



KS certification



Green Certification



Quality certification



Patent registration



Promising business



ISO certified company



Venture company



Innobiz company



High efficiency
certification



Safety certification



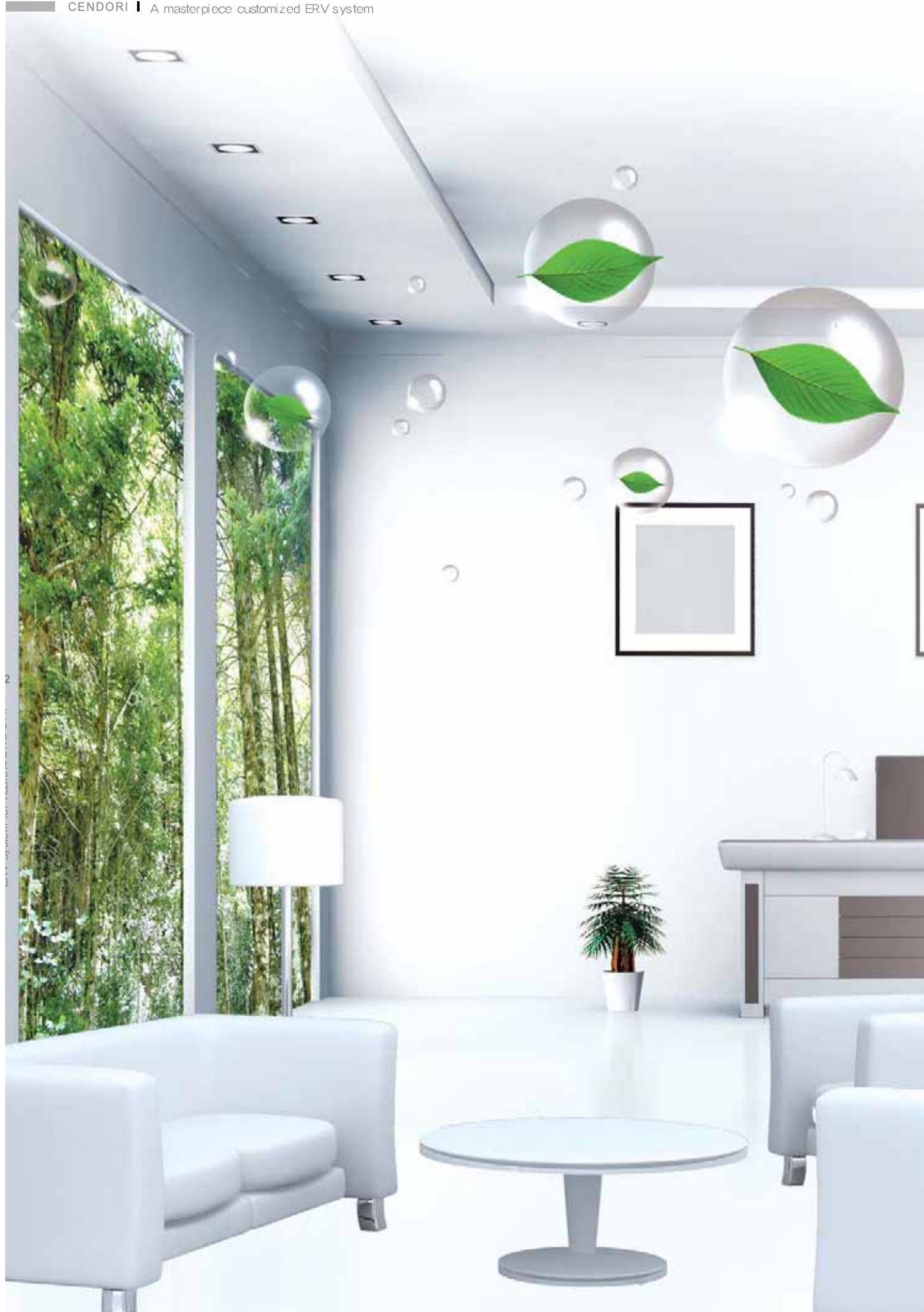
Public Procurement
Service registered product

Best customized Energy Recovery Ventilator (ERV) system

Health friendly building / Cost saving / ERV system for fresh air / Improvement for work and study



CENDORI corporation
www.cendori.com



Company State

Certification

- KS Certification
- KC Certification
- Q-mark Certification
- high efficiency energy material Certification
- Technology Institute Certification
- New Renewable Energy Corporation Certification
- Venture Company Certification
- Inobiz company
- ISO 9001 Certification
- ISO 14001 Certification
- KEPCO Ice storage cooling system Certification
- 30 Patents incl. Total heat exchanger
- 20 Patents incl. Heat-storage air-conditioning and heating equipment

Manufacturing

- ESS
- ERV (Energy Recovery Ventilator)
- air-conditioning and heating equipment
- air-conditioner
- large size refrigerator
- refrigerator
- thermohygrostat
- cooling tower
- heat storing tank
- air-conditioning equipment

Engineering

- Energy diagnosis organization
- ESCO Corporation
- TAB performing Corporation
- New Renewable Energy Design
- Machine equipment design and inspection business
- Mining inspection business
- Clean facilities business

Design and construction business

- Machine equipment construction business
- Electric work business
- Facility management business
- ground-water development business
- New Renewable Energy Construction business



CENDORI ERV system makes a life healthy

President. Moon-su Park

Line-up

Type		Picture	Model	Capacity	High efficiency	KS	Features
Non-duct type	Window-installed type		C-100CMH	100CMH	○	○	• KC certification
	Stand type wall-installed type						
Duct type	Ceiling installed type		C100S	100CMH	○	○	• Green certification
			C150S	150CMH	○	○	• Q-mark certification
			C200S	200CMH	○	○	• Patent registration
			C250SC	250CMH	○	○	• Procurement registration
			C350SC	350CMH	○	○	• BLDC waterproofing motor
			C-400CMH	400CMH	○	○	• damper-integral type air blower patent
			C-500CMH	500CMH	○	○	• Central control/ PC control system (Optional)
			C-600CMH	600CMH	○	○	• CO2 automatic control system (Optional)
			C-700CMH	700CMH	○	○	• Home network linkage (Optional)
			C-800CMH	800CMH	○	○	
			C-1000CMH	1000CMH	○	○	

