Made in Poland. Established 1990.

POL-EKO APARATURA®

2016/17 POL-EKO-APARATURA products

WWW.POL-EKO.EU

Your partner in laboratory analysis and technological processes

POL-EKO-APARATURA has been present in the Polish market for 26 years.

Highest quality equipment and service we provide ensures your satisfaction. Our wide range of products and professional solutions will suit the most demanding customers.

We remain open to assist in choosing the right product for your needs, as well as to provide you with customized solutions.

We are your partner in lab analysis and technological processes.

Thank you for your confidence.

POL-EKO-APARATURA team.

Climatic chambers

Application

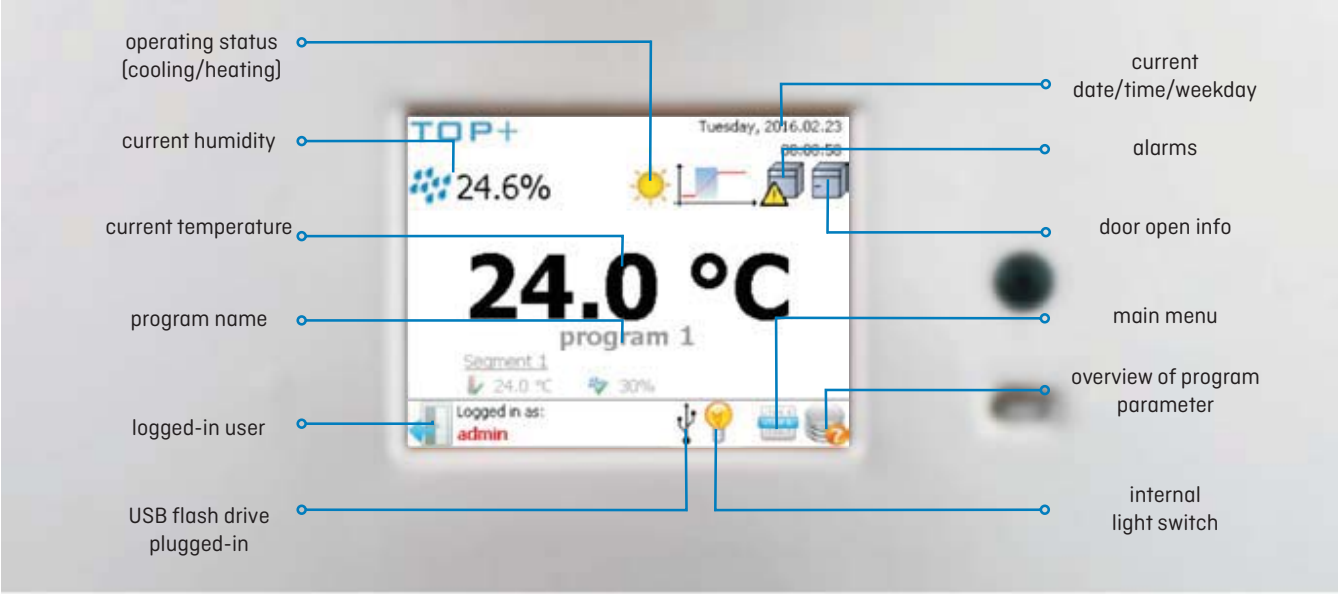
- growth of plants and fungus
- seeds germination
- microorganisms and insects breeding
- photostability tests
- food preservation tests
- any kind of research that requires a stable temperature and humidity environment (optionally light)
- tests of building materials

Climatic chambers with phytotron system can control temperature, humidity and light to create a stable environment.

