



Semiflooded evaporation for supermarket refrigeration

Esra Wirth

Kaufland Stiftung & Co.KG | esra.wirth@kaufland.com | +49 7132 94-691227

Agenda

- 01** Kaufland – a retailer
- 02** functionality of the semiflooded evaporation
- 03** overview over the systems
- 04** determination of the efficiency



01

Kaufland

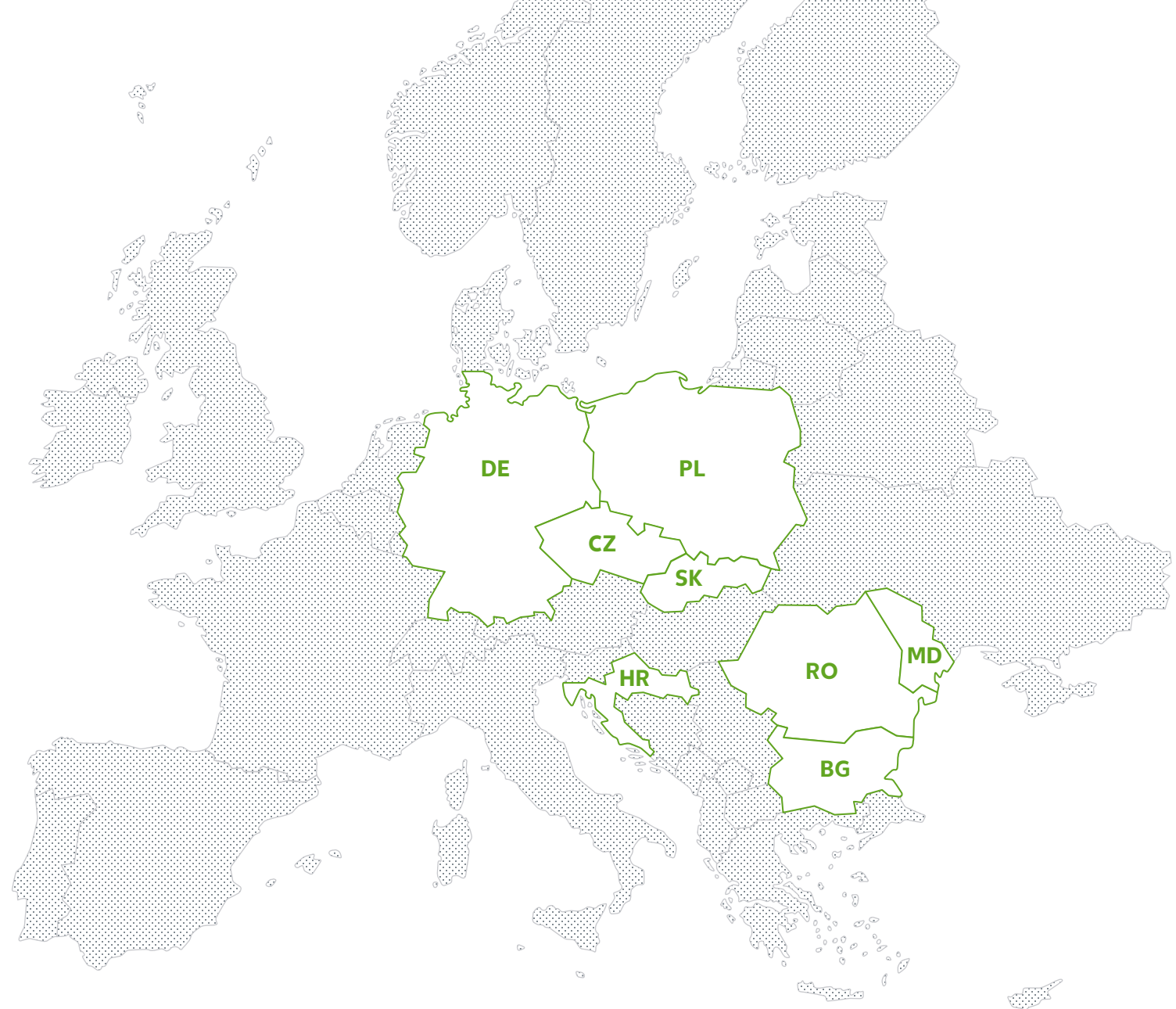
Kaufland

International

8 countries

1.510 branches

284 Integral system
since 2010



highest **energy efficiency**

The overview



Photovoltaic array

produces energy for own use

natural refrigerant

standard for new buildings and modernisations

Integral System

Heating with the waste heat of the refrigeration plant

Cooling cabinets with glas doors

save energy and create comfort



LED-light

Friendly and energy saving

E-charging stations

Supporting the E-Mobility



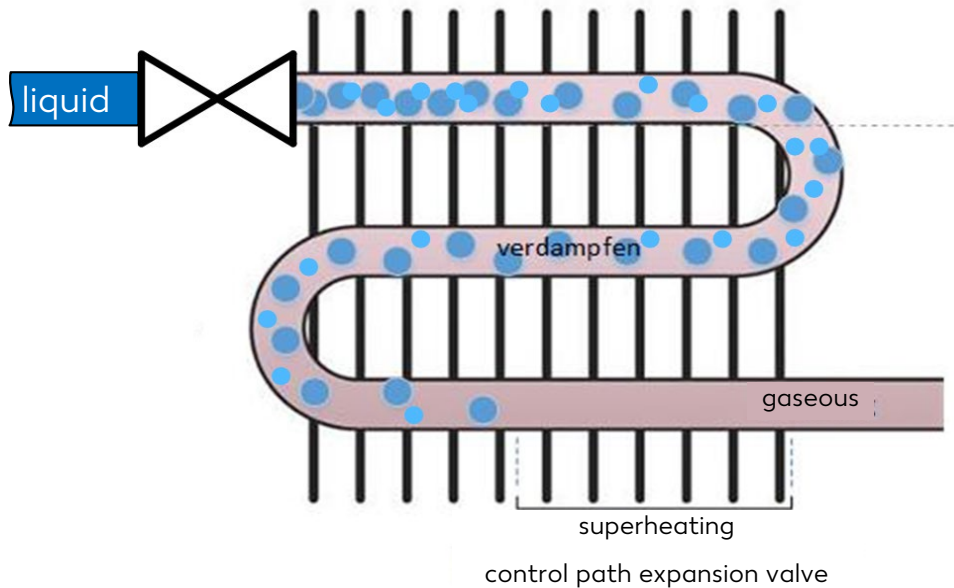
02

**functionality of the
semiflooded evaporation**

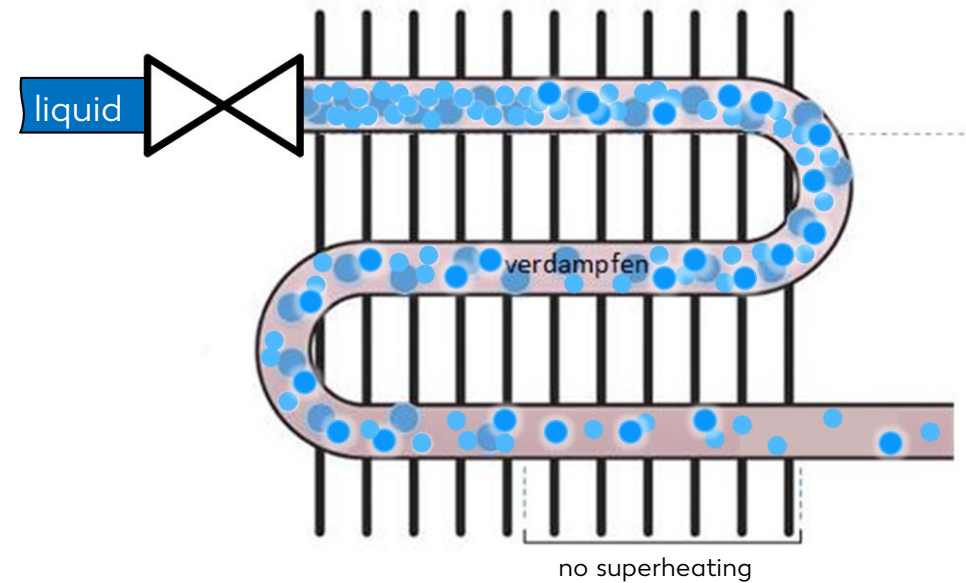


Semiflooded evaporation

dry expansion



semiflooded expansion



$$\downarrow \Delta T = \frac{q}{\alpha} \uparrow$$

- q = heat flow density
- α = heat - transfer coefficient

A bald eagle is shown in flight, with its wings spread wide. The eagle's head is turned towards the left, and it has a sharp, yellow beak. The background is a dramatic sky with dark, heavy clouds and a hint of light breaking through. The eagle's feathers are dark brown and appear to have a shimmering quality. The overall mood is powerful and majestic.

