

i-FOCS

Air cooled high efficiency water chillers,
with screw compressors.
Complete inverter management.
From 492 kW to 842 kW



Highest system efficiency



High part-load efficiency



Practically silent operation



Low inrush current





The evolved concept of efficiency

Optimized performance for the majority of operating conditions, at part load and at the most frequent outdoor temperatures. This is the i-FOCS philosophy: extraordinary efficiency of both the single unit and of the whole system, when it is really needed.

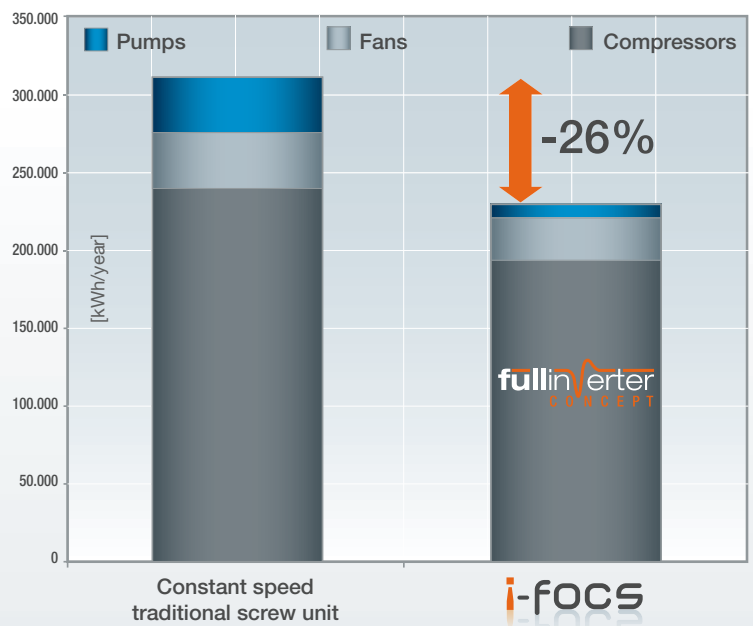
System efficiency

A HVACR plant is always a complex system. The composite parts are inter-dependent. Only the global synergy amongst the single components allows the actual performance of the system.

With i-FOCS the approach to energy efficiency becomes system-oriented.

Each part features high efficiency at the most frequent conditions of utilization. The benefits achievable with the i-FOCS chillers exceed the specific efficiencies of the single components: the evolved control logic by Climaveneta, regulate compressors, fans, pumps in synergy.

Annual energy consumption of the system unit
Load distribution as for ESEER



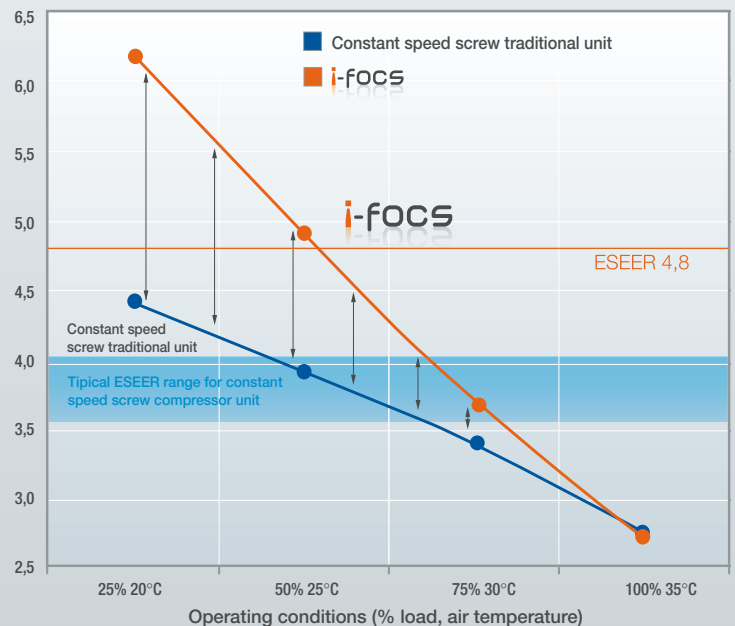
Highest efficiency at part loads

A chiller operates at full regime just for 3% of the time, as per the “Energy Efficiency and Certification of Central Air Conditioners” study, conducted on behalf of the European Union. For this reason the part load efficiency, expressed by the ESEER, is the key factor for the assessment of the unit’s consumption at the real operating conditions.

