

# CPC COOPERATIVE PATENT CLASSIFICATION

## F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING (NOTE omitted)

### LIGHTING; HEATING

#### F24 HEATING; RANGES; VENTILATING (NOTE omitted)

#### F24F AIR-CONDITIONING; AIR-HUMIDIFICATION; VENTILATION; USE OF AIR CURRENTS FOR SCREENING (removing dirt or fumes from areas where they are produced [B08B 15/00](#); vertical ducts for carrying away waste gases from buildings [E04F 17/02](#); tops for chimneys or ventilating shafts, terminals for flues [F23L 17/02](#))

##### NOTES

1. This subclass covers treatment, e.g. purification, of air supplied to human living or working spaces in air conditioning systems or in room units.
2. In this subclass:
  - air-humidification as auxiliary treatment in air-conditioning, i.e. in units wherein the air is also either cooled or heated, is covered by groups [F24F 1/00](#) or [F24F 3/14](#);
  - air-humidification per se, e.g. "room humidifiers", is covered by group [F24F 6/00](#).
3. In this subclass, the following terms or expressions are used with the meanings indicated:
  - "air-conditioning" means the supply of air to or the treatment of air in rooms or spaces by means of cooling or a combination of cooling and a further kind of air treatment, e.g. humidification, heating or air purification;
  - "ventilation" means the supply of air to, or its extraction from, rooms or spaces, and systems for circulating air within rooms or spaces, but does not cover the mere treatment of air being supplied to, extracted from, or circulated within, rooms or spaces.
4. In this subclass, control or safety arrangements are classified in group [F24F 11/00](#). In order to indicate the type of air-treatment system in which these arrangements are used, further classification may be made in groups [F24F 1/00](#) - [F24F 9/00](#).

<b>1/00</b>	<b>Room units for air-conditioning, e.g. separate or self-contained units or units receiving primary air from a central station</b>	1/0047	. . . mounted in the ceiling or at the ceiling
		1/005	. . . mounted on the floor; standing on the floor
1/0003	. characterised by a split arrangement, wherein parts of the air-conditioning system, e.g. evaporator and condenser, are in separately located units	1/0053	. . . mounted at least partially below the floor; with air distribution below the floor
1/0007	. Indoor units, e.g. fan coil units ( <a href="#">self-contained units F24F 1/02</a> )	1/0057	. . . mounted in or on a wall
1/00073	. . {comprising a compressor in the indoor unit housing}	1/0059	. . characterised by heat exchangers
1/00075	. . {receiving air from a central station}	1/0063	. . . by the mounting or arrangement of the heat exchangers
1/00077	. . {receiving heat exchange fluid entering and leaving the unit as a liquid}	1/0067	. . . by the shape of the heat exchangers or of parts thereof, e.g. of their fins
1/0011	. . characterised by air outlets	1/0068	. . characterised by the arrangement of refrigerant piping outside the heat exchanger within the unit casing
1/0014	. . . having two or more outlet openings	1/0071	. . with means for purifying supplied air ( <a href="#">perfuming or deodorising means F24F 1/008</a> )
1/0018	. . characterised by fans ( <a href="#">with secondary air induced by injector action of the primary air F24F 1/01</a> )	1/0073	. . . characterised by the mounting or arrangement of filters
1/0022	. . . Centrifugal or radial fans	1/0076	. . . by electric means, e.g. ionisers or electrostatic separators
1/0025	. . . Cross-flow or tangential fans	1/008	. . with perfuming or deodorising means
1/0029	. . . Axial fans	1/0083	. . with dehumidification means
1/0033	. . . having two or more fans	1/0087	. . with humidification means
1/0035	. . characterised by introduction of outside air to the room	1/009	. . characterised by heating arrangements ( <a href="#">characterised by heat exchangers F24F 1/0059</a> )
1/0038	. . . in combination with simultaneous exhaustion of inside air	1/0093	. . . with additional radiant heat-discharging elements, e.g. electric heaters
1/0041	. . characterised by exhaustion of inside air from the room ( <a href="#">in combination with simultaneous introduction of outside air F24F 1/0038</a> )	1/0097	. . . using thermoelectric or thermomagnetic means, e.g. Peltier elements
1/0043	. . characterised by mounting arrangements		

