

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](#).

1/00	Room units for air-conditioning, e.g. separate or self-contained units or units receiving primary air from a central station	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 (self-contained units F24F 1/02)	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 (perfuming or deodorising means F24F 1/008)
1/0018	. . characterised by fans (with secondary air induced by injector action of the primary air F24F 1/01)	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 (characterised by heat exchangers F24F 1/0059)
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 (in combination with simultaneous introduction of outside air F24F 1/0038)	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 | 3/00 | 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) |
| 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} |
| NOTE | 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}	WARNING	
3/0525	. . . . {in which the air treated in the central station is reheated}	Group F24F 3/16 is impacted by reclassification into groups F24F 8/00 , F24F 8/20 , F24F 8/22 , F24F 8/24 , F24F 8/26 , F24F 8/28 , F24F 8/30 , F24F 8/40 , F24F 8/50 , F24F 8/60 , F24F 8/70 , F24F 8/80 , and F24F 8/95 .	
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 (F24F 3/0525 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 F24F 13/078)	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 F24F 7/10)
3/065	. . {with a plurality of evaporators or condensers}	5/00	Air-conditioning systems or apparatus not covered by F24F 1/00 or F24F 3/00 {, e.g. using solar heat or combined with household units such as an oven or water heater}
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 (F24F 5/0046 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 ₂ liquid or N ₂ 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}

