Adaptive Function Plus
Patented and certified technology

The low consumption revolution

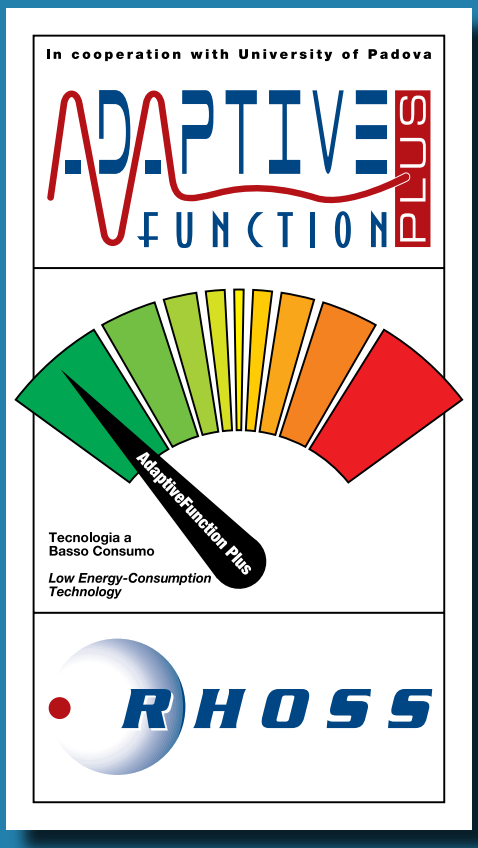
RHOSS
CREATING YOUR COMFORT

...the low-consumption technology

ADAPTIVE FUNCTION PLUS

In modern air-conditioning systems, increased efficiency, lower energy consumption and resulting savings are a must!
The Adaptive Function Plus predictive technology, patented by Rhoss in partnership with top universities and applied to chillers up to 900 kW with scroll compressors, allows for significant seasonal energy savings, greater stability of the temperature of the water provided to the system and lower emissions of pollutants into the environment.

Rhoss chillers, with Adaptive Function Plus technology, stand out for their unique trademark:



…a guarantee of comfort and energy savings thanks to high seasonal efficiency.

PREDICTIVE TECHNOLOGY

Adaptive Function Plus is an innovative predictive control software, patented in exclusive by RHOSS, developed with the collaboration of the Departments of Technical Physics and Computer Engineering of the University of Padua.
The new logic allows the chiller to collect information from the system regarding its load and inertia, and to adjust and optimize the operating parameters in order to reduce the energy consumption of chillers and heat pumps.

"THE ENERGY REQUIRED, ONLY WHEN REQUIRED"

In the air conditioning systems, the chillers only operate at full load for a small number of hours while they work at partial load for most of the season: therefore they must be designed and managed in a way that their energy consumption is as low as possible during the entire period of use.
Adaptive Function Plus works on the set-point value, allowing to increase the unit efficiency and to reduce the energy consumption, compared to chillers and heat pumps of the same capacity and with traditional control logic.
The energy consumption saving reaches 36% in the winter and 18% in the summer!

RELIABILITY WITH LOW WATER CONTENT

The ability of the controller to estimate the inertia and dynamics of the systems allows units, fitted with Adaptive Function Plus, to operate even in system with low water content.

REDUCTION OF CONSUMPTION AND RESPECT FOR THE ENVIRONMENT

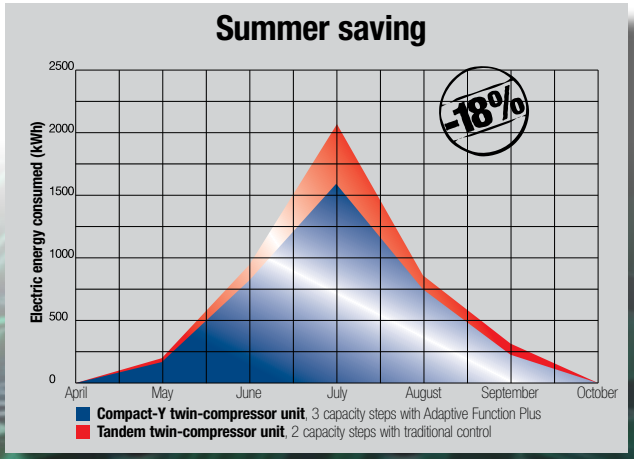
With Adaptive Function Plus the energy saving of the building-unit system is improved thanks to its energy saving capacity.
The value of the building therefore increases, while the emission of pollutant substances into the environment is reduced.

