

## BINDER LED lighting system for plants

The LED light module was developed for maximum flexibility of use. It consists of 16 LED light bars that can be positioned individually in a cooling incubator or climate chamber. Each light bar contains three different LED channels that can be controlled separately: sunlike cool white, sunlike warm white and far red phytochrome control light.



### Compatibility with BINDER climate chambers

The LED plant light module (Art. No. 8012-2439) was developed for use in the new generation of BINDER cooling incubators and climate chambers (E7). Installation can be carried out easily on site by the customer. The LED light bar length has been optimized for size models 260, 470 and 720, but can also be used in larger models.

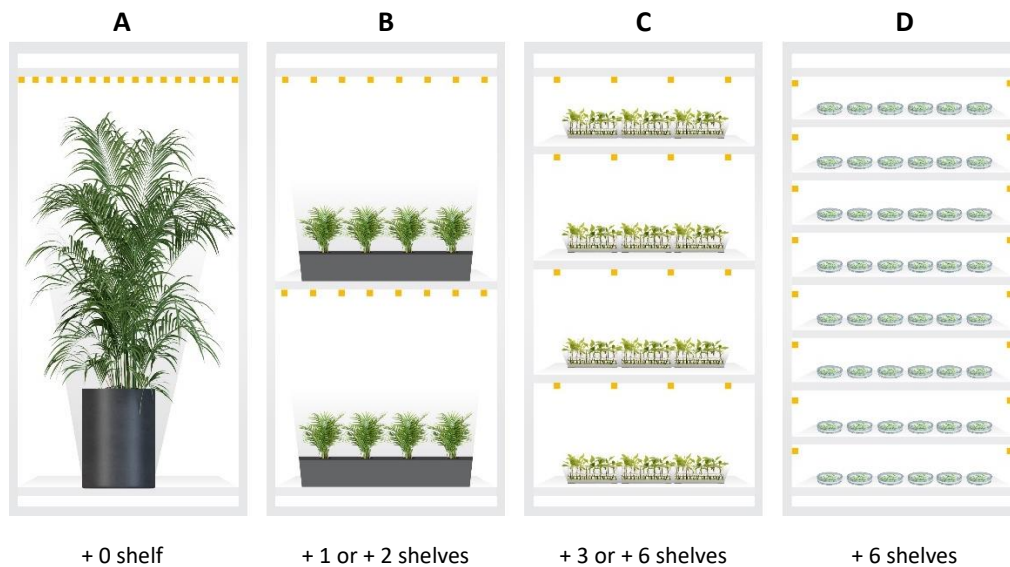
| Series         | Model                     | Temperature range | Humidity range |
|----------------|---------------------------|-------------------|----------------|
| <b>KB</b>      | 260, 470, 720, 1060       | 20 ... 50°C       | unregulated    |
| <b>KB PRO</b>  | 260, 470, 720, 1060, 1600 | 5 ... 60°C        | unregulated    |
| <b>KBF</b>     | 260, 470, 720, 1060, 1600 | 20 ... 50°C       | 20 ... 50      |
| <b>KBF PRO</b> | 260, 470, 720, 1060, 1600 | 10 ... 50°C       | 10 ... 90 % RH |

### LED plant light - scope of delivery

- 16 light bars with retaining clips for clipping into standard grid shelves
- Light control box with program controller
- Mains cable
- Supply distribution cable for the LED light bars
- Operating manual
- Grid shelves\* for holding the light bars are not included

\*Standard grids shelves are suitable for attaching the LED light strips. These grids should be ordered as an accessory with the chamber, as the size and number depend on the chamber model and configuration. Although grid shelves may serve as light bar holders and for loading sample material at the same time, this is not recommended. With an additional grid shelf, a distance of approx. 10 cm is achieved between the LED light strips and the sample material, which reduces thermal effects on the samples.

### LED light bars - example configurations



- A** The chamber comes with two grid shelves as standard, no additional shelf is required
- B** In addition to the two standard grid shelves, one additional shelf set is required, two additional shelf sets are recommended
- C** In addition to the two standard grid shelves, three additional shelf sets are required, six additional shelf sets are recommended
- D** In addition to the two standard grid shelves, six additional shelf sets are required for samples, the light bars are fixed to the side walls with cable ties.

