

## KBW series

### Plant growth chambers with optimal lighting conditions

Precision combined with maximum dynamics. KBW exceeds any requirements with respect to optimal lighting and temperature conditions for exactly defined culture processes. Extremely short reaction times keep all growth parameters in equilibrium -- natural simulation as never before. Handling is truly enhanced by the integrated week program timer function in the controller.



#### Leistungsmerkmale/Ausstattung:

- Electronically controlled APT.line™ preheating chamber technology
- Temperature range: -10 °C to 60 °C (14 °F to 140 °F) without illumination
- MP controller with 2 programs with 10 sections each, alternatively switchable to 1 program with 20 sections
- The time interval of single program sections can be adjusted up to a maximum of either 99:59 hours or 999:59 hours. This adjustment applies to all program sections.
- Integrated week program timer with real time function for programming day/night cycles
- Adjustable ramp functions via program editor
- Digital temperature setting with an accuracy of a tenth of a degree
- Adjustable fan speed (0 to 100 %)
- Elapsed time indicator
- Illumination: flexible illumination cassettes with 4 daylight fluorescent tubes each (KBW 720 with 8 tubes), switchable (OFF – 50 % – 100 %)
- Access port, Ø 30 mm (1.2 inch) , right side, top and bottom
- Inner glass door
- Independent adjustable temperature safety device, Class 3.1 (DIN 12880) with visual and acoustic alarm
- Environmentally friendly refrigerant R 134a
- RS 422 interface for communication software APT-COM™ DataControlSystem, or switch over to printer output with RS 232 / RS 422 interface converter
- Adjustable intervals for printer
- Stainless steel shelves
- BINDER test certificate

	KBW 240	KBW 400	KBW 720
<b>Exterior dimensions</b>			
Width (mm/inch)	905 / 35.6	884 / 34.8	1234 / 48.6
Height (inclusive feet/castors) (mm/inch)	1458 / 57.4	1850 / 72.8	1816 / 71.5
Depth (mm/inch)	765 / 30.1	716 / 28.2	867 / 34.1
Plus door handle, I-panel, connection (mm/inch)	100 / 3.9	100 / 3.9	100 / 3.9
Wall clearance (mm/inch)	100 / 3.9	100 / 3.9	100 / 3.9
Wall clearance with open door(s) (mm/inch)	160 / 6.3	160 / 6.3	160 / 6.3
Steam space volume (l/cu.ft.)	338 / 11.9	515 / 18.2	855 / 30.2
Number of door(s) / inner glass door(s)	1	1	2
<b>Interior dimensions</b>			
Width (mm/inch)	650 / 25.6	650 / 25.6	1000 / 39.4
Height (mm/inch)	785 / 30.9	1308 / 51.5	1168 / 46.0
Depth (mm/inch)	470 / 18.5	470 / 18.5	600 / 23.6
Interior volume (l/cu.ft.)	240 / 8.5	400 / 14.1	700 / 24.7
Load per shelf (kg/lbs.)	30 / 66	20 / 44	45 / 99
Permitted total load (kg/lbs.)	100 / 221	100 / 221	100 / 221
Weight of the unit (empty) (kg/lbs.)	177 / 391	236 / 521	262 / 578
Shelves (number standard/max.)	2/7	3/15	3/14
Flexible adjustable illumination cassettes	2	3	3**
<b>Temperature data</b>			
Temperature range			
at 0 % illumination (°C/°F)	-10-60 / 14-140	-10-60 / 14-140	-10-60 / 14-140
at 100 % illumination (°C/°F)	5-60 / 57-140	14-60 / 57-140	30-60 / 57-140
Temperature range 0 % illumination with option enhanced refrigeration (°C/°F)	-10,0-60,0/ 14-140	-10,0-60,0/ 14-140	-10,0-60,0/ 14-140
Temperature range 100 % illumination with option enhanced refrig. (°C/°F)	0-60 / 32-140	0-60 / 32-140	9-60 / 48-140
Temp. range 100 % high intensity illumination and reinforced refrigeration			
1 shelf (°C/°F)	0-60 / 32-140	-3-60 / 27-140	12-60 / 54-140
2 shelves (°C/°F)	22-60 / 72-140	12-60 / 54-140	-
3 shelves (°C/°F)	-	33-60 / 91-140	-
Temperature variation			
at 0 °C (32 °F), 0 % / 100 % illumination and enhanced refrigeration (± °C)	0,7/2,5	0,7/2,9	0,7/-
at 25 °C (77 °F), 0 % / 100 % illumination (± °C)	0,4/3,6	0,5/4	0,5/-
at 25 °C (77 °F), 100 % illumination and enhanced refrigeration (± °C)	3,4	2,8	3,5
Temperature fluctuation			
during heating operation (± °C)	0,1	0,1	0,1
during cooling operation (± °C)	0,3	0,3	0,3
Heating up time at 37 °C (98.6 °F), 0 % / 100 % illumination 1) (Min.)	22/15	26/22	22/28
Cooling down time room temperature			
at 4 °C (39.2 °F), 0 % illumination 1), 2) (Min.)	77	120	125
at 4 °C (39.2 °F), 0 % / 100 % illumination / enhanced refrigeration 1) (Min.)	30/47	39/84	62/-
Recovery time after door was opened for 30 sec.			
at 4 °C (39.2 °F), 0 % illumination 1)(Min.)	5	8	10
at 4 °C (39.2 °F), 0 % / 100 % illumination / enhanced refrigeration (Min.)	3/5	3/5	5/-
at 37 °C (98.6 °F), 0 % / 100 % illumination (Min.)	3/2	2/3	2/4
Max. illumination intensity / daylight illumination tubes 3)			

