



Digital Inverter

Light commercial heat pump system with digital inverter



R410A



The Digital Inverter from Toshiba combines economy and ecology in a smart body. It offers state-of-the-art technology, exceptional energy savings, high performance, easy installation and flexible control. The latest digital inverter technology ensures smooth start-up and capacity control for optimum comfort. A choice of indoor units includes cassettes, ducted, under-ceiling, wall-mounted and floor-mounted units.



Key features

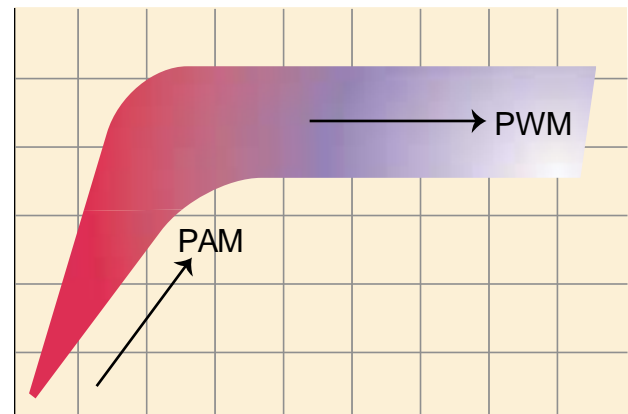
- Superior COP with significant savings in energy consumption
- High-performance operation, using digital inverter control systems
- Designed for use with non-ozone depleting refrigerant R410A
- Compact, space-saving design - the weight up to 35% lower than comparable models
- Easy installation and maintenance
- Reduced installation cost with smaller piping diameter
- Precise capacity control at all conditions
- Quiet operation with automatic quiet mode
- Performance tuning for optimised comfort
- The innovative inverter technology ensures precise temperature control
- The same outdoor unit is compatible with a choice of indoor units

Innovative inverter technology

The Digital Inverter uses the latest inverter technology, ensuring high power and high efficiency.

Inverter control, assisted by PAM (pulse amplitude modulation), increases compressor frequency to rapidly reach the desired temperature. Once the temperature has been reached, the inverter control uses PWM (pulse width modulation) to adjust the compressor speed and efficiently maintain precise temperature control without excessive power consumption (size 560 with PAM and PWM Digital Inverter, and size 800 with Digital Inverter).

By adopting this innovative inverter technology, the Toshiba Digital Inverter offers remarkable energy savings, efficient economical operation, and superior comfort.



PAM - Pulse Amplitude Modulation
PWM - Pulse Width Modulation

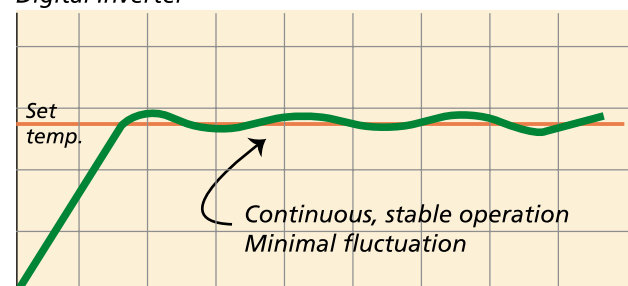
Inverter air conditioners for offices, shops, restaurants and other light commercial facilities

The digital inverter maintains precise room temperature control and creates a comfortable environment, as shown in the diagrams on the right.

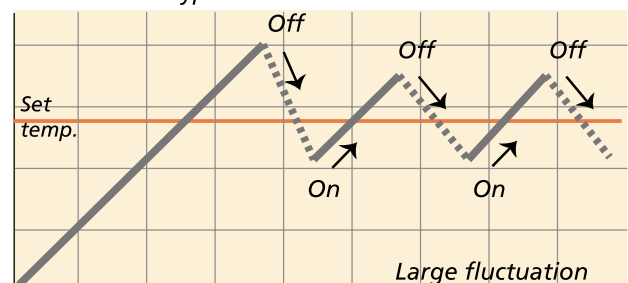
In conventional units, the compressor switches off once the set temperature is reached, and on again after the temperature drops. During the time it takes for the unit to switch on and off the room temperature fluctuates greatly.

With the digital inverter compressor power is reduced, once the desired temperature has been reached, and operation continues at a reduced state to maintain a stable room temperature with minimal fluctuations. This also results in significantly reduced noise levels.

