Danfoss EKC & AK-CC Controllers — Selection, Replacement

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The electronic layer of commercial and marine refrigeration decoded for buyers and service engineers: what EKC case/evaporator controllers and AK-CC controllers for AKV pulse valves actually do, how variants differ (relay outputs, defrost schemes, comms like Modbus and LON), the sensor question that decides every replacement (PT1000 against NTC and probe placement), the AKV pulse-valve partnership that separates AK-CC duty from thermostatic systems, accessories from terminals to real-time-clock modules, replacement rules when a controller dies mid-season, and the cross-class map to Eliwell and Carel territory.

The short version

Two families do most of the work: EKC — the classic panel-mount case/evaporator controllers (temperature control, defrost management, alarm, fan logic; e.g. the EKC 202D1 with LON/Modbus, 230 V) — and AK-CC — evaporator controllers built to drive AKV pulse expansion valves as part of Danfoss's electronic-injection architecture (e.g. AK-CC 550A and the 550B with two defrost outputs).
Variant letters are feature sets, not cosmetics: within EKC 202 and AK-CC 550, the A/B/C/D suffixes step through relay counts, defrost options and communications (the D-class carrying fieldbus such as Modbus/LON). Replacing "an EKC 202" without the suffix is how a cold room loses its network alarm path.
The sensor decides the swap: these controllers read specific probe types (PT1000 ohm-class sensors in the Danfoss architecture, where competitor ecosystems often run NTC). A controller "replacement" that ignores probe type reads garbage — probe type, count and placement (air-on, air-off, defrost-stop on the coil, product simulant) travel with the controller choice.
AK-CC means electronic injection: the AKV is a pulse-width solenoid expansion valve — controller and valve are one system delivering superheat control and tight case temperatures. You cannot drop a thermostatic TEV logic into an AKV case or vice versa without redesign; the expansion valve finder maps the valve side.
Accessories make or break the install: matched 2-pole and 7-pole EKC terminal connector sets, the AK-OB 101A real-time-clock module for schedule-driven defrost on AK-CC/AK-PC, displays and gateway hardware — cheap lines that strand a job when forgotten.

1. Which controller does what

Family / class | Duty | Expansion device it assumes | Notes |

EKC 100-class (e.g. EKC 102) | Basic case/room temperature + defrost | Thermostatic (TEV) or solenoid-controlled systems | The economical panel controller; terminals per the 084B connector sets |

EKC 200-class (EKC 202 A/B/C/D) | Full case/evaporator control: temperature, defrost (natural/electric), fans, alarms | TEV/solenoid systems | D-variants add fieldbus — the 202D1 (LON/Modbus) is the networked workhorse |

AK-CC 550 (A/B) | Evaporator control with electronic injection | AKV pulse valves | 550A standard; 550B with second defrost output for twin-section cases |

AK-CC 55-class compacts | Case-mounted electronic injection | AKV | Per case format |

AK-PC class (context) | Pack/compressor capacity control | — | The suction-side sibling; shares accessories like the AK-OB 101A RTC |

System architecture in one sentence: EKC-class controllers manage the cold space around conventional expansion; AK-CC + AKV replace the thermostatic valve with pulse-controlled electronic injection — tighter temperatures, better part-load behaviour, and a different parts list. Identify which world a dead controller lived in before quoting its successor; the valve on the coil answers it instantly.

2. Replacement rules — the mid-season swap that works first time

Check | Why it decides the swap |

Exact type + variant from the label (084B/080Z code number) | The code number carries relay set, defrost scheme and comms — "EKC 202" alone under-specifies; the 084B number does not |

Supply voltage | 230 V and low-voltage versions exist across the families — read the label, not the habit |

Probe type and count | PT1000-class probes in this architecture; verify each input's probe and placement (air-on, air-off/defrost-stop, product) — mismatched probe type reads tens of degrees wrong |

Defrost method | Natural, electric, hot gas — the variant must carry the outputs the case wires (the 550B's second defrost output exists for a reason) |

Comms | If the plant monitors via Modbus/LON/system manager, the replacement must speak it (D-variants, gateway hardware) or the alarm chain silently dies |

Parameter set | Photograph or export the old settings if the unit still boots; otherwise commission from the case schedule — setpoint, differential, defrost times, fan logic, alarm limits |

Hardware completion | Terminal sets (7-pole/2-pole), panel cut-out match, RTC module where schedules run offline (AK-OB 101A) |

The honest mid-season playbook: a same-code replacement plus fresh terminals plus the parameter sheet is a one-hour job; a "similar" controller from another class is a redesign performed at 22:00 in a provision room. We quote same-code first, successor-code (with the parameter mapping flagged) second, cross-class only when asked.

