

# MCHP

MICROCOENERATOR

MADE IN JAPAN 



ENERGY.



5QNG7-/KFFNGCUVKUVTKDWWQT

Gas Heat Pump (GHP) / Microgenerator (MCHP)

Sales & After Sales

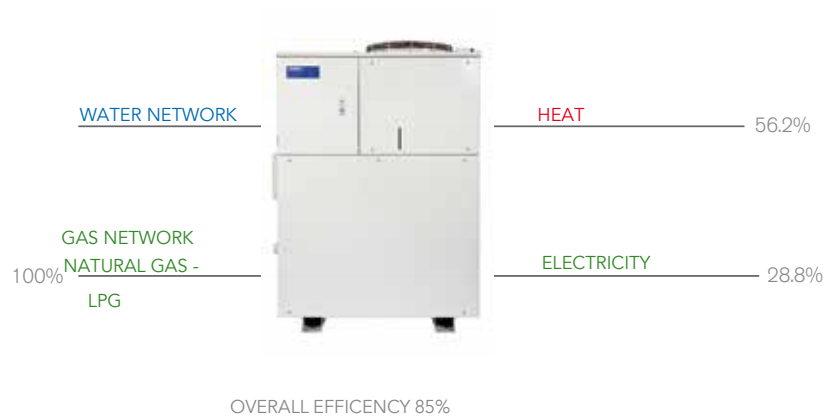
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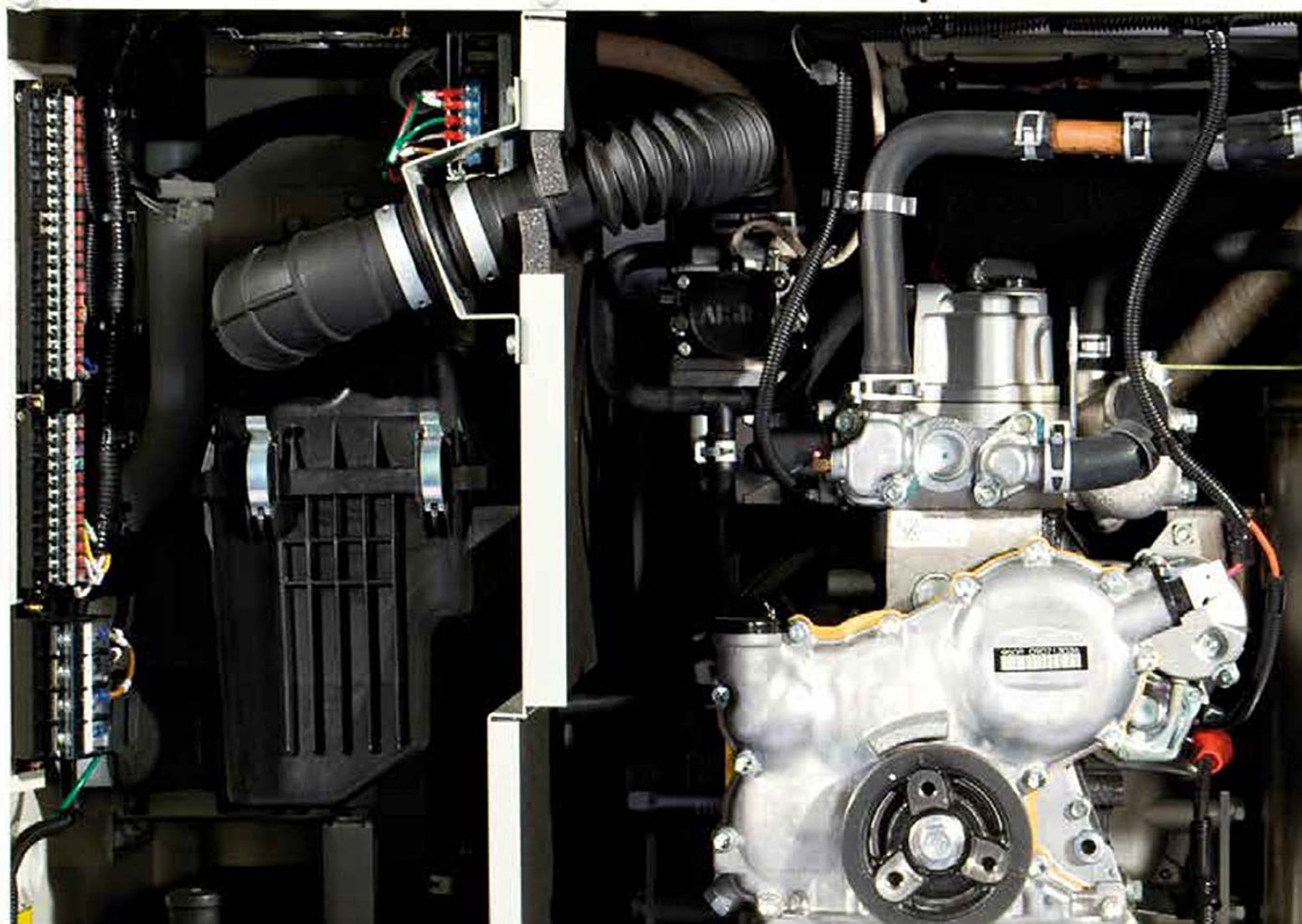
## CUSTOMISED ENERGY