customized ERV system

Air Condition

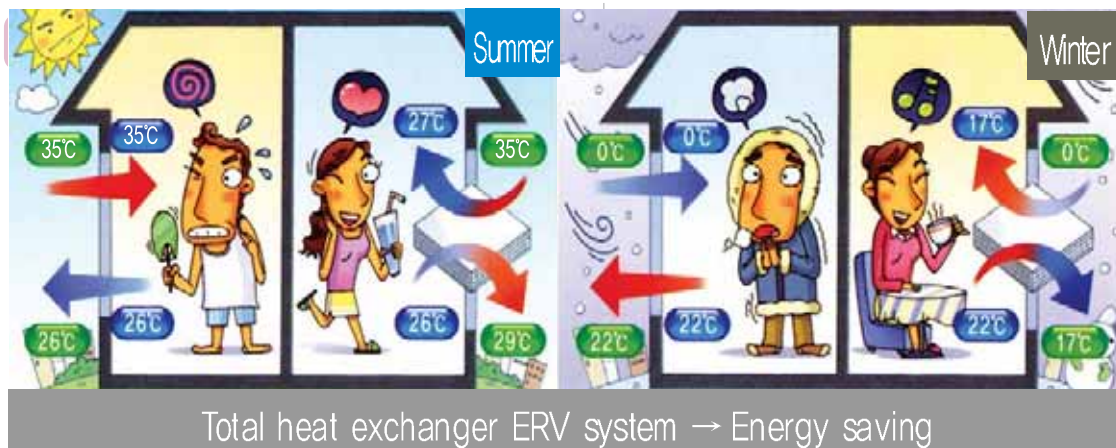
Classification	Indoor		Outdoor	
	dry bulb temperature (°C)	wet bulb temperature (°C)	dry bulb temperature (°C)	wet bulb temperature (°C)
Cooling	24 ± 0.3	$17 \pm 0.2(49.6\%)$	35 ± 0.3	$24 \pm 0.2(40.3\%)$
Heating	22 ± 0.3	$13.9 \pm 0.2(40.0\%)$	2 ± 0.3	$0.442 \pm 0.2(75.1\%)$

Note 1) **Cooling**, enthalpy indoor 11.37 Kcal/kg, outdoor 17.13Kcal/kg

Heating, enthalpy indoor 9.27 Kcal/kg, outdoor 2.44 Kcal/kg

Note 2) Standard of air condition : Ministry of Trade,

Industry and Energy : A regulation for promoting high efficiency energy equipment), Korean Association of Air Conditioning Refrigerating and Sanitary Engineers (A standard of ventilation unit utilizing waste heat)



Energy recovery

classification	OA	SA	RA
dry-bulb temperature(°C)	35	27	24
Enthalpy (Kcal/kg)	21.3	16.5	14.4
air volume (m³/h)	1000		
efficiency of total heat transfer (%)	72		

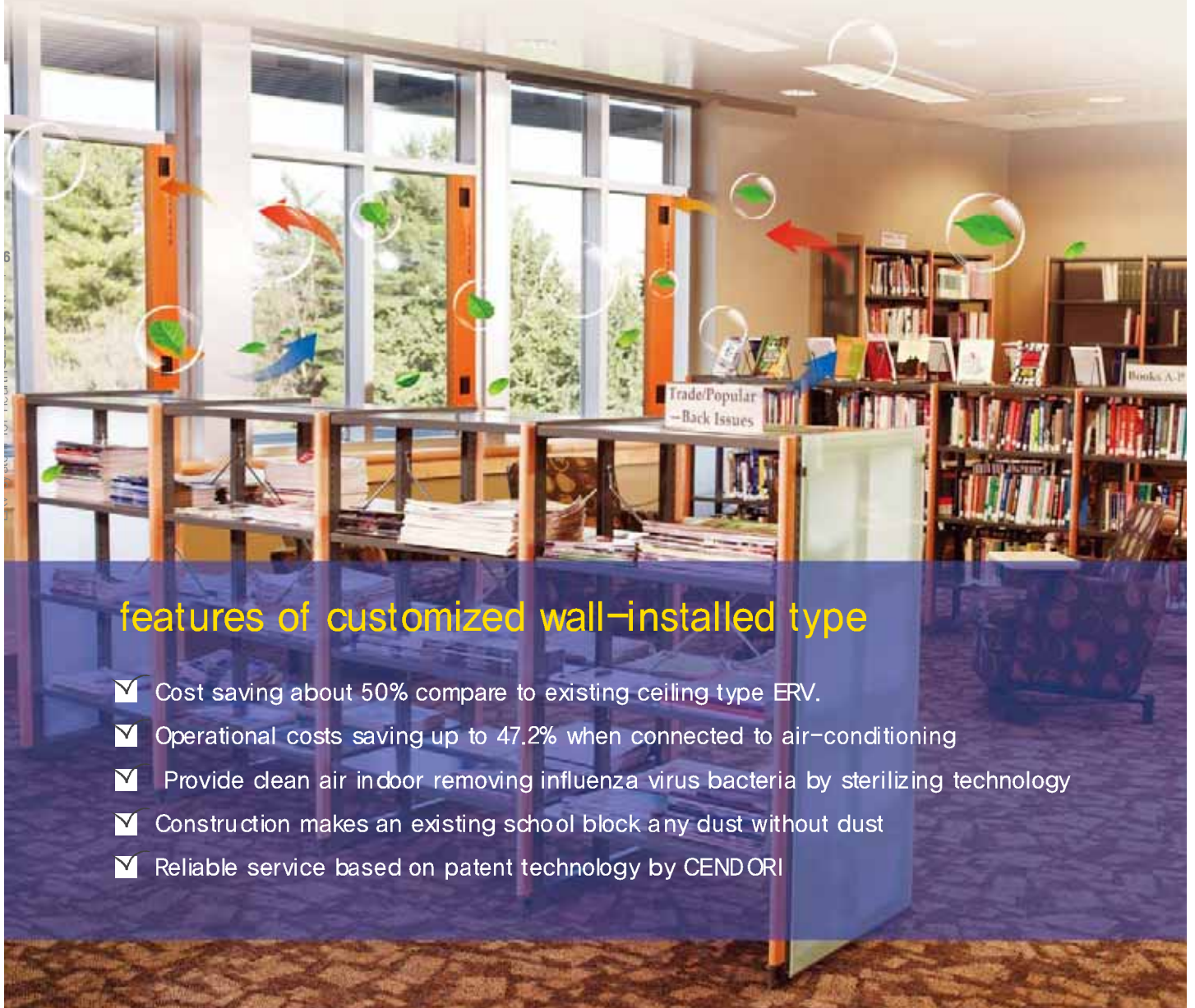
Note 1) Data in the table above is a formula for understanding. Therefore, please refer to data approved by qualified institution

Best customized ERV system

wall-installed type or window-installed ERV equipment

Dust, virus free clean air!

