incremented by one. To switch the ballast 'on' a value between 128 and 255 must be send to this address. A value of 0…127 will cause the ballast switching off.
Dimming is done by sending a value between 128 and 255 to the dimming address which will correspond to lamp power regulated between 50% (128) to 100% (255) of the nominal value.
To control the ballast via remote it is necessary that it was switched on by remote. In this case the dimming potentiometer on front plate of the ballast has no function!

Attention: The potential of the remote control signals at the connectors may not exceed 70 Volts (peak) against protective earth.

4.5 Selection of Device Address

At the upper part of the front panel is a LED Display which indicates the current address of the ballasts **dimming channel**. The "↑" (up) and "↓" (down) keys can be used to change the displayed address. To take over the new address, the "ENTER" key has to be pressed within two seconds.

The green LED "Signal" indicates that DMX signals are received at the adjusted channel (dimming) and at the next channel (switching).

4.6 Remote Function

When the Remote is switched on, the EB can be started by apply of line voltage or by use of the main circuit breaker.

5. Technical Data

EB 12/18 kW High Speed

Mains supply

Line Power	:	19400 VA (max.)
Supply Voltage	:	190 – 250 V~ 50/60 Hz 1, N, PE
Nominal Current	:	12kW: 68 – 52 A
		18kW: 102 – 77 A
Power Factor	:	cos $\varphi \approx 0.98$

Lamp connection

Lamp Power	:	12000 W / 18000 W constant control
Power Regulation	:	Automatic detection of lamp types 12000 W (LV) and 18000 W. Electronic detection of lamp type
Current Characteristic	:	square wave, ca. 1000 Hz in “High Speed” mode square wave, 75 Hz in “75 Hz” mode. nearly square wave, 50 or 60 Hz in “50/60 Hz” mode.
Dimming	:	Range 50 - 100% of nominal Lamp power
Starting	:	cold start and hot restrike
typical light ripple	:	typ. < 3%

Dimensions

width · height · depth	:	283 · 548 · 506 mm
Weight	:	ca. 49 kg
Protective Rate	:	IP 22

Remote Control

According DMX-512 standard

Channel 1	:	Dimming, Address selectable.
		LED-Display shows current Address
Channel 2	:	Device on/off; Dimming address incremented by one.
Connectors	:	XLR 5-pin
PIN 1	:	Ground
PIN 2	:	DMX -
PIN 3	:	DMX +
PIN 4	:	n.c.
PIN 5	:	n.c.

6. Trouble Shooting Guide

6.1 Does supply voltage correspond with ballast required voltage? Dual voltage ballasts are autoswitching.

6.2. Ensure ballast wattage matches lamp power!

6.3 Ensure correct lamp is fitted!

6.4 Connect ballast to power supply and test earth (LED “PE” has to be on).

6.5 Re-energizing system:
Set Main Circuit Breaker to "0"-position.
Set Main Circuit Breaker to "I"-position.
Press Push Button "ON". - WAIT-
After approx. 5 seconds lamp should ignite.

6.6 If lamp does not strike, the safety circuit may be broken - check if lens door is fully shut, the lens safety switch is activated and the on/off switch is in on position.

6.7 Is there a good power supply to the ballast?

6.8 Is the ballast main circuit breaker in ON position?

6.9 If a ballast / head to ballast cable / luminaire does not work then all three units should be considered faulty.

Do not try a suspected luminaire with another ballast - you may end up with two faulty ballasts!

To check if a ballast is good, run it with a known good luminaire and known good head to ballast cable.

