

Model MKF 56 | Dynamic climate chambers for rapid temperature changes with humidity control

A BINDER MKF series environmental simulation chamber is ideally suited for any cold and heat testing based on current temperature and climate testing methods according to DIN and IEC standards. The comprehensive standard equipment for this environmental simulation chamber ensures ease of operation.

BENEFITS

- Homogeneous climate conditions thanks to APT.line™ technology
- Automatic water and wastewater management
- Pressure humidification with fast response times
- Comprehensive programming and data acquisition
- Large heated viewing window



Model 56



Model 56

MAIN FEATURES

- Temperature range: -40 °C to 180 °C
- Humidity range: 10 % to 98 % RH
- 4 zero-voltage relay contacts that can be activated via MCS controller
- APT.line™ preheating chamber technology
- Programmable condensation protection for test material
- Heated viewing window with LED interior lighting
- Humidity regulation with capacitive humidity sensor and vapor humidification
- 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
- Unit self-test for comprehensive status analysis
- Access port with silicone plug: 50 mm, left
- 4 castors, two with brakes
- Computer interface: Ethernet
- Adjustable ramp function
- Integrated chart recorder
- Real-time clock
- Door heating
- 1 stainless steel rack
- Complete safety connection kit for water supply and drainage, up to 1 m height
- BINDER test confirmation
- Inner chamber made of stainless steel
- Pt 100 temperature sensor
- Thermal insulation using PUR foam
- CFC-free refrigerant R-452A
- Cooling with compressor cooling unit
- Fin evaporator

ORDERING INFORMATION

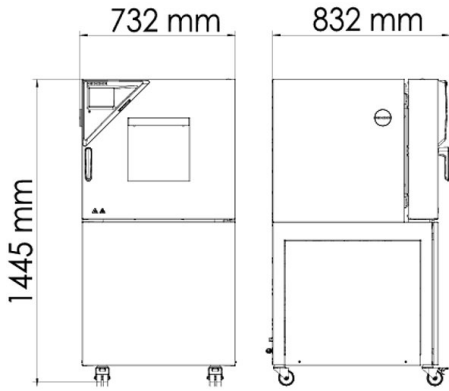
Interior volume [L]	Voltage	Option model	Version	Art.-No.
60	200...230 V 1~ ph 50 Hz	Standard	MKF056-230V	9020-0378
	200...240 V 1~ ph 60 Hz	Standard	MKF056-240V	9020-0389

TECHNICAL DATA

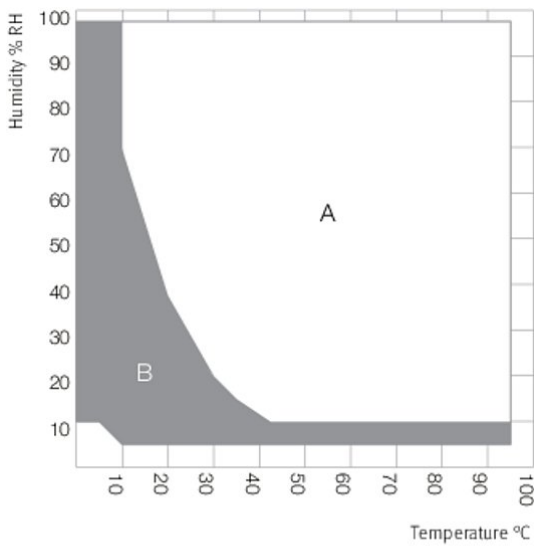
Description	MKF056-230V ¹	MKF056-240V ¹
Article Number	9020-0378	9020-0389
Performance Data Temperature		
Temperature range	-40...180	-40...180
Temperature variation depending on setpoint [± K]	0.5...1.5	0.5...1.5
Temperature fluctuation depending on setpoint [± K]	0.1...0.5	0.1...0.5
Average heating-up rate according to IEC 60068-3-5 [K/min]	5	5
Cooling down time from 180 °C to -40 °C [min]	90	90
Average cooling down time according to IEC 60068-3-5 [K/min]	5	5
Max. heat compensation at 25 °C [W]	1200	1200
Performance Data Climate		
Temperature range [°C]	10...95	10...95
Temperature fluctuation depending on setpoint [± K]	0.1...0.5	0.1...0.5
Humidity range [% RH]	10...98	10...98
Humidity fluctuation depending on setpoint	≤2,5 ± % RH	≤2,5 ± % RH
Dew point temperature range [°C]	5...94	5...94
Electrical data		
Rated Voltage [V]	200...230	200...240
Power frequency [Hz]	50	60
Nominal power [kW]	2.8	2.8
Unit fuse [A]	16	16
Phase (Nominal voltage)	1~	1~
Measures		
Interior volume [L]	60	60
Net weight of the unit (empty) [kg]	175	175
Permitted load [kg]	60	60
Load per rack [kg]	15	15
Viewing window width [mm]	288	288
Viewing window height [mm]	255	255
Wall clearance back [mm]	300	300
Wall clearance sidewise [mm]	200	200
Internal Dimensions		
Width [mm]	400	400
Height [mm]	420	420
Depth [mm]	348	348
Doors		
Unit doors	1	1
Housing dimensions not incl. fittings and connections		
Width net [mm]	720	720
Height net [mm]	1445	1445
Depth net [mm]	780	780
Environment-specific data		
Sound-pressure level [dB(A)]	59	59
Fixtures		
Number of shelves (std./max.)	1/4	1/4