Without complicated ceiling construction, floor, wall and window installed ventilation system supplies clean air removing asbestos, dust and virus

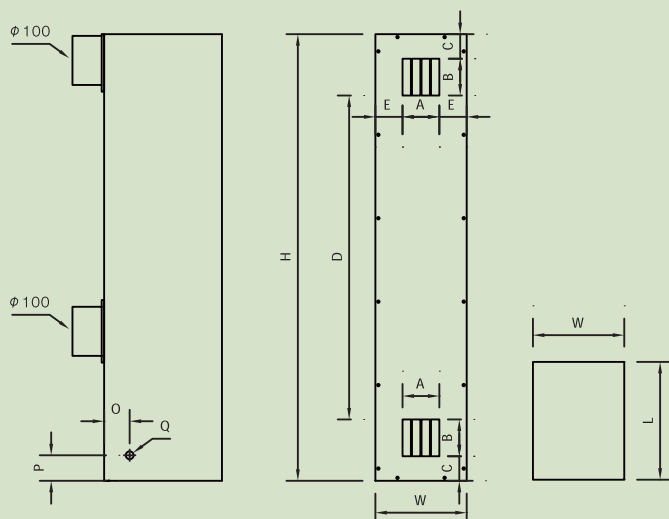


features of customized wall-installed type

- ✓ Cost saving about 50% compare to existing ceiling type ERV.
- ✓ Operational costs saving up to 47.2% when connected to air-conditioning
- ✓ Provide clean air indoor removing influenza virus bacteria by sterilizing technology
- ✓ Construction makes an existing school block any dust without dust
- ✓ Reliable service based on patent technology by CENDORI

C-100 / 0150 CMH (Wall-installed, window frame-installed, wall-mounted, stand type)

Appearance (Out-Drawing)



Size (Dimensions)

unit: mm

Model	W	L	H	A	B	C	D	E
C-100CMH	186	240	910	75	75	50	660	55.5
C-0150CMH	186	240	910	75	75	50	660	55.5

Specifications

Classification		unit	C-100CMH			C-0150CMH		
POWER		Ø, V, Hz	1Ø x 220V x 60Hz			1Ø x 220V x 60Hz		
Ventilation mode		—	electric heat exchanger			electric heat exchanger		
Operation mode		—	High	Medium	Low	High	Medium	Low
volume		CMH	100	50	30	150	100	50
Electric consumption		W	48	30	20	60	48	30
Effective efficiency of electric heat	cooling	%	50					
	heating	%	70					
noise		dB	39					
filter		Pre/Medium	polypropylene or chloride /synthetic					
casing		—	cold-drawn steel plate CR)+Powder coating/internal heat insulation					
weight		kg	18.5					
duct size		mm	75 ~ 100					
size		mm	240L x 186W x 910H					

※ Specification in the table may be changed without a notice to improve product quality according to the condition

Best customized ERV system

ERV equipment of Ceiling installed-duct type

Clean air with high-efficiency and low-cost

The air in a classroom is kept clean with a low construction cost

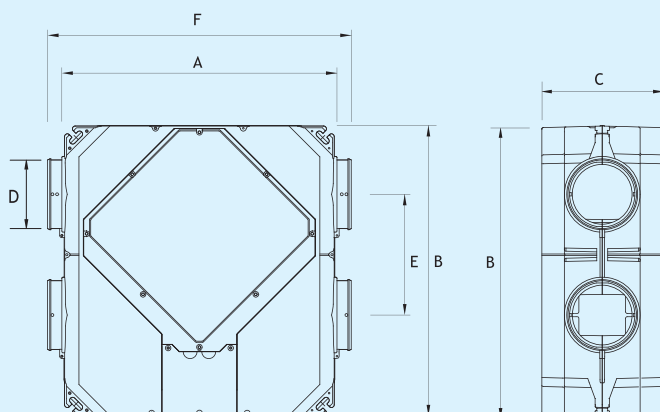


features for ceiling-installed type for school

- ✓ High efficiency up to a world standard
- ✓ Cost-reducing equipment for cooling and heating when links to an air-conditioner
- ✓ Provide clean air to a classroom removing influenza virus and bacteria by sterilizing technology
- ✓ Reduce cost by connecting flexible duct
- ✓ Reliable service based on patent technology by CENDORI

C100 / 150 / 200 S

Appearance(Out-Drawing)



■ size(Dimensions)

unit:mm

Model	A	B	C	D	E	F
C100S	493	530	220	125	220	553
C150S	493	530	220	125	220	553
C200S	493	530	220	125	220	553

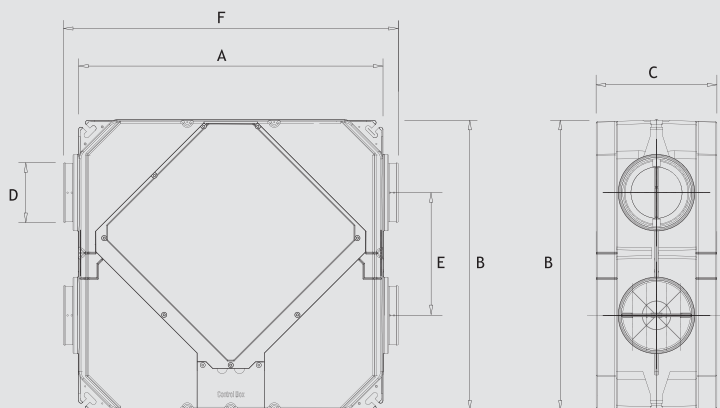
■ Specifications

Classification		unit	C100S	C150S	C200S
POWER		∅, V, Hz	1∅ x 220V x 60Hz		
Ventilation mode		—	electric heat exchanger		
Speed		—	High/ /Medium/Low	High/ /Medium/Low	High/ /Medium/Low
volume		CMH	100/80/60	150/120/90	200/160/120
Electric consumption		W	40/35/25	49/38/28	82/70/60
extra pressure		mmaq	10mmaq		
Effective efficiency of electric heat	cooling	%	61	60	56
	heating	%	73	73	71
noise		dB	below 40db (after construction)		
filter		—	Mesh type filter or non-woven fabric filter		
weight		kg	7.2		
Size(L x W x H)		mm	530X493X220		