The innovative i-FOCS was conceived exactly for the purpose of the maximum efficiency at part loads. From this, resulting ESEER values are higher by 25% or more, with respect to the traditional screw units available in the market.

The operation cost savings are conspicuous and sound, bringing to a more favourable classification of the energy efficiency of the building (European Directive 2002/91 CE), associated to the reduction of primary energy consumption and consequent carbon dioxide emissions.

Comparison between i-FOCS and traditional screw unit at typical operating conditions



True harmony unit-plant-environment

Extended modulation of the cooling capacity with conspicuous benefits regarding noise impact and the building's load. Soft start with important reduction of the electrical stress on the components.



Practically silent operation

The new i-FOCS units ensure further low noise at the most typical operating conditions.

The noise is particularly critical during night time operation, a condition usually associated with the unit's partialized regimes.

The adoption of compressors and fans with continuous speed variation involves the reduction of the noise levels right at the most critical conditions in terms of noise impact.

Moreover, by modulating the capacity down to 12%, i-FOCS limits to a minimum the transients related to the activation of the circuit's resources (compressors and fans), making the noise disturbance less frequent and less perceptible.



Soft integration with the electric installation

Further differentiating element is the absence of inrush currents, resulting from the features of the inverter-driven compressor.

This decisive point highlights the i-FOCS units, offers superior reliability and contributes to limit the installation cost, making the use of additional switching equipment unnecessary.

Furthermore, the use of motors with continuous speed variation increases the unit's power factor. This ensures optimum terms for the power supply sourcing, with no need of expensive additional components for power factor correction.

i-FOCS

Air cooled high efficiency water chillers,
with screw compressors. Complete inverter
management. From 525 kW to 843 kW



System efficiency

Advanced regulation logic ensures the synergistic integration of all components. So the overall result exceeds the simple addition of each single part.



Plug & play approach

The evolved unit's built-in electronics allows an optimum adjustment of the operation with reference to the changing loads.

This point, coupled with the possibility to integrate of the pumping resources within the unit-plant system, offers high flexibility for both the design- and commissioning stages. This allows an effective installation of the unit in plants with variable flow primary circuits. It is therefore possible to use the on-board pumps as the sole circuit's resources, while such units are also applicable to systems with both primary and secondary circuits.

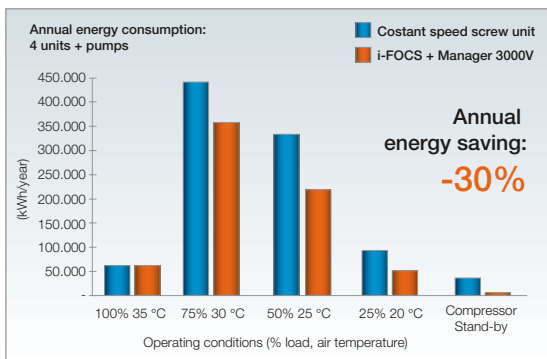


Integration unit's group - plant

With a group of multiple i-FOCS units in a plant, the group regulation device Manager 3000V permits the optimum activation of the resources available on each installed unit.

This is based upon an accurate regulation, involving also various parameters detected on the water circuit, when the unit is provided with inverter pumps.

Moreover, the advanced resource management algorithms enables also to maximize the advantages intrinsically related to the system-wise exploitation of the inverter technology on all key components.



Global efficiency

The advantages of i-FOCS are further heightened in the group operation. While one i-FOCS achieves an energy saving of 26% on yearly basis with respect to a traditional chiller, the benefit rises to 30% if a group of multiple units is considered, with regulation performed by Manager3000V. As a matter of fact, the advanced regulation logic enables the optimum balance of the resources at the various load conditions. This is completed by the smart management of the pumps, especially during stand-by conditions. The overall advantages of the group management substantially exceed those already offered by a single chiller.