03

**Overview over
the systems**

semiflooded systems – variance

Fischer [CF]
Supreme

Hauser HLS

Hauser Low
Superheat

EPTA

FTE +

Full Transcritical
Efficiency

Carrier SFS

Semiflooded
System

TEKO EVALIFT

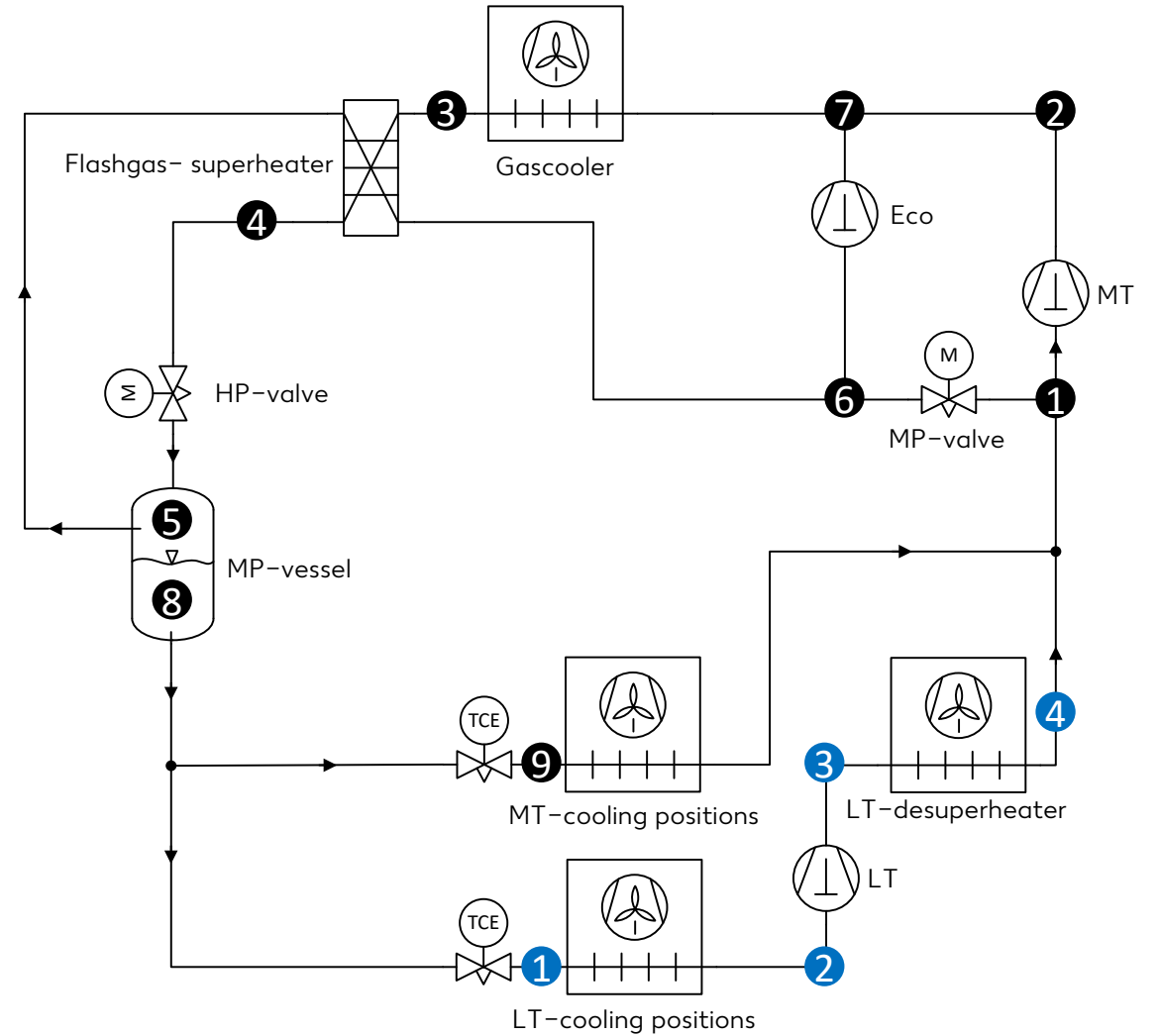
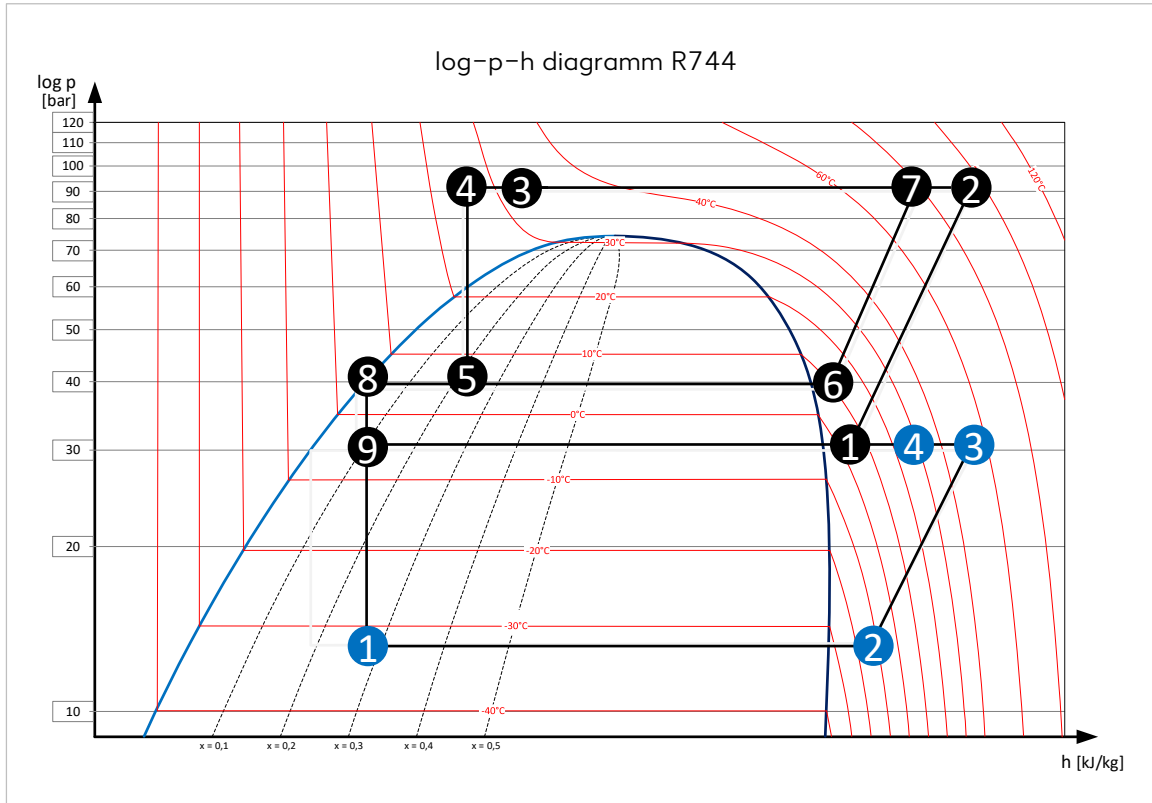
Evaporation Lift

Advansor ULS

Ultra Low
Superheat

03 OVERVIEW OVER THE SYSTEMS

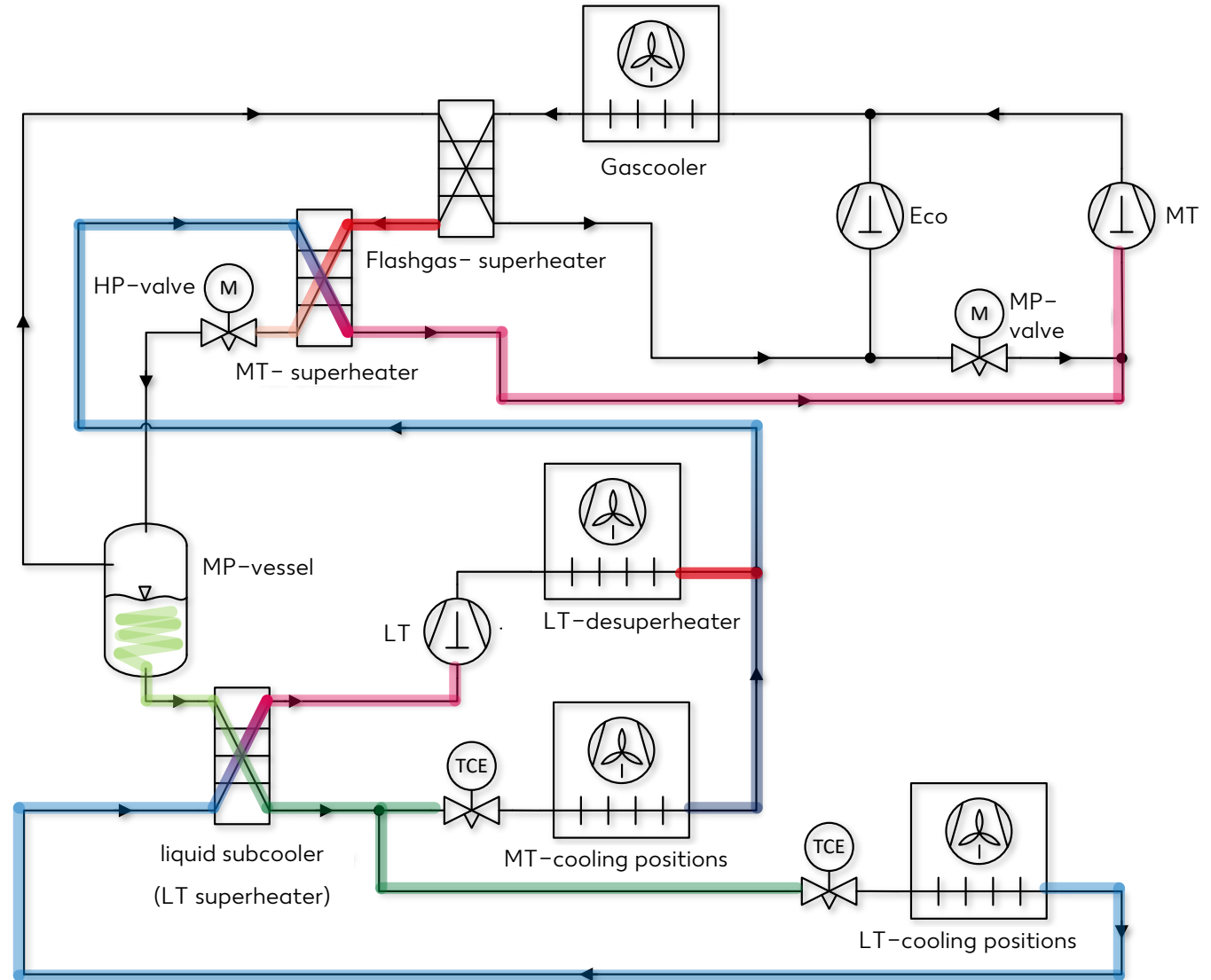
standard CO₂ Booster with parallelcompression