Calibration

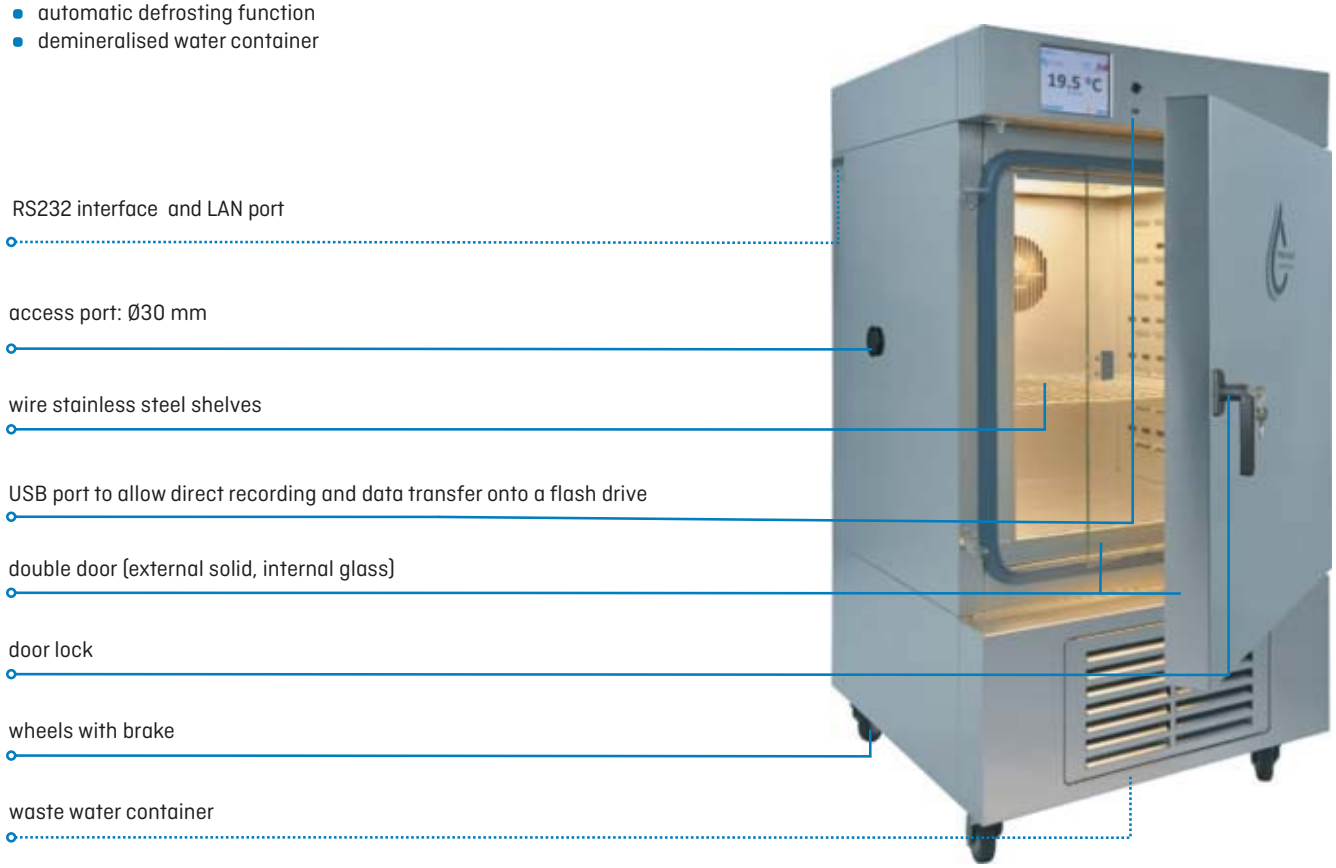
All thermostatic equipment manufactured by POL-EKO-APARATURA can be provided with Calibration Certificate issued by accredited Measurement Laboratory. Detailed information on accreditation of POL-EKO Laboratorium Pomiarowe is available on website: www.polekolab.pl.

Control panel



Standard features

- temperature range: -10°C ...60°C (KK) and -10...+100°C (KKS); +10°C ...+50°C (FIT option with light on)
- Ethernet cable
- TOP+ Control software
- quality control protocol (at +25°C, 60%rH)
- English instruction manual
- available menu languages: English, Estonian, French, German, Hungarian, Italian, Latvian, Polish, Portuguese, Romanian, Russian, Spanish
- temperature protection class 3.3 to DIN 12880
- open door alarm
- automatic defrosting function
- demineralised water container



Climatic chambers are equipped with a PID microprocessor temperature and humidity (optionally light - */FIT option) controller with a large (5,7'') full colour touch screen, intuitive menu and user friendly software.
They can be connected to Ethernet network for remote control from any computer, being one of their greatest advantages. Climatic chambers are available in the TOP+ version exclusively.