Micro-cogeneration is currently one of the most efficient methods to generate heat and electricity from fossil fuels. The AISIN (MCHP) gas Micro-Cogeneration System simultaneously produces electrical and thermal energy right at the user's site, that is, without waste and while using the clean energy of gas (natural gas or LPG).

The specifically designed endothermic engine, manufactured on the basis of TOYOTA's experience, drives a synchronous generator that can supply up to 6 kW of electrical power also when responding the user's needs instantaneously; at the same time, its modern technology allows recovering the heat otherwise dissipated by the engine with a power of 11.7 kW, available for the production of hot water up to a temperature of 65°C (for domestic use, general heating purposes, heating of pools, and post-heating of large air conditioning systems such as Air Treatment Units for large premises).



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## ADVANTAGES

Full utilization of the energy sources, cost-efficiency, respect for the environment: when machines serve the wellbeing of humans.

### Economy

- Designed to reduce losses to a minimum: the AISIN micro-cogeneration system converts almost the entire primary energy source into electrical energy and heat. Its overall efficiency is 85%; thus, either natural gas or LPG are exploited at their best.
- Cost Reduction: the principle of cogeneration allows obtaining heat through the same mechanism that generates electricity consequently benefitting from two energy sources at the price of one.
- The reliability of the endothermic TOYOTA engine, specifically designed, has a positive effect on operating costs: more than 40,000 hours of operation reached with only minimal ordinary maintenance and extra low costs; usual filters and sparking plugs replacement every 10,000 hours, and complete oil replacement and engine service every 30,000 hours.

### Ecology

To the age-old pollution problem, MCHP replies with good news for the environment: a 40% reduction in CO2 emissions respect to the standard production of separate electricity and heating systems. The widespread use of AISIN micro-cogeneration systems would make the construction of power plants and nuclear plants unnecessary while simultaneously resolving the issue of the emission of toxic substances and the concentration of polluting agents.



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**CLEAN AND CHEAP  
CUSTOMISED ENERGY**