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| 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} | | |
| 6/00 | Air-humidification {, e.g. cooling by humidification} | | |
| 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 (F24F 6/105 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 | | |
| 7/00 | Ventilation | | |
| | WARNING | | |
| | Group F24F 7/00 is impacted by reclassification into group F24F 7/003. | | |
| | Groups F24F 7/00 and F24F 7/003 should be considered in order to perform a complete search. | | |
| 2007/001 | • {with exhausting air ducts} | 7/007 | • with forced flow (using ducting systems F24F 7/06) |
| | WARNING | 7/013 | • • using wall or window fans, displacing air through the wall or window |
| | Group F24F 2007/001 is impacted by reclassification into group F24F 7/003. | 7/02 | • Roof ventilation (ventilation of roof coverings E04D) |
| | Groups F24F 2007/001 and F24F 7/003 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 (F24F 7/02 takes precedence)} |
| | WARNING | 7/06 | • • with forced air circulation, e.g. by fan {positioning of a ventilator in or against a conduit} |
| | Group F24F 2007/002 is impacted by reclassification into group F24F 7/003. | 7/065 | • • • {fan combined with single duct; mounting arrangements of a fan in a duct} |
| | Groups F24F 2007/002 and F24F 7/003 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 (outlet members for directing or distributing air {into rooms or spaces, e.g. ceiling air-diffusers} F24F 13/06) |
| | WARNING | 8/00 | Treatment, e.g. purification, of air supplied to human living or working spaces otherwise than by heating, cooling, humidifying or drying |
| | Group F24F 2007/0025 is impacted by reclassification into group F24F 7/003. | | WARNING |
| | Groups F24F 2007/0025 and F24F 7/003 should be considered in order to perform a complete search. | | Groups F24F 8/00, F24F 8/20, F24F 8/22, F24F 8/24, F24F 8/26, F24F 8/28, F24F 8/30, F24F 8/40, F24F 8/50, F24F 8/60, F24F 8/70, F24F 8/80, and F24F 8/95 are incomplete pending reclassification of documents from group F24F 3/16. |
| | | | 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"> • Cleaning of purification apparatus <p>WARNING</p> <p>Group F24F 8/90 is incomplete pending reclassification of documents from group F24F 8/10.</p> <p>Groups F24F 8/10 and F24F 8/90 should be considered in order to perform a complete search.</p>	2011/0005	<ul style="list-style-type: none"> • . . . {to create underpressure in a room, keeping contamination inside}
8/95	<ul style="list-style-type: none"> • specially adapted for specific purposes 	2011/0006	<ul style="list-style-type: none"> • . . {using low temperature external supply air to assist cooling}
8/96	<ul style="list-style-type: none"> • . for removing pollen <p>WARNING</p> <p>Group F24F 8/96 is incomplete pending reclassification of documents from group F24F 8/10.</p> <p>Groups F24F 8/10 and F24F 8/96 should be considered in order to perform a complete search.</p>	11/0008	<ul style="list-style-type: none"> • {for air-humidification (F24F 11/30 takes precedence)}
8/97	<ul style="list-style-type: none"> • . for removing tobacco smoke <p>WARNING</p> <p>Group F24F 8/97 is incomplete pending reclassification of documents from group F24F 8/10.</p> <p>Groups F24F 8/10 and F24F 8/97 should be considered in order to perform a complete search.</p>	11/30	<ul style="list-style-type: none"> • for purposes related to the operation of the system, e.g. for safety or monitoring <p>WARNINGS</p> <ol style="list-style-type: none"> 1. Group F24F 11/30 is impacted by reclassification into groups F24F 11/32 – F24F 11/88, F24F 2120/00, and F24F 2140/00. All groups listed in this Warning should be considered in order to perform a complete search. 2. Groups F24F 11/32 – F24F 11/49 are incomplete pending reclassification of documents from group F24F 11/30. Groups F24F 11/30 and F24F 11/32 – F24F 11/49 should be considered in order to perform a complete search.
8/98	<ul style="list-style-type: none"> • . for removing ozone <p>WARNING</p> <p>Group F24F 8/98 is incomplete pending reclassification of documents from group F24F 8/10.</p> <p>Groups F24F 8/10 and F24F 8/98 should be considered in order to perform a complete search.</p>	11/32	<ul style="list-style-type: none"> • . . Responding to malfunctions or emergencies
8/99	<ul style="list-style-type: none"> • . for treating air sourced from urban areas, e.g. from streets <p>WARNING</p> <p>Group F24F 8/99 is incomplete pending reclassification of documents from group F24F 8/10.</p> <p>Groups F24F 8/10 and F24F 8/99 should be considered in order to perform a complete search.</p>	11/33	<ul style="list-style-type: none"> • . . . to fire, excessive heat or smoke
9/00	<p>Use of air currents for screening, e.g. air curtains</p>	11/34	<ul style="list-style-type: none"> • by opening air passages
2009/002	<ul style="list-style-type: none"> • {Room dividers} 	11/35	<ul style="list-style-type: none"> • by closing air passages
2009/005	<ul style="list-style-type: none"> • {combined with a door} 	11/36	<ul style="list-style-type: none"> • . . . to leakage of heat-exchange fluid
2009/007	<ul style="list-style-type: none"> • {using more than one jet or band in the air curtain} 	11/37	<ul style="list-style-type: none"> • . . Resuming operation, e.g. after power outages; Emergency starting
11/00	<p>Control or safety arrangements</p> <p>NOTE</p> <p>In this group, it is desirable to add the indexing codes of groups F24F 2110/00 – F24F 2140/00.</p>	11/38	<ul style="list-style-type: none"> • . . . Failure diagnosis
11/0001	<ul style="list-style-type: none"> • {for ventilation (F24F 11/30 takes precedence)} 	11/39	<ul style="list-style-type: none"> • . . . Monitoring filter performance
2011/0002	<ul style="list-style-type: none"> • . . {for admittance of outside air} 	11/41	<ul style="list-style-type: none"> • . Defrosting; Preventing freezing
2011/0004	<ul style="list-style-type: none"> • . . . {to create overpressure in a room} 	11/42	<ul style="list-style-type: none"> • . . . of outdoor units
		11/43	<ul style="list-style-type: none"> • . . . of indoor units
		11/46	<ul style="list-style-type: none"> • . Improving electric energy efficiency or saving
		11/47	<ul style="list-style-type: none"> • . . Responding to energy costs
		11/48	<ul style="list-style-type: none"> • . prior to normal operation, e.g. pre-heating or pre-cooling
		11/49	<ul style="list-style-type: none"> • . ensuring correct operation, e.g. by trial operation or configuration checks
		11/50	<ul style="list-style-type: none"> • characterised by user interfaces or communication <p>WARNING</p> <p>Groups F24F 11/50 – F24F 11/61 are incomplete pending reclassification of documents from group F24F 11/30. Groups F24F 11/50 – F24F 11/61 and F24F 11/30 should be considered in order to perform a complete search.</p>
		11/52	<ul style="list-style-type: none"> • . . Indication arrangements, e.g. displays
		11/523	<ul style="list-style-type: none"> • . . . for displaying temperature data
		11/526	<ul style="list-style-type: none"> • . . . giving audible indications
		11/54	<ul style="list-style-type: none"> • . using one central controller connected to several sub-controllers
		11/56	<ul style="list-style-type: none"> • . Remote control
		11/57	<ul style="list-style-type: none"> • . . . using telephone networks
		11/58	<ul style="list-style-type: none"> • . . . using Internet communication
		11/59	<ul style="list-style-type: none"> • . . . for presetting
		11/61	<ul style="list-style-type: none"> • . using timers

- 11/62 . characterised by the type of control or by internal processing, e.g. using fuzzy logic, adaptive control or estimation of values

WARNING

Groups [F24F 11/62](#) – [F24F 11/67](#) are incomplete pending reclassification of documents from group [F24F 11/30](#).

Groups [F24F 11/62](#) – [F24F 11/67](#) and [F24F 11/30](#) should be considered in order to perform a complete search.