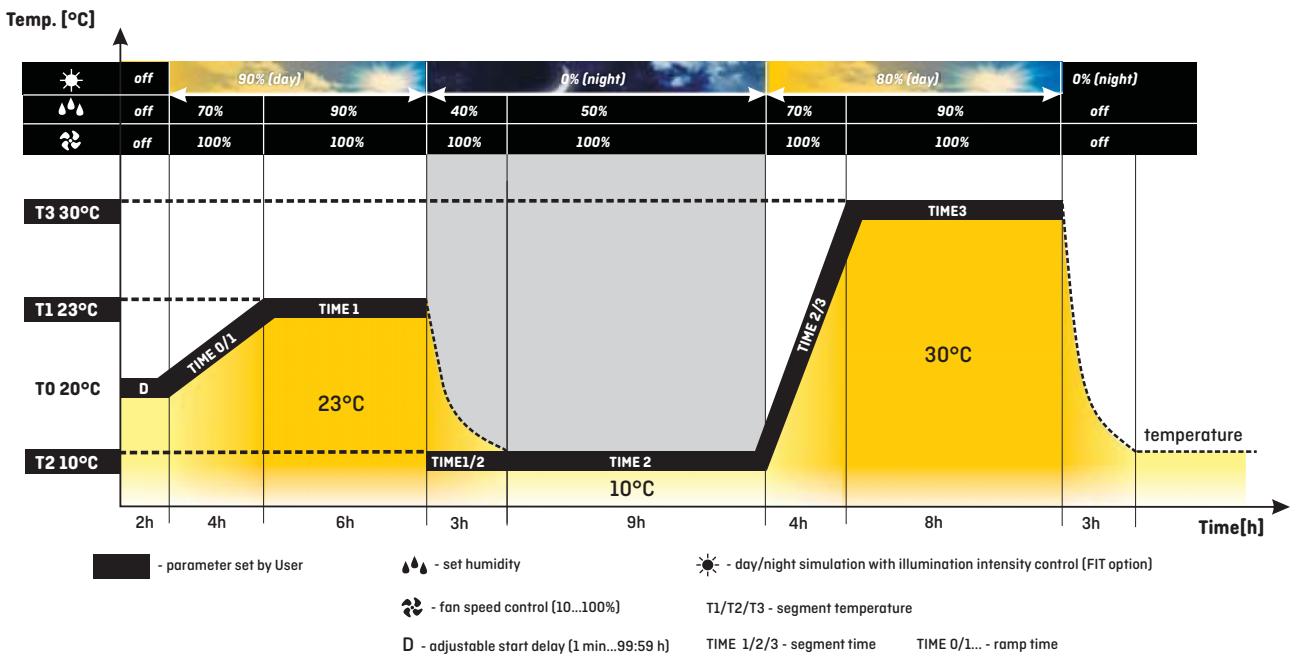
Controller advantages

- multi-segment temperature-time profile (up to 100)
- loop function up to 99 times or endless
- adjustable start delay feature (from 1 min to 99:59 h)
- adjustable ramps
- adjustable hold at set point time for temperature, humidity and lighting (for FIT option) from 1 min to 999:59 h, or continuous operating
- recording of min, average and max temperature and humidity value for each segment
- overview of set and current parameters while operating
- audible and visual temperature and humidity alarm
- access control via login
- Administrator function to manage User accounts
- 7 days programming
- possibility of temperature and humidity calibration by the User
- operating in temperature or time priority mode
- temperature and humidity sensor fail alarm
- power failure control system (program continued after restoring power)
- real time clock
- digital timer
- auto-diagnostic function
- forced air convection with fan speed control from 10 up to 100%
- automatic fan shut-down after completing the program

GLP supporting functions:

- password protected settings
- 20 user programs memory
- internal memory to store up to 4100 data records for each User, possibility to overview the values on the display or a PC computer in tabular or graphic form
- USB port to allow direct data recording or transfer onto a flash drive
- events registry

TOP+ control application included (see page 68).