## Controller functions

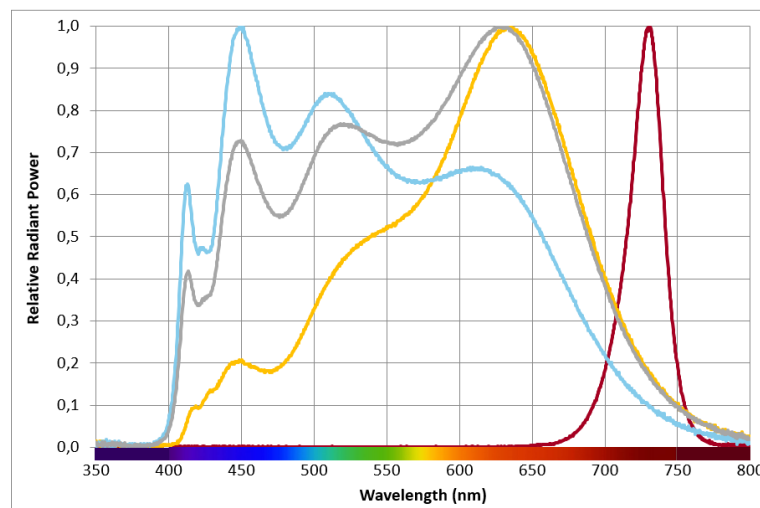
- Independent controller in the supply box
- All three light channels can be controlled individually
- Light channels can be dimmed individually from 10% to 100%
- Real-time programming (time light on / time light off)
- Twilight function (light on / light off runs through a ramp of one hour)
- Ventilation function (0 to 500 L of ambient air per hour)



| BINDER Plant Light System      |                         |                         |                      |
|--------------------------------|-------------------------|-------------------------|----------------------|
|                                | Channel 1<br>Cool White | Channel 2<br>Warm White | Channel 3<br>Far Red |
| Channel Setpoint               | 50 %                    | 50 %                    | 10 %                 |
| Manual Channel Selection       | ON                      | ON                      | OFF                  |
| Day / Night Simulation Program | Program                 | Light On: 06:00         | Dawn / Dusk          |
|                                | ON                      | Light Off: 18:00        | ON                   |

## Light quality emission spectra of the three LED channels

- SunLike Cool white 6.500 K
- SunLike Warm white 2.700 K
- Warm white + Cool white
- Far red 730 nm



**Specifications KB + LED plant light module (100 % light) (preliminary)**

|                                                 | KB 260               | KB 470           | KB 720           | KB 1060          |
|-------------------------------------------------|----------------------|------------------|------------------|------------------|
| <b>Art. No. Climate chamber 230 V</b>           | <b>9020-0473</b>     | <b>9020-0474</b> | <b>9020-0475</b> | <b>9020-0476</b> |
| <b>Art. No. Climate chamber 120 V</b>           | <b>9020-0501</b>     | <b>9020-0502</b> | <b>9020-0503</b> | <b>9020-0504</b> |
| Inner volume (L)                                | 262                  | 472              | 727              | 1.070            |
| Inner width (mm)                                | 656                  | 656              | 1.011            | 1.011            |
| Inner height (mm)                               | 695                  | 1.250            | 1.250            | 1.250            |
| Inner depth (mm)                                | 575                  | 575              | 575              | 847              |
| Temperature range with light (°C)               | 20 ... 50            | 20 ... 50        | 20 ... 50        | 20 ... 50        |
| Humidity range with light (% RH)                | unregulated          | unregulated      | unregulated      | unregulated      |
| <b>Art. No. LED Plant light module</b>          | <b>8012-2439</b>     | <b>8012-2439</b> | <b>8012-2439</b> | <b>8012-2439</b> |
| PFR PAR 25 cm/1 level (μmol/m <sup>2</sup> /s)  | 1600                 | 1600             | 1200             | 1200             |
| PFR PAR 25 cm/2 levels (μmol/m <sup>2</sup> /s) | 800                  | 800              | 600              | 600              |
| PFR PAR 25 cm/4 levels (μmol/m <sup>2</sup> /s) | –                    | 400              | 300              | 300              |
| Power supply for Light module                   | 120-240 V / 50-60 Hz |                  |                  |                  |

