

# Model MK 400 | Dynamic climate chambers for rapid temperature changes

The BINDER MK series chamber is suitable for all heat and cold tests between -40 °C and 180 °C. The MK is a clever alternative to complex individual solutions for cyclical temperature tests.

#### **BENEFITS**

- Homogeneous climate conditions thanks to APT.line™ technology
- Comprehensive programming and data acquisition
- Large heated viewing window



Model 400



Model 400

#### IMPORTANT FEATURES

- Temperature range: -40 °C to +180 °C
- APT.line™ preheating chamber technology
- Programmable condensation protection for test material
- Heated viewing window with LED interior lighting
- BINDER Multi Management Software APT-COM™ Basic Edition
- Troubleshooting system with visual and audible alarms
- Intuitive touchscreen controller with time-segment and real-time programming •
- Internal data logger, measured values can be read out in open format via USB 1 stainless steel rack
- Unit self-test for comprehensive status analysis
- · Access port with silicone plug, 50 mm, left

- Class 2 independent adjustable temperature safety device (DIN 12880) with visual alarm
- 4 castors, two with brakes
- Computer interface: Ethernet
- Adjustable ramp function
- Integrated chart recorder
- Real-time clock
- Inner chamber made of stainless steel
- CFC-free refrigerant R-452A
- Cooling with compressor cooling unit

#### **OPTIONAL EQUIPMENT**

- APT-COM Multi Management Software for managing, recording, and documenting unit parameters
- Racks option of stainless steel racks, depending on test requirements
- · Compressed air supply system
- Services wide range of services to ensure that the unit functions correctly

## ORDERING INFORMATION

Interior volume [L]	Power supply - unit fuse	Plug*	Version	Model version	ArtNo.
Model MK 400					
417	400 V 3~/N/PE 50 Hz -16,0 A	CEE 16 / 6 H plug 5- pin	Standard	MK400-400V	9020-0406
	480 V 3~ 60 Hz -16,0 A	CEE 16 / 6 H plug 5- pin	with voltage and frequency converter	MK400-480V-C	9020-0445