Climatic chambers with phytotron system (*/FIT option)

- temperature, humidity and light control
- day/night simulation with light intensity control:
  - lamps in the door and side walls KK 350, 500 and 700 FIT DS
  - lamps in the side walls KK 350, KK 500 and 700 FIT S
  - lamps in the door KK 115 and KK 750 FIT D
  - lamps in the over-shelf panels KK 115, 240, 400, 500, 700, 750, 1200, 1450 FIT/P (and FIT PANEL)
- temperature range with light OFF: -10°C up to 60°C
- temperature range with light ON: +10°C up to +50°C
- light colour selection
- max light intensity 15000 LUX per panel (measured 25cm under the light source)

FIT D - Climatic chambers with lamps installed in the door

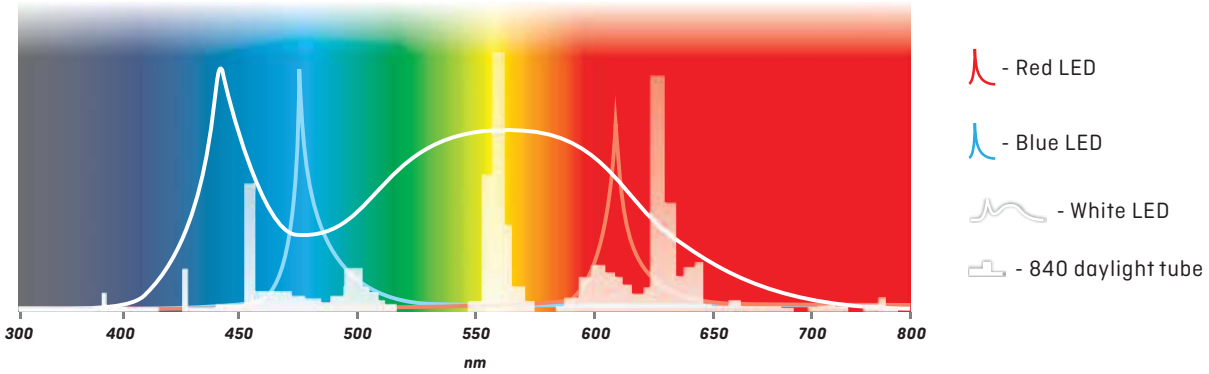
FIT S -Climatic chambers with lamps installed in the side walls

FIT DS -Climatic chambers with lamps installed in the door and side walls

Climatic chambers equipped with phytotron system can control temperature and humidity, as well as light intensity to simulate day and night conditions. Standard light colour is 840 type and the tubes can be installed in the door, side walls or over-shelf panels.

There are also special LED panels designed for plant growing. As most plants use only a part of the sunlight emission, narrow spectrum and specific colours have been used. A and B chlorophyll absorbance maxima are blue and red colour. Chlorophyll absorbs most energy and strongly influences photosynthesis at blue colour spectrum which intensifies growth. Red and far red colours (619-720nm wave length) stimulate blooming and proliferation.

	KK 115	KK 240	KK 350	KK 400	KK 500	KK 700	KK 750	KK 1200	KK 1450
FIT P	+	+		+	+	+	+	+	+
FIT D	+						+		
FIT S					+	+			
FIT DS			+		+	+			



FIT P -version

FIT P LED -version

LED White -version

Available light tubes:
- standard type 840 for daylight simulation
- UV tubes for air sterilization and food aging tests

840 daylight type intensity:
- 280 µmol/m^{2}s (25cm below light source)

Available LED modules:
- deep red – max for wave length 660 nm
- blue – max for wave length 470 nm
- far red – max for wave length 740 nm
- white – max for wave length 440 nm

LED light intensity:
for configuration of multiple: 2 modules of far red and 1 blue
- 50 cm below light source – 165 [umol/m^{2}s]
- 25 cm below light source – 230 [umol/m^{2}s]

for configuration of multiple: 3 modules of white LED
- 50 cm below light source – 135 [umol/m^{2}s]
- 25 cm below light source – 190 [umol/m^{2}s]

FIT P version

Climatic chambers with over-shelf panels with light. Depending on the model, there can be between 1 and 3 panels inside the chamber (standard light colour: 840 daylight). The FIT P version includes 1 over-shelf panel and sockets to allow installation of extra panels if required (to be ordered separately). The **FIT/R3** option allows to control the light intensity separately for each panel.