**Specifications KB PRO + LED plant light module (100 % light) (preliminary)**

|                                                 | KB PRO 260           | KB PRO 470       | KB PRO 720       | KB PRO 1060      | KB PRO 1600      |
|-------------------------------------------------|----------------------|------------------|------------------|------------------|------------------|
| <b>Art. No. Climate chamber 208-240 V</b>       | <b>9020-0434</b>     | <b>9020-0435</b> | <b>9020-0436</b> | <b>9020-0437</b> | <b>9020-0438</b> |
| Inner volume (L)                                | 262                  | 472              | 727              | 1.070            | 1.610            |
| Inner width (mm)                                | 656                  | 656              | 1.011            | 1.011            | 1.521            |
| Inner height (mm)                               | 695                  | 1.250            | 1.250            | 1.250            | 1.250            |
| Inner depth (mm)                                | 575                  | 575              | 575              | 847              | 847              |
| Temperature range with light (°C)               | 5 ... 60             | 5 ... 60         | 5 ... 60         | 5 ... 60         | 5 ... 60         |
| Humidity range with light (% RH)                | unregulated          | unregulated      | unregulated      | unregulated      | unregulated      |
| <b>Art. No. LED Plant light module</b>          | <b>8012-2439</b>     | <b>8012-2439</b> | <b>8012-2439</b> | <b>8012-2439</b> | <b>8012-2439</b> |
| PFR PAR 25 cm/1 level (μmol/m <sup>2</sup> /s)  | 1600                 | 1600             | 1200             | 1200             | 1000             |
| PFR PAR 25 cm/2 levels (μmol/m <sup>2</sup> /s) | 800                  | 800              | 600              | 600              | 500              |
| PFR PAR 25 cm/4 levels (μmol/m <sup>2</sup> /s) | –                    | 400              | 300              | 300              | 300              |
| Power supply for Light module                   | 120-240 V / 50-60 Hz |                  |                  |                  |                  |

**Specifications KBF + LED plant light module (100 % light) (preliminary)**

|                                                 | KBF 260              | KBF 470          | KBF 720          | KBF 1060         | KBF 1600         |
|-------------------------------------------------|----------------------|------------------|------------------|------------------|------------------|
| <b>Art. No. Climate chamber 230 V</b>           | <b>9020-0479</b>     | <b>9020-0480</b> | <b>9020-0481</b> | <b>9020-0482</b> | <b>9020-0483</b> |
| <b>Art. No. Climate chamber 120 V</b>           | <b>9020-0495</b>     | <b>9020-0496</b> | <b>9020-0497</b> | <b>9020-0498</b> | <b>9020-0499</b> |
| Inner volume (L)                                | 262                  | 472              | 727              | 1.070            | 1.610            |
| Inner width (mm)                                | 656                  | 656              | 1.011            | 1.011            | 1.521            |
| Inner height (mm)                               | 695                  | 1.250            | 1.250            | 1.250            | 1.250            |
| Inner depth (mm)                                | 575                  | 575              | 575              | 847              | 847              |
| Temperature range with light (°C)               | 20 ... 50            | 20 ... 50        | 20 ... 50        | 20 ... 50        | 20 ... 50        |
| Humidity range with light (% RH)                | 20 ... 50            | 20 ... 50        | 20 ... 50        | 20 ... 50        | 20 ... 50        |
| <b>Art. No. LED Plant light module</b>          | <b>8012-2439</b>     | <b>8012-2439</b> | <b>8012-2439</b> | <b>8012-2439</b> | <b>8012-2439</b> |
| PFR PAR 25 cm/1 level (μmol/m <sup>2</sup> /s)  | 1600                 | 1600             | 1200             | 1200             | 1000             |
| PFR PAR 25 cm/2 levels (μmol/m <sup>2</sup> /s) | 800                  | 800              | 600              | 600              | 500              |
| PFR PAR 25 cm/4 levels (μmol/m <sup>2</sup> /s) | –                    | 400              | 300              | 300              | 300              |
| Power supply for Light module                   | 120-240 V / 50-60 Hz |                  |                  |                  |                  |

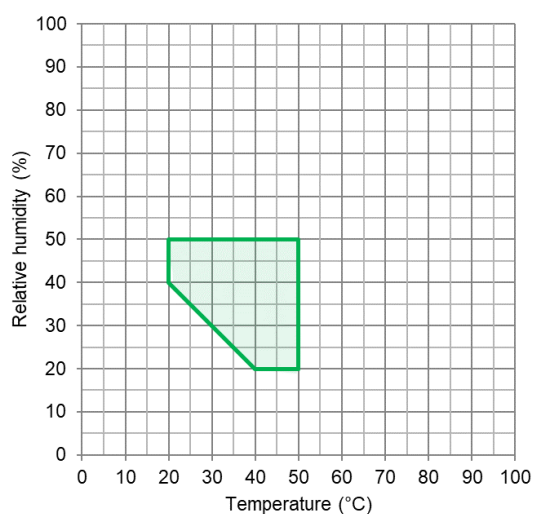
### Specifications KBF PRO + LED plant light module (100 % light) (preliminary)