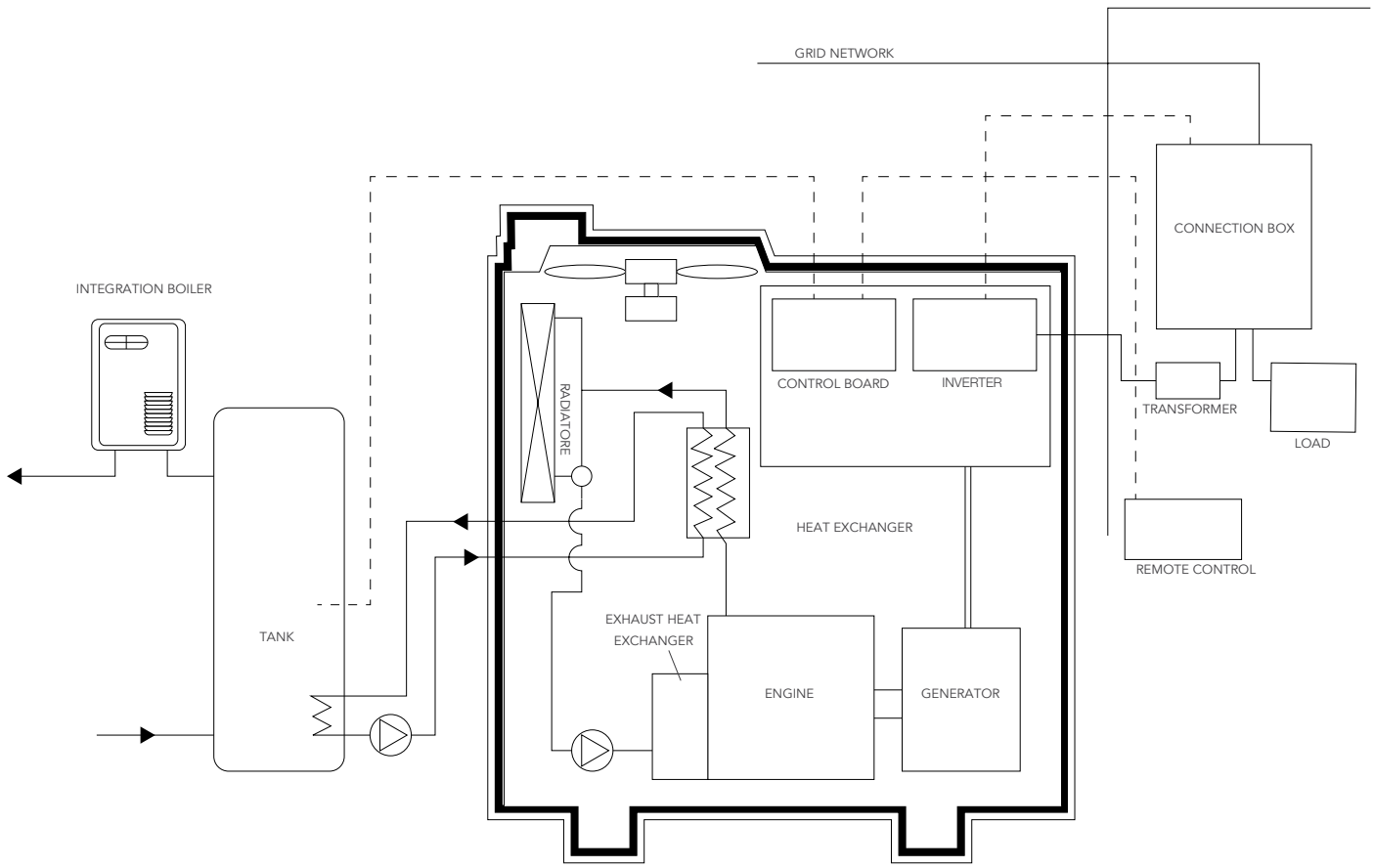
## OPERATION

The MCHP's main strength is its extreme flexibility. Two operating modes allow the equipment to be completely suitable for any need. In addition, its integration with other energy saving systems (photovoltaic plants and solar heating systems) is always possible.