1 All technical data is specified for unloaded units with standard equipment at an ambient temperature of +22 °C ±3 °C and a power supply voltage fluctuation of ±10 %. 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.

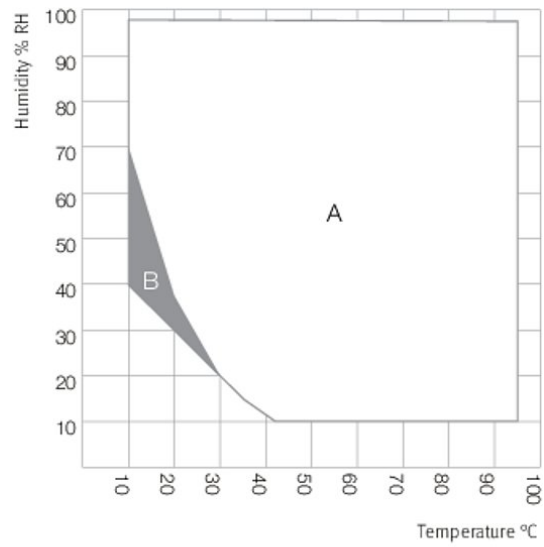
DIMENSIONS incl. fittings and connections [mm]



CHARTS

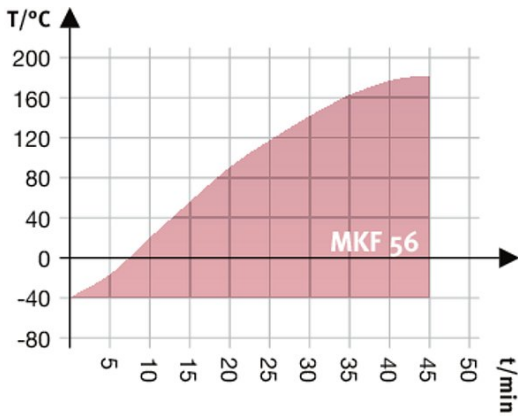


A: Standard Climate range
B: Extended range with dry-air purge



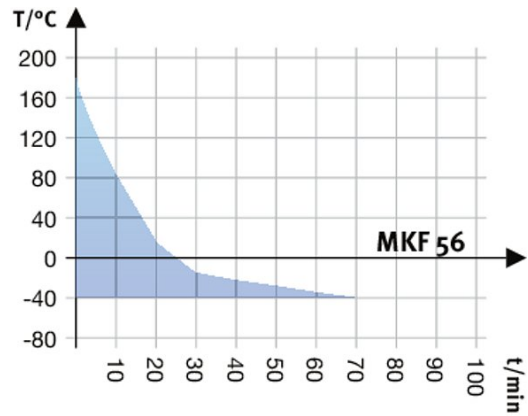
A: Standard Climate range
B: Time-limited operation (max. 24 hours)

