

Carel Electronic Expansion Valves — E2V/E3V Hardware, Stators, Orifice Inserts and EVD Evolution Drivers

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The parts that make a Carel EEV loop work: E2V valves and 90-bar versions, E3V for CO₂ at 140 bar, replaceable stators and cables, orifice inserts, inlet strainers, the EVD Evolution driver family and the transformer and probe set every installation needs.

Why the EEV loop

An electronic expansion valve holds superheat at the evaporator's edge of stability across the whole load range — the single biggest efficiency and stability upgrade over thermostatic valves on variable plants. A Carel loop is four parts: the valve (stepper-driven needle), the driver (EVD Evolution: runs the motor, computes superheat), two sensors (suction pressure transmitter + temperature probe) and the power/backup arrangement that closes the valve on supply loss.

Valves

E2V — the HFC workhorse, sized by the figure in the code (E2V05 ... E2V35): standard versions (E2V14, E2V24) and 90-bar high-pressure versions for subcritical CO₂ (E2V05 90 bar, E2V18 90 bar).

E3V — the CO₂ transcritical class at 140 bar: E3V30, E3V45 (5/8"), E3V65 (7/8").

Capacity tuning: orifice inserts swap the E2V's rating without re-piping — E2V30Z insert, E2V03Z (1.8 kW at " 30 °C CO₂).

Protection: the inlet strainer (E2VFIL 150 µm) is cheap insurance for the needle seat — fit it, especially after brazing (and purge with nitrogen: the purge guide exists because of EEVs).

Stators and cables

The stepper stator slips over the valve's hermetic cartridge and is a separate spare — a burned coil never needs the braze broken: E2V*B* stator, E3V*A*, E3V*B/S/C/H*, coil for the spool valves (E2VSTA0201). Cables are keyed and shielded: 3 m stator cable, IP67 connector versions (E2VCAB0300), E2V-Z coil cables (3 m, 6 m). Route them away from contactor wiring; a stepper cable picking up coil transients steps the valve on its own.

Drivers

EVD Evolution does the control: single driver, RS485/Modbus, twin driver (two independent valves), universal version, with the plug-in display for commissioning (EVDIS). Inputs: the suction transmitter — ratiometric SPKT matched to the refrigerant's range (see the transmitter table) — and an NTC/PTC suction-temperature probe strapped and insulated at the evaporator outlet. Power: 24 V AC from a dedicated transformer (230/24 V 20 VA DIN-rail, E2V-driver class); specify the backup module or normally-closed strategy the plant design calls for, so a power cut doesn't leave the valve open into a flooded start.

Commissioning and diagnosis

Verify refrigerant setting, valve model and probe types in the driver before enabling — wrong refrigerant = confident nonsense superheat.

Watch first pull-down on the display: superheat target typically 5–8 K; steady positioning, no hunting.

Hunting: oversized valve or noisy pressure signal (shield/ground the transmitter); fit the next insert down rather than detuning the whole loop.

Valve won't control at low load: check minimum-steps settings and strainer; at high load pins at 100 %: undersized or flash gas in the liquid line — look upstream (sight glass, subcooling), not at the valve.

Log the driver parameters in the plant file; the next engineer should read, not reverse-engineer.

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