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|-------------|---|-------------|--|
| 1/01        | • in which secondary air is induced by injector action of the primary air   | 1/20        | • • Electric components for separate outdoor units   |
| 1/02        | • Self-contained room units for air-conditioning, i.e. with all apparatus for treatment installed in a common casing  | 1/22        | • • • Arrangement or mounting thereof  |
| 1/022       | • • comprising a compressor cycle   | 1/24        | • • • Cooling of electric components   |
| 1/027       | • • • mounted in wall openings, e.g. in windows   | 1/26        | • • Refrigerant piping   |
| 1/028       | • • characterised by air supply means, e.g. fan casings, internal dampers or ducts (with secondary air induced by injector action of the primary air F24F 1/01)                                   | 1/28        | • • • for connecting several separate outdoor units  |
| 1/0284      | • • • with horizontally arranged fan axis   | 1/30        | • • • for use inside the separate outdoor units  |
| 1/0287      | • • • with vertically arranged fan axis   | 1/32        | • • • for connecting the separate outdoor units to indoor units  |
| 1/029       | • • characterised by the layout or mutual arrangement of components, e.g. of compressors or fans  | 1/34        | • • • Protection means thereof, e.g. covers for refrigerant pipes  |
| 1/03        | • • characterised by mounting arrangements  | 1/36        | • • Drip trays for outdoor units   |
| 1/031       | • • • penetrating a wall or window  | 1/38        | • • Fan details of outdoor units, e.g. bell-mouth shaped inlets or fan mountings   |
| 1/0314      | • • • mounted on a wall   | 1/40        | • • Vibration or noise prevention at outdoor units (for outdoor units compressors F24F 1/12)   |
| 1/0317      | • • • suspended from the ceiling  | 1/42        | • • characterised by the use of the condensate, e.g. for enhanced cooling  |
| 1/032       | • • characterised by heat exchangers  | 1/44        | • • characterised by the use of internal combustion engines  |
| 1/0323      | • • • by the mounting or arrangement of the heat exchangers   | 1/46        | • • Component arrangements in separate outdoor units   |
| 1/0325      | • • • by the shape of the heat exchangers or of parts thereof, e.g. of their fins   | 1/48        | • • • characterised by air airflow, e.g. inlet or outlet airflow   |
| 1/0326      | • • characterised by the arrangement of refrigerant piping outside the heat exchanger within the unit casing  | 1/50        | • • • • with outlet air in upward direction  |
| 1/0328      | • • with means for purifying supplied air (perfuming or deodorising means F24F 1/0355)  | 1/52        | • • • • with inlet and outlet arranged on the same side, e.g. for mounting in a wall opening   |
| 1/035       | • • • characterised by the mounting or arrangement of filters   | 1/54        | • • • • Inlet and outlet arranged on opposite sides  |
| 1/0353      | • • • by electric means, e.g. ionisers or electrostatic separators  | 1/56        | • • Casing or covers of separate outdoor units, e.g. fan guards  |
| 1/0355      | • • with perfuming or deodorising means   | 1/58        | • • • Separate protective covers for outdoor units, e.g. solar guards, snow shields or camouflage  |
| 1/0358      | • • with dehumidification means   | 1/60        | • • Arrangement or mounting of the outdoor unit  |
| 1/037       | • • with humidification means   | 1/62        | • • • Wall-mounted   |
| 1/0373      | • • characterised by heating arrangements (characterised by heat exchangers F24F 1/032)   | 1/64        | • • • Ceiling-mounted, e.g. below a balcony  |
| 1/0375      | • • • with additional radiant heat-discharging elements, e.g. electric heaters  | 1/66        | • • • under the floor level  |
| 1/0378      | • • • using thermoelectric or thermomagnetic means, e.g. Peltier elements   | 1/68        | • • • Arrangement of multiple separate outdoor units   |
| 1/039       | • • using water to enhance cooling, e.g. spraying onto condensers   | <b>3/00</b> | <b>Air-conditioning systems in which conditioned primary air is supplied from one or more central stations to distributing units in the rooms or spaces where it may receive secondary treatment; Apparatus specially designed for such systems (room units F24F 1/00)</b> |
| 1/04        | • • Arrangements for portability  | 3/001       | • {in which the air treatment in the central station takes place by means of a heat-pump or by means of a reversible cycle (reversible cycle for humidifying and drying air F24F 3/147)}   |
| 1/06        | • Separate outdoor units, e.g. outdoor unit to be linked to a separate room comprising a compressor and a heat exchanger  | 2003/003    | • {with primary air treatment in the central station and subsequent secondary air treatment in air treatment units located in or near the rooms}   |
| <b>NOTE</b> | In this group, the first place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place. | 2003/005    | • • {with a single air duct for transporting treated primary air from the central station to air treatment units located in or near the rooms}   |
| 1/08        | • • Compressors specially adapted for separate outdoor units  | 2003/006    | • • {with two air ducts for separately transporting treated hot and cold primary air from the central station to air treatment units located in or near the rooms}   |
| 1/10        | • • • Arrangement or mounting thereof   | 2003/008    | • {Supplying highly filtered air to a room or to a limited area within a room}   |
| 1/12        | • • • Vibration or noise prevention thereof   | 3/02        | • characterised by the pressure or velocity of the primary air   |
| 1/14        | • • Heat exchangers specially adapted for separate outdoor units  | 3/04        | • • operating with high pressure or high velocity  |
| 1/16        | • • • Arrangement or mounting thereof   | 3/044       | • Systems in which all treatment is given in the central station, i.e. all-air systems   |
| 1/18        | • • • characterised by their shape  |             |  |