03 OVERVIEW OVER THE SYSTEMS

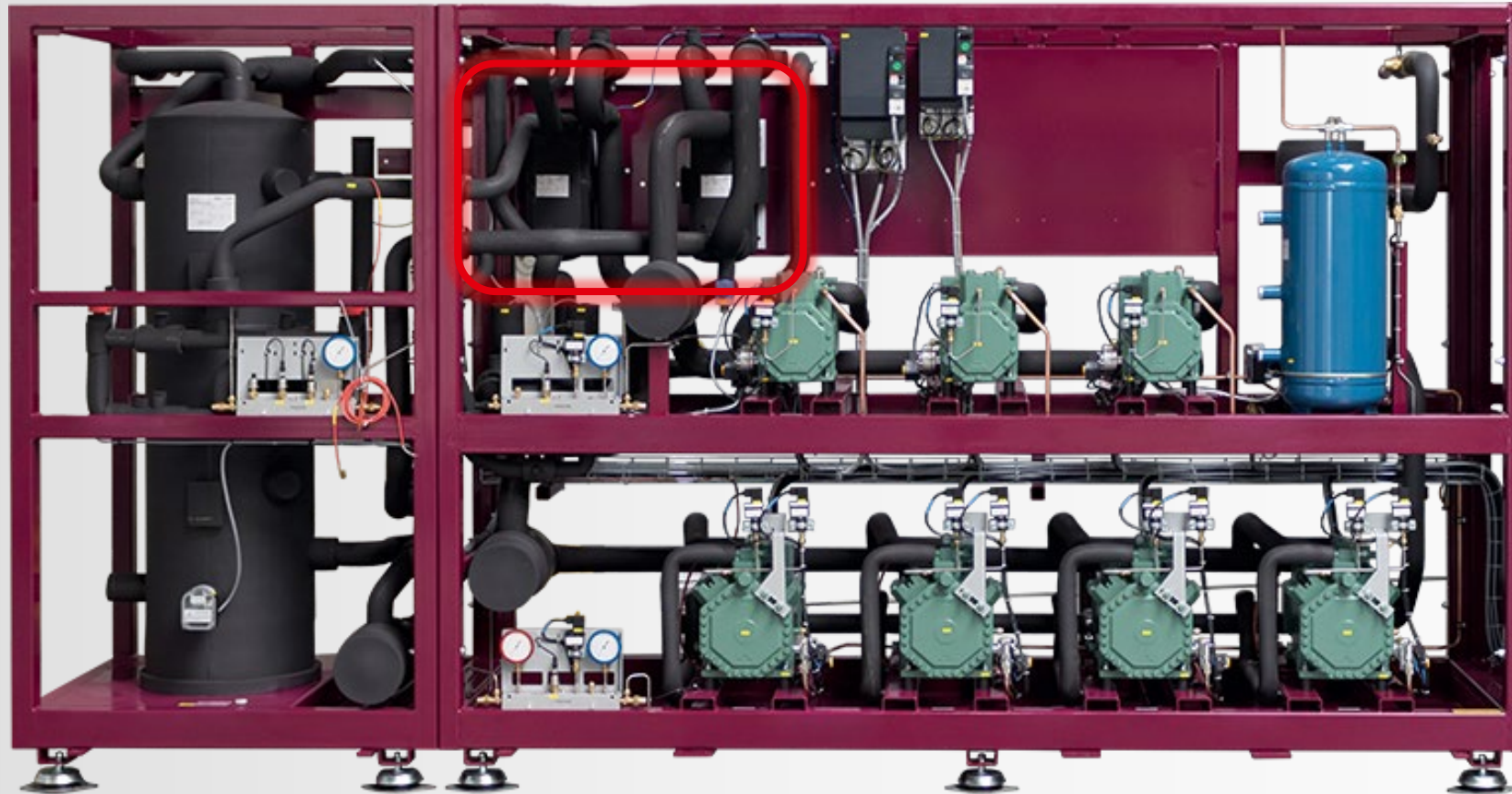
TEKO

EVALIFT



03 OVERVIEW OVER THE SYSTEMS

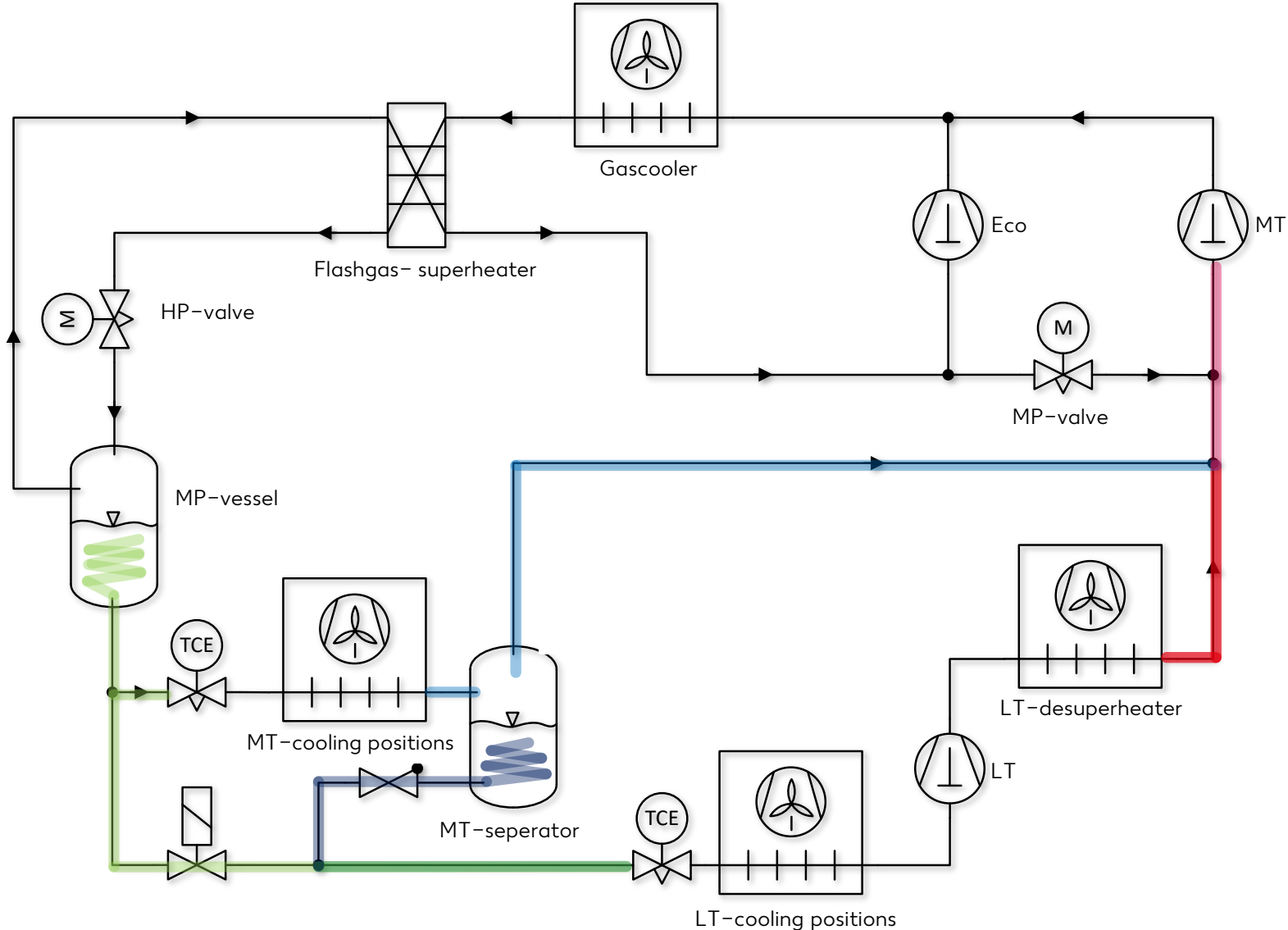
TEKO EVALIFT



03 OVERVIEW OVER THE SYSTEMS

EPTA

FTE

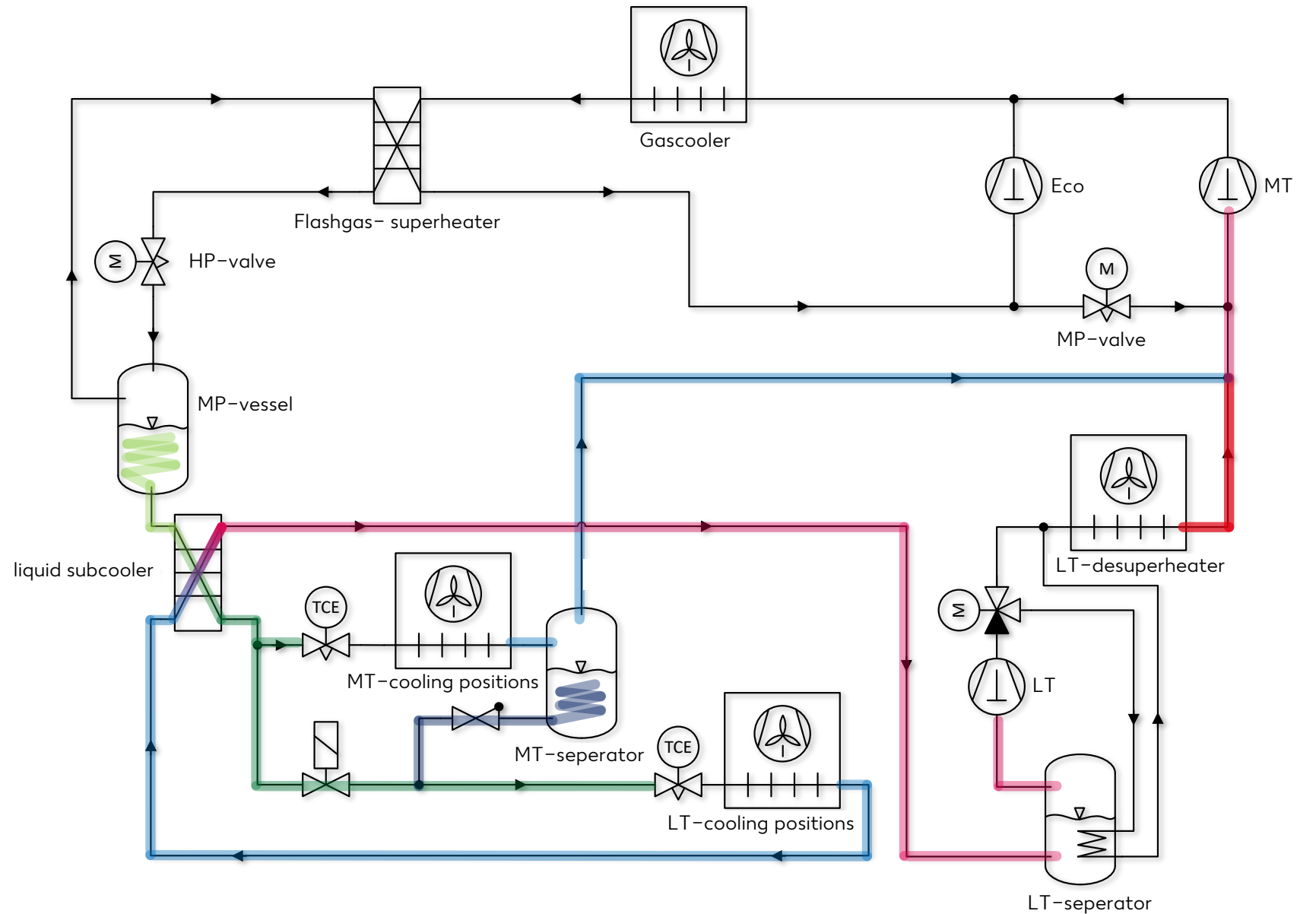


03 OVERVIEW OVER THE SYSTEMS

EPTA

FTE

+



03 OVERVIEW OVER THE SYSTEMS