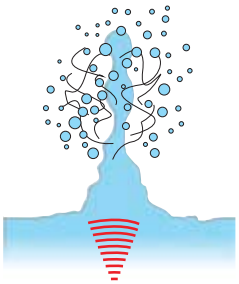
		KK 115	KK 240	KK 400	KK 500	KK 700	KK 750	KK 1200	KK 1450
standard		1	1	1	1	1	1	1	1
max*		1	2	2	3	3	3	3	3
max light intensity on shelf	FIT version	5000	10000	15000	15000	15000	15000	15000	15000

*max number of over-shelf, panels with illumination inside the chamber

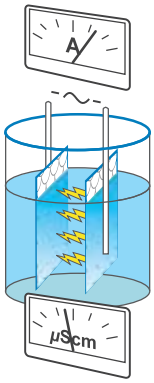
FIT P LED version

The user can choose the light colour and intensity for each program segment. The colour modules can be combined, e.g. far red with blue. Dimming allows to set the required level of intensity. This flexibility provides specific light selection for each plant. The LED modules are long-life – after 25000 operating hours they still feature 90% of the nominal efficiency. The unique optics ensures uniform light distribution for each plant. The LED technology also emits very little heat which helps maintain precise temperature inside the chamber.

Climatic chambers with ultrasonic humidifier are professional and reliable equipment to guarantee stable and precise conditions. The max temperature of 60°C allows to use them for seed germination, fungus and plant growing or food tests. Perfect climatic conditions allow stability tests of pharmaceuticals and cosmetics, as well as packaging and electronics.



The ultrasonic humidifier uses piezo-electric generators which convert electrical energy into mechanical vibrations energy. The generators are immersed in deionized water and smash it into very small drops which are consequently sprayed uniformly inside the chamber.

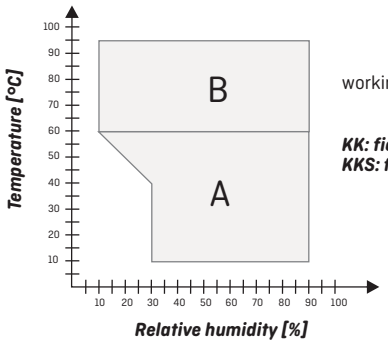


The KKS climatic chambers with steam humidifier do not emit ultrasounds and therefore allow insects breeding (e.g. Drosophila melanogaster). Compared to the KK chambers, they feature an extended temperature and humidity range and can be used for tests of electronics, plastic or building materials.

The steam humidifier consists of a two-electrode boiler immersed in tap water. The voltage applied to electrodes generates a flow of electric charge between them in the water. According to Joule's first law, the electrical energy dissipates which rises the temperature. As soon as water starts boiling, a stream of steam is generated which next comes into the chamber.

The KK and KKS climatic chambers can be used for pharmaceutical stability tests according to ***ICH Q1A***

Parameter		**Climatic chamber KK with ultrasonic humidifier**	**Climatic chamber KKS with steam humidifier**
Temperature range	-	-10 °C... +60 °C	-10 °C... +100 °C
	FIT	-10 °C... +60 °C (+10 °C...+50 °C with light on)	
Relative humidity range		field "A"	field "A+B"
Water supply (conductivity)		deionized (≤1 µS/cm)	tap water (125-1250 µS/cm)
Water source		• deionized water container • deioniser • internal deionized water network	• water supply system • tap water container