- 11/63 . . Electronic processing
11/64 . . . using pre-stored data
11/65 . . . for selecting an operating mode

WARNING

Group [F24F 11/65](#) is incomplete pending reclassification of documents from group [F24F 11/30](#).

Group [F24F 11/65](#) is also impacted by reclassification into group [F24F 11/67](#).

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

- 11/66 Sleep mode
11/67 Switching between heating and cooling modes

WARNING

Group [F24F 11/67](#) is incomplete pending reclassification of documents from groups [F24F 11/30](#) and [F24F 11/65](#).

Groups [F24F 11/30](#), [F24F 11/65](#), and [F24F 11/67](#) should be considered in order to perform a complete search.

- 11/70 . Control systems characterised by their outputs; Constructional details thereof

WARNING

Groups [F24F 11/70](#) – [F24F 11/875](#) are incomplete pending reclassification of documents from group [F24F 11/30](#).

Group [F24F 11/70](#) is also impacted by reclassification into groups [F24F 11/80](#) – [F24F 11/875](#).

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

- 11/72 . . for controlling the supply of treated air, e.g. its pressure
11/74 . . . for controlling air flow rate or air velocity

WARNING

Group [F24F 11/74](#) is incomplete pending reclassification of documents from group [F24F 11/30](#) and [F24F 11/70](#).

Group [F24F 11/74](#) is also impacted by reclassification into group [F24F 11/755](#).

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

- 11/745 {the air flow rate increasing with an increase of air-current or wind pressure}
11/75 for maintaining constant air flow rate or air velocity
11/755 for cyclical variation of air flow rate or air velocity

WARNING

Group [F24F 11/755](#) is incomplete pending reclassification of documents from groups [F24F 11/30](#), [F24F 11/70](#) and [F24F 11/74](#).

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

- 11/76 by means responsive to temperature, e.g. bimetal springs
11/77 by controlling the speed of ventilators
11/79 . . . for controlling the direction of the supplied air
11/80 . . for controlling the temperature of the supplied air

WARNING

Groups [F24F 11/80](#) – [F24F 11/875](#) are incomplete pending reclassification of documents from groups [F24F 11/30](#) and [F24F 11/70](#).

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

- 11/81 . . . by controlling the air supply to heat-exchangers or bypass channels
11/83 . . . by controlling the supply of heat-exchange fluids to heat-exchangers

WARNING

Group [F24F 11/83](#) is incomplete pending reclassification of documents from groups [F24F 11/30](#) and [F24F 11/70](#).

Group [F24F 11/83](#) is also impacted by reclassification into groups [F24F 11/84](#) and [F24F 11/85](#).

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

- 11/84 using valves

WARNING

Group [F24F 11/84](#) is incomplete pending reclassification of documents from groups [F24F 11/30](#), [F24F 11/70](#) and [F24F 11/83](#).

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

- 11/85 using variable-flow pumps

WARNING

Group [F24F 11/85](#) is incomplete pending reclassification of documents from groups [F24F 11/30](#), [F24F 11/70](#) and [F24F 11/83](#).