Simplified design and commissioning

i-FOCS - plus Manager3000V in the case of multiple units - simplifies the design and implementation of plants with variable flow and offers benefits, besides the reduced consumption, also in terms of engineering of the water circuit. The possibility of integration of the built-in inverter pumps allows substantial reduction of occupied spaces, components and also time required for the system's commissioning.

The monitoring performed on the water circuit, the equalization of resources' working times, and quick response by the resources increase the installation's reliability in any working condition.



The technological choices

Years of experience in the development of proprietary advanced technologies as regards the high-level, integrated modulation. From this background comes i-FOCS.



Full inverter concept regulation

The controller of i-FOCS features an integrated approach by which all unit's resources are regulated and it is based on a reliable, consolidated platform.

It integrates an advanced control logic developed for the optimum management of the continuous modulation of the adopted devices.

So a fine-tuned regulation – based on leaving water temperature and applied to a stretched range of capacity partialization – can be exploited.



Inverter-driven screw compressor

Full inverter concept. The innovative i-FOCS chillers combine the inherent reliability of screw compressors with all the advantages of inverter technology. Via the continuous modulation of the rotor speed, the i-FOCS units auto-adapt their performance quickly as per the real demand of the installation.

Consumption is therefore reduced to a minimum thanks to the removal of inefficiencies typical of traditional screw compressor operation based on slider adjustment. The removal of the slider and associated components reduces the moving parts with consequent benefits for the compressor's reliability. The reliability is also enhanced by the limited electrical stress, especially due to the absence of inrush currents and transients when switching the compressor on.



EC fans

Full inverter concept. Not only the compressors, but also the fans feature continuous adjustment of their speed.

The intrinsic energy efficiency of the DC brushless motors further improves the performances of the chillers. The very low current at start-up contributes to the overall reliability. Substantial operating cost savings are achieved.

Moreover the ability to continuously adjust the fan speed minimizes the noise level depending on the outdoor temperatures.



Variable flow pumps (optional)

Full inverter concept. The energy consumption associated with the fluid circulation weighs heavily on the cumulative operating costs of a large installation. It is particularly detrimental when the units work in partial regime or, even more, when they are in stand-by.

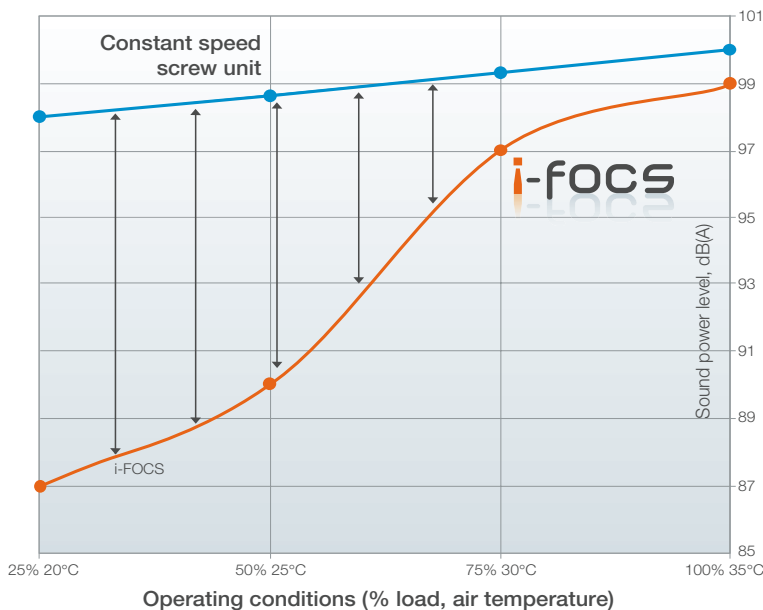
In such conditions, against a reduced consumption with reference to compressors or fans, the consumption for the circulation of water may remain undiminished. i-FOCS reduces the installation's power consumption thanks to the possibility to adopt of pumps with continuous regulation of the water flow achieved via inverter, integrated by the unit's controller.



Minimum impact on environment and installation

Not only efficient cooling. Silent operation and electrical features complete the list of advantages offered by the new i-FOCS units, differentiating them from other solutions available today.