6.10 If a ballast cuts out after running a few minutes there are a number of possible failures:

- The lamp itself may be faulty or at the end of its life.
- The thermal cut-out in the ballast may have activated (LED "TEMP" on front plate is lit) due to extreme ambient temperature or exposure to direct sunlight in hot summer conditions.
- The ventilation might be restricted. In such a case the ballast can be used after it had cooled down and the condition causing the overheating is removed.
- If the power supply exceeds the limits or has spikes or drop-outs the ballast switches off to protect itself. If running on a generator the output should be regulated between 195 and 245 V.
- If a ballast has cut off due to a momentary supply drop-out switch the ballast "OFF" and "ON" again. The ballast should start up as normal.
- Earth leakage of luminaires or head to ballast cables will also cause the protection circuit to be activated. Test the ballast with a known good luminaire. If cables are suspect, they should be exchanged with known good cables.

If a ballast is found to be faulty ideally it should be returned together with the luminaire and head to ballast cable to the ARRI-service location for examination.

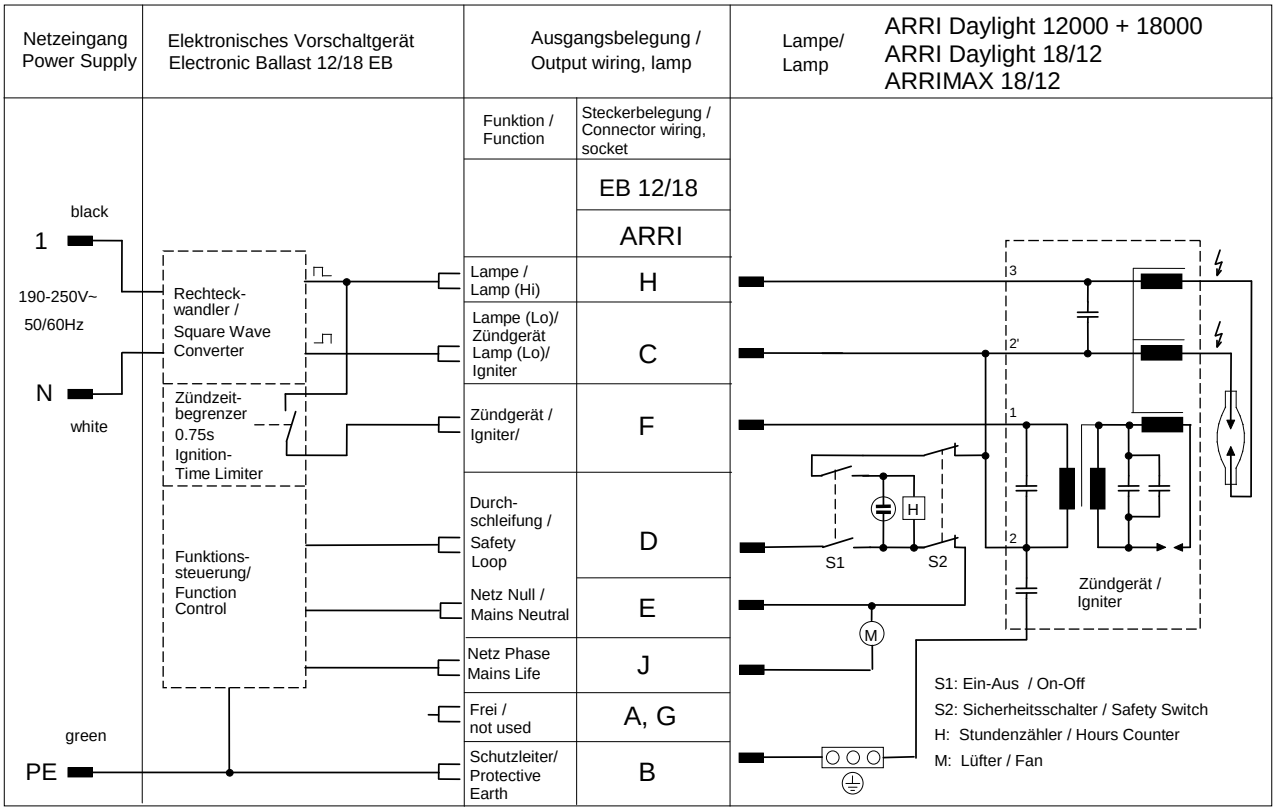

Abb./Fig. 1a: Anschlußbelegung ARRI /