# TECHNICAL DATA

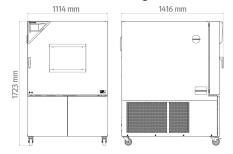
Personance Marcon M	Data				
Performance Data Temperature         Standard         with rollings and frequency conversor           Performance Data Temperature         40±80 °C         40±80 °C           Temperature antitionally disperdent on set value         0±±0.5 °C         0±±0.5 °C           Temperature antitionally disperdent on set value         0±±0.5 °C         0±±0.5 °C           Average beating up rate according to EC Goode3-5         5 o K/min         5 o K/min           Cooling down time from 180°C to 40°C         15 min         15 min           Neversige cooling down time according to EC Goode3-75         5 o K/min         5 o K/min           Power frequency         5 o K/min         5 o K/min           Retericl data         400 °C         450 °C           Retericl data         5 o K/min         5 o K/min           Power frequency         5 o K/min         5 o K/min           Retericl data         400 °C         450 °C           Power frequency         5 o K/min         5 o K/min           National Diversity	Designation	MK400-400V	MK400-480V-C		
Professionance Data Temperature         40.180 °C         40.180 °C           Temperature Informity dependent on set value         0.1.1.2 °K         0.1.1.2 °K           Temperature Informity dependent on set value         0.1.0 °K         0.1.0 °K           Average heading spar fat according to EC 60089 35         50 Krimin         50 Krimin           Average coding down time according to EC 60089 35         50 Krimin         50 Krimin           Average coding down time according to EC 60089 35         50 Krimin         50 Krimin           Average coding down time according to EC 60089 35         50 Krimin         50 Krimin           Average coding down time according to EC 60089 35         50 Krimin         50 Krimin           Average coding down time according to EC 60089 35         50 Krimin         50 Krimin           Average coding down time according to EC 60089 35         50 Krimin         50 Krimin           Average coding down time according to EC 60089 35         50 Krimin         50 Krimin           Average coding down time according to EC 60089 35         50 Krimin         50 Krimin           Average frequency         60 IV         60 IV         60 IV           Average frequency         400 A         40 A         40 A           Average frequency         47 L         47 L         40 Krimin           A	Article Number	9020-0406	9020-0445		
Temperature range         4686 °C         4689 °C           Temperature sufformity dependent on set value         0.12 k         0.105 °K           Temperature Bucksation dependent on set value         0.105 °K         0.105 °K           Accesses bearings up note according to EC 60068-95         5.0 K/min         5.0 K/min           Accesses bearings up note according to EC 60068-95         5.0 K/min         5.0 K/min           Accesses bearings up note according to EC 60068-95         5.0 K/min         5.0 K/min           Accesses bearings up note according to EC 60068-95         5.0 K/min         5.0 K/min           Accesses bearings up note according to EC 60068-95         5.0 K/min         5.0 K/min           Accesses bearings up note according to EC 60068-95         5.0 K/min         5.0 K/min           Accesses bearings up note according to EC 60068-95         5.0 K/min         5.0 K/min           Belefit of the sunt according to EC 60068-95         5.0 K/min         4.00 V           Power frequency         5.0 M2         4.00 V           Nominal power         7.00 M2         4.00 A           Unification of the sunt access (Nominal power)         4.70 K         4.70 K           Not weight of the unit (empty)         4.3 kg         4.10 kg           Not weight of the unit (empty)         4.3 kg <t< td=""><td>Option model</td><td>Standard</td><td>with voltage and frequency converter</td></t<>	Option model	Standard	with voltage and frequency converter		
Interpretative uniformly dependent in set value         0.1.1.2 s K           Temperature fluctuation dependent in set value         0.1.0.9 s K         0.1.0.9 s K           Average healing up rate according to IEC 60068-95         50 Kmin         50 Kmin           Cooling down time from 180°C to 40°C         15 min         15 min           Average cooling down time according to IEC 60068-95         50 Kmin         50 Kmin           Place of Frequency         50 Mz         450 V           Rough frequency         50 Mz         60 Mz           Nominal power         7 kW         7 kW           Place (Nominal voltage)         3-N/97         3-           Place (Nominal voltage)         3-N/97         3-           Net weight of the unit (empty)         47 I         47 I           Net weight of the unit (empty)         30 kg         30 kg           Valid charance back         50 mm         500 mm           Wall charance selecute         500 mm         500 mm           Wall charance selecute         500 mm         500 mm           Wall charance selecute         1155 mm         4115 mm           Height net         4,200 mm         4,200 mm	Performance Data Temperature				
