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)
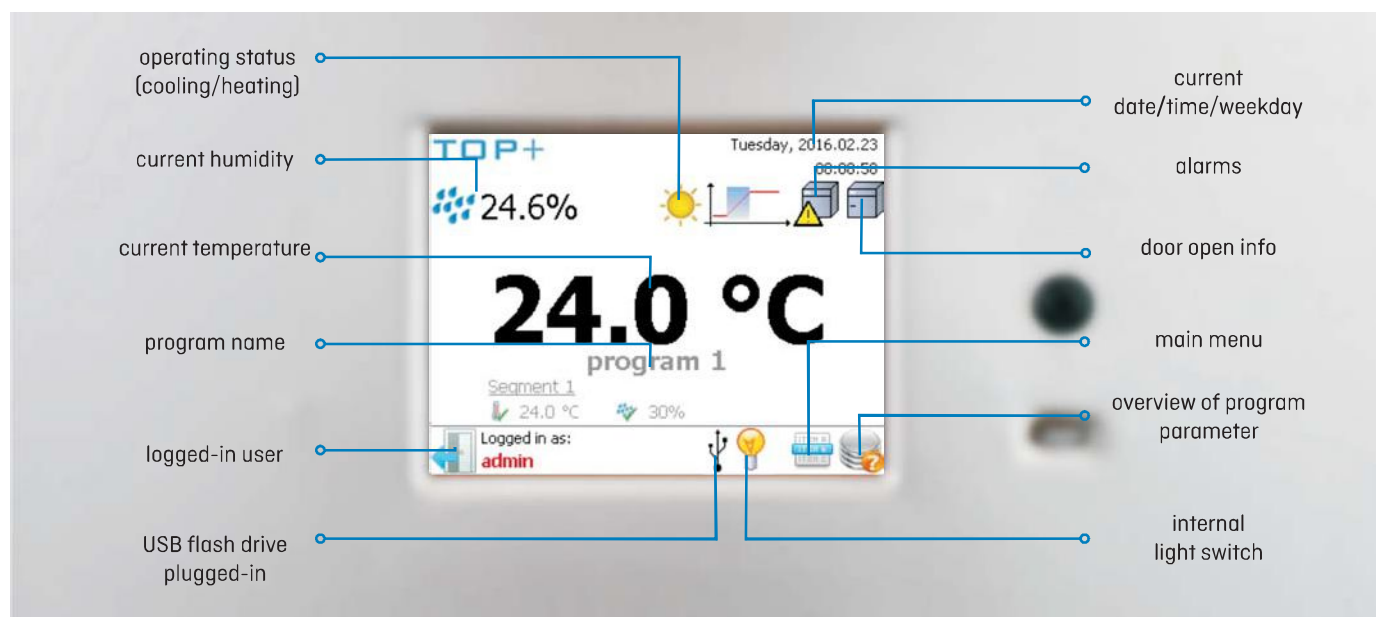- tests of building materials

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 is available on website: www.pol-eko.eu.

◤ Control panel

operating status (cooling/heating)

current humidity

current temperature

program name

logged-in user

USB flash drive plugged-in

current date/time/weekday

alarms

door open info

main menu

overview of program parameter

internal light switch

TOP+

Tuesday, 2016.02.23

🌢 24.6%

24.0 °C

program 1

Segment 1
24.0 °C   30%

Logged in as:
admin

◤ 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: Czech, 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
- deionized water container (for KK)

RS 232 port for data transfer

LAN port for remote control

access port: Ø30 mm

wire stainless steel shelves

USB port to allow direct recording and data transfer to a USB mass storage device

double door (external solid, internal glass)

door lock

wheels with brake

waste water container (for KK)

