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► Performance diagrams – Climate control



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Performance diagrams

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Enclosure heaters

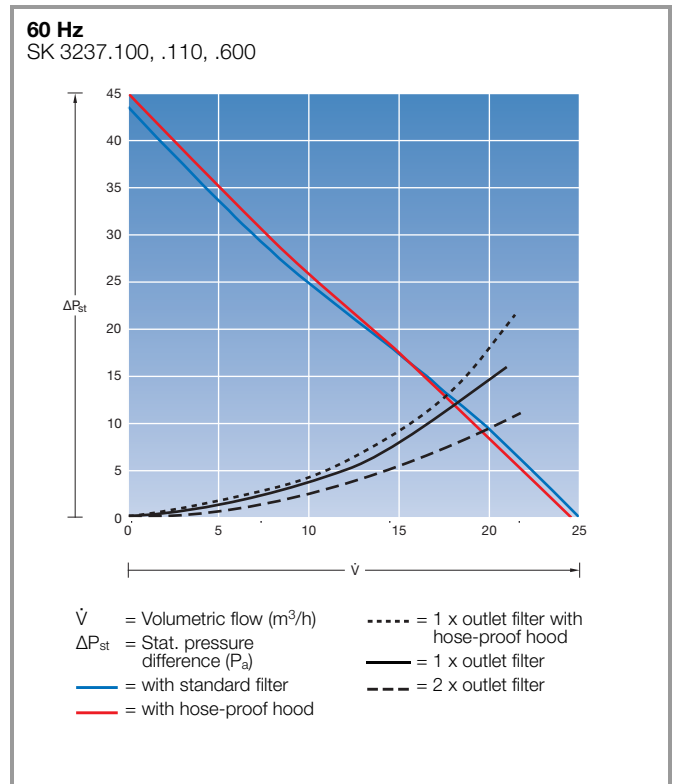
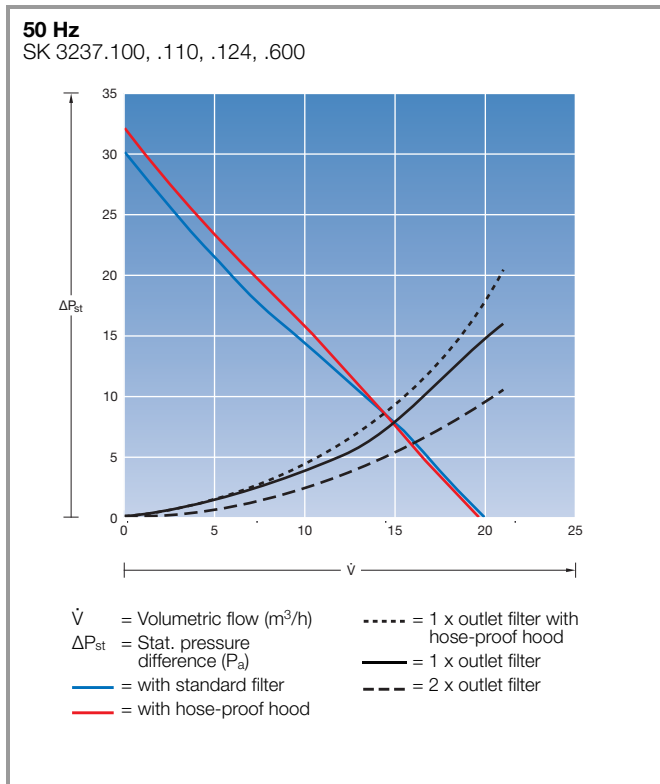
| | |
|--------------------------------------|----|
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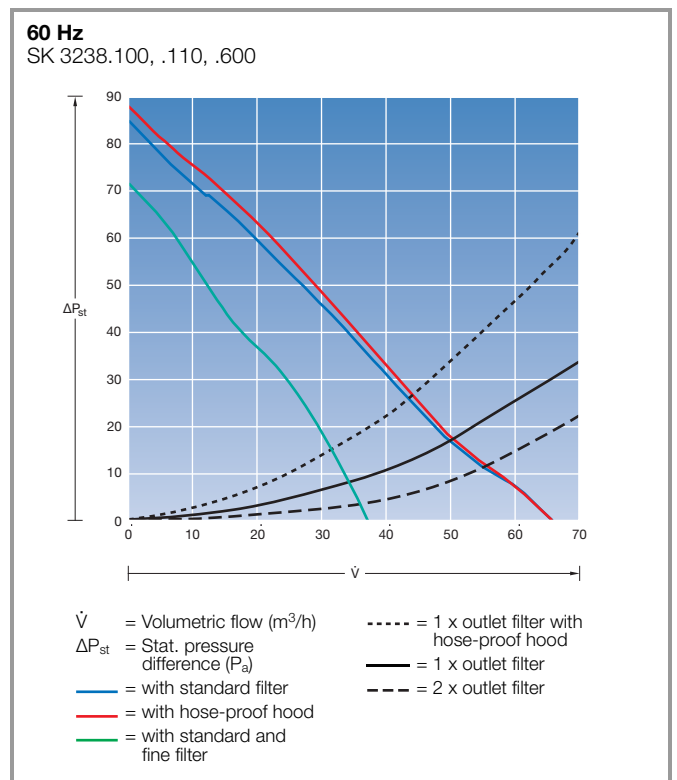
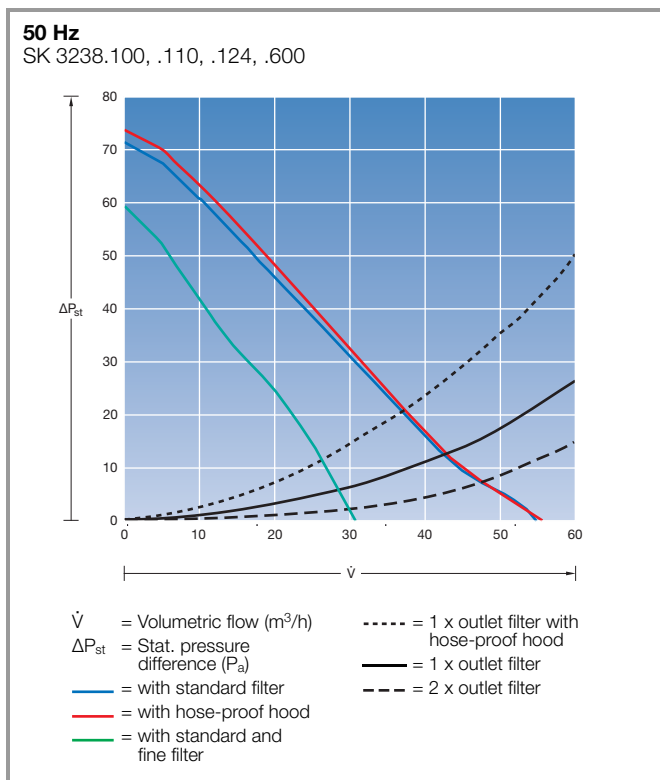
Cooling with ambient air

TopTherm fan-and-filter units and EMC TopTherm fan-and-filter units

Air throughput 20/25 m³/h

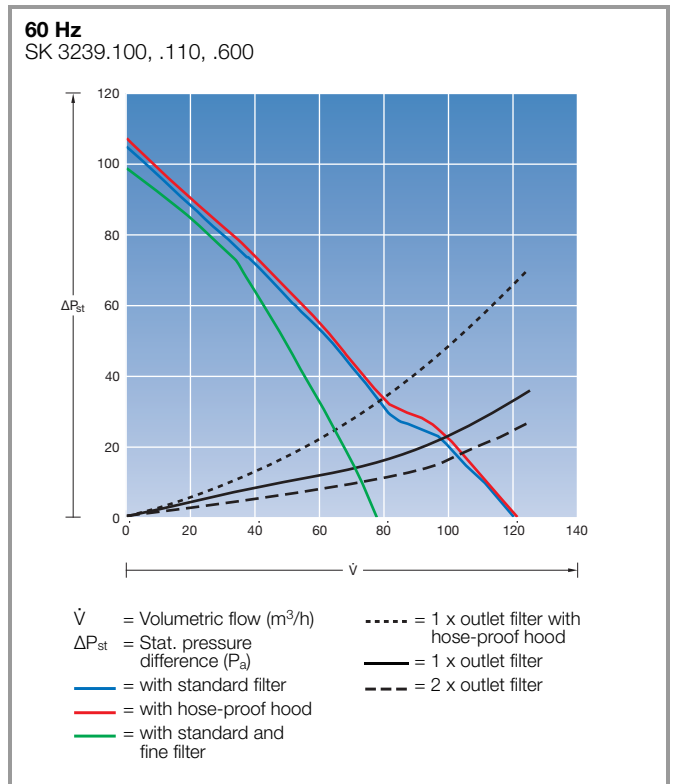
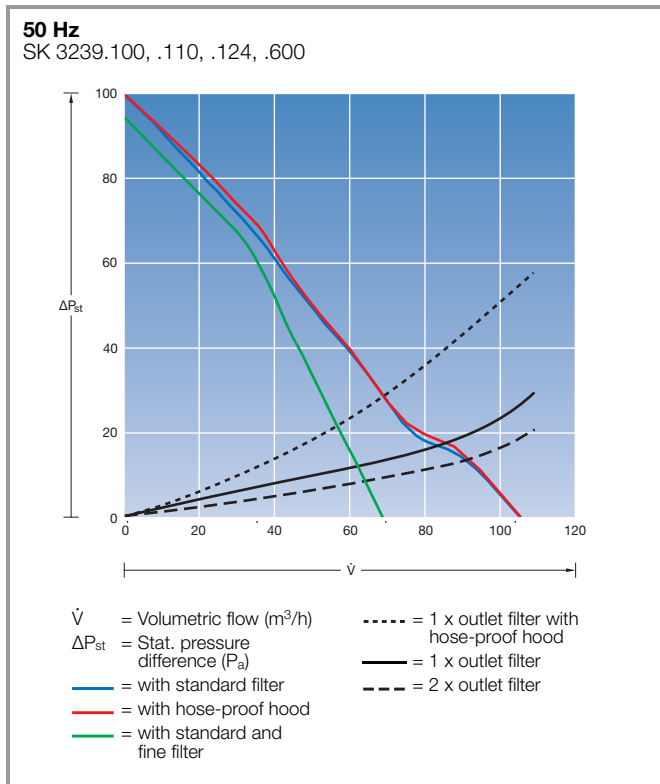


Air throughput 55/66 m³/h

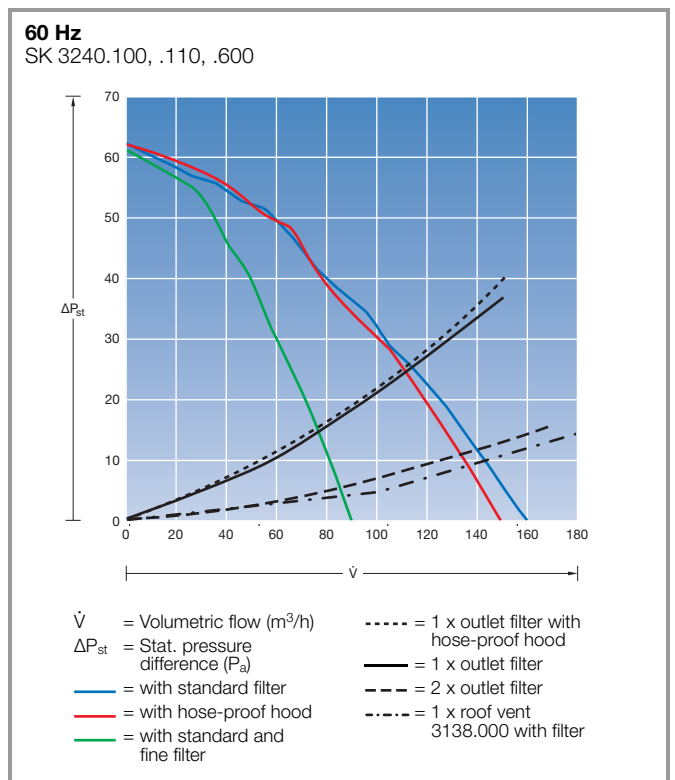
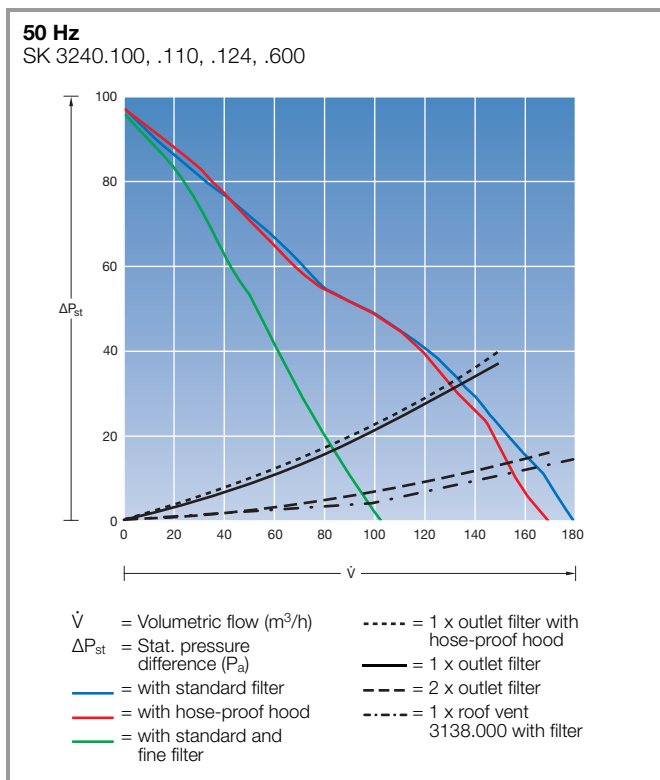


TopTherm fan-and-filter units and EMC TopTherm fan-and-filter units

Air throughput 105/120 m³/h



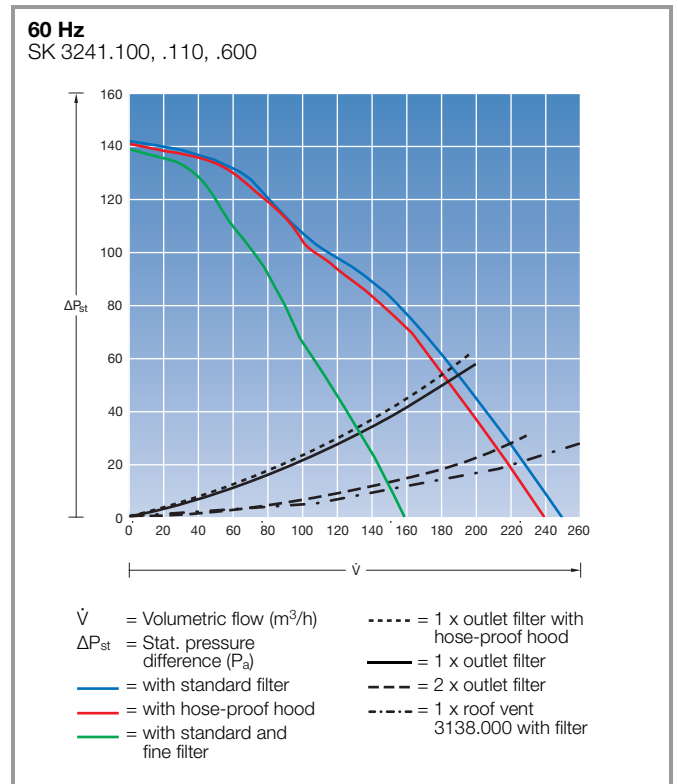
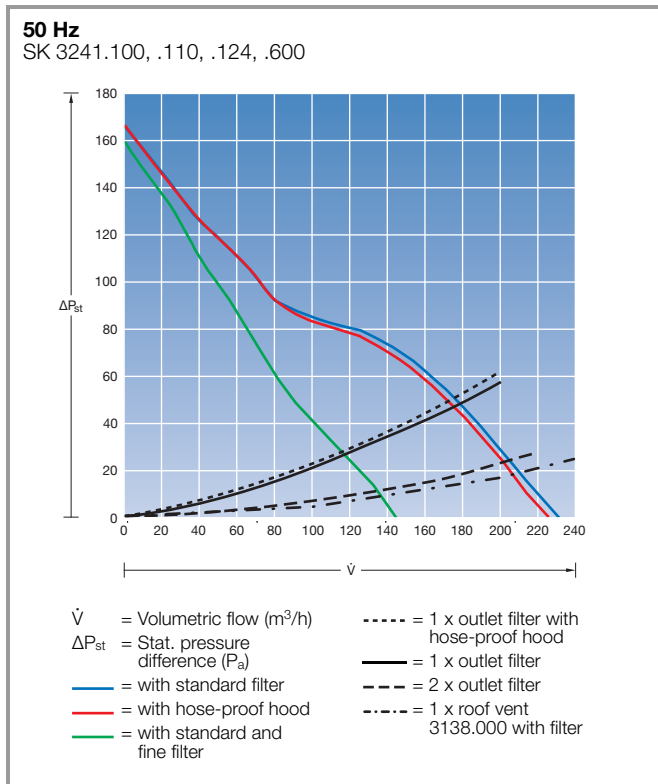
Air throughput 180/160 m³/h



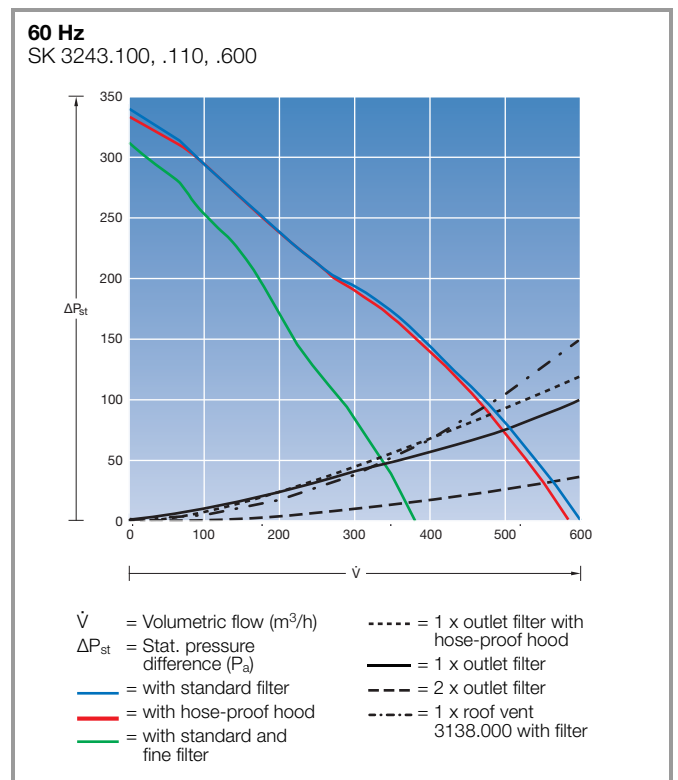
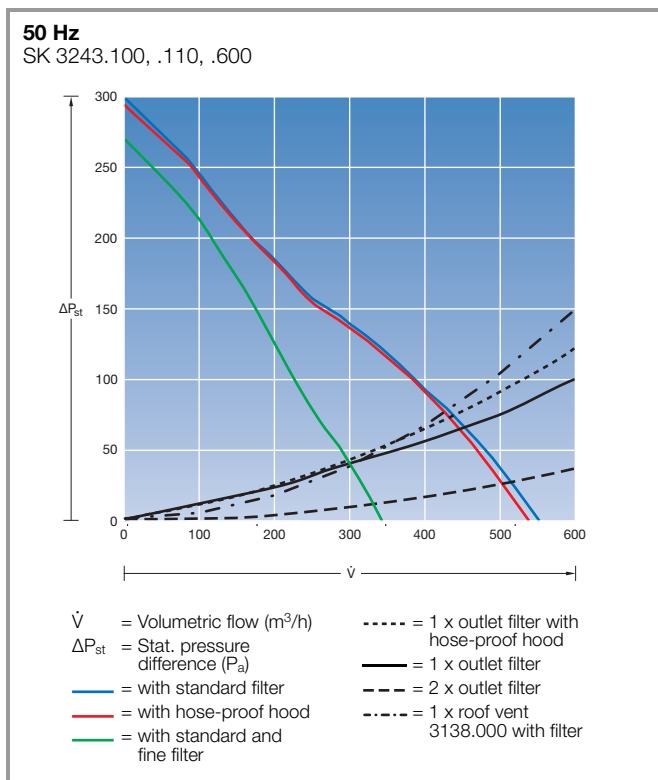
Cooling with ambient air

TopTherm fan-and-filter units and EMC TopTherm fan-and-filter units

Air throughput 230/250 m³/h

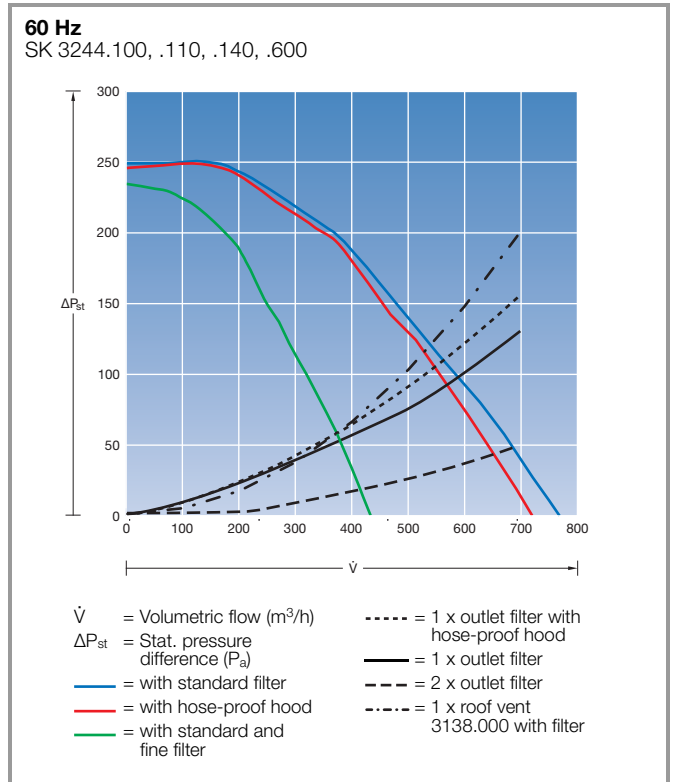
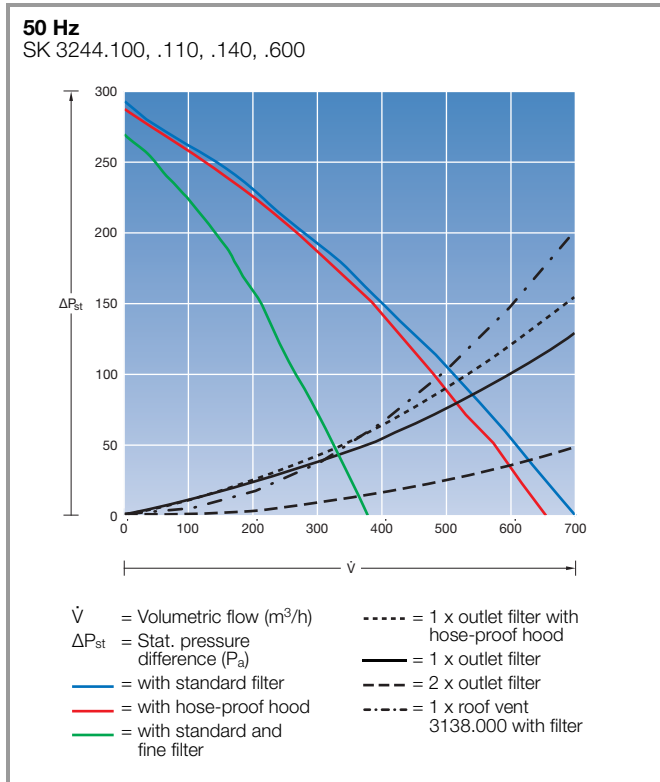


Air throughput 550/600 m³/h



TopTherm fan-and-filter units and EMC TopTherm fan-and-filter units

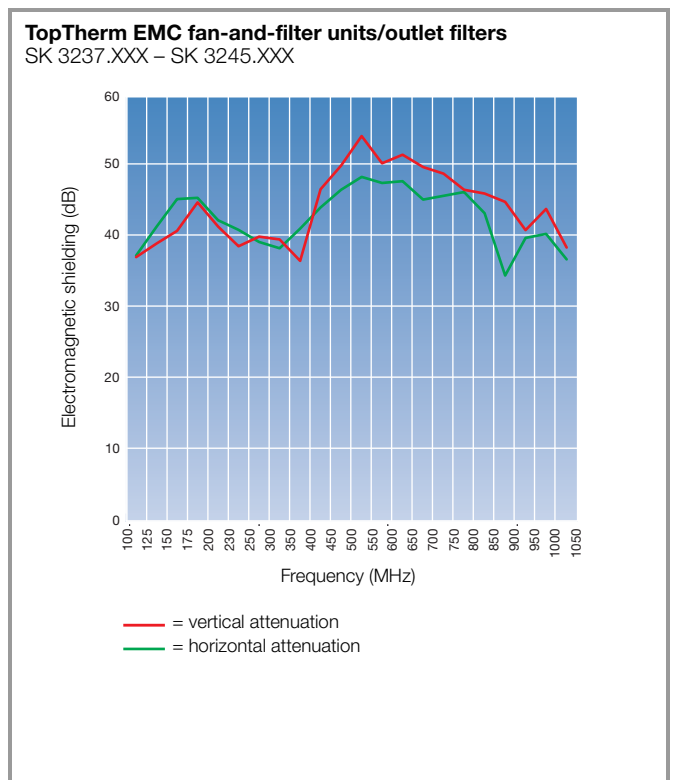
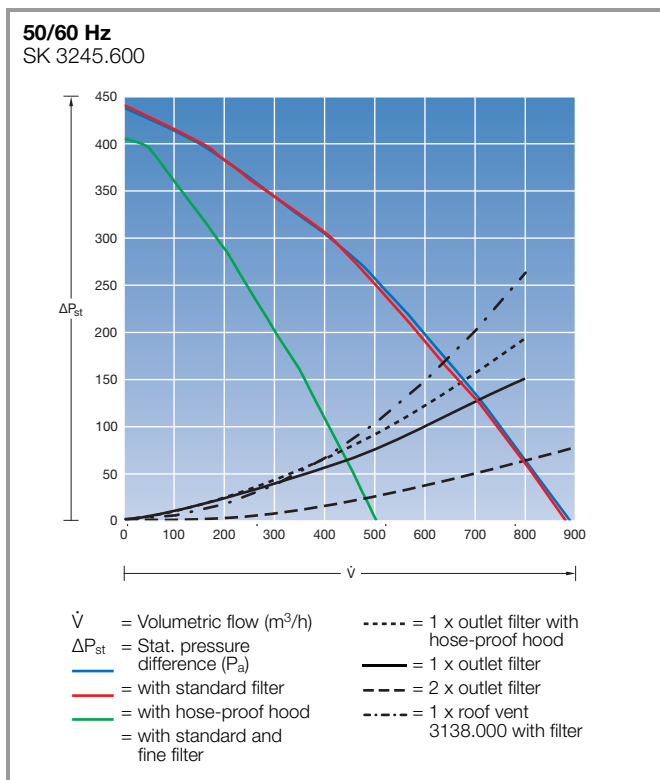
Air throughput 700/770 m³/h



Air throughput 900 m³/h

Shielding/attenuation diagram

Testing to EN 61587-3: 2006 – Electromagnetic shielding performance tests for cabinets, racks and sub-racks

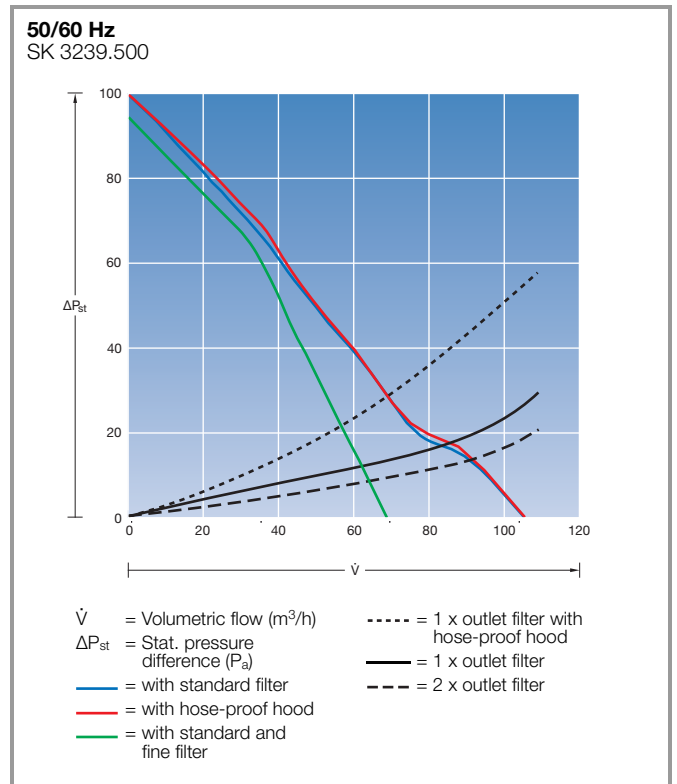
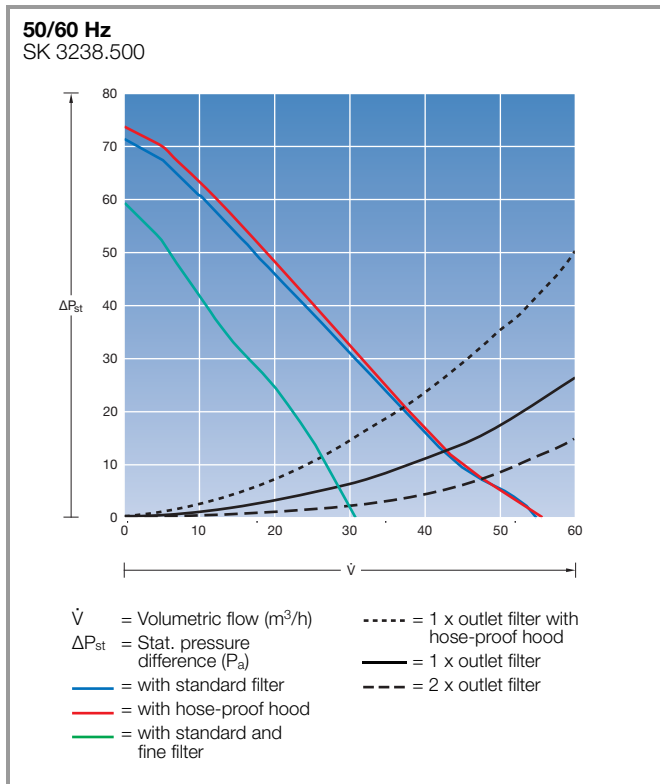


