

THERMONOVA

PROPANE R290 AIR/WATER HEAT PUMPS

110 kW – 2.5 MW



MADE IN

DENMARK

We make it easy for you

The NOVA series is delivered directly from the factory, craned into place, assembled and ready to operate.



We carefully plan every detail to achieve optimal comfort and reliability.



NOVA - the natural choice

NOVA 110-880 is an air/water heat pump series with propane gas as a refrigerant (natural refrigerant R290).

The heat pump is built as a cascade-connected unit consisting of 1-8 independent compressors with associated frequency converters, condensers, and evaporators. It is possible to optimize the system's supply temperature, heating effect, and COP with a hot gas exchanger and sub-cooler. The heat pump's cold side is designed with direct evaporation of refrigerant in the air heat absorber (DX). The heat pump's hot side can be delivered with series-connected condensers on the waterside. This results in a higher COP.

Refrigerant

At ThermoNova, we work hard to minimize the climate impact, but since emissions are always a small risk, the NOVA series' cooling circuit is equipped with natural refrigerant propane gas. The environmental impact of emissions is negligible, and compared to a traditional synthetic refrigerant, it is as follows:

GWP factor (CO₂ equivalent)

Natural refrigerant propane gas (R290)

CO₂ per kg refrigerant: 3 kg CO₂

Synthetic refrigerant Fx R410A

CO₂ per kg refrigerant: 2088 kg CO₂

Propane has better thermodynamic qualities than the synthetic alternatives R410A and R32, and you can thereby obtain a higher water temperature on the hot side as well as a higher COP.

Compressor

The heat pump series is equipped with 1-8 6-cylinder semi-hermetic suction gas-cooled compressors that rotate independently according to need.

Versatile compressor type with great advantages:

- Water temperature of 65 °C at -12 °C outdoor temperature
- Highest COP in its class
- Approved for propane gas

Evaporator

The heat pump is equipped with 2-16 evaporators with direct expansion of the refrigerant (DX) (two per compressor/refrigerant circuit). The evaporators have a total surface area facing the open of 412 m² per compressor, which helps to ensure a min. span between outdoor temperature and the refrigerant's evaporation temperature. To reduce the risk of leakage, all copper pipes in the evaporator have the largest possible wall thickness, and to reduce the heat loss between the outdoor air and refrigerant, the pipes are equipped with a unique internal rifling, which provides the best possible heat contact between outdoor air and refrigerant. Due to the Danish climate with high humidity in the heating season, great emphasis has been placed on reducing the energy requirement for the increased defrosting expenditure. The evaporator is therefore designed with an increased fin spacing (3 mm), which means that defrosting in critical situations must be done no more than once per operating hour. The evaporator is designed as a light construction, which requires a minimum of energy for defrosting. A unique control method between the evaporator's superheating on the refrigerant side and interaction with the heat pump's sub-cooler means that the evaporator is partially flooded (low superheating). The method ensures that the evaporator's surface area facing the open is best utilized for evaporation of the refrigerant and thereby creates a higher COP.

Fans

The heat pump is equipped with 2-16 fans (2 per compressor/refrigerant circuit). The fan is regulated in terms of revolutions according to cooling effect.

Total air flow: max 48,000 m³/h per compressor

Blade diameter: 1000 mm

Speed at max: 570 rpm (at nom.).

Condenser

The condenser is a fully soldered hermetic plate heat exchanger with counterflow between the refrigerant and water circuit. The condenser is designed with an asymmetric plate pattern with a larger volume in the water circuit and a reduced volume in the refrigerant circuit. The asymmetric structure means that the pressure loss in the water circuit is greatly reduced and allows you to connect the plant's condensers in series.

Hot gas exchanger

The energy from the overheating refrigerant (80-100 °C) from the compressor's pressure line is separated

via a hot gas exchanger and used to raise the heating system's supply temperature as the last step. The energy from this will amount to 20-35 pct. of the heat pump's total heating capacity. Raising the supply temperature via the hot gas exchanger does not influence the compressor's condensation temperature and therefore contributes to raising the heat pump's COP.

Sub-cooler

A sub-cooler (heat exchanger) is mounted between the liquid line and the compressor's suction gas line. To increase COP and protect the compressor's lubricant (oil) against entering into a chemical reaction with the refrigerant.