19.5 °C

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.
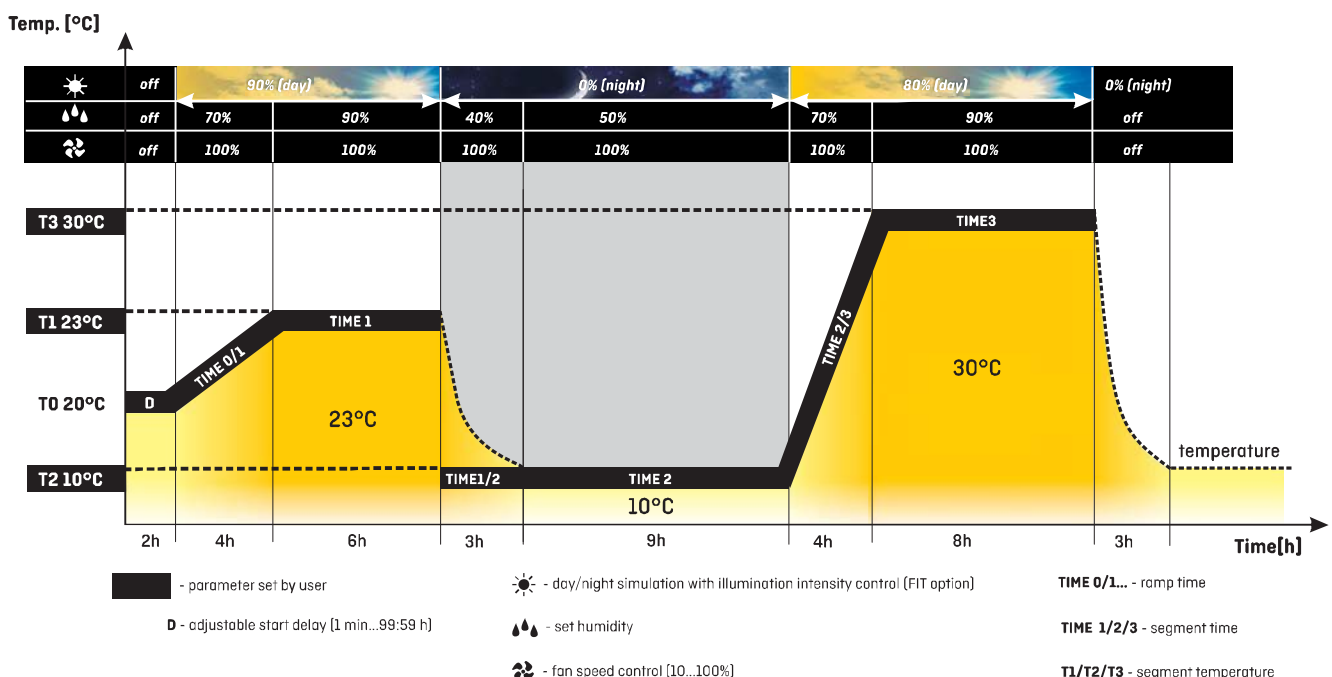
◣ Controller advantages

- 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 once power is restored)
- 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 a tabular or graphic form
- USB port to allow direct data recording or transfer to a USB mass storage device
- events registry

TOP+ Control software included (see page 66).

		- parameter set by user	☀ - day/night simulation with illumination intensity control (FIT option)	TIME 0/1... - ramp time
D - adjustable start delay (1 min...99:59 h)			♦♦ - set humidity	TIME 1/2/3 - segment time
			♻ - fan speed control (10...100%)	T1/T2/T3 - segment temperature

◣ Climatic chambers with phytotron system (*/FIT option) except KKS models

- temperature, humidity and light control
- day/night simulation with light intensity control:
    - lamps in door and side walls
    - lamps in side walls
    - lamps in door
    - lamps in over-shelf panels
- 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 door

FIT S - Climatic chambers with lamps installed in side walls

FIT DS - Climatic chambers with lamps installed in 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. Hyper and far red colours 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			+		+	+			