Cooling with ambient air

TopTherm fan-and-filter units with EC technology

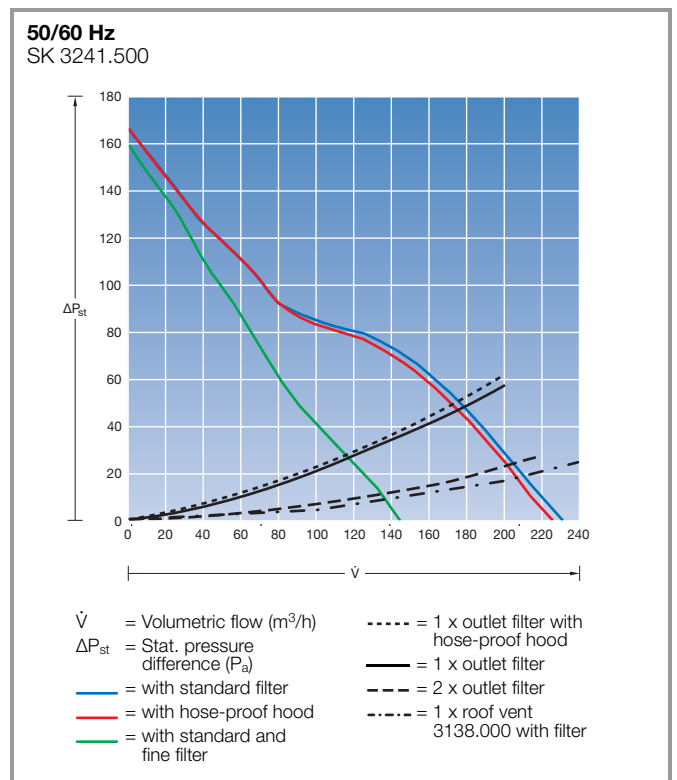
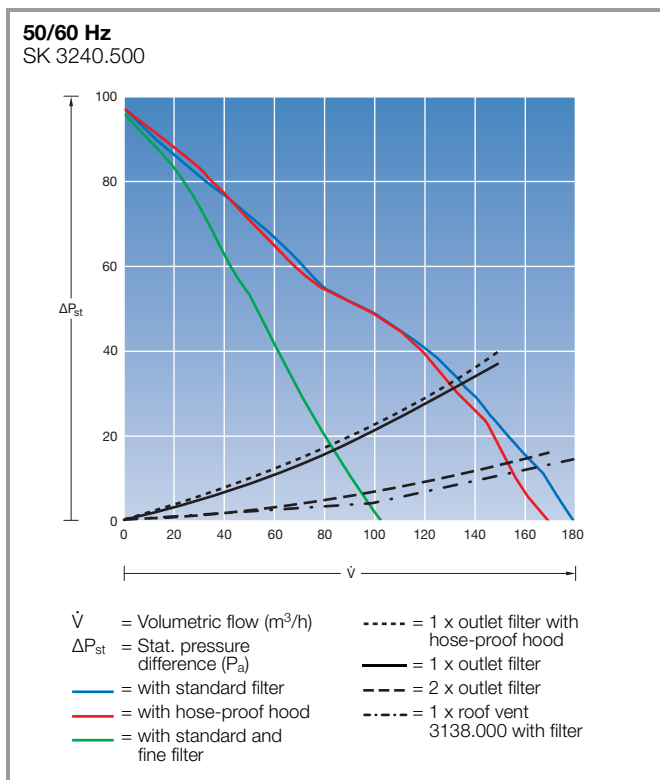
Air throughput 55 m³/h

Air throughput 105 m³/h



Air throughput 180 m³/h

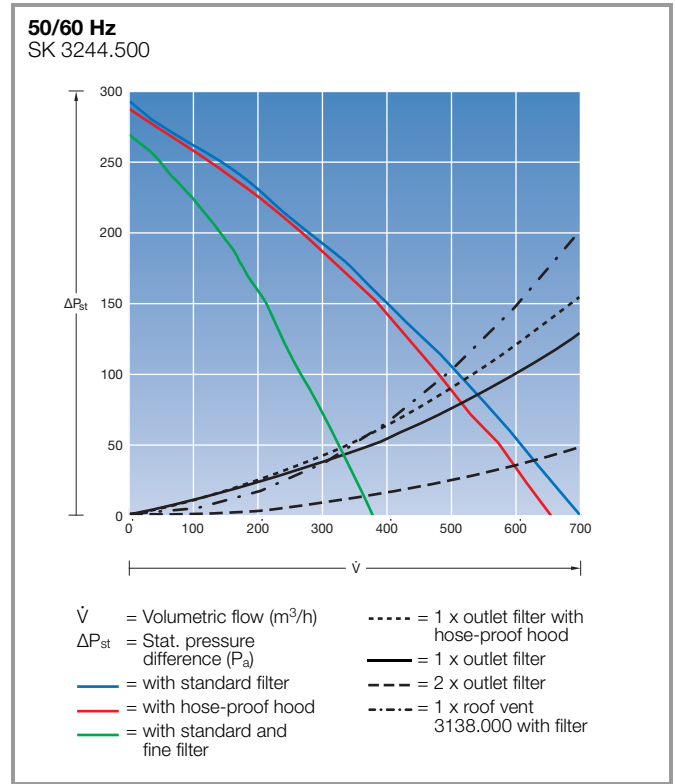
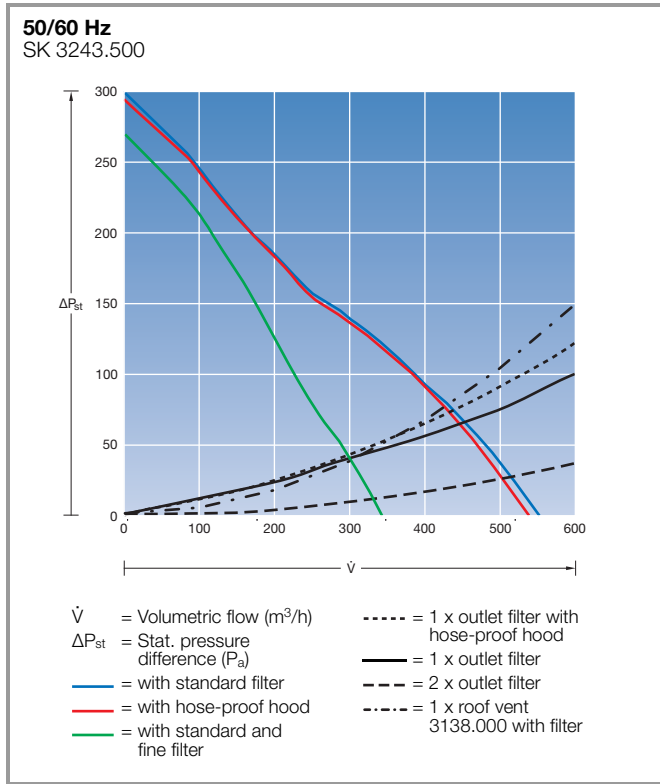
Air throughput 230 m³/h



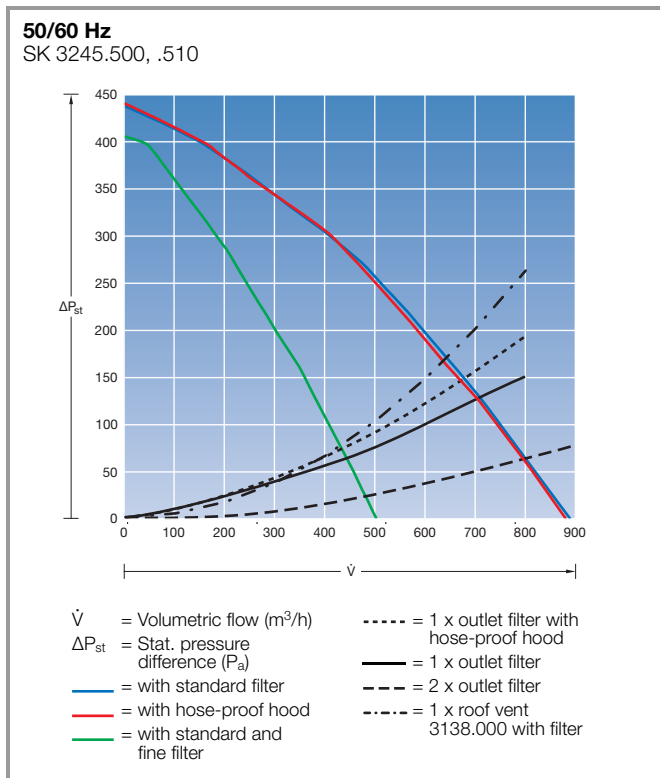
TopTherm fan-and-filter units with EC technology

Air throughput 550 m³/h

Air throughput 700 m³/h



Air throughput 900 m³/h



Cooling with ambient air

Roof-mounted fans

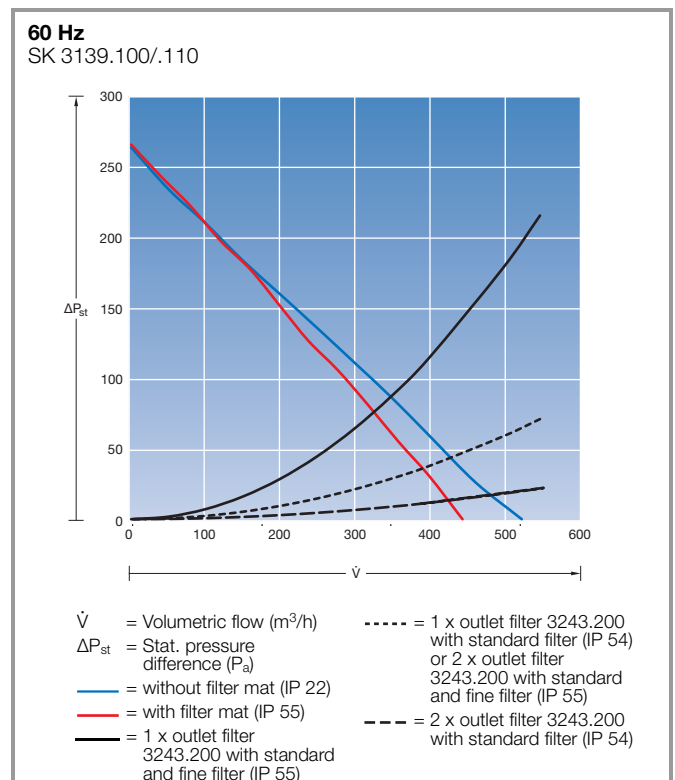
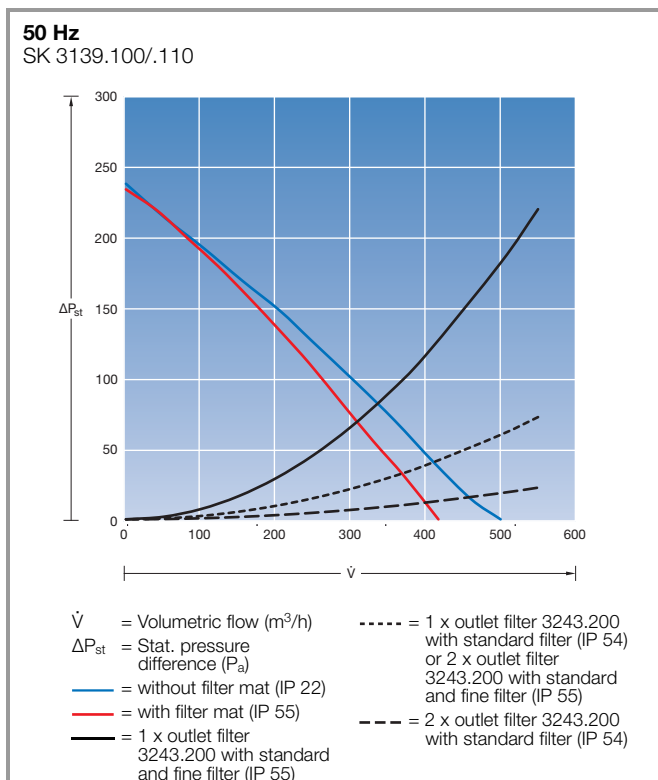
Using the base/plinth:

If the vented base/plinth is used as an air inlet instead of the outlet filter 3243.200, the resistance curves as indicated in the performance diagrams will apply as follows:

- 1 x vented base/plinth with filter
- 2 x vented base/plinth with filter
- 1 x vented base/plinth without filter

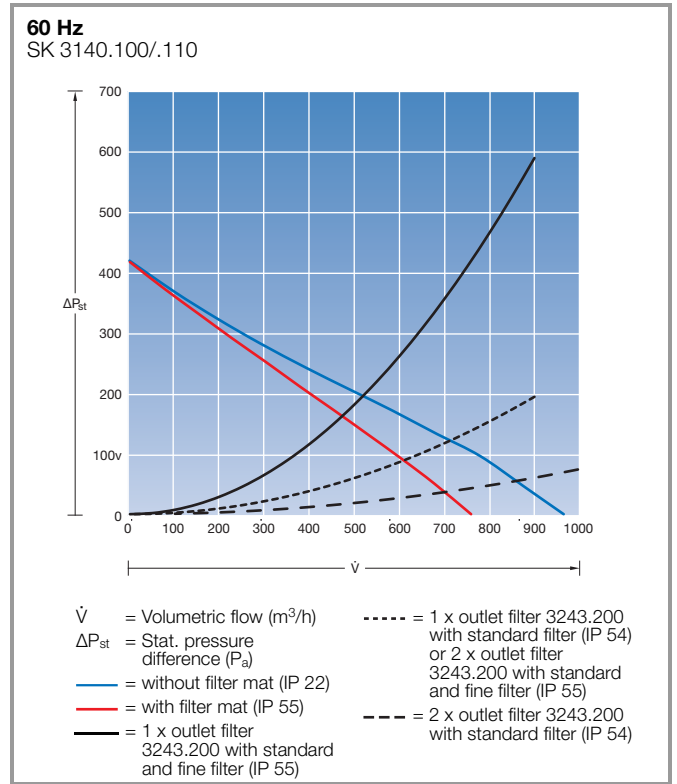
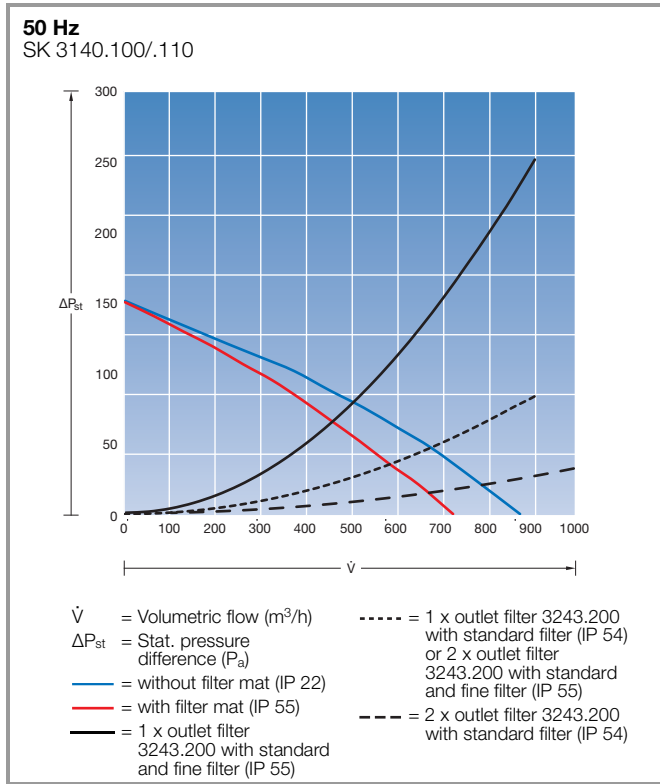
Roof-mounted fans

Air throughput 500/525 m³/h

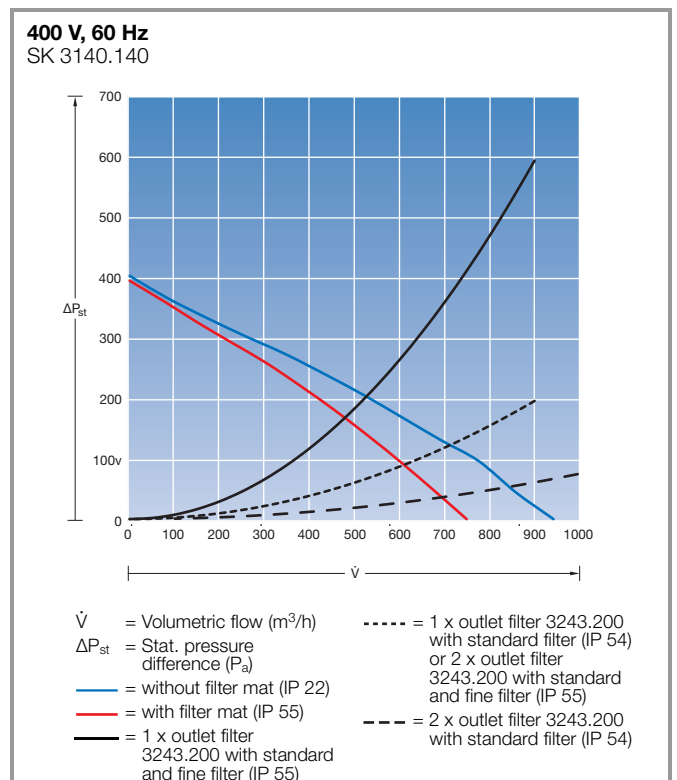
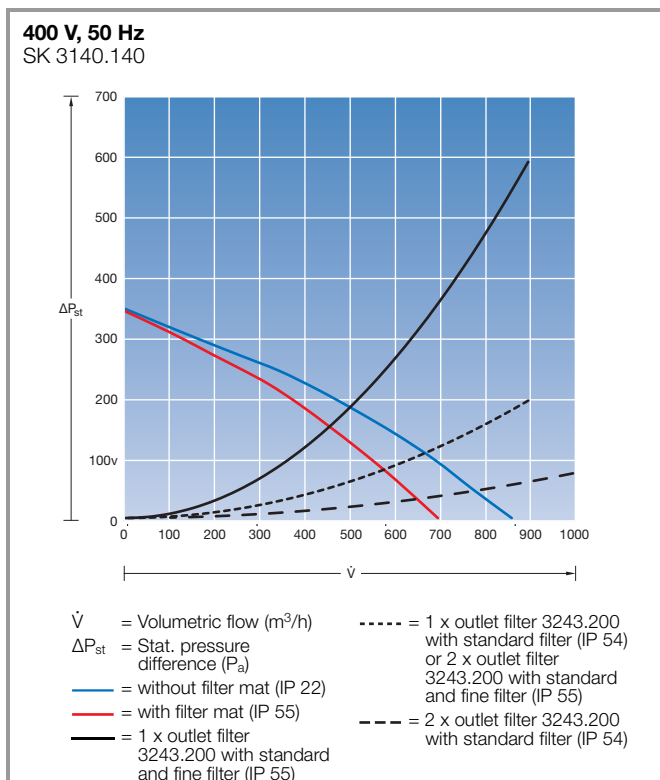


Roof-mounted fans

Air throughput 873/965 m³/h



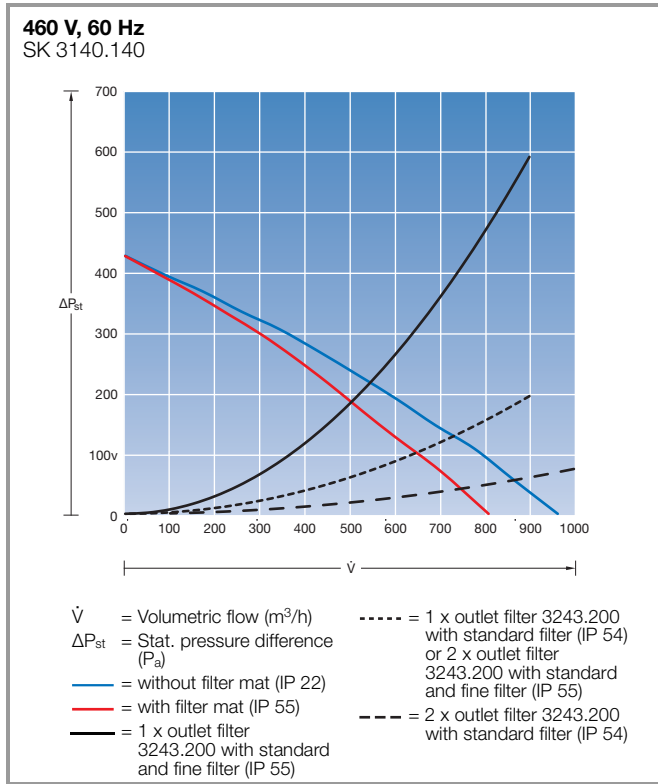
Air throughput 863/942 m³/h



Cooling with ambient air

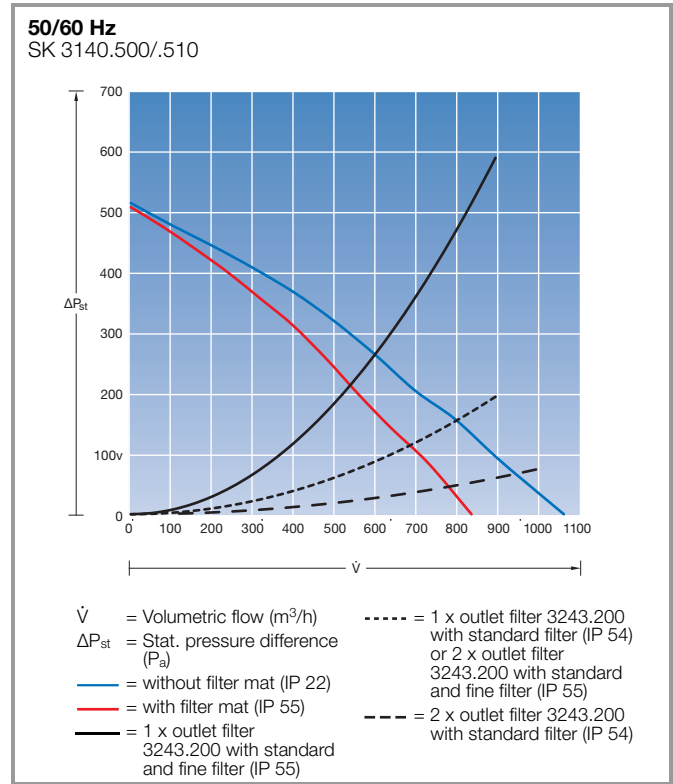
Roof-mounted fans

Air throughput 963 m³/h



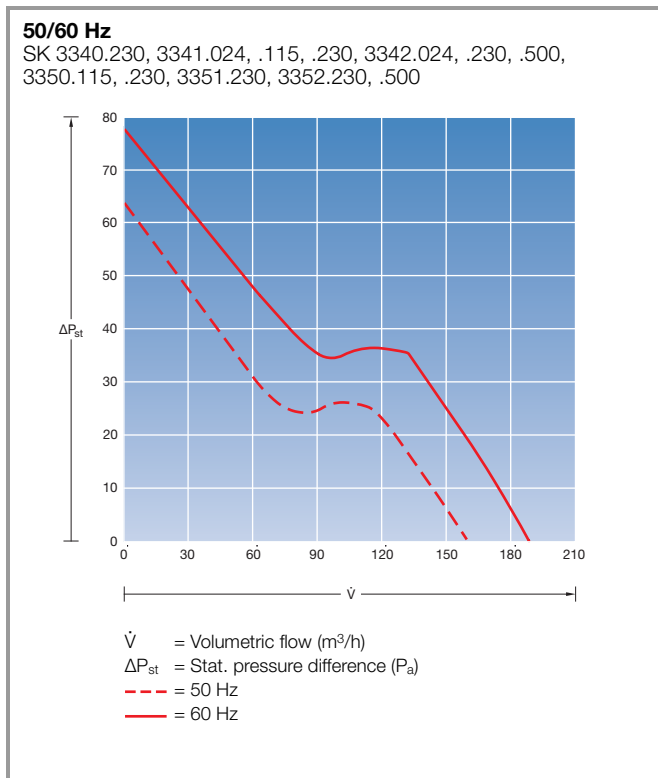
Roof-mounted fans with EC technology

Air throughput 1069 m³/h



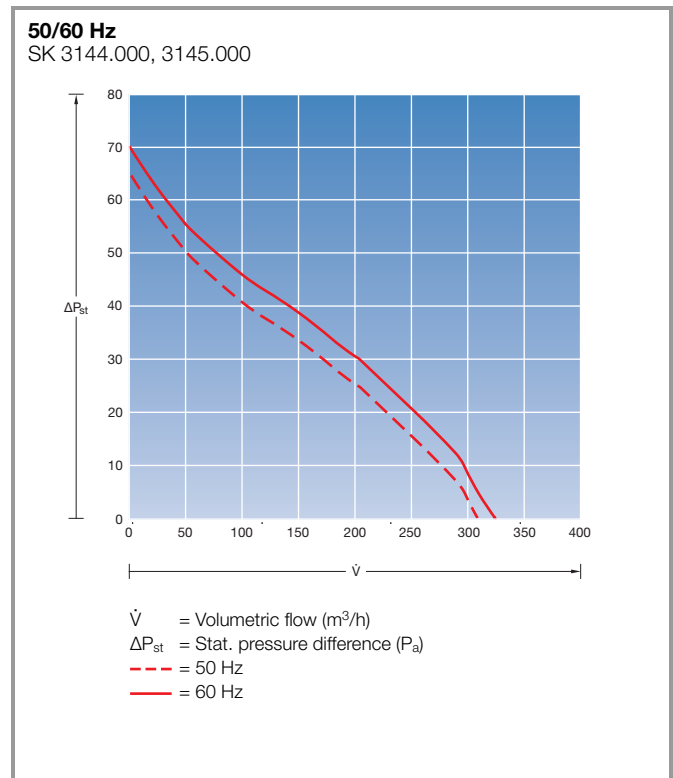
Rack-mounted fans for 482.6 mm (19")

Air throughput 320/480 m³/h

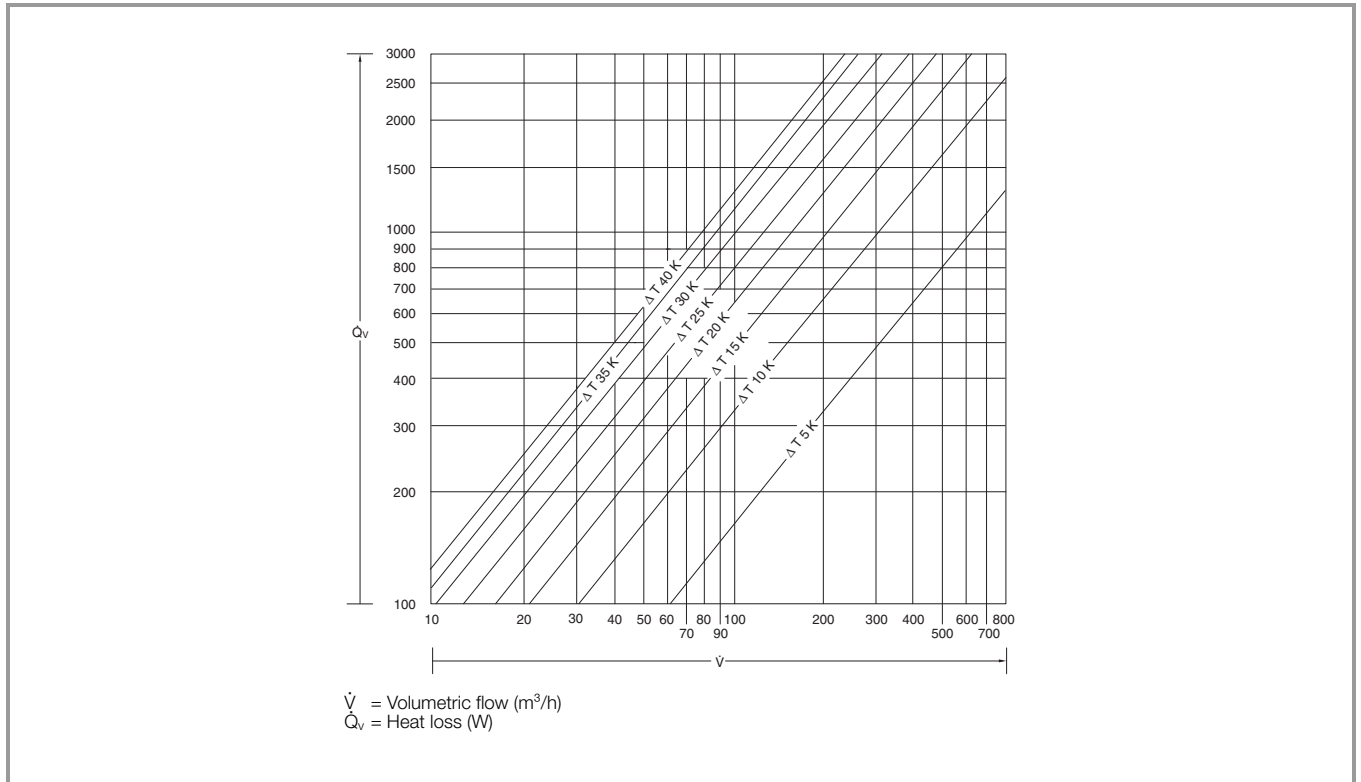


Tangential fans for 482.6 mm (19")