3. Sensors and probe placement — where control quality is made

Probe discipline, because most "controller problems" are probe findings: air-on (return air) is the control probe for case temperature; air-off (supply) tightens display-case control in the schemes that use both; the defrost-stop probe sits on the coil, in the fins where ice lingers longest — a defrost that "runs too long" usually has this probe in the wrong place, not a wrong parameter; product/simulant probes drive alarms that reflect food temperature rather than air swings. Replace probes with the matching type (PT1000-class for this family), verify with an ice-bath or calibrator (calibrator guide), and route probe cables away from mains — induced noise reads as wandering temperatures. Probe stock per voltage/type belongs in the same drawer as the EVR coils: the consumables that keep refrigeration RFQs small and fast instead of large and desperate.

4. Ecosystem and cross-class map

Ecosystem | Controllers | Cross-class reality |

Danfoss (this guide) | EKC panel classes, AK-CC/AK-PC with AKV injection, system managers above them | Within-family: clean same-code/successor logic by 084B/080Z number |

Eliwell | IDNext/ICPlus classes — see our Eliwell & Penn guide and stocked IDNext 902 P6D, ICPlus 11I | Function-level crosses for basic case control (thermostat+defrost+fan) are routine; probe types (NTC vs PT1000) and relay ratings must be re-checked line by line |

Carel, Penn/Johnson classes | Parallel programmes | Same function-level logic; electronic-injection systems do NOT cross between ecosystems — controller + valve + algorithm are one system |

The rule that keeps crosses honest: basic case controllers cross on function; injection systems do not cross at all. An EKC 202-class duty can be served by an Eliwell IDNext-class unit with probes and relays re-verified; an AK-CC + AKV case stays Danfoss (or gets re-engineered deliberately). Every crossed line we quote names its basis and its probe consequence — the same honesty rule as the refrigeration cross-reference guide applies to the electronics.

How buying works at cballast. We stock EKC and AK-CC controllers, probes, terminal sets and RTC/display accessories, quote same-code and successor paths with the parameter consequences stated, and cross to Eliwell-class hardware only at the function level with probes re-specified. Accounts are vetted at onboarding; first order prepaid; established accounts on credit terms with repeat discounts; public bodies and utilities invoiced against purchase order from the first order. RFQs to sales@cballast.com.

Frequently asked questions

What is the difference between Danfoss EKC and AK-CC controllers?EKC classes control cases and cold rooms built on conventional (thermostatic or solenoid) expansion; AK-CC controllers drive AKV pulse expansion valves — electronic injection — as one system. The valve on the evaporator tells you which family you are standing in front of.
What is the difference between AK-CC 550A and 550B?Feature set within the same class — the B carries a second defrost output for twin-section cases (per our stocked 084B8030 vs 084B8032 units). Replace by the full code number on the label, not by the family name.
Can I replace a Danfoss EKC with an Eliwell or Carel controller?For basic case duty (thermostat, defrost, fans), yes at the function level — with probe type (PT1000 vs NTC), relay ratings and defrost outputs re-verified per line. For AK-CC/AKV electronic-injection cases, no — controller and pulse valve are one system; changing ecosystem there is a redesign, not a swap.
Which sensor does an EKC controller use?The Danfoss architecture runs PT1000-class probes; verify each input (air-on, air-off, defrost-stop on the coil, product) and replace probes type-for-type. A controller reading nonsense after a "repair" almost always received the wrong probe family.
Why does my cold room defrost run too long or too short?Look at the defrost-stop probe first — its placement on the coil decides termination; a probe hanging in air terminates early (ice remains), one buried near the heater terminates late. Then check the parameter pair (max duration, stop temperature). The controller is usually innocent.
What is an AKV valve?Danfoss's pulse-width-modulated electronic expansion valve: a solenoid valve opened in timed pulses by the AK-CC controller to meter injection and control superheat. It replaces the thermostatic TEV in that architecture and only works with a controller that speaks its language.
Who supplies Danfoss EKC and AK-CC controllers?cballast.com stocks the controllers, probes, terminal connector sets and accessories, quotes replacements by exact code with parameter consequences stated, and serves the marine provision-plant and commercial-refrigeration trades from one catalogue. Write to sales@cballast.com with the 084B/080Z number or a label photo.

References and related guides

Standards and sources referenced: Danfoss EKC and AK-CC/AK-PC product documentation and parameter guides, AKV electronic-injection system documentation; Eliwell programme data for the cross-class map; EN 60730-class controller practice.

Danfoss EVR solenoid valves & coils

Expansion valve finder (incl. AKV)

Eliwell & Penn controls for refrigeration

Refrigeration parts cross-reference

Danfoss KP & RT pressure switches

Process calibrator selection

Refrigerant PT chart

Questions on a controller you cannot identify or a cross you are unsure of: write to sales@cballast.com. We answer whether or not you buy from us.

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