- far red LED
- hyper red LED
- deep blue LED
- white LED
- 840 daylight tube

wavelength [nm]
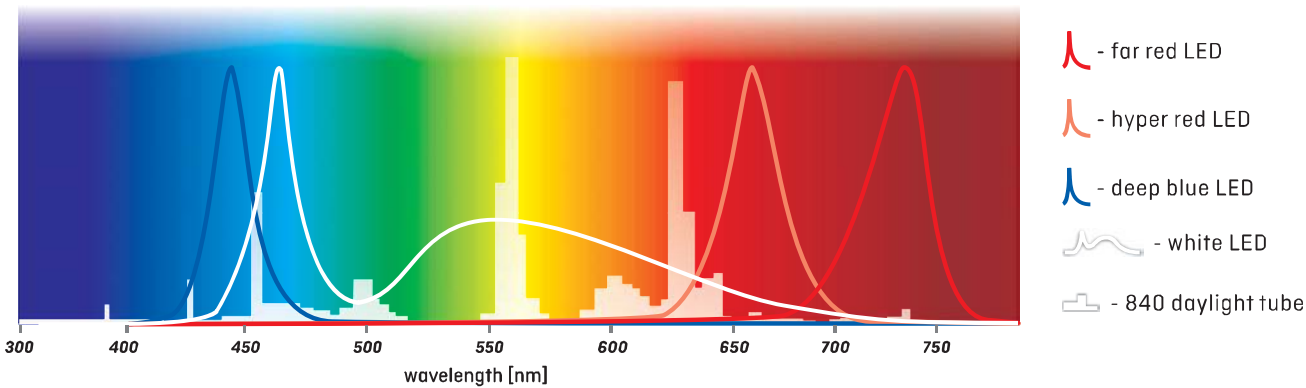
FIT P - version

FIT P LED - version

FIT P LED White - version

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

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

Available LED modules:
- hyper red – max for wavelength 660 nm
- deep blue – max for wavelength 450 nm
- far red – max for wavelength 730 nm
- white – max for wavelength 440 nm

LED light intensity:
The dimmable over-shelf panels can be provided with one or two independently controlled colours of light. Other configurations on request.

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 P 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 an ultrasonic humidifier are professional and reliable equipment to guarantee stable and precise conditions. They can be used for seed germination, fungus and plant growing or food tests. Perfect climatic conditions allow you to perform stability tests of pharmaceuticals and cosmetics, as well as packaging and electronics.
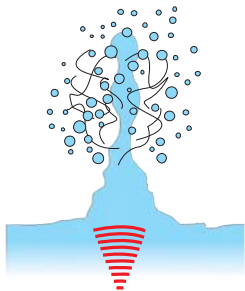
The ultrasonic humidifier uses piezo-electric generators which convert electrical energy into mechanical vibrations energy. The generators are immersed in deionized water and smash it into very small drops which are consequently sprayed uniformly inside the chamber.
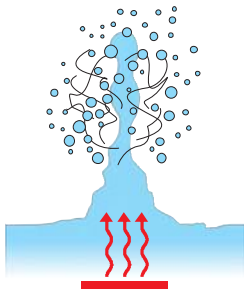
The KKS climatic chambers with a steam humidifier do not emit ultrasounds and therefore allow insects breeding (e.g. Drosophila melanogaster). Compared to the KK chambers, they feature an extended temperature and humidity range and can be used for tests of electronics, plastic or building materials.

The steam humidifier (steam generator) is a closed boiler that produces steam with higher pressure than atmospheric. The heat required to produce steam is obtained by a heater placed in a boiler. Much higher temperature and humidity range is used in more applications in comparison to KK units.