Air throughput 320 m³/h

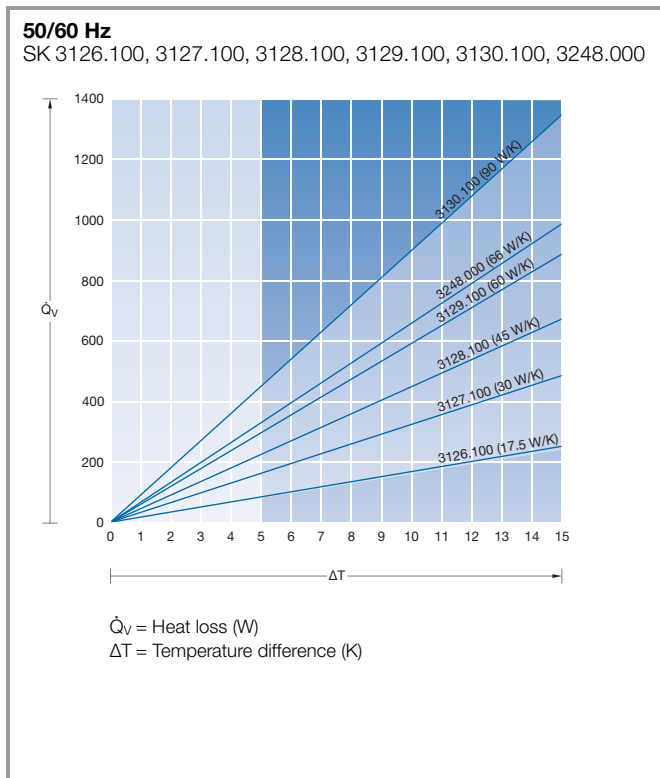


Selection diagram for fans



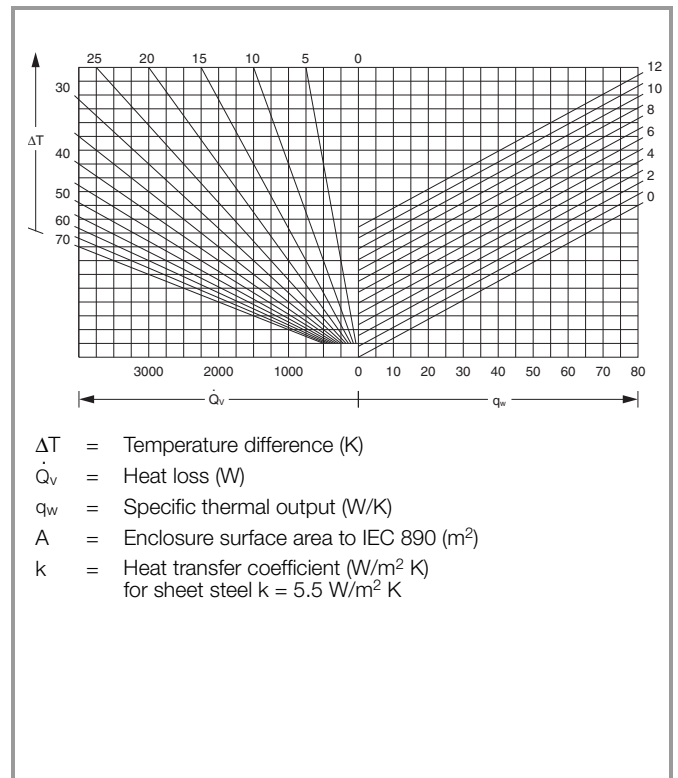
TopTherm air/air heat exchangers

Specific thermal output 17.5 – 90 W/K,
wall-mounted with controller



Selection diagram for air/air heat exchangers

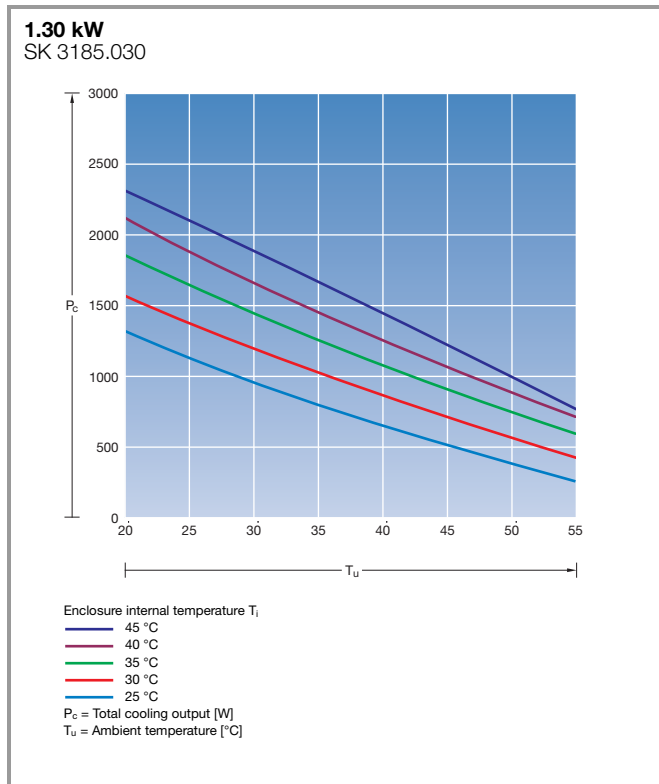
Specific thermal output 17.5 – 90 W/K,
wall-mounted with controller



Cooling units

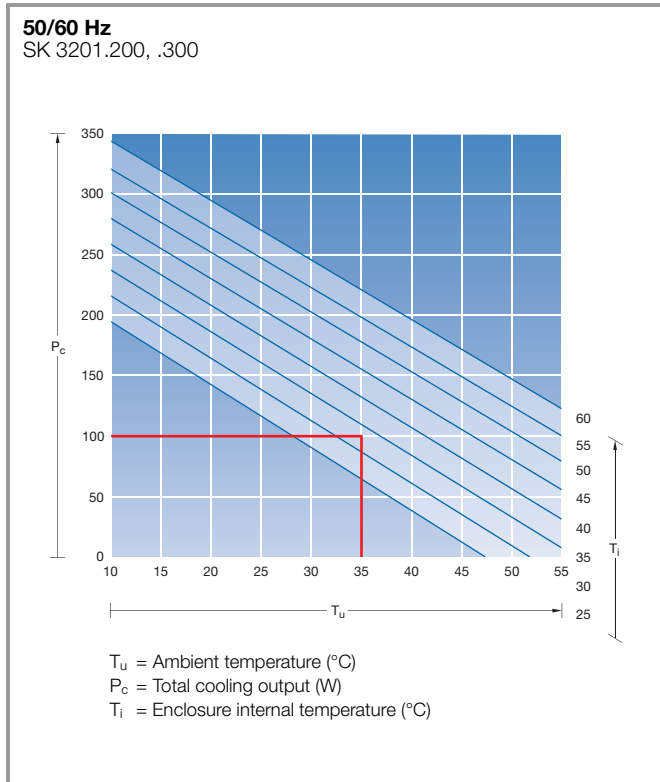
VX25 Blue e+ integration solution

Output class 1300 W (110 – 240 V, 1 ~, 50 – 60 Hz / 380 – 480 V, 3 ~, 50 – 60 Hz)

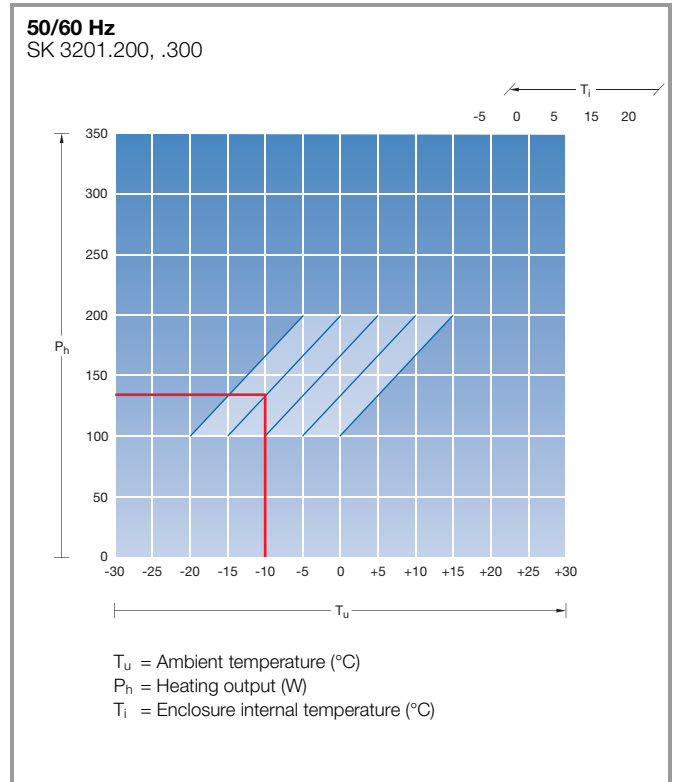


Thermoelectric coolers

Cooling output

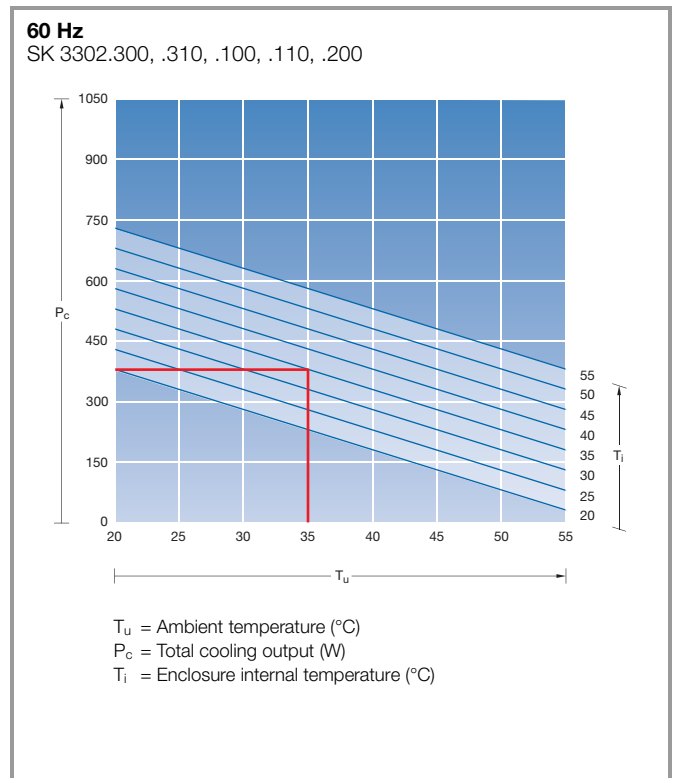
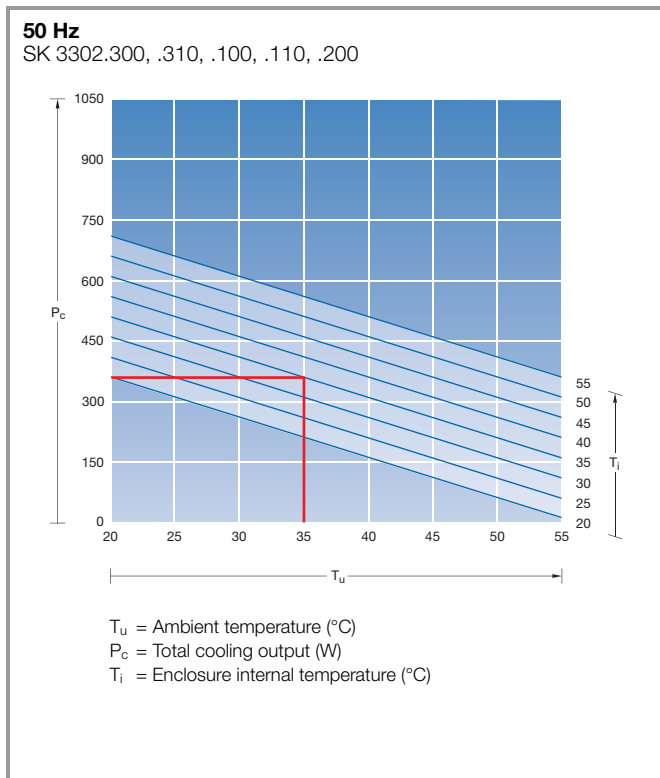


Heating output



TopTherm wall-mounted cooling units

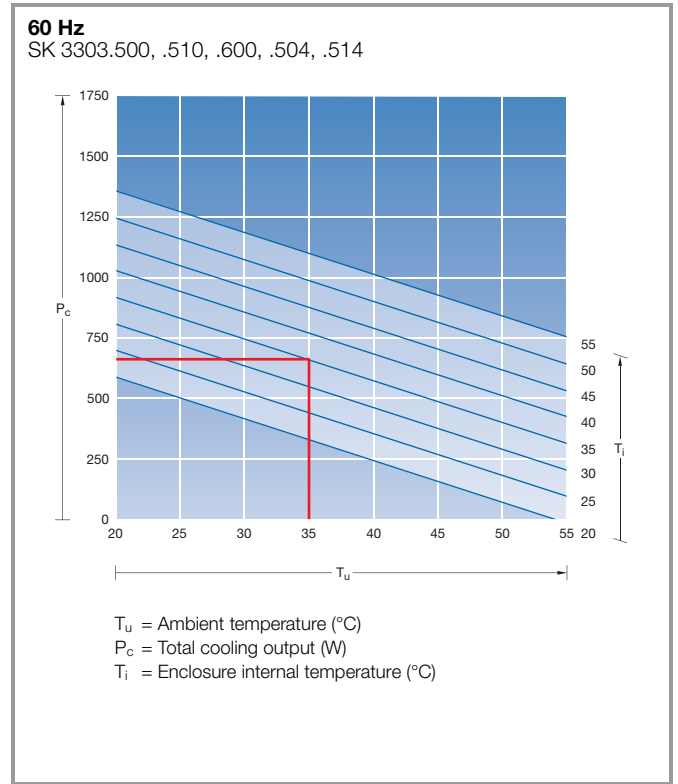
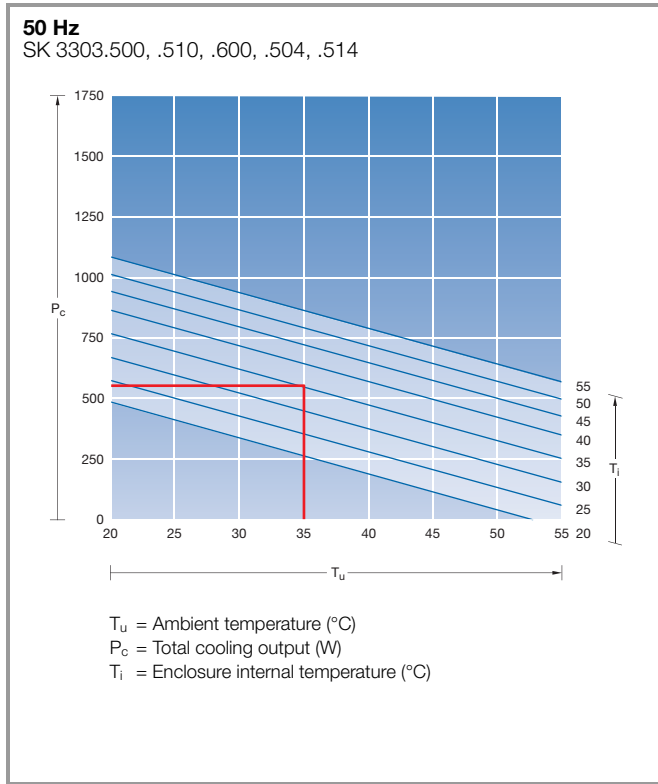
Output class 300 W (115/230 V, 1~)



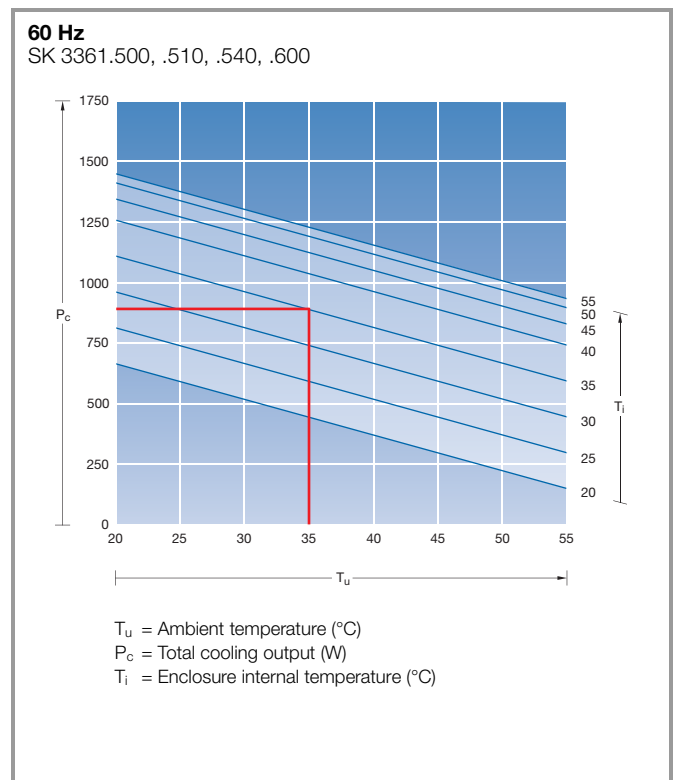
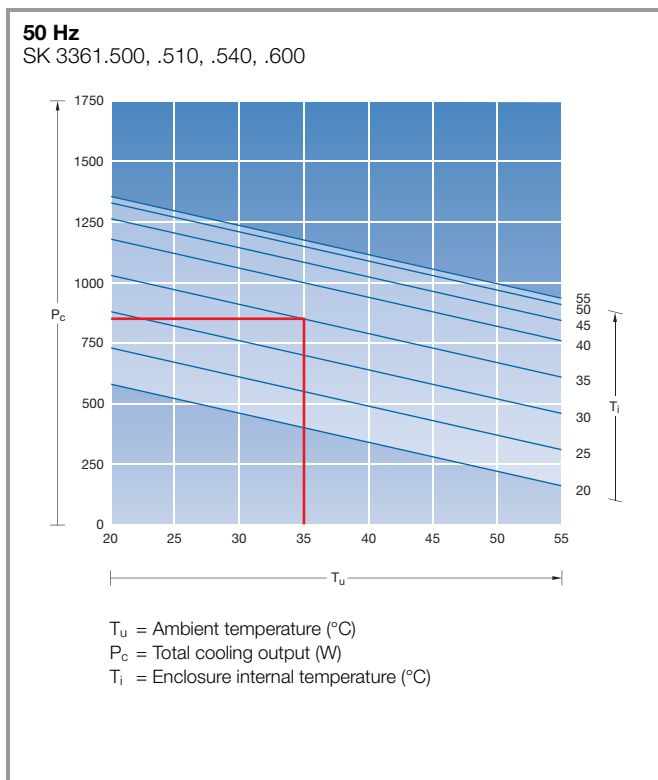
Cooling units

TopTherm wall-mounted cooling units Blue e

Output class 500 W (115/230 V, 1~)

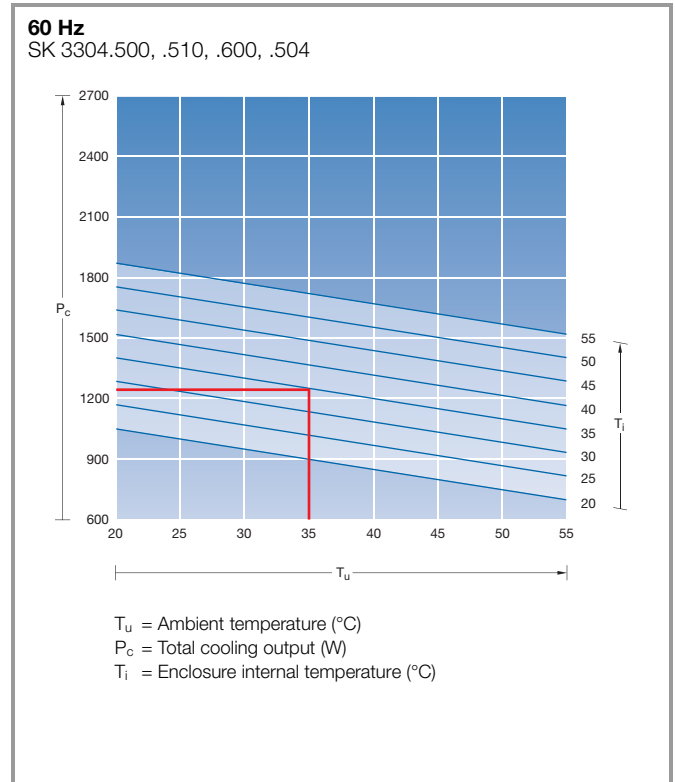
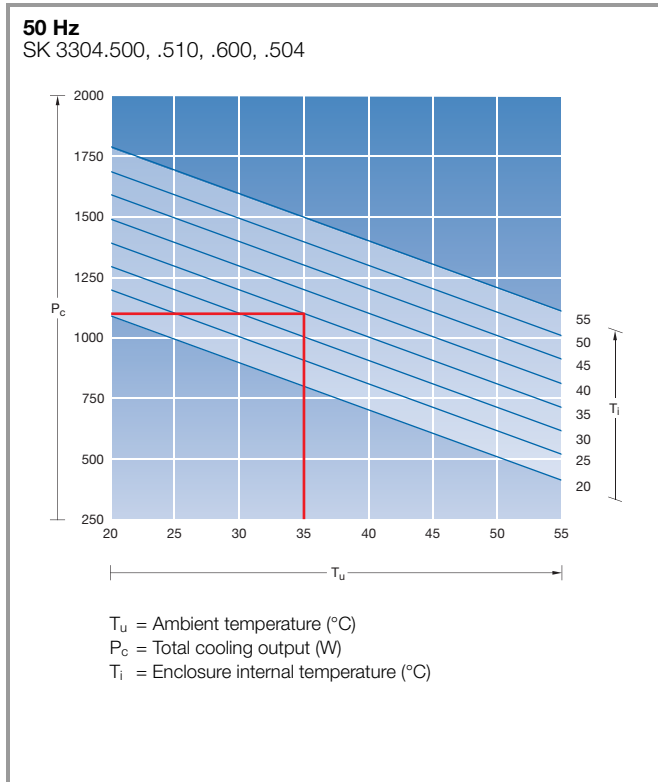


Output class 750 W (115/230 V, 1~, 400 V, 2~)

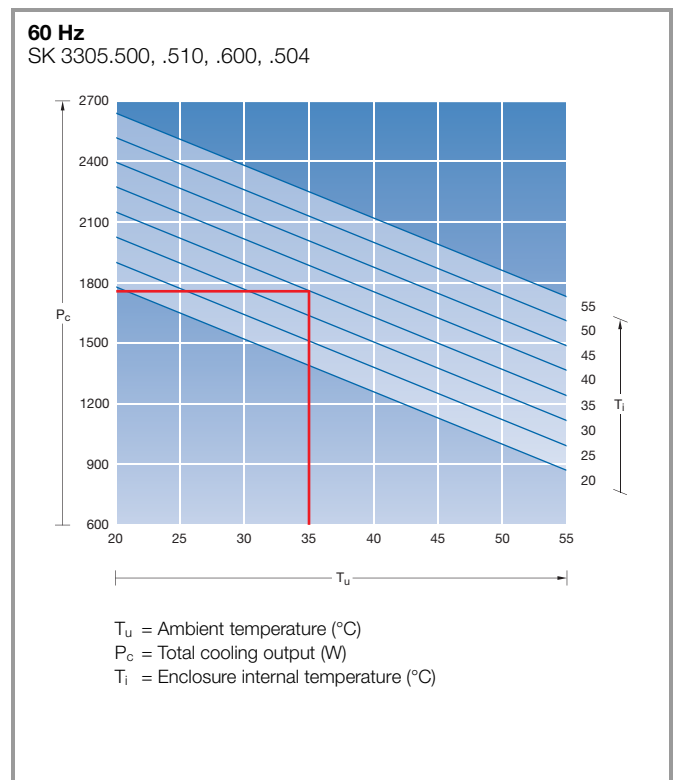
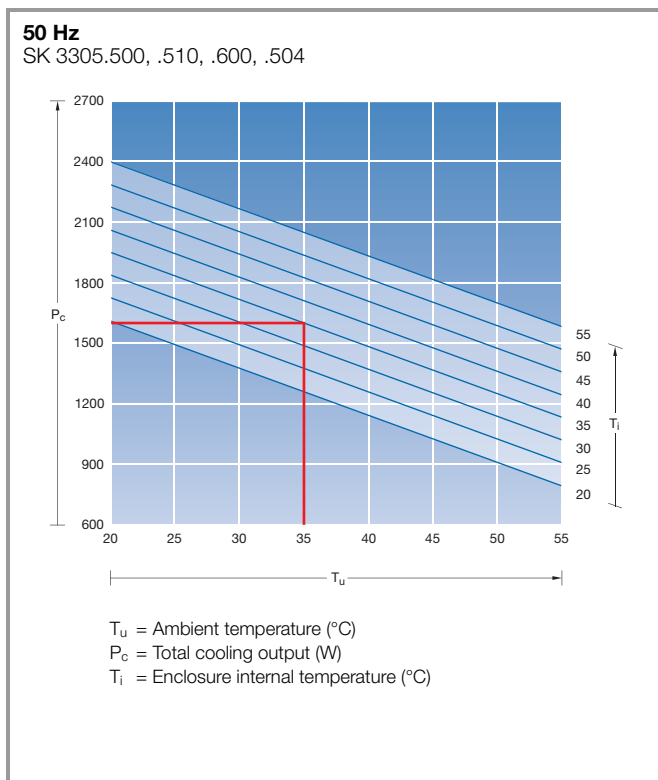


TopTherm wall-mounted cooling units Blue e

Output class 1000 W (115/230 V, 1~)



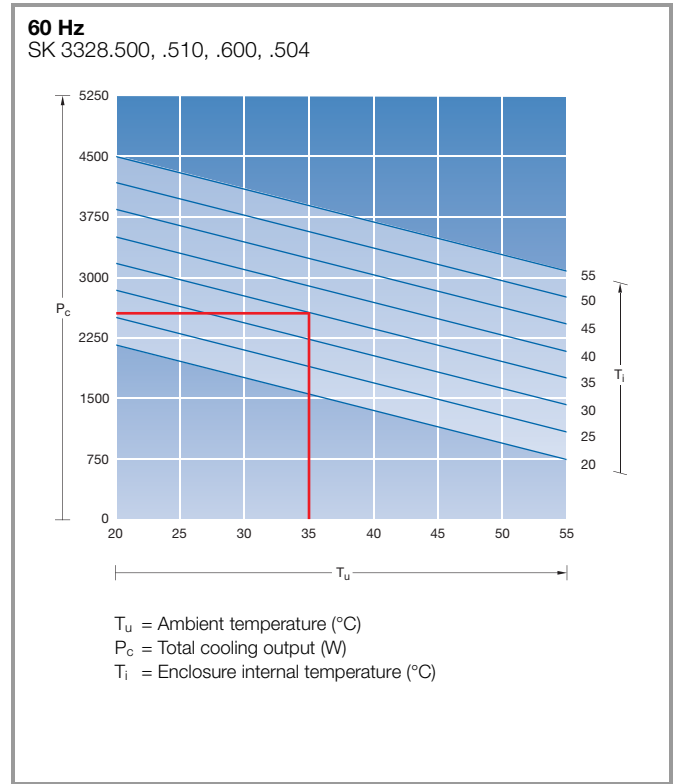
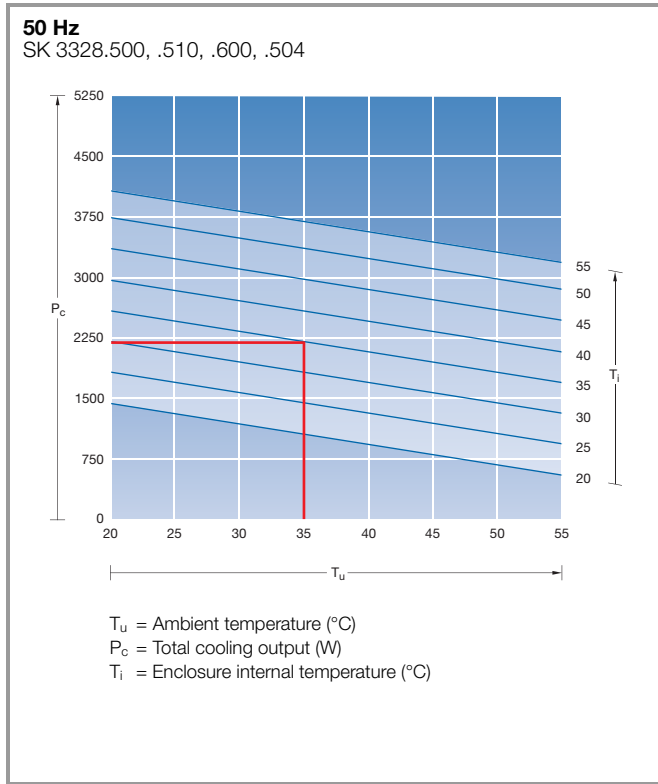
Output class 1500 W (115/230 V, 1~)



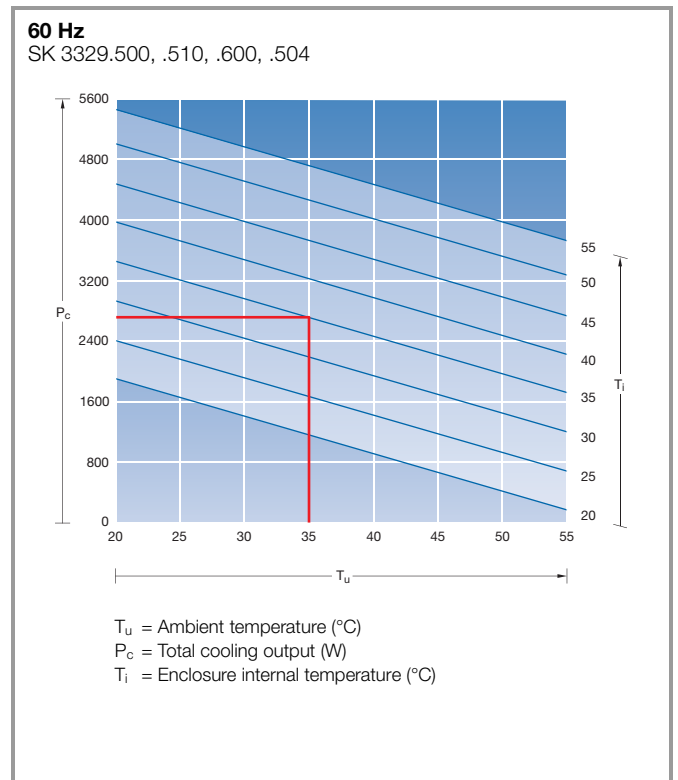
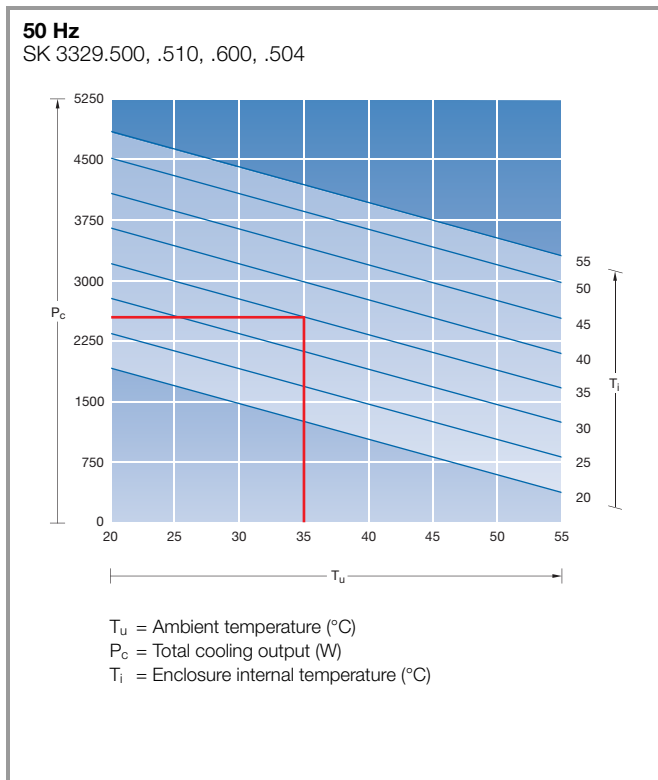
Cooling units

TopTherm wall-mounted cooling units Blue e

Output class 2000 W (115/230 V, 1~)