3/0442	. . {with volume control at a constant temperature}	2003/1452	. . . . {heat extracted from the humid air for condensing is returned to the dried air}
3/0444	. . . {in which two airstreams are conducted from the central station via independent conduits to the space to be treated, of which one has a constant volume and a season-adapted temperature, while the other one is always cold and varies in volume}	2003/1458	. . . {using regenerators}
2003/0446	. . {with a single air duct for transporting treated air from the central station to the rooms}	2003/1464	. . . . {using rotating regenerators}
2003/0448	. . {with two air ducts for separately transporting treated hot and cold air from the central station to the rooms}	3/147	. . . with both heat and humidity transfer between supplied and exhausted air
3/048	. . with temperature control at constant rate of air-flow	3/153	. . . with subsequent heating, i.e. with the air, given the required humidity in the central station, passing a heating element to achieve the required temperature
3/052	. . . Multiple duct systems, e.g. systems in which hot and cold air are supplied by separate circuits from the central station to mixing chambers in the spaces to be conditioned	3/16	. . by purification, e.g. by filtering; by sterilisation; by ozonisation
3/0522	. . . . {in which warm or cold air from the central station is delivered via individual pipes to mixing chambers in the space to be treated, the cold air/warm air ratio being controlled by a thermostat in the space concerned, i.e. so-called Dual-duct System}	<b>WARNING</b>	
3/0525	. . . . {in which the air treated in the central station is reheated}	Group <a href="#">F24F 3/16</a> is impacted by reclassification into groups <a href="#">F24F 8/00</a> , <a href="#">F24F 8/20</a> , <a href="#">F24F 8/22</a> , <a href="#">F24F 8/24</a> , <a href="#">F24F 8/26</a> , <a href="#">F24F 8/28</a> , <a href="#">F24F 8/30</a> , <a href="#">F24F 8/40</a> , <a href="#">F24F 8/50</a> , <a href="#">F24F 8/60</a> , <a href="#">F24F 8/70</a> , <a href="#">F24F 8/80</a> , and <a href="#">F24F 8/95</a> .	
3/0527	. . . . {in which treated air having differing temperatures is conducted through independent conduits from the central station to various spaces to be treated, i.e. so-called "multi-Zone" systems ( <a href="#">F24F 3/0525</a> takes precedence)}	All groups listed in this Warning should be considered in order to perform a complete search.	
3/056	. . the air at least partially flowing over lighting fixtures, the heat of which is dissipated or used (outlets for directing or distributing air into rooms or spaces combined with lighting fixtures <a href="#">F24F 13/078</a> )	3/163	. . . Clean air work stations, i.e. selected areas within a space which filtered air is passed
3/06	. characterised by the arrangements for the supply of heat-exchange fluid for the subsequent treatment of primary air in the room units	3/167	. . . Clean rooms, i.e. enclosed spaces in which a uniform flow of filtered air is distributed (air distribution by perforated walls <a href="#">F24F 7/10</a> )
3/065	. . {with a plurality of evaporators or condensers}	<b>5/00</b>	<b>Air-conditioning systems or apparatus not covered by <a href="#">F24F 1/00</a> or <a href="#">F24F 3/00</a> {, e.g. using solar heat or combined with household units such as an oven or water heater}</b>
3/08	. . with separate supply and return lines for hot and cold heat-exchange fluids {i.e. so-called "4-conduit" system}	5/0003	. {Exclusively-fluid systems}
3/10	. . with separate supply lines and common return line for hot and cold heat-exchange fluids {i.e. so-called "3-conduit" system}	5/0007	. {cooling apparatus specially adapted for use in air-conditioning ( <a href="#">F24F 5/0046</a> takes precedence)}
3/12	. characterised by the treatment of the air otherwise than by heating and cooling	5/001	. . {Compression cycle type}
3/14	. . by humidification; by dehumidification	5/0014	. . {using absorption or desorption}
3/1405	. . . {in which the humidity of the air is exclusively affected by contact with the evaporator of a closed-circuit cooling system or heat pump circuit}	5/0017	. . {using cold storage bodies, e.g. ice}
3/1411	. . . {by absorbing or adsorbing water, e.g. using an hygroscopic desiccant}	5/0021	. . . {using phase change material [PCM] for storage}
3/1417	. . . . {with liquid hygroscopic desiccants}	2005/0025	. . . {using heat exchange fluid storage tanks}
3/1423	. . . . {with a moving bed of solid desiccants, e.g. a rotary wheel supporting solid desiccants}	2005/0028	. . . {using hydridable metals as energy storage media}
3/1429	. . . . {alternatively operating a heat exchanger in an absorbing/adsorbing mode and a heat exchanger in a regeneration mode}	2005/0032	. . . {Systems storing energy during the night}
2003/1435	. . . {comprising semi-permeable membrane}	5/0035	. . {using evaporation}
2003/144	. . . {by dehumidification only}	2005/0039	. . {using a cryogen, e.g. CO <sub>2</sub> liquid or N <sub>2</sub> liquid}
2003/1446	. . . . {by condensing}	5/0042	. {characterised by the application of thermo-electric units or the Peltier effect}
		5/0046	. {using natural energy, e.g. solar energy, energy from the ground}
		5/005	. . {using energy from the ground by air circulation, e.g. "Canadian well"}
		2005/0053	. . {receiving heat-exchange fluid from a well}
		2005/0057	. . {receiving heat-exchange fluid from a closed circuit in the ground}
		2005/006	. . {receiving heat-exchange fluid from the drinking or sanitary water supply circuit}
		2005/0064	. . {using solar energy}
		2005/0067	. . . {with photovoltaic panels}
		5/0071	. {adapted for use in covered swimming pools}
		5/0075	. {Systems using thermal walls, e.g. double window}
		2005/0078	. . {Double windows}
		2005/0082	. . {Facades}