Digital Inverter



Conventional type



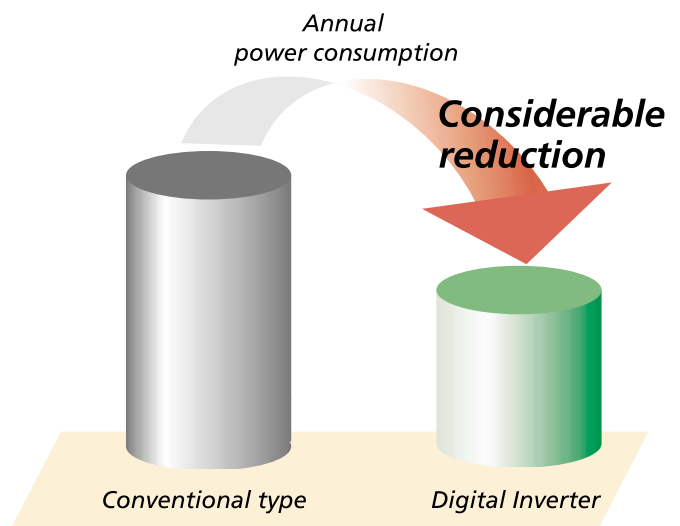
Economical, energy-efficient use

The Digital Inverter's powerful yet super-efficient inverter technology features energy-saving operation that considerably reduces the annual power consumption.

The variable compressor power levels maintain even room temperature control, so that little energy is wasted. Without the surging on and shutting off of the conventional units, the Toshiba Digital Inverter can operate as low as 1.5 kW*, saving a considerable amount of energy.

All this results in minimum power input levels and a superior COP (Coefficient of Performance) for all Toshiba Digital Inverter models.

* Example: heating and cooling capacity, using the 4-way cassette unit, size 500



Ecological and environmentally friendly

The Toshiba Digital Inverter uses the environmentally safe, non-ozone depleting refrigerant R410A.

In order to comply with current European legislation, Toshiba selected R410A refrigerant for the Digital Inverter units, an environmentally neutral refrigerant that protects our environment.

R410A refrigerant

Ozone depletion potential (ODP)	0
Refrigerant capability*	147%
Pressure loss*	56%

*in comparison with R22

Outdoor units

Flexible inverter control

Model numbers

RAV-SM560AT-E
 RAV-SM800AT-E
 RAV-SM1100AT-E*
 RAV-SM1400AT-E*

* available from autumn 2003



Innovative outdoor units

The Digital Inverter outdoor units are equipped with rotary compressors and an Intelligent Power Drive Unit (IPDU)** for increased reliability, efficiency and reduced noise levels.

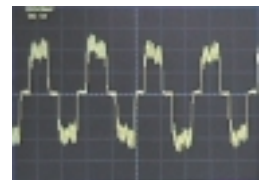
**size 800 only



Digital DC inverter



DC inverter



DC twin-rotary compressor

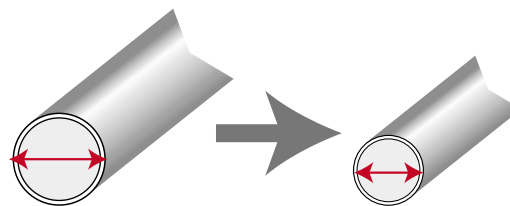


Brushless DC compressor motor



With vector IPDU control, noise emitted from the drive unit is greatly reduced by changing the motor current wave to a smooth sinusoidal pattern.

With their ultra-compact and lightweight design the new outdoor units guarantee easy and convenient installation. The outdoor units are fitted with smaller diameter piping than conventional models to further facilitate installation and reduce installation time and cost.



Conventional pipe 3/4"

Digital inverter pipe 5/8"

Technical data

Outdoor unit		RAV-SM560AT-E	RAV-SM800AT-E
Dimensions	mm		
Height		595	795
Width		780	900
Depth		270	320
Weight	kg	35	55
Sound power level, cooling	dB(A)	46	49
Sound power level, heating	dB(A)	48	50
Pipe connections		Flare	Flare
Gas	in	1/2	5/8
Liquid	in	1/4	3/8
Pipe length, maximum	m	30	50
Pipe length, chargeless	m	20	20
Height difference	m	30	30
Condensate pipe diameter (OD)	mm	16	16
Operating range, cooling	°C	-5/43	-5/43
Operating range, heating	°C	-15/15	-15/15
Power supply	V-ph-Hz	220/240-1-50	220/240-1-50

Four-way cassettes

Flexible, elegant styling

Model numbers

RAV-SM560UTE
RAV-SM800UTE
RAV-SM1100UTE*
RAV-SM1400UTE*

* available from autumn 2003



Other features

- Four-way adjustable grille direction
- High-lift drain (850 mm)
- Lightweight design

Clean ceiling

Innovative air flow control and the new panel design prevent dust from accumulating around the air outlets on the ceiling, and this means that your ceiling will stay clean.