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 (included) • deionizer • internal deionized water network	• water supply system
outflow		• container (included) • drain system	• drain system
power supply		230 V 50 Hz	400 V 50 Hz

working temperature and humidity range for KK and KKS (the ability to control temperature and humidity)

KK: field A
KKS: field A+B
short-term work area (max. 24h)
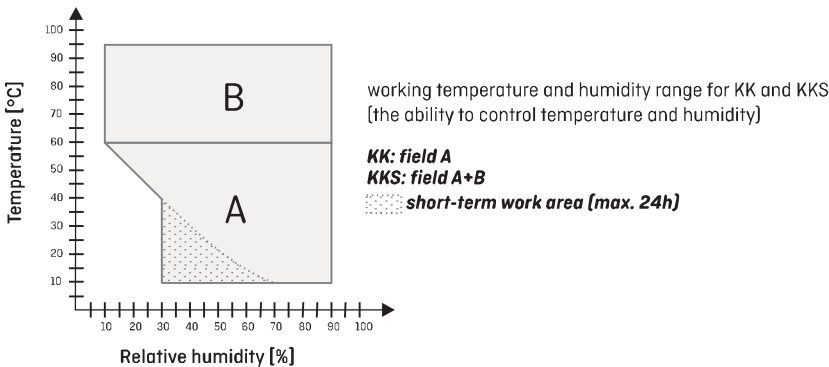
Climatic chambers with ultrasonic humidifier

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]		109	240	322	416	470	600	749	1330	1485
working capacity [l]		109	240	283	416	392	485	749	1132	1264
door type		double (external solid, internal glass) / external glass (option)								
temperature range [°C]	-	-10...+60								
	FIT version	-10...+60 (with light on +10...+50)								
temperature resolution [°C]		every 0,1								
relative humidity range [%]		30...90 (see working temperature and humidity chart for details on page 62)								
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	650	740	1250	1470	1450
	B height	1260	1600	2000	1850	1990	1990	2010	1990	1970
	C depth	960	1020	980	1040	1040	1070	1140	1070	1170
internal dims [mm]	D width	460	600	480	800	480	540	1040	1270	1270
	D' width	-	-	-	-	510	600	-	1340	1340
	E height	540	800	1340	1040	1510	1510	1200	1510	1460
	F depth	440	500	500	500	600	660	600	660	760
	I height	-	-	1180	-	1360	1360	-	1360	1310
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]		1350	1550	1850	2250	1850	1850	2850	3450	3450
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)

* also available: 230V 60Hz, 115V 60Hz, 3P 230V 60Hz (according to model); 400V 50Hz for KK 1200/1450 with phytotron system
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

▶ Options and accessories (icon description see pages 78-79)

Climatic chambers with steam humidifier

Parameter		KKS 115	KKS 240	KKS 400	KKS 750
air convection		forced			
chamber capacity [l]		109	240	416	749
working capacity [l]		109	240	416	749
door type		double (external solid, internal glass) / external glass (option)			
temperature range [°C]		-10...+100			
temperature resolution [°C]		every 0,1			
relative humidity range [%]		10...90 (see working temperature and humidity chart for details on page 62)			
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 [mm]	A width	650	810	1020	1250
	B height	1440	1600	1850	2000
	C' depth	830	890	890	1030
internal dims [mm]	D width	460	600	800	1040
	E height	540	800	1040	1200
	F depth	440	500	500	600
max shelf workload[1] [kg]	-	10	10	10	-
	PW[2] version	50	100	100	100
max unit workload [kg]		60	90	120	140
nominal power [W]		2850	3050	3700	4350
weight [kg]		103	140	185	275
over temperature protection		class 3.3 to DIN 12880			
power supply*		400 3/N			
shelves fitted/max		2/7	3/10	3/14	5/16
warranty		24 months			
manufacturer		POL-EKO-APARATURA			

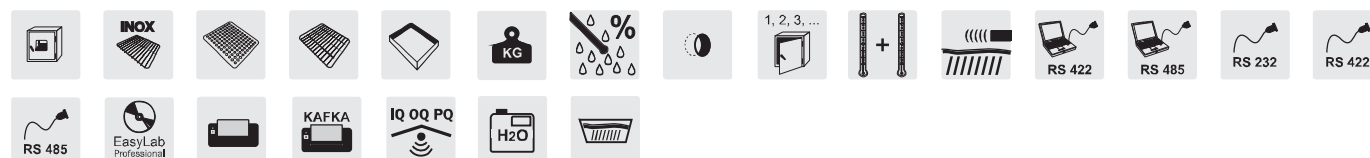all the above technical data refer to standard units (without optional accessories)