5/0085	. {Systems using a compressed air circuit}	7/003	. in combination with air cleaning
5/0089	. {Systems using radiation from walls or panels}		
5/0092	. . {ceilings, e.g. cool ceilings}		
5/0096	. {combined with domestic apparatus}		
<b>6/00</b>	<b>Air-humidification {, e.g. cooling by humidification}</b>		
2006/001	. {using a water curtain}		
2006/003	. {using a decorative fountain}		
2006/005	. {using plants}		
2006/006	. {with water treatment}		
2006/008	. {Air-humidifier with water reservoir}		
6/02	. by evaporation of water in the air		
6/025	. . {using electrical heating means ( <a href="#">F24F 6/105</a> takes precedence)}	2007/004	. {Natural ventilation using convection}
6/04	. . using stationary unheated wet elements		
6/043	. . . {with self-sucking action, e.g. wicks}		
2006/046	. . . {with a water pump}		
6/06	. . using moving unheated wet elements		
2006/065	. . . {using slowly rotating discs for evaporation}		
6/08	. . using heated wet elements	2007/005	. {Cyclic ventilation, e.g. alternating air supply volume or reversing flow direction}
6/10	. . . heated electrically		
6/105	. . . . {using the heat of lamps}		
6/12	. by forming water dispersions in the air		
6/14	. . using nozzles		
2006/143	. . . {using pressurised air for spraying}		
2006/146	. . . {using pressurised water for spraying}		
6/16	. . using rotating elements		
6/18	. by injection of steam into the air		
<b>7/00</b>	<b>Ventilation</b>		
	<b><u>WARNING</u></b>		
	Group <a href="#">F24F 7/00</a> is impacted by reclassification into group <a href="#">F24F 7/003</a> .		
	Groups <a href="#">F24F 7/00</a> and <a href="#">F24F 7/003</a> should be considered in order to perform a complete search.		
2007/001	. {with exhausting air ducts}	7/007	. with forced flow ( <a href="#">using ducting systems F24F 7/06</a> )
	<b><u>WARNING</u></b>	7/013	. . using wall or window fans, displacing air through the wall or window
	Group <a href="#">F24F 2007/001</a> is impacted by reclassification into group <a href="#">F24F 7/003</a> .	7/02	. Roof ventilation ( <a href="#">ventilation of roof coverings E04D</a> )
	Groups <a href="#">F24F 2007/001</a> and <a href="#">F24F 7/003</a> should be considered in order to perform a complete search.	7/025	. . {with forced air circulation by means of a built-in ventilator}
2007/002	. . {Junction box, e.g. for ducts from kitchen, toilet or bathroom}	7/04	. with ducting systems {, e.g. by double walls; with natural circulation ( <a href="#">F24F 7/02</a> takes precedence)}
	<b><u>WARNING</u></b>	7/06	. . with forced air circulation, e.g. by fan {positioning of a ventilator in or against a conduit}
	Group <a href="#">F24F 2007/002</a> is impacted by reclassification into group <a href="#">F24F 7/003</a> .	7/065	. . . {fan combined with single duct; mounting arrangements of a fan in a duct}
	Groups <a href="#">F24F 2007/002</a> and <a href="#">F24F 7/003</a> should be considered in order to perform a complete search.	7/08	. . . with separate ducts for supplied and exhausted air {with provisions for reversal of the input and output systems}
2007/0025	. {using vent ports in a wall}	7/10	. . . with air supply, or exhaust, through perforated wall, floor or ceiling ( <a href="#">outlet members for directing or distributing air {into rooms or spaces, e.g. ceiling air-diffusers} F24F 13/06</a> )
	<b><u>WARNING</u></b>	<b>8/00</b>	<b>Treatment, e.g. purification, of air supplied to human living or working spaces otherwise than by heating, cooling, humidifying or drying</b>
	Group <a href="#">F24F 2007/0025</a> is impacted by reclassification into group <a href="#">F24F 7/003</a> .		<b><u>WARNING</u></b>
	Groups <a href="#">F24F 2007/0025</a> and <a href="#">F24F 7/003</a> should be considered in order to perform a complete search.		Groups <a href="#">F24F 8/00</a> , <a href="#">F24F 8/20</a> , <a href="#">F24F 8/22</a> , <a href="#">F24F 8/24</a> , <a href="#">F24F 8/26</a> , <a href="#">F24F 8/28</a> , <a href="#">F24F 8/30</a> , <a href="#">F24F 8/40</a> , <a href="#">F24F 8/50</a> , <a href="#">F24F 8/60</a> , <a href="#">F24F 8/70</a> , <a href="#">F24F 8/80</a> , and <a href="#">F24F 8/95</a> are incomplete pending reclassification of documents from group <a href="#">F24F 3/16</a> .
			All groups listed in this Warning should be considered in order to perform a complete search.

- 8/10 . by separation, e.g. by filtering

**WARNING**

Group [F24F 8/10](#) is impacted by reclassification into groups [F24F 8/108](#), [F24F 8/117](#), [F24F 8/125](#), [F24F 8/133](#), [F24F 8/142](#), [F24F 8/15](#), [F24F 8/158](#), [F24F 8/167](#), [F24F 8/175](#), [F24F 8/183](#), [F24F 8/90](#), [F24F 8/96](#), [F24F 8/97](#), [F24F 8/98](#), and [F24F 8/99](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 8/108 . . using dry filter elements

**WARNING**

Group [F24F 8/108](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Groups [F24F 8/10](#) and [F24F 8/108](#) should be considered in order to perform a complete search.

- 8/117 . . using wet filtering

**WARNING**

Group [F24F 8/117](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Group [F24F 8/117](#) is also impacted by reclassification into groups [F24F 8/125](#), [F24F 8/133](#), and [F24F 8/142](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 8/125 . . . using wet filter elements

**WARNING**

Group [F24F 8/125](#) is incomplete pending reclassification of documents from groups [F24F 8/10](#) and [F24F 8/117](#).