Clean design

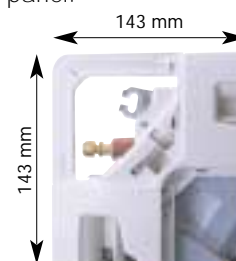
Both the flap and the grille are easily detachable and washable.



Easy installation and maintenance

Corner pockets

Corner pockets in all four panel corners permit easy installation and height adjustments. The opening is the largest in the industry and allows convenient access to the adjustment controls behind the panel.



Simple connections

The control box is easily removed by simply loosening two screws on the panel. All electrical parts and connections are simplified for easy installation and maintenance.



Accessible terminal stand for easy power supply and remote control connections

Technical data

		RAV-SM560AT-E RAV-SM560UT-E	RAV-SM800AT-E RAV-SM800UT-E
Outdoor unit			
Indoor unit			
Appliance type		Cooling/heating	Cooling/heating
Cooling mode		Air-cooled	Air-cooled
Cooling capacity	kW	5.3	7.1
Capacity range, min.-max.	kW	1.5-5.6	2.2-8.0
Power input, cooling	kW	1.76	2.34
EER, cooling	W/W	3.01	3.03
Heating capacity	kW	5.6	8.0
Capacity range, min.-max.	kW	1.5-6.3	2.2-9.0
Power input, heating	kW	1.44	2.32
EER, heating	W/W	3.90	3.45
Annual power consumption, cooling	kWh	880	1170
Energy label, cooling		B	B
Energy label, heating		A	B
Fan type		Turbo fan	Turbo fan
Air flow	l/s	292	333
Dimensions, height x width x depth	mm	256 x 840 x 840	256 x 840 x 840
Weight	kg	21	22
Panel dimensions, height x width x depth	mm	35 950 x 950	
Panel weight	kg	4,5	4,5
Sound power level, cooling/heating	dB(A)	45/45	47/47

Ducted units

Smart and versatile

Model numbers

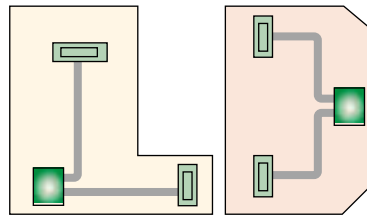
RAV-SM560BT-E
 RAV-SM800BT-E
 RAV-SM1100BT-E*
 RAV-SM1400BT-E*

* available from autumn 2003

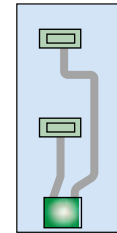


Wide range of applications

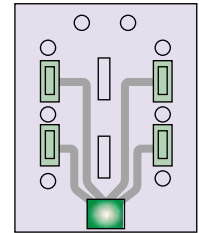
The use of ducts allows air outlets to be conveniently installed anywhere in the ceiling, eliminating the conspicuous presence of the air conditioner in the centre of the room. Not only can this be applied to a wide variety of layouts from narrow spaces to polygonal rooms, but it also greatly improves the aesthetics of a room, with its unobtrusive presence.



Polygonal rooms



Narrow rooms



Rooms with fixtures and obstacles

High static pressure

External static pressure can be raised as high as 98 Pa, so that all areas of the room can be reached for even temperature distribution, no matter how complex the layout.

High lift drain pump

The flexible condensate piping layout is made possible by a drain pump kit that raises drain piping up to 300 mm. This is available as an optional extra.

