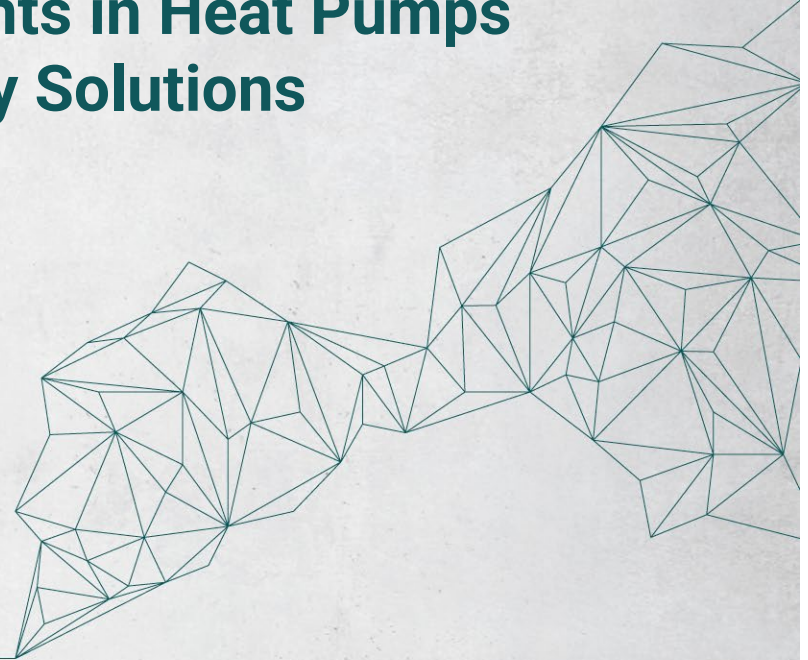


Handling Flammable Refrigerants in Heat Pumps with Proven Sensing and Safety Solutions

**CONNECTING
EXPERTS.**



We are a **global industrial tech company** and a leading provider of **sensor-rich solutions** creating valuable insights for customers.

\$4B

2023 revenues

19,000+

employees

15 countries

with Sensata sites

Key market player

in **automotive**, appliance, aircraft, **industrial**, military, **heavy vehicle**, off-road, **HVAC**, data, telecom, RV, and marine markets



Wouter Oosterwijk

Key Account Manager,
HVAC Division

Sensata Technologies
Industrial Europe

Sensata Expertise in HVAC/R

CHILLVENTA

Two main market areas in the climate sector

Climate control of goods

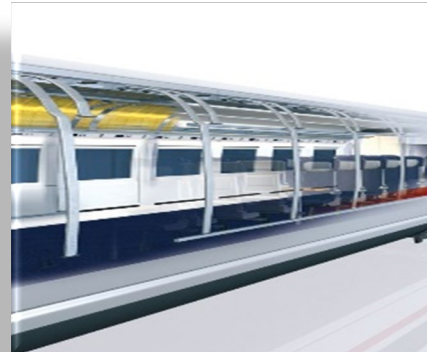
**Commercial /
Industrial
Refrigeration**



**Transport
Refrigeration**



**Rail & Bus
Cooling**



**Chillers / Rooftops
Split AC / Heat Pumps**



Natural refrigerant adoption

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Trends and regulations to lower carbon footprint is changing technology requirements



Clean & Efficient

Need for cleaner,
more efficient
products

- International obligation to reduce HFC consumption (Montreal Protocol)
- Achieving EU 2030 climate targets
- Low GWP rates
- Environmentally friendly
- Legislation compliance
- Lower costs



Sensata Solutions to help Heat Pump OEMs for more efficient product design

- ✓ Wide range of pressure sensors & switches specifically designed for heat pumps using traditional refrigerants, propane (R290), CO2 and other natural refrigerant types
- ✓ One stop shop for regulation and protection of cooling loop and hydronic loop
- ✓ Long term reliability of the parts
- ✓ Production according to automotive standards
- ✓ ATEX IEC 60079- 0/-15 certification for R290 natural refrigerant
- ✓ UL 60335-2-40 for multiple A2L refrigerants leak detection
- ✓ ISO14903 Qualification of tightness of components and joints in refrigerating systems and heat pumps

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Case Example: R290 – Heat Pump

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Application Requirements:

- Flammable gas certification of all the cooling loop components or certification of every single unit type.
- Prevent dangerous leakage and option to make use of gas detection sensor.



Pressure switch to ensure safety by high pressure cut-out control (HPCO)



Pressure sensor with thermal isolating tube for regulating the cooling loop, ensuring less potential leakage and thermal isolation



A3 gas leakage detection sensor to control mitigation systems and/or shutdowns



Pressure measurement in the hydronic heating loop, for optimal heating distribution



Thermal high cut-out protection



Temperature sensor for optimal regulation of refrigeration loop

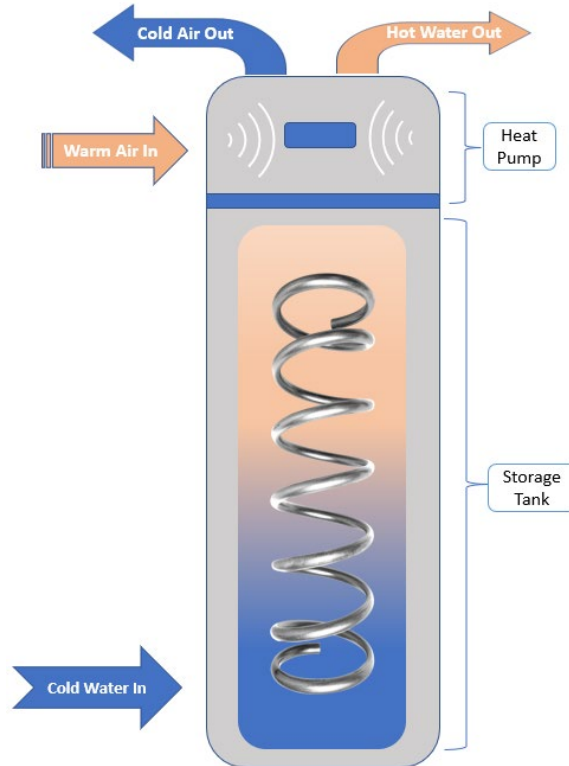


Case Example: R290 - Domestic hot water Heat pump

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Pressure switch to ensure safety by high pressure cut-out control (HPCO)



Thermal high cut-out protection



Temperature sensor for optimal regulation of refrigeration loop



Sensor Solutions for Heat Pumps and Refrigeration

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Solution		Description	R290	CO2	ATEX	2D code
	116CP	Pressure Sensor				✓
	3NT	Thermostat	✓	✓	✓	✓
	PS80	Pressure Switch	✓	✓	✓	✓
	81/82CP	Pressure Sensor	✓		✓	✓
	2HMP	Pressure Sensor	✓		✓	✓
	5PP6	Pressure Sensor		✓		✓
	A2L A3	Leak Detector Leak Detector in development	✓			✓



Sensata
Technologies

ecovadis





**Our sensors are the fundamental building blocks
needed for a cleaner, more efficient and
electrified world.**

We welcome you at stand 322 in Hall 5

THANK YOU FOR YOUR ATTENTION

CONNECTING
EXPERTS.