COP is increased partly by sub-cooling the liquid refrigerant before the evaporator's expansion valve, whereby an increased amount of energy can be absorbed in the evaporator -, and partly by making the sub-cooler part of a unique regulation of the evaporators overheating. The sub-cooler also ensures sufficient overheating of the compressor's suction gas line, so that a chemical reaction between the refrigerant and the lubricating oil does not occur.



DATASHEET FOR NOVA 110 - 220 - 330 - 440						
		Unit	NOVA 110	NOVA 220	NOVA 330	NOVA 440
Total heating capacity	Ambient +7°C water outlet 55°C	kW	108	215	320	426
Energy class	EN14825		A++	A++	A++	A++
SCOP	Average operation point floor heating/radiator		4.19 / 3.68	4.19 / 3.68	4.19 / 3.68	4.19 / 3.68
Operation Range	Ambient min/max	°C	-20 to 30	-20 to 30	-20 to 30	-20 to 30
	Water outlet min/max	°C	35-70	35-70	35-70	35-70
Electrical information	Power supply		3X400V+N+PE/50Hz	3X400V+N+PE/50Hz	3X400V+N+PE/50Hz	3X400V+N+PE/50Hz
	Input power (max)	kW	35	70	105	140
	Maximum current	A	58	116	174	232
	Circuit breaker	A	63	150	200	250
Evaporators	Quantity	Pc.	2	4	6	8
	Surface	m ²	412	824	1236	1648
	Fin spacing	mm	3.0	3.0	3.0	3.0
Fans	Quantity	Pc.	2	4	6	8
	Fan motor		- EC motor	- EC motor	- EC motor	- EC motor
	Air volume max	m ³ /h	48,000	96,000	144,000	192,000
	Blade diameter	mm	1000 in diameter	1000 in diameter	1000 in diameter	1000 in diameter
	Speed max	RPM	570	570	570	570
Compressor	Quantity	Pc.	1	2	3	4
	Type		Semi-hermetic 6 cyl.	Semi-hermetic 6 cyl.	Semi-hermetic 6 cyl.	Semi-hermetic 6 cyl.
	Modulating	Hz		30-70	30-70	30-70
%			44-100% (variable)	22-100% (variable)	11-100% (variable)	6-100% (variable)
Refrigerant	Type/amount	kg	Propane R290/10	Propane R290/2x10	Propane R290/3x10	Propane R290/4x10
Condenser	Type		Plate heat exchanger	Plate heat exchanger	Plate heat exchanger	Plate heat exchanger
	Hot gas exchanger		Option	Option	Option	Option
	Sub-cooler		Option	Option	Option	Option
Dirt collector	Y-filter with pressure guard		Yes	Yes	Yes	Yes
Communication	Modbus RS485		Yes	Yes	Yes	Yes
Control signals	Analogue and digital		Yes	Yes	Yes	Yes
Dimensions	L x W x H incl. electric panel	mm	2740 x 1540 x 2490	5400 x 1540 x 2490	7805 x 1540 x 2490	10210 x 1540 x 2490
Weight	Dry weight	kg	975	1850	2650	3450
	Operational weight	kg	1025	1950	2800	3650
Energy meter			Option	Option	Option	Option
Electric meter			Option	Option	Option	Option
Internet connection	Gateway w/LAN		Yes, Ethernet RJ45	Yes, Ethernet RJ45	Yes, Ethernet RJ45	Yes, Ethernet RJ45
	Gateway w/4G-modem		Option	Option	Option	Option

Heating capacity is in line with EN 14511. We reserve the right to make changes without notice.