Temperature fluctuation desendent on set value of 10.5 ± K of	Temperature range	-40180 °C	-40180 °C		
Average heating-up rate according to IEC 60068-35         5.0 K/min         5.0 K/min           Cooling down time according to IEC 60068-35         5.0 K/min         5.0 K/min           Average cooling down time according to IEC 60068-35         5.0 K/min         5.0 K/min           Bectrical data         Exercisal data           Power frequency         5.0 k/m         460 V           Power frequency         5.0 k/m         66 Hz           Nominal bower         7 kW         7 kW           Phase (Nominal voltage)         3-7 k/PE         3-           Dimensions and weights         427 L         47 L           Returned voltage         447 L         47 L           Net weight of the unit (empty)         443 k8         43 k8           Voll clearance back         500 mm         500 mm           Woll clearance back         500 mm         500 mm           Woll clearance sidewise         500 mm         4,155 mm           Height net         1,270 mm         1,470 mm           Depth net         1,200 mm         1,400 mm	Temperature uniformity dependent on set value	0.11.2 ± K	0.11.2 ± K		
Cooling down time from 180°C to 40°C         135 min         135 min           Average cooling down time according to EC 60068-316         5 o K/min         5 o K/min           Electrical data         Week of Value         480 V           Power frequency         50 Hz         60 Hz           Nominal power         7 kW         60 Hz           Unit fise         160 A         60 A           Phase (Moninal voltage)         3 - N/PE         3 -           Dimensions and weights         477 I         477 I         477 I           Net weight of the unit (empty)         413 kg         413 kg         413 kg           Load per rack         30 kg         30 kg         30 kg           Wall clearance black         500 mm         500 mm         500 mm           Wall clearance sidevise         500 mm         1,125 mm         1,125 mm           Depth et         1,250 mm         1,200 mm         1,200 mm	Temperature fluctuation dependent on set value	0.10.5 ± K	0.10.5 ± K		
Electrical data         Sp. K/min         Sp. K/min           Electrical data         Warrange cooling down time according to IEC 60068-35 sp. K/min         Sp. K/min         Sp. K/min           Rated Voltage         400 V         480 V         480 V           Power frequency         50 Hz         60 Hz         60 Hz           Unit fuse         16,0 A         7 kW         400 C         60 Hz           Phase (Nominal voltage)         3-/N/PE         3-         7 kW	Average heating-up rate according to IEC 60068-3-5	5.0 K/min	5.0 K/min		
Electrical data           Rated Voltage         400 V         480 V           Power frequency         50 Hz         60 Hz           Nominal power         7 kW         7 kW           Unit fuse         160 A         160 A           Phase (Vominal voltage)         3-/N/PE         3-           Directions and weights         417 L         417 L           Net weight of the unit (empty)         413 kg         417 kg           Load per rack         30 kg         30 kg           Pemilted load         350 kg         350 kg           Wall clearance back         500 mm         300 mm           Wall clearance back         300 mm         300 mm           Housing dimensions not incl. fittings and connections         415 mm         4155 mm           Wall clearance back         4,125 mm         4,250 mm           Depth net         1,400 mm         4,400 mm	Cooling down time from 180°C to -40°C	115 min	115 min		
Rated Voltage         400 V         480 V           Power frequency         50 Hz         60 Hz           Nominal power         7 kW         7 kW           Unit fuse         160 A         160 A           Phase (Nominal voltage)         3-/NVPE         3-           Dimensions and weights         417 L         417 L           Net weight of the unit (empty)         413 kg         413 kg           Load per rack         30 kg         30 kg           Permitted load         150 kg         500 kg           Wall clearance back         500 mm         500 mm           Wall clearance back         300 mm         300 mm           Housing dimensions not incl. fittings and connections           Width net         1.115 mm         1.115 mm           Height net         1.210 mm         1.210 mm         1.210 mm           Depth net         1.400 mm         1.400 mm         1.400 mm	Average cooling down time according to IEC 60068-3-5	5.0 K/min	5.0 K/min		