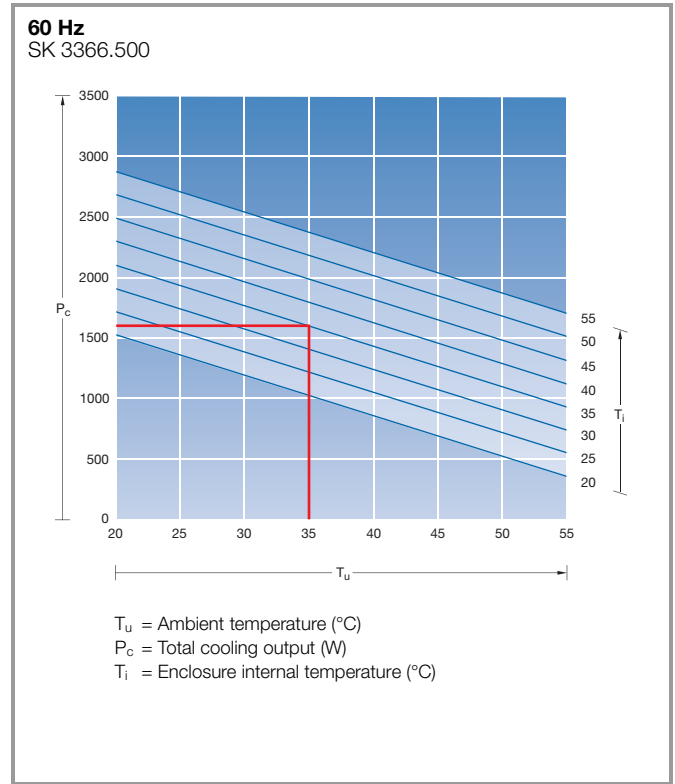
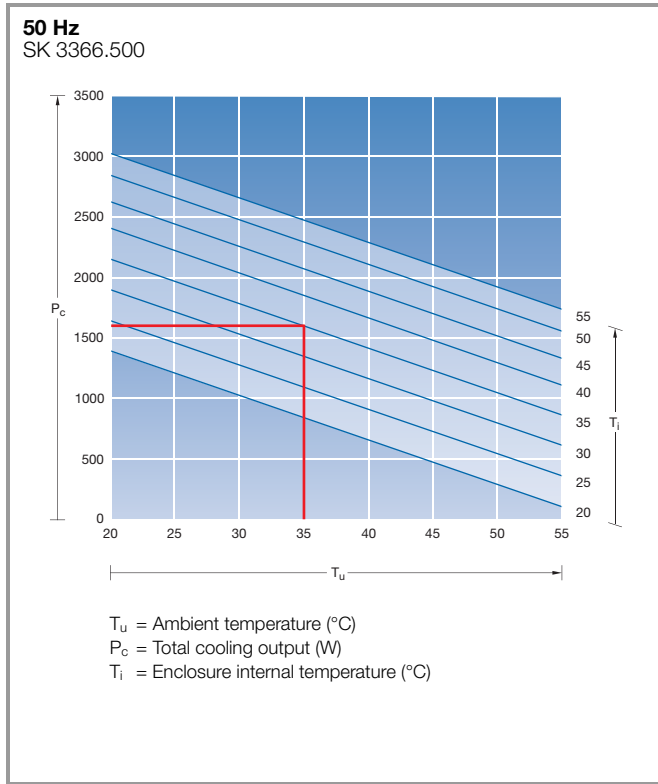


Output class 2500 W (115/230 V, 1~)

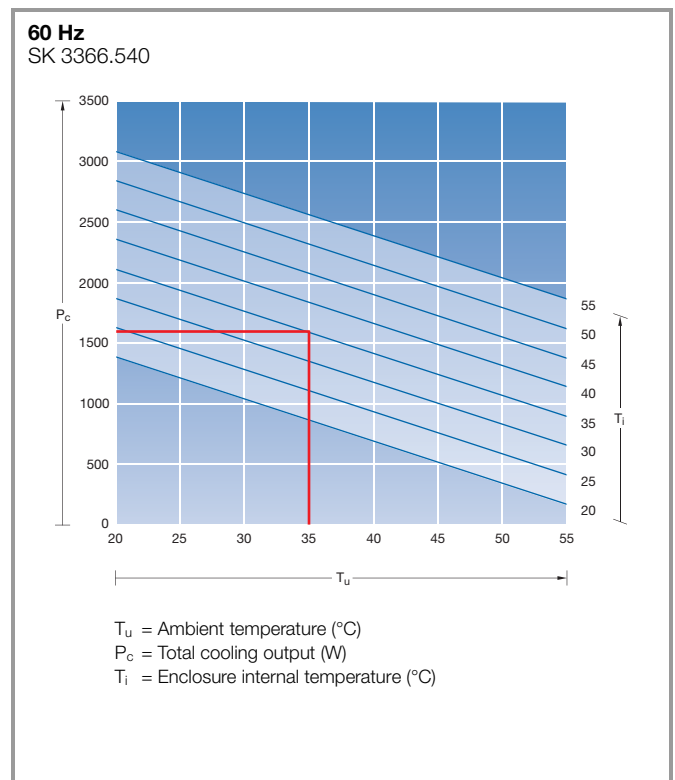
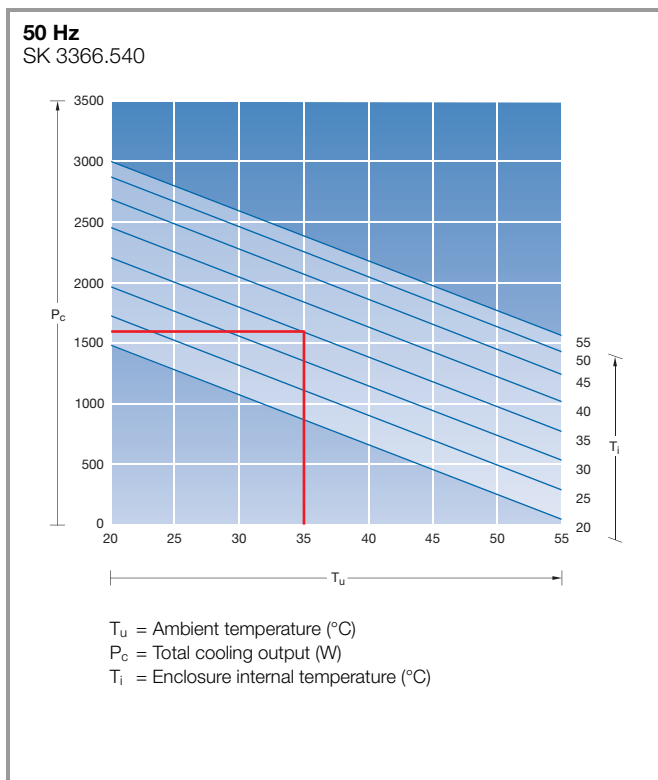


TopTherm wall-mounted cooling units Blue e, slimline

Output class 1500 W (230 V, 1~)



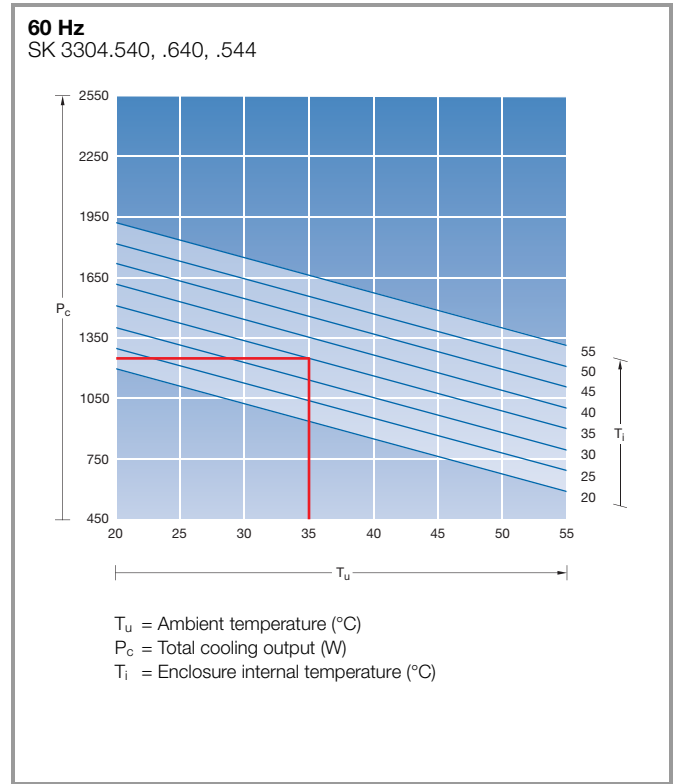
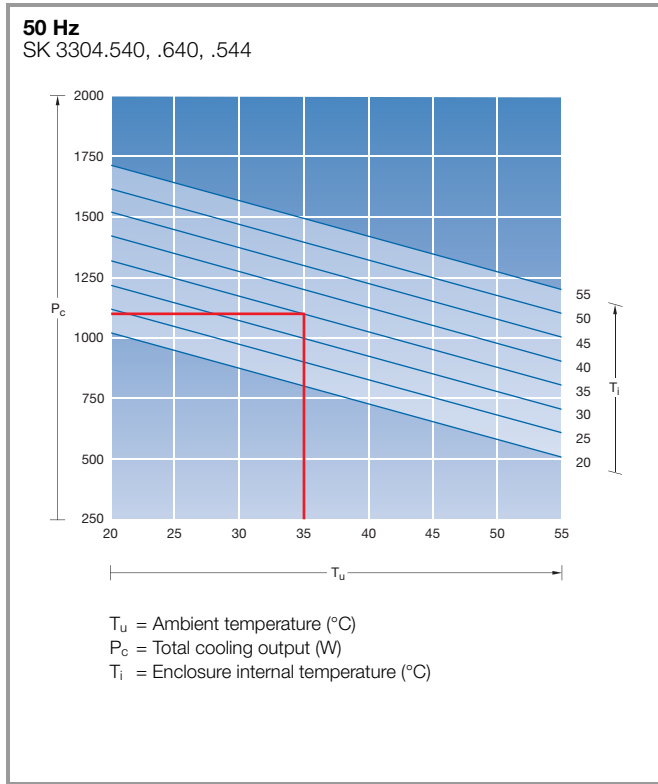
Output class 1500 W (400/460 V, 3~)



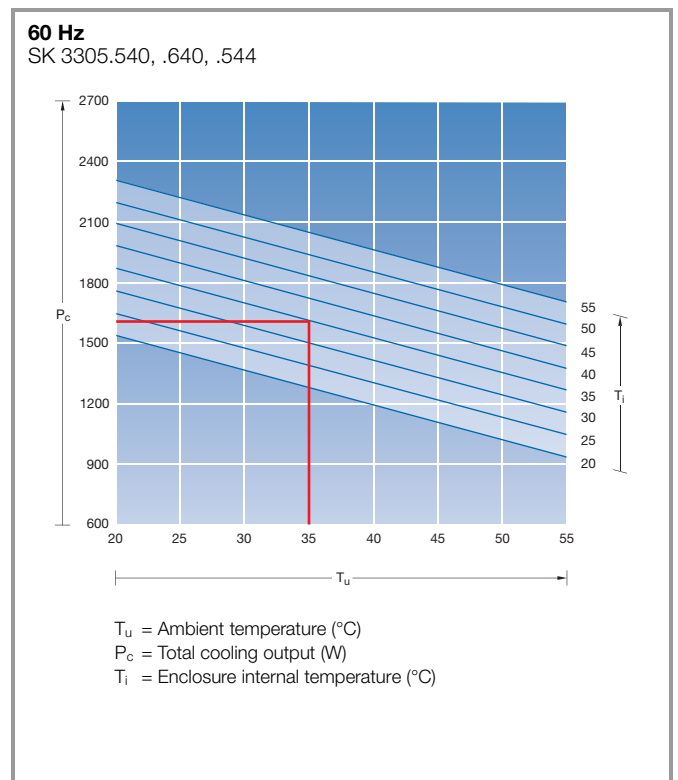
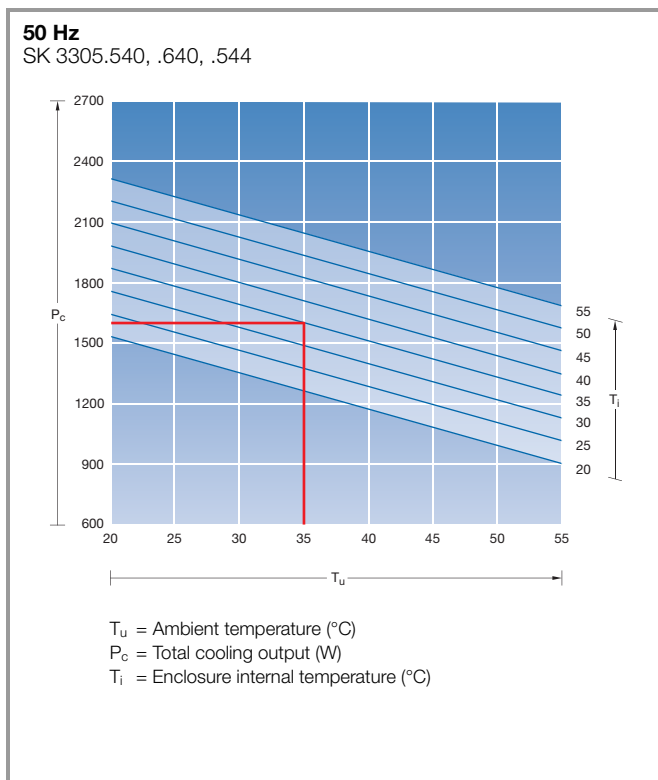
Cooling units

TopTherm wall-mounted cooling units Blue e

Output class 1000 W (400/460 V, 3~)



Output class 1500 W (400/460 V, 3~)

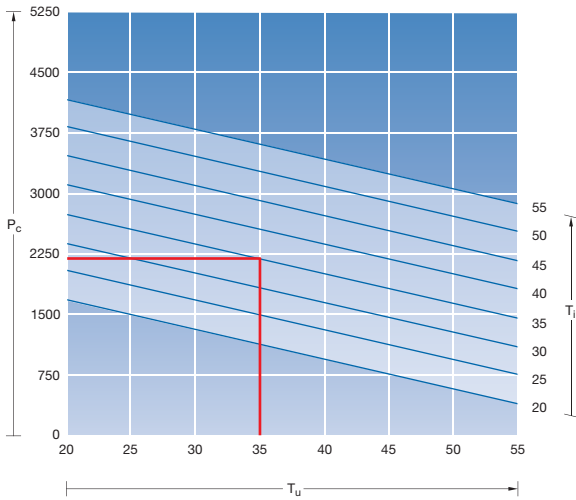


TopTherm wall-mounted cooling units Blue e

Output class 2000 W (400/460 V, 3~)

50 Hz

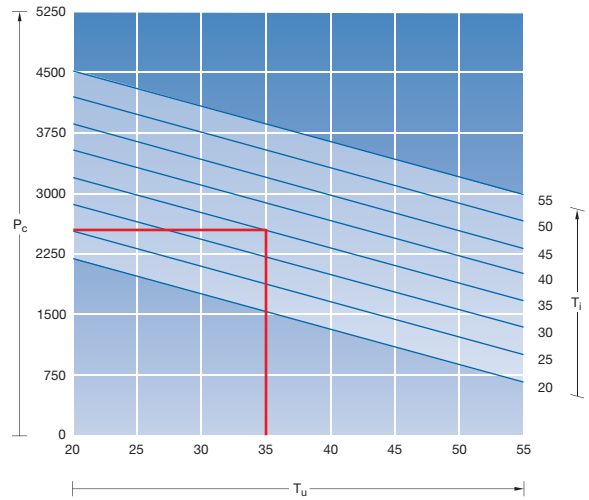
SK 3328.540, .640, .544



T_u = Ambient temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz

SK 3328.540, .640, .544

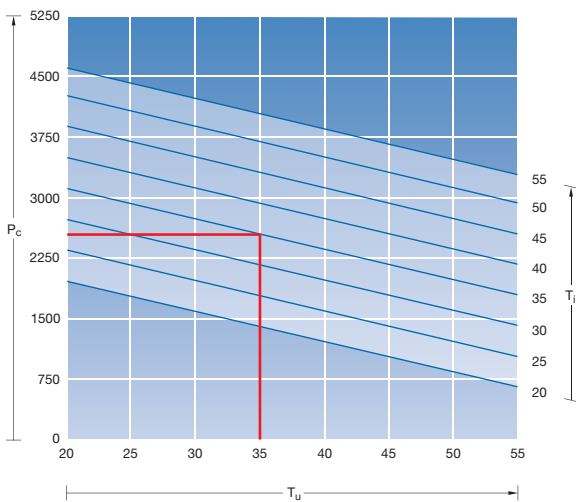


T_u = Ambient temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Output class 2500 W (400/460 V, 3~)

50 Hz

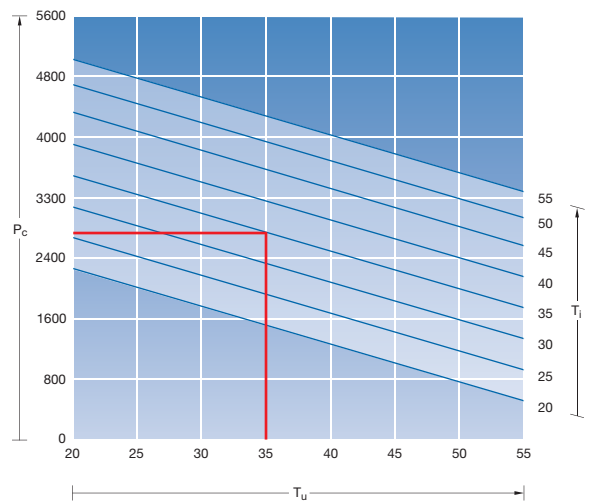
SK 3329.540, .640, .544



T_u = Ambient temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz

SK 3329.540, .640, .544

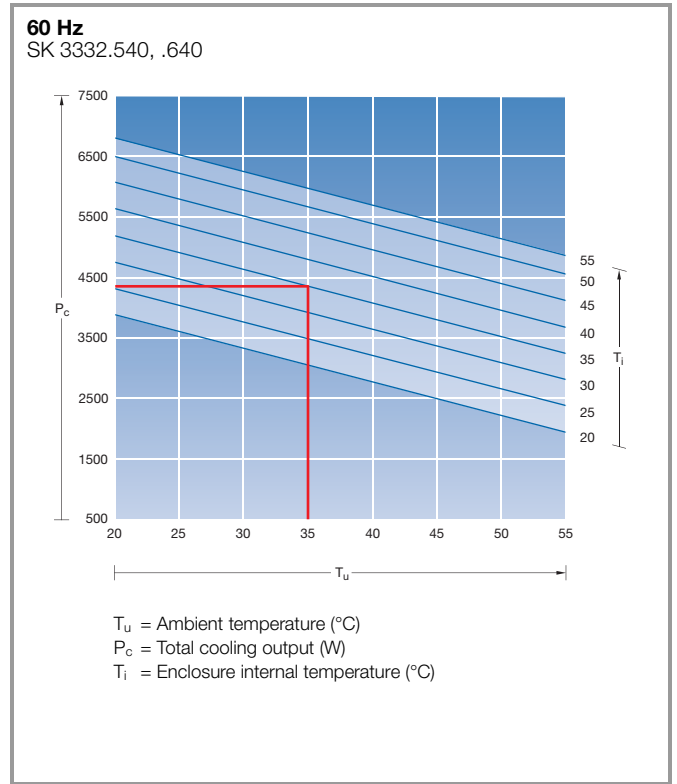
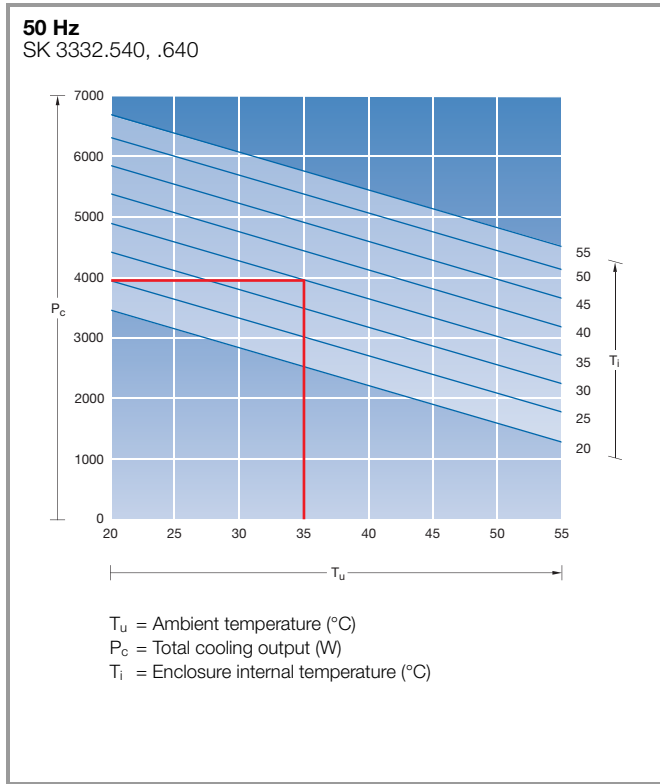


T_u = Ambient temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Cooling units

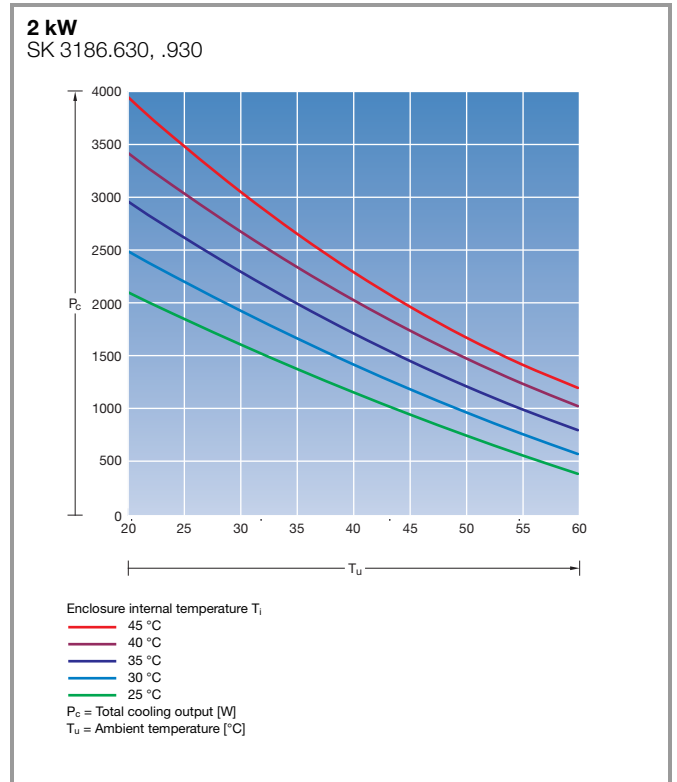
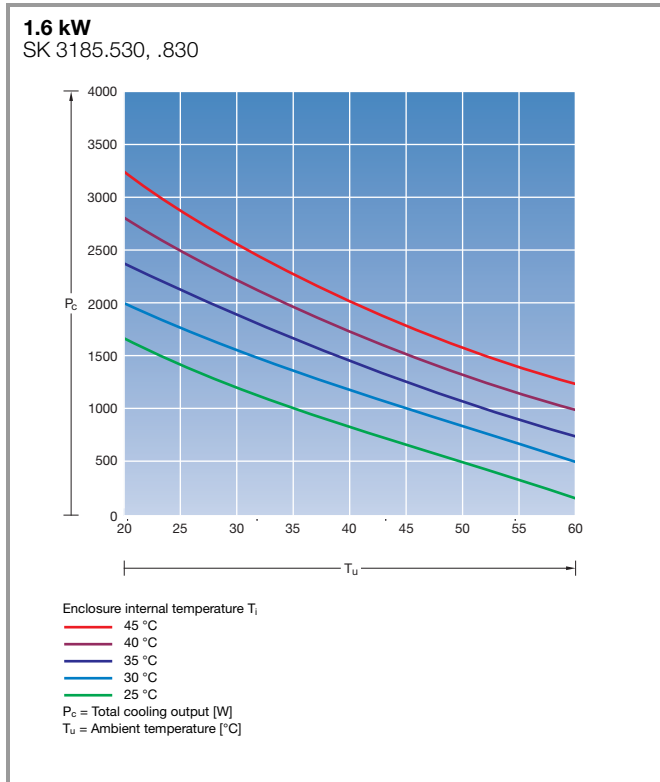
TopTherm wall-mounted cooling units Blue e

Output class 4000 W (400/460 V, 3~)

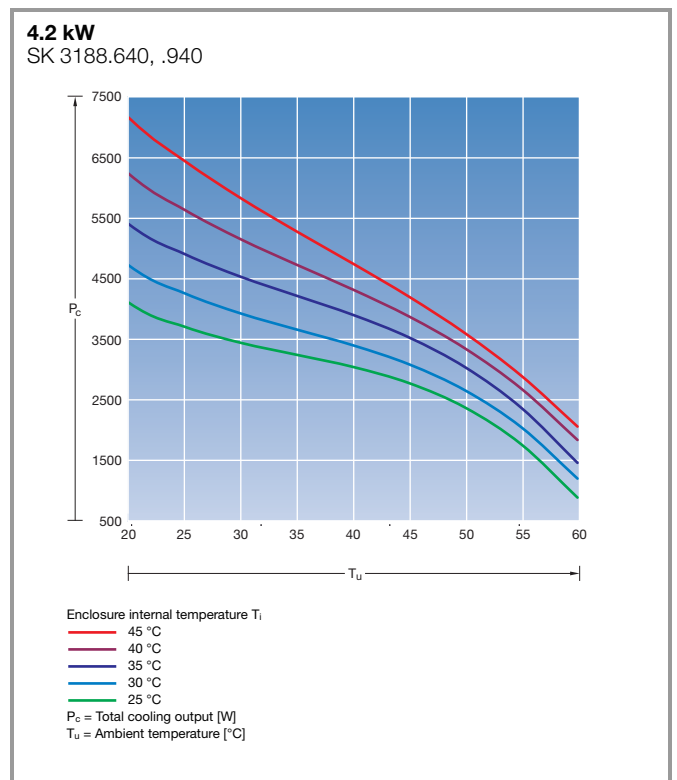
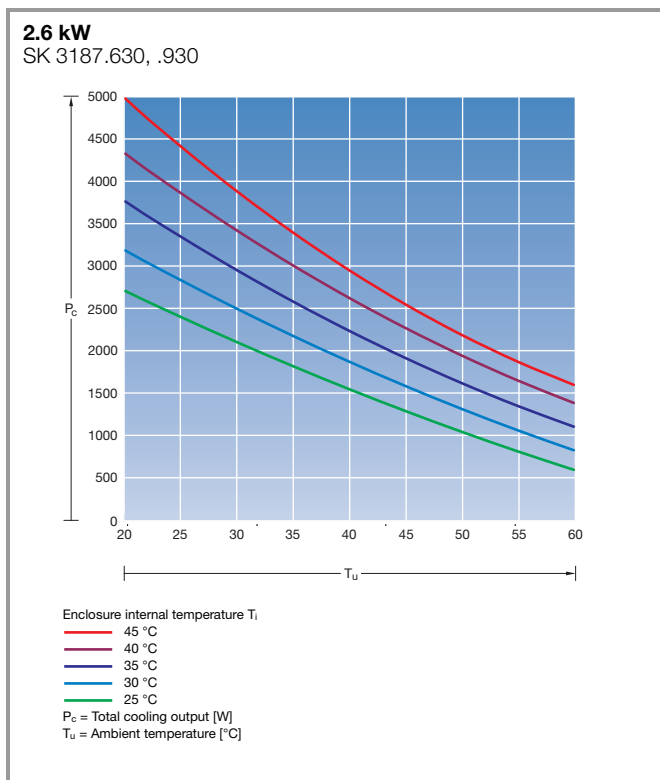


Wall-mounted cooling units Blue e+

Output class 1600/2000 W (110 – 240 V, 1~, 50 – 60 Hz / 380 – 480 V, 3~, 50 – 60 Hz)

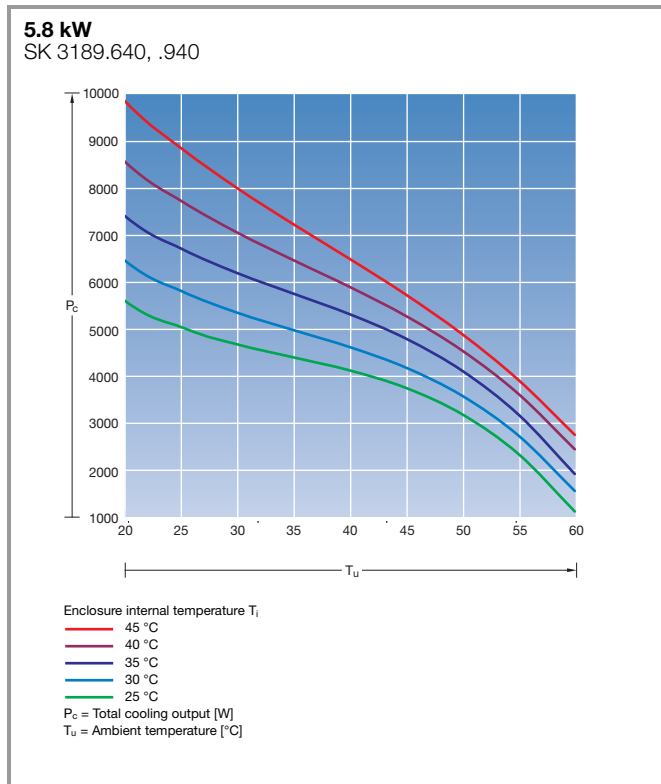


Output class 2600/4200 W (110 – 240 V, 1~, 50 – 60 Hz / 380 – 480 V, 3~, 50 – 60 Hz)



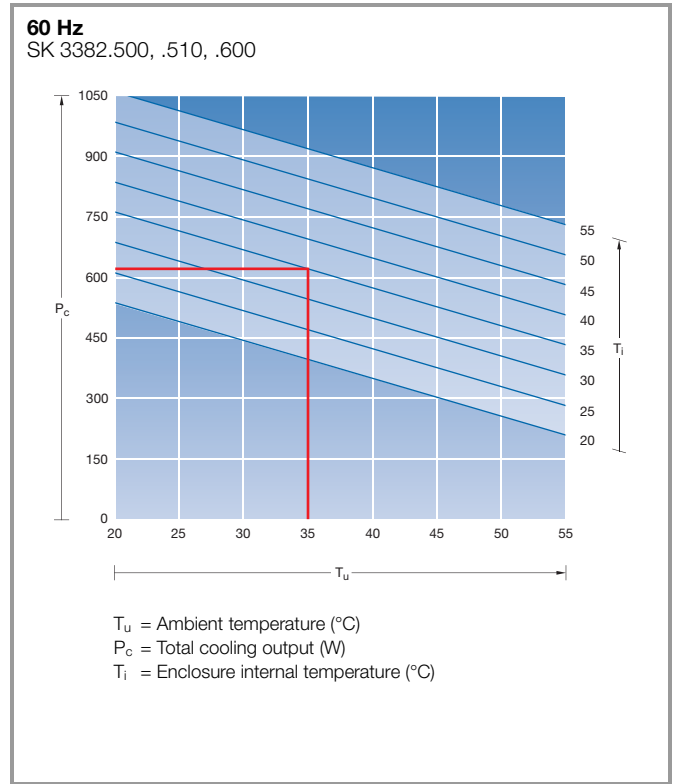
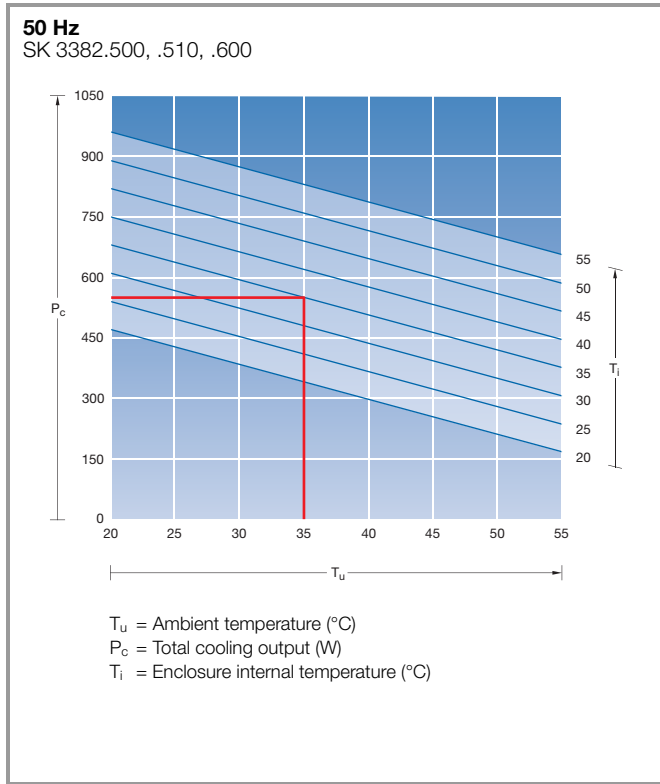
Cooling units