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

11/86	. . . by controlling compressors within refrigeration or heat pump circuits	13/065	. . . formed as cylindrical or spherical bodies which are rotatable
11/87	. . . by controlling absorption or discharge of heat in outdoor units	13/068	. . . formed as perforated walls, ceilings or floors (F24F 13/078 takes precedence)
11/871	. . . . by controlling outdoor fans	13/072	. . . of elongated shape, e.g. between ceiling panels
11/873	. . . by controlling refrigerant heaters	13/075	. . . having parallel rods or lamellae directing the outflow, e.g. the rods or lamellae being individually adjustable (F24F 13/072 takes precedence)
11/875	. . . by controlling heat-storage apparatus		
11/88	. Electrical aspects, e.g. circuits	13/078	. . . combined with lighting fixtures
WARNING		13/08	. Air-flow control members, e.g. louveres, grilles, flaps or guide plates (F24F 7/013 , F24F 13/06 take precedence)
Group F24F 11/88 is incomplete pending reclassification of documents from group F24F 11/30 .		13/081	. . {for guiding air around a curve}
Groups F24F 11/30 and F24F 11/88 should be considered in order to perform a complete search.		13/082	. . {Grilles, registers or guards}
11/89	. Arrangement or mounting of control or safety devices	13/084	. . . {with mounting arrangements, e.g. snap fasteners for mounting to the wall or duct}
12/00	Use of energy recovery systems in air conditioning, ventilation or screening (with both heat and humidity transfer between supplied and exhausted air F24F 3/147)	13/085	. . . {including an air filter}
12/001	. {with heat-exchange between supplied and exhausted air}	2013/087	. . . {using inflatable bellows}
12/002	. . {using an intermediate heat-transfer fluid}	2013/088	. . . {Air-flow straightener}
12/003	. . . {using a heat pump}	13/10	. . movable, e.g. dampers
2012/005	. . . {using heat pipes}	13/105	. . . {composed of diaphragms or segments}
12/006	. . {using an air-to-air heat exchanger (F24F 12/002 takes precedence)}	13/12	. . . built up of sliding members
2012/007	. . {using a by-pass for bypassing the heat-exchanger}	13/14	. . . built up of tilting members, e.g. louver
2012/008	. . {cyclic routing supply and exhaust air}	13/1406	. . . . {characterised by sealing means}
13/00	Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening	13/1413	. . . . {using more than one tilting member, e.g. with several pivoting blades (F24F 13/15 takes precedence)}
13/02	. Ducting arrangements	13/142	. . . . {using pivoting blades with intersecting axles}
13/0209	. . {characterised by their connecting means, e.g. flanges}	13/1426	. . . . {characterised by actuating means}
13/0218	. . {Flexible soft ducts, e.g. ducts made of permeable textiles}	2013/1433	. . . . . {with electric motors}
13/0227	. . {using parts of the building, e.g. air ducts inside the floor, walls or ceiling of a building}	2013/144	. . . . . {with thermoactuators}
13/0236	. . {with ducts including air distributors, e.g. air collecting boxes with at least three openings}	2013/1446	. . . . . {with gearings}
13/0245	. . {Manufacturing or assembly of air ducts; Methods therefor}	2013/1453	. . . . . {with cables, e.g. bowden cables}
13/0254	. . {characterised by their mounting means, e.g. supports}	2013/146	. . . . . {with springs}
13/0263	. . {Insulation for air ducts}	2013/1466	. . . . . {with pneumatic means}
13/0272	. . {Modules for easy installation or transport}	2013/1473	. . . . . {with cams or levers}
13/0281	. . {Multilayer duct}	2013/148	. . . . . {with magnets}
13/029	. . {Duct comprising an opening for inspection, e.g. manhole}	13/1486	. . . . . {characterised by bearings, pivots or hinges}
13/04	. . Air-mixing units (F24F 13/06 takes precedence)	2013/1493	. . . . . {using an elastic membrane}
13/06	. . Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser	13/15	. . . . . with parallel simultaneously tiltable lamellae
13/0604	. . . {integrated in or forming part of furniture}	13/16	. . . built up of parallelly-movable plates
2013/0608	. . . {Perforated ducts}	13/18	. . specially adapted for insertion in flat panels, e.g. in door or window-pane
2013/0612	. . . {Induction nozzles without swirl means}	13/20	. Casings or covers
2013/0616	. . . {Outlets that have intake openings}	2013/202	. . {Mounting a compressor unit therein}
13/062	. . . having one or more bowls or cones diverging in the flow direction	2013/205	. . {Mounting a ventilator fan therein}
		2013/207	. . {with control knobs; Mounting controlling members or control units therein}
		13/22	. Means for preventing condensation or evacuating condensate
		2013/221	. . {to avoid the formation of condensate, e.g. dew}
		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

WARNING

Group [F24F 2110/40](#) is impacted by reclassification into groups [F24F 2140/10](#) and [F24F 2140/12](#).

Groups [F24F 2110/40](#), [F24F 2140/10](#), and [F24F 2140/12](#) should be considered in order to perform a complete search.

- 2110/50 . Air quality properties

WARNING

Group [F24F 2110/50](#) is impacted by reclassification into group [F24F 2110/65](#).

Groups [F24F 2110/50](#) and [F24F 2110/65](#) should be considered in order to perform a complete search.

- 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

WARNING

Group [F24F 2110/65](#) is incomplete pending reclassification of documents from group [F24F 2110/50](#).

Groups [F24F 2110/50](#) and [F24F 2110/65](#) should be considered in order to perform a complete search.

- 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

WARNING

Group [F24F 2120/00](#) is incomplete pending reclassification of documents from group [F24F 11/30](#).

Groups [F24F 11/30](#) and [F24F 2120/00](#) should be considered in order to perform a complete search.

- 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

WARNING

Group [F24F 2140/00](#) is incomplete pending reclassification of documents from group [F24F 11/30](#).

Groups [F24F 11/30](#) and [F24F 2140/00](#) should be considered in order to perform a complete search.

- 2140/10 . Pressure

WARNING

Groups [F24F 2140/10](#) and [F24F 2140/12](#) are incomplete pending reclassification of documents from group [F24F 2110/40](#).

Groups [F24F 2110/40](#), [F24F 2140/10](#) and [F24F 2140/12](#) should be considered in order to perform a complete search.

- 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