* 400V 60 Hz also available
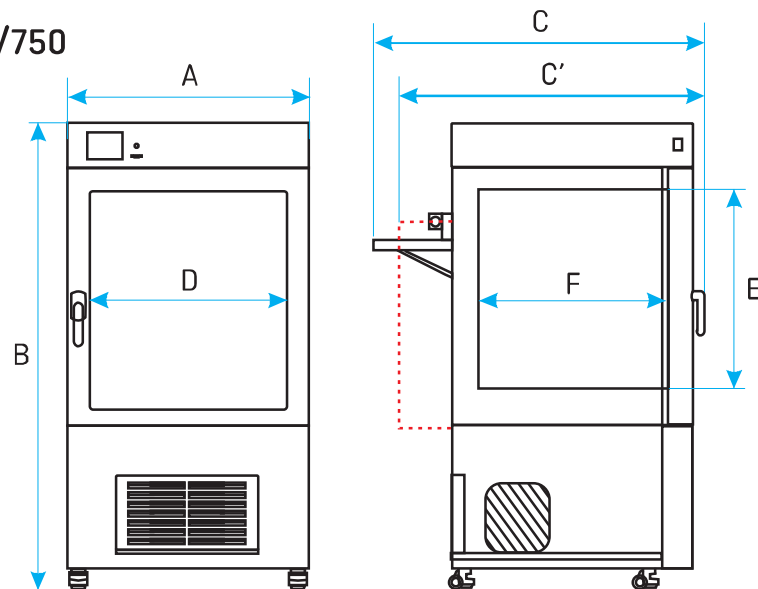1 - on uniformly loaded surface
2 - reinforced shelf

Reverse osmosis system included.

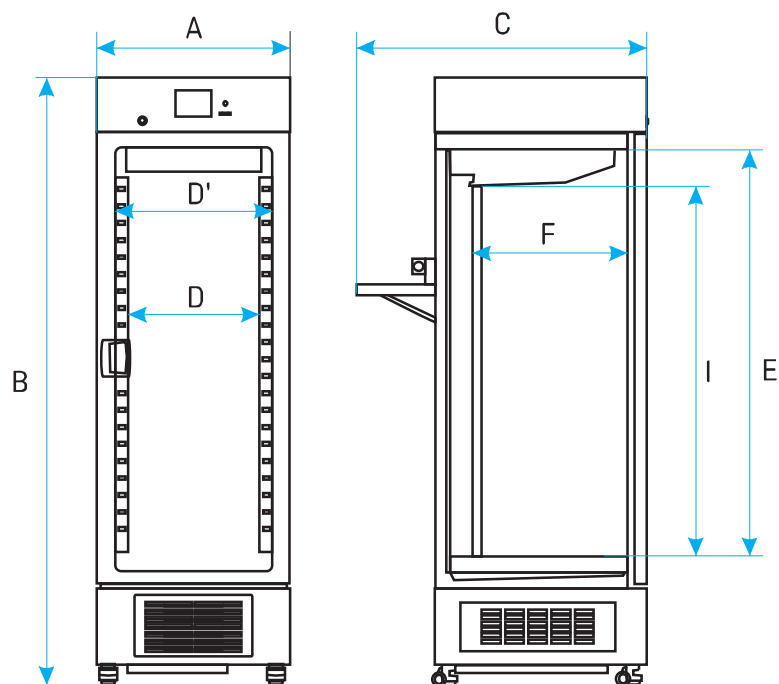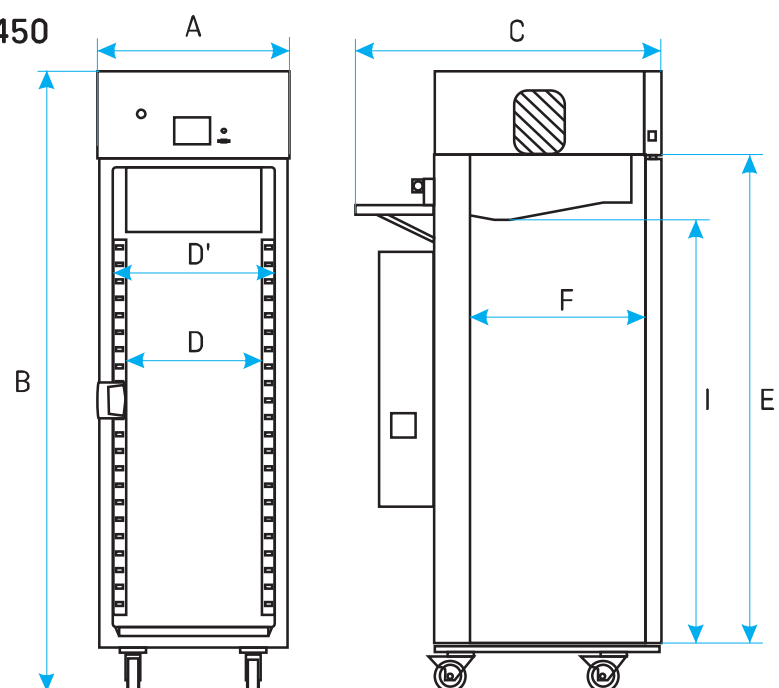◥ **Options and accessories** (icon description see pages 78-79)