※ Specification in the table may be changed without a notice to improve product quality according to the condition

C 250 / 350 SC

Appearance(Out-Drawing)



■ size(Dimensions)

unit : mm

Model	A	B	C	D	E	F
C250SC	630	600	250	150	225	693
C350SC	630	600	250	150	225	740

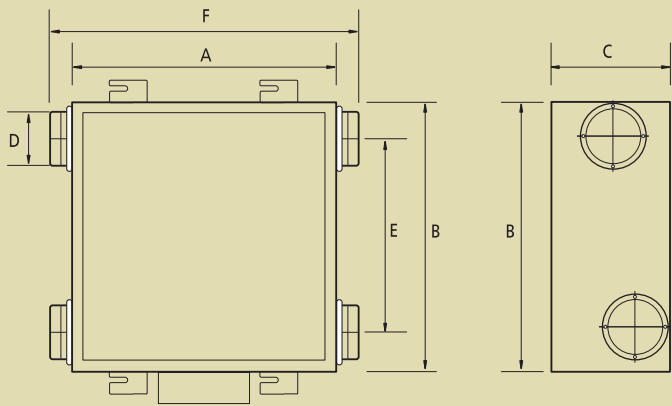
■ Specifications

Classification		unit	C250SC	C350SC
POWER		Ø, V, Hz	1Ø x 220V x 60Hz	
Ventilation mode		—	electric heat exchanger	
volume		CMH	250/200/160	350/300/250
Electric consumption		W	100/90/70	142/120/100
extra pressure		mmaq	10mmaq	
Effective efficiency of electric heat	cooling	%	50	48
	heating	%	74	74
noise		dB	below 40db (after construction)	
filter		—	Mesh type filter or non-woven fabric filter	
weight		kg	12	
Size(L x W x H)		mm	630X600X250	

※ Specification in the table may be changed without a notice to improve product quality according to the condition

C-400 CMH

Appearance(Out-Drawing)



■ size(Dimensions)

Model	A	B	C	D	E	F
C-400CMH	700	700	230	150	350	790

unit : mm

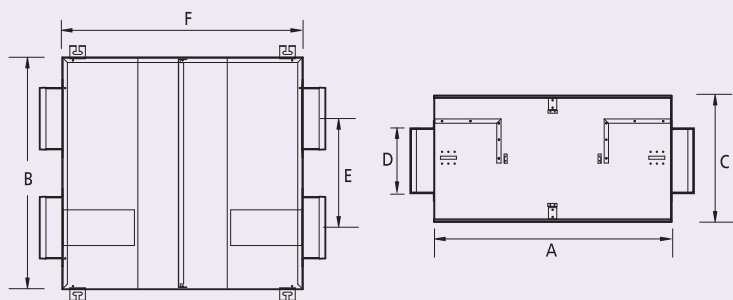
■ Specifications

Classification		unit	C-400CMH
POWER		Ø, V, Hz	1Ø x 220V x 60Hz
Ventilation mode		—	electric heat exchanger
Speed		—	High//Medium/Low
volume		CMH	400/350/300
Electric consumption		W	145/142/135
extra pressure		mmaq	15mmaq
Effective efficiency of electric heat	cooling	%	47
	heating	%	72
noise		dB	below 40db (after construction)
filter		—	Mesh type filter or non-woven fabric filter
weight		kg	32
Size(L x W x H)		mm	700X700X230

※ Specification in the table may be changed without a notice to improve product quality according to the condition

C-500 CMH

Appearance(Out-Drawing)



■ size(Dimensions)

unit:mm

Model	A	B	C	D	E	F
C-500CMH	770	742	400	200	350	860

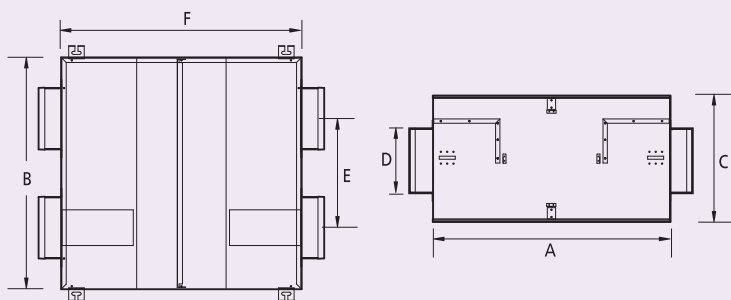
■ Specifications

Classification		unit	C-500CMH
POWER		Ø, V, Hz	1Ø x 220V x 60Hz
Ventilation mode		—	electric heat exchanger
Speed		—	High//Medium/Low
volume		CMH	500/450/380
Electric consumption		W	174/160/143
extra pressure		mmaq	15mmaq
Effective efficiency of electric heat	cooling	%	55
	heating	%	70
noise		dB	below 40db (after construction)
filter		—	Mesh type filter or non-woven fabric filter
weight		kg	38
Size(L x W x H)		mm	770X740X400

※ Specification in the table may be changed without a notice to improve product quality according to the condition

C-600 / 700 / 800 / 1000 CMH

Appearance(Out-Drawing)



size(Dimensions)

unit : mm

Model	A	B	C	D	E	F
C-600CMH	1200	1200	400	250	720	1300
C-700CMH	1200	1200	400	250	720	1300
C-800CMH	1200	1200	400	250	720	1300
C-1000CMH	1200	1200	400	250	720	1300