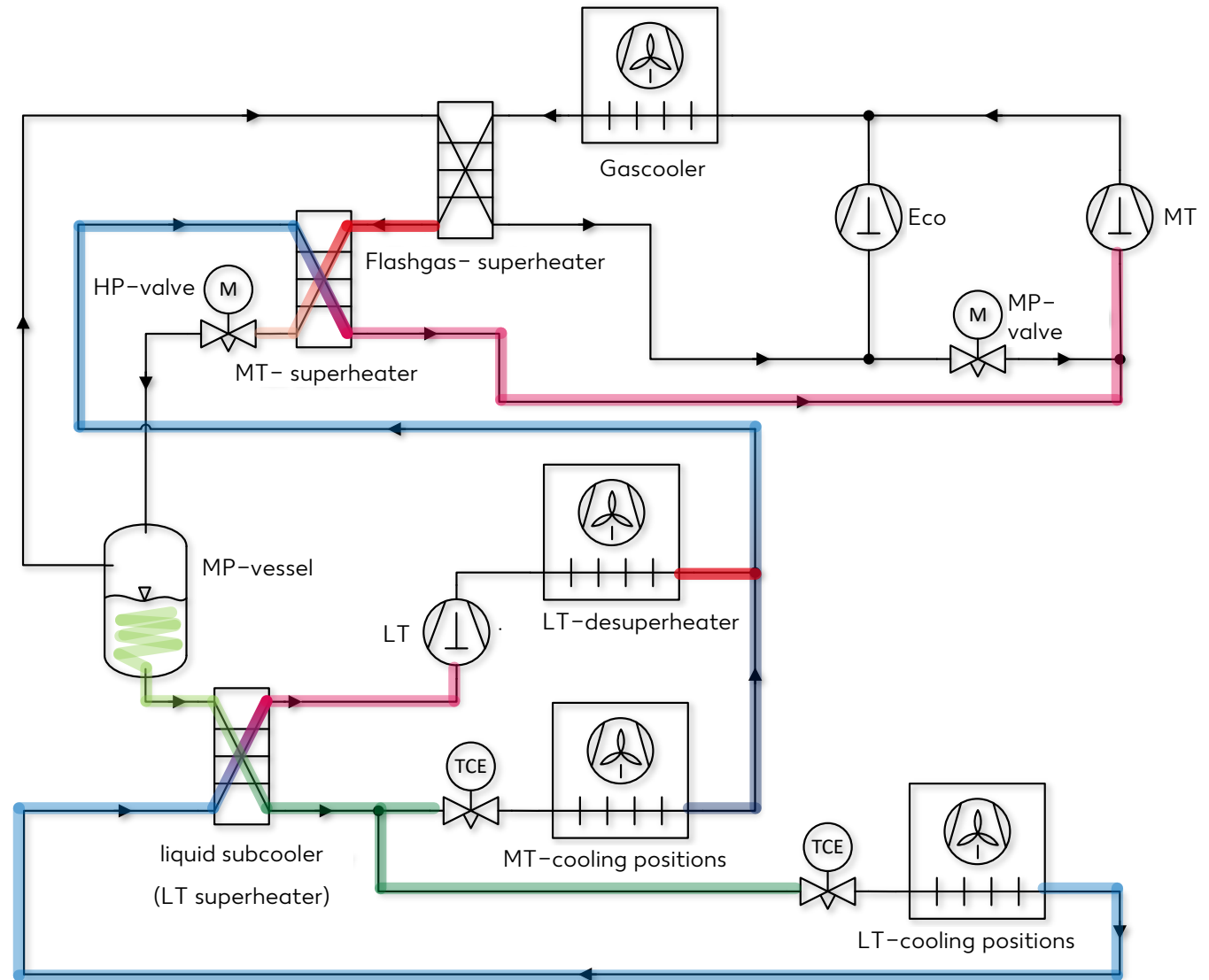
Epta FTE +



03 OVERVIEW OVER THE SYSTEMS

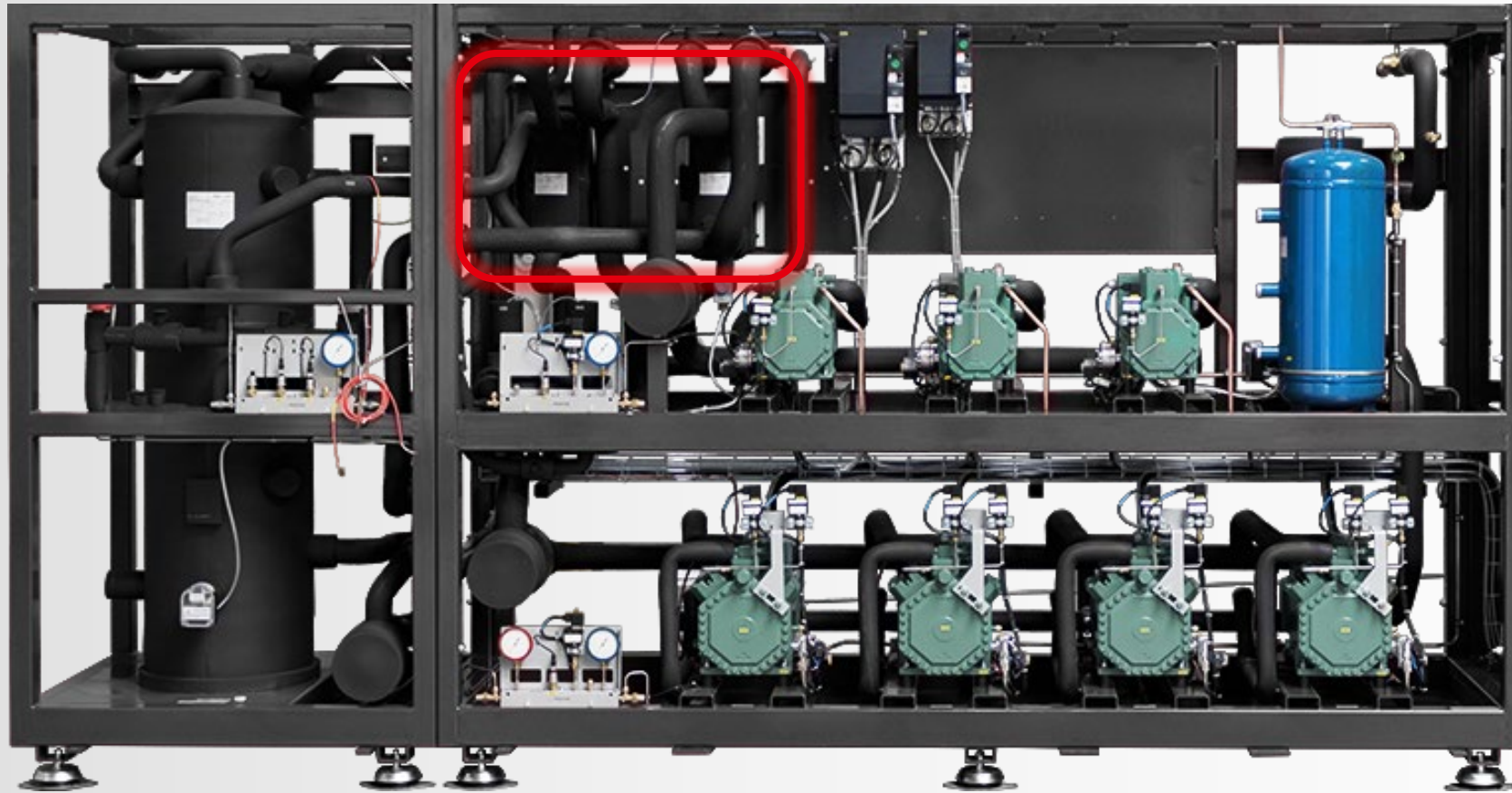
HAUSER

HLS



03 OVERVIEW OVER THE SYSTEMS

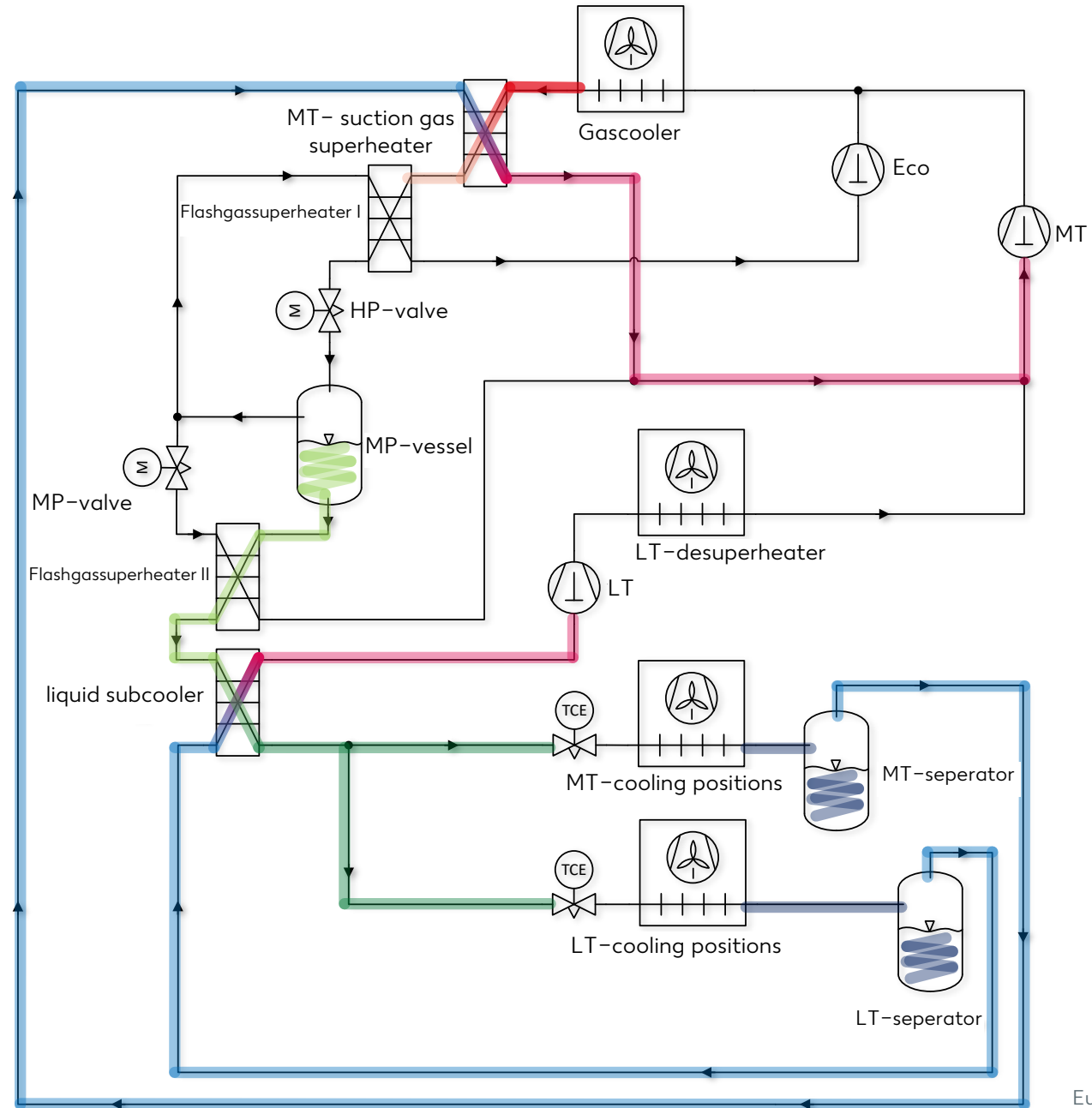
Hauser HLS



03 OVERVIEW OVER THE SYSTEMS

CARRIER

SFS



03 OVERVIEW OVER THE SYSTEMS

Carrier SFS

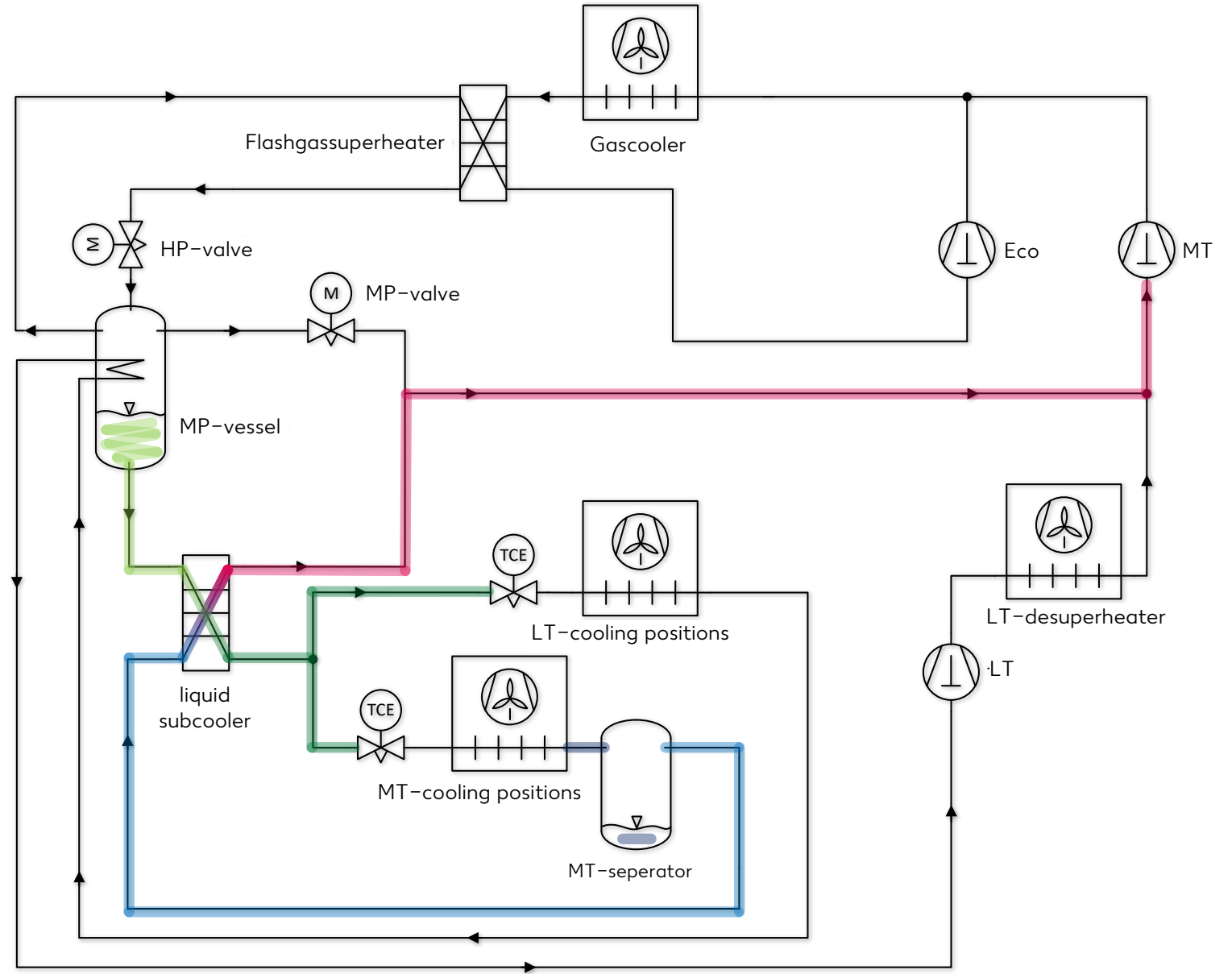