Power frequency         50 Hz         60 Hz           Nominal power         γ kW         γ kW           Unit fuse         16.0 Λ         16.0 Λ           Phase (Nominal voltage)         3-/N/PE         3-           Dimensions and weights           Interior volume         447 L         417 L           Net weight of the unit (empty)         413 kg         413 kg           Load per rack         30 kg         30 kg           Wall clearance back         500 mm         500 mm           Wall clearance sidewise         300 mm         300 mm           Housing dimensions not incl. fittings and connections           Width net         1,115 mm         1,115 mm           Beight net         1,270 mm         1,270 mm           Depth net         1,400 mm         1,400 mm	Electrical data				
Nominal power         7 kW         7 kW           Unit fuse         160 A         160 A           Phase (Nominal voltage)         3-/N/PE         3-           Dimensions and weights           Interior volume         417 L         417 L           Net weight of the unit (empty)         413 kg         413 kg           Load per rack         30 kg         30 kg           Permitted load         150 kg         150 kg           Wall clearance back         500 mm         300 mm           Housing dimensions not incl. fittings and connections           Width net         1,115 mm         1,710 mm           Height net         1,710 mm         1,710 mm           Depth net         1,400 mm         1,400 mm	Rated Voltage	400 V	480 V		
Unit fuse         16,0 A         16,0 A           Phase (Nominal voltage)         3~/N/PE         3~           Dimensions and weights           Interior volume         417 L         417 L           Net weight of the unit (empty)         413 kg         413 kg           Load per rack         30 kg         30 kg           Permitted load         150 kg         150 kg           Wall clearance back         500 mm         500 mm           Wall clearance sidewise         300 mm         300 mm           Housing dimensions not incl. fittings and connections           Width net         1,115 mm         1,115 mm           Height net         1,720 mm         1,420 mm           Internal Dimensions         1,400 mm         1,400 mm	Power frequency	50 Hz	60 Hz		
Phase (Nominal voltage) 3-/N/PE 3-  Dimensions and weights  Interior volume 417 L  Net weight of the unit (empty) 413 kg 413 kg  Load per rack 30 kg 30 kg  Permitted load 150 kg 150 kg  Wall clearance back 500 mm 500 mm  Wall clearance sidewise 300 mm 300 mm  Housing dimensions not incl. fittings and connections  Width net 1,710 mm 1,710 mm  Depth net 1,400 mm 1,400 mm	Nominal power	7 kW	7 kW		
Dimensions and weights  Interior volume 417 L  At 18 A13 kg  Load per rack 30 kg  Permitted load 500 mm  Soo mm  Wall clearance back 500 mm  Woll clearance sidewise 300 mm  Housing dimensions not incl. fittings and connections  Width net 1,115 mm  Lipto mm  Depth net 1,400 mm  Internal Dimensions  Internal Dimensions  Internal Dimensions	Unit fuse	16,0 A	16,0 A		
Interior volume 417 L 417 L  Net weight of the unit (empty) 413 kg 413 kg  Load per rack 30 kg 30 kg  Permitted load 150 kg 150 kg  Wall clearance back 500 mm 500 mm  Wall clearance sidewise 300 mm 300 mm  Housing dimensions not incl. fittings and connections  Width net 1,115 mm 1,115 mm  Depth net 1,400 mm 1,400 mm  Internal Dimensions	Phase (Nominal voltage)	3~/N/PE	3~		
Net weight of the unit (empty)  13 kg  13 kg  30 kg  30 kg  150 kg  15	Dimensions and weights				
Load per rack 30 kg 30 kg  Permitted load 150 kg 150 kg  Wall clearance back 500 mm 500 mm  Wall clearance sidewise 300 mm 300 mm  Housing dimensions not incl. fittings and connections  Width net 1,115 mm 1,115 mm  Depth net 1,400 mm 1,400 mm  Internal Dimensions	Interior volume	417 L	417 L		
Permitted load 150 kg 150 kg  Wall clearance back 500 mm 500 mm  Wall clearance sidewise 300 mm 300 mm  Housing dimensions not incl. fittings and connections  Width net 1,115 mm 1,115 mm  Depth net 1,400 mm 1,400 mm  Internal Dimensions	Net weight of the unit (empty)	413 kg	413 kg		
Wall clearance back 500 mm 500 mm  Wall clearance sidewise 300 mm 300 mm  Housing dimensions not incl. fittings and connections  Width net 1,115 mm 1,115 mm  Height net 1,710 mm 1,710 mm  Depth net 1,400 mm	Load per rack	30 kg	30 kg		
Wall clearance sidewise 300 mm 300 mm  Housing dimensions not incl. fittings and connections  Width net 1,115 mm 1,115 mm  Height net 1,710 mm 1,710 mm  Depth net 1,400 mm 1,400 mm	Permitted load	150 kg	150 kg		
Housing dimensions not incl. fittings and connections  Width net 1,115 mm 1,115 mm  Height net 1,710 mm 1,710 mm  Depth net 1,400 mm 1,400 mm	Wall clearance back	500 mm	500 mm		
Width net 1,115 mm 1,115 mm Height net 1,710 mm 1,710 mm Depth net 1,400 mm 1,400 mm Internal Dimensions	Wall clearance sidewise	300 mm	300 mm		
Height net 1,710 mm 1,710 mm  Depth net 1,400 mm 1,400 mm  Internal Dimensions	Housing dimensions not incl. fittings and connections				
Depth net 1,400 mm 1,400 mm  Internal Dimensions	Width net	1,115 mm	1,115 mm		
Internal Dimensions	Height net	1,710 mm	1,710 mm		
	Depth net	1,400 mm	1,400 mm		
Interior width 735 mm 735 mm	Internal Dimensions				
	Interior width	735 mm	735 mm		