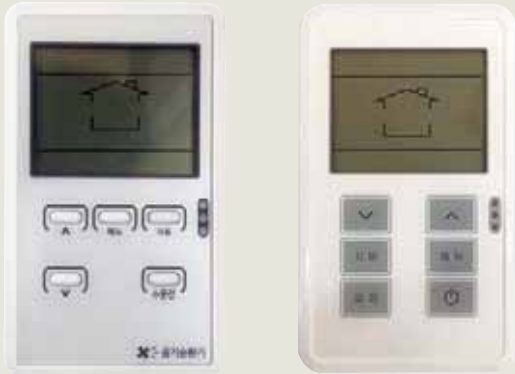
Specifications

Classification		unit	C-600CMH	C-700CMH	C-800CMH	C-1000CMH
POWER		Ø, V, Hz	1Ø x 220V x 60Hz			
Ventilation mode		—	electric heat exchanger			
Speed		—	High//Medium/Low			
volume		CMH	600/550/500	700/650/600	800/700/600	1000/800/700
Electric consumption		W	175/174/172	212/185/175	244/212/175	361/244/212
extra pressure		mmaq	15mmaq			
Effective efficiency of electric heat	cooling	%	64	62	59	54
	heating	%	76	71	73	70
noise		dB	below 40db (after construction)			
filter		—	Mesh type filter or non-woven fabric filter			
weight		kg	65			
Size(L x W x H)		mm	1200 X 1200 X 400			

※ Specification in the table may be changed without a notice to improve product quality according to the condition

Control condition by adjusting individual controller

Individual controller – LCD remote controller



■ Function

- on/off display
- air volume control
- schedule setting(on/off)
- display for filter replacement
- display for element replacement
- display for Fan error(optional)
- display for heating, temperature error(optional)
- display for communication control error
- central control, home network, group control (optional)

PC central controller

It is available to operate and stop ventilation system by operating a central-control device



Clean space for both nature and human can breathe CENDORI promises to make space clean and pleasant

Importance of ERV system

Curtain Wall

It is difficult to ventilate space completely in new building like high-rise apartment

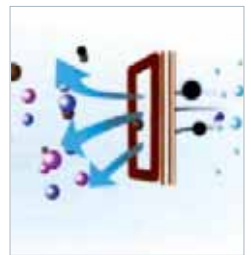


Sick House syndrome

It is easy for people who live in a polluted house to expose to Sick House syndrome which causes dermatitis, headache and asthma

Importance of ventilation

It is important for human to breath fresh air because human inhales 20,000 liter of air a day



Polluted indoor air

Ventilation system purifies air discharging polluted indoor air

Healthy life

Ventilation system guarantees healthy life providing clean and fresh air in your place



Clean air

ERV system provides you clean and fresh air

Practical ventilation method

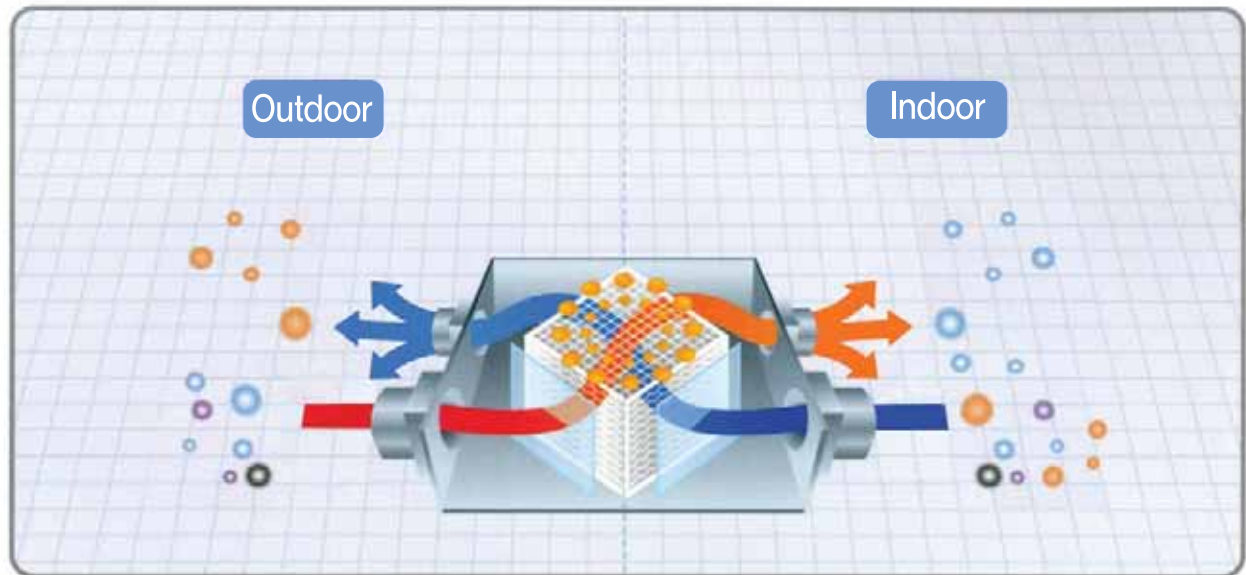
Ventilation system makes your life healthy

Energy efficiency

ERV system reduces a loss of energy in your space



CENDORI ERV system makes air in your environment clean and fresh by purifying pollution source indoor



pollution source	Dust	Carbon dioxide (CO ₂)	Formaldehyde	Germ	Smoke	Radon/Asbestos	Organic solvent/ Odor causing material
Source	• ctivity, clothes, influx from air	• breathing, combustion device, vehicle emission	• chipboard and furniture, insulator, glue	• humidifier, air-conditioner, refrigerator (mold, pollen)	• active/inactive smoking, heating device, vehicle emission	• concrete, soil, underground water, insulator, asbestos tile	• paint, glue, spray, air freshene, odor causing material
Effect on human body	• respiratory disease, pneumoconiosis, allergic asthma, atopic dermatitis	• tinnitus, headache, respiratory problem	• stimulatory sign of eye, nose, throat, dizziness, cough, anxiety	• infectious disease, allergy, pneumonia, rhinitis	• headache, tiredness, bronchitis, pneumonia/ chronic lung disease, asthma	• lung cancer/ skin problem, respiratory disease	• tiredness, headache, nausea, allergy



Residential space

Modern people spend most of their time in indoors such as a house and an office. It is difficult to ventilate a room due to a complicated building structure meant to save energy. And dust and noise in an atmosphere makes hard to ventilate indoor.