(Lux) / $\mu\text{E}/(\text{s} \times \text{m}^2)^*$ / ( W/m2) UVA	9000 / 95 / 0.7	12000 / 125 / 0.65	13000 / 225/ 1.17
Max. illumination intensity / high-intensity illumination 3)			
(Lux) / $\mu\text{E}/(\text{s} \times \text{m}^2)^*$ / ( W/m2) UVA	25000 / 370 / 2.2	28600 / 430 / 2.3	30000 / 774 / 4.1
Max. illumination intensity / growth lamps 3) (Lux) / $\mu\text{E}/(\text{s} \times \text{m}^2)^*$	4000 / 75	6300 / 77	7200 / 138
<b>Electrical data</b>			
Housing protection acc. to EN 60529	IP 20	IP 20	IP 20
Nominal voltage ( $\pm 10\%$ ) 50/60 Hz (V)	230 / 115	230 / 115	230 / 115
Nominal power (W)	1100	1350	2000
Energy consumption 2) at 37 °C (W)	100	90	160

1) up to 98 % of the set value

2) these energy consumption values can be used upon calculation of air conditioning systems

3) Average values based on 25 measuring points. The distance between the measuring plane and each illuminated shelf is 12 cm (4.7 inch).

\* Light measurement using Quantum sensors with cosinus correction positioned vertically upside.

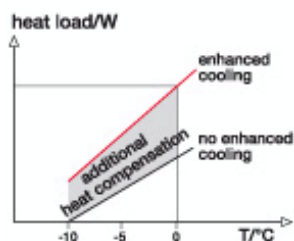
\*\* KBW 720 / 115 V: Standard equipped with 2 illumination cassettes and 2 shelves stainless steel.

All technical specifications are specified for units with standard equipment at an ambient temperature of 20 °C (68 °F) and a voltage fluctuation of  $\pm 10\%$ . The temperature data are determined in accordance to factory standard following DIN 12880, part 2 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. All indications are average values, typical for units produced in series. We reserve the right to alter technical specifications at all times.



### Different illumination

Lighting can be selected based upon application and light intensity. Day light lamps / growth lamps / Arabidopsis lamps.



