

Save **energy** while you enjoy the freshness
of the outdoors, in the comfort of the indoors.



Energy Recovery Ventilators (ERVs)

 **UNITECH**
enterprise
Building Solutions



You and your building may not be breathing right!

It could be a Sick Building Syndrome...

Indoor Air Quality (IAQ), relates to the quality of air that we breathe for almost 80% of our life, the time we spend indoors in an A.C.Environment.

According to The National Institute of Occupational Safety and Health (USA), Sick Building Syndrome, an outcome of poor IAQ due to increased levels of Carbon Dioxide (CO₂), is the condition of a building in which occupants suffer from adverse health effects, but with no clinically diagnosable disease present, indicating symptoms such as hyperventilation, headache, dizziness, shortness of breath and drowsiness, alongwith long term effect of memory loss and concentration. Human respiration and electrical appliances can easily raise indoor levels of CO₂ between 1,000 ppm to 6,000 ppm (parts per million).

Global Regulation for Indoor Air Quality in an A.C. Premise








Rate of Ventilation

CHINA HVAC GB / 118883-200	30m ³ / Hour / Person
USA ASHRAE ASHRAE 62-1999	25.5 m ³ / Hour / Person
BRITISH BUILDING	0.5 Air Change / Hour
REGULATION 2000 FRANCE	0.35-0.5 Air Change / Hour

What happens when CO₂ levels increase ?

CO₂ affects humans in a number of ways and as the table below shows, effects of increased CO₂ level in the air that we breathe.

Levels of CO₂

250-350 ppm		Fresh air content.
600-800 ppm		Recommended limit for indoor air quality.
1,000 ppm 0.1%		Prolonged exposure can affect powers of concentration.
5,000 ppm 0.5%		Continuous exposure leads to health disorder.
10,000 ppm 1%		Breathing rate increases.
15,000 ppm 1.5%		The permissible Short Term Exposure Limit in hazardous applications.
20,000 ppm 2%		You start to breathe at about 50% above your normal rate. If you are exposed to this level over several hours you may feel tired and get headaches.



As per our survey, A.C. Premises without ventilation have CO₂ levels in the range of 1,500 ppm to as high as 6,000 ppm.

Solution

VENTILATION - Bringing in fresh air (hot & humid) into an A.C. premise so as to maintain the indoor air quality causes load on the existing A.C. system, thereby resulting in excessive energy cost.

Energy Recovery Ventilator (ERV) with CO₂ Sensor + Controller

The Indoor Air Quality (IAQ) is monitored and maintained at its optimum level, as per the ventilation rate norms, by the combination of ERV & CO₂ Sensor + Controller.

ERV system is a special technology to recover both sensible and latent energy from the outgoing stale exhaust air and transferring it into the incoming fresh air, through the fixed plate energy exchanger without cross contamination.

ERV system reduces the cooling load on the existing A.C. cooling system by recovering coolness and humidity (transferring up to 75% of difference in temperature and humidity levels between A.C. premise and outside air) from the outgoing cooled and dehumidified exhaust air through an A.C. premise and transferring it into the incoming fresh air, without cross contamination.

Thus, ERV system minimizes energy loss resulting in huge yearly recurring energy savings and down sizing your A.C. Equipment tonnage between 10-20 %.

