

# HiRef

Innovators above  
the standards

INDUSTRY

DATA CENTER



**Air condensed perimeter mounted units**

# NRG A

**for Data Centers with modulating compressors**

Range: 9.3-147.2 kW



NRG series perimeter-mounted air conditioning units are designed for **high thermal density** IT facilities requiring **accurate hygrothermal parameter control and continuous operation**. The use of inverter-driven compressors, capable of tracking the thermal load with extreme precision, of EC fans (standard), and of electronically controlled lamination valves (standard) also **make it possible to achieve high performance with reduced energy consumption, improving the Data Centre's PUE**. The strength of the new NRG range is **the high efficiency** (KW/sq.m), obtained thanks to the precise internal design, a frame of just 890 mm in depth, and the careful choice of components. Versatile and flexible range The following refrigerating configuration options are available:

**NRG A:** Air condensing with remote condenser.

**NRG W:** Dry-Cooler or water condensing.

**NRG Z:** Mains water condensing (15°C).

**NRG F:** Water condensing and indirect water Free-Cooling.

**NRG D:** Air condensing with remote condenser and Dual Cooling.

**NRG K:** Dry-Cooler or water condensing and Dual Cooling.

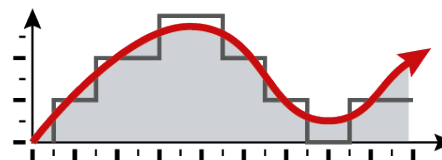
**NRG Q:** Mains water condensing (15°C) and Dual Cooling.

The NRG A units are air-condensed perimeter-mounted units of the NRG range; they are widely used for the cooling of Data Centers. The air-condensed solution offers a **simple system design**, thanks to the absence of auxiliary circuits and pumps; **the cooling circuit is managed by the cabinet**, and both the indoor unit and the remote condenser are **easy to install**.

## Main advantages

### Power modulation

The NRG A units adapt quickly to Data Center cooling requests. Thanks to the inverter-controlled compressor, performance can be modulated to up to 25% of the rated value, thus reducing consumption. This ensures continuous operation of the unit even at low loads, without switching cycles on and off.

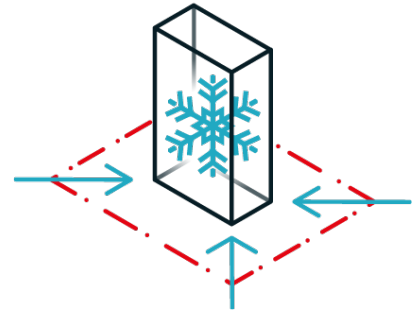


### Aiming at maximised system efficiency

Design choices include, in addition to the use of electronically controlled expansion valves, the management of variable-speed scroll compressors and EC (electronically commutated) fans via Modbus. Thanks to these features it is possible to acquire, manage and adjust operating parameters and therefore thermo-hygrometric values in the server room very accurately, with high levels of energy efficiency.

### Maximised power density

The internal design and the special arrangement of the components of the TRF Evolution platform, used in the NRG units, have been designed to maximise the exchange surface of the evaporating coil. These characteristics, combined with the use of latest-generation electronic switching EC fans with high air flow rate, have allowed the power density to be increased. The space available in the server room is made the most of and this makes the NRG A units suitable for applications with high thermal load density, typical of latest generation Data Centres.

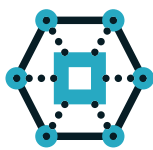


### Remote condensers

All units can be combined with HiRef remote condensers, choosing from different combinations to meet all system needs. Oversize remote condensers are ideal for warmer environments, where it is necessary to keep the condensing temperature under control, while the compact condensers on the other hand are small in terms of both size and consumption. The condensers, used with dual-circuit units, are available with a single cooling circuit for maximum reliability and redundancy of the system or with a double cooling circuit, to reduce installation spaces and costs.



## Technological components



### Multi-protocol communication interface

HiRef units can be integrated with the customer's external supervision Building Management System (BMS), using the most popular communication protocols, including Modbus RTU, Modbus/IP, BacNet, LonWorks, SNMP.