Groups [F24F 8/10](#), [F24F 8/117](#), and [F24F 8/125](#) should be considered in order to perform a complete search.

- 8/133 . . . by direct contact with liquid, e.g. with sprayed liquid

**WARNING**

Group [F24F 8/133](#) is incomplete pending reclassification of documents from groups [F24F 8/10](#) and [F24F 8/117](#).

Groups [F24F 8/10](#), [F24F 8/117](#), and [F24F 8/133](#) should be considered in order to perform a complete search.

- 8/142 . . . Treatment of used liquid, e.g. cleaning for recycling

**WARNING**

Group [F24F 8/142](#) is incomplete pending reclassification of documents from groups [F24F 8/10](#) and [F24F 8/117](#).

Groups [F24F 8/10](#), [F24F 8/117](#), and [F24F 8/142](#) should be considered in order to perform a complete search.

- 8/15 . . by chemical means

**WARNING**

Groups [F24F 8/15](#) - [F24F 8/167](#) are incomplete pending reclassification of documents from group [F24F 8/10](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 8/158 . . . using active carbon

- 8/167 . . . using catalytic reactions

- 8/175 . . using biological materials, plants or microorganisms

**WARNING**

Group [F24F 8/175](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Groups [F24F 8/10](#) and [F24F 8/175](#) should be considered in order to perform a complete search.

- 8/183 . . by centrifugal separation, e.g. using vortices

**WARNING**

Group [F24F 8/183](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Groups [F24F 8/10](#) and [F24F 8/183](#) should be considered in order to perform a complete search.

- 8/192 . . by electrical means, e.g. by applying electrostatic fields or high voltages

- 8/194 . . . {by filtering using high voltage}

- 8/20 . by sterilisation

- 8/22 . . using UV light

- 8/24 . . using sterilising media

- 8/26 . . . using ozone

- 8/28 . . specially adapted for combatting or avoiding Legionella bacteria

- 8/30 . by ionisation

- 8/40 . by ozonisation (for sterilisation [F24F 8/26](#))