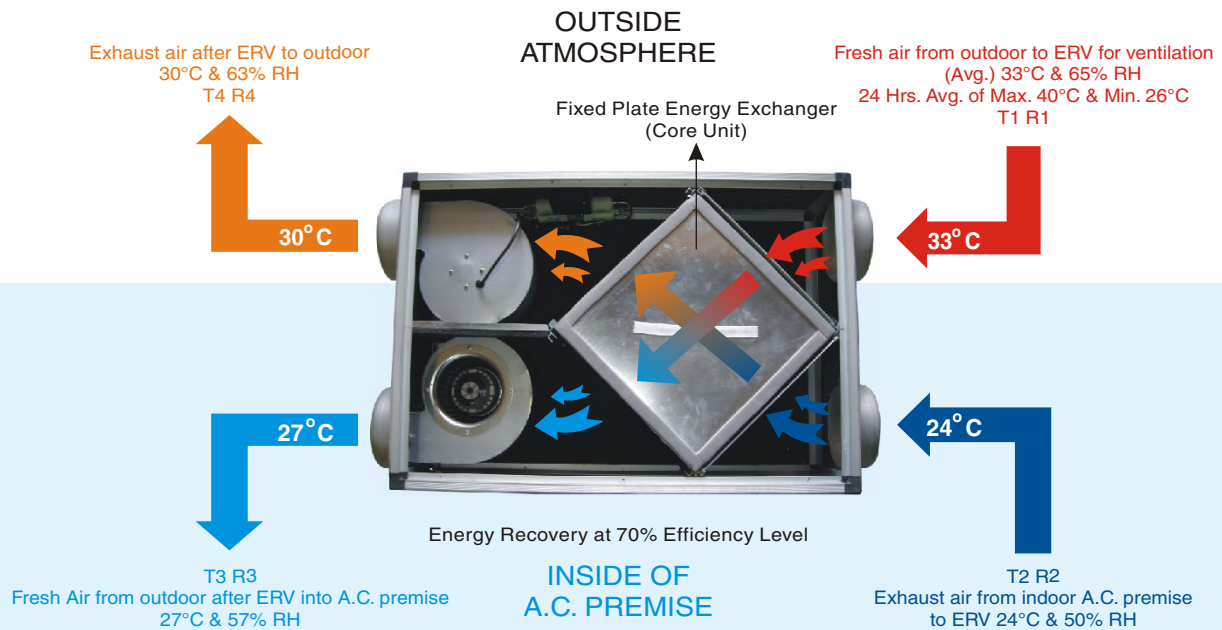


CO₂ Sensor + Controller



ERV
MODEL 150

Working of ERV



Demand Ventilation with CO₂ Sensors + Controller

What is Demand Ventilation?

Bringing in fresh outside air in an A.C. premise only when required is known as Demand Ventilation resulting in further savings of energy costs.

Demand ventilation system measures CO₂ as an indicator of air quality in an indoor A.C. premise. As levels of CO₂ rise, so do levels of other contaminants. In such a situation, the CO₂ Sensor + Controller will actuate the ventilation. As levels of CO₂ fall, the CO₂ Sensor + Controller will de-actuate the ventilation, thereby reducing the cooling load resulting in saving of energy cost.



Advantages due to Demand Ventilation

Normally the conventional ventilation is designed considering full occupancy of an A.C. premise, operating at a fixed ventilation rate without any co-relation to the variations in occupancy level. But at times, the same premise may have lesser occupancy levels, requiring lower ventilation rate. In such a situation, the conventional ventilation continues to operate at a rate which is higher than the situation demands due to CO₂ levels being within the safe limits, thereby unnecessarily increasing the energy cost. However in Demand Ventilation the CO₂ Sensor + Controller opens & closes ventilation in relation with the CO₂ levels, thus saving energy cost.



ERV Models & its specifications

1 cmh = 0.5885 cfm

MODEL NO.	DIMENSION mm			WT Kg	AIR FLOW cmh	STATIC PRESSURE Pa	RATINGS		NOISE LEVEL dB	ENERGY RECOVERY %	YEARLY ENERGY SAVING Rs.*
	L	B	H				I/P V	POWER W			
150	642	486	200	18	150/150/110	90/65/30	220	40/38/32	24/23/22	65/65/68	6,506/-
200	746	508	242	20	200/200/110	115/75/40	220	68/60/55	27/25/22	65/65/68	8,756/-
300	1075	784	270	21	300/250/160	125/75/30	220	105/100/80	27/26/22	71/71/75	15,669/-
400	1075	924	270	31	400/350/270	135/80/30	220	140/125/115	31/29/25	71/71/75	21,162/-
550	1128	1018	310	50	550/500/360	150/60/30	220	190/175/150	33/31/27	71/71/75	30,007/-
850	1488	1000	396	61	850/800/625	180/100/40	220	320/273/205	38/36/32	71/71/75	48,216/-
1000	1488	1246	396	80	1000/780/650	195/115/45	220	450/375/330	39/37/33	71/71/75	53,951/-
1500	1580	1020	558	90	1500	180	380	500	46	70	73,562/-
2000	1580	1220	558	110	2000	200	380	900	46.5	70	91,063/-
2500	1720	1420	558	180	2500	250	380	1100	54	70	1,15,475/-
3000	1950	1620	558	252	3000	250	380	1600	58	70	1,27,954/-
4000	1950	1898	805	330	4000	320	380	2600	60	70	1,54,477/-
4001	1930	890	1680	350	4000	320	380	2200	64	72	1,75,142/-
5001	2330	890	1680	385	5000	320	380	3000	65	72	2,11,898/-
6001	2630	890	1680	650	6000	320	380	3600	66	72	2,53,956/-
8001	1950	1700	2555	950	8000	350	380	4400	68	72	3,51,895/-
10001	2350	1700	2635	1150	10000	350	380	6000	69	72	4,23,796/-
10002	2250	1600	1730	700	10000	~	380	~	~	72	4,20,651/-
15002	3300	1600	1730	950	15000	~	380	~	~	72	# 7,04,814/-
20002	4400	1600	1700	1300	20000	~	380	~	~	72	# 9,85,832/-
30002	4400	1600	2475	1950	30000	~	380	~	~	72	# 15,84,038/-
40002	4400	1600	3290	2600	40000	~	380	~	~	72	# 21,80,634/-
50002	4400	1600	4065	3250	50000	~	380	~	~	72	# 27,85,281/-

- Warranty : 2 years • Core unit replacement : 7 years • ERV life span : 15 years
- Filter cleaning : Every 300 - 500 hrs of usage • Filter replacement : 3 - 5 years

* Yearly Energy Savings are calculated assuming 31°C average outdoor temperature at 65% RH with 16 hours/day for 360 days of day time ERV usage at lower CMH air flow with Energy cost @ Rs.6/Kwh, in an air conditioned premise having 24°C at 50% RH. Higher outdoor average temperature and/or higher RH will boost further savings than what is stated above. Similarly, if operated beyond 16 hours perday, the saving figures will go higher.