### Scroll compressors

Scroll compressors include a mobile scroll, driven by the motor, which completes orbital revolutions and a fixed scroll that is coupled to it. The orbital motion creates a series of gas pockets that move from one scroll to the other. When moving closer to the centre of the scroll, where exhaust takes place, the gas is compressed to smaller and smaller volumes until the desired delivery pressure is reached. Scroll technology improves volumetric efficiency and flow continuity, reduces noise and leakage and eliminates harmful volumes and downtime.



### EC Radial Fans

Radial or centrifugal fans are characterised by backward blades. Air is taken in the axial direction, parallel to the rotation axis and delivered radially, perpendicular to the rotation axis. This type of fan does not require an external screw, has a high head and is suitable for use in indoor units where the air is often ducted and recirculated. They are driven by electronically commutated (EC) brushless permanent-magnet (BLDC) synchronous motors. The use of these motors reduces unit consumption, noise and footprint, improves the efficiency and life cycle of the system through accurate control of speed and acceleration, resulting in less heat dissipation. In addition, inrush currents and sparks are eliminated.



### Modbus controlled fans

The Modbus protocol, unlike the 0-10V signal, allows to not only control the speed of the fans, but also to capture, monitor and manage considerably more data and alarm information.



### Fast restart

The fast restart function (on request) allows the unit to restart quickly after a mains power outage. This optional feature is available with dual power to minimise restart times.



### On-board Humidifier

Humidifiers are essential components for maintaining the right level of humidity in the server room and ensuring the proper functioning of the room equipment. Humidifiers with immersed electrodes can be installed in HiRef units, managed by proprietary software which, equipped with a special probe, keeps humidity levels at pre-established values.



### Modulating hot gas post-heating

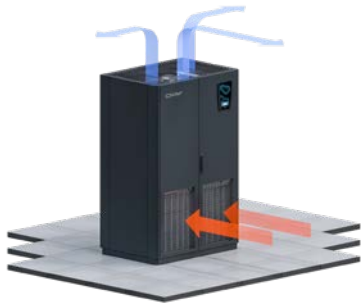
Post-heating by modulating hot gas controls the air temperature through the action of an additional coil, powered by the gas delivered by the compressor and partially bypassed by the condenser towards the coil. Unlike the On/Off version, the flow of hot gas is controlled by a diverter valve, which accurately regulates the flow rate required for post-heating. This option is only available for direct expansion units.



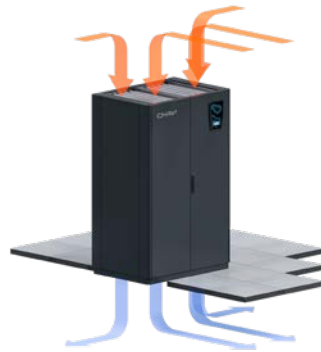
### Inverter driven compressors

Inverter-driven compressors allow compressor rotation speed and efficiency to be controlled, by modulating the frequency and the supply voltage of the motor. They are driven by electronically commutated (EC) brushless permanent-magnet (BLDC) synchronous motors. The use of these motors reduces unit consumption, noise and footprint, improves the efficiency and life cycle of the system through accurate control of speed and acceleration, resulting in less heat dissipation. In addition, inrush currents and sparks are eliminated.