03 OVERVIEW OVER THE SYSTEMS

ADVANSOR

ULS

MT

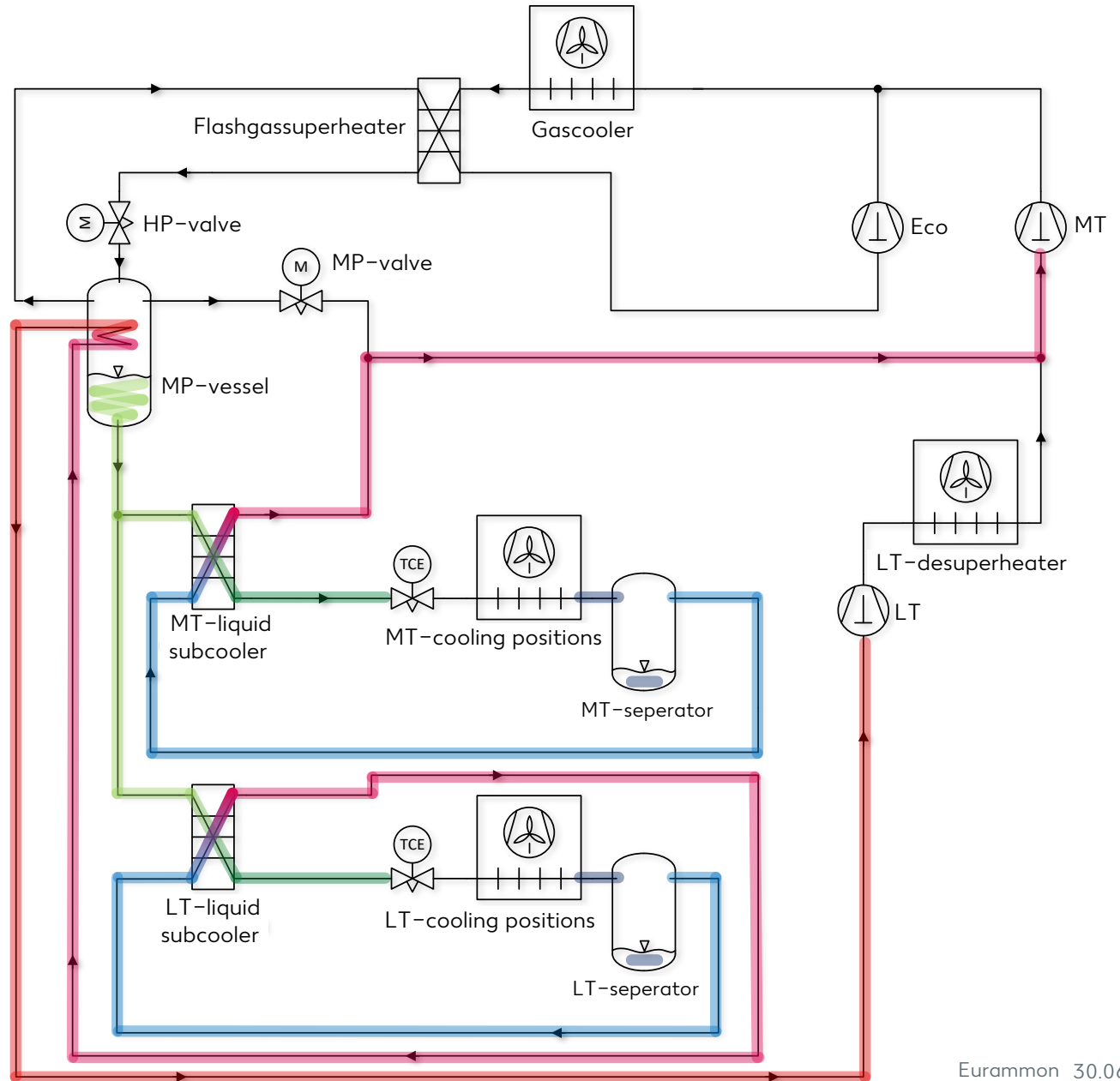


03 OVERVIEW OVER THE SYSTEMS

ADVANSOR

ULS

MT + LT



03 OVERVIEW OVER THE SYSTEMS

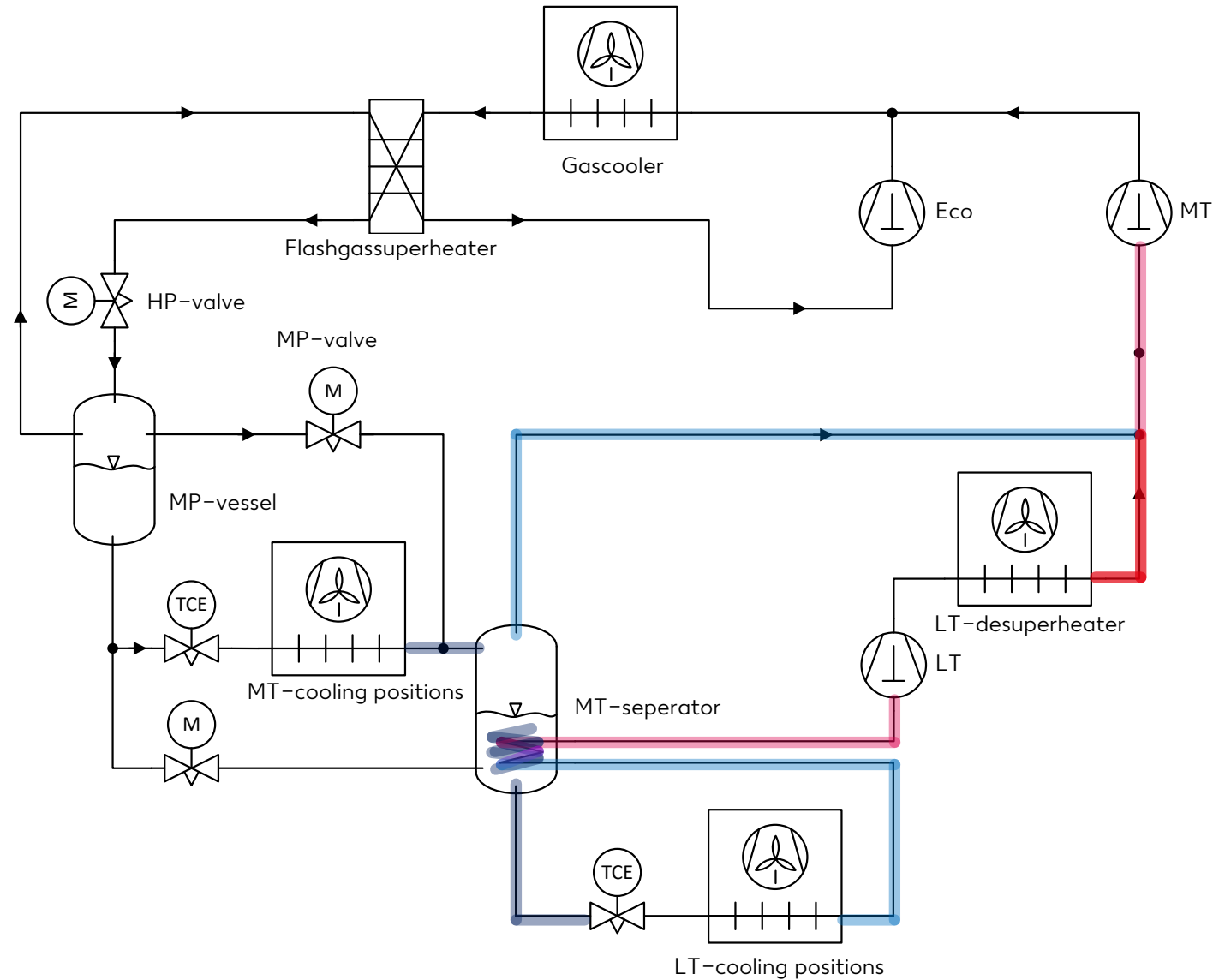
Advansor ULS



03 OVERVIEW OVER THE SYSTEMS

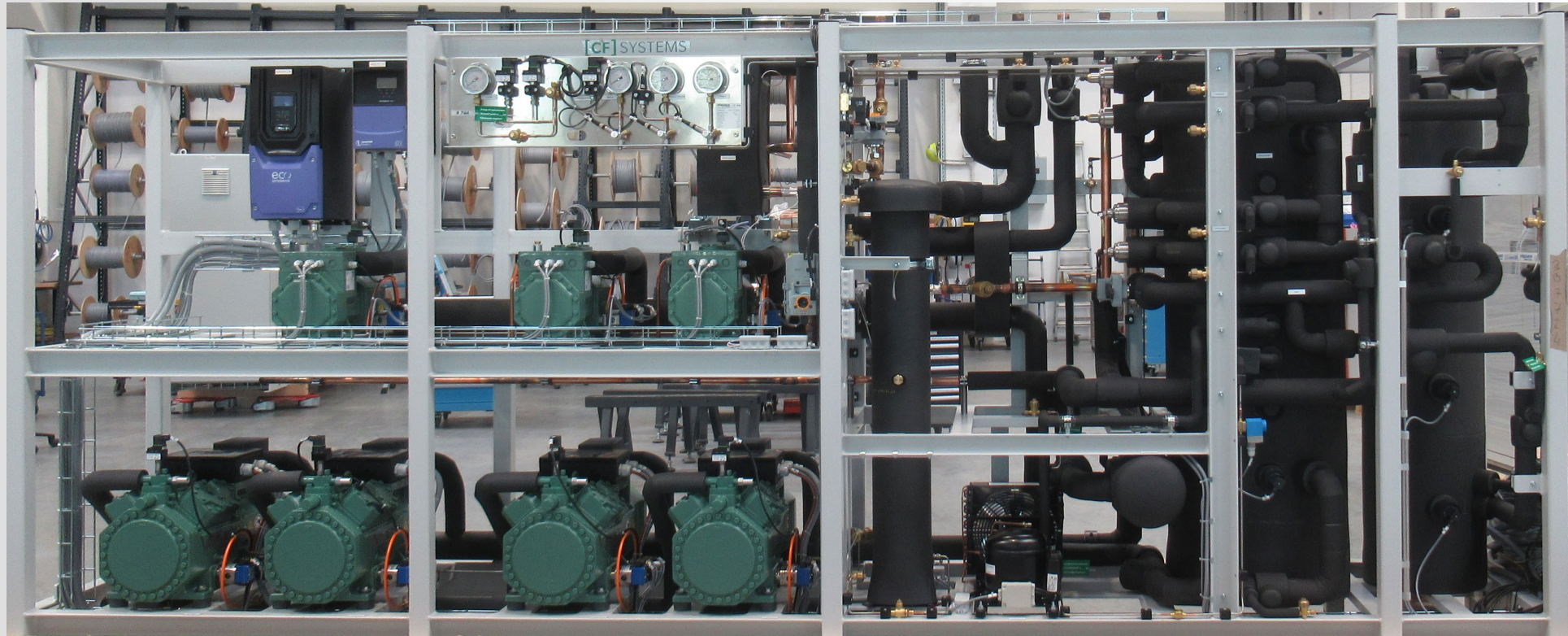
FISCHER

**[CF]
SUPREME**