working temperature and humidity range

KK: field A
KKS: field A+B

Climatic chambers with ultrasonic humidifier

Parameter		KK 115	KK 240	KK 350	KK 400	KK 500	KK 700	KK 750	KK 1200	KK 1450
air convection		forced								
chamber capacity [l]		112	245	335	424	493	625	749	1365	1467
working capacity [l]		112	245	335	424	386	450	749	1229	1307
door type		double (external solid, internal glass) / external glass (option)								
temperature range [°C]	-	-10...+60								
	FIT version	-10...+60°C (with light on +10...+50°C)								
temperature resolution [°C]		every 0,1								
relative humidity range [%]		30...90 (see working temperature and humidity chart for details on page 64)								
humidity resolution [%]		every 1								
controller		microprocessor with external LCD graphic display								
interior		acid-proof stainless steel to DIN 1.4301								
housing	-	powder coated sheet								
	INOX/G	stainless steel linen finish								
overall dims[1] [mm]	A width	650	810	640	1020	630	730	1250	1460	1440
	B height	1160	1600	2000	1840	1990	2000	2000	1990	1970
	C depth	960	1000	980	1000	1040	1070	1100	1070	1170
internal dims [mm]	D width	460	600	500	800	510	600	1040	1310	1340
	D' width	-	-	-	-	510	600	-	1310	1340
	E height	540	800	1340	1040	1510	1510	1200	1510	1460
	F depth	450	510	500	510	640	690	600	690	750
	I height	-	-	1270	-	1380	1360	-	1360	1300
max shelf workload[2] [kg]	-	10	10	10	10	20	30	-	30	30
	PW[3] version	50	100	100	100	100	100	100	100	100
max unit workload [kg]		60	90	100	120	100	150	140	300	300
nominal power [W]	-	1000	1500	1400	2000	1600	1600	2500	2200	2200
	FIT version	1200	1800	2600	2300	2000	2000	2900	3000	3000
weight [kg]		90	140	125	185	130	170	275	220	230
over temperature protection		class 3.3 to DIN 12880								
power supply*		230 V 50 Hz								
shelves fitted/max		2/7	3/10	3/11	3/14	3/11	3/11	5/16	2 x 3/11	2 x 3/11
warranty		24 months								
manufacturer		POL-EKO-APARATURA								

all the above technical data refer to standard units (without optional accessories)

* - 230V 60Hz, 115V 60Hz also available
1 - external dimensions for units without FIT option, depth doesn't include 50 mm of power cable
2 - on uniformly loaded surface
3 - reinforced shelf

All data on temperature stability and uniformity available on www.pol-eko.eu.

Options and accessories (icon description see pages 80-81)

Climatic chambers with steam humidifier

Parameter		KKS 115	KKS 240	KKS 400	KKS 750
					
air convection		forced			
chamber capacity [l]		112	245	424	749
working capacity [l]		112	245	424	749
door type		double (external solid, internal glass) / external glass (option)			
temperature range [°C]	-	-10...+100			
	FIT version	-10...+60°C (with light on +10...+50°C)			
temperature resolution [°C]		every 0,1			
relative humidity range [%]		10...90 (see working temperature and humidity chart for details on page 64)			
humidity resolution [%]		every 1			
controller		microprocessor with external LCD graphic display			
interior		acid-proof stainless steel to DIN 1.4301			
housing	-	powder coated sheet			
	INOX/G	stainless steel linen finish			
overall dims[1] [mm]	A width	650	810	1020	1250
	B height	1160	1600	1840	2000
	C depth	960	1000	1000	1100
internal dims [mm]	D width	460	600	800	1040
	E height	540	800	1040	1200
	F depth	450	510	510	600
max shelf workload[2] [kg]	-	10	10	10	-
	PW[3] version	50	100	100	100
max unit workload [kg]		60	90	120	140
nominal power [W]	-	2000	2200	3475	4165
	FIT version	2050	2520	3625	4325
weight [kg]		103	140	185	275
over temperature protection		class 3.3 to DIN 12880			
power supply*		230V 50Hz			
shelves fitted/max		2/7	3/10	3/14	5/16
warranty		24 months			
manufacturer		POL-EKO-APARATURA			