Wall-mounted cooling units Blue e+ Output class 5800 W (380 – 480 V, 3~, 50 – 60 Hz)

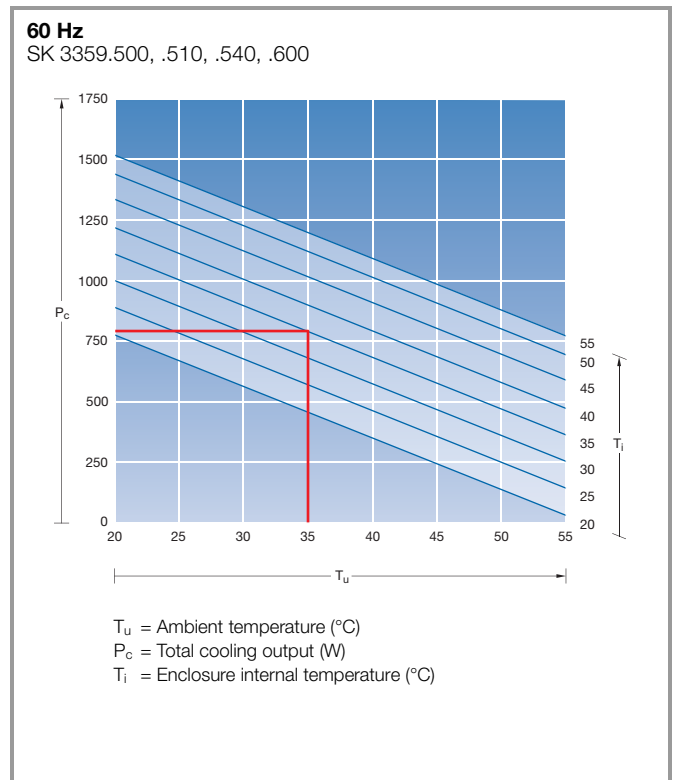
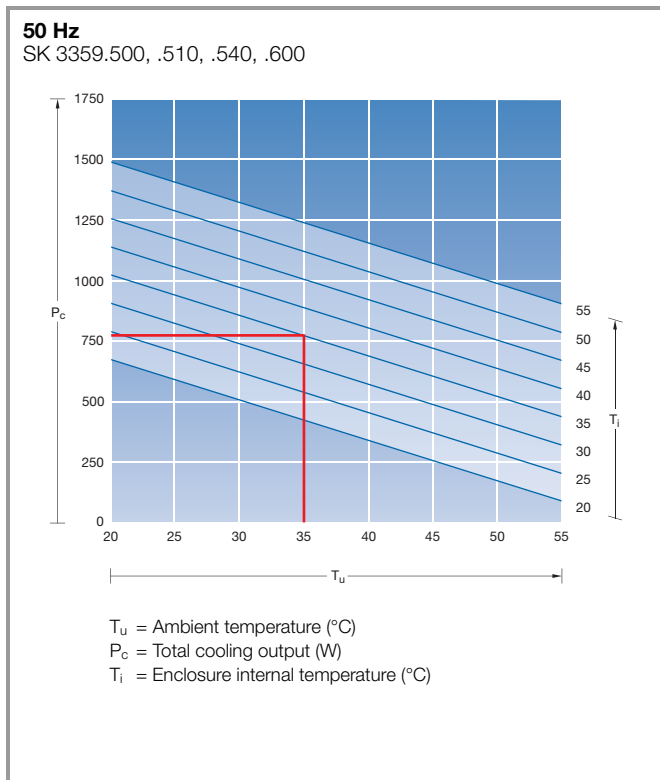


TopTherm roof-mounted cooling units Blue e

Output class 500 W (115/230 V, 1~)



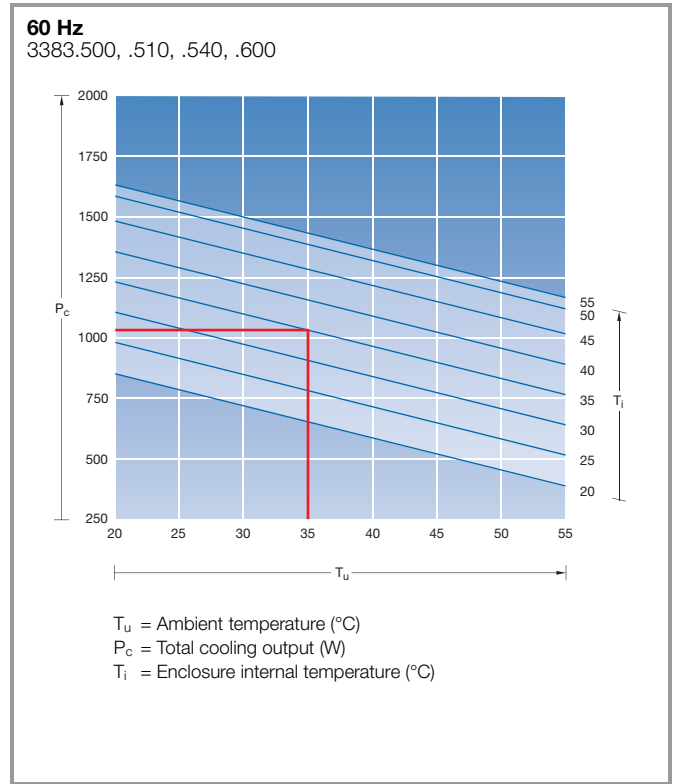
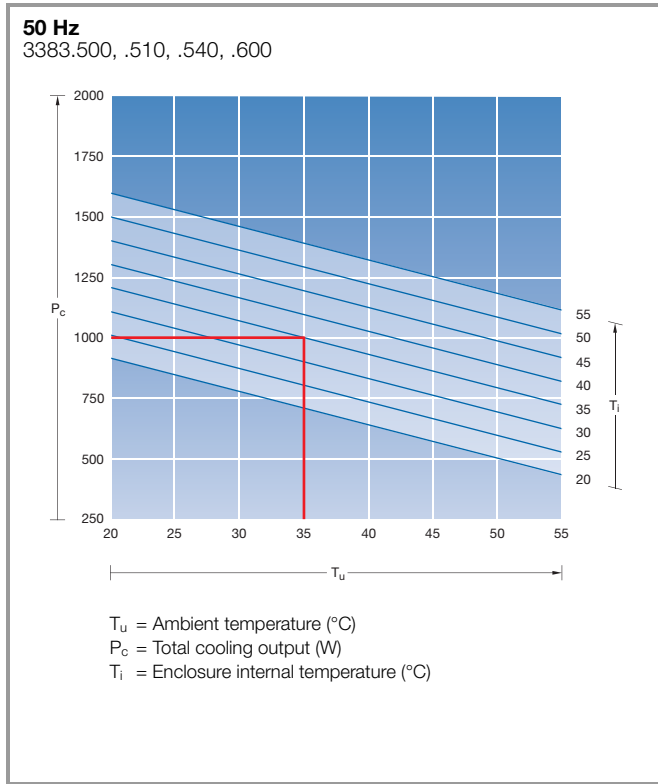
Output class 750 W (115/230 V, 1~, 400 V, 2~)



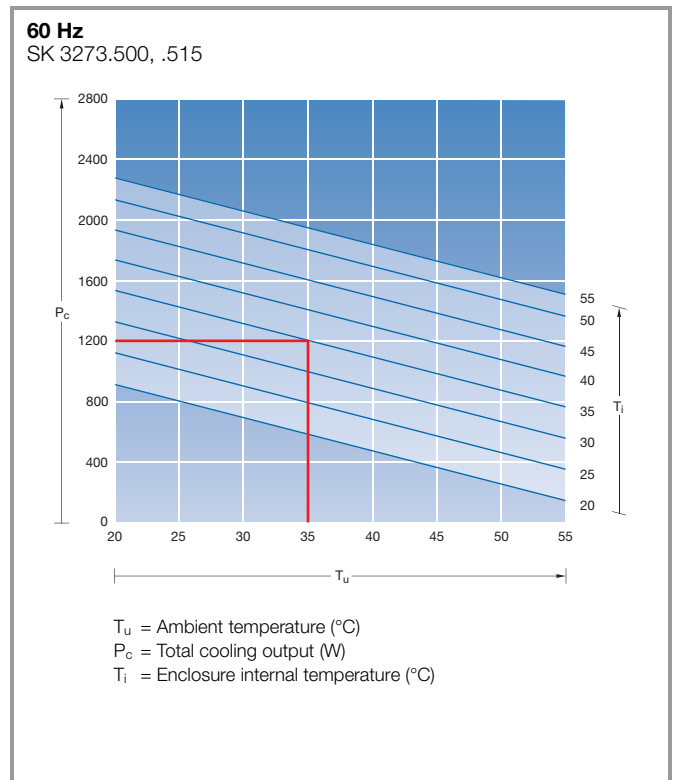
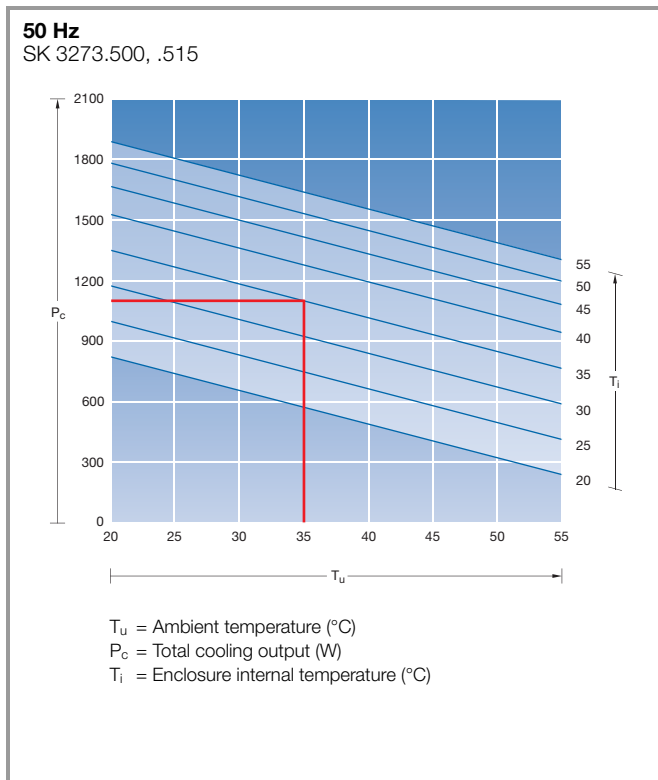
Cooling units

TopTherm roof-mounted cooling units Blue e

Output class 1000 W (115/230 V, 1~, 400 V, 2~)

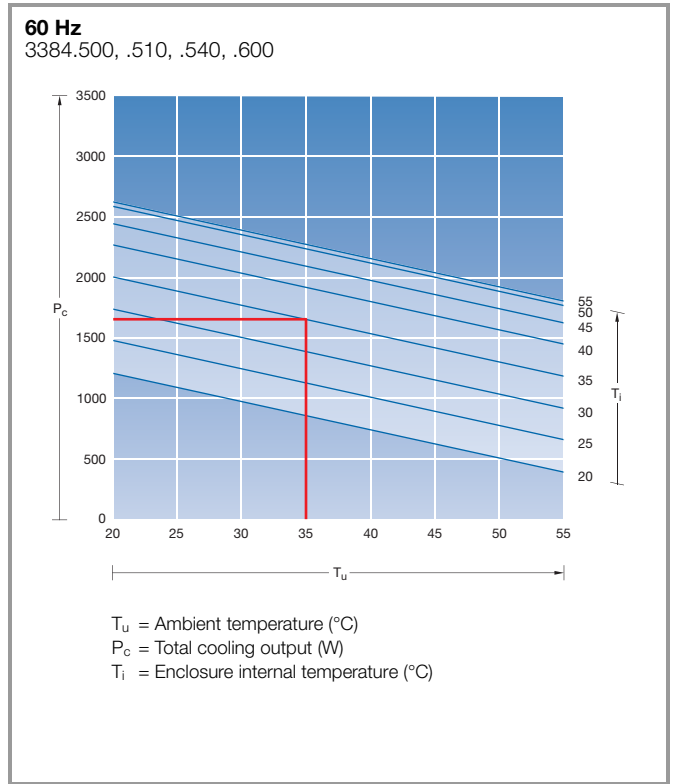
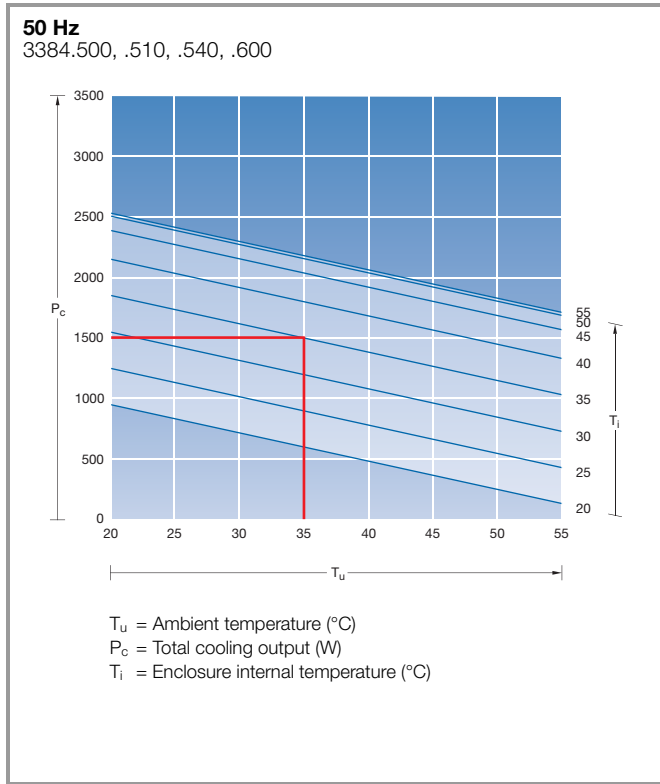


Output class 1100 W (115/230 V, 1~)

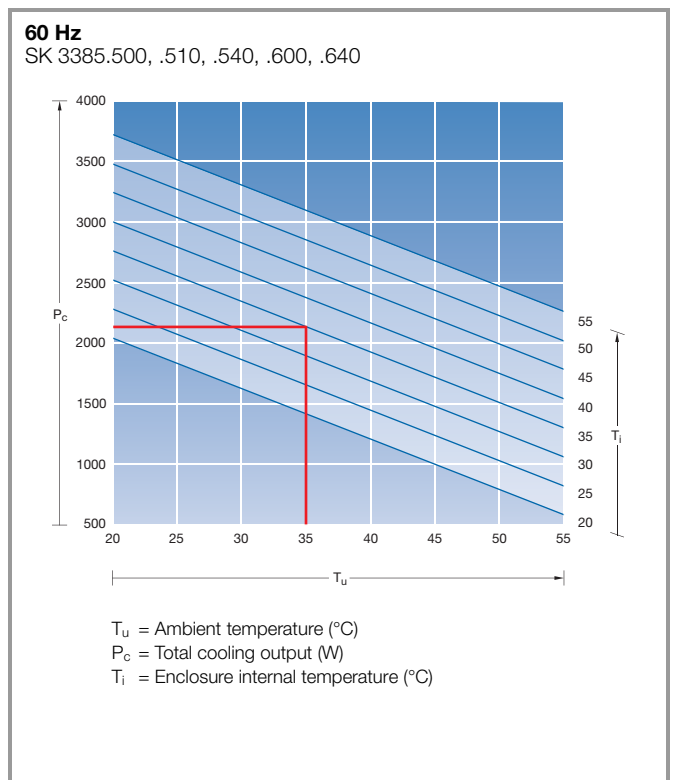
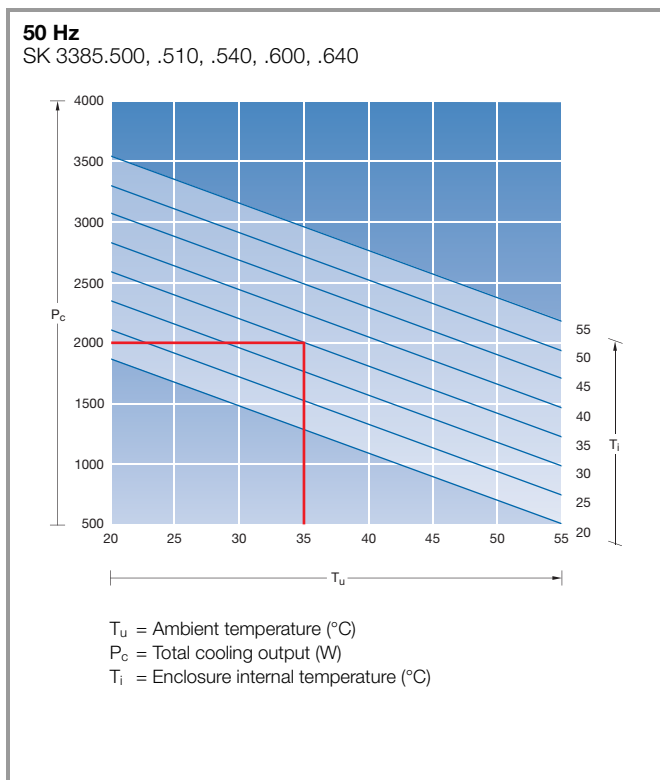


TopTherm roof-mounted cooling units Blue e

Output class 1500 W (115/230 V, 1~, 400 V, 2~)



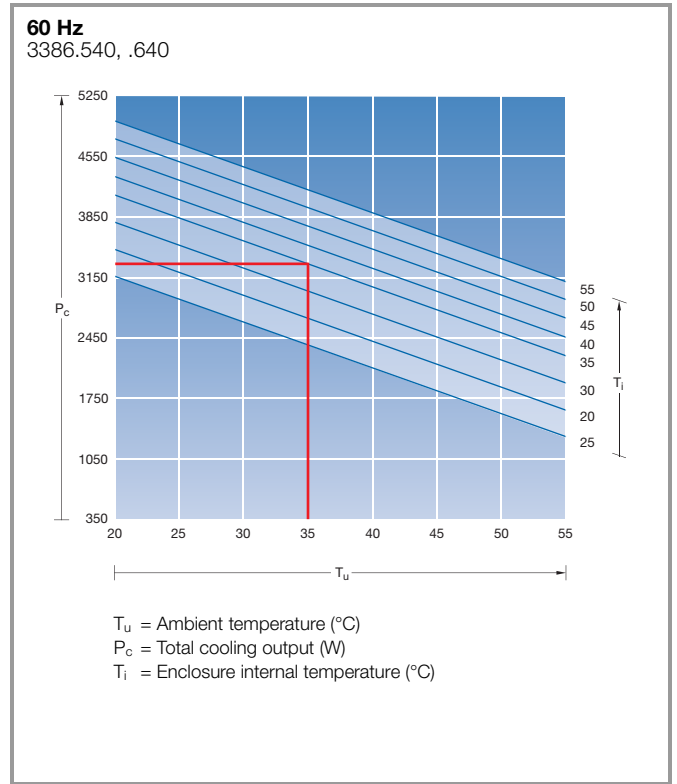
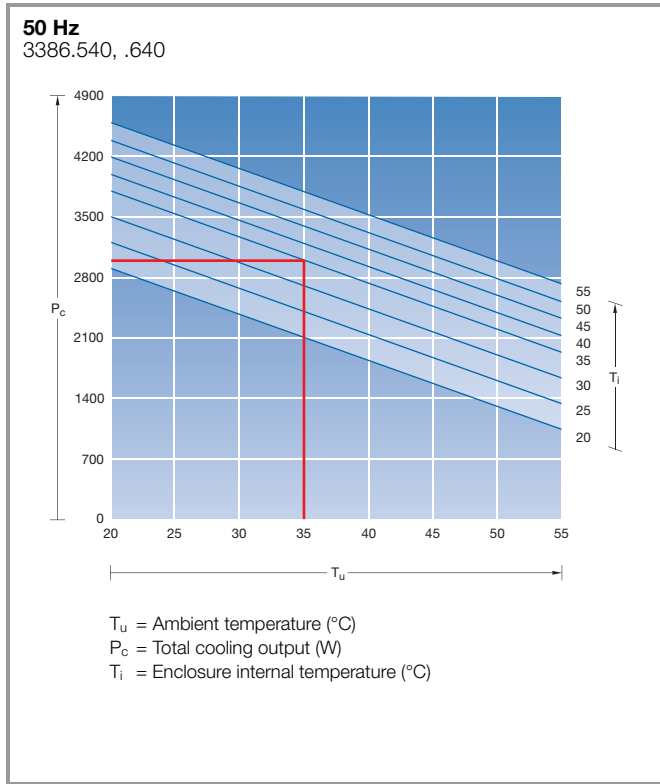
Output class 2000 W (115/230 V, 1~, 400 V, 2~)



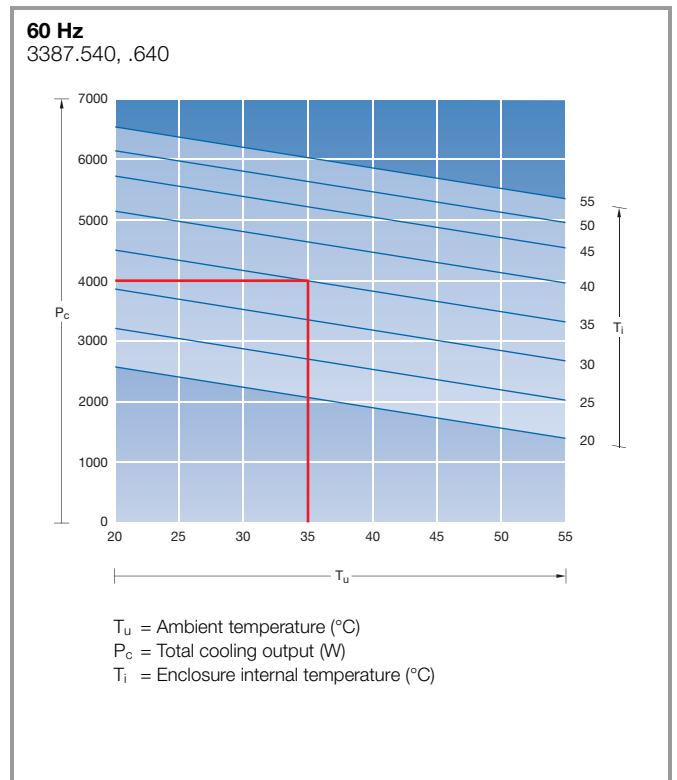
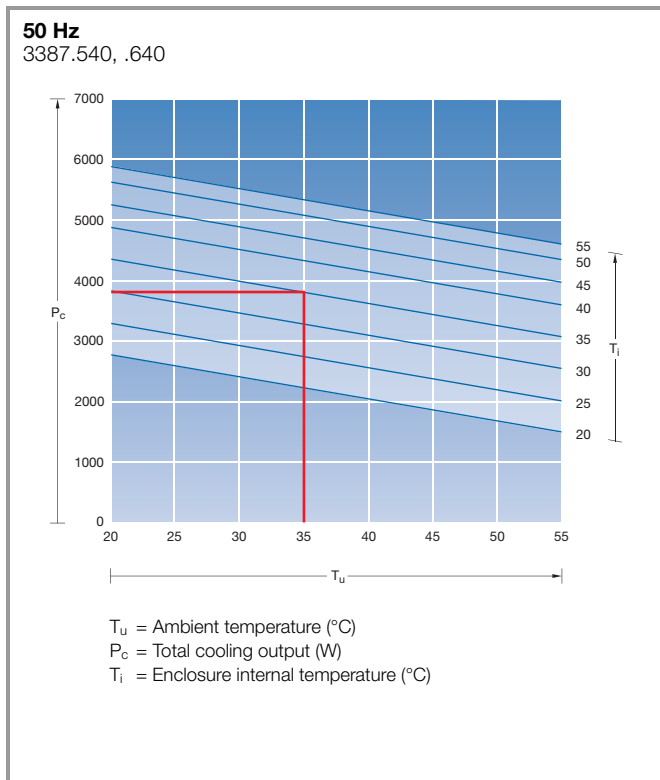
Cooling units

TopTherm roof-mounted cooling units Blue e

Output class 3000 W (400/460 V, 3~)

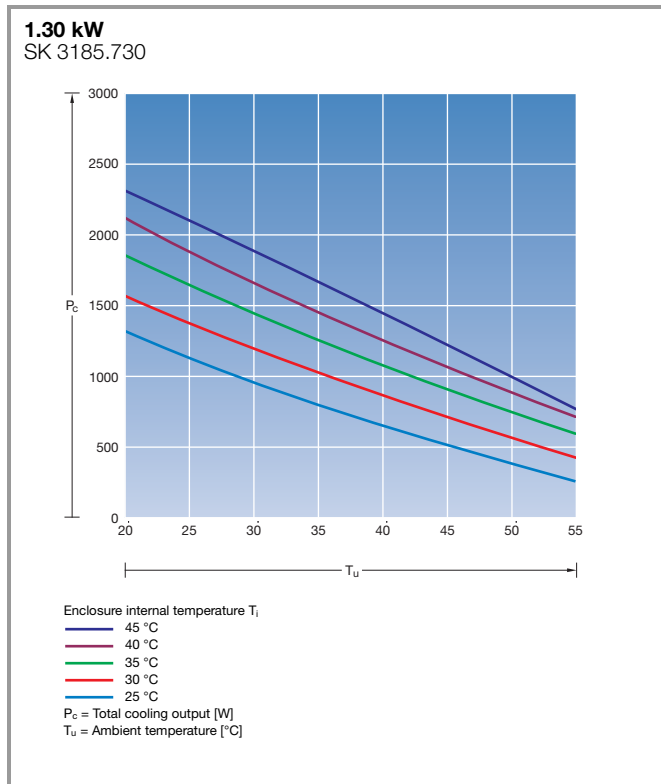


Output class 4000 W (400/460 V, 3~)



Roof-mounted cooling unit Blue e+

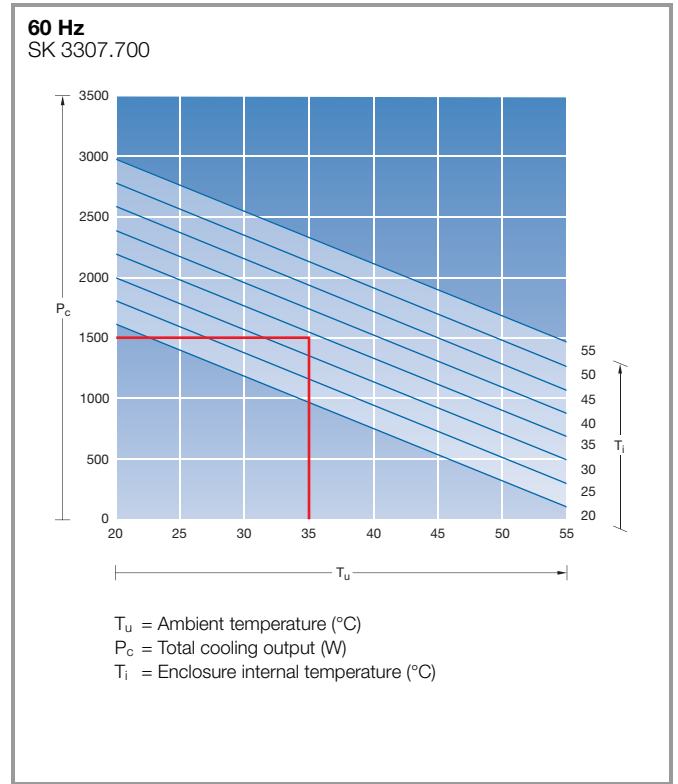
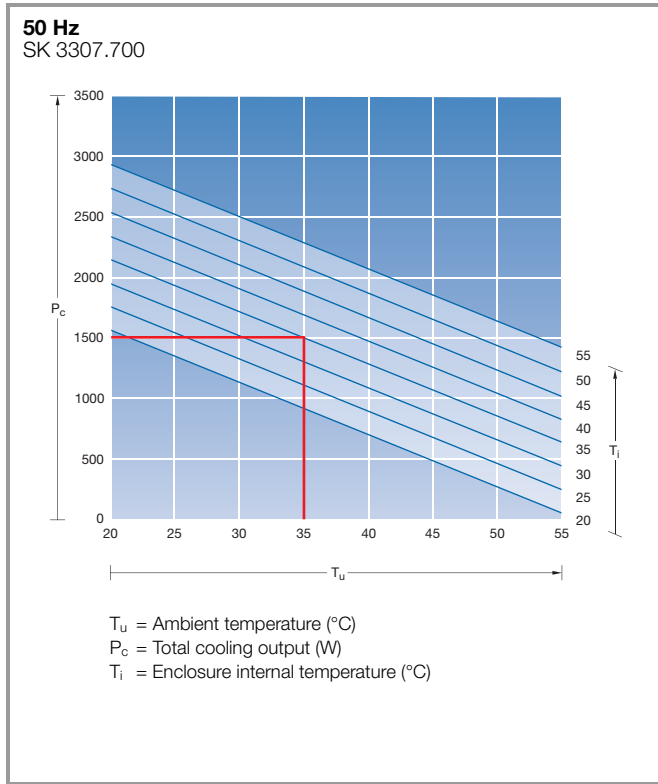
Output class 1300 W (110 – 240 V, 1 ~, 50 – 60 Hz / 380 – 480 V, 3 ~, 50 – 60 Hz)