- 8/50 . by odourisation

- 8/60 . by adding oxygen

- 8/70 . by removing radon

- 8/80 . Self-contained air purifiers



8/90	<ul style="list-style-type: none"> <li>• Cleaning of purification apparatus</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24F 8/90</a> is incomplete pending reclassification of documents from group <a href="#">F24F 8/10</a>.</p> <p>Groups <a href="#">F24F 8/10</a> and <a href="#">F24F 8/90</a> should be considered in order to perform a complete search.</p>	2011/0005	<ul style="list-style-type: none"> <li>• . . . {to create underpressure in a room, keeping contamination inside}</li> </ul>
8/95	<ul style="list-style-type: none"> <li>• specially adapted for specific purposes</li> </ul>	2011/0006	<ul style="list-style-type: none"> <li>• . . {using low temperature external supply air to assist cooling}</li> </ul>
8/96	<ul style="list-style-type: none"> <li>• . for removing pollen</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24F 8/96</a> is incomplete pending reclassification of documents from group <a href="#">F24F 8/10</a>.</p> <p>Groups <a href="#">F24F 8/10</a> and <a href="#">F24F 8/96</a> should be considered in order to perform a complete search.</p>	11/0008	<ul style="list-style-type: none"> <li>• {for air-humidification (<a href="#">F24F 11/30</a> takes precedence)}</li> </ul>
8/97	<ul style="list-style-type: none"> <li>• . for removing tobacco smoke</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24F 8/97</a> is incomplete pending reclassification of documents from group <a href="#">F24F 8/10</a>.</p> <p>Groups <a href="#">F24F 8/10</a> and <a href="#">F24F 8/97</a> should be considered in order to perform a complete search.</p>	11/30	<ul style="list-style-type: none"> <li>• for purposes related to the operation of the system, e.g. for safety or monitoring</li> </ul>
8/98	<ul style="list-style-type: none"> <li>• . for removing ozone</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24F 8/98</a> is incomplete pending reclassification of documents from group <a href="#">F24F 8/10</a>.</p> <p>Groups <a href="#">F24F 8/10</a> and <a href="#">F24F 8/98</a> should be considered in order to perform a complete search.</p>	11/32	<ul style="list-style-type: none"> <li>• . Responding to malfunctions or emergencies</li> </ul>
8/99	<ul style="list-style-type: none"> <li>• . for treating air sourced from urban areas, e.g. from streets</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24F 8/99</a> is incomplete pending reclassification of documents from group <a href="#">F24F 8/10</a>.</p> <p>Groups <a href="#">F24F 8/10</a> and <a href="#">F24F 8/99</a> should be considered in order to perform a complete search.</p>	11/33	<ul style="list-style-type: none"> <li>• . . . to fire, excessive heat or smoke</li> </ul>
9/00	<p><b>Use of air currents for screening, e.g. air curtains</b></p>	11/34	<ul style="list-style-type: none"> <li>• . . . . by opening air passages</li> </ul>
2009/002	<ul style="list-style-type: none"> <li>• {Room dividers}</li> </ul>	11/35	<ul style="list-style-type: none"> <li>• . . . . by closing air passages</li> </ul>
2009/005	<ul style="list-style-type: none"> <li>• {combined with a door}</li> </ul>	11/36	<ul style="list-style-type: none"> <li>• . . . to leakage of heat-exchange fluid</li> </ul>
2009/007	<ul style="list-style-type: none"> <li>• {using more than one jet or band in the air curtain}</li> </ul>	11/37	<ul style="list-style-type: none"> <li>• . . Resuming operation, e.g. after power outages; Emergency starting</li> </ul>
11/00	<p><b>Control or safety arrangements</b></p> <p><b>NOTE</b></p> <p>In this group, it is desirable to add the indexing codes of groups <a href="#">F24F 2110/00</a> – <a href="#">F24F 2140/00</a>.</p>	11/38	<ul style="list-style-type: none"> <li>• . . . Failure diagnosis</li> </ul>
11/0001	<ul style="list-style-type: none"> <li>• {for ventilation (<a href="#">F24F 11/30</a> takes precedence)}</li> </ul>	11/39	<ul style="list-style-type: none"> <li>• . . . Monitoring filter performance</li> </ul>
2011/0002	<ul style="list-style-type: none"> <li>• . . {for admittance of outside air}</li> </ul>	11/41	<ul style="list-style-type: none"> <li>• . Defrosting; Preventing freezing</li> </ul>
2011/0004	<ul style="list-style-type: none"> <li>• . . . {to create overpressure in a room}</li> </ul>	11/42	<ul style="list-style-type: none"> <li>• . . . of outdoor units</li> </ul>
		11/43	<ul style="list-style-type: none"> <li>• . . . of indoor units</li> </ul>
		11/46	<ul style="list-style-type: none"> <li>• . Improving electric energy efficiency or saving</li> </ul>
		11/47	<ul style="list-style-type: none"> <li>• . . Responding to energy costs</li> </ul>
		11/48	<ul style="list-style-type: none"> <li>• . prior to normal operation, e.g. pre-heating or pre-cooling</li> </ul>
		11/49	<ul style="list-style-type: none"> <li>• . ensuring correct operation, e.g. by trial operation or configuration checks</li> </ul>
		11/50	<ul style="list-style-type: none"> <li>• characterised by user interfaces or communication</li> </ul>
		11/52	<ul style="list-style-type: none"> <li>• . Indication arrangements, e.g. displays</li> </ul>
		11/523	<ul style="list-style-type: none"> <li>• . . . for displaying temperature data</li> </ul>
		11/526	<ul style="list-style-type: none"> <li>• . . . giving audible indications</li> </ul>
		11/54	<ul style="list-style-type: none"> <li>• . using one central controller connected to several sub-controllers</li> </ul>
		11/56	<ul style="list-style-type: none"> <li>• . Remote control</li> </ul>
		11/57	<ul style="list-style-type: none"> <li>• . . . using telephone networks</li> </ul>
		11/58	<ul style="list-style-type: none"> <li>• . . . using Internet communication</li> </ul>
		11/59	<ul style="list-style-type: none"> <li>• . . . for presetting</li> </ul>
		11/61	<ul style="list-style-type: none"> <li>• . using timers</li> </ul>
		11/62	<ul style="list-style-type: none"> <li>• characterised by the type of control or by internal processing, e.g. using fuzzy logic, adaptive control or estimation of values</li> </ul>
		11/63	<ul style="list-style-type: none"> <li>• . Electronic processing</li> </ul>
		11/64	<ul style="list-style-type: none"> <li>• . . . using pre-stored data</li> </ul>
		11/65	<ul style="list-style-type: none"> <li>• . . . for selecting an operating mode</li> </ul>
		11/66	<ul style="list-style-type: none"> <li>• . . . . Sleep mode</li> </ul>
		11/67	<ul style="list-style-type: none"> <li>• . . . . Switching between heating and cooling modes</li> </ul>
		11/70	<ul style="list-style-type: none"> <li>• Control systems characterised by their outputs; Constructional details thereof</li> </ul>
		11/72	<ul style="list-style-type: none"> <li>• . for controlling the supply of treated air, e.g. its pressure</li> </ul>
		11/74	<ul style="list-style-type: none"> <li>• . . . for controlling air flow rate or air velocity</li> </ul>
		11/745	<ul style="list-style-type: none"> <li>• . . . . {the air flow rate increasing with an increase of air-current or wind pressure}</li> </ul>
		11/75	<ul style="list-style-type: none"> <li>• . . . . for maintaining constant air flow rate or air velocity</li> </ul>
		11/755	<ul style="list-style-type: none"> <li>• . . . . for cyclical variation of air flow rate or air velocity</li> </ul>
		11/76	<ul style="list-style-type: none"> <li>• . . . . by means responsive to temperature, e.g. bimetal springs</li> </ul>
		11/77	<ul style="list-style-type: none"> <li>• . . . . by controlling the speed of ventilators</li> </ul>
		11/79	<ul style="list-style-type: none"> <li>• . . . for controlling the direction of the supplied air</li> </ul>
		11/80	<ul style="list-style-type: none"> <li>• . for controlling the temperature of the supplied air</li> </ul>