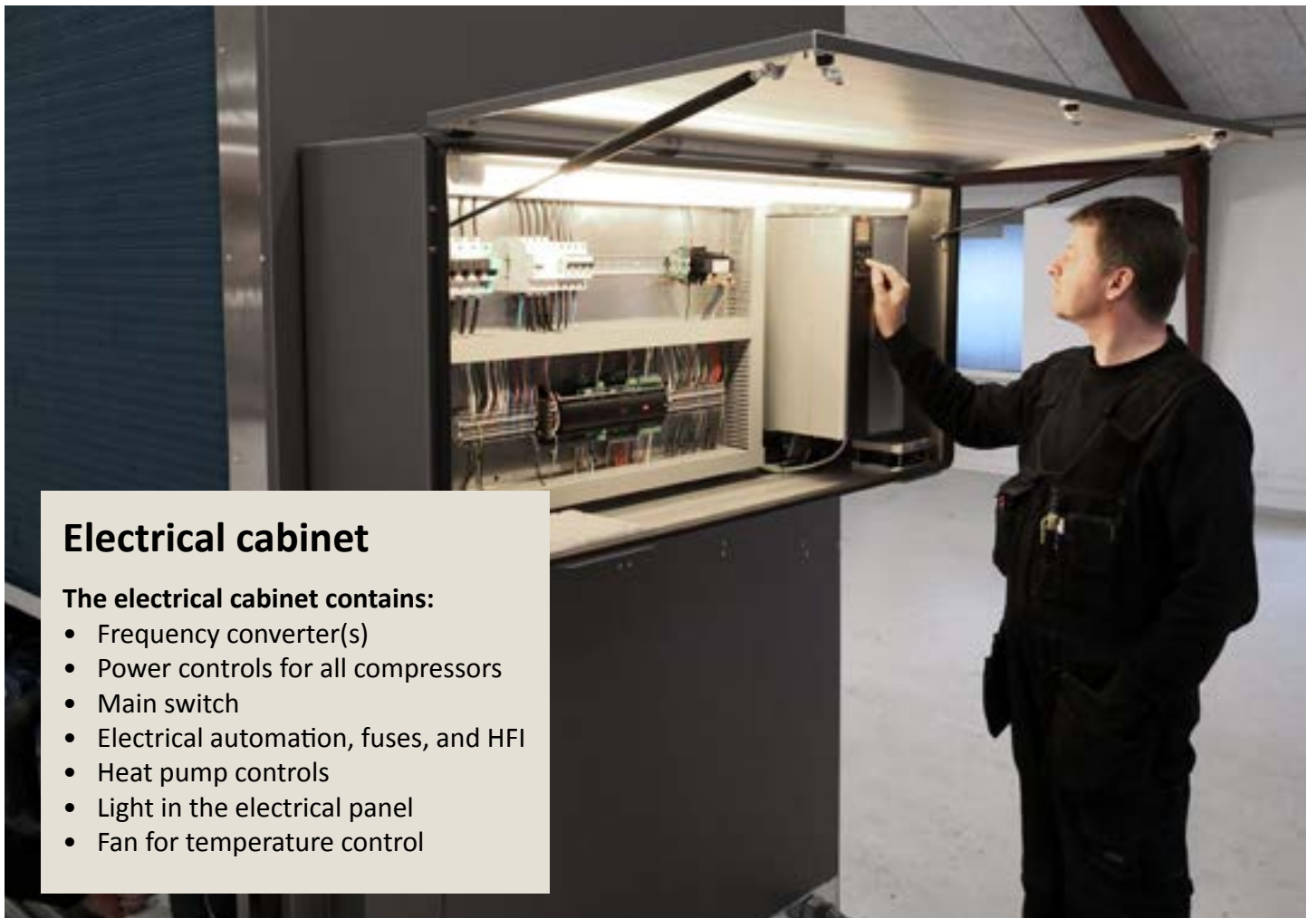
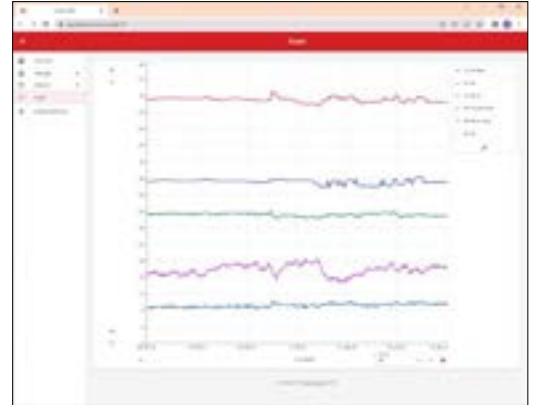
Remote access and data log

Platform for factory monitoring

- Monitoring from the factory
- Logging of a wide range of data
- Alarm and warning via e-mail and text
- Operating curves
- Remote control
- Remote software update

Data logging

The NOVA heat pump is equipped with a unique monitoring platform with data logging, which provides deep insight into how the heat pump works and performs. The platform also provides additional security for competent and insightful support from the factory and local technicians. Server and data service is performed with Amazon Web Services to achieve high reliability. The solution requires an internet connection via a built-in gateway to an Ethernet cable or 4G data connection.



Electrical cabinet

The electrical cabinet contains:

- Frequency converter(s)
- Power controls for all compressors
- Main switch
- Electrical automation, fuses, and HFI
- Heat pump controls
- Light in the electrical panel
- Fan for temperature control



Connection below ground



Connection above ground

MANUFACTURER:

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