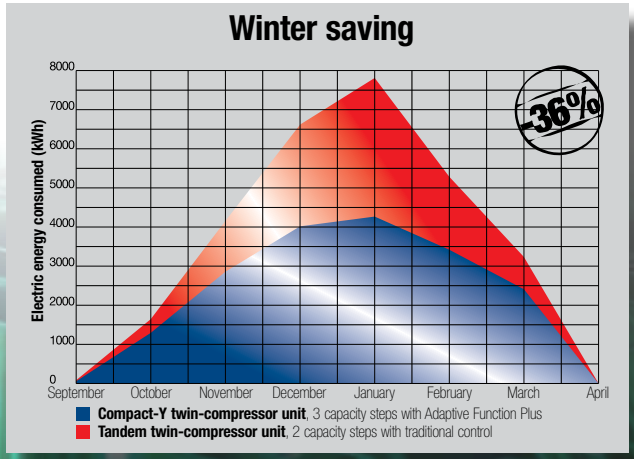
...100% guaranteed savings

ADAPTIVE FUNCTION PLUS

Adaptive Function Plus allows energy performance equal or better than a corresponding A Class unit, without any cost penalty.
Tests performed in our R&D Lab have confirmed the dynamic analyses carried out by the University of Padua to compare traditional heat pumps with heat pumps by Rhoss with Adaptive Function Plus logic.

Dynamic analysis performed for an office building in Milan, comparing the functioning of a reversible heat pump with two compressors with equal power operating on the same cooling circuit, which works with traditional control with fixed Set-point (7°C in the summer season and 45°C in the winter season) and a Compact-Y unit with three capacity steps that work with Adaptive Function Plus logic with shifting Set-point (range between 7 and 14 °C in the summer season, range between 35 and 45°C in the winter season).





THE PLUS SEASONAL EFFICIENCY INDEX

The University of Padua has elaborated the ESEER+ seasonal efficiency index, which considers the chiller set-point trend at the different partial load conditions and which better characterises the seasonal behaviour of the cooling unit with Adaptive Function Plus with respect to the more traditional ESEER index.
The ESEER+ index can therefore be used for a rapid evaluation of the seasonal energy consumption just for chillers fitted with Adaptive Function Plus, when more complex analysis is performed on the building-unit system, which are usually difficult to complete.

Simplified method for the calculation of energy saving with Adaptive Function Plus

The dynamic analysis for the calculation of energy consumption of a cooling unit in a building-unit system are generally too elaborated to be used to compare different cooling machines quickly as a range of data is required, which is not always available to the designer.
For a quick estimate of what the energy saving could be using a machine with **Adaptive Function Plus** software with respect to a machine with traditional control, we therefore propose a simplified method that uses the following formulas:

$$E = \frac{0{,}54 \times N \times C}{ESEER+}$$

E = electric energy absorbed by the chiller fitted with **Adaptive Function Plus** [kWh]
N = number of chiller functioning hours
C = chiller nominal cooling capacity [kW]
ESEER + = average seasonal efficiency of the chiller fitted with **Adaptive Function Plus**

$$E = \frac{0{,}54 \times N \times C}{ESEER}$$

E = electric energy absorbed by the chiller fitted with traditional control [kWh]
N = number of chiller functioning hours
C = chiller nominal cooling capacity [kW]

ESEER = (European seasonal EER) – Average European seasonal efficiency

Therefore, with equal nominal cooling capacity and supposing the same number of working hours of the two cooling units with different controls, the electric energy absorbed will be greater the less the seasonal efficiency of the unit itself. For simplicity, we propose a calculation example on a Rhoss machine with traditional control and with **Adaptive Function Plus** control:

EXAMPLE

TCAEY 260 model fitted with traditional software:
Nominal cooling capacity = 59.2 kW
N = 8 hours/day x (5monthsx30days/month) = 1200 hours
ESEER = 4.38

$$E = \frac{0{,}54 \times 1200 \times 59{,}2}{4{,}38} = \mathbf{8.758{,}4\ kW/h}$$

TCAEY 260 model fitted with control with **Adaptive Function Plus** software:
Nominal cooling capacity = 59.2 kW
N = 8 hours/day x (5monthsx30days/month) = 1200 hours
ESEER = 5.04

$$E = \frac{0{,}54 \times 1200 \times 59{,}2}{5{,}04} = \mathbf{7.611{,}4\ kW/h}$$

The **energy saving** that can be obtained, therefore **with Adaptive Function Plus is 13%**.

Adaptive Function Plus,

- Patented and certified technology
- Wide range of units with scroll compressors from 5 to 900 kW
- The set-point adapts to the unit's load
- Technology that provides real energy savings
- Reliability even with a low water content in the system
- New ESEER+ index to calculate seasonal consumption

...the low-consumption revolution has started!

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RHOSS S.P.A.
Via Oltre Ferrovia, 32 - 33033 Codroipo (UD) - Italy
tel. +39 0432 911611 - fax +39 0432 911600
rhoss@rhoss.it - www.rhoss.it - www.rhoss.com

IR GROUP SARL
19, chemin de la Plaine - 69390 Vourles - France
tél. +33 (0)4 72 31 86 31 - fax +33 (0)4 72 31 86 30
exportsales@rhoss.it

RHOSS Deutschland GmbH
Hölzlestraße 23, D-72336 Balingen, OT Engstlatt - Germany
tel. +49 (0)7433 260270 - fax +49 (0)7433 2602720
info@rhoss.de - www.rhoss.de

RHOSS GULF JLT
Suite No: 3004, Platinum Tower
Jumeirah Lakes Towers, Dubai - UAE
ph. +971 4 44 12 154 - fax +971 4 44 10 581
e-mail: info@rhossgulf.com

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