Technical data

Outdoor unit		RAV-SM560AT-E	RAV-SM800AT-E
Indoor unit		RAV-SM560BT-E	RAV-SM800BT-E
Appliance type		Cooling/heating	Cooling/heating
Cooling mode		Air-cooled	Air-cooled
Cooling capacity	kW	5.0	7.1
Capacity range, min.-max.	kW	1.5-5.6	2.2-8.0
Power input, cooling	kW	1.92	2.60
EER, cooling	W/W	2.60	2.73
Heating capacity	kW	5.6	8.0
Capacity range, min.-max.	kW	1.5-6.3	2.2-9.0
Power input, heating	kW	1.71	2.49
EER, heating	W/W	3.27	3.21
Annual power consumption, cooling	kWh	960	1300
Energy label, cooling		D	D
Energy label, heating		C	C
Fan type		Centrifugal	Centrifugal
Air flow	l/s	233	317
Dimensions, height x width x depth	mm	320 x 700 x 800 (+ 75)	320 x 1000 x 800 (+ 75)
Weight	kg	39	53
Sound power level, cooling/heating	dB(A)	55/55	56/56

High-wall units

Compact and stylish

Model numbers

RAV-SM560KRT-E
RAV-SM800KRT-E

* available from autumn 2003

Remote control options

A wired remote control unit (RBC-SR1-PE), a simple-function remote control (RBC-SR2-PE), and a weekly timer (RBC-WT1-PE) are also available.



Enhanced aesthetics

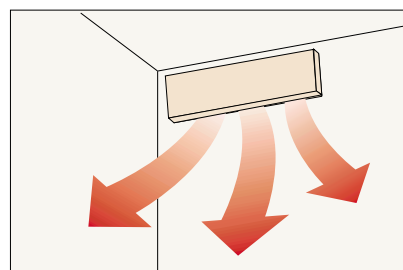
With its rounded shape and slim body, the compact and stylish design blends in with any room setting without interfering with the interior aesthetics of the room.

Filters for clean air

Air quality is greatly improved with a triple filter system. A washable filter first removes large solid particles and dust from the air. A passive electrostatic filter then entraps solid particles as small as 0.01 microns.

Auto louvre

The auto louvre mode assures even distribution of the air throughout the entire room.



Technical data

Outdoor unit		RAV-SM560AT-E	RAV-SM800AT-E
Indoor unit		RAV-SM560KRT-E	RAV-SM800KRT-E
Appliance type		Cooling/heating	Cooling/heating
Cooling mode		Air-cooled	Air-cooled
Cooling capacity	kW	5.1	6.7
Capacity range, min.-max.	kW	1.5-5.6	2.2-8.0
Power input, cooling	kW	1.74	2.72
EER, cooling	W/W	2.93	2.46
Heating capacity	kW	5.6	8.0
Capacity range, min.-max.	kW	1.5-6.3	2.2-9.0
Power input, heating	kW	1.70	2.67
EER, heating	W/W	3.29	3.00
Annual power consumption, cooling	kWh	870	1360
Energy label, cooling		C	E
Energy label, heating		C	D
Fan type		Centrifugal	Centrifugal
Air flow	l/s	233	308
Dimensions, height x width x depth	mm	298 x 998 x 208	298 x 998 x 208
Weight	kg	12	12
Sound power level, cooling/heating	dB(A)	52/52	58/58

Console and under-ceiling units

Quiet and flexible

Model numbers

RAV-SM560XTE*

RAV-SM800XTE*

* available from autumn 2003



Remote control

Ultimate flexibility

The console and under-ceiling indoor unit can be installed either at low wall level or under the ceiling, without any modifications or additional accessories. An optional 300-mm lift drain pump offers extra convenience. Both unit types can be installed with utmost ease, simply by removing the air intake grille and connecting the refrigerant piping and electrical wiring. At 23 kg, under-ceiling installation is easier than ever.

Natural air distribution

Airflow can be easily directed where desired. In under-ceiling applications, for example, airflow can be directed horizontally, parallel to the ceiling and far away from the room occupants, for non-intrusive, natural air distribution.



Effective air filtering

A triple-action air filtering system effectively improves the room air quality by first removing the large particles. Then solid particles down to 0.01 microns in size are removed by with a passive electrostatic filter, and then even smaller airborne pollutants with Toshiba's patented Zeolite-Plus filter.