03 OVERVIEW OVER THE SYSTEMS

[CF] Supreme



04

**Determination of
the efficiency**



04 DETERMINATION OF THE EFFICIENCY

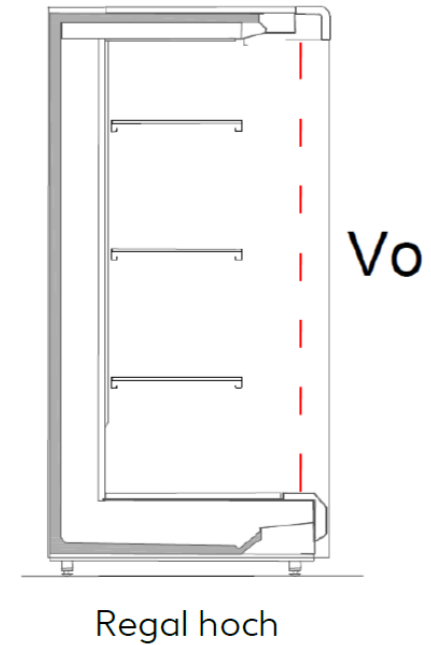
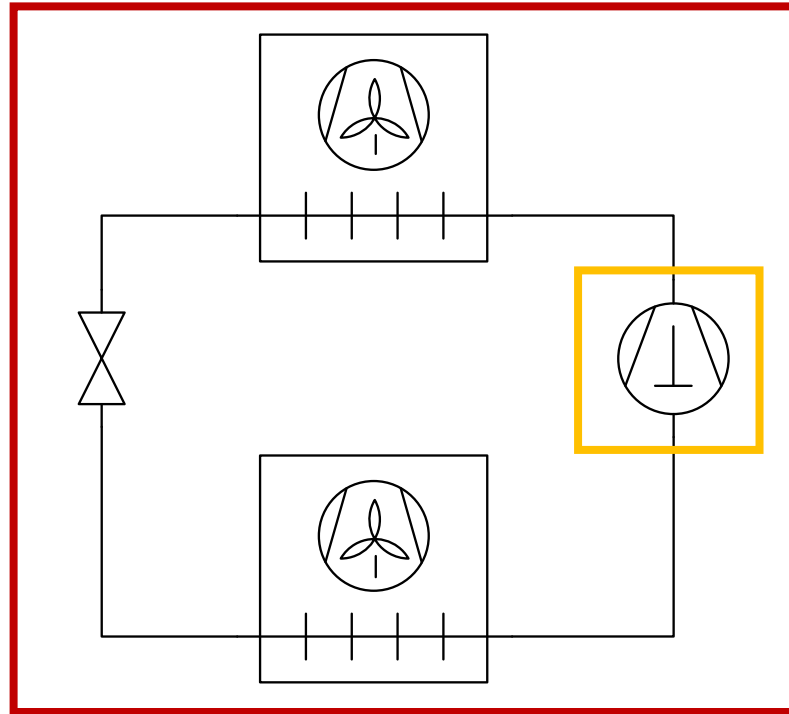
Determination of comparative figures

- COP system boundary 0
(VDMA 24247-7)

- COP system boundary III
(VDMA 24247-7)

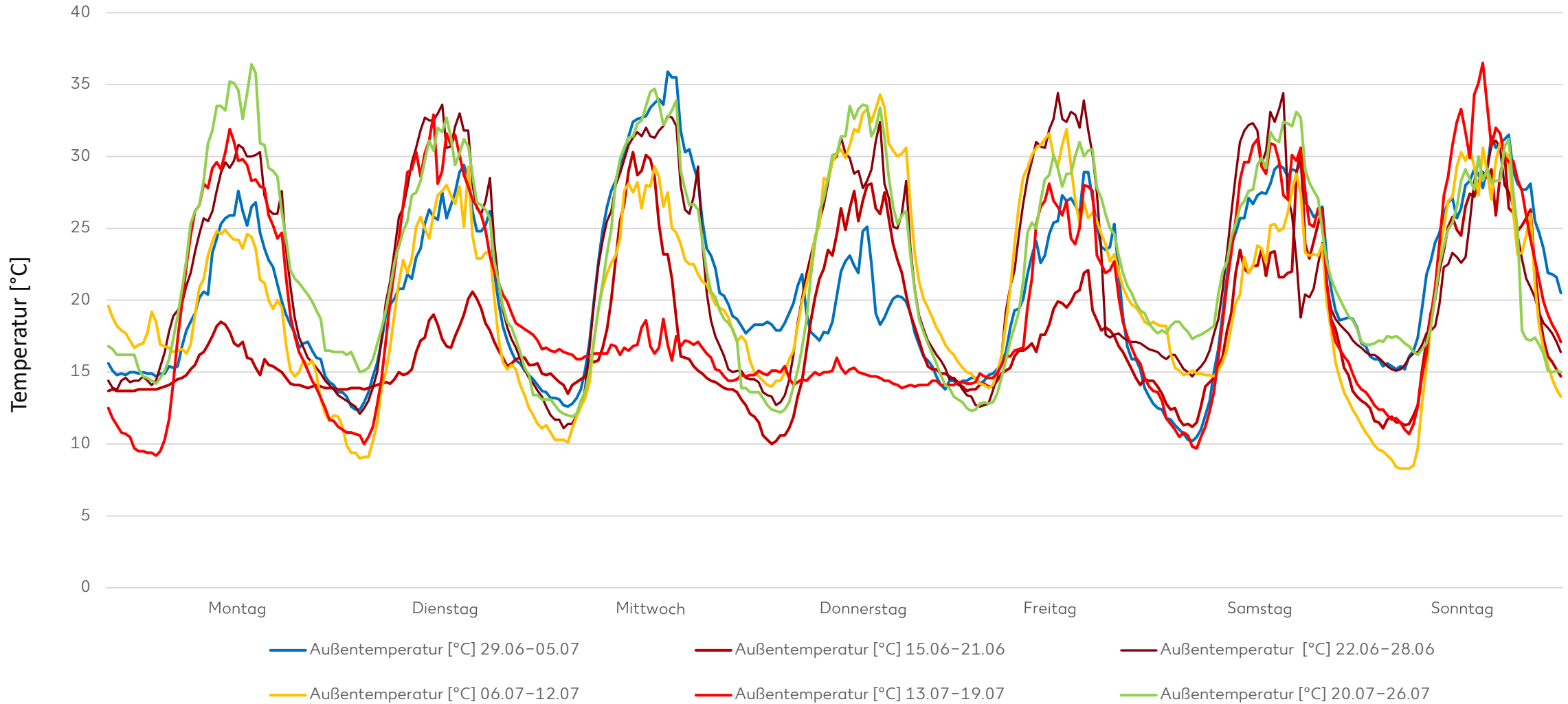