Connector Wiring ARRI

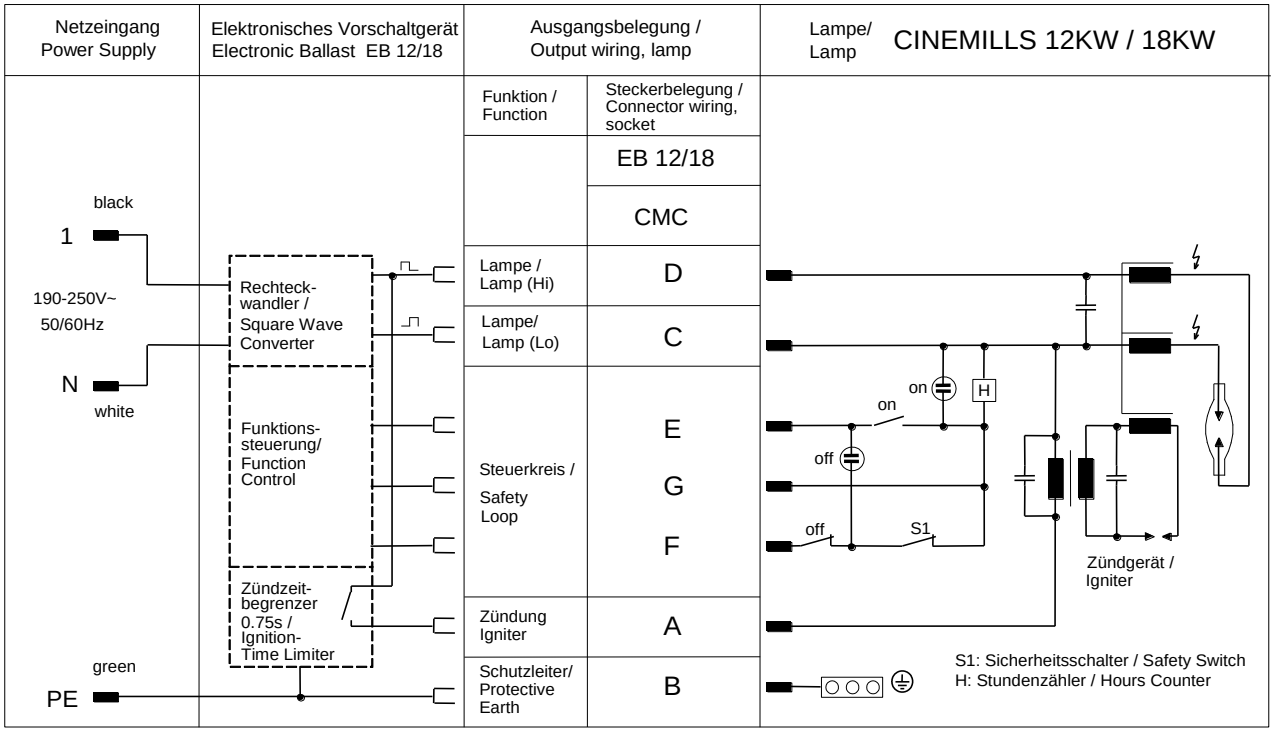

Abb./Fig. 1b: Anschlußbelegung CMC /
Connector Wiring CMC

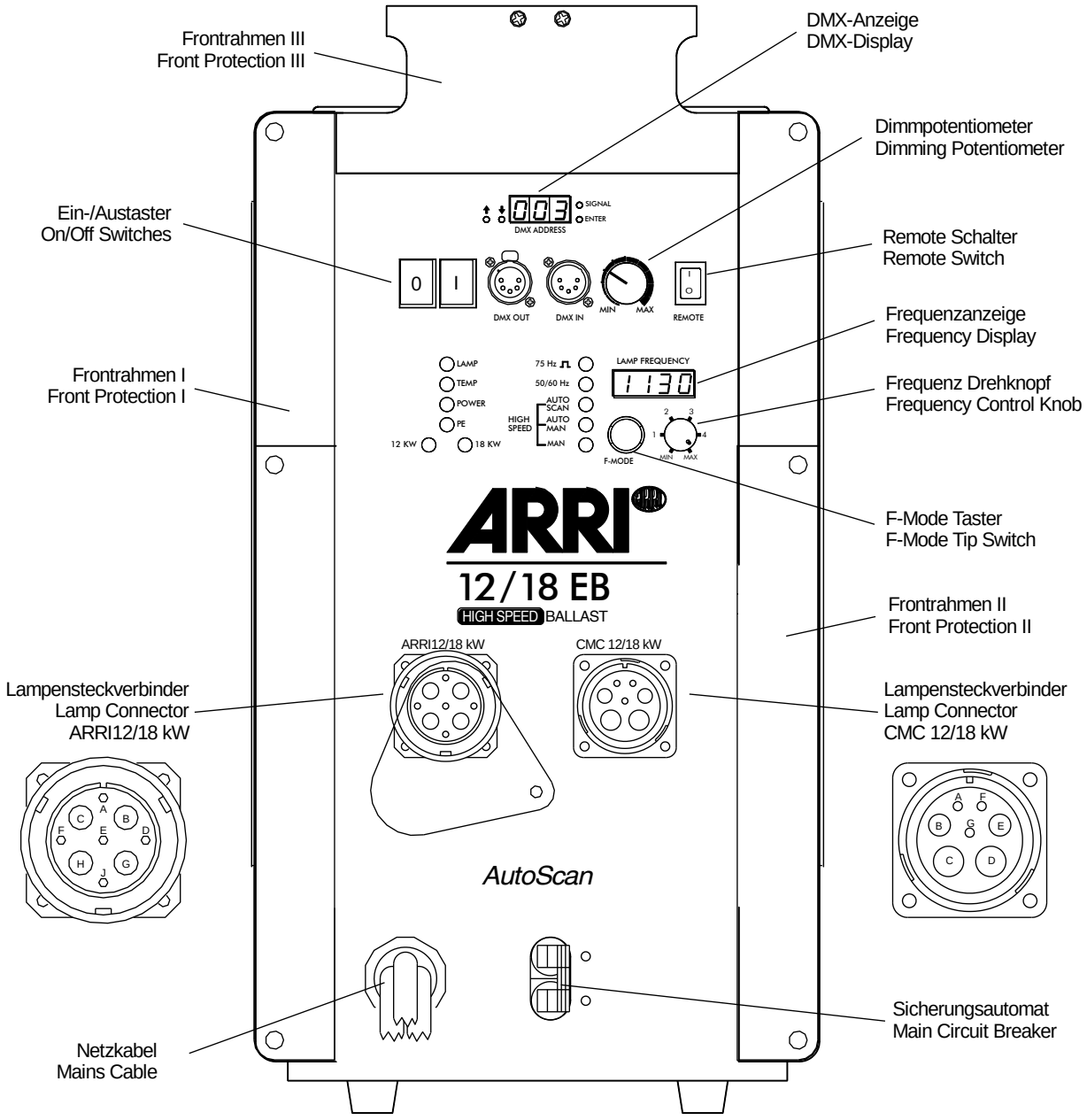

Abb./Fig. 2: Bedienelemente auf der Frontplatte
Operating Parts on Front Panel

Für alle weiteren technischen Fragen besuchen Sie bitte die ARRI Webseite oder kontaktieren Sie die ARRI Service Zentren. Technische Änderungen vorbehalten!

For any additional technical questions please visit the ARRI website or contact the ARRI service centers.
Design and specifications are subject to change without notice!

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