

SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

F24 HEATING; RANGES; VENTILATING

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)

Note(s) [3]

- 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.
- 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.
- In this subclass, control or safety arrangements are classified in 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 main groups F24F 1/00-F24F 9/00.

Subclass index

AIR-CONDITIONING

Room units; central systems; other systems or apparatus.....1/00, 3/00, 5/00

AIR-HUMIDIFICATION.....6/00

VENTILATION.....7/00

SCREENING BY AIR CURRENTS.....9/00

CONTROL OR SAFETY ARRANGEMENTS.....11/00

USE OF ENERGY RECOVERY SYSTEMS.....12/00

DETAILS.....13/00

1/00 Room units for air-conditioning, e.g. separate or self-contained units or units receiving primary air from a central station [1, 2006.01, 2011.01, 2019.01]

- 1/0003 • characterised by a split arrangement, wherein parts of the air-conditioning system, e.g. evaporator and condenser, are in separately located units [2019.01]
- 1/0007 • Indoor units, e.g. fan coil units (self-contained units F24F 1/02) [2019.01]
- 1/0011 • • characterised by air outlets [2019.01]
- 1/0014 • • • having two or more outlet openings [2019.01]
- 1/0018 • • • characterised by fans (with secondary air induced by injector action of the primary air F24F 1/01) [2019.01]
- 1/0022 • • • Centrifugal or radial fans [2019.01]
- 1/0025 • • • Cross-flow or tangential fans [2019.01]
- 1/0029 • • • Axial fans [2019.01]
- 1/0033 • • • having two or more fans [2019.01]
- 1/0035 • • • characterised by introduction of outside air to the room [2019.01]
- 1/0038 • • • in combination with simultaneous exhaustion of inside air [2019.01]
- 1/0041 • • • characterised by exhaustion of inside air from the room (in combination with simultaneous introduction of outside air F24F 1/0038) [2019.01]

- 1/0043 • • characterised by mounting arrangements [2019.01]
- 1/0047 • • • mounted in the ceiling or at the ceiling [2019.01]
- 1/005 • • • mounted on the floor; standing on the floor [2019.01]
- 1/0053 • • • mounted at least partially below the floor; with air distribution below the floor [2019.01]
- 1/0057 • • • mounted in or on a wall [2019.01]
- 1/0059 • • characterised by heat exchangers [2019.01]
- 1/0063 • • • by the mounting or arrangement of the heat exchangers [2019.01]
- 1/0067 • • • by the shape of the heat exchangers or of parts thereof, e.g. of their fins [2019.01]
- 1/0068 • • characterised by the arrangement of refrigerant piping outside the heat exchanger within the unit casing [2019.01]
- 1/0071 • • with means for purifying supplied air (perfuming or deodorising means F24F 1/008) [2019.01]
- 1/0073 • • • characterised by the mounting or arrangement of filters [2019.01]
- 1/0076 • • • by electric means, e.g. ionisers or electrostatic separators [2019.01]
- 1/008 • • with perfuming or deodorising means [2019.01]
- 1/0083 • • with dehumidification means [2019.01]

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- 1/0087 • • with humidification means [2019.01]
- 1/009 • • characterised by heating arrangements (characterised by heat exchangers F24F 1/0059) [2019.01]
- 1/0093 • • • with additional radiant heat-discharging elements, e.g. electric heaters [2019.01]
- 1/0097 • • • using thermoelectric or thermomagnetic means, e.g. Peltier elements [2019.01]
- 1/01 • in which secondary air is induced by injector action of the primary air [3, 2006.01, 2011.01]
- 1/02 • Self-contained room units for air-conditioning, i.e. with all apparatus for treatment installed in a common casing [1, 2006.01, 2011.01, 2019.01]
- 1/022 • • comprising a compressor cycle [2019.01]
- 1/027 • • • mounted in wall openings, e.g. in windows [2019.01]
- 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) [2019.01]
- 1/0284 • • • with horizontally arranged fan axis [2019.01]
- 1/0287 • • • with vertically arranged fan axis [2019.01]
- 1/029 • • characterised by the layout or mutual arrangement of components, e.g. of compressors or fans [2019.01]
- 1/03 • • characterised by mounting arrangements [2019.01]
- 1/031 • • • penetrating a wall or window [2019.01]
- 1/0314 • • • mounted on a wall [2019.01]
- 1/0317 • • • suspended from the ceiling [2019.01]
- 1/032 • • characterised by heat exchangers [2019.01]
- 1/0323 • • • by the mounting or arrangement of the heat exchangers [2019.01]
- 1/0325 • • • by the shape of the heat exchangers or of parts thereof, e.g. of their fins [2019.01]
- 1/0326 • • characterised by the arrangement of refrigerant piping outside the heat exchanger within the unit casing [2019.01]
- 1/0328 • • with means for purifying supplied air (perfuming or deodorising means F24F 1/0355) [2019.01]
- 1/035 • • • characterised by the mounting or arrangement of filters [2019.01]
- 1/0353 • • • by electric means, e.g. ionisers or electrostatic separators [2019.01]
- 1/0355 • • with perfuming or deodorising means [2019.01]
- 1/0358 • • with dehumidification means [2019.01]
- 1/037 • • with humidification means [2019.01]
- 1/0373 • • characterised by heating arrangements (characterised by heat exchangers F24F 1/032) [2019.01]
- 1/0375 • • • with additional radiant heat-discharging elements, e.g. electric heaters [2019.01]
- 1/0378 • • • using thermoelectric or thermomagnetic means, e.g. Peltier elements [2019.01]
- 1/039 • • using water to enhance cooling, e.g. spraying onto condensers [2019.01]
- 1/04 • • Arrangements for portability [1, 2006.01, 2011.01]
- 1/06 • Separate outdoor units, e.g. outdoor unit to be linked to a separate room unit comprising a compressor and a heat exchanger [2011.01]