- Energy consumption /
display area
(VDMA 24247-4)

$$COP = \frac{\dot{Q}_0}{P_{el}}$$



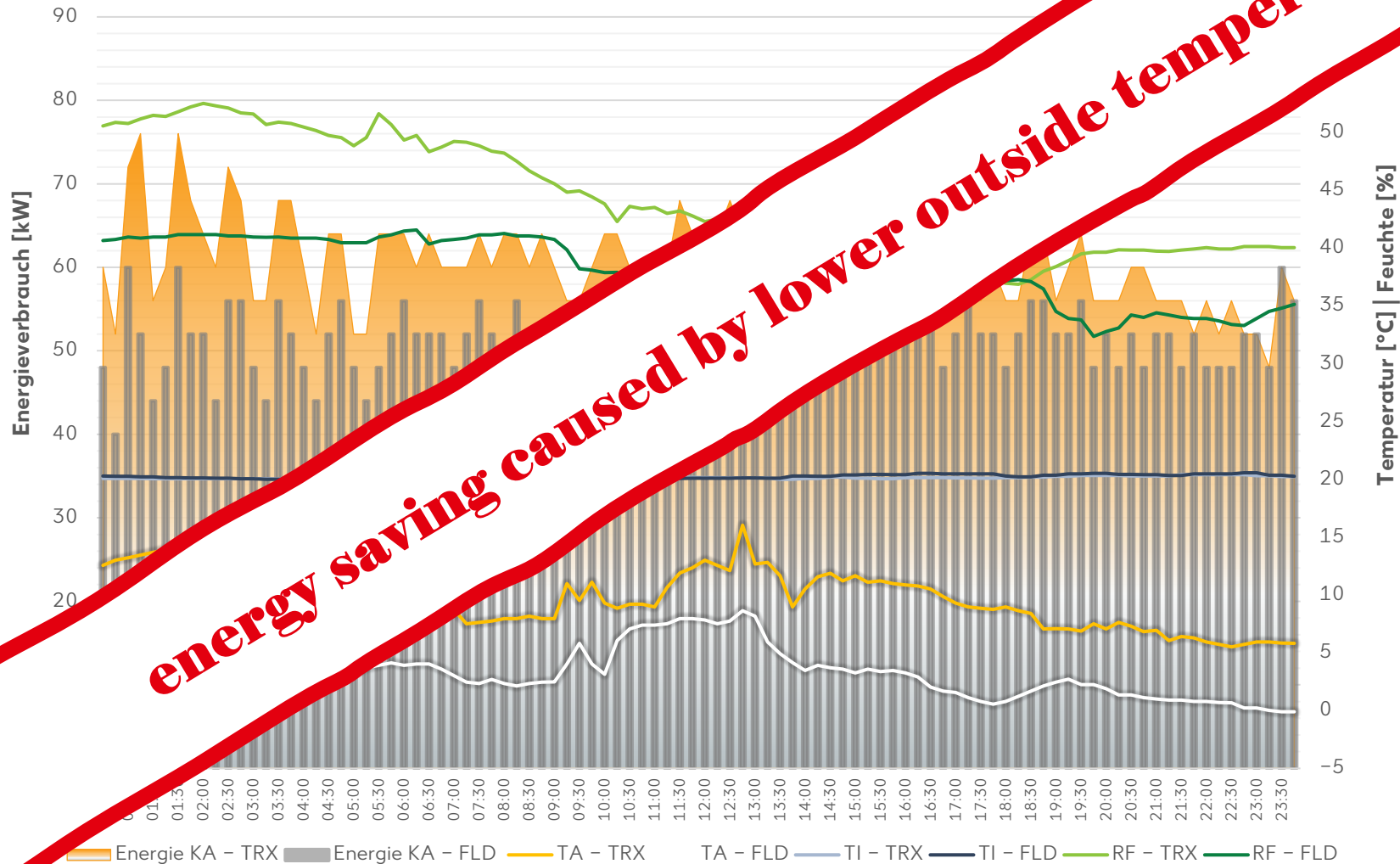
04 DETERMINATION OF THE EFFICIENCY

trend of the outside temperature KL D Schwäbisch Gmünd 15.06 – 26.07.2020



04 DETERMINATION OF THE EFFICIENCY

comparison 5 Do [FLD 20.01.2022 | TRX 17.02.2022]