Sick house syndrome

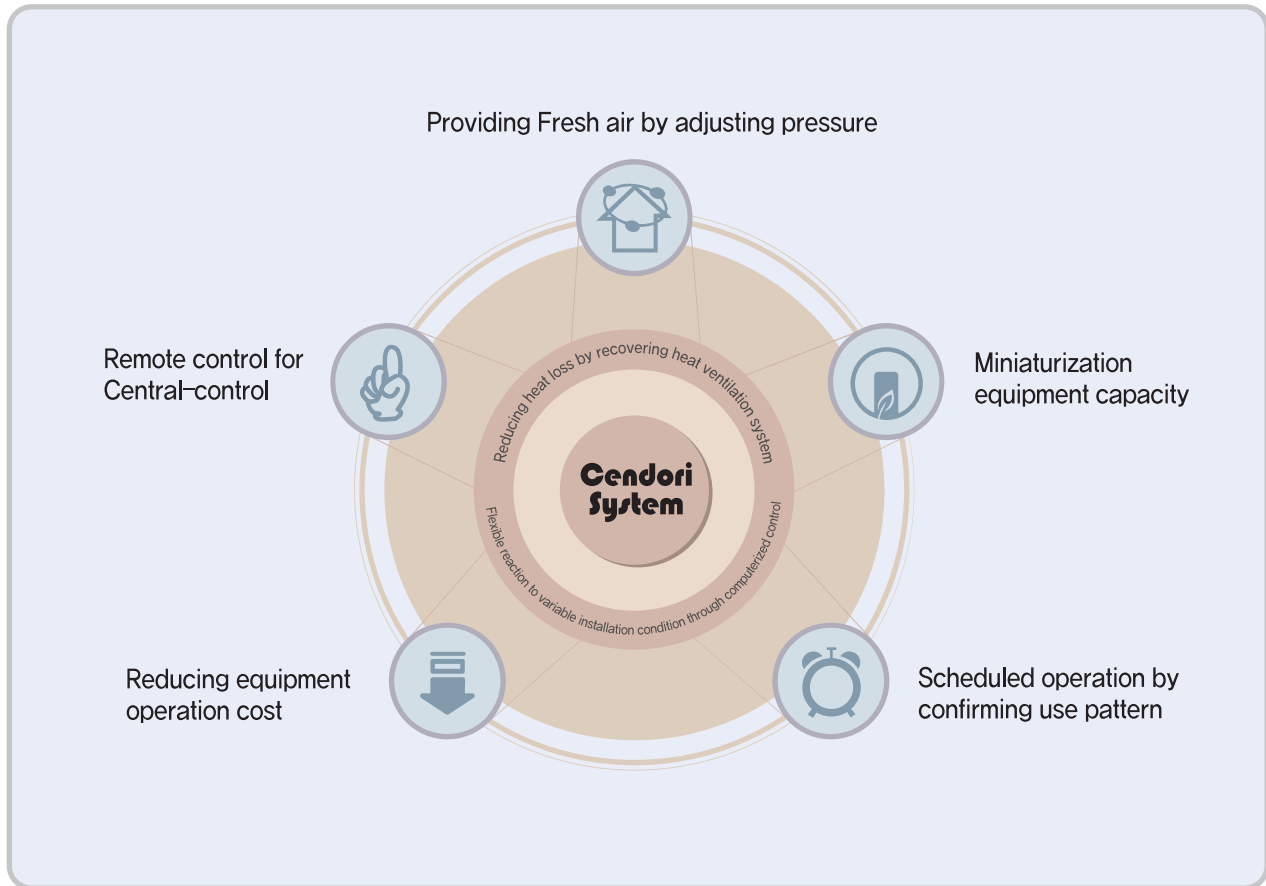
Sick house syndrome is a symptom to cause headache, nausea, allergic reaction. This is caused by construction materials, smoking, exposure to toxic substance when breath in polluted environment. This is worsened in an enclosed space which lacks fresh air.



Mandatory Ventilation [Korean law]

By 'Act on Air Quality in Crowd Facilities' as from May 2004, it has been a mandatory for developer to announce a result and degree of a quality of air in a building. Also it has been a mandatory to set natural ventilation system or mechanical ventilation system in an enclosed building for removing toxic substance which is main reason for variable diseases.

CENDORI ERV system gives solution for ventilation



Humidity control

Keep humidity indoor pleasant level through total heat exchanger



Environment- friendly ventilation

Environment-friendly technology provides both-way ventilation



Blocking dust from outside

Filter blocks dust from outside keeps space clean



Blocking noise

CENDORI Energy Recovery Ventilator system blocks both noise and allergenic substance



Customized installation for condition

Flexible application and installation is possible to conditions by using variable products we offered; Ceiling-installed type, window type, top-installed type, wall-installed type



- Maintenance criteria based on Enforcement regulation on school Health Act [Korean law]

A modern, minimalist interior space, likely a reception area or lounge. It features a white reception desk on the left, a black sofa with white cushions in the center, and a large screen on the wall. The ceiling has exposed ductwork and modern lighting fixtures. The overall design is clean and contemporary.

- Regulation of ventilation for public housing above 100 units
- Rating system for ventilation performance in housing building
- Proposal of installation standard and volume of ventilation in public housing



- Obligation on measurement and report of air quality
- Obligation on ventilation equipment
- Proposal on administrative criterion of air quality in public housing



- **Obligation on ventilation equipment in newly-built school**
- Ventilation volume per capita: 21.6CMH
- Regulation on Co2 when ventilation equipment installed: below 1,500ppm



■ Maintenance criteria based on Enforcement regulation on School Health Act

Subject	Criteria	Applicable facility	Note
Fine dust ($\mu\text{g}/\text{m}^3$)	100	Every classroom	Below 10 μm
Carbon dioxide (ppm)	1,000		1,500 ppm in machinery room
Formaldehyde ($\mu\text{g}/\text{m}^3$)	100		—
Total floating bacteria (CFU/ m^3)	800		—
Falling bacteria (CFU/Room)	10	Health service room, cafeteria	—
Carbon monoxide(ppm)	10	Individual heating and wayside classroom	Heating by direct combustion
Nitrogen dioxide(ppm)	0.05		
Radon(PCI/L)	4.0	Underground classroom	—
Total volatile organic compounds ($\mu\text{g}/\text{m}^3$)	400	School not passed by 3 years since construction	Including extension and reconstruction
Asbestos(number/cc)	0.01	School made with asbestos	School made with asbestos as insulator
Ozone(ppm)	0.06	Teacher's room and administrative office	Office device (copy machine) generating ozone
Mite(number/ m^3)	100	Health service room	—