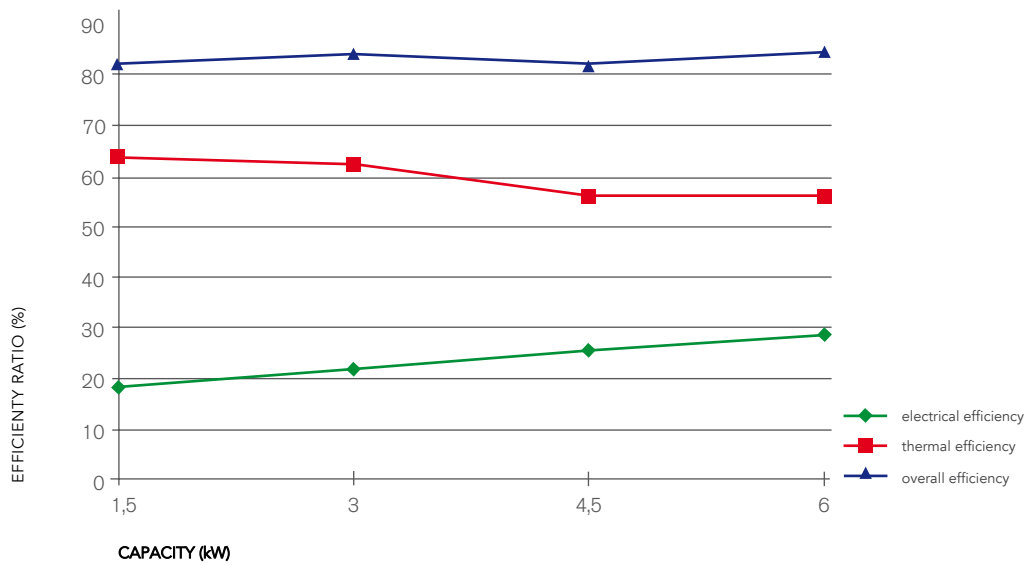
Modulating output when in this operating mode, the AISIN Micro-Cogeneration System produces electricity by modulating, that is by varying, the power supplied through the inverter on the basis of the user's power demand in that instant, in the range between 0.3 kW and 6 kW. The heat recovered, also variable, is transferred to the storage tank of the heat generator system.

Heat control When in this operating mode, the AISIN Micro-Cogeneration System produces its maximum electrical (6kW) and thermal (11.7kW) power. Propeller operation is controlled by the thermal request of the building through a specific thermostat placed on the storage tank of the heat generator system. Any unused excess of current that is not self-used is sent to the power line on the basis of the net metering contract.

# MCHP OPERATION PRINCIPLE LAYOUT



# CAPACITY/EFFICIENCY RATIO





## TECHNOLOGY WITHOUT WORRIES

### Managing the Electricity Generated

The AISIN MCHP is supported by advanced electronics that simplifies user's interface and limits maintenance requirements to the endothermic components. In fact, the generator-inverter assembly does not require any maintenance.

The electrical power generated by the micro-cogeneration system is qualitatively equal to the line power. The safety and control of the parallel connections are guaranteed by the electrical devices that the power utility requires and that are installed in the electrical panel for parallel connections supplied with the product. The inverter IGBT technology ensures maximum protection against voltage and frequency fluctuations, which are seriously damaging for any equipment. The system can be integrated with an anti-blackout optional kit that allows the unit to operate even in case of power outage (modulating output mode only).

### Managing the Heat Generated

The AISIN Micro-Cogeneration System produces thermal energy by recovering heat from the coolant, the exhaust gas and the engine. This heat is transferred to the water through a high efficiency plate heat exchanger. Depending on the selected mode, the unit's management system controls the engine start-up, avoiding waste of energy and allowing the engine to operate always at safe temperatures.

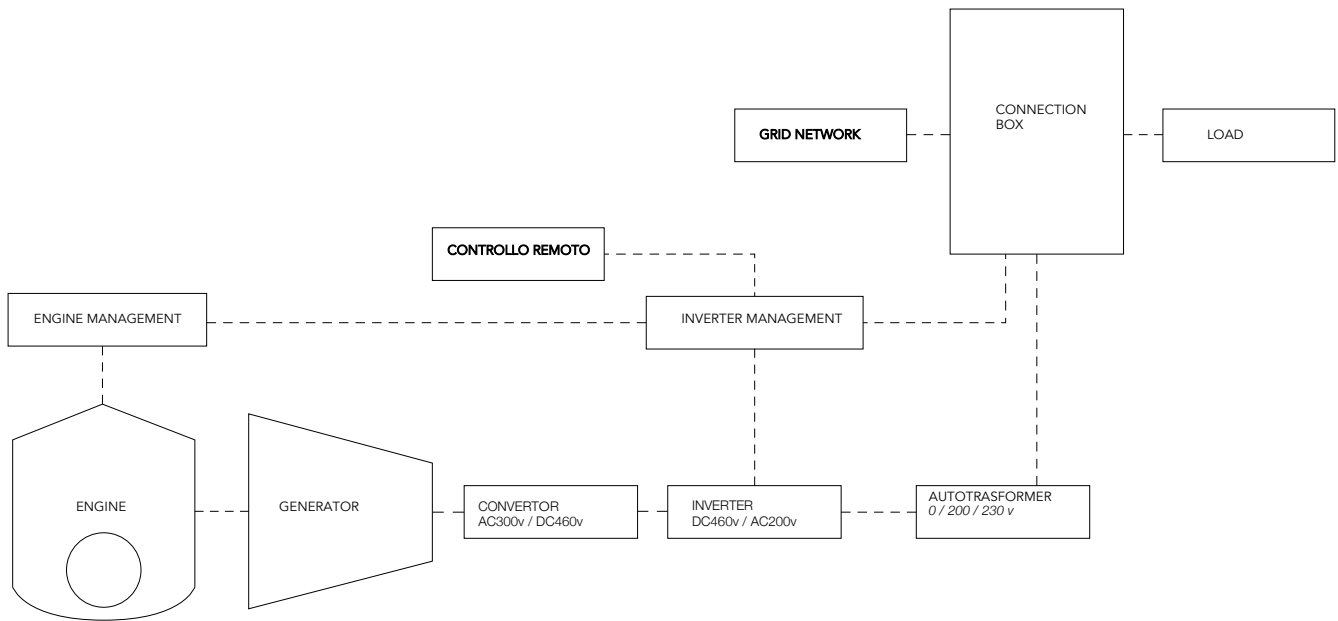


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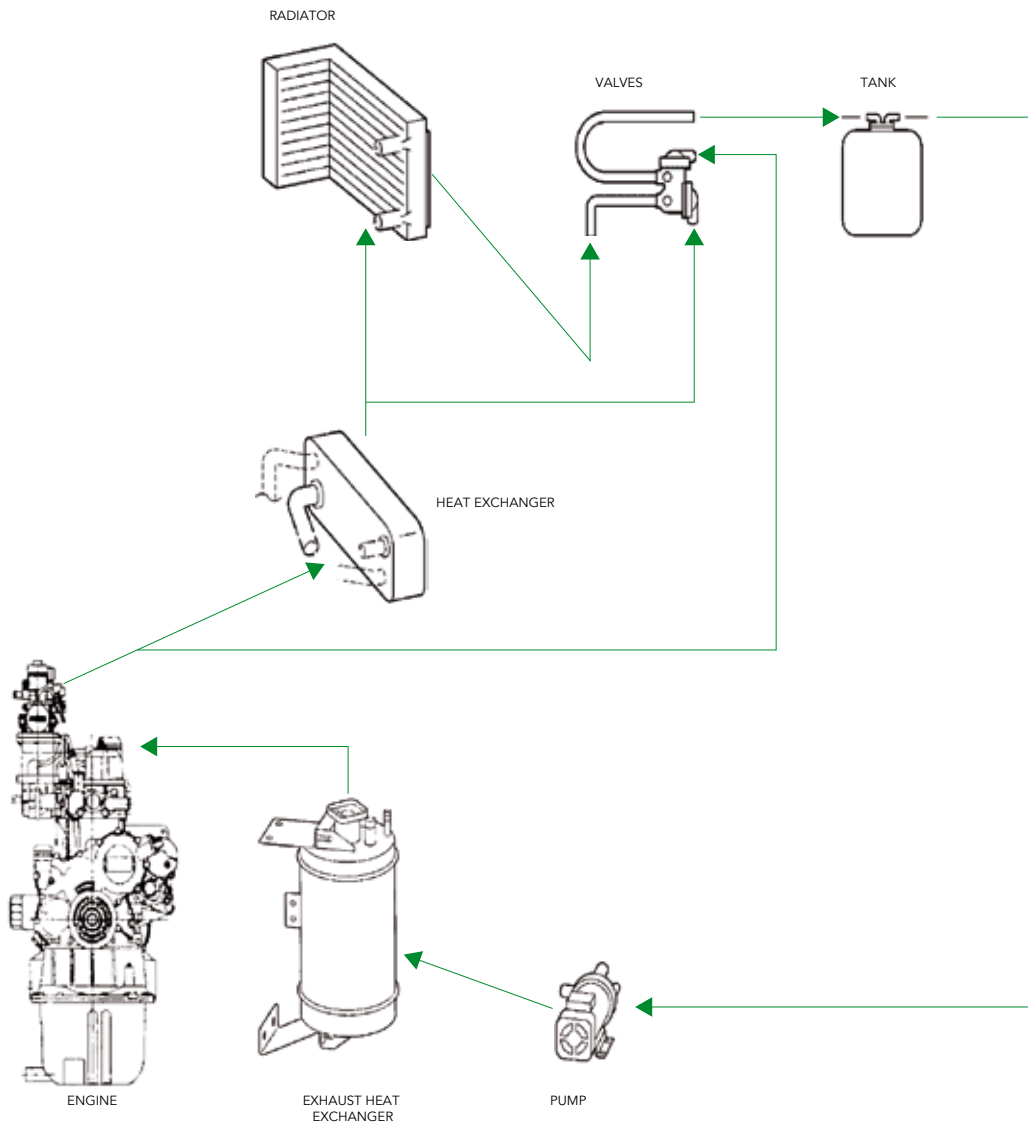
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# ELECTRICAL CAPACITY MANAGEMENT



# HEATING CAPACITY MANAGEMENT



## MAIN FEATURE: SAVINGS

### Let's look at the numbers

Savings obtainable using the AISIN MCHP are real and measurable. The example below provides useful hard data.

Let's consider the case of a small condominium classified as energy class A with an annual electrical consumption of 22,000 kWh, annual domestic hot water energy requirement in the amount of 9,700 kWh and annual heating energy requirement in the amount of 19,260 kWh.

Assuming that 30% of the electrical consumption is handled through the AISIN MCHP, the unit would have to operate for 1100 hours. This amount of hours would provide 100% of the annual energy required for the domestic hot water and 15% of the annual energy required for the heating

#### Electrical energy savings:

$$1,100 \text{ h/year} \times 6 \text{ kWh} \times 0.18 \text{ €/kWh} = 1,188 \text{ €/year}$$

#### Thermal energy savings:

$$1,100 \text{ h/year} \times 11,7 \text{ kWh} \times 0.06 \text{ €/kWh} = 772 \text{ €/year}$$

#### Total savings:

$$1,960 \text{ €/year}$$

#### Fuel gas costs:

$$1,100 \text{ h/year} \times 20,8 \text{ kWh} \times 0,05 \text{ €/kWh}^* = 1,144 \text{ €/year}$$

\*gas cogeneration benefits from a tax exemption equivalent to the reduction of the excise tax on 0.25 m<sup>3</sup> per each kWh of electrical energy produced

#### MCHP maintenance costs:

$$1,100 \text{ h/year} \times 6 \text{ kWh} \times 0,016 \text{ €/kWh} = 105 \text{ €/year}$$

#### Total costs:

$$1,249 \text{ €/year}$$

#### Overall savings:

711 €/year equivalent to approximately 35%

By increasing the yearly hours of operation, it is possible to increase the overall savings. In fact, the AISIN MCHP has been designed for continuous operation.



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## THE NUMBERS OF SAVING

Table 1 shows the ratio between the savings that can be obtained by using the MCHP and the hours of operation of the equipment.

The graph clearly shows the trend of the energy savings while using the AISIN Micro-Cogeneration System respect to the separate purchase of electrical and thermal energy through traditional systems.

Since the MCHP is designed for continuous operation, the higher the quantity of hours of operation in a year, the greater the savings.

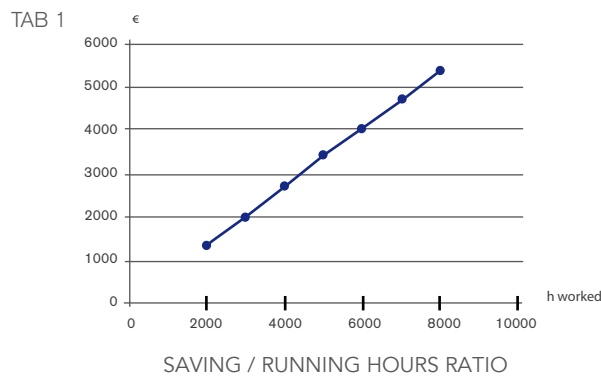
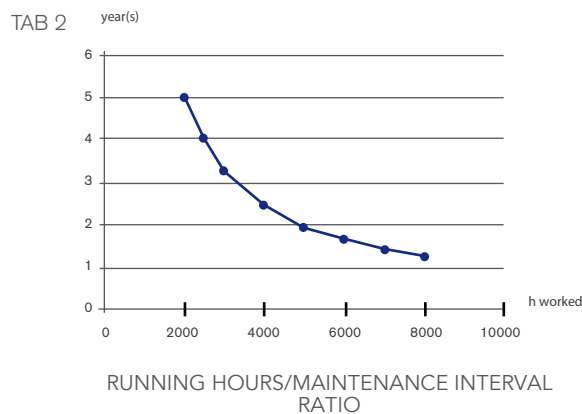


Table 2 – through the graph that shows the ratio between the number of hours of usage and maintenance intervals – highlights how the significant reliability of the MCHP system contributes to reducing maintenance costs. Even assuming its maximum exploitation - 24 hours a day 365 days per year - the high quantity of operation hours between a maintenance service and the next allows limiting the frequency of the ordinary maintenance operations.



# SPECIFICATIONS



model		GECC46A2 (NR - P)	GECC60A2 (NR - P)
natural gas		natural gas / LPG	natural gas / LPG
basic specifications	• rated output	max 4,6 (0,3~4,6)	max 6 (0,3~6)
	• phases and frequency	single phase 50 Hz	
	• output voltage	200	
	• voltage to the user	230 (200-230 V auto-trasformer supplied)	
	• power fact	95%	
	• operation	system interconnection	
	• control system	AC/DC/AC conversion + inverter interconnection	
	• exhaust heat recovery rate	11,7	
	• in/out water temperature	60 → 65	
	• circuit flow	33,5	
	• max operation pressure	5	
	• fuel gas type	natural gas LPG	
	• gas consumption	18,9	20,8
• power consumption(50Hz)	221 OFF 355 ON		
motore engine	• type	water cooled, vertical 4 - cycle, 3 - cylinder	
	• displacement	952	
	• rated output	1600~1800	
	• radiator fan air flow	35	
generatore generator	• type	permanent - magnet type, synchronous generator 16 pole	
	• cooling fans air flow	5	
sistema system	• dimensions	height	150
		width	110
		depth	66
	• weight		465
	• operating sound <sup>1</sup>		54
rendimenti efficiency	• overall efficiency	84,0	85,0
	• generating efficiency	25,5	28,8
	• heat recovery efficiency	58,5	56,2
		<i>T<sub>in</sub> 60° C T<sub>out</sub> 65°C - flow rate 33.5 // min</i>	<i>T<sub>in</sub> 60° C T<sub>out</sub> 65°C - flow rate 33.5 // min</i>

<sup>1</sup> This value is measured at 1m distance and 1,5 m height.

## ACCESSORIES

### **Electrical panel for parallel connections**

Supplied with the unit, it allows interfacing the Micro-Cogeneration System with the standard power line, through an interaction in parallel. It includes all the safety and control devices required by the power utility, including the approved interface protection.

### **Remote control with cable**

Supplied with the unit, it enables the remote monitoring of every function (up to a 200 mt. distance from the MCHP) and it is equipped with a weekly timer, a display showing the stage of operation and the instantaneous power generated; it is also equipped with visual and acoustic indicators of anomalies.

### **Autotransformer**

Supplied with the unit, it makes the output voltage compliant with the low voltage network, and it is designed for continuous operation. It does not require any maintenance.

### **YOSHI Watcher**

It is an anti-blackout kit which allows the Micro-Cogeneration System to operate even in case of temporary electrical outage (when in modulanted output only). It is supplied as an optional device with a dedicated panel for parallel connections; it can be installed at a later time.

### **VIRTUAL REM Remote Monitoring**

Optional remote monitoring device that allows controlling all the operation parameters of the MCHP. Thanks to Virtual REM, the Technical Assistance Center is capable of managing every data and to act in real time to resolve critical situations.

The remote monitoring service is an additional guarantee for the user, who can count on specialized technical personnel for the continuous monitoring of its Micro-Cogeneration System efficiency.



**HEAT, COOL, ELECTRICITY:  
LESS GAS, MORE ENERGY**

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