Energy saving total: 213,00 kWh

energy consumption FLD: -14,31 %

T_A average FLD: 3,32 °C

T_A average TRX: 9,83 °C

average humidity

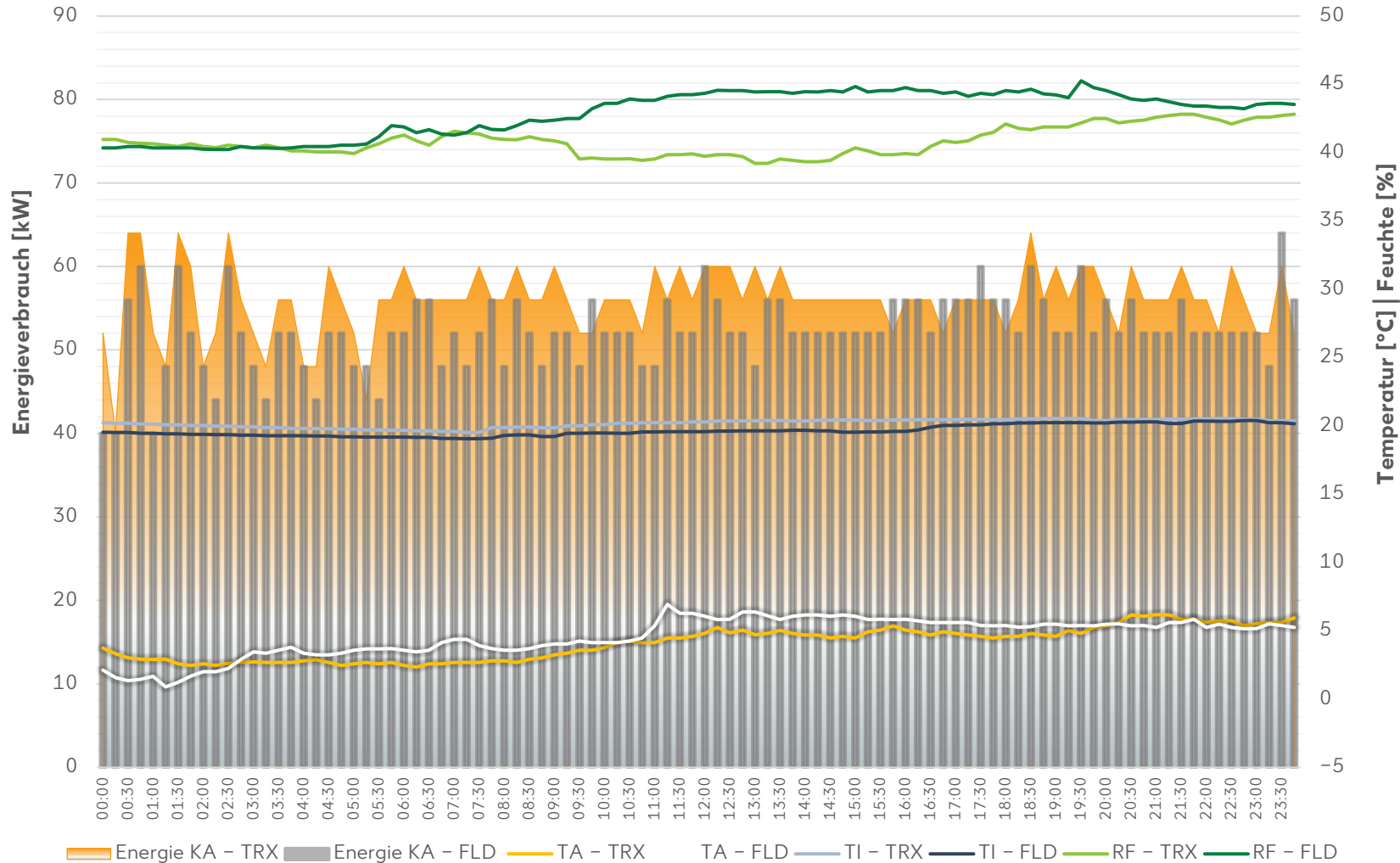
FLD: 37,81 %

average humidity

TRX: 44,19 %

04 DETERMINATION OF THE EFFICIENCY

comparison 3 Di [FLD 18.01.2022 | TRX 01.02.2022]



energy saving total: 85,00 kWh

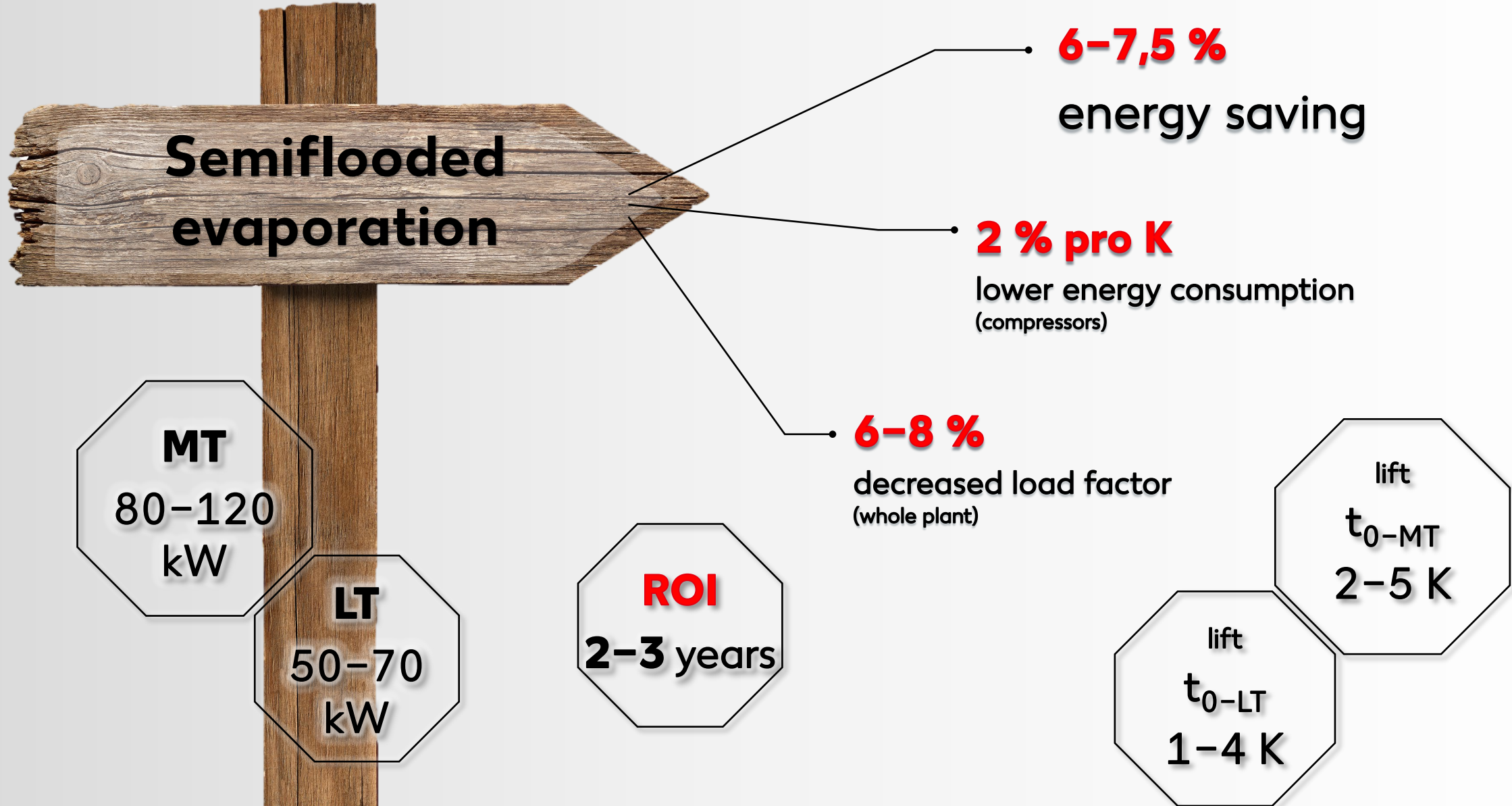
energy consumption FLD: -6,17 %

T_A average FLD: 4,65 °C

T_A average TRX: 4,08 °C

Average humidity FLD: 42,88 %

Average humidity TRX: 40,82 %





eurammon e. V. is always available as a sparring partner for questions on refrigeration with natural refrigerants.

Contact:

Dr. Alexander Schmeink | Lyoner Straße 18 | 60528 Frankfurt | Germany

Phone: +49 (0)69 6603-1277 | E-Mail: alexander.schmeink@eurammon.com