► Newly– built school

- 〈Administration law on Air Quality in Crowd Facilities〉 limit of usage for construction material emitting toxic substance by regulation No. 11
- Ventilation equipment Installation Obligation and usage of school furniture like desk and chair which emits less formaldehyde
- Administration for suitability of formaldehyde and maintenance criteria of volatile organic compounds

► School within 3 years after construction

- Administration for suitability of formaldehyde and maintenance criteria

► School more than 10 years after construction

- Administration for suitability of fine dust and floating bacteria
- Usage of environment–friendly material when renovate facility
- Usage of school furniture like desk and chair which emits less formaldehyde

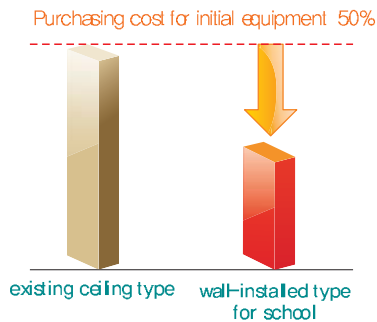
► wayside school

- Administration for suitability of carbon monoxide and nitrogen dioxide for wayside school and individual heating(direct combustion)
- Administration for suitability of criteria on falling bacteria and mite in cafeteria and Health service room
- Administration for suitability of criteria on school made with asbestos as insulator

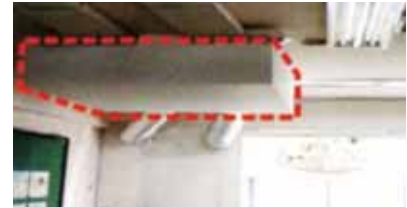
Economic benefits

Reducing cost of initial purchase and maintenance

You can save extra expense installing on floor not on ceiling. Ventilation system is operated efficiently complying convective circulation exhausting polluted air through upper part of equipment and providing fresh air through the bottom.



wall-installed type ERV
Safe installation on a floor



ceiling-installed type ERV
Visual repulsion from exposure on a ceiling

※ More cost saving for school installed existing equipment. ※ Quick and easy installation

※ Core drilling work is needed to insert $\phi 100$ duct. It is not influential for building safety because of work on fake wall in a classroom

Cost saving effect compares to existing ceiling-installed ERV

It bears external shock applying steel case which makes easy for cleaning and maintenance with reducing maintenance cost.

Object	details of Purchasing cost for initial equipment	Reducing rate
newly-built school	Cost for ceiling duct, cost for tex-burial	50%~100%
existing school	cost for tex-elimination / cost for tex-burial, cost for asbestos elimination	50%~100%



wall-installed type ERV
Easy to maintenance and shock-proof



ceiling-installed type ERV
Inconvenience for construction and maintenance

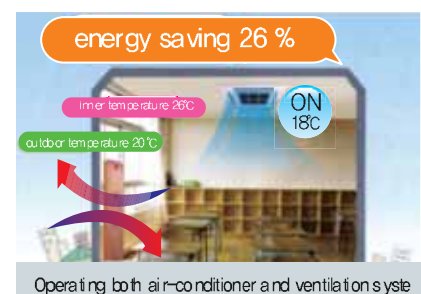
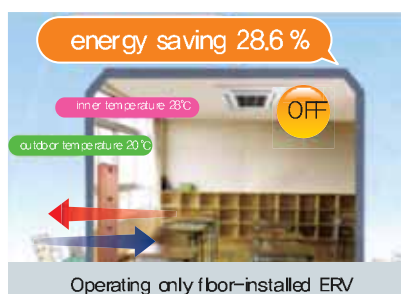
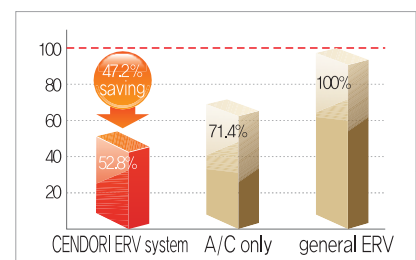
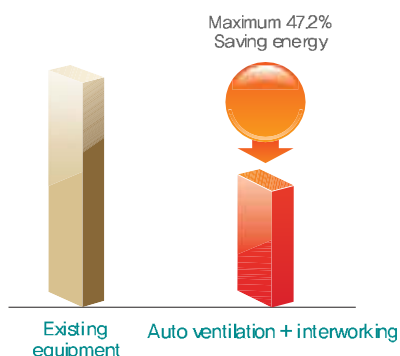
※ There is no limit to install for extra ceiling installation space

Energy saving to reduce cost for operation

This is solution for energy saving which reduces cost for cooling and heating shortening operation time dramatically by operating Energy Recovery Ventilator system.

※ Reducing cost up to 28.6% by operating ventilation system using outdoor air cooling

※ Reducing cost up to 28.6% by operating ventilation system and air-conditioner

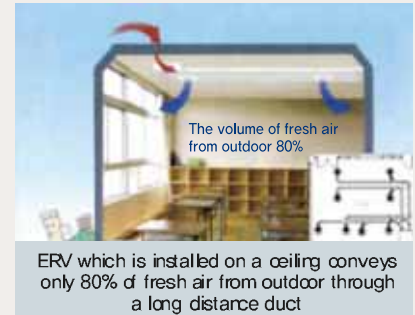
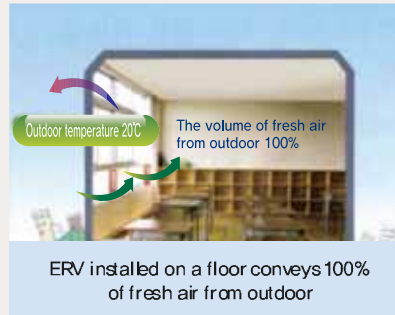


※ Study result by joint research with SungKyunKwan University Construction environment lab. Subject: 2ND floor classroom in J high school, Seoul(67.2m³)→
Criterion 800 CMH(result can be variable)

Maintenance of clean air

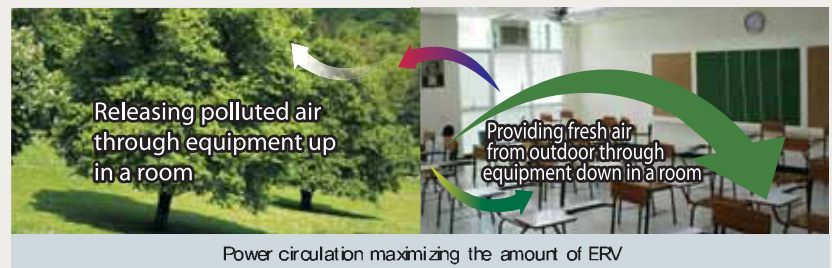
Providing sufficient amount of ventilation by non-duct design