Note(s) [2011.01]

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.

- 1/08 • • Compressors specially adapted for separate outdoor units [2011.01]

- 1/10 • • • Arrangement or mounting thereof [2011.01]
- 1/12 • • • Vibration or noise prevention therefor [2011.01]
- 1/14 • • Heat exchangers specially adapted for separate outdoor units [2011.01]
- 1/16 • • • Arrangement or mounting thereof [2011.01]
- 1/18 • • • characterised by their shape [2011.01]
- 1/20 • • Electric components for separate outdoor units [2011.01]
- 1/22 • • • Arrangement or mounting thereof [2011.01]
- 1/24 • • • Cooling of electric components [2011.01]
- 1/26 • • Refrigerant piping [2011.01]
- 1/28 • • • for connecting several separate outdoor units [2011.01]
- 1/30 • • • for use inside the separate outdoor units [2011.01]
- 1/32 • • • for connecting the separate outdoor unit to indoor units [2011.01]
- 1/34 • • • Protection means therefor, e.g. covers for refrigerant pipes [2011.01]
- 1/36 • • Drip trays for outdoor units [2011.01]
- 1/38 • • Fan details of outdoor units, e.g. bell-mouth shaped inlets or fan mountings [2011.01]
- 1/40 • • Vibration or noise prevention at outdoor units (for outdoor unit compressors F24F 1/12) [2011.01]
- 1/42 • • characterised by the use of the condensate, e.g. for enhanced cooling [2011.01]
- 1/44 • • characterised by the use of internal combustion engines [2011.01]
- 1/46 • • Component arrangements in separate outdoor units [2011.01]
- 1/48 • • • characterised by airflow, e.g. inlet or outlet airflow [2011.01]
- 1/50 • • • • with outlet air in upward direction [2011.01]
- 1/52 • • • • Inlet and outlet arranged on the same side, e.g. for mounting in a wall opening [2011.01]
- 1/54 • • • • Inlet and outlet arranged on opposite sides [2011.01]
- 1/56 • • Casing or covers of separate outdoor units, e.g. fan guards [2011.01]
- 1/58 • • • Separate protective covers for outdoor units, e.g. solar guards, snow shields or camouflage [2011.01]
- 1/60 • • Arrangement or mounting of the outdoor unit [2011.01]
- 1/62 • • • Wall-mounted [2011.01]
- 1/64 • • • Ceiling-mounted, e.g. below a balcony [2011.01]
- 1/66 • • • under the floor level [2011.01]
- 1/68 • • • Arrangement of multiple separate outdoor units [2011.01]
- 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, 2006.01]
- 3/02 • characterised by the pressure or velocity of the primary air [1, 3, 2006.01]
- 3/04 • • operating with high pressure or high velocity [1, 2006.01]
- 3/044 • Systems in which all treatment is given in the central station, i.e. all-air systems [3, 2006.01]
- 3/048 • • with temperature control at constant rate of air-flow [3, 2006.01]