Climate chart

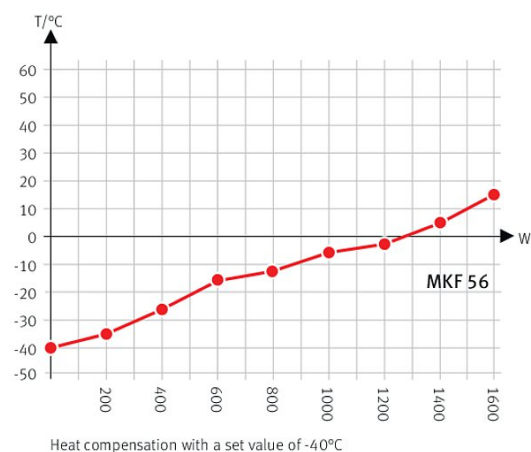


Heating up rate

Climate chart



Cooling down rate



Heat compensation chart

OPTIONS

Designation	Description	*	Art.-No.
	left		
	30 mm	01	8012-1323
	50 mm	01	8012-1329
	80 mm	01	8012-1335
Access port with silicone plug	right		
	30 mm	01	8012-1320
	50 mm	01	8012-1326
	80 mm	01	8012-1332
	top		
	80 mm	01	8012-1537
Analog output 4-20 mA	for temperature and humidity values (output not adjustable)	-	8012-1085
Calibration certificate, expanded	for temperature and humidity; for extending the measurement in center of chamber to include another test value	-	8012-1194
Calibration certificate, temperature	temperature measurement incl. certificate and 27 measuring points at specified temperature	-	8012-1609
	temperature measurement incl. certificate, 15- 18 measuring points at specified temperature	-	8012-1589
	temperature measurement incl. certificate, 9 measuring points at specified temperature	-	8012-1568
Calibration certificate, temperature and humidity	Measurement in center of chamber at 25 °C / 60% RH or at specified test values	-	8012-1188
	temperature (according to DIN12880) and humidity measurement incl. certificate, 27 temperature measuring points and 1 humidity measuring point, at 25 °C / 60 % RH or at specified values	-	8012-1615
Door lock	lockable door handle	-	8012-1096
Dry-air purge	controlled, incl. connection; suitable for the simulation of current automobile industry standards	-	8012-1088
Dry-air purge, connection	for the connection to an existing pressurized air network	-	8012-1796
Pt 100 temperature sensor	additional flexible Pt 100, interior, for displaying the temperature on the unit display	-	8012-1094
RS 485 interface, 2-wire	Additional serial interface can be used parallel to Ethernet, for Multi Management Software APT-COM™	-	8012-1769
Temperature safety device class 2	with visual alarm (DIN 12880)	-	8012-1097
Water cooling	for reduced heat loss to ambient air	-	8012-1098

* Notes › See last page

ACCESSORIES

Designation	Description	*	Art.-No.
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	19	9053-0042
APT-COM™ 4 PROFESSIONAL-Edition	convenient unit and user management built on the BASIC edition. Suitable for networking up to 100 units. version 4, PROFESSIONAL edition	19	9053-0040
BINDER PURE AQUA SERVICE	System for preparation or complete desalination of tap water, complete set containing PURE AQUA 300 single-use cartridge, measuring device, and all necessary connecting parts	-	8012-0759
BINDER PURE AQUA SERVICE, accessories	Single-use, replacement cartridge for BINDER PURE AQUA System	-	6011-0165
Data Logger Kit	T 220: For continuous temperature logging from -90 °C to 220 °C. The kit includes 1 data logger, Pt 100 sensor with 2 m extension cable and 1 magnetic fixture for mounting to the BINDER unit	19	8012-0715
	TH 100/70: For continuous temperature and humidity logging from -40 °C to 100 °C / 0% to 100% RH and additional logging of ambient conditions. Kit includes 1 data logger, 2 attachable combined humidity/temperature sensors, 2 m extension cable and 1 fixture for mounting to the BINDER unit	19	8012-1838
	TH 100: For continuous temperature and humidity logging from -50 °C to 100 °C; 0% to 100% RH. Kit includes 1 data logger, Pt 100 sensor with 2 m extension cable, and 1 magnetic fixture for mounting to the BINDER unit	19	8012-1837
pH-neutral detergent	concentrated, for gentle remove of residual contaminants; 1 kg	-	1002-0016
Qualification documents	IQ/OQ documents – supporting documents for validation performed by customers, consisting of: IQ/OQ checklists incl. calibration guide and comprehensive unit documentation; parameters: temperature and humidity values Digital in PDF format	-	7057-0002
	Hard copy inside folder	-	7007-0002
	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 and humidity values Digital in PDF format	-	7057-0006
	Hard copy inside folder	-	7007-0006
Rack	stainless steel	-	6004-0150
Rack accessories	fasteners (1 set of 4) for additional security of racks	-	8012-0620
Rack, reinforced	stainless steel, with fasteners (1 set of 4)	-	8012-1091
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	-	6004-0182
Water supply set	consisting of fresh- and waste-water containers (20 liters each), cabling and pump external, free-standing	-	8012-1846

