Fuel Cell Compressor

Oil-free air supply for the fuel-cell cathode circuit

The compressor sets the cathode pressure and air flow, and with them the power density the stack can reach. Air bearings take the oil system out of the air path, so what leaves the compressor is clean; the matching PMSM and controller give the fast load following a vehicle duty cycle asks for. Nine models cover 0–320 kW of stack power, with or without an integrated turbine.



Compressor, motor and controller — supplied as one matched unit

What the design covers

Compressor design & build

Oil-free running, quick response, medium-high pressure ratio and high efficiency from the impeller and volute.

Air bearing

No oil circuit at all: no oil carry-over into the cathode air, and no oil change in service.

PMSM & controller

Motor and inverter sized together, for quick response in a compact envelope.

System integration

Compressor, controller and — on the FCTC range — turbine supplied as one matched assembly, low noise and high reliability.

Prototype to series

One design carried from prototype build into series production, so the validation done early stays valid.

Platform commonality

Every model shares the same oil-free, low-noise architecture, so a platform scales across power classes.

Typical applications

Material handling

Fuel-cell forklifts

Commercial vehicles

Heavy-duty trucks and city buses

Passenger cars

Fuel-cell passenger vehicles

Railway

Fuel-cell locomotives

Marine

Vessel fuel-cell powertrains

Stationary power

Backup power, distributed generation, CHP

Model selection

Standard parameters give the rated air flow in Nm³/h and in g/s at the stated pressure ratio. Matched FC power is the stack range the model is sized for; motor power is the shaft power of the compressor drive.

Model	Standard parameters	Matched FC power	Motor power	Key features	Application
XT-FCC28	28 Nm³/h or 10 g/s @ PR 2.0	0 – 10 kW	1.5 kW	Two-stage compression	Forklift
XT-FCC35	35 Nm³/h or 13 g/s @ PR 2.63	0 – 20 kW	3.5 kW	Two-stage compression	Forklift
XT-FCC120	120 Nm³/h or 40 g/s @ PR 2.5	10 – 40 kW	8 kW	Two-stage compression	Forklift
XT-FCC1000	1,000 Nm³/h or 300 g/s @ PR 3.87	150 – 260 kW	55 kW	Two-stage compression	Heavy-duty truck
XT-FCTC380	380 Nm³/h or 120 g/s @ PR 3.8	60 – 130 kW	23 kW	Two-stage compression + single-stage VNT turbine	Heavy-duty truck
XT-FCTC500	500 Nm³/h or 200 g/s @ PR 3.5	100 – 140 kW	22.5 kW	Two-stage compression + single-stage VNT turbine	Heavy-duty truck
XT-FCTC600	600 Nm³/h or 275 g/s @ PR 3.5	150 – 180 kW	34.5 kW	Two-stage compression + single-stage VNT turbine	Heavy-duty truck
XT-FCTC850	850 Nm³/h or 274 g/s @ PR 2.83	200 – 260 kW	40 kW	Single-stage compression + single-stage turbine	Heavy-duty truck
XT-FCTC1200	1,200 Nm³/h or 400 g/s @ PR 4.0	200 – 320 kW	52 kW	Two-stage compression + single-stage turbine	Heavy-duty truck

Two build options

XT-FCC — compressor only

Compressor, motor and controller. The cathode exhaust is handled downstream by the system, so this is the simple route where packaging and cost matter more than exhaust-energy recovery.

XT-FCTC — compressor with turbine

A turbine is added on the same shaft, so pressure energy that would otherwise be throttled away is recovered and the motor covers less of the compressor work. VNT on the 380–600 models keeps the match across the flow range.

How to pick a model

1 Read off the flow

Take the stack air flow at rated power from the system model, in Nm³/h or g/s — the table gives both. Pick the model whose rated flow sits at or just above it.

2 Check the pressure ratio

Match the PR the stack needs at that flow. Higher PR costs motor power, so do not oversize it to gain margin.

3 Decide on the turbine

If the system can use cathode exhaust energy, the FCTC range recovers part of it; if packaging or cost rules, the FCC range is the shorter route.

Every model shares

- **Oil-free**
- **Quick response**
- **Medium-high PR**
- **High efficiency**
- **Compact**
- **Low noise**
- **High reliability**
- **Low cost**

Note

The model number states the rated air flow: FCC120 = 120 Nm³/h, FCTC380 = 380 Nm³/h. Flow and pressure ratio are quoted at the design point — confirm the stack flow map, ambient conditions and turbine configuration against the project data sheet before ordering.