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, 2006.01]		
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, 2006.01]		
3/06	• characterised by the arrangements for the supply of heat-exchange fluid for the subsequent treatment of primary air in the room units [1, 2006.01]		
3/08	• • with separate supply and return lines for hot and cold heat-exchange fluids [1, 2006.01]		
3/10	• • with separate supply lines and common return line for hot and cold heat-exchange fluids [1, 2006.01]		
3/12	• characterised by the treatment of the air otherwise than by heating and cooling [1, 2006.01]		
3/14	• • by humidification; by dehumidification [1, 2006.01]		
3/147	• • • with both heat and humidity transfer between supplied and exhausted air [3, 2006.01]		
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, 2006.01]		
3/16	• • by purification, e.g. by filtering; by sterilisation; by ozonisation [1, 2006.01]		
5/00	Air-conditioning systems or apparatus not covered by group F24F 1/00 or F24F 3/00 [1, 2006.01]		
6/00	Air-humidification [3, 2006.01]		
6/02	• by evaporation of water in the air [3, 2006.01]		
6/04	• • using stationary unheated wet elements [3, 2006.01]		
6/06	• • using moving unheated wet elements [3, 2006.01]		
6/08	• • using heated wet elements [3, 2006.01]		
6/10	• • • heated electrically [3, 2006.01]		
6/12	• by forming water dispersions in the air [3, 2006.01]		
6/14	• • using nozzles [3, 2006.01]		
6/16	• • using rotating elements [3, 2006.01]		
6/18	• by injection of steam into the air [3, 2006.01]		
7/00	Ventilation [1, 2006.01]		
7/007	• with forced flow (using ducting systems F24F 7/06) [3, 2006.01]		
7/013	• • using wall or window fans, displacing air through the wall or window [3, 2006.01]		
7/02	• Roof ventilation (ventilation of roof coverings E04D) [1, 3, 6, 2006.01]		
7/04	• with ducting systems [1, 2006.01]		
7/06	• • with forced air circulation, e.g. by fan [1, 2006.01]		
7/08	• • • with separate ducts for supplied and exhausted air [3, 2006.01]		
7/10	• • • with air supply, or exhaust, through perforated wall, floor or ceiling (outlet members for directing or distributing air F24F 13/06) [3, 2006.01]		
9/00	Use of air currents for screening, e.g. air curtains [1, 2006.01]		
11/00	Control or safety arrangements [1, 3, 2006.01, 2018.01]		
		Note(s) [2018.01]	
		In this group, it is desirable to add the indexing codes of groups F24F 110/00-F24F 140/00.	
		11/30 • for purposes related to the operation of the system, e.g. for safety or monitoring [2018.01]	
		11/32 • • Responding to malfunctions or emergencies [2018.01]	
		11/33 • • • to fire, excessive heat or smoke [2018.01]	
		11/34 • • • • by opening air passages [2018.01]	
		11/35 • • • • by closing air passages [2018.01]	
		11/36 • • • to leakage of heat-exchange fluid [2018.01]	
		11/37 • • • Resuming operation, e.g. after power outages; Emergency starting [2018.01]	
		11/38 • • • Failure diagnosis [2018.01]	
		11/39 • • • Monitoring filter performance [2018.01]	
		11/41 • • Defrosting; Preventing freezing [2018.01]	
		11/42 • • • of outdoor units [2018.01]	
		11/43 • • • of indoor units [2018.01]	
		11/46 • • Improving electric energy efficiency or saving [2018.01]	
		11/47 • • • Responding to energy costs [2018.01]	
		11/48 • • prior to normal operation, e.g. pre-heating or pre-cooling [2018.01]	
		11/49 • • ensuring correct operation, e.g. by trial operation or configuration checks [2018.01]	
		11/50 • characterised by user interfaces or communication [2018.01]	
		11/52 • • Indication arrangements, e.g. displays [2018.01]	
		11/523 • • • for displaying temperature data [2018.01]	
		11/526 • • • giving audible indications [2018.01]	
		11/54 • • using one central controller connected to several sub-controllers [2018.01]	
		11/56 • • Remote control [2018.01]	
		11/57 • • • using telephone networks [2018.01]	
		11/58 • • • using Internet communication [2018.01]	
		11/59 • • • for presetting [2018.01]	
		11/61 • • using timers [2018.01]	
		11/62 • characterised by the type of control or by internal processing, e.g. using fuzzy logic, adaptive control or estimation of values [2018.01]	
		11/63 • • Electronic processing [2018.01]	
		11/64 • • • using pre-stored data [2018.01]	
		11/65 • • • for selecting an operating mode [2018.01]	
		11/66 • • • • Sleep mode [2018.01]	
		11/67 • • • • Switching between heating and cooling modes [2018.01]	
		11/70 • Control systems characterised by their outputs; Constructional details thereof [2018.01]	
		11/72 • • for controlling the supply of treated air, e.g. its pressure [2018.01]	
		11/74 • • • for controlling air flow rate or air velocity [2018.01]	
		11/75 • • • • for maintaining constant air flow rate or air velocity [2018.01]	
		11/755 • • • • for cyclical variation of air flow rate or air velocity [2018.01]	
		11/76 • • • • by means responsive to temperature, e.g. bimetal springs [2018.01]	
		11/77 • • • • by controlling the speed of ventilators [2018.01]	
		11/79 • • • for controlling the direction of the supplied air [2018.01]	
		11/80 • • for controlling the temperature of the supplied air [2018.01]	

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- 11/81 • • • by controlling the air supply to heat-exchangers or bypass channels [2018.01]
- 11/83 • • • by controlling the supply of heat-exchange fluids to heat-exchangers [2018.01]
- 11/84 • • • • using valves [2018.01]
- 11/85 • • • • using variable-flow pumps [2018.01]
- 11/86 • • • by controlling compressors within refrigeration or heat pump circuits [2018.01]
- 11/87 • • • by controlling absorption or discharge of heat in outdoor units [2018.01]
- 11/871 • • • • by controlling outdoor fans [2018.01]
- 11/873 • • • by controlling refrigerant heaters [2018.01]
- 11/875 • • • by controlling heat-storage apparatus [2018.01]
- 11/88