* Notes › See last page

SERVICES

Designation	Description	*	Art.-No.
Installation services			
Unit installation	Unpacking and setting up of unit, connecting to existing connections, and checking function	13, 18	DL10-0300
Unit instructions	Unit function instructions for operation and programming of the controller	18	DL10-0700
Preventive maintenance			
Maintenance	Functional testing of all electrical and mechanical components, short calibration, documentation in the maintenance schedule	14, 18	DL20-0500
Calibration services			
Temperature and humidity calibration	Expansion – including certificate, each additional measuring point in center of chamber at 25 °C / 60% RH or at specified values	14, 16, 17, 18	DL30-0302
	Temperature and humidity calibration with 1 measuring point in center of chamber with 1 specified pair of values, including certificate	14, 16, 17, 18	DL30-0301
Temperature measurement in accordance with DIN 12880, 27 temperature measuring points and 1 humidity measuring point	Temperature measurement in accordance with DIN 12880 with 27 temperature measuring points and 1 humidity measuring point in center of chamber at specified values, including certificate	14, 16, 17, 18	DL30-0427

* Notes › See last page

Designation	Description	*	Art.-No.
Temperature measurement, 18 temperature measuring points and 1 humidity measuring point	Temperature measurement with 18 temperature measuring points and 1 humidity measuring point in center of chamber with 1 specified pair of values, including certificate	14, 16, 17, 18	DL30-0318
Temperature measurement, 27 temperature measuring points and 1 humidity measuring point	Temperature measurement with 27 temperature measuring points and 1 humidity measuring point in center of chamber with 1 specified pair of values, including certificate	14, 16, 17, 18	DL30-0327
Temperature measurement, 9 temperature measuring points and 1 humidity measuring point	Temperature measurement with 9 temperature measuring points and 1 humidity measuring point in center of chamber at specified values, including certificate	14, 16, 17, 18	DL30-0309
Validation services			
Execution of IQ/OQ	Execution of IQ/OQ in accordance with qualification folder	15, 18	DL42-0300
Execution of IQ/OQ/PQ	Execution of IQ/OQ/PQ in accordance with qualification folder	15, 18	DL44-0500
Warranty service			
Warranty extension from 2 to 3 years	The warranty is extended from 2 to 3 years from the delivery date, wear parts are excluded	–	DL01-3041
Warranty extension from 2 to 5 years	The warranty is extended from 2 to 5 years from the delivery date, wear parts are excluded	–	DL01-3042

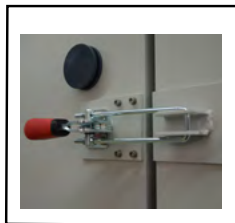
* Notes › See last page

Lithium ion battery cell testing chambers

The BINDER test chambers for aging and performance of lithium-ion energy storage devices offer maximum application convenience and meet Eucar/Hazard level 4*. BINDER supplies test chambers with a standard package for aging tests, as well as a more extensive package for carrying out performance and aging tests.



Pressure relief flap with an additional relieving spring as a safety measure in the event of faults



Door-locking mechanism with strong closing brackets on the side

Access port for introducing external measuring instruments

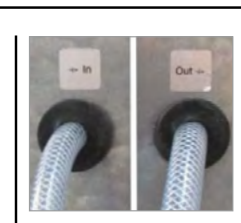


Eucar/
Hazard
Level 4*

Additional safety measures on the MK 240 dynamic climate chamber



Temperature range limited to 120 °C on the controller



Inert gas connections for rinsing (e.g., for nitrogen)

PACKAGE P – FOR PERFORMANCE AND AGING TESTS

Application:

Cells and modules are tested at different temperatures **with and without a current supply** to measure performance.

Solution:

- Class 2 independent temperature safety device when temperature is set to 120 °C
- Temperature range limited to 120 °C on the controller
- Stainless steel pressure relief flap installed in the middle of the top of the unit
- Enhanced door lock mechanism with reinforced brackets
- Inert gas connections



PACKAGE A – FOR AGING TESTS

Application:

Cells and modules are tested at different temperatures always **without a current supply** in order to assess aging during storage.

Solution:

- Class 2 independent temperature safety device when temperature is set to 120 °C.
- Temperature range limited to 120 °C on the controller

FURTHER ADJUSTMENTS AVAILABLE ON REQUEST:

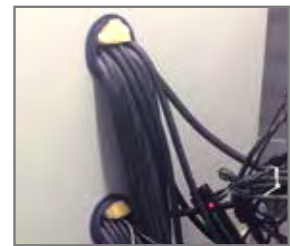
BINDER series units are converted by our BINDER INDIVIDUAL department according to special customer requirements, and equipped with additional functions.



Program sequence display using indicator lamps



Electromechanical door lock mechanism controlled in a program and/or manually



Additional access ports available in almost all sizes and locations

TIPS AND TRICKS



Learn more in our user report:

TÜV SÜD Battery Testing GmbH -
Energy storage device in hardness test

› go2binder.com/en-TUEV-SUED-Battery-Testing

Find out more ›



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