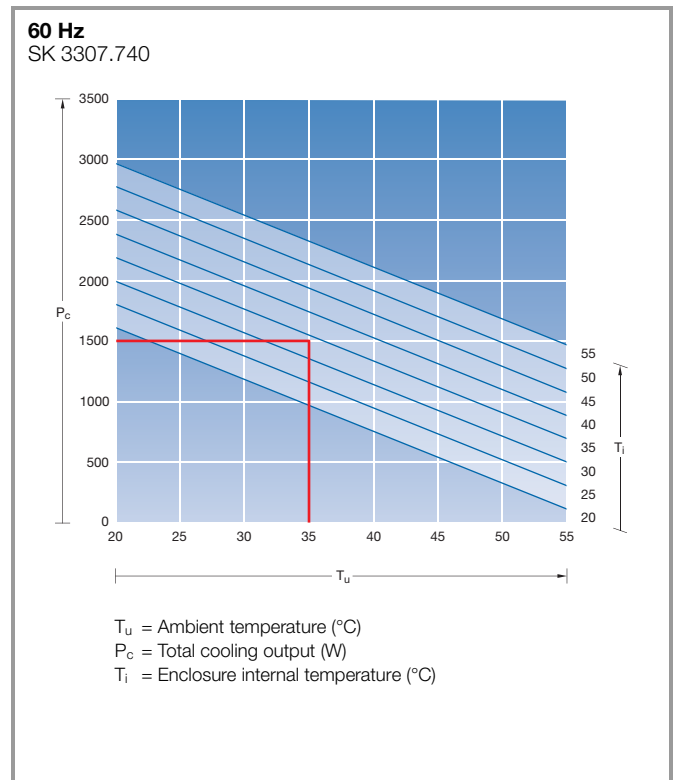
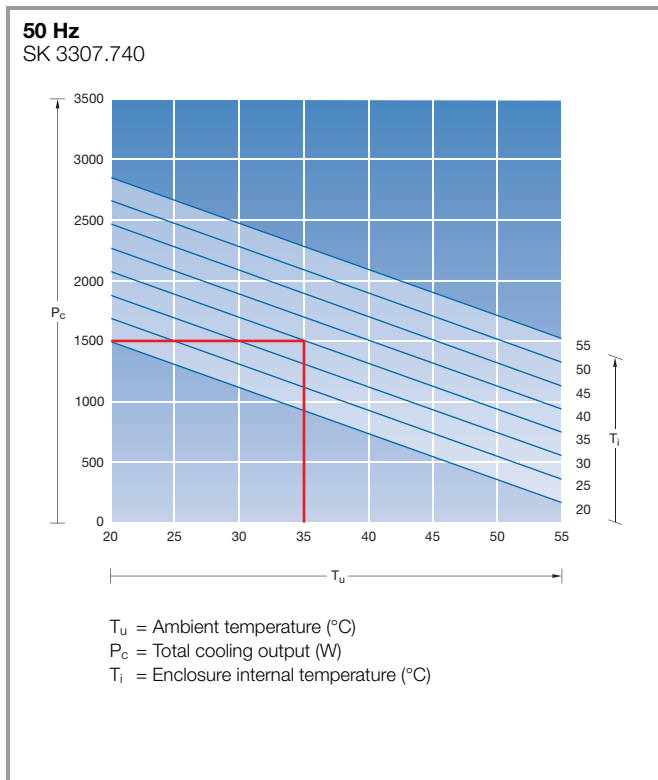
Cooling units

Modular climate control concept – Cooling module Blue e

Output class 1500 W (230 V, 1~)

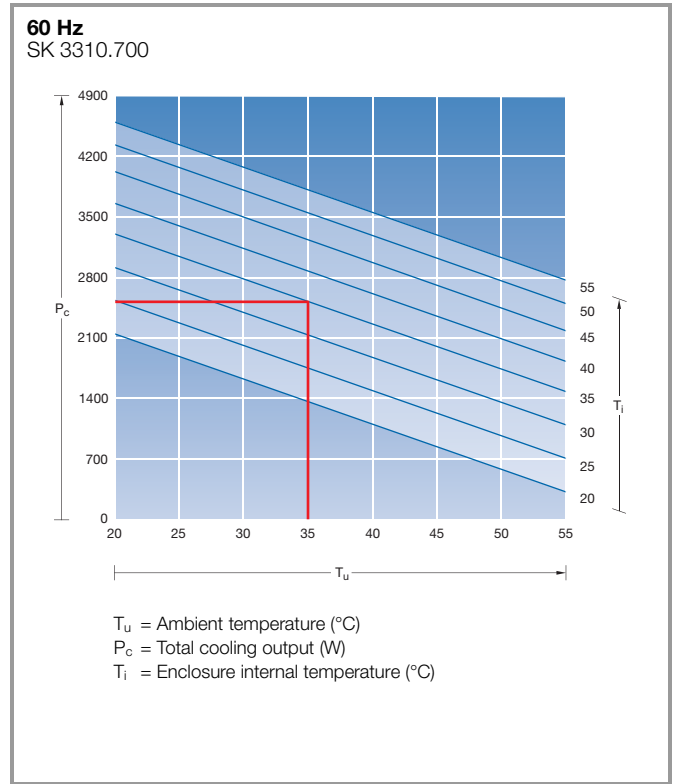
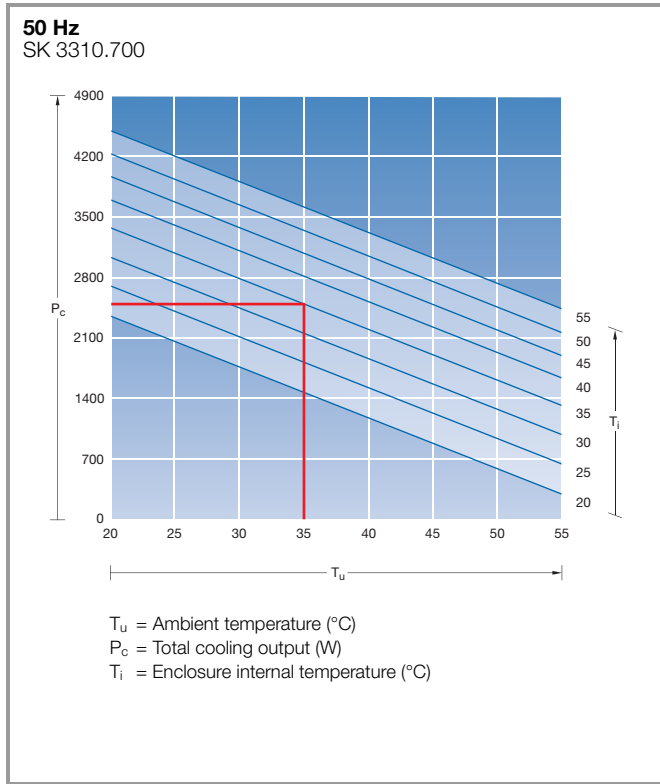


Output class 1500 W (400/460 V, 3~)

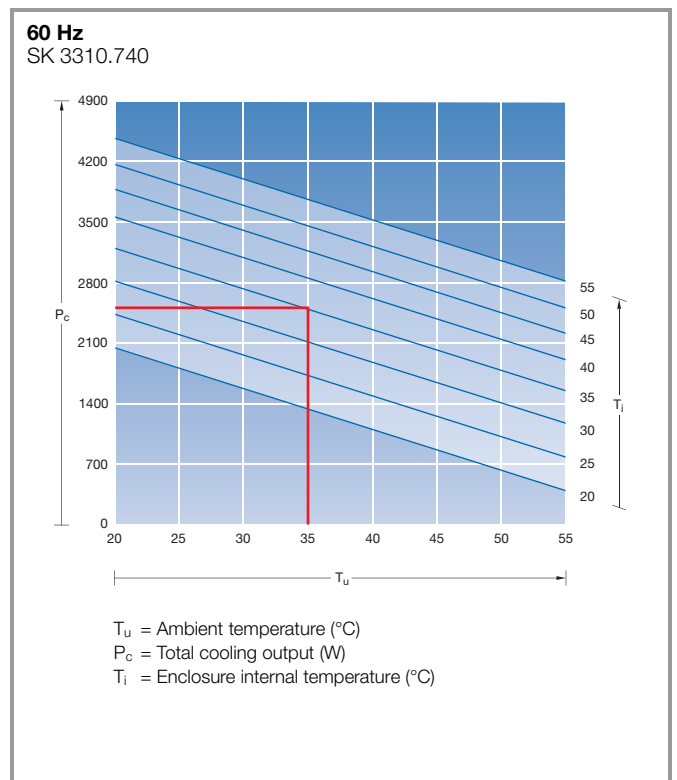
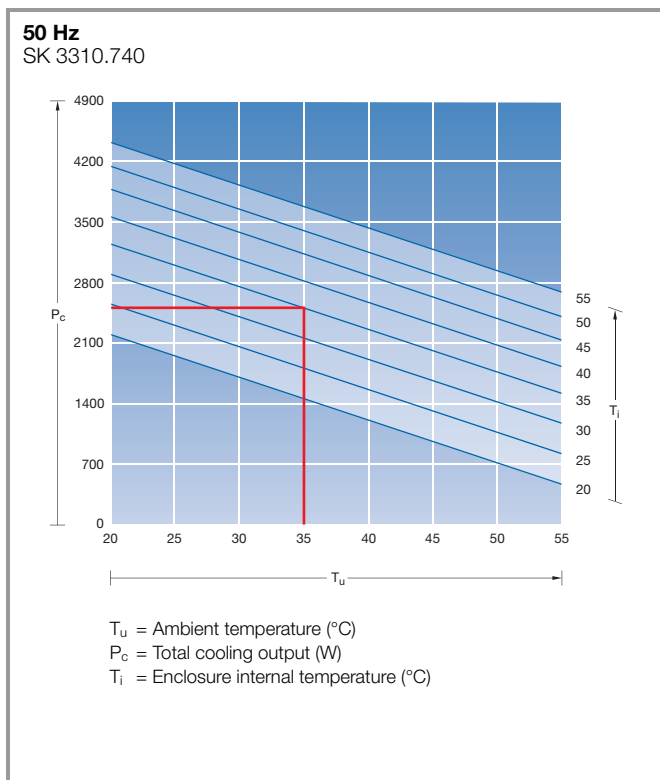


Modular climate control concept – Cooling module Blue e

Output class 2500 W (230 V, 1~)



Output class 2500 W (400/460 V, 3~)

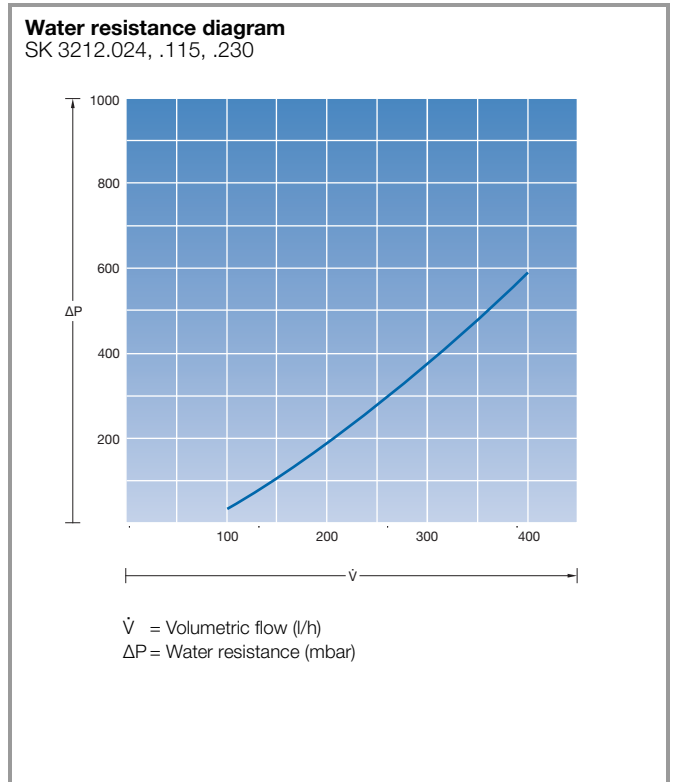
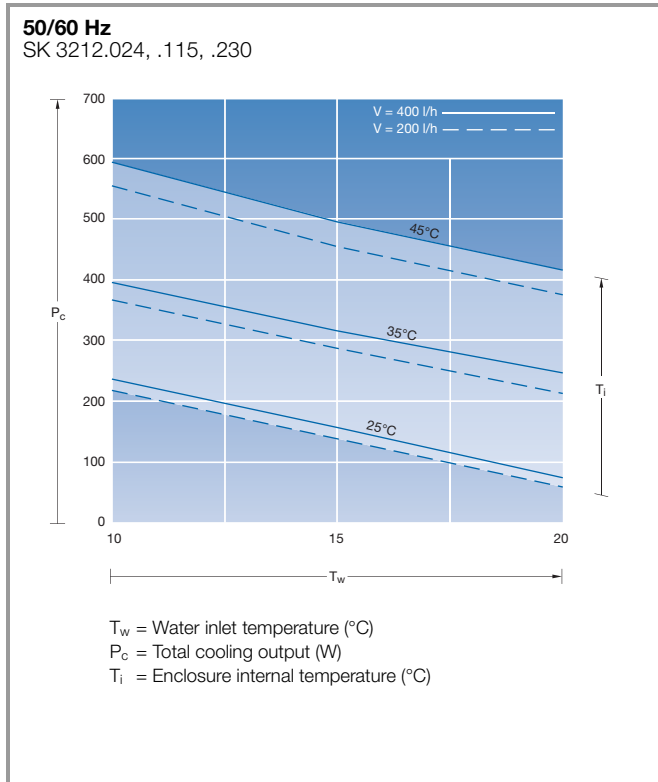


Cooling with water

Wall-mounted air/water heat exchangers

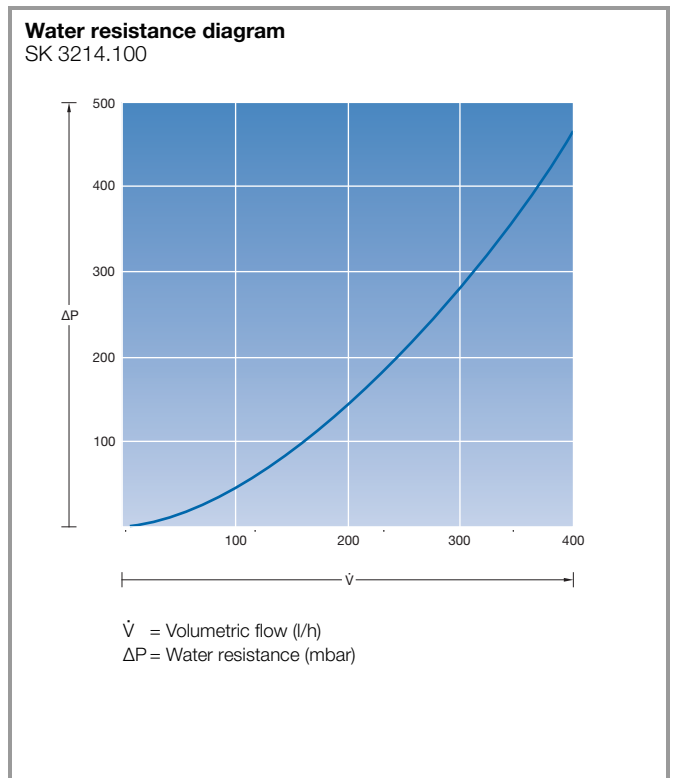
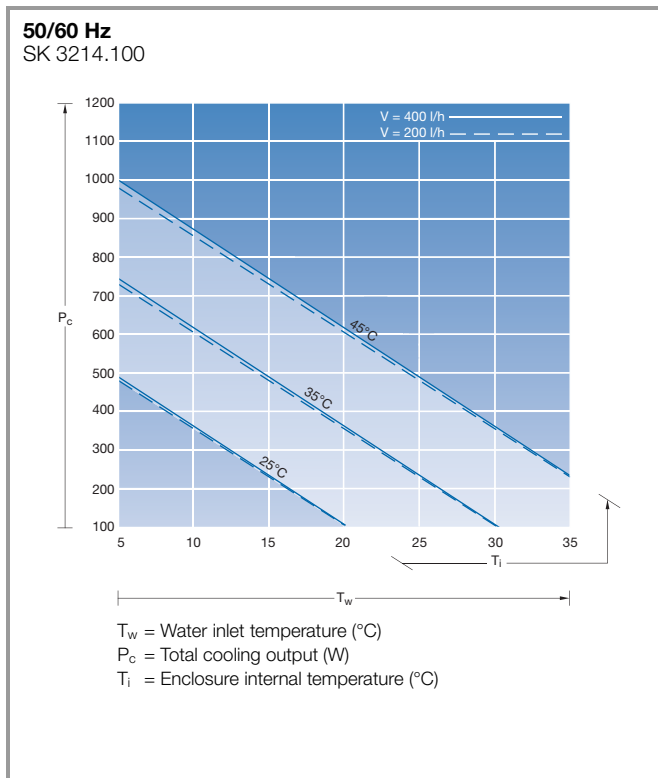
Output class 300 W

Water-carrying parts: Copper/brass (Cu/CuZn)



Output class 600 W

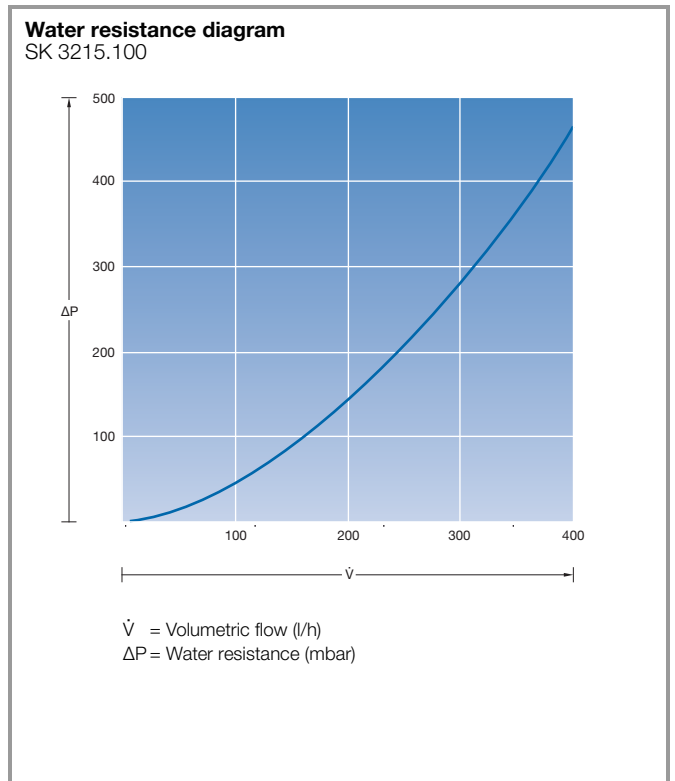
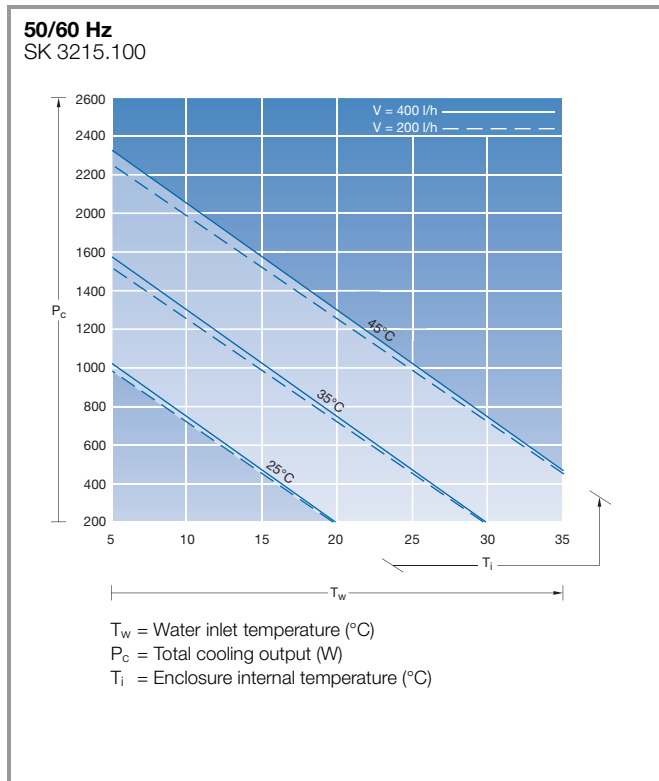
Water-carrying parts: Copper/brass (Cu/CuZn)



Wall-mounted air/water heat exchangers

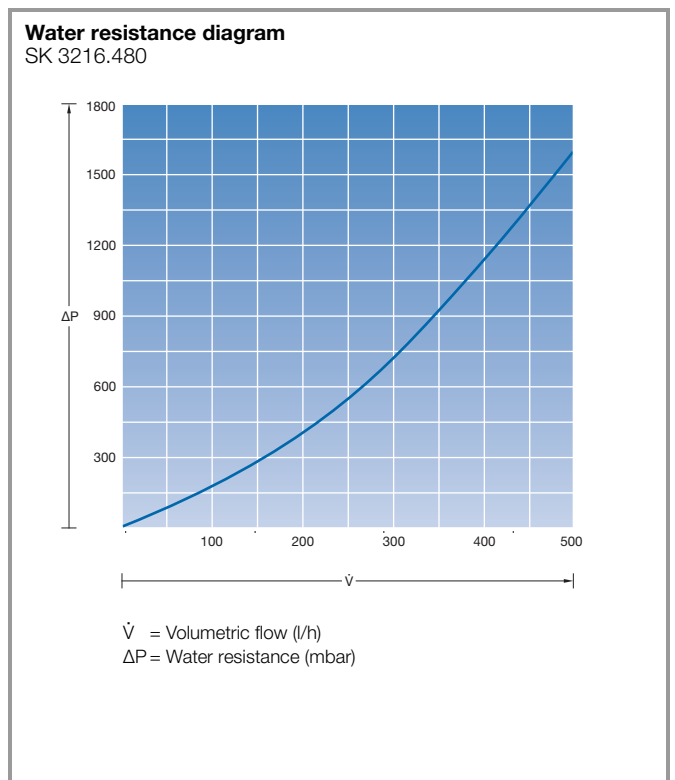
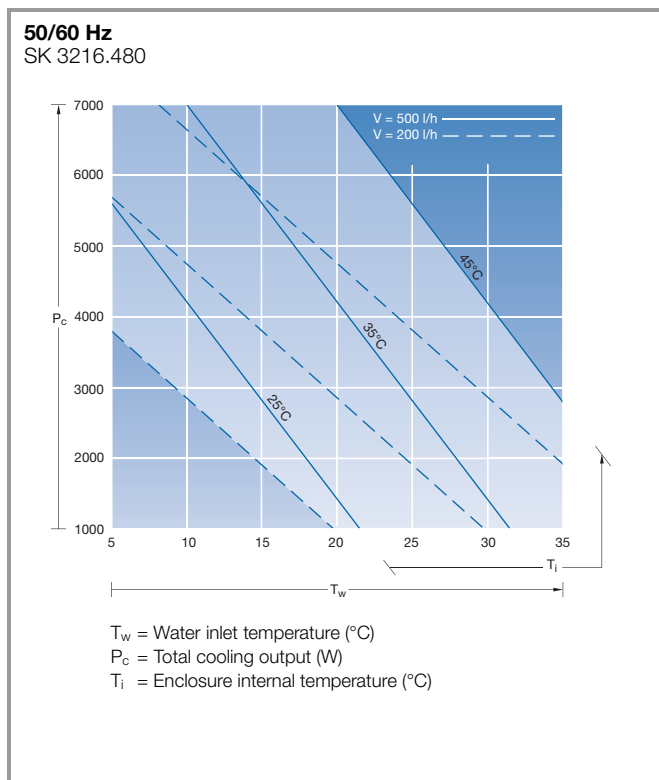
Output class 1250 W

Water-carrying parts: Copper/brass (Cu/CuZn)



Output class 7000 W

Water-carrying parts: Copper/brass (Cu/CuZn)



Cooling with water

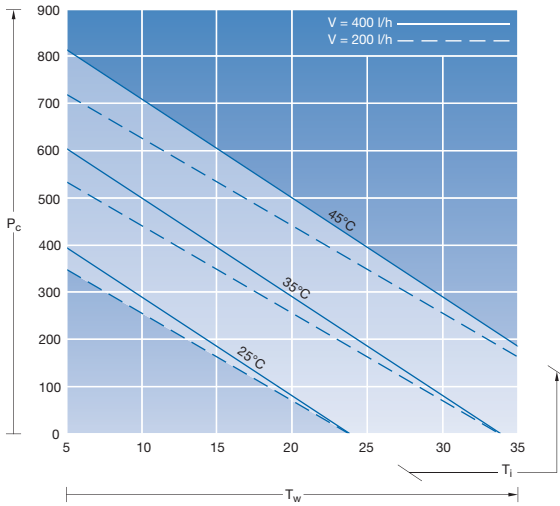
Wall-mounted air/water heat exchangers

Output class 500 W

Water-carrying parts: Copper/brass (Cu/CuZn)

50 Hz

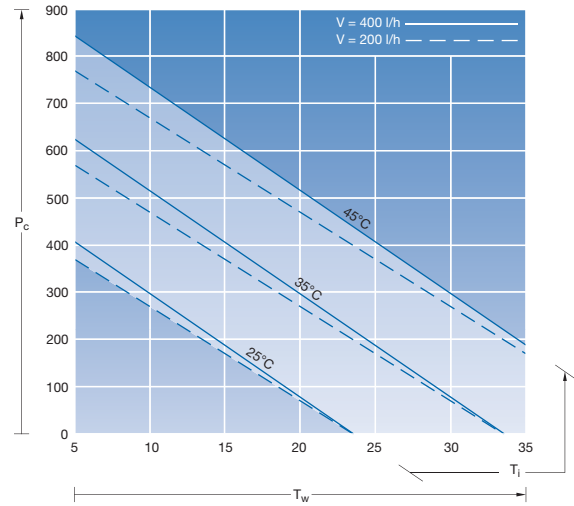
SK 3363.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz

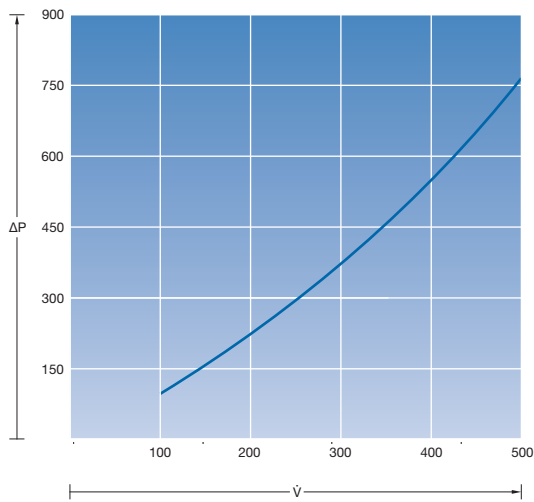
SK 3363.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3363.100, .500



\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

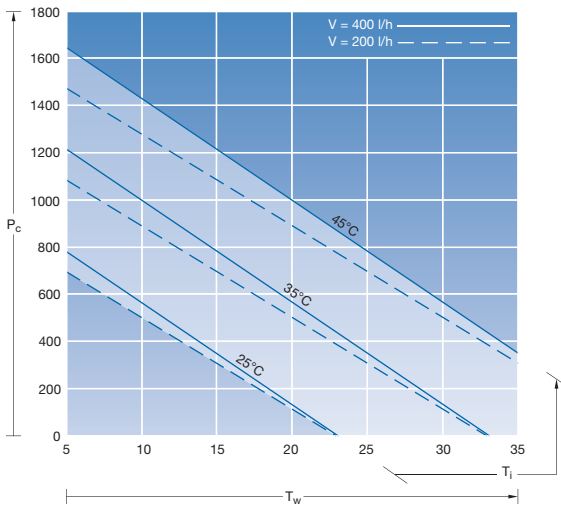
Wall-mounted air/water heat exchangers

Output class 1000 W

Water-carrying parts: Copper/brass (Cu/CuZn)

50 Hz

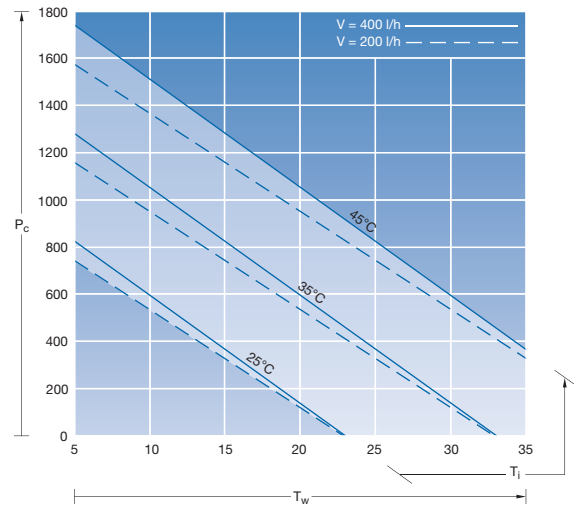
SK 3364.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz

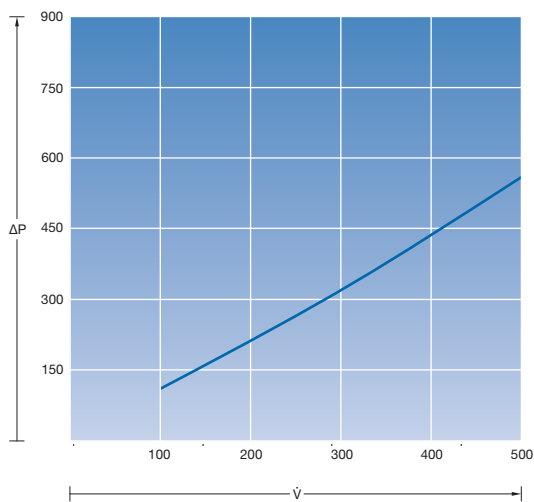
SK 3364.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3364.100, .500



\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

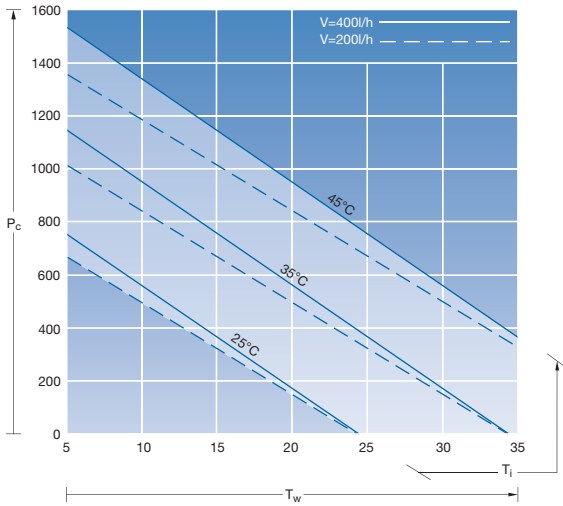
Cooling with water

Wall-mounted air/water heat exchangers

Output class 1000 W

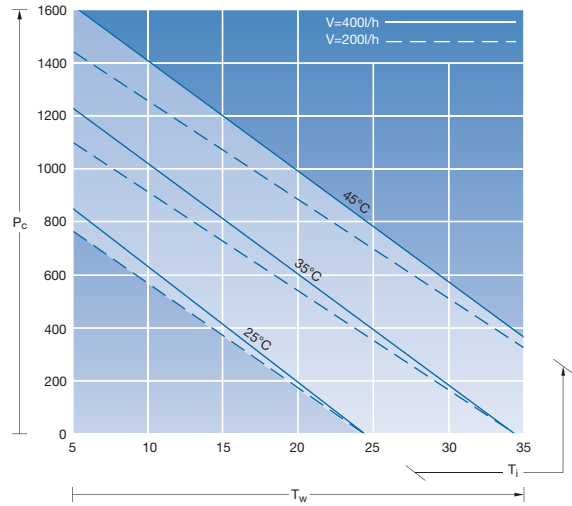
Water-carrying parts: Stainless steel (1.4571)