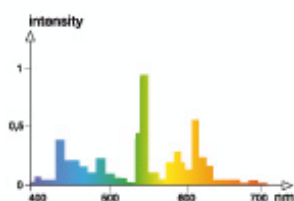
### Reinforced refrigerating

To compensate for heat from the lamps.



### Waterproof interior power socket in the inner chamber

Maximum 500 W, switched via the main switch, with associated plug (protection type IP 65), 230 V 1N ~50/60 Hz.



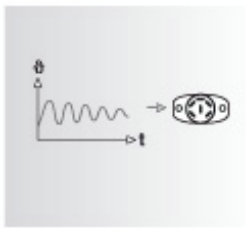
### Classification of illumination conditions

Radiometric measurements of the visible spectral range, with definition and documentation of intensity distribution from a light module on three measurement levels.



### Zero-voltage relay alarm outputs

Monitoring function for temperature and humidity monitoring, forwarding of alarm signals (e.g. computer, cell phone).



## Analog outputs

For temperature 4 - 20 mA with 6-pin DIN socket (non-adjustable output).

## High intensity illumination

High intensity illumination under the chamber ceiling with additional daylight fluorescent tubes. Thermal isolation and ventilation to simulate natural lighting. Restricted humidity range < 30 % r.H. at 20 °C (68 °F).

	KBW 240	KBW 400	KBW 720
Access port with silicone plug	O	O	O
Shelf, stainless steel	O	O	O
Shelf, perforated, stainless steel	O	O	O
Reinforced shelf, stainless steel, with 1 set of securing elements (max. 70 kg / 154 lbs.)	O	O	O
Securing elements for additional fastening of racks (1 set of 4)	O	O	O
Lockable door	O	O	O
Locking of controller keyboard	-	-	-
Independent adjustable temperature safety device, Class 3.3 (DIN 12880)	O	O	O
Safety kit for water connection. Pre-mounted assembly of reflux prevention device and hose burst protection device	-	-	-
High-intensity illumination under ceiling of chamber with additional daylight fluorescent tubes (KBWF 240: 6 x 18 W, KBWF 720: 8 x 18 W)	-	-	-
Potential-free alarm outputs for temperature and humidity, accessible via 6-pin DIN socket with acoustic signal that can be switched off. (max. power 24 V AC/DC, 2.5 A)	-	-	O
Analog output, 4–20 mA for temperature and humidity measurements, with 6-pin DIN socket (Outputs are adjusted automatically as the controller is adjusted)	O	O	O
Reinforced refrigeration system	O	O	O
High-intensity illumination with reinforced refrigeration system (Only available in combination with KBW equipped with dimmable illumination. Only for 230 V units!)	O	O	-
FLUORA growth lamps	O	O	O
Arabidopsis lamps	O	O	O
Serial printer with interface converter for printing temperature logs. Connects to RS 232 printer interface. Inclusive connection cables for RS 422 interface and RS 232/RS 422 interface converter, 230 V	O	O	O
Dimmable illumination	O	O	O
Certificate illumination measurement for KBW. Radiometric measurements in the visible spectral range with definition and documentation of intensity allocation from the illumination cassette to 3 measurement levels.	O	O	O
Waterproof interior socket 230 V (maximum 500 W)	O	O	O
Temperature measurement according to DIN 12880-2 at 25 °C (77 °F) or at specified temperature measurement log and certificate	O	O	O
Calibration certificate for temperature and humidity	O	O	O
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Fanfold chart paper	-	-	-
1 set fibre pens	-	-	O

O Option - not available

Technical specifications subject to change

**BINDER GmbH** Postfach 102 D-78502 Tuttlingen **Direction:** Im Mittleren Ösch 5 D-78532 Tuttlingen

**Contact:** Phone: +49 (0) 74 62/2005-0 | Fax: +49 (0) 74 62/2005-100 | [info@binder-world.com](mailto:info@binder-world.com) | [www.binder-world.com](http://www.binder-world.com)