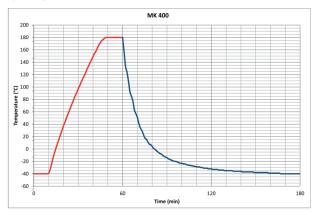
Interior height	700 mm	700 mm
Interior depth	810 mm	810 mm
Unit doors	1	1
Environment-specific data		
Sound-pressure level	65 dB(A)	65 dB(A)
Energy consumption at 20°C	1,400 Wh/h	1,400 Wh/h
Fixtures		
Number of shelves (std./max.)	1/6	1/6

All technical data is specified for unloaded units with standard equipment at an ambient temperature of  $\pm 20^{\circ}$  C  $\pm 3^{\circ}$ C and a power supply voltage fluctuation of  $\pm 10^{\circ}$  %. The temperature data is determined in accordance to BINDER factory standard following DIN 12880, observing the recommended wall clearances of 10 % of the height, width, and depth of the inner chamber. Technical data refers to 100 % fan speed. All indications are average values, typical for units produced in series. We reserve the right to change technical specifications at any time.

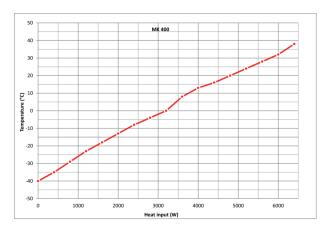
## DIMENSIONS Incl. fittings and connections [mm]



## **DIAGRAMS**



Heating up rate / Cooling down rate



Heat compensation chart

## **OPTIONS**

Designation	Description	MK 400	*	ArtNo.
	left			
Access port with silicone plug	30 mm	•	01	8012-1322



Designation	Description	MK 400	*	ArtNo.
	50 mm	•	01	8012-1328
	80 mm	•	01	8012-1334
	100 mm	•	01	8012-1542
	125 mm	•	01	8012-1351
	right			
	30 mm	•	01	8012-1319
	50 mm	•	01	8012-1325
	80 mm	•	01	8012-1331
	100 mm	•	01	8012-1539
	125 mm	•	01	8012-1348
	top			
	80 mm	•	01	8012-1536
	100 mm	•	01	8012-1530
	125 mm	•	01	8012-1533
Analog output 4-20 mA	for temperature values (output not adjustable)	•	-	8012-1084
Calibration certificate, expanded	for temperature; for extending the measurement in center of chamber to include another test temperature	•	-	8012-1124
	for temperature, measurement in center of chamber at specified temperature	•	-	8012-1143
Calibration certificate,	temperature measurement incl. certificate, 9 measuring points at specified temperature	•	-	8012-1560
temperature	temperature measurement incl. certificate, 15- 18 measuring points at specified temperature	•	-	8012-1581
	temperature measurement incl. certificate and 27 measuring points at specified temperature	•	-	8012-1602
Compressed air connection	for the connection to an existing pressurized air network	•	-	8012-1089
Door lock	lockable door handle	•	-	8012-1861
Notch-type access port	notch-type access port in door, 100 x 35 mm	•	-	8012-1850
Pt 100 temperature sensor	additional flexible Pt 100, interior, for displaying the temperature on the unit display	•	-	8012-1093
RS 485 interface, 2-wire	Additional serial interface can be used parallel to Ethernet, for Multi Management Software APT-COM™	•	-	8012-1768
Temperature safety device class	with visual alarm (DIN 12880)	•	-	8012-1792



Designation	Description	MK 400	*	ArtNo.
Zero voltage relay contacts	for controlling 3 relay contacts via program regulators, accessible via 6-pin DIN socket (max. 24 V - 2.5 A)	•	-	8012-1095