50 Hz
SK 3364.504



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

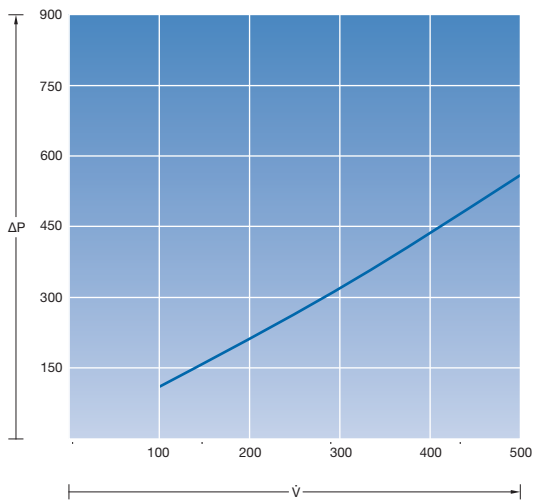
60 Hz
SK 3364.504



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3364.504



\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

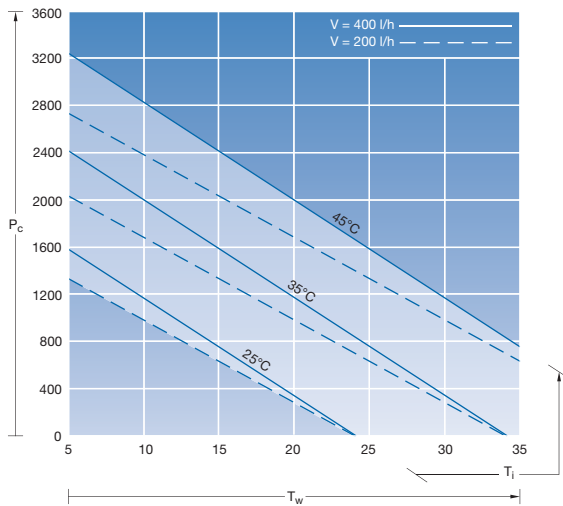
Wall-mounted air/water heat exchangers

Output class 2000 W

Water-carrying parts: Copper/brass (Cu/CuZn)

50 Hz

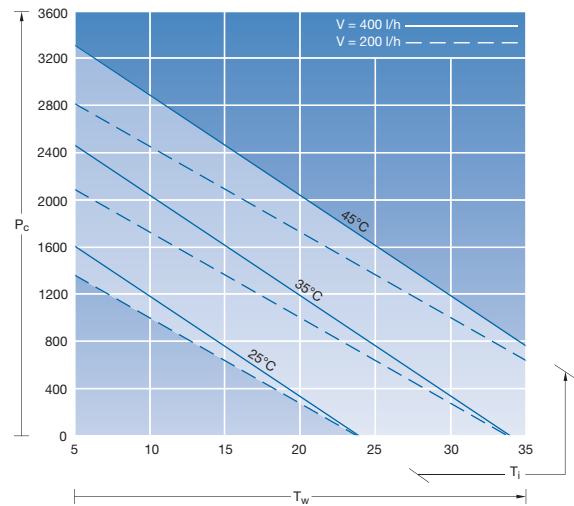
SK 3373.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz

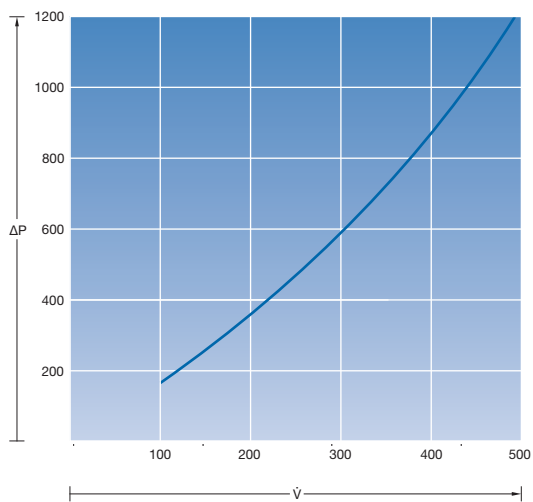
SK 3373.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3373.100, .500



\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

Cooling with water

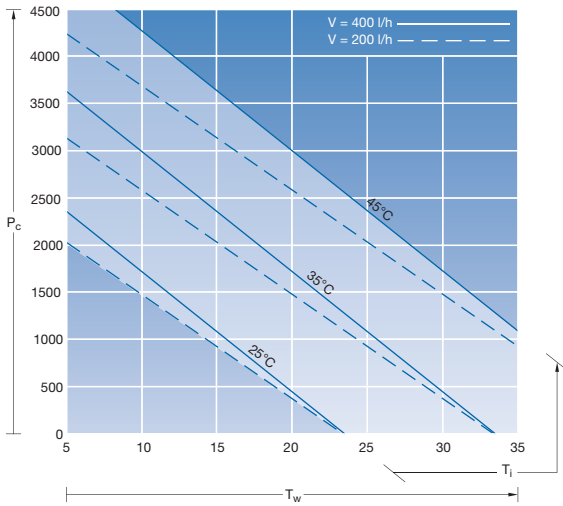
Wall-mounted air/water heat exchangers

Output class 3000 W

Water-carrying parts: Copper/brass (Cu/CuZn)

50 Hz

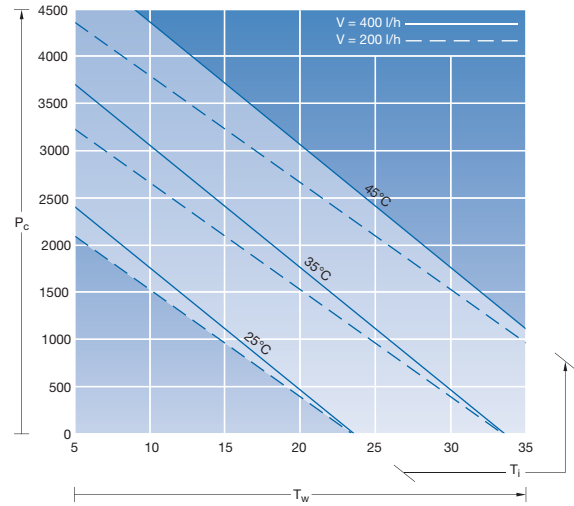
SK 3374.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz

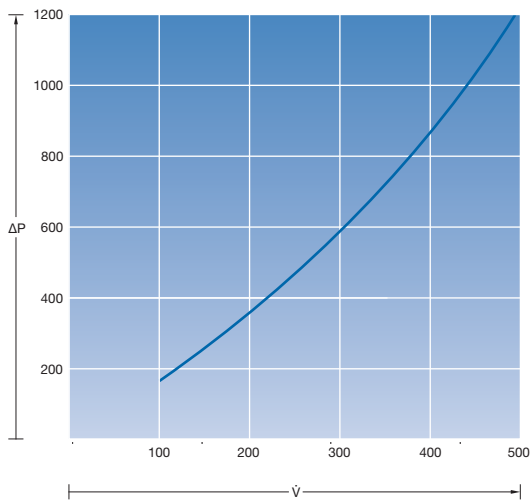
SK 3374.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3374.100, .500



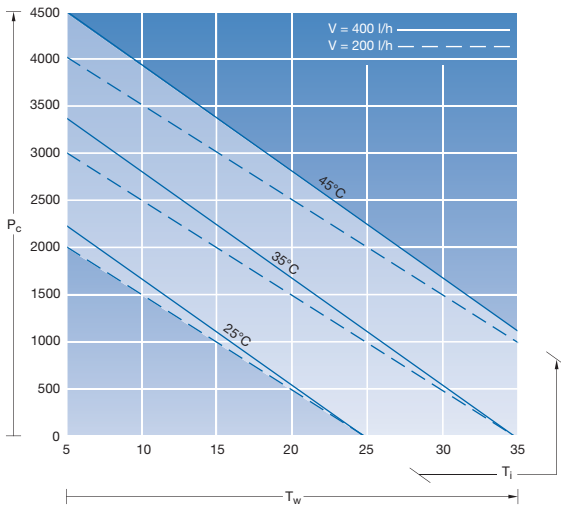
\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

Wall-mounted air/water heat exchangers

Output class 2500 W

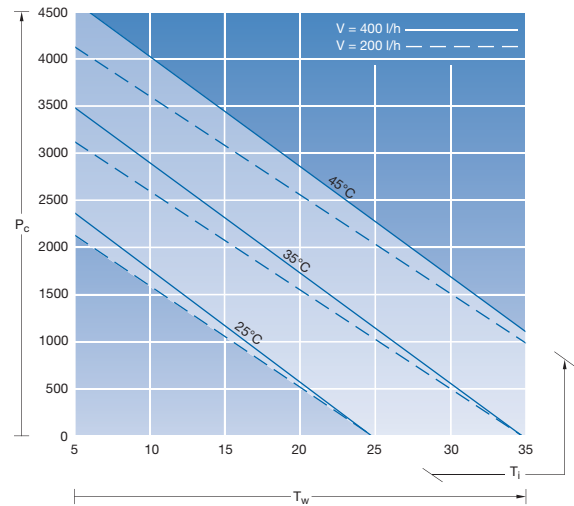
Water-carrying parts: Stainless steel (1.4571)

50 Hz
SK 3374.504



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

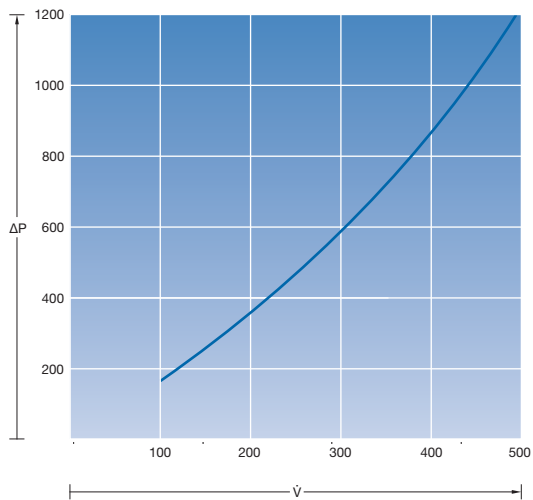
60 Hz
SK 3374.504



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3374.504



\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

Cooling with water

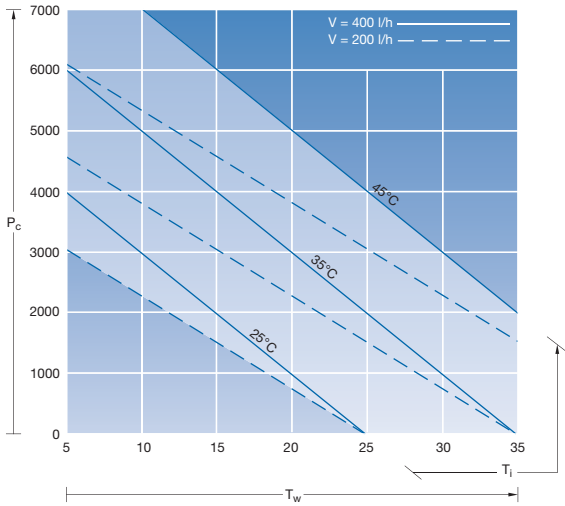
Wall-mounted air/water heat exchangers

Output class 5000 W

Water-carrying parts: Copper/brass (Cu/CuZn)

50 Hz

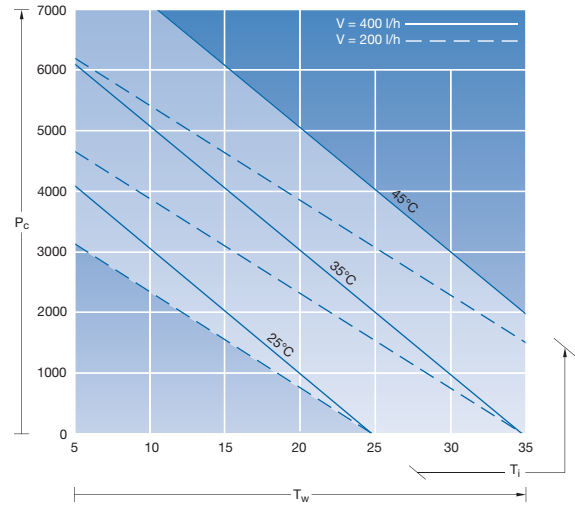
SK 3375.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz

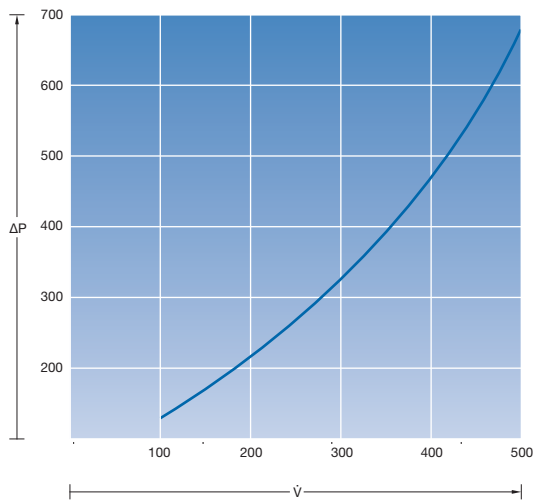
SK 3375.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3375.100, .500



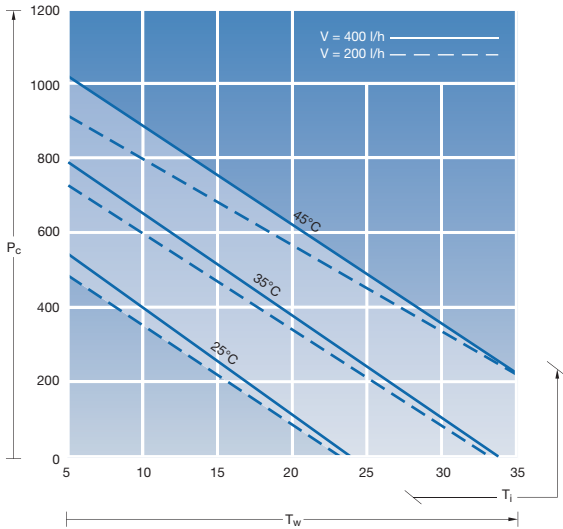
\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

Wall-mounted air/water heat exchangers HD

Output class 600/1200 W

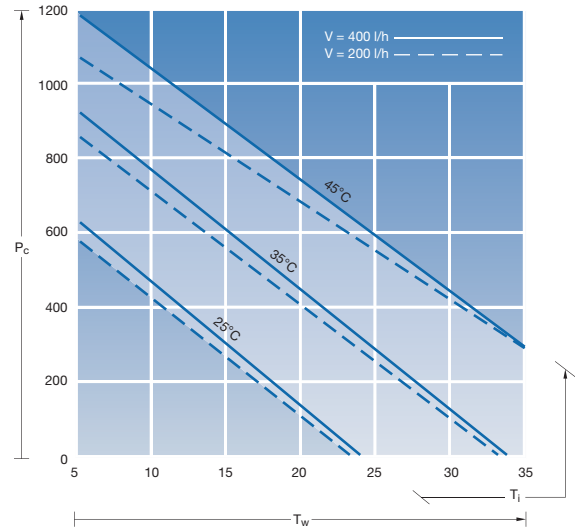
Water-carrying parts: Copper/brass (Cu/CuZn)

50 Hz
SK 3214.700



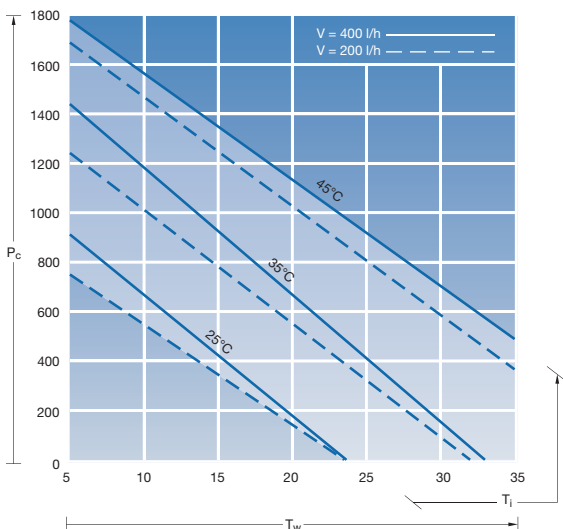
T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz
SK 3274.600



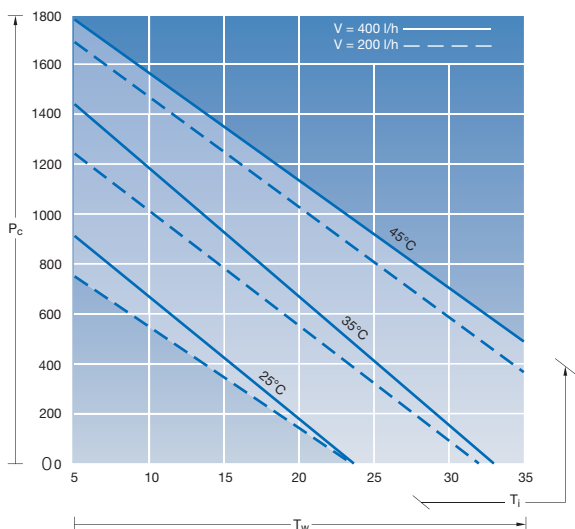
T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

50 Hz
SK 3217.500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz
SK 3217.600



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

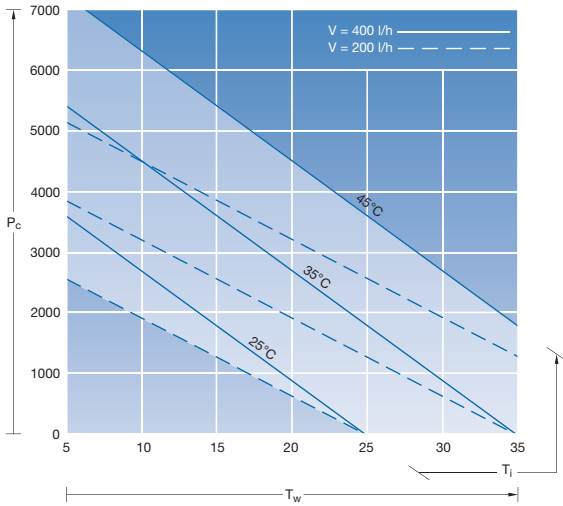
Cooling with water

Wall-mounted air/water heat exchangers

Output class 4000 W

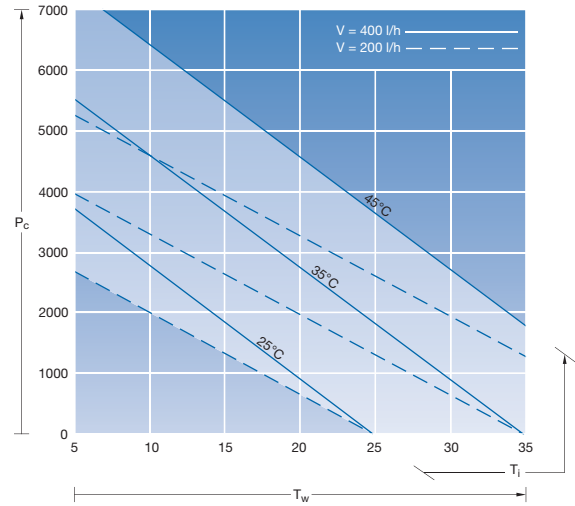
Water-carrying parts: Stainless steel (1.4571)

50 Hz
SK 3375.504



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

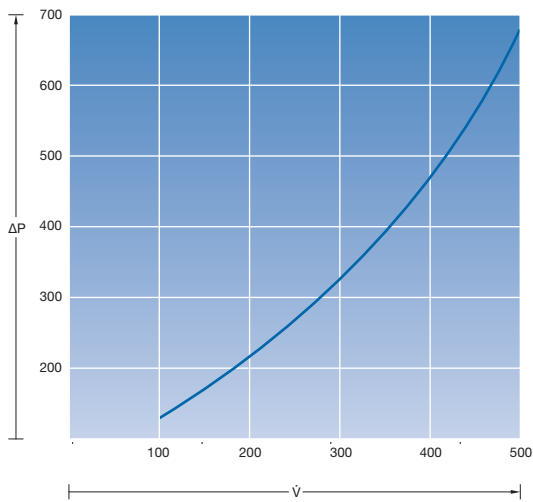
60 Hz
SK 3375.504



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3375.504



\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

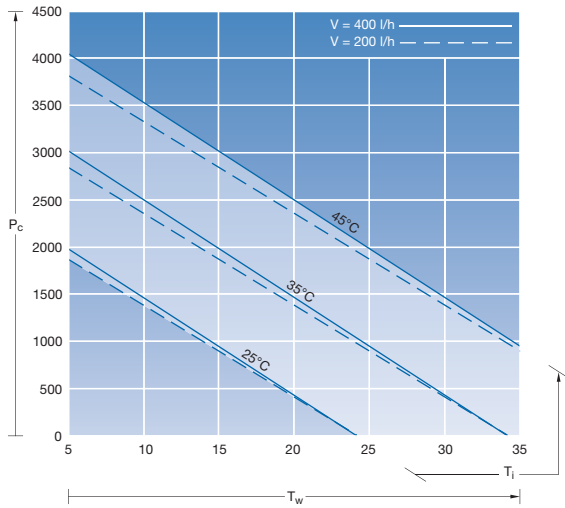
Roof-mounted air/water heat exchangers

Output class 2500 W

Water-carrying parts: Copper/brass (Cu/CuZn)

50 Hz

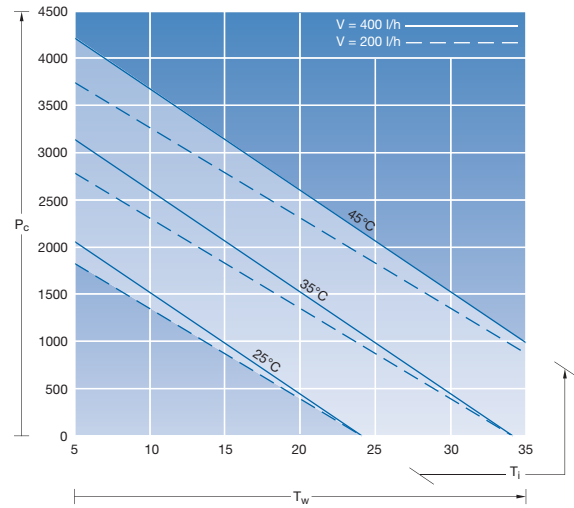
SK 3209.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz

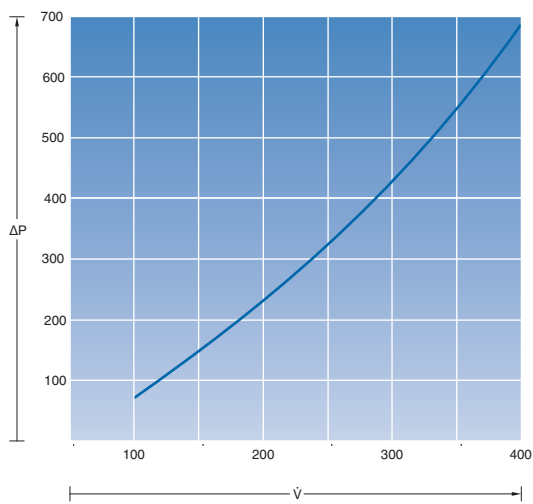
SK 3209.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3209.100, .500



\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

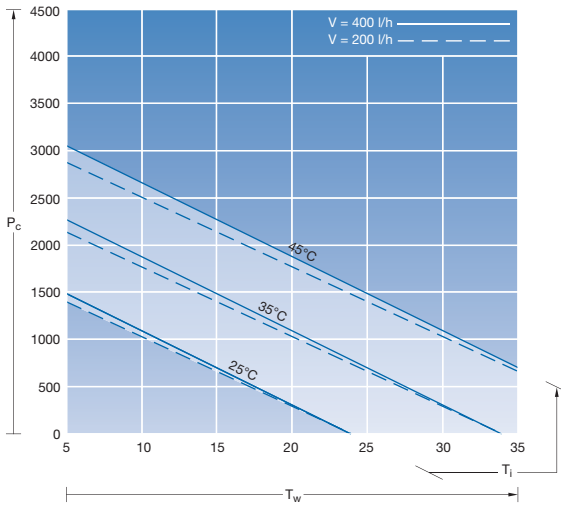
Cooling with water

Roof-mounted air/water heat exchangers

Output class 1875 W

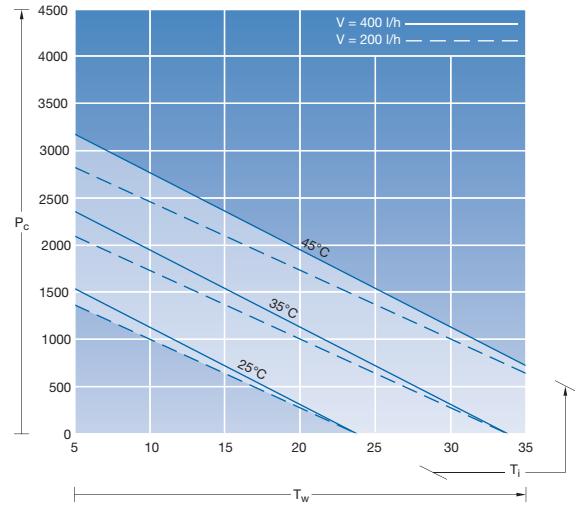
Water-carrying parts: Stainless steel (1.4571)

50 Hz
SK 3209.504



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

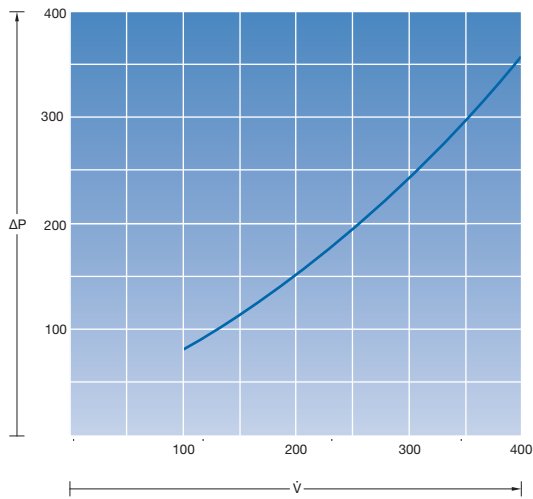
60 Hz
SK 3209.504



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3209.504



\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

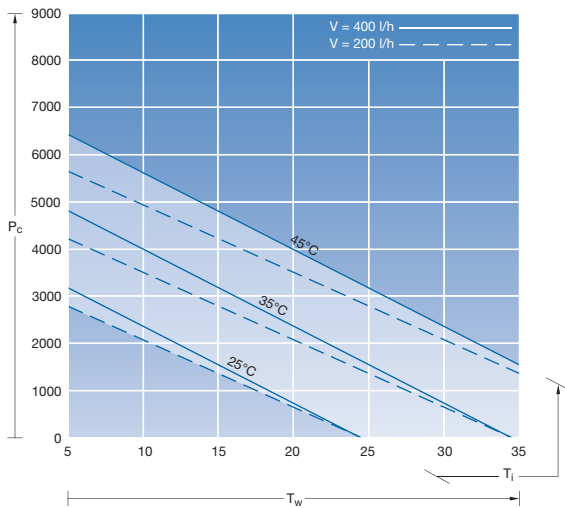
Roof-mounted air/water heat exchangers

Output class 4000 W

Water-carrying parts: Copper/brass (Cu/CuZn)

50 Hz

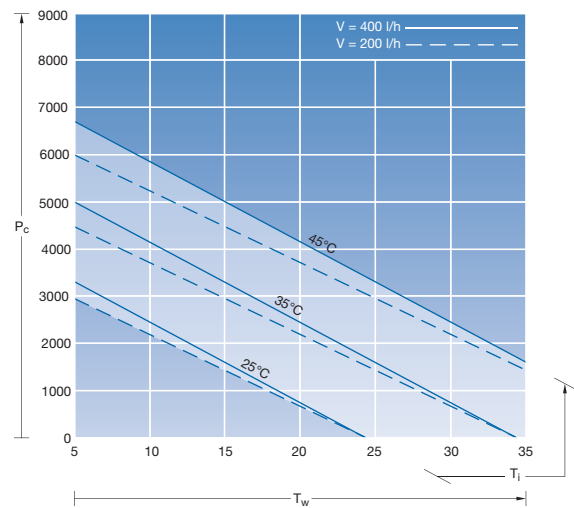
SK 3210.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

60 Hz

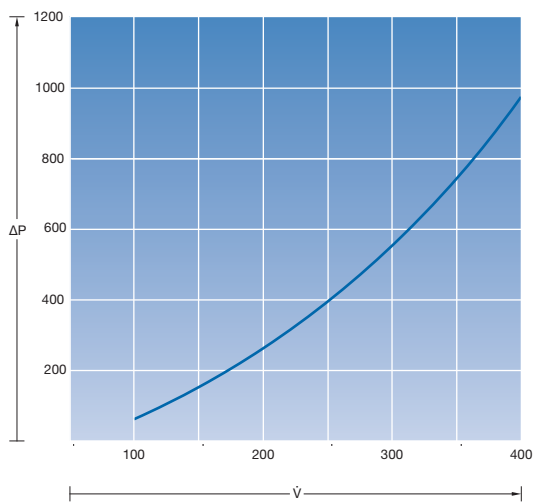
SK 3210.100, .500



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3210.100, .500



\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

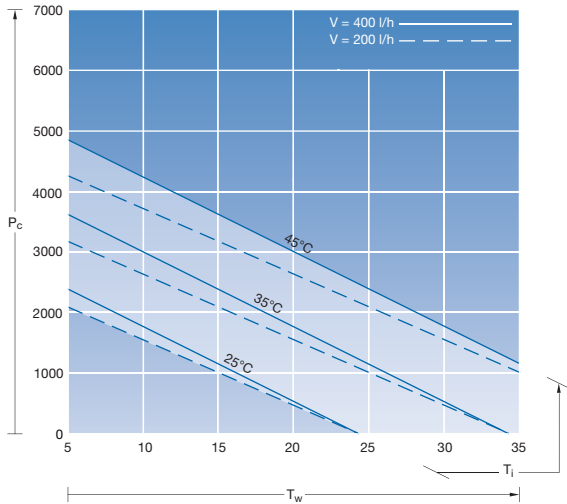
Cooling with water

Roof-mounted air/water heat exchangers

Output class 3000 W

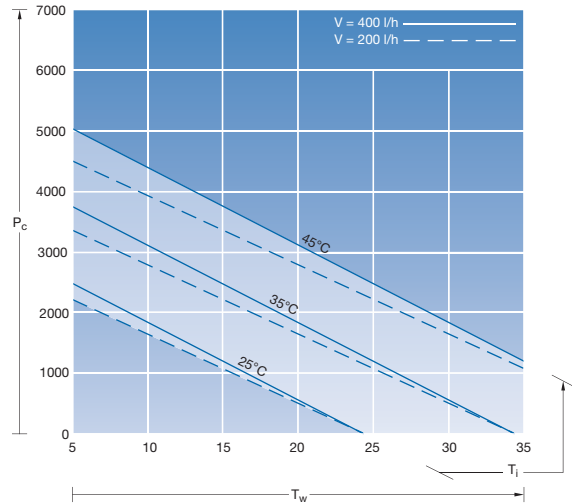
Water-carrying parts: Stainless steel (1.4571)

50 Hz
SK 3210.504



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

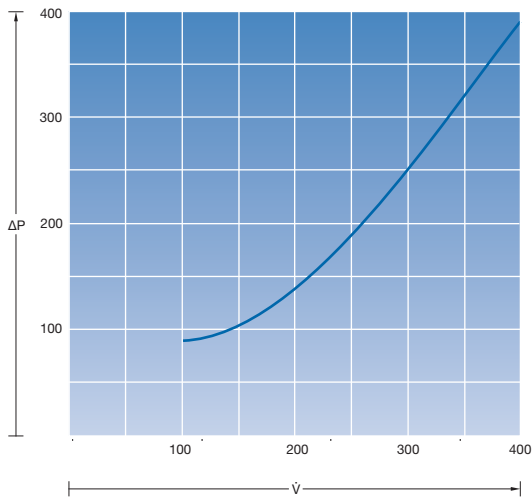
60 Hz
SK 3210.504



T_w = Water inlet temperature (°C)
 P_c = Total cooling output (W)
 T_i = Enclosure internal temperature (°C)