## Air flow configurations



Upflow



Downflow

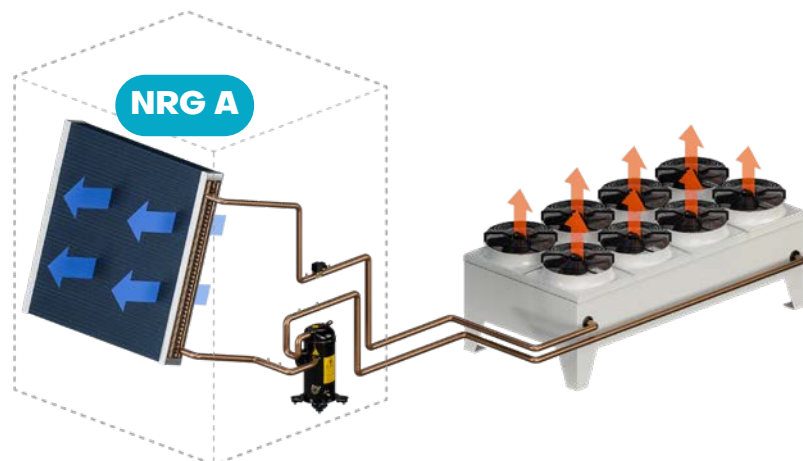


Displacement

## Types of system



AIR/AIR



## Additional benefits

- Refrigerant R410A
- EC Fans
- Scroll inverter and on-off compressors
- Electronic expansion valves
- Advanced programmable microprocessor control with LCD display
- Humidity control through dehumidification and humidification
- Temperature control through heating and post-heating systems with electric heating elements, hot water and hot gas
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling
- Air filter class G3 supplied as standard Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure ( $\Delta P$  control) ventilation modulation
- Long distance kits for optimal operation in the case of large distances between indoor and outdoor units
- Low temperature kits for optimal operation in the case of installation in particularly cold environments

## Technical table

NRG A		0091	0131	0201	0251	0301	0381	0441	0501	0551	0641	0701	0801	0852	0962	1003	1103	
<b>AIR TEMPERATURE 24°C - RELATIVE HUMIDITY 50% / OUTDOOR AIR TEMPERATURE 35°C</b>																		
<b>COOLING CAPACITY</b>	<b>kW</b>	9.3	12.3	19.8	23.8	31.3	38.1	44	47.7	56.8	58.2	73.8	77.3	81.4	93.3	109.2	127	
<b>SHR</b>	-	0.89	0.94	1	1	1	0.99	0.93	0.99	0.91	0.99	0.93	0.99	1	0.94	0.87	0.81	
<b>EER</b>	-	3.74	3.71	4	3.99	4.19	3.9	3.46	3.89	3.78	3.85	3.72	3.83	4.21	4.1	4.06	3.61	
<b>TOTAL POWER INPUT</b>	<b>kW</b>	2.7	3.7	6.2	7.2	9.3	11.6	14.5	14.5	17.2	18	23.8	25.1	25.2	28.6	32.8	41.1	
<b>AIR TEMPERATURE 30°C - RELATIVE HUMIDITY 35% / OUTDOOR AIR TEMPERATURE 35°C</b>																		
<b>COOLING CAPACITY</b>	<b>kW</b>	10	13.9	22.5	27	35.5	43.2	48.7	53.7	62.9	65.6	81.9	87.3	92	104.1	119	135.7	
<b>SHR</b>	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.97	
<b>EER</b>	-	3.94	4.09	4.44	4.42	4.67	4.32	3.67	4.2	4.11	4.23	3.98	4.16	4.65	4.45	4.37	3.79	
<b>TOTAL POWER INPUT</b>	<b>kW</b>	2.7	3.8	6.3	7.4	9.4	11.8	15.1	15	17.5	18.4	24.5	25.9	25.6	29.3	33.1	41.7	
<b>AIR TEMPERATURE 35°C - RELATIVE HUMIDITY 30% / OUTDOOR AIR TEMPERATURE 35°C</b>																		
<b>COOLING CAPACITY</b>	<b>kW</b>	10.8	15.2	25	29.9	39.2	47.5	53.4	59	68.9	72.3	90	96.1	101.2	114.3	130.1	147.2	
<b>SHR</b>	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
<b>EER</b>	-	4.18	4.35	4.86	4.81	5.08	4.66	3.9	4.48	4.43	4.59	4.25	4.45	5.02	4.81	4.69	4.04	
<b>TOTAL POWER INPUT</b>	<b>kW</b>	2.8	3.9	6.4	7.4	9.5	12	15.5	15.4	17.8	18.6	25.1	26.5	26	29.6	33.6	42.3	
<b>AIR FLOW</b>	<b>m³/h</b>	2150	3700	8800		11720		14300	17500	19900	23700					25300		
<b>AT 2 METERS FREE FIELD</b>	-							400/3+N/50										
<b>SOUND PRESSURE LEVEL at 2 meters free field</b>	<b>dB</b>	50	54	70		71	74	75	77			76					77	
<b>DIMENSIONS [LxHxD]</b>	<b>mm</b>	600 x1875 x600	900 x1875 x600	1010 x2000 x890		1270x2000x890		1760 x2000 x890		2020 x2000 x890				2510x2000x890				

Performance data relating to Downflow versions combined with standard HiRef remote condenser. | Also available with 60 Hz power supply. | Model height Displacement 2125 mm for sizes 0091-0131.