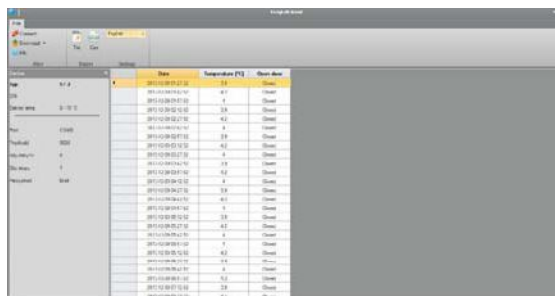**KK/KKS 115/240/400/750**

KK 350

KK 500/700/1200/1450

Software

◣ EasyLab Basic

Using EasyLab Basic software the User can easily download data saved in the unit's internal memory to the PC. Basic version of EasyLab is available free of charge (download from the website www.pol-eko.com.pl). In order to keep constant data registration to the PC, create charts or statistical reports, EasyLab Professional version must be purchased.

Downloaded data

◣ TOP+ Control software

To facilitate the configuration of complex programs, a TOP+ Control software has been introduced. Moreover, the User is able to program and control the "TOP+" equipment with ease from any corner of the world by accessing the unit via Internet!
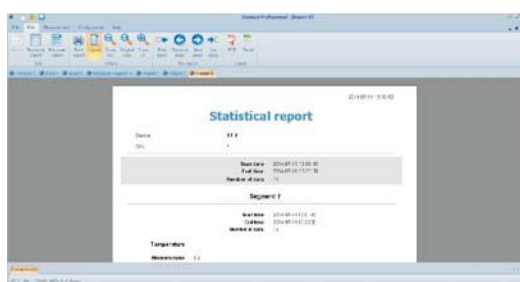

Device status

◣ EasyLab Professional

EasyLab Professional software features temperature and humidity monitoring in all thermostatic equipment manufactured by POL-EKO-APARATURA.

The User may record constant or temporary values, accumulate them and convert into charts. RS 232 or USB port allows the recording process (it is necessary to purchase a connection cable along with the software). If the unit is equipped with an additional Pt 100 temperature sensor, the EasyLab Professional software enables simultaneous recording. Additionally EasyLab Professional software enables programming of devices in TOP+ version, thanks to integrated TOP+ Control application. Available languages: Czech, English, Estonian, French, German, Hungarian, Latvian, Polish, Portuguese, Romanian, Russian, Spanish.

EasyLab Professional features high quality tools for chart making and approximation.
Standard features of EasyLab Professional software:
- report creator
- import data from USB mass storage device
- tabular and graphic form to present data

Statistical report