## **ACCESSORIES**

Designation	Description	MK 400	*	ArtNo.
APT-COM™ 4 GLP-Edition	for working under GLP-compliant conditions. Measured values are documented in a tamper- proof way in line with the requirements of FDA Regulation 21 CFR 11.			
	version 4, GLP edition	•	-	9053-0042
APT-COM™ 4 PROFESSIONAL- Edition	convenient unit and user management built on the BASIC edition. Suitable for networking up to 100 units.			
Edition	version 4, PROFESSIONAL edition	•	-	9053-0040
pH-neutral detergent	concentrated, for gentle remove of residual contaminants; 1 kg	•	-	8012-2250
	IQ/OQ/PQ documents – supporting documents for validation performed by customers, according to customer requirements, PQ section added to qualification folder IQ/OQ; parameters: temperature, ${\rm CO_2}$ , ${\rm O_2}$ – or pressure, depending on unit			
	Digital in PDF format	•	-	7057-0005
Qualification documents	Hard copy inside folder	•	-	7007-0005
	IQ/OQ documents – supporting documents for validation performed by customers, consisting of: IQ/OQ checklists incl. calibration guide and comprehensive unit documentation; parameters: temperature, ${\rm CO_2}$ , ${\rm O_2}$ , pressure, depending on unit			
	Digital in PDF format	•	-	7057-0001
	Hard copy inside folder	•	-	7007-0001
Rack	stainless steel	•	-	8012-2123
Rack, reinforced	stainless steel, with fasteners (1 set of 4)	•	-	8012-2104
Rack accessories	fasteners (1 set of 4) for additional security of racks	•	-	8012-2280
RS 485 / RS 422 interface converter	RS 422 cable set and RS 485 / RS 422 interface converter for connection to 10-way plug distributor			
	115 V option model	•	-	8012-0599
	230 V option model	•	-	8012-0589
Shelf, perforated	Stainless steel	•	-	8012-2260

## **SERVICES**

Designation	Description	*	ArtNo.
Calibration services			



Designation	Description	*	ArtNo.
Calibration cortificate temporature	Calibration of one (1) test temperature specified by the user in center of chamber, including certificate	-	DL30-0130
Calibration certificate, temperature	Extension of calibration of one (1) additional test temperature specified by the user in the center of the usable space, including certificate	-	DL30-0102
Temperature measurement, 9 measuring points	Temperature measurement with 9 measuring points with a set value specified by the user, including certificate	-	DL30-0109
Temperature measurement, 18 measuring points	Temperature measurement with 18 measuring points with a set value specified by the user, including certificate	-	DL30-0118
Temperature measurement, 27 measuring points	Temperature measurement with 27 measuring points with a set value specified by the user, including certificate	-	DL30-0127
Installation services			
Unit commissioning	Connect the unit to the customer-side connections (electricity, water, wastewater, gas), basic functions check, brief operating instructions. (excl.: unpacking, setup, controller instructions, programming, installation work)	-	DL10-0300
Unit instructions	Instruction regarding operating principle and basic functions of the unit, operation of the control electronics including programming	05	DL10-0700
Maintenance contracts			
BRONZE 3-year maintenance contract	Maintenance service as contractually agreed, visual inspection of mechanical and electrical components, check of control response, 20% discount on spare parts	-	DL20-0710
GOLD 3-year maintenance contract	Maintenance service as contractually agreed, visual inspection of mechanical and electrical components, check of control response, 20% discount on spare parts, testing of all key functions, replacement of wear parts, calibration of one temperature/humidity/pressure value, including certificate	-	DL20-0930
SILVER 3-year maintenance contract	Maintenance service as contractually agreed, visual inspection of mechanical and electrical components, check of control response, 20% discount on spare parts, testing of all key functions, calibration of one test temperature specified by the user in the center of the usable space, without certificate	-	DL20-0830
Maintenance services			
Leakage test	Testing and logging of the leak-tightness of systems containing hydrofluorocarbons in accordance with Regulation EC842/2006, incl. test book	-	DL00-0034
Maintenance	One-off maintenance service in accordance with maintenance schedule. Visual inspection of mechanical and electrical components, testing of all key functions. Calibration of a test temperature specified by the user in center of usable space without certificate	-	DL20-0607
Validation services			
Execution of IQ/OQ	Execution of IQ/OQ in accordance with qualification folder	-	DL41-0200
Execution of IQ/OQ/PQ	Execution of IQ/OQ/PQ in accordance with qualification folder	-	DL44-0500
Warranty service			
1-year warranty extension	The warranty is extended by 1 year from the delivery date, wear parts are excluded		DL50-0040



#### **NOTES**

- O1 Condensation may occur in the area around the access port. Access ports may be placed in custom locations for an additional charge.
- Quoted prices do not include travel costs. Please refer to the chapter on BINDER Service for travel costs for your region. Quoted prices for services performed in Switzerland do not include a country-specific added fee (available on request).

#### **BINDER GmbH**

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