For precise Energy Savings calculation please refer to our ERV Calculator, or contact us. The yearly energy saving figures for models 10002 to 50002 are calculated with an approx. power consumption of these ERVs. The exact calculations shall be assessed on a case to case basis.

~ To be assessed on a case to case basis.

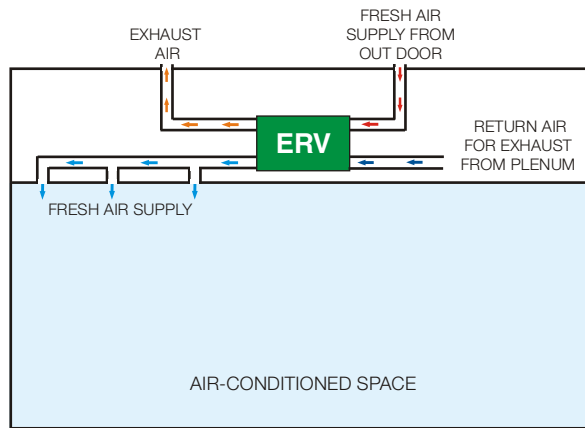
CO₂ Sensor + Controller & its specifications

W - Wall Mounted, S - Relay, L - LCD, D - Duct

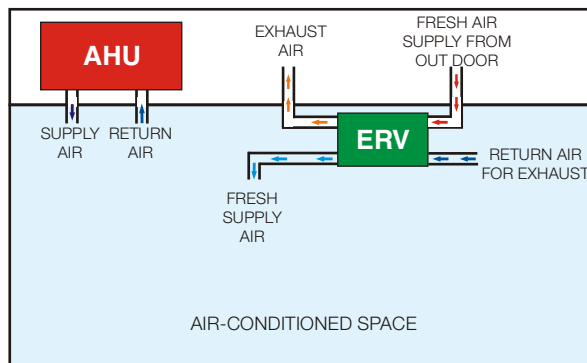
M O D E L S		130 w	130 wS	130 wL	130 wSL	130 wD	130 wSD	130 wLD	130 wSLD
E P Y T	RELAY		✓		✓		✓		✓
	DISPLAY			✓	✓			✓	✓
	DUCT KIT					✓	✓	✓	✓
OPERATING PRINCIPLE GAS SAMPLING METHOD MEASURING RANGE ACCURACY RECOMMENDED CALIBRATION LEVEL SENSOR LIFE RESPONSE TIME OPERATING TEMPERATURE RANGE OPERATING HUMIDITY RANGE STORAGE TEMPERATURE POWER REQUIREMENT DIMENSIONS VOLTAGE OUT PUT (LINEAR) WEIGHT OPERATING LIFE EXPECTANCY WARRANTY STANDARDS		NON - DISPERSIVE INFRARED (NDIR) DIFFUSION OR SAMPLE DRAW 0-5000 PPM +/- 5% OF READING OR +/- 75 PPM, WHICHEVER IS GREATER 5 YEARS 10 YEARS LESS THAN 1MINUTE 0 - 50°C 0 - 90% RH (NON-CONDENSING) -30°C TO +60°C 20 - 28 V AC, 18 - 30 V DC 5.2"X3.2"X1.4" 0 - 10 V DC STANDARD 0.35 KG 10 YEARS TYPICAL 18 MONTHS AS PER CE , EN55011, EN61000 - 4 - 2 & EN61000 - 4 - 4							
Each Sensor + Controller is calibrated at concentrations of 400, 1200, 2000 & 5000 ppm CO ₂ using calibration gas whose accuracy is traceable to National Institute of Science & Technology (NIST, USA) certification.									

Installation options for ERV

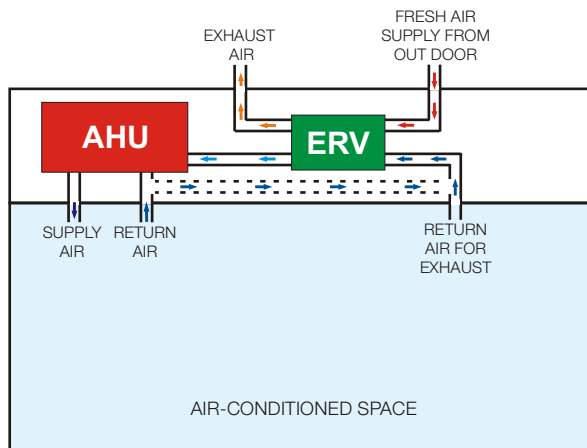
CEILING MOUNTED ERV INSTALLATION



ERV MOUNTED IN AC SPACE



ERV CONNECTED WITH AHU



ERV and/or CO₂ Sensor + Controller can be retrofitted in an existing A.C. System.