11/81	. . . by controlling the air supply to heat-exchangers or bypass channels	13/068	. . . formed as perforated walls, ceilings or floors ( <a href="#">F24F 13/078 takes precedence</a> )
11/83	. . . by controlling the supply of heat-exchange fluids to heat-exchangers	13/072	. . . of elongated shape, e.g. between ceiling panels
11/84	. . . . using valves	13/075	. . . having parallel rods or lamellae directing the outflow, e.g. the rods or lamellae being individually adjustable ( <a href="#">F24F 13/072 takes precedence</a> )
11/85	. . . . using variable-flow pumps	13/078	. . . combined with lighting fixtures
11/86	. . . by controlling compressors within refrigeration or heat pump circuits	13/08	. Air-flow control members, e.g. louveres, grilles, flaps or guide plates ( <a href="#">F24F 7/013</a> , <a href="#">F24F 13/06 take precedence</a> )
11/87	. . . by controlling absorption or discharge of heat in outdoor units	13/081	. . {for guiding air around a curve}
11/871	. . . . by controlling outdoor fans	13/082	. . {Grilles, registers or guards}
11/873	. . . by controlling refrigerant heaters	13/084	. . . {with mounting arrangements, e.g. snap fasteners for mounting to the wall or duct}
11/875	. . . by controlling heat-storage apparatus	13/085	. . . {including an air filter}
11/88	. Electrical aspects, e.g. circuits	2013/087	. . . {using inflatable bellows}
11/89	. Arrangement or mounting of control or safety devices	2013/088	. . . {Air-flow straightener}
<b>12/00</b>	<b>Use of energy recovery systems in air conditioning, ventilation or screening (with both heat and humidity transfer between supplied and exhausted air <a href="#">F24F 3/147</a>)</b>	13/10	. . movable, e.g. dampers
12/001	. {with heat-exchange between supplied and exhausted air}	13/105	. . . {composed of diaphragms or segments}
12/002	. . {using an intermediate heat-transfer fluid}	13/12	. . . built up of sliding members
12/003	. . . {using a heat pump}	13/14	. . . built up of tilting members, e.g. louver
2012/005	. . . {using heat pipes}	13/1406	. . . . {characterised by sealing means}
12/006	. . {using an air-to-air heat exchanger ( <a href="#">F24F 12/002 takes precedence</a> )}	13/1413	. . . . {using more than one tilting member, e.g. with several pivoting blades ( <a href="#">F24F 13/15 takes precedence</a> )}
2012/007	. . {using a by-pass for bypassing the heat-exchanger}	13/142	. . . . {using pivoting blades with intersecting axles}
2012/008	. . {cyclic routing supply and exhaust air}	13/1426	. . . . {characterised by actuating means}
<b>13/00</b>	<b>Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening</b>	2013/1433	. . . . . {with electric motors}
13/02	. Ducting arrangements	2013/144	. . . . . {with thermoactuators}
13/0209	. . {characterised by their connecting means, e.g. flanges}	2013/1446	. . . . . {with gearings}
13/0218	. . {Flexible soft ducts, e.g. ducts made of permeable textiles}	2013/1453	. . . . . {with cables, e.g. bowden cables}
13/0227	. . {using parts of the building, e.g. air ducts inside the floor, walls or ceiling of a building}	2013/146	. . . . . {with springs}
13/0236	. . {with ducts including air distributors, e.g. air collecting boxes with at least three openings}	2013/1466	. . . . . {with pneumatic means}
13/0245	. . {Manufacturing or assembly of air ducts; Methods therefor}	2013/1473	. . . . . {with cams or levers}
13/0254	. . {characterised by their mounting means, e.g. supports}	2013/148	. . . . . {with magnets}
13/0263	. . {Insulation for air ducts}	13/1486	. . . . . {characterised by bearings, pivots or hinges}
13/0272	. . {Modules for easy installation or transport}	2013/1493	. . . . . {using an elastic membrane}
13/0281	. . {Multilayer duct}	13/15	. . . . . with parallel simultaneously tiltable lamellae
13/029	. . {Duct comprising an opening for inspection, e.g. manhole}	13/16	. . . built up of parallelly-movable plates
13/04	. . Air-mixing units ( <a href="#">F24F 13/06 takes precedence</a> )	13/18	. . specially adapted for insertion in flat panels, e.g. in door or window-pane
13/06	. . Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser	13/20	. Casings or covers
13/0604	. . . {integrated in or forming part of furniture}	2013/202	. . {Mounting a compressor unit therein}
2013/0608	. . . {Perforated ducts}	2013/205	. . {Mounting a ventilator fan therein}
2013/0612	. . . {Induction nozzles without swirl means}	2013/207	. . {with control knobs; Mounting controlling members or control units therein}
2013/0616	. . . {Outlets that have intake openings}	13/22	. Means for preventing condensation or evacuating condensate
13/062	. . . having one or more bowls or cones diverging in the flow direction	2013/221	. . {to avoid the formation of condensate, e.g. dew}
13/065	. . . formed as cylindrical or spherical bodies which are rotatable	13/222	. . {for evacuating condensate}
		13/224	. . . {in a window-type room air conditioner}
		2013/225	. . . {by evaporating the condensate in the cooling medium, e.g. in air flow from the condenser}
		2013/227	. . . {Condensate pipe for drainage of condensate from the evaporator}
		2013/228	. . {Treatment of condensate, e.g. sterilising}
		13/24	. Means for preventing or suppressing noise
		2013/242	. . {Sound-absorbing material}
		2013/245	. . {using resonance}
		2013/247	. . {Active noise-suppression}

- 13/26 . Arrangements for air-circulation by means of induction, e.g. by fluid coupling or thermal effect
- 13/28 . Arrangement or mounting of filters
- 13/30 . Arrangement or mounting of heat-exchangers
- 13/32 . Supports for air-conditioning, air-humidification or ventilation units