Sound power level at different cooling load



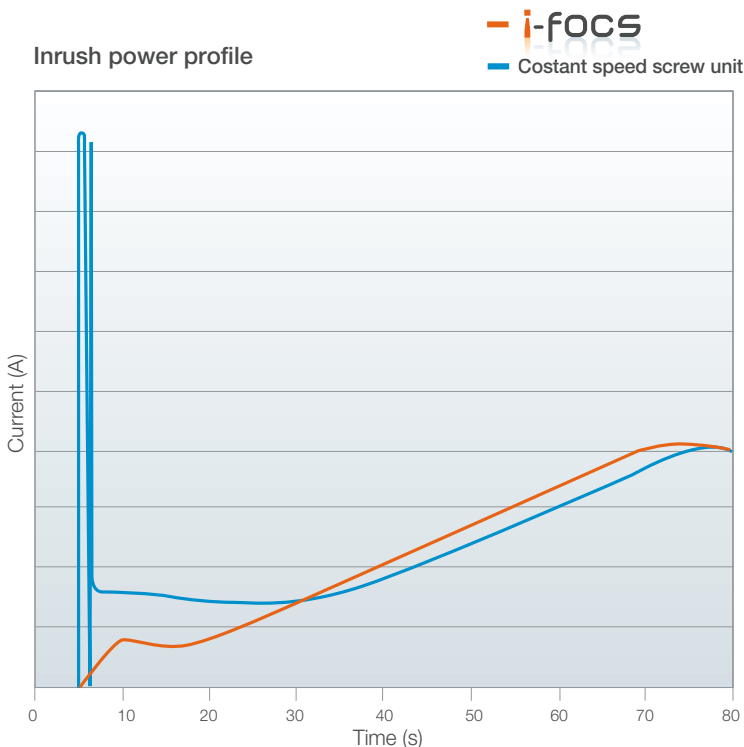
Silent operation when it is needed

i-FOCS deals with the issue of noise in a totally new way. Hitting the target of quiet operation means first of all understanding when this is important. During the night, when the background noise is remarkably attenuated, the acoustical impact of a chiller is much more perceptible. At these conditions the cooling loads are usually low and the unit works mostly in partial regime.

At partial regimes, typical of night time hours, the inverter devices adjust the speed of the related unit components so that the exact capacity is supplied instantaneously.

Without waste and especially with the minimum noise. Moreover the i-FOCS series features also a low-noise version, in order to satisfy even the most stringent low noise requirements.

Inrush power profile



Minimum inrush current. Maximum power factor.

The i-FOCS units feature very low inrush current at start-up. The use of variable speed motors removes the fluctuations on the power lines. The stress on the electrical equipment is reduced to zero. This is beneficial also regarding the costs and sizing of the protection equipment to be installed between power line transformer and chiller.

All i-FOCS units are also characterized by a very high power factor, with $\cos(\phi)$ up to 0,94. It therefore reduces the electric power which the motor does not transform into useful power for the compressor.

The installation of devices for the electrical loads' power factor correction, are rendered unnecessary.



Main technical data

i-FOCS		Versions	52	62	72	82
Number of compressors	N°	E / SL-E	2	2	2	2
Number of circuits	N°	E / SL-E	2	2	2	2
Cooling capacity (1)	kW	E	511	670	737	842
		SL-E	492	644	712	808
ESEER		E	4,69	4,70	4,74	4,71
		SL-E	4,70	4,71	4,76	4,72
Sound power level (2)	dB(A)	E	97	98	98	99
		SL-E	91	92	92	93
Sound pressure level (3)	dB(A)	E	68	69	69	70
		SL-E	62	63	63	64
DIMENSIONS						
A	mm	E / SL-E	4900	5800	7000	7000
B	mm	E / SL-E	2260	2260	2260	2260
H	mm	E / SL-E	2430	2430	2430	2430

Versions

- i-FOCS / E** High efficiency unit
i-FOCS / SL-E High efficiency super-low noise unit

Notes:

- (1) Evaporator water temperature (in/out) 13/7°C; outdoor air temperature 35°C.
 (2) Sound power level: Climaveneta determines the value according to measures made in compliance with the ISO 3744 norm. This is the sole value to be considered as binding.
 (3) Sound pressure level: in open field on reflecting surface, directivity factor Q=2, at 10 m from the outer surface of the unit.

The unit can operate with variable water flow on the evaporator.