Technical data

Outdoor unit		RAV-SM560AT-E	RAV-SM800AT-E
Indoor unit		RAV-SM560XT-E	RAV-SM800XT-E
Appliance type		Cooling/heating	Cooling/heating
Cooling mode		Air-cooled	Air-cooled
Cooling capacity	kW	5.0	6.8
Capacity range, min.-max.	kW	1.5-5.6	2.2-8.0
Power input, cooling	kW	1.81	2.82
EER, cooling	W/W	2.76	2.41
Heating capacity	kW	5.6	8.0
Capacity range, min.-max.	kW	1.5-6.3	2.2-9.0
Power input, heating	kW	1.60	2.66
EER, heating	W/W	3.50	3.01
Annual power consumption, cooling	kWh	910	1410
Energy label, cooling		D	E
Energy label, heating		B	D
Fan type		Centrifugal	Centrifugal
Air flow	l/s	tba	tba
Dimensions, height x width x depth	mm	208 x 1093 x 633	208 x 1093 x 633
Weight	kg	23	23
Sound power level, cooling/heating	dB(A)	56/56	59/59

Ceiling units

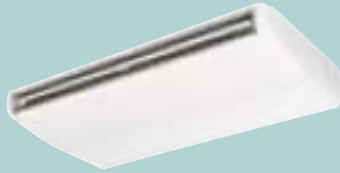
Quiet and comfortable

Model numbers

RAV-SM1100CTE*

RAV-SM1400CTE*

* available from autumn 2003



Comfortable ambience

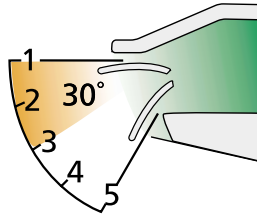
Extremely quiet

A new design is adopted to greatly reduce noise level to half that of conventional units. Operation is always whisper-quiet.

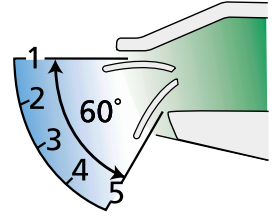
Flap control

Airflow angle is automatically set to the most suitable setting according to your cooling or heating needs, and an automatic swing mode enables air flow to reach all areas of the room and create a comfortable ambience.

In cooling mode, the flap automatically swings between the top three positions.



In heating mode, the flap automatically swings between all five positions.



Installation efficiency

Suspending the unit from the ceiling saves the trouble of complex installation procedures. It can be suspended simply by adjusting two screws on the intake grill. Therefore, compared to conventional units which involve a dozen screws, installation is further simplified.

Note: The provisional capacities for these units are 10.0 kW and 12.5 kW cooling capacity and 11.2 kW and 14.0 kW heating capacity. The validated capacities and all technical data will be available in autumn 2003.

All capacities in this document are based on Eurovent conditions:

Cooling

Entering indoor air temperature: 27°C db, 19°C wb, outdoor air temperature: 35°C db

Heating

Entering indoor air temperature: 20°C db, outdoor air temperature: 7°C db, 6°C wb

Remote control options



Model: RBC-AMT21E

Dimensions: H120 x W120 x D16 mm

- Applicable for 4-way cassette, ducted and ceiling type indoor units.
- A wired simple-function remote unit RBC-AS21E is also available.



Model: RBC-EXW21E

Dimensions: H120 x W120 x D16 mm

Applicable for 4-way cassette, ducted, and ceiling type indoor units.



Remote controller
Model: TCB-AX21U(W)-E














Remote receiver
Model: TCB-TC21LE

Main wired remote controller (option)

Toshiba Digital Inverter is operated with an easy-to-use remote controller that can control a group of up to eight indoor units. It has a 72-hour on/off timer, and an error diagnosis function that indicates errors to facilitate maintenance.

Some major functions:

-  Central controlling
-  Check function
-  Filter rise and fall
-  Service monitor/check
-  Ventilation
-  Timer setup
-  Service mode

R.C. No.	No. of indoor units in group
	Remote control sensor
	No operation
	Defrost
	Filter reset

Weekly timer (option)

A weekly schedule of operations can be registered using the optionally available weekly timer. Three different on/off time settings can be made for precise and effective operation of the Toshiba Digital Inverter.

Wireless remote controller (option)

A handy wireless remote controller is optionally available for Toshiba Digital Inverter 4-way cassette type indoor units.



Nemegeer Koeltechniek Knesselare

TOSHIBA
AIR CONDITIONING

United Technologies House
Guildford Road
Leatherhead, Surrey KT22 9UT
Telephone 01372 220240
Fax 01372 220241
Email general.enquiries@toshiba-ac.com
www.toshiba-aircon.co.uk