**Indexing scheme associated with group F24F 11/00, relating to control inputs, e.g. measured or estimated values or parameters**

**2110/00 Control inputs relating to air properties**

- 2110/10 . Temperature
- 2110/12 . . of the outside air
- 2110/20 . Humidity
- 2110/22 . . of the outside air
- 2110/30 . Velocity
- 2110/32 . . of the outside air
- 2110/40 . Pressure, e.g. wind pressure
- 2110/50 . Air quality properties
- 2110/52 . . of the outside air
- 2110/60 . . Odour
- 2110/62 . . Tobacco smoke
- 2110/64 . . Airborne particle content
- 2110/65 . . Concentration of specific substances or contaminants
- 2110/66 . . . Volatile organic compounds [VOC]
- 2110/68 . . . Radon
- 2110/70 . . . Carbon dioxide
- 2110/72 . . . Carbon monoxide
- 2110/74 . . . Ozone
- 2110/76 . . . Oxygen
- 2110/80 . . Electric charge

**2120/00 Control inputs relating to users or occupants**

- 2120/10 . Occupancy
- 2120/12 . . Position of occupants
- 2120/14 . . Activity of occupants
- 2120/20 . Feedback from users

**2130/00 Control inputs relating to environmental factors not covered by group F24F 2110/00**

- 2130/10 . Weather information or forecasts
- 2130/20 . Sunlight
- 2130/30 . Artificial light
- 2130/40 . Noise

**2140/00 Control inputs relating to system states**

- 2140/10 . Pressure
- 2140/12 . . Heat-exchange fluid pressure
- 2140/20 . Heat-exchange fluid temperature
- 2140/30 . Condensation of water from cooled air
- 2140/40 . Damper positions, e.g. open or closed
- 2140/50 . Load
- 2140/60 . Energy consumption

**2203/00 Devices or apparatus used for air treatment**

- 2203/02 . System or Device comprising a heat pump as a subsystem, e.g. combined with humidification/dehumidification, heating, natural energy or with hybrid system
- 2203/021 . . Compression cycle
- 2203/023 . . . with turbine used for expansion
- 2203/025 . . . with turbine for compression

- 2203/026 . . Absorption - desorption cycle
- 2203/028 . . . using a solid absorbing medium
- 2203/10 . Rotary wheel
- 2203/1004 . . Bearings or driving means
- 2203/1008 . . comprising a by-pass channel
- 2203/1012 . . Details of the casing or cover
- 2203/1016 . . combined with another type of cooling principle, e.g. compression cycle
- 2203/102 . . combined with a heat pipe
- 2203/1024 . . combined with a humidifier
- 2203/1028 . . combined with a spraying device
- 2203/1032 . . Desiccant wheel
- 2203/1036 . . . Details
- 2203/104 . . Heat exchanger wheel
- 2203/1044 . . performing other movements, e.g. sliding
- 2203/1048 . . Geometric details
- 2203/1052 . . comprising a non-axial air flow
- 2203/1056 . . comprising a reheater
- 2203/106 . . . Electrical reheater
- 2203/1064 . . . Gas fired reheater
- 2203/1068 . . comprising one rotor
- 2203/1072 . . comprising two rotors
- 2203/1076 . . comprising three rotors
- 2203/108 . . comprising rotor parts shaped in sector form
- 2203/1084 . . comprising two flow rotor segments
- 2203/1088 . . comprising three flow rotor segments
- 2203/1092 . . comprising four flow rotor segments
- 2203/1096 . . comprising sealing means
- 2203/12 . Dehumidifying or humidifying belt type

**Air-conditioning**

**2221/00 Details or features not otherwise provided for**

- 2221/02 . combined with lighting fixtures
- 2221/08 . Installation or apparatus for use in sport halls, e.g. swimming pools, ice rings
- 2221/10 . combined with, or integrated in, furniture
- 2221/12 . transportable
- 2221/125 . . mounted on wheels
- 2221/14 . mounted on the ceiling
- 2221/16 . mounted on the roof
- 2221/17 . mounted in a wall
- 2221/18 . combined with domestic apparatus
- 2221/183 . . combined with a hot-water boiler
- 2221/186 . . combined with a fireplace
- 2221/20 . mounted in or close to a window
- 2221/22 . Cleaning ducts or apparatus
- 2221/225 . . using a liquid
- 2221/26 . improving the aesthetic appearance
- 2221/28 . using the Coanda effect
- 2221/30 . comprising fireproof material
- 2221/32 . preventing human errors during the installation, use or maintenance, e.g. goofy proof
- 2221/34 . Heater, e.g. gas burner, electric air heater
- 2221/36 . Modules, e.g. for an easy mounting or transport
- 2221/38 . Personalised air distribution
- 2221/40 . HVAC with raised floors
- 2221/42 . Mobile autonomous air conditioner, e.g. robots
- 2221/44 . Protection from terrorism or theft
- 2221/46 . Air flow forming a vortex
- 2221/48 . HVAC for a wine cellar



- 2221/50 . HVAC for high buildings, e.g. thermal or pressure differences
- 2221/52 . Weather protecting means, e.g. against wind, rain or snow
- 2221/54 . Heating and cooling, simultaneously or alternatively
- 2221/56 . Cooling being a secondary aspect