|                                                 | KBF PRO 260          | KBF PRO 470 | KBF PRO 720 | KBF PRO 1060 | KBF PRO 1600 |
|-------------------------------------------------|----------------------|-------------|-------------|--------------|--------------|
| Art. No. Climate chamber 208-240 V              | 9020-0440            | 9020-0441   | 9020-0442   | 9020-0443    | 9020-0444    |
| Inner volume (L)                                | 262                  | 472         | 727         | 1.070        | 1.610        |
| Inner width (mm)                                | 656                  | 656         | 1.011       | 1.011        | 1.521        |
| Inner height (mm)                               | 695                  | 1.250       | 1.250       | 1.250        | 1.250        |
| Inner depth (mm)                                | 575                  | 575         | 575         | 847          | 847          |
| Temperature range with light (°C)               | 10 ... 50            | 10 ... 50   | 10 ... 50   | 10 ... 50    | 10 ... 50    |
| Humidity range with light (% RH)                | 10 ... 90            | 10 ... 90   | 10 ... 90   | 10 ... 90    | 10 ... 90    |
| Art. No. LED Plant light module                 | 8012-2439            | 8012-2439   | 8012-2439   | 8012-2439    | 8012-2439    |
| PFR PAR 25 cm/1 level (μmol/m <sup>2</sup> /s)  | 1600                 | 1600        | 1200        | 1200         | 1000         |
| PFR PAR 25 cm/2 levels (μmol/m <sup>2</sup> /s) | 800                  | 800         | 600         | 600          | 500          |
| PFR PAR 25 cm/4 levels (μmol/m <sup>2</sup> /s) | –                    | 400         | 300         | 300          | 300          |
| Power supply for Light module                   | 120-240 V / 50-60 Hz |             |             |              |              |

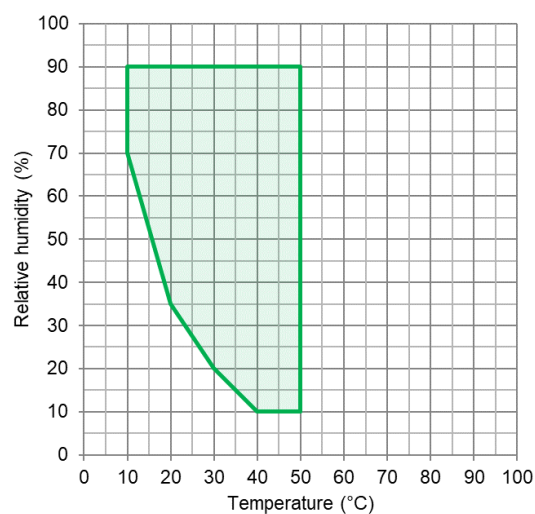
The equipment of a PRO device with two LED light modules can be requested via BI.

### Climate diagrams

KBF 720 with 100% LED plant light



KBF PRO 720 with 100% LED plant light



## Recommended BINDER accessories

- Grid shelf sets with telescopic runners
  - Size 260/470 8012-2384
  - Size 720 8012-2385
  - Size 1060 8012-2386
  - Size 1600 8012-2387
- Grid shelf sets with U-rails
  - (recommended for mounting the light bars)
  - Größen 260/470 8012-2390
  - Größe 720 8012-2391
  - Größe 1060 8012-2392
  - Größe 1600 8012-2393



- BINDER PureAqua (desalination system)
  - System 8012-0759
  - Replacement cartridge 8012-0165



- Water supply set (canister solution)
  - KBF 8012-2592
  - KBF PRO 8012-2592

The water supply system consists of a 20 L freshwater canister with level sensor, a water pump with magnetic holder for fresh water and a 20 L waste water canister



- CO<sub>2</sub> control module 0...1 Vol.% CO<sub>2</sub>
  - KB PRO 8012-2140
  - KBF 8012-2140
  - KBF PRO 8012-2140



## Useful BINDER options

- Swivel castors, levelable
  - KB 8012-2541
  - KB PRO 8012-2542
  - KBF 8012-2543
  - KBF PRO 8012-2544



Levelling castors are recommended for installation sites with uneven floors. This option cannot be retrofitted on site.

- Object temperature controller sensor
  - KB 8012-2549
  - KB PRO 8012-2553
  - KBF 8012-2591
  - KBF PRO 8012-2554

BINDER cooling incubators and climate chambers regulate the temperature of the supply air. Additional heat input (e.g. lighting equipment) increases the temperature in the interior slightly (by 1 to 3°C). This can be compensated for by manually setting the setpoint 1 to 3°C lower or by using the “object temperature controller sensor” option. This regulates the indoor temperature precisely to the measuring point of the flexible controller sensor in the usable space. This option is particularly recommended for light/dark cycles.

## Service for the installation of the LED Plant light module on site

| Art. No.  | Designation                         | Description                                                                                                                                                                                      |
|-----------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DL10-0150 | Installation LED plant light module | Installation of the BINDER LED plant light module, mounting the supply box, mounting the LED light bars on demand, laying the cables and fresh air hose, sealing the access port, function check |