The equipment which is ductless can provide fresh and sufficient air in a class room without any voltage loss by a long distance duct



Air circulation to remove polluted air by keeping fresh air provided

The Equipment of CENDORI system make a perfect environment for working and studying by providing fresh air and purifying polluted air



Install Example



Wall-installed type



Window-installed type



Wall-mounted type



Stand type

Patent : Applying a damper ventilator and damper for conditioning equipment



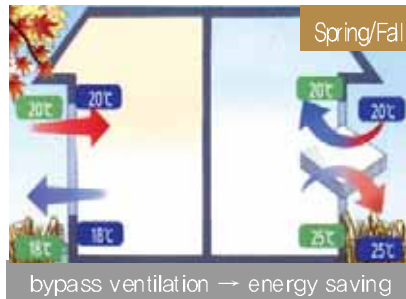
The equipment applied a rotary on-off damper increases energy efficiency up to 38%, the volume of air up to 30% and reduces power consumption up to 19% by operating an improved integral damper.

Energy saving by ventilation

Ventilation through ERV reduces energy consumption dramatically, compared to natural ventilation which takes a lot more energy

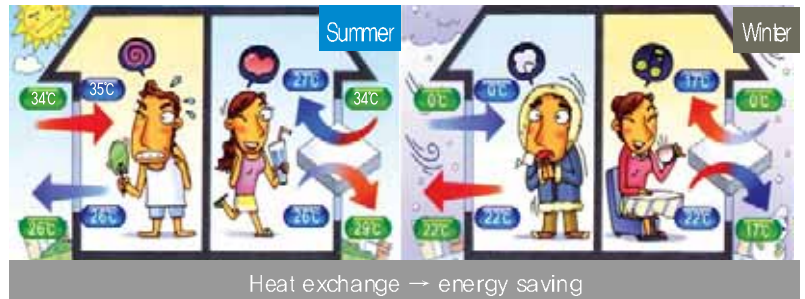
► Spring/Fall : ERV system through adopting air from outdoor(optional)

Cost saving by adopting air for the equipment



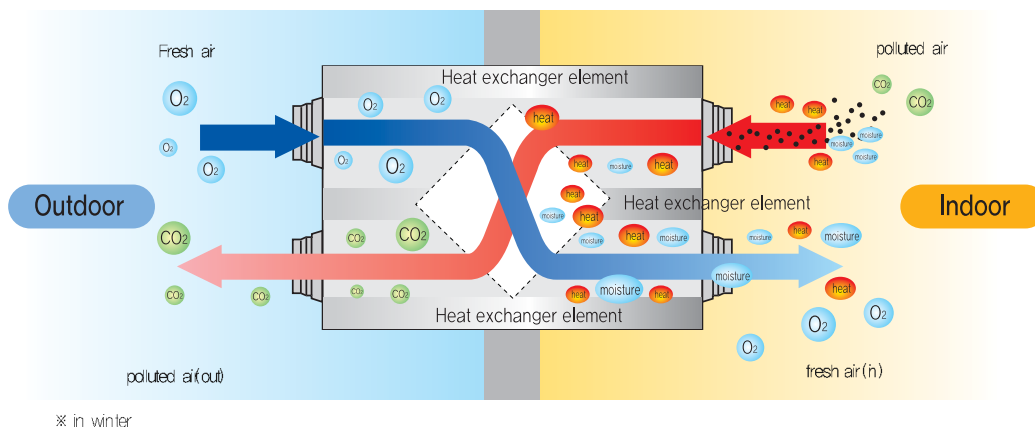
► Summer/Winter: Ventilation through a heat exchange way

Operational cost saving to lower a load for temperature set



New ventilation system adopting total heat exchange way! ERV

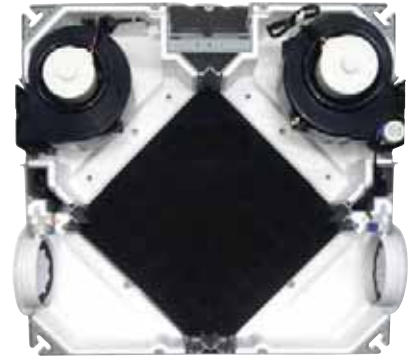
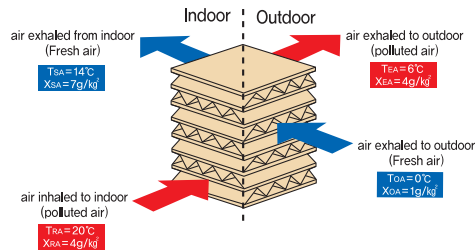
- Both way ventilation system adopting separated pipes for exhausting and in-taking makes better performance
- The special structure of equipment which is not re-introduced polluted materials makes better performance
- The equipment specially designed collects a heat and humidity in winter time and removes a heat and humidity in summer time



Energy Recovery Ventilator system component

Heat exchanger

High heat exchange rate adopting high quality heat exchanger



Insulation-supplemented product(optional)

Ventilator(patent)

Fixed pressure and low noise ventilator is used for durability



Filter

High performance filter

Metal filter



Installation component

Diffuser	 Mini diffuser	 General diffuser	 Fan diffuser	 Nozzle diffuser	 Nozzle diffuser	 Line diffuser	
Distributor	 4 way distributor	 6 way distributor	Damper	 back draft damper	 Fire damper	 motorized damper	 motorized on-off damper(patent)
Flexible duct hose	 AL duct hose	 AL duct hose(heating)	 T/P duct hose	Sleeve	 슬리브		
Spiral	 direct pipe	 socket	 90° ELBOW	 TEE	 Y- T BRANCH	 Y- B BRANCH	 R-Y-T/B
PVC square duct	 Square duct	 Couple ring	 Horizontal 90° elbow	 Vertical 90° elbow	 T-piece	 Square reducer	 Deformed reducer
Exterior finishing material	 Ventilation cap(patent)	 Cap grill	 Grill	 louver			



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The description of products in this catalog is to help customer's understanding of product trend, so it may be changed according to a trend of market and product development.

Please make sure you request a salesperson to explain for the product you want in detail before purchase.