

**HEAT EXCHANGER COILS - AIR/AIR RECUPERATORS**

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## COMPANY

Cominter established in 1980, near Bergamo in Italy, as the manufacturer of customized finned pack heat exchanger coils and heat recuperators air/air to meet the requirement of HVAC market, both commercial and industrial.

Cominter operates on their own 8000mq property, which includes 800mq of offices, 3000mq of production area, 800mq of the warehouse and the remaining area for the logistics.



During these years Cominter tried to differentiate itself for its ability to follow the market trend, integrating its own range of products and working in many application sectors, like cruise ships, shopping centers, hospitals, foods industries, becoming more and more present in national and international business.

Cominter is able to realize products on customer request, suggesting the more indicating typology of product for the application field, succeeding to be present in many sectors where there is the necessity to treat air or other type of fluid.



## Certifications

To ameliorate its products, and to grant the reliability of the design of its heat exchanger coils, Cominter got the AHRI STANDARD 410 (air-conditioning, heating and refrigeration institute). To grant the quality, Cominter submits its products following the ISO 9001/UNI EN ISO 9001:2008 Quality System, certified by SGS Italy, rather besides the high technological content of the own machines like:

- Straightening, calibration, cut of the tubes
- Expansion of the tubes
- Shearing of the fins in the different geometries
- Brazing of the bends realized with special machines which grant the cleaning in the inner of the tubes
- Final leak test make Cominter an highly qualified partner.



**Cominter 7.2:** we realized for our customers a next generation software; full of options to help our customers to become independents to select the coils and recuperators; with accurate data and performances.

This program allows to select coils made of different materials. This program permits even to compare in a unique selection all our geometries; underlining the geometry which better responds to the imposed parameters.





## Production

The high quality standard of the own machines; like the straightening, calibration and cut the tubes, the trenching of the fins in different geometries, the rolling expansion of the tubes, the brazing of the bends (realized using special machines which ensure the cleaning in the inner of the tubes) and the final check by a test and held examination make Cominter a very high qualified partner.



Certifications



Design



Production



Customized Production



Technical support



Supply planning



Software  
Cominter 7.02

The secret of our continuous improvement can be found in the very nature of our company, in its capacity to grow and transform in order to receive changes.

## REFERENCE



*Airports, trains, hotels, health facilities, large buildings: Cominter is present everywhere people want to ameliorate their wellness.*

## From 1990

### UNITED ARAB EMIRATES

Sh-Zayed Central Hospital – Abu Dhabi  
Ajman Hospital – Ajman  
Bustan Rotana Hotel – Dubai  
H-H Sheikh Zayed Villa - Abu Dhabi  
Polyclinic at Al Ain  
American University – Sharjah  
Bin Ghurair  
Metropolitan Palace Hotel  
American University Sharjah – Main Bldg.  
Sharjah University – Meeting Hall  
Emirates Hotel Tower (TP-15)  
Emirates Office Tower (TP-16)  
Emirates Tower Podium (TP-17)  
Al Ghurair Development  
Marina Mall / Plug Ins  
Moh. Bin Masaood  
Abu Dhabi Trade Centre  
Manar Mall at Ras Al Khaima  
Caterpillar Logistics  
Dubai Internet City  
Villa for Sheikh Khalifa  
Proposed New Stables  
Zabeel Palace Kitchen  
Toy Town  
Rest House Motor Service Station  
Commercial Bank of Dubai  
Internet City – Phase III  
ENEL Power (3,009,000 m3/hr)  
Technical School  
Sh. Saif Villa  
Minco  
Geaco  
Zayed Cricket stadium  
Beach Palace  
Media City – phase II  
Mariam Mutawie Bldg.