Water resistance diagram

SK 3210.504

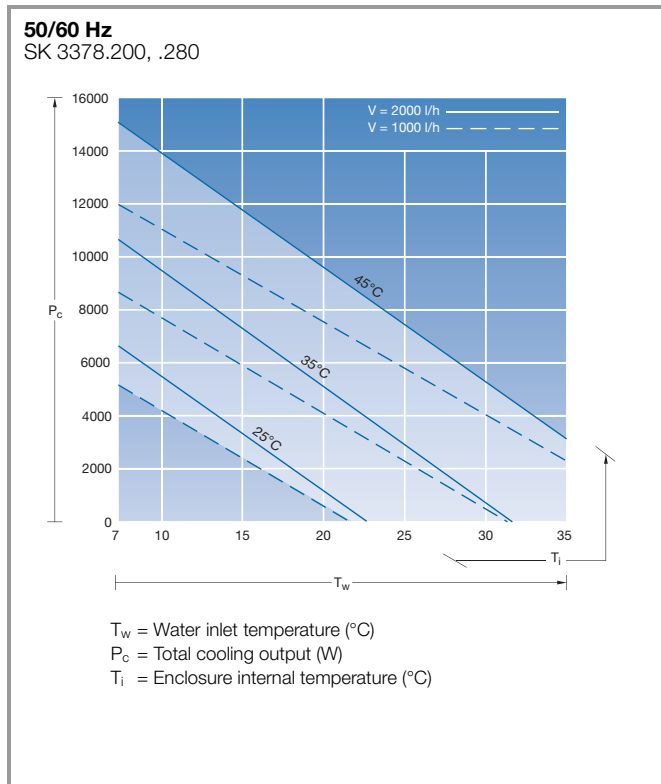


\dot{V} = Volumetric flow (l/h)
 ΔP = Water resistance (mbar)

Liquid Cooling Package

Output class 10 kW, LCP Rack Industry

Water-carrying parts: Copper/brass (Cu/CuZn)



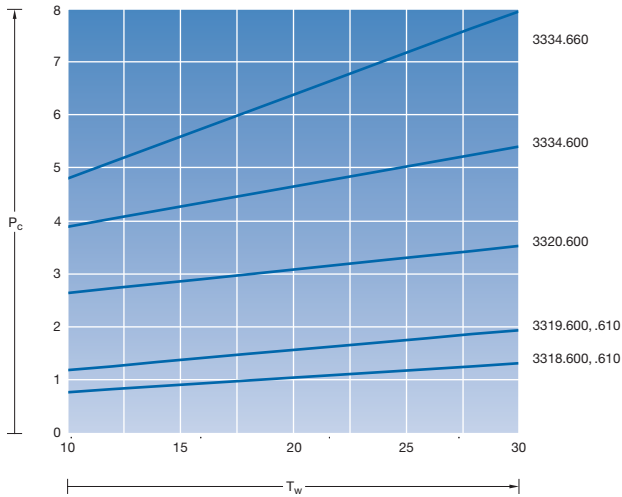
Cooling with water

TopTherm chillers

Output class 1 – 6 kW

50 Hz at $T_u = 32\text{ °C}$

SK 3318.600, .610, 3319.600, .610, 3320.600, 3334.600, .660

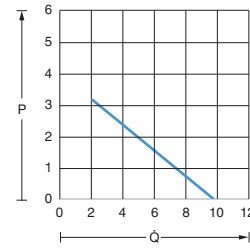


T_w = Water inlet temperature (°C)
 T_u = Ambient temperature (°C)
 P_c = Total cooling output (kW)

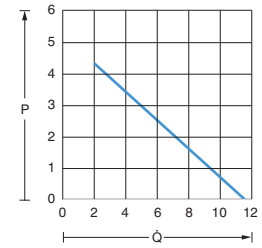
Characteristic curves of pump

SK 3318.600/SK 3318.610/SK 3319.600/SK 3319.610

50 Hz

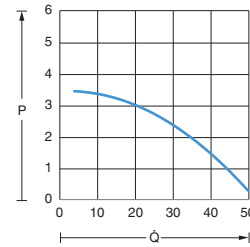


60 Hz

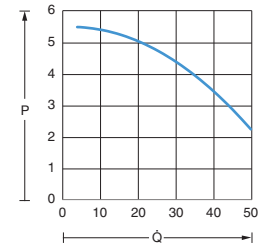


SK 3320.600/SK 3334.600/SK 3334.660

50 Hz



60 Hz

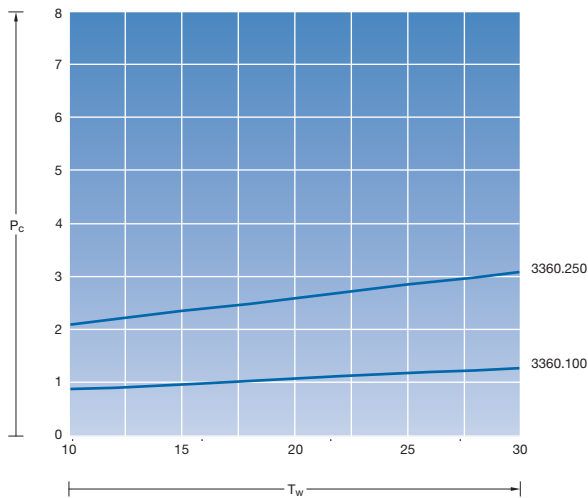


P = External static pressure [bar]
 \dot{Q} = Delivery flow Q [l/min]

Output class 1 – 2.5 kW, wall-mounted

50 Hz at $T_u = 32\text{ °C}$

SK 3360.100, .250

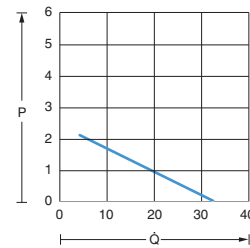


T_w = Water inlet temperature (°C)
 T_u = Ambient temperature (°C)
 P_c = Total cooling output (kW)

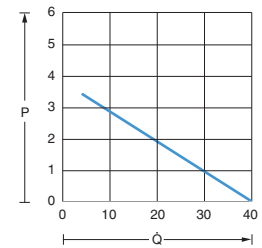
Characteristic curves of pump

SK 3360.100/SK 3360.250

50 Hz



60 Hz



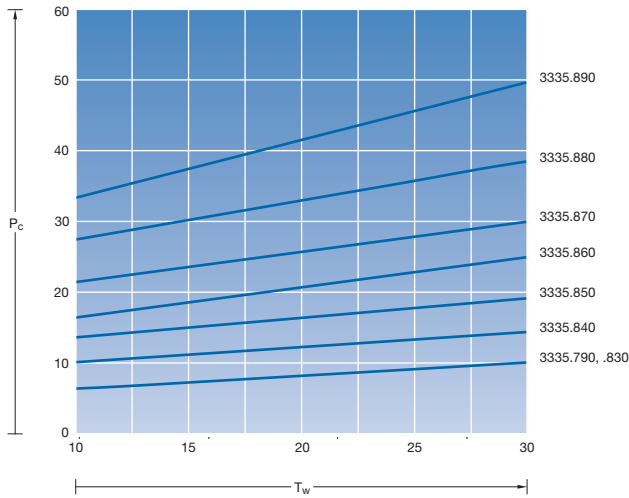
P = External static pressure [bar]
 \dot{Q} = Delivery flow Q [l/min]

TopTherm chillers

Output class 8 – 40 kW

50 Hz at $T_u = 32\text{ }^\circ\text{C}$

SK 3335.790, .830, .840, .850, .860, .870, .880, .890

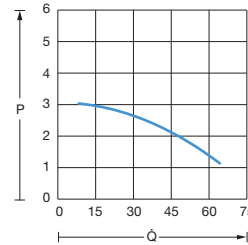


T_w = Water inlet temperature ($^\circ\text{C}$)
 T_u = Ambient temperature ($^\circ\text{C}$)
 P_c = Total cooling output (kW)

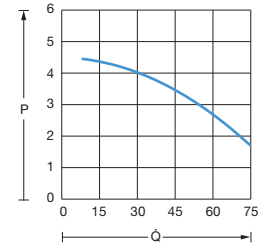
Characteristic curves of pump

SK 3335.850

50 Hz

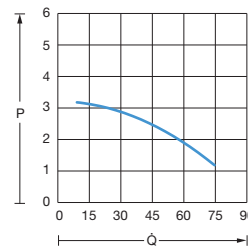


60 Hz

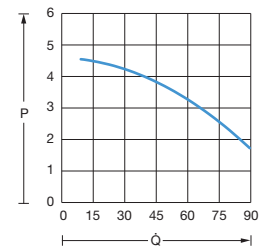


SK 3335.860

50 Hz

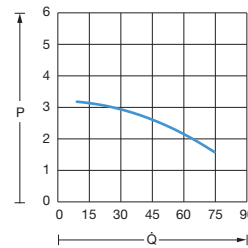


60 Hz

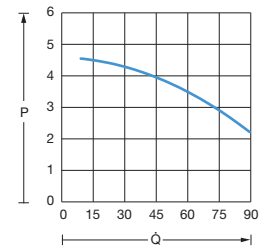


SK 3335.870

50 Hz



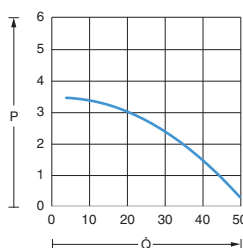
60 Hz



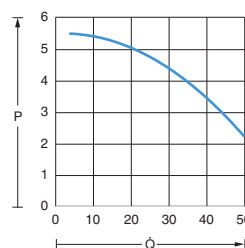
Characteristic curves of pump

SK 3335.790/SK 3335.830

50 Hz

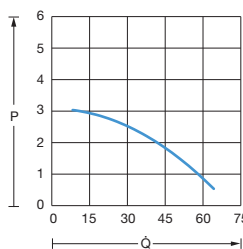


60 Hz

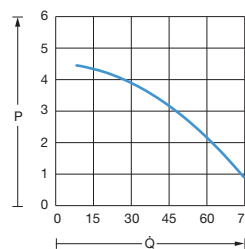


SK 3335.840

50 Hz

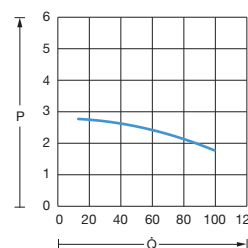


60 Hz

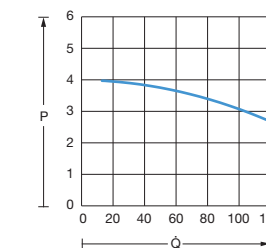


SK 3335.880

50 Hz

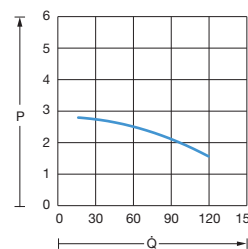


60 Hz

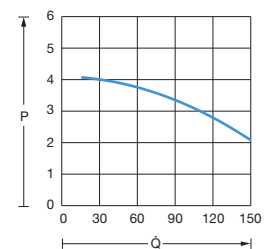


SK 3335.890

50 Hz



60 Hz

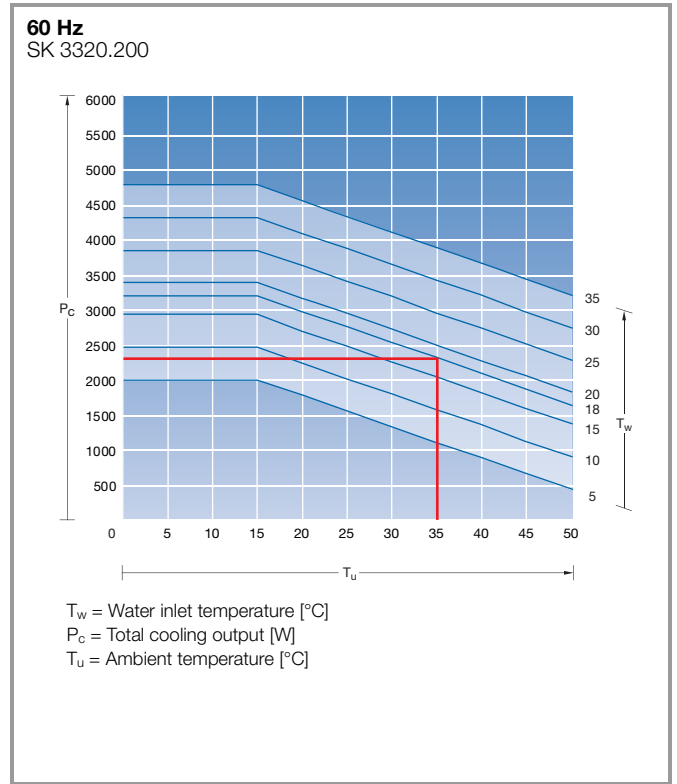
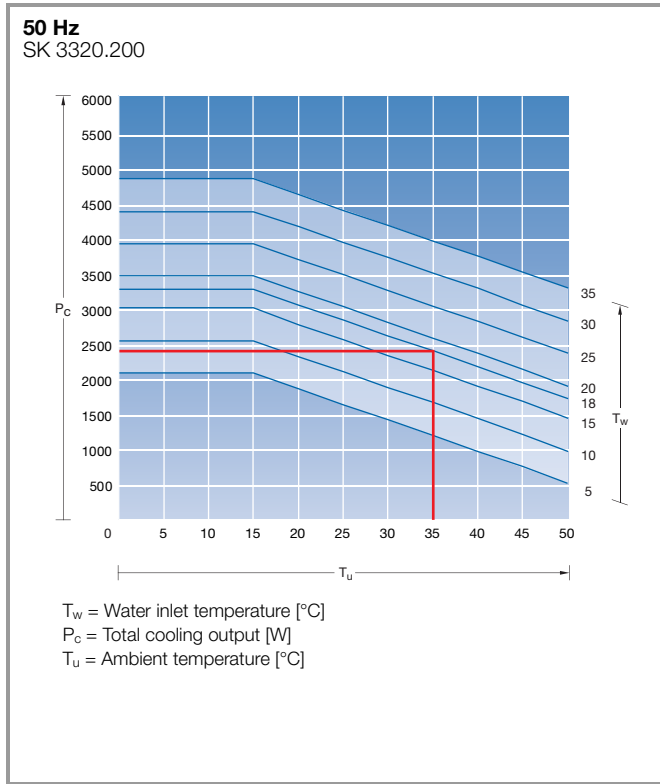


P = External static pressure [bar]
 \dot{Q} = Delivery flow Q [l/min]

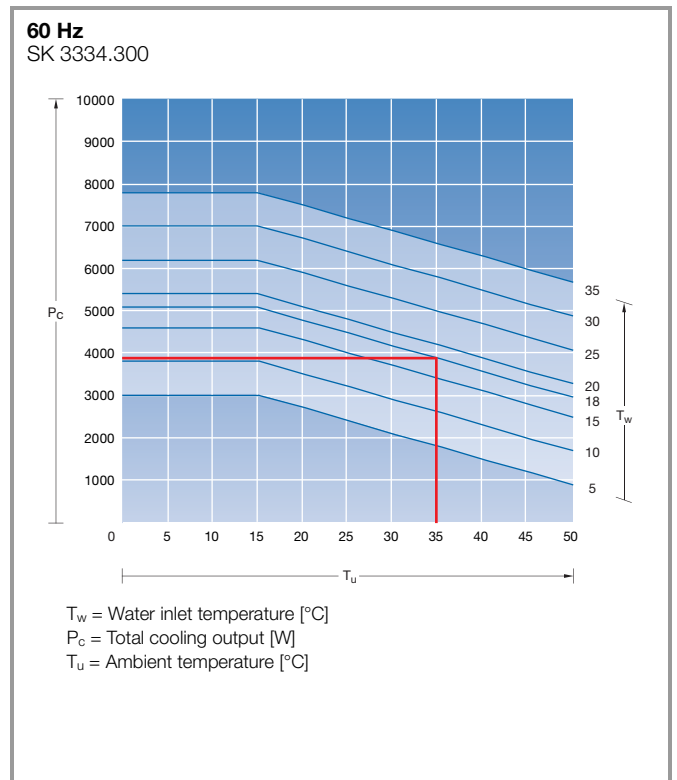
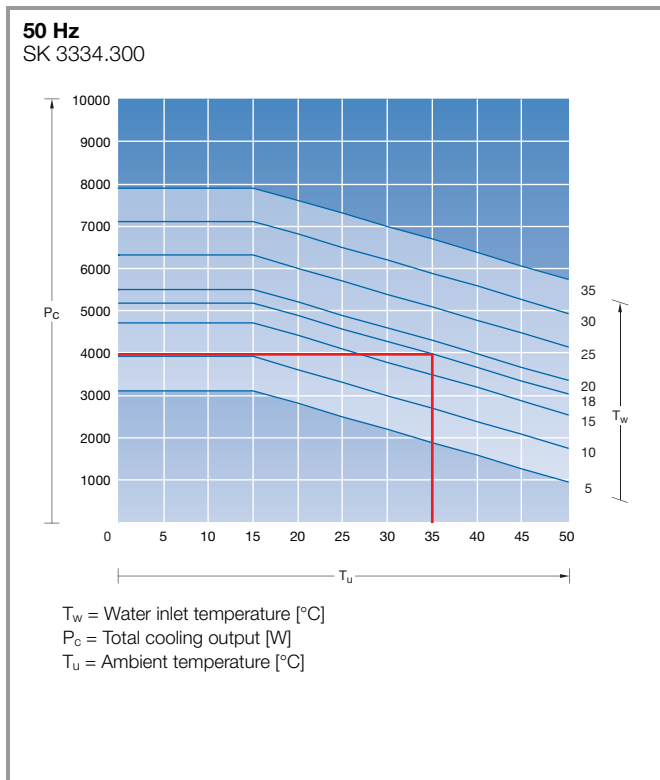
Cooling with water

Blue e+ chillers

Output class 2.5 kW

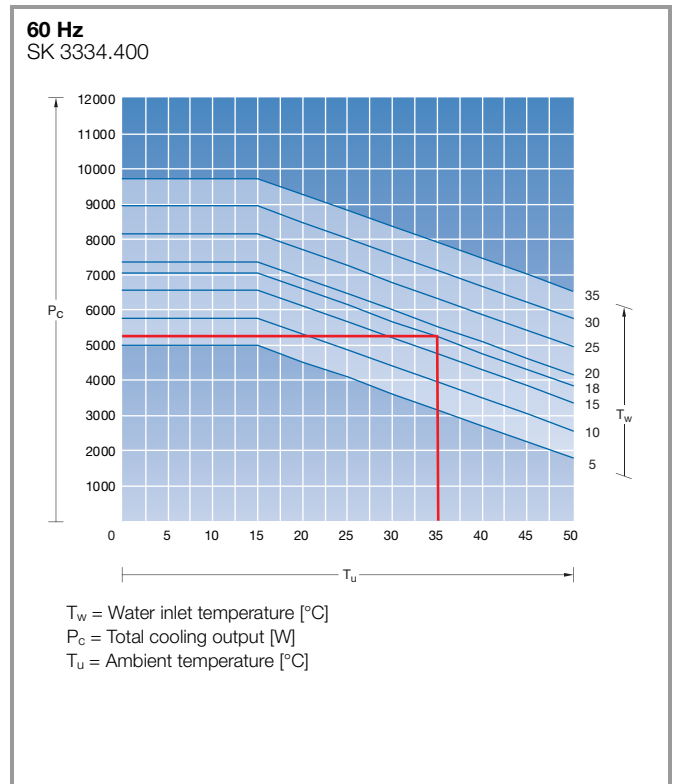
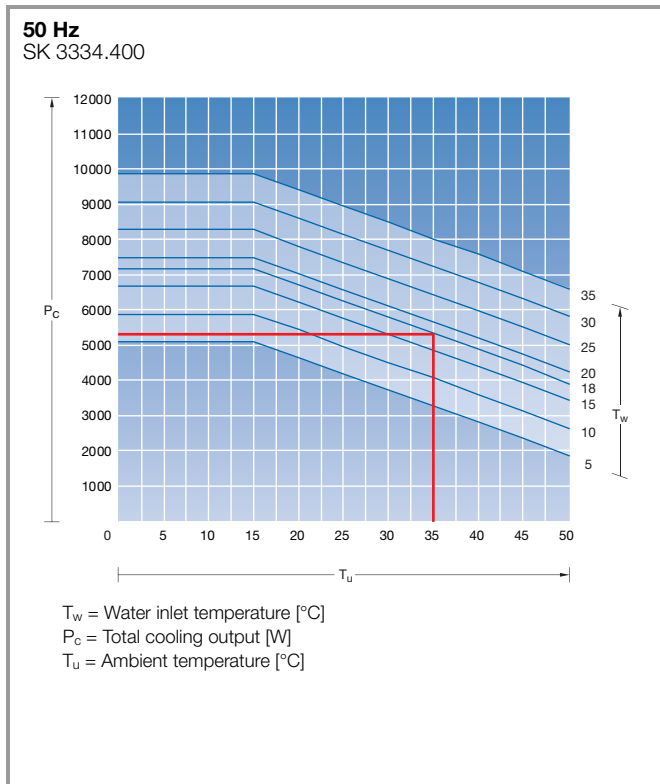


Output class 4.0 kW



Blue e+ chillers

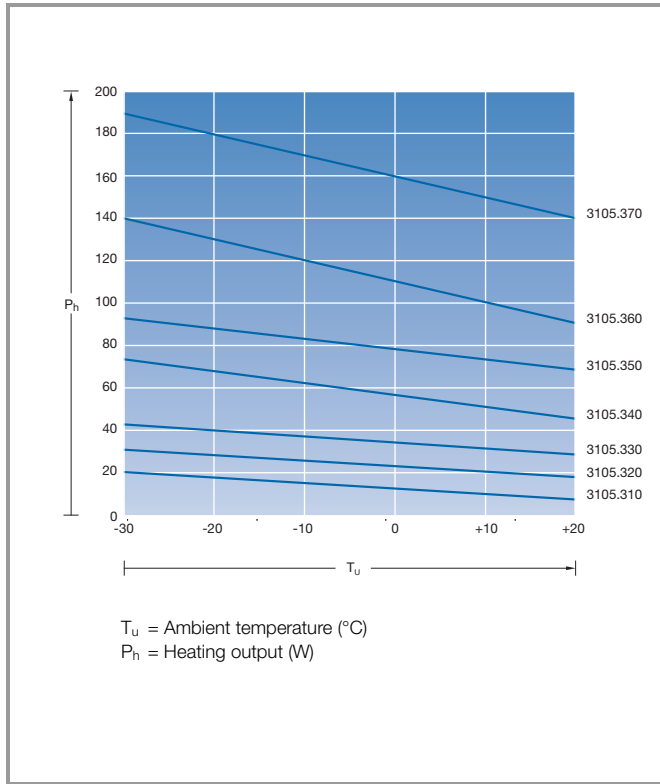
Output class 5.5 kW



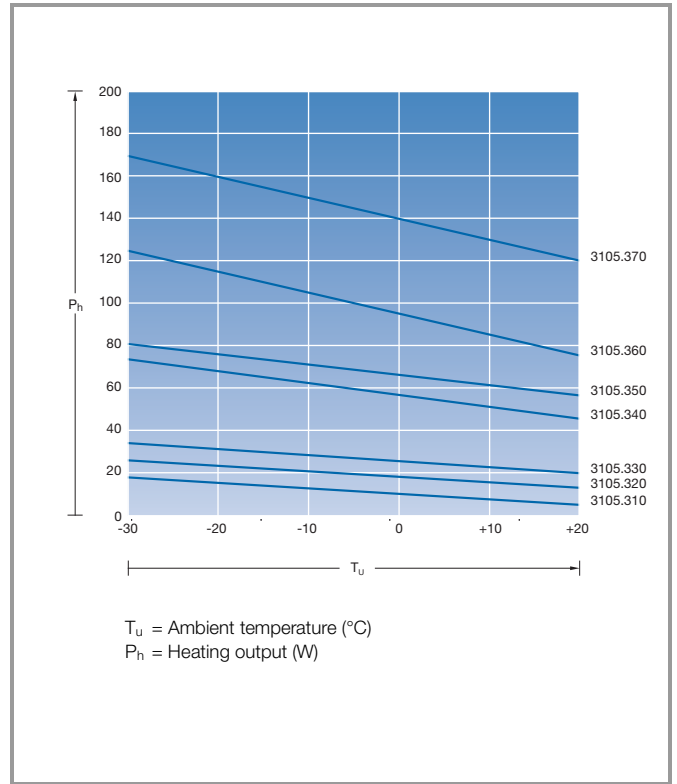
Enclosure heaters

Enclosure heaters without fan

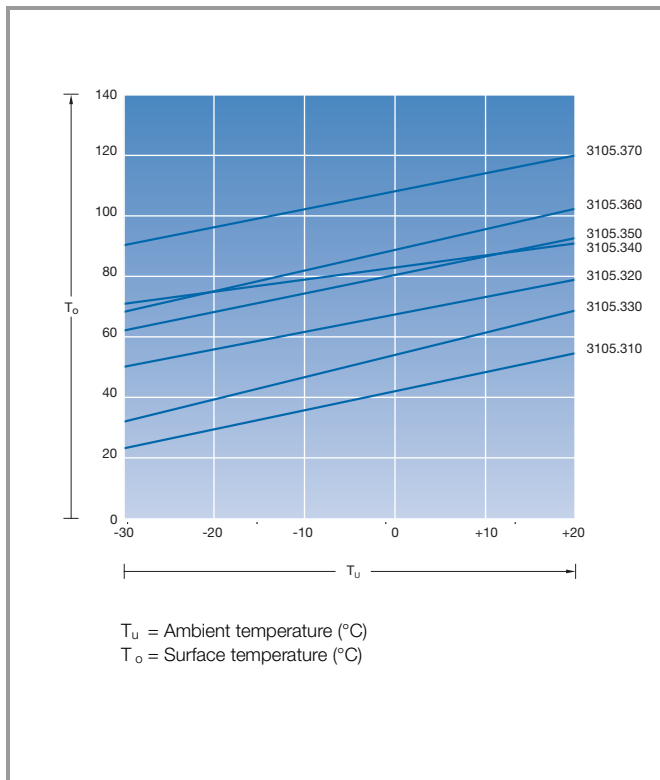
Heating output 230 V



Heating output 110 V

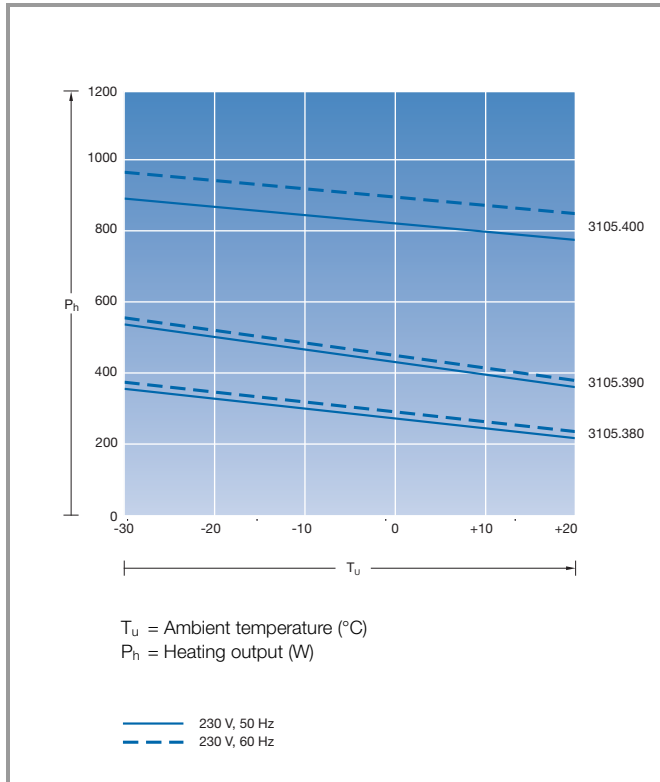


Maximum surface temperature

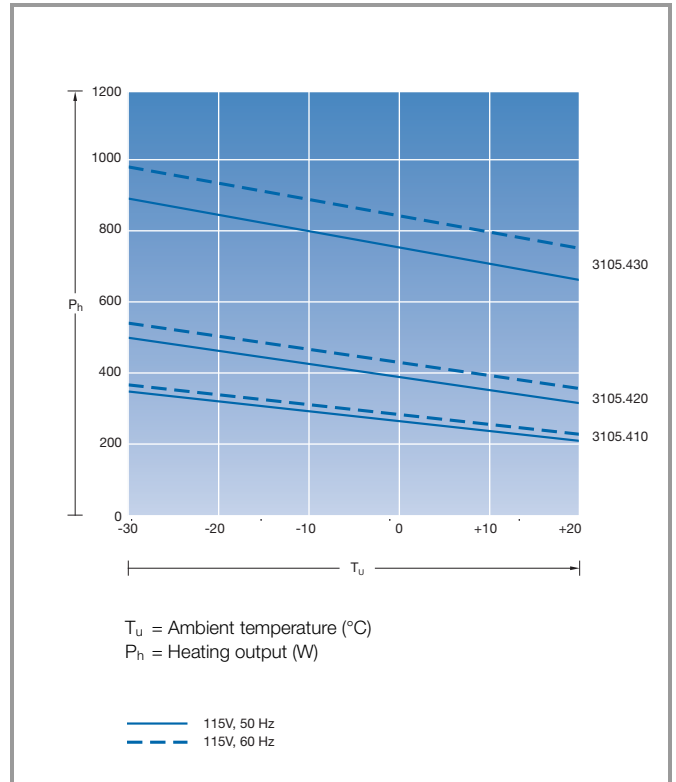


Enclosure heaters with fan

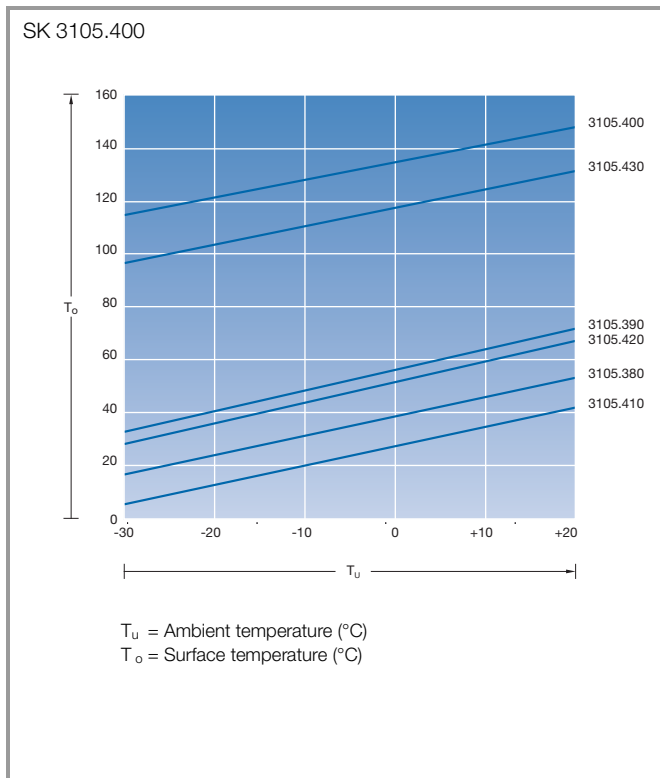
Heating output 230 V, 50/60 Hz



Heating output 115 V, 50/60 Hz



Maximum surface temperature



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