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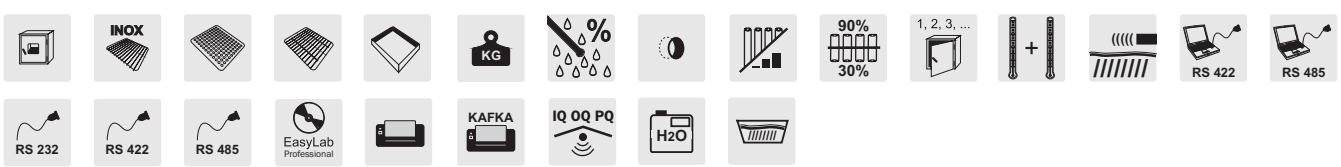
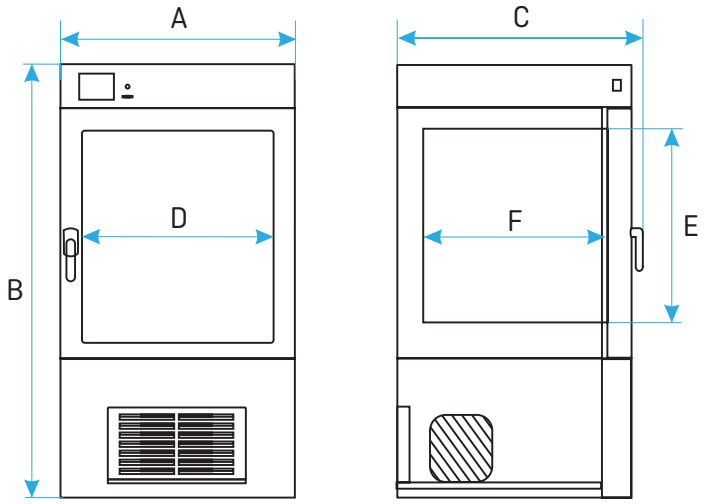
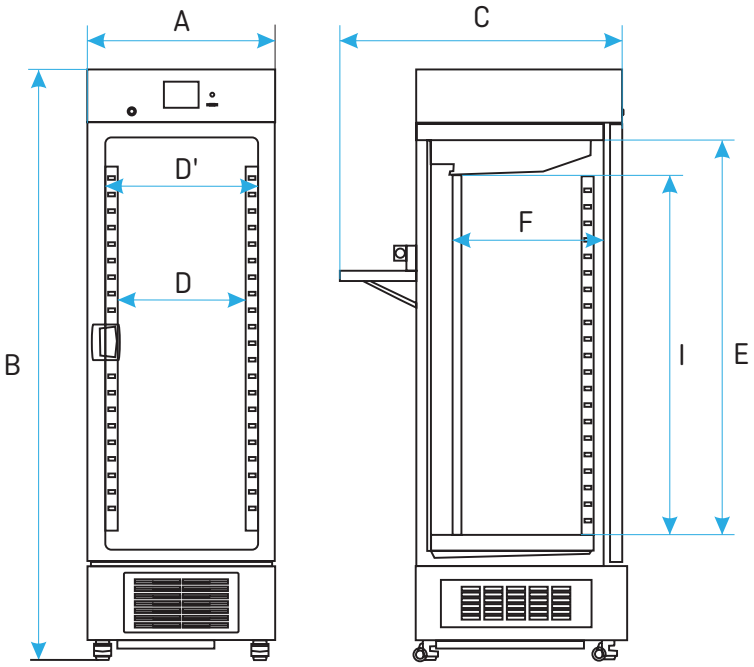


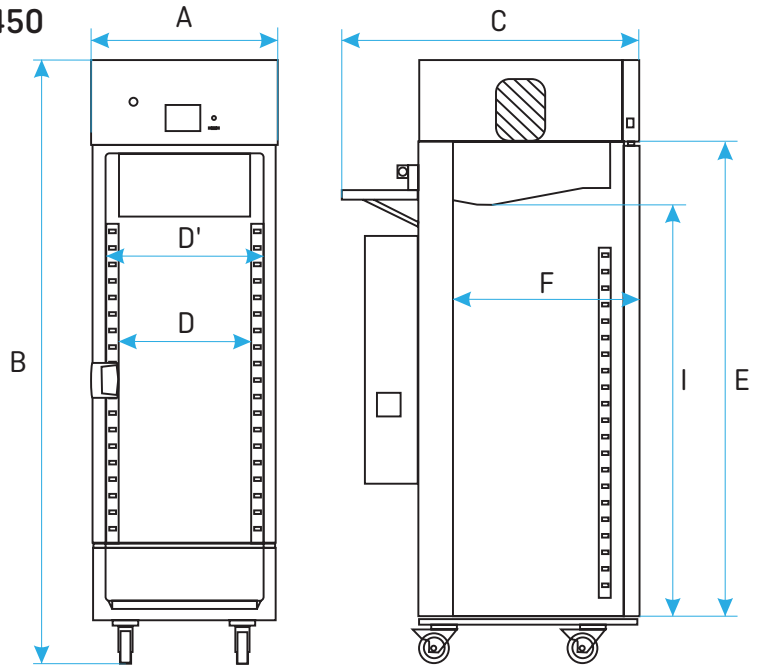
KK/KKS 115/240/400/750



KK 350



KK 500/700/1200/1450



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2016 17

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Catalogue "Products of POL-EKO-APARATURA" version 11.1/2016.