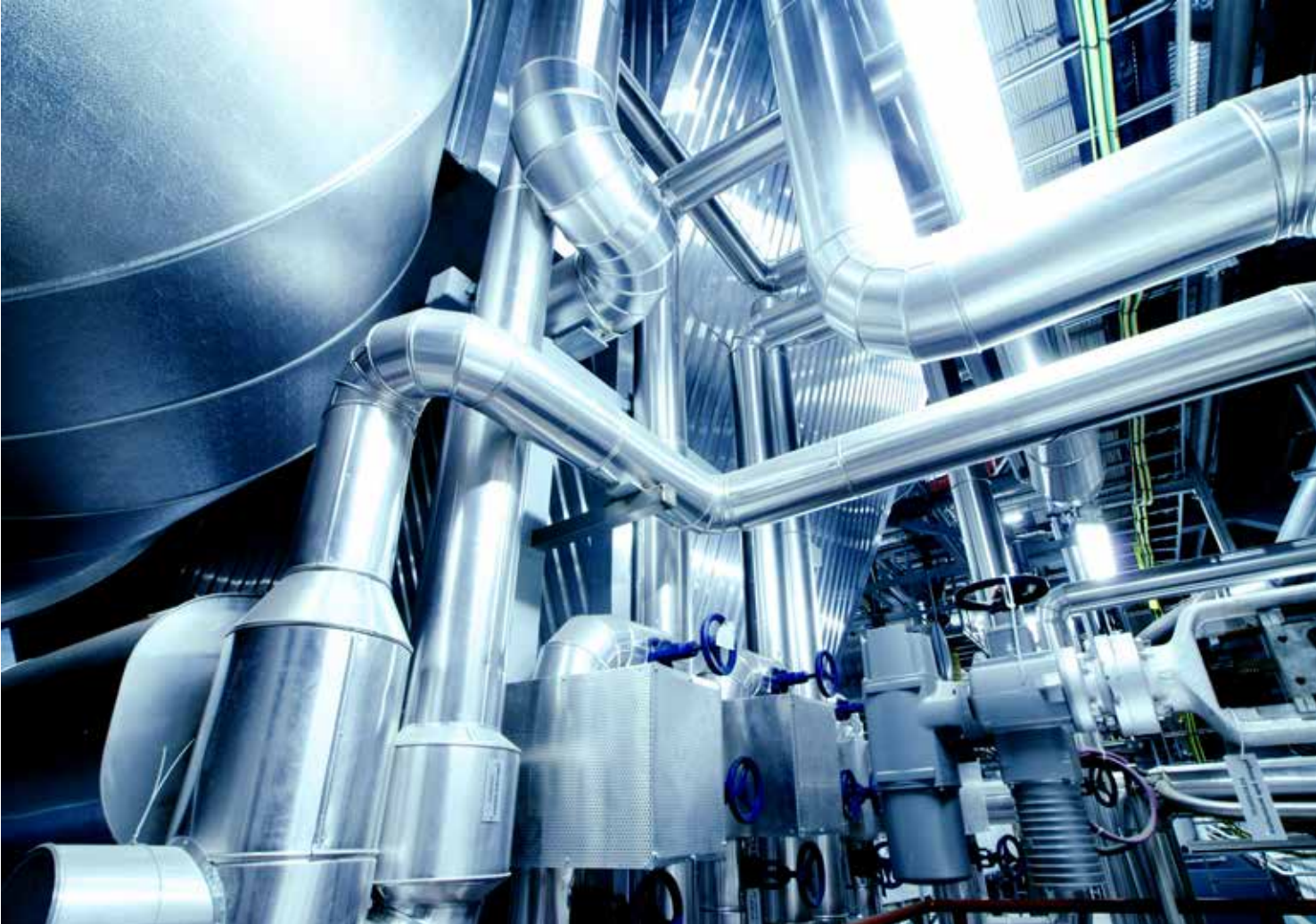


# ApenGroup



Heat Exchangers for Industrial Processes,  
Air Handling Units and Roof Tops



**ApenGroup**<sup>®</sup>

Manufacturing processes often require different forms of heating, as for heat treatment or the drying or drying processes, using the air as a heat convector.

Apen Group has nearly fifty years of experience in the study and production of hot air generators for industrial processes.

Our Investments in R&D projects for the development and construction of energy efficient systems, allow the industrial customer to benefit from:

reliable products, energy-saving advantages and low maintenance requirements which help to reduce the operating costs.

Process safety and equipment's lifespan is guaranteed by high quality resistant materials and design. ApenGroup is able to supply an extended range of heat exchangers and to fulfill customized requirements. Our design department is able to support the customer in finding the optimal solution in any planning phase.

#### Application fields:

- Coating and Painting
- Drying of food processes.
- Drying processes for components
- Ceramics drying processes
- Textile and clothes drying
- Heating in concrete making for construction industry
- Agricultural products drying as for Cereals and Tobacco.

#### AHU or ROOF TOP Applications

Apen Group has developed the series of high efficiency condensing modules with premixed burner and stainless steel exchangers to combine with gas burners and fuel oil burners, to satisfy all the needs of heating and heat integration within air handling units and roof top.



Textile and clothes drying



Drying of food processes



Coating and painting



Ceramics drying processes



# SYSTEMS FOR INDUSTRIAL APPLICATIONS, ROOFTOP AND AHU

**PCH/PRH Exchanger Modules**  
PCH and PRH exchanger modules are equipped with the premixing and modulation technology, which can achieve efficiencies up to 109% (calculated on lower heating value).  
The module can operate autonomously. For the start-up just connect power and gas supplies  
Modules heat output goes from 5 to 97 kW; for higher values several modules must be combined.  
The modules can be assembled in parallel, achieving high power levels (up to 400 kW).

The regulation can be made:

- proportionally, with external control voltage in 0-10Vdc;
- with ON-OFF control;
- with insertion in cascade, in the case of multiple units..

**EMS/GH Exchanger Modules**  
The exchanger modules EMS and GH series are manufactured in 14 different capacity range from 14 kW to 1,050 kW.  
The modules can be fueled either with gaseous fuels or with liquid fuels.

The difference between the GH models and EMS models is related to the type of use for which they were designed.  
**EMS Modules:** designed to be directly canalized or connected in series to AHU; the structure is composed by an aluminum frame and sandwich panels, insulated with glass wool, in white painted sheet (towards the outside) and in galvanized steel sheet (towards the inside).  
**GH Modules:** designed to be inserted inside the air handling units, they have a galvanized sheet lightweight chassis that allows its inclusion in dedicated units.

**GO Exchanger Module**  
The GO series of combustion chambers (heat exchangers) are built in 12 different capacity range from 14 kW to 1,050 kW, for a total of 48 models depending on the type of construction; can be powered either by gaseous fuels or with liquid fuels.



Textile and clothes drying



Industry



Roof Top



Air handling unit

# Method of Calculation for Process Heat Exchanger Choice

Apen Group' engineers are at your disposal in order to support the right choice and definition of the appropriate heat exchanger suitable for your process plant application. Following page is giving you an initial technical overview on the method of calculation to identify the appropriate product module.

## CHOICE OF HEAT EXCHANGER

When looking at technical characteristics included in description pages for products GO/GH/EMS/PK, starting from page 12 of this brochure, appropriate power values must be corrected on the base of the following procedures and charts.

## DELIVERED AIR TEMPERATURE

If delivery temperature from the exchanger is over 70°C, the max heat input set for the burner must be reduced by the percentage shown in chart 1.

Please note that when delivered air temperature exceeds 257°F (125°C), AISI 310 exchangers are recommended.

Example:

| GH7980 / EMS190N-00A Exchanger |                                    |
|--------------------------------|------------------------------------|
| Max heat output                | 230 kW                             |
| Delivered air temperature      | 257°F (190°C)                      |
| Max heat input set [burnt]     | $230 \times 0.87 = 200 \text{ kW}$ |

## CONSISTENT HEAT DROP

If heat drop is > 95°F (35°C), the max heat input set for the burner must be reduced by the percentage shown in chart 2. If heat drop is > 239°F (115°C), AISI 310 exchangers are recommended.

Example:

| GH7980 / EMS190N-00A Exchanger |                                    |
|--------------------------------|------------------------------------|
| Max heat output                | 230 kW                             |
| Heat drop                      | 120 °K                             |
| Max heat input set [burnt]     | $230 \times 0.88 = 202 \text{ kW}$ |

## COMBINED EFFECT

If the exchanger is used with both high delivered air temperature and consistent heat drop, these two conditions and relevant efficiency reductions must be taken into account.

Example:

| GH7980 / EMS190N-00A Exchanger |                                                                      |
|--------------------------------|----------------------------------------------------------------------|
| Max heat output                | 230 kW                                                               |
| Heat drop                      | 120 °K                                                               |
| Delivered air temperature      | 392°F (200°C)                                                        |
| Max heat input set [burnt]     | $230 \times 0.88 \times 0.86 = 174 \text{ kW}$<br>AISI 310 exchanger |

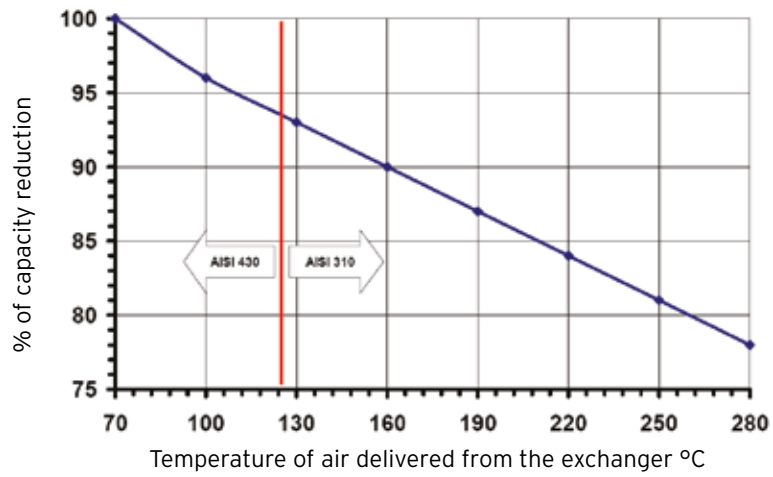
## LIMIT CONDITIONS FOR USING HEATERS ARE THE FOLLOWING:

|          |                                                                         |
|----------|-------------------------------------------------------------------------|
| AISI 430 | Maximum delivery temperature 239°F (115°C)                              |
|          | Maximum heat drop 100°K with maximum delivery temperature 212°F (100°C) |
| AISI 310 | Maximum delivery temperature 392°F (200°C)                              |
|          | Maximum heat drop 180°K with delivery temperature 356°F (180°C)         |

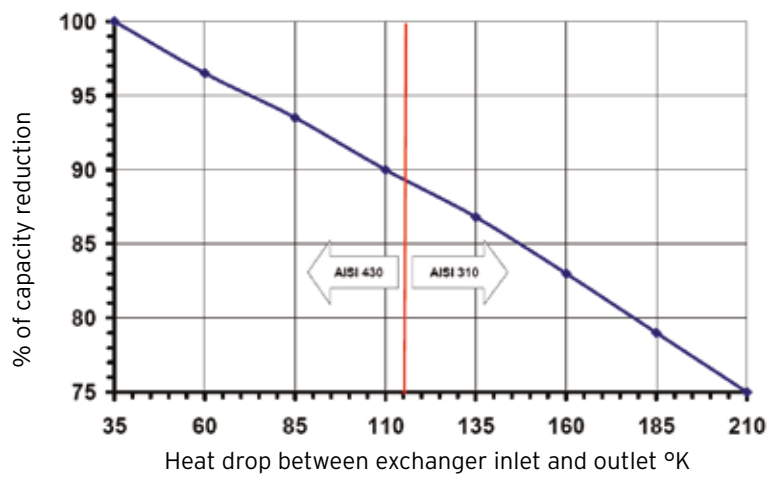
Contact APEN GROUP for different requirements of running parameters.



### CHART 1



### CHART 2







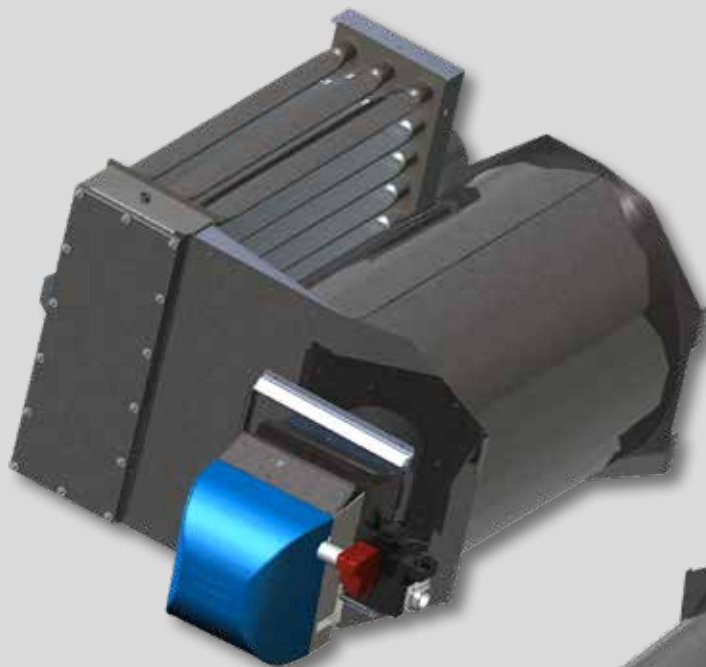
### Technical Features

- Combustion chamber, in AISI 441 or AISI 310 stainless steel, with wide exchange surface.
- Flame inversion furnace with three-pass, fully welded, flue gas layout.
- High efficiency heat exchanger made of AISI 441 stainless steel with low carbon content.  
The exchanger is formed by a streamlined tube bundle with conic section with an aerodynamic design (low pressure drops in air circuit and high efficiency)..
- Very wide range from 15 kW to 1.050 kW.
- Patented tube bundle
- Efficiency up to 94,6%.
- EC Approval in compliance with all applicable regulations.



## WHY CHOOSE GO?

- Reliability
- Quality
- Advanced Technology
- Ecology
- Safety



## Burner Choice

The burners, to complement the GO modules, can be:

- Modulating
- Two-stages (high - low flame)
- ON/OFF

The GO modules can be installed with burners produced by the main burner manufacturers on the market.

## ErP Compliant

For modules to be inserted in the AHU and in the Roof Top, check the correct coupling of the burner to meet the requirements of ErP 2018.

## Used materials

The following table shows the correspondence and the composition for the type of stainless steels used for the construction of GO heat exchangers.

Do not hesitate to contact us for specific offers with different steels.

TABLE OF USED STEEL

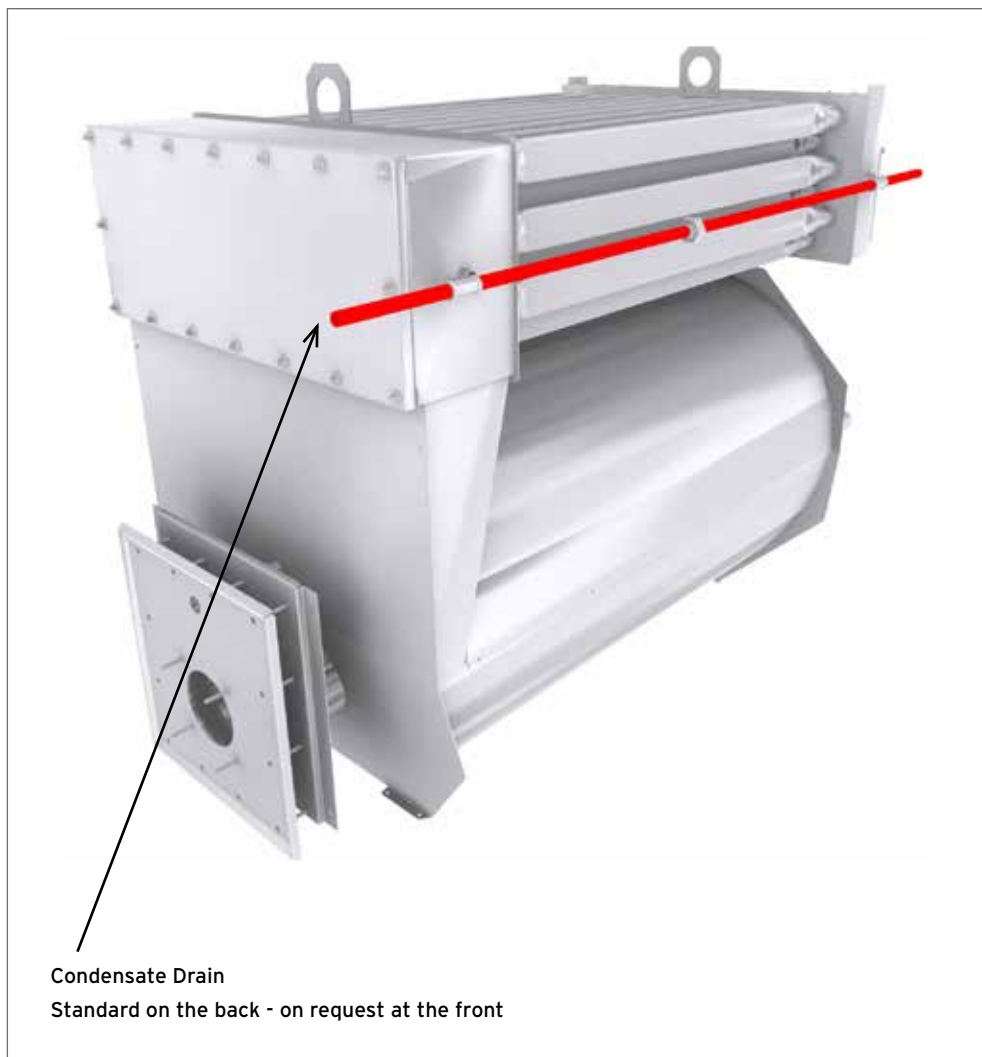
| USA      | EN     | FORMULA       |
|----------|--------|---------------|
| AISI 310 | 1.4845 | X8 CrNi 25-21 |
| AISI 441 | 1.4509 | X2 CrTiNb 18  |
| AISI 304 | 1.4301 | X5 CrNi 18-10 |

## Condensate Drain

When a GO heaters used into a Air Handling Unit and/or Roof Top Unit, where high flow rate and low thermal heat drop is requested, a condensate drain system shall be provided in the exchanger.

All exchangers are provided with five connectors for the evacuation of the condensate. The fittings are placed on the collectors (rear and front), on the sides (right and left) and on the lower wall of the rear of the flue gas collector.

The condensation is allowed only in case of coupling with gas burners, while it must be absolutely prohibited in case of use of oil burners.

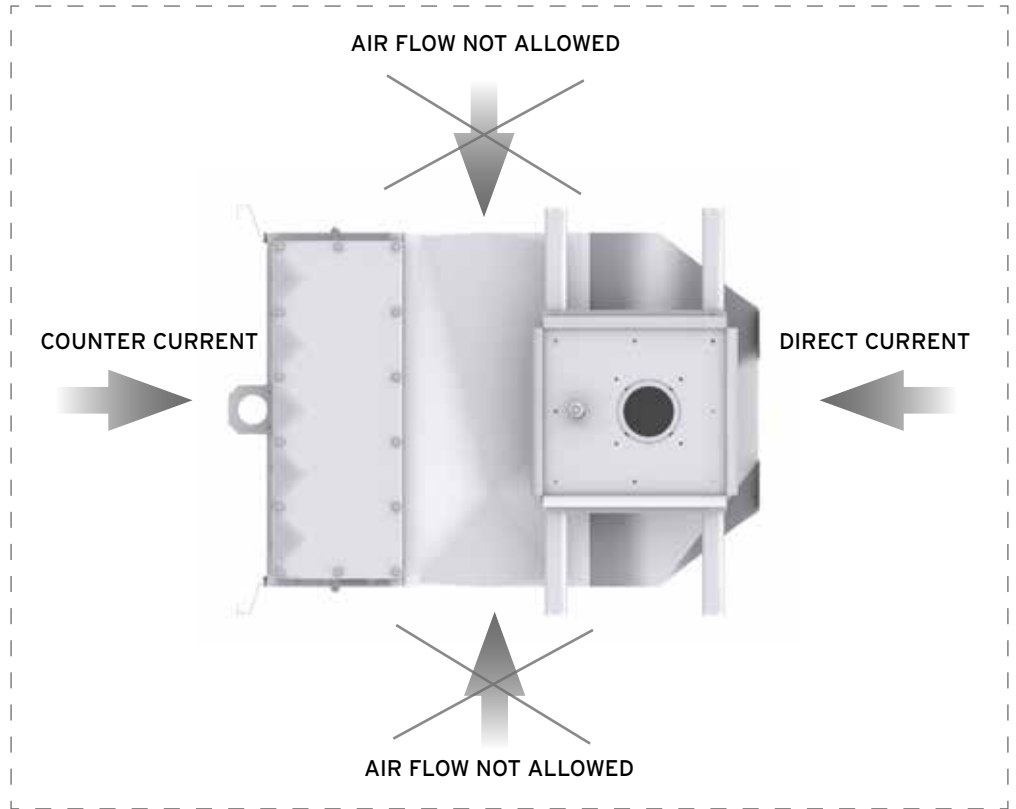




The heat exchanger module can be assembled into air heating units either in horizontal position or in vertical position. The air can flow in two directions:

- **EQUICURRENT FLOW:** cold air flows from warmer part of the exchanger [combustion chamber] to colder end.
- **COUNTER-CURRENT FLOW:** cold air flows from colder [tube bundle] to warmer end of the exchanger.

Depending on the application, it may be more convenient one or the other installation.

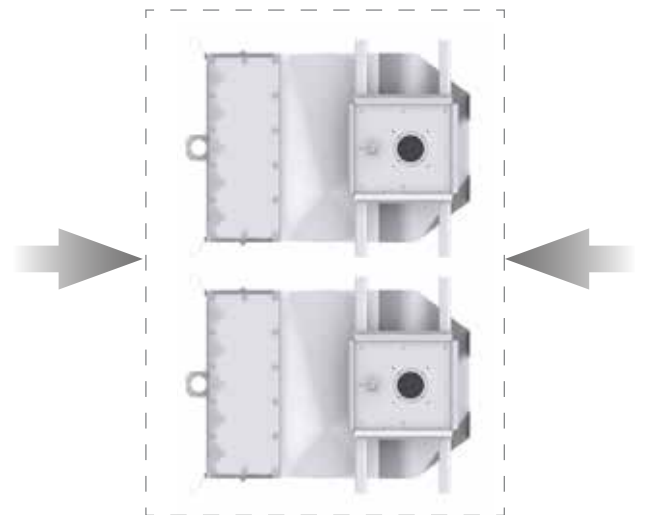


### Assembling one or more modules

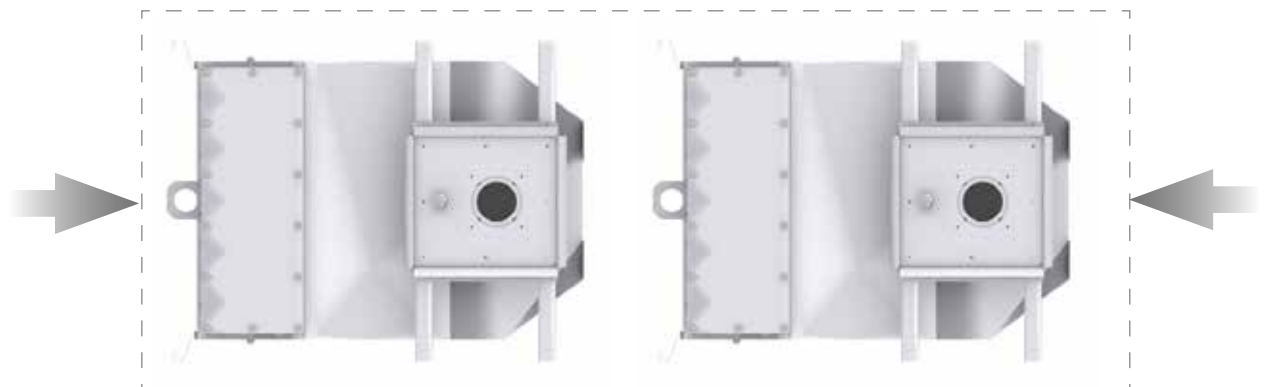
When the required heat output exceeds the single module's output, or when you like to divide the minimum heat output below the minimum value of a single heat exchanger, multiple modules can be assembled into a single air handling, roof top or process heater unit, thus covering any range of required output.

Using convenient precautions, modules can be assembled either in series or in parallel layouts and the air flow can be equicurrent or counter-current to heat flow

Modules connected in PARALLEL



Modules connected in SERIES



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# **ApenGroup**<sup>®</sup>

APEN GROUP S.p.A.  
Via Isonzo, 1 - Pessano con Bornago  
20060 (Milano) - Italy  
Tel +39 02 95 96 931 Fax +39 02 95 74 27 58  
[www.apengroup.com](http://www.apengroup.com) [apen@apengroup.com](mailto:apen@apengroup.com)

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