### UNITED ARAB EMIRATES

Cinema & Supermarket @ Al Ghurair  
Grand Cineplex  
Semi Luxury apartments for Rashid Hospital  
Vegetable & Fish Market at Al Ain  
Knowledge Village  
Emirates Hill – Food Court  
Al Yamamah  
Dubai Islamic Bank  
Jumeirah Island  
Dubai Polyfilm  
Snow Dome  
Marina Mall Ph II  
Marina Tower  
Metropolitan Beach Tower  
Gold Factory Labour Acc  
Emirates Hangar (4,341,000 m3/hr)  
Mall of the Emirates  
Mall of the Emirates – Hotel Package  
Flower Centre (stainless steel casings) (OEM Carrier)  
Dubai airport AX 227  
Wafi Hotel & Mall  
Hatta Hospital  
Old Town Commercial Island  
7WX – Dubai Marina (468,000 m3/hr)  
Al Mass Tower  
Al Ghurair Investment (141,800 m3/hr)  
Downtown Jebel Ali  
Aweer Power Station  
Paint Shop Pckg. 100 – Hangar  
Abu Dhabi International Airport – ETHIHAD  
Emirates Hangar – H  
Hatta Community Hospital  
Al Aryam Tower  
Al Jimi Tower

Ferrari experience  
Ethihad Food & Beverage  
Ethihad Pier Grids  
Yas Island Welcome Pavillion  
Ethihad Car Park  
Essa Bldg. – Al Ghurair  
Ferrari JRA Boxes + Gateway Bridge  
Total Air Handling Units

### QATAR

North Camp 12 Defence base  
Defence HQ  
Ministry of Foreign Affairs  
Toyota Showroom  
Beach Villas  
Tennis & Squash Courts  
Ras Abu Fontas Power Station  
Beach Resort  
Palace of H.H. the Emir  
Banque Paribas  
Doha International Airport Extension  
Mecon Office  
Commercial Complex  
Villa for Sh. Mohd bin Hamad  
Swimming pool for H.H. Sh Hamad and Sh Abdul Aziz  
Qatar Fertilizer Company  
Qatar General Petroleum (QGPC)  
Al Khisa Transmitter Station  
Madinat Shamal Hospital  
Khoys Control Hospital  
Radar Station No. 3  
Rumaillah Hospital  
QAFPCO PHASE-II  
Qatar Flour Mills (MECON)  
Qatar Flour Mills (KDS)  
QAFPCO – Phase II  
Mumtaaza CO. OP  
Analyzer Building  
18 Storey Building  
Acolid Bldg  
QAFPCO Expansion – Catalyst Building  
Al Kahayareen Villa  
Al Wajbah Complex  
QAFPCO – III Expn  
Falcon Space Channel – Doha  
Shopping Mall at 'D' Ring Road  
QIMCO Building  
Sh. Hamad Building  
Igloos  
Umm Bab Cement Factory  
Al Wajbah Villa  
Sheraton Hotel – Conference Centre  
Emiri Diwan Office

### QATAR

Substation at Umm Bab & Dukhan  
Doha South Super  
Doha North Super  
Sh. Abdulla Villa  
Villa for Mr. Jaidah  
Lee Hwa & KFC  
QAFPCO Lab.  
Museum / Aquarium  
Al Arish Transmitting Station  
Ras Laffan & Mesaieed Substation  
Abdullah Abdulghani Villa  
Sheraton Gulf Hotel  
New NCC Bldg.  
QASCO / Airport Super  
QAFAC  
Sub-Station Saliya & Khor – Al Udeid  
Al Hubara Restaurant  
QASCO II – Substation (2005)  
Salam Plaza  
Sheraton Hotel – Bistro – Laundry

QAFPCO Appendix C  
QAFPCO Lab.  
QAFPCO Workshop  
Gulf Hotel  
Doha International Airport  
Al Udeid Package III  
Ministry of Finance  
Gulf Hotel – Food Store  
Qatar University – Women's College  
Junior School  
Qatar Shipping Co.  
Aquatic Complex  
British Bank  
Landmark  
Marriot Gulf Hotel – Lobby Renovation  
Al Jazeera satellite – Space Channel  
Ministry of Interior  
Umm Qarn Farm House  
Swimming Pool & Fitness Centre Mr. Ali H.  
Al Attiya  
Diplomatic Club  
AM' House  
Mc Donalds  
Al Sulaiti Office Tower

### QATAR

Office Bldg. Grand Hamad Avenue  
Hypermarket  
City Centre  
Qatar Islamic Bank  
Arab Bank  
Al Bida Plaza  
Al Attiyah Bldg.  
Rumaillah Hospital  
University of Qatar – Phase II  
Modern Home  
Salam Shop  
Royal Plaza  
Marriott Gulf Hotel Health Club  
Ammunition stores @ Qatar Emiri Naval Force  
QAFPCO Control Room  
Medical Commission  
Q.P. Head Quarters  
Dukhan Field Gas  
Elementary Schools  
Central laboratory at Rumaillah Hospital  
Al Hodaifi Tower  
Cancer Hospital – Phase I  
Emadi Centre  
Renovation of Doha Bank  
Qatar Islamic Museum Stores  
Cancer Hospital – Phase II  
Khalifa Stadium  
Bridge Arts & Science College at Qatar  
Foundation  
Qatar Islamic Museum  
Sofitel Hotel – Shopping Mall  
Technical Record Centre for Qatar Petroleum  
Al Saad Sports Club  
Indoor Stadium  
Qatar Motorcycle Grand Prix  
Hamad Medical Corporation  
Al Jazeera Children Chanel  
Doha Marriott Hotel  
Sh. Fahad Bin Ali Palace  
QP Central Office Building  
Al Udeid  
The Villaggio  
Darwish Tower  
Al Wusayl Shooting Range

### QATAR

Dolphin Tower  
Cultural Village  
Women's Sport Club  
Refinery & Administration Bldg.

Commercial Bank Plaza of Qatar  
Majlis at Al Wajba Palace  
Hospitality Suit @ Ramada Hotel  
National Command Centre  
Carrefour at Villaggio Mall  
Hamad Hospital  
Millennium Hotel  
Texas A&M College at Qatar Foundation  
Schools  
Science and Technologies Park at Qatar  
Foundation  
Central Plant CP2 & 4 at Qatar Foundation  
Al Bidda Tower  
Villaggio Retail  
Jaidah Hotel  
Villaggio Cinema Extension  
Midmac Office Bldg.  
New Training Centre at Dukan  
Commercial Bank Plaza  
Jaidah Villa for Mr. Ali  
Villa for Mr. Omar Al Mana  
Emiri Guard  
Akis Primary school  
Central Plant CP3 & CP6  
Waqod Tower  
Barwa Commercial Avenue - 4  
Total Air Handling Units

### In Progress

Sidra Medical Research Centre

### BAHRAIN

Awali Houses for BAPCO  
Mannai Residence  
Al Alawi Complex  
BAPCO – prayer hall  
BAPCO – Houses  
Housing Bank Mall at Sanabis  
GPIC  
BAPCO – Control Room  
Le Meridien  
Sato Restaurant  
Gulf Hotel : Exhibition Hall – Capex  
BAPCO Houses at Awali  
BAPCO Inline Blending  
BATELCO New  
Sheraton – Mech. Refub.  
Ministry of Transport  
BAPCO AC System  
Tubll  
Gulf Hotel – Sales Office  
Hangar for Boeing 747  
HIDD & SEEF Pumping Station  
BAPCO  
Pool Pavilion  
Majlis at Rowdah  
Diplomat Hotel  
Tertiary Treatment plant exp.  
Ras Abu Jarjur  
Bahrain City Centre  
Total Air Handling Units

Ospedale di Bergamo  
Aeroporto di Malpensa 2000  
Nave da crociera Fortuna  
Nave da crociera Magica  
Nave da crociera Concordia  
Nave da crociera Serena  
Nave da crociera Favolosa  
Nave da crociera Pacifica



Cominter produces a wide range of products which can be divided into:

**HEAT EXCHANGER COILS** : addressed to the heating, conditioning, refrigeration and heat recovery, both civil than industrial market.

### FRAME:

The frame is made of hot dip galvanized steel sheet of adequate thickness, or, on request, of copper, aluminium, brass or stainless steel and is constructed so that the finned pack and the return bends are efficiently protected. The holes for the passage of the tubes into the side plate are extruded with collars to allow free sliding of the tubes, thus eliminating any risk of the damage on the tubes during the thermal changes. Coils above 1800mm are provided with intermediate drain pan, as standard.

### Headers and Connections

The water coils are provided with steel or copper with threaded BSP connections, while the steam coils are with treaded or flanged steel connections. The headers for the refrigerant coils such as the condensing and evaporating coils are made of copper with connection suitable for brazing. However refrigerant coils are supplied with pre-charge .

TUBES	FINS
CU copper	CU copper
CU/SN Tin plated Copper	CU/SN Tin plated Copper
CU/NI copper/nickel	AL aluminium
FE carbon steel	ALUPRE pre-coated aluminium
INOX stainless steel	

### FINNED PACK:

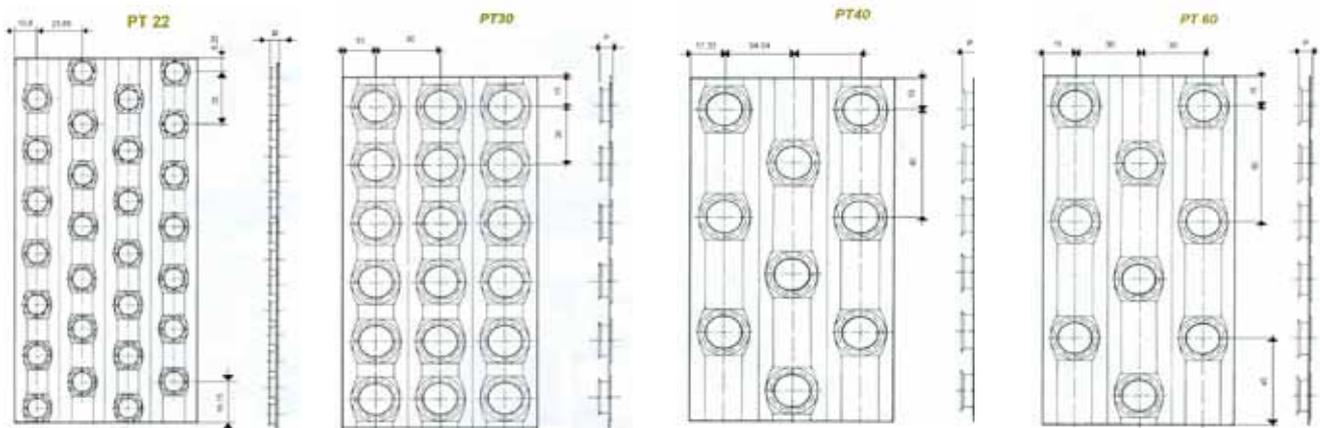
This consists of copper tubes and aluminium fins, pre-coated-aluminium, copper and tin-plated copper. The fins are of the continuous type and have a collar of the desired height which allows regular and constant spacing between one fin and the next. The tubes are expanded mechanically so that there is perfect contact with the fins allowing efficient heat transfer.

The fins have a corrugated surface for rigidity and to create turbulence, to increase the heat exchange coefficient, this type of surface also prevents dust accumulating inside the pack and allows easy dispersion of condensate.

COMINTER coil are identified by the following code

Ex. PT60 04R 10T 1000A 2,5P 10NC CU.AL 01	
PT60	Coil type
AC	Hot water
AF	Cold water
AS	Superheated water
V	Stream
ED	Evaporating
C	Condensation
ED/C	Evaporation / condensation
R	Number of rows
T	Number of tubes
A	Finned length (mm)
P	Fin spacing (mm)
NC	Number of circuits
01	Connection side





## RUN AROUND COIL (RAR) SYSTEM

A typical run around coils system comprises of two or more multi-row finned tube coils connected to each other by a pumped pipe work circuit.

The pipe work is charged with a heat exchange fluid, normally water, which picks up heat from the exhaust air coil and gives up heat to the supply air coils before returning again. Thus heat from the exhaust air steam is transferred thought the pipe work coil to the circulating fluid, and them from the fluid thought the pipe work coil to the supply air steam.

The complete physical separation of air flows eliminate cross contamination, thus make this type of recuperator particularly suitable for special applications, such as Hospitals, Laboratories.

### ADVANTAGES:

- Amount energy Recovery can be varied by varying the speed of the recirculation pump.
- RAR system makes possible the energy recovery from the steams, separated one from the other.
- Zero cross contamination between the air flows.

### DISVANTAGES:

- The presence of an intermediate fluid limits the energy recovery to around 50%.
- Normally RAR system can recover only sensible energy, resulting in a change in dry bulb temperature of the medium (air in this case), but with no change in moisture content.





## HEAT RECUPERATORS AIR-AIR (RCP)

equipments which allow the heat transfer from the two air flows at different temperatures.

### OPERATION

The "DUOTERM RCP" heat recuperator is made of an heat exchanger block manufactured in plane aluminium sheet interspaced with undulation aluminium sheet and an aluminium frame.

The exhaust hot air and the supply cool air go trough the exchanger with a crossed movement without interfering each other.

As final result heat is transmitted from the exhaust air to the supply air.

### COSTRUCTION

The plates can be make with different material : aluminium, pre-painted aluminium, inox steel according to the final uses. The aluminium plates used for recuperation problems in general while inox plates are used for the industrial application : the choice depends on the corrosive nature of the exhaust air and on its temperature.

The tightness of the plates is guaranteed by suitable sealing studies in order to resist, to the exercise temeratures.

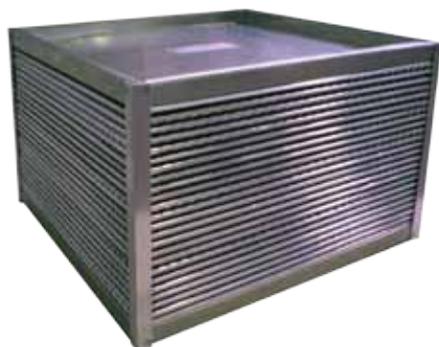
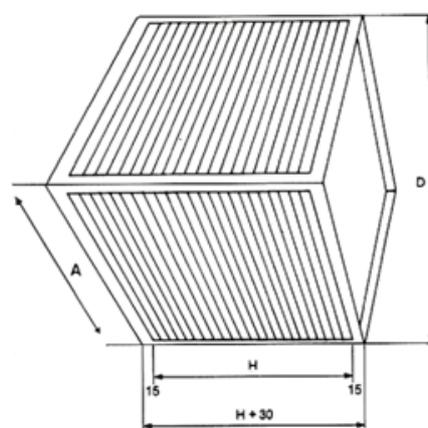
The tightness into the air channel is excellent, lower than 1% of leakage for a differential pressure of 1000pa, the recuperator resist to a static pressure higher than 4500pa without undergoing any changes in the technical characteristics.

### HIGHT EFFICENCY

The way in which is formulated the "DUOTERM RCP" recuperator allows the acquisition of an hight exchange surface; the reduced space inside the undulated plates constitutes an additional mass of accumulation heat.

A total surface which can change till 350 times the frontal surface itself, essential reason if the high efficiency of "DUOTERM RCP" recuperator.

TYPE	A (mm)	B (mm)	H (mm)
02	204	289	Variabile secondo la selezione
03	304	439	
04	404	572	
05	504	713	
06	604	856	
07	704	996	
08	804	1138	
09	904	1280	
10	1004	1420	
12	1204	1704	
14	1408	1993	
16	1608	2275	
18	1808	2558	
20	2008	2842	
24	2408	3406	



### HEAT PIPE DUOTERM RCD:

In external appearance the "DUOTERM RCD" heat recuperator seems a usual exchanger coil with finned pack but subdivided into 2 sections by an intermediate baffle. Hot exhaust air goes through one of the two sections dispersing its' heat. Inside the tubes the dispersed heat is conveyed by a two-phase fluid to the other section and is transferred to the fresh air.

Up to 80% of the heat can be recovered which would otherwise be lost, giving a proportionate saving of fuel.

The heat pipe system comprises of two heat exchanger coils, capable moving large amount of sensible energy from one air flow to the other with the no mechanical energy.

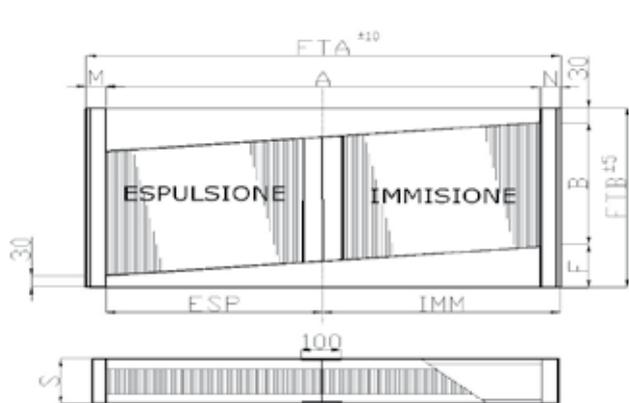
When warm air passes over the first coil, the liquid refrigerant vaporizes, transferring heat to the second coil. During this process the warm air is cooled while cool air passing through the second coil is heated . Both coils are charged with refrigerant such as R134A and connected to each other.

### ADVANTAGES:

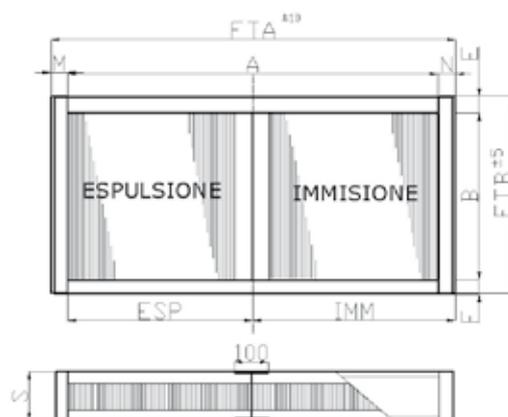
- Energy recovery is achieved with no mechanical parts.

### DISVANTAGES:

- Only sensible energy can be recovered.
- Leakage of refrigerant can not be easily detected.
- Energy transfer can not be control.



modello RCD-F



modello RCD-B





## DESIGNATION OF THE DUOTERM RCD:

The Cominter DUOTERM RCD recuperators can be of two different types and are named with 2 item :  
 DUOTERM RCD-B 10/9 60° pos. 1 syst. 2  
 DUOTERM RCD-F 15/7 160° syst. 3

DUOTERM RCD	Heat Recuperator
B	Recuperator with possibility of tilting
F	Fix recuperator with predetermined inclination
Da 1 a 10	Dimension if the recuperator
Pos. 1 a 3	Functioning position
Sist. 1 a 3	Installation system

## POSITION OF THE SEPTUM PARTITION:

In the standard position the septum partition is central. In the case that M report is major or minor of 1 and the pressure drops between the 2 air flows result too unbalanced to move the septum.

## TREATMENT OF HUMID AIR:

When expelled air is humid, quite certainly there is a formation of condensing. It is necessary to foreseen special baths of picked and unloaded; and there is a considerable increase of performance.

## MODELS:

RCD Recuperators are built in 2 models which are useful for any kind of application or basing on the available sizes.

The model B; as here below shown, can be mounted in all position, but inclined from the installer, with tilting unit of our construction is particularly adapted for the summer recovery in the condition field.

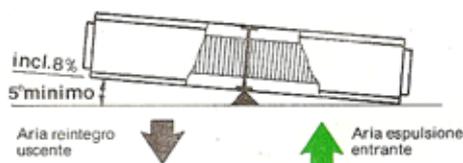
### MODEL B

Operation positions:

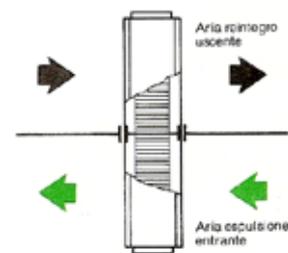
1. Vertical installation with appeared horizontal air flow.
2. Horizontal installation with appeared vertical air flow.
3. Vertical installation with overlapping horizontal air flow.



1



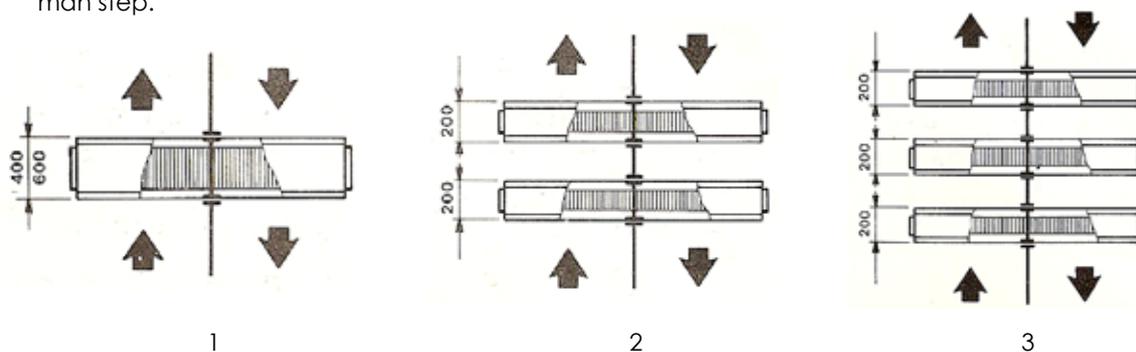
2



3

Construction accommodations:

1. Single block installation.
2. Installation with subdivision of the recuperator in 2 section of the same thickness with intermediate man step.
3. Installation with subdivision of hte recuperator in 3 section of same the tickness with intermediate man step.



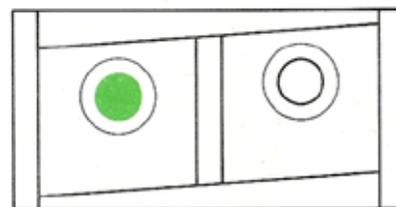
In the model F, the inclination is assured by the support frame.

If mounted in drawer model, this model is very easy to extract for the periodic cleaning, is so particularly adapted for the industrial application.

**MODEL F**

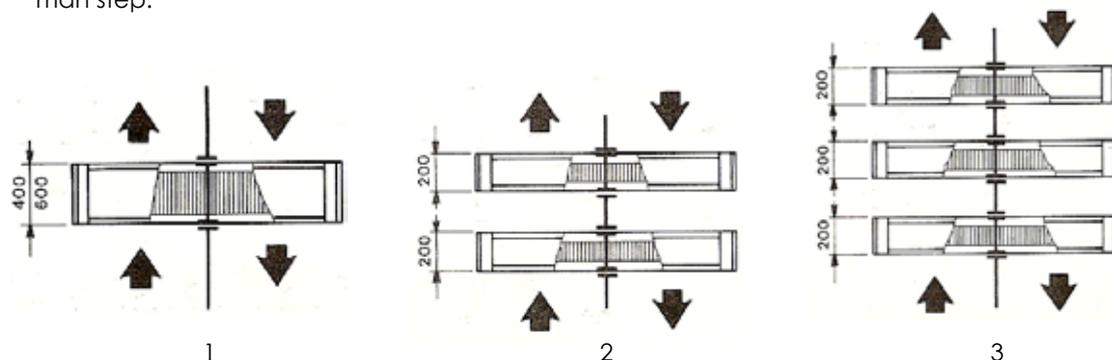
Operation positions:

- Possible only vertical installation with appeared horizontal air flows.



Construction accommodations:

1. Single block installation.
2. Installation with subdivision of the recuperator in 2 section of the same thickness with intermediate man step.
3. Installation with subdivision of hte recuperator in 3 section of same the tickness with intermediate man step.



## Research and development

Cominter updates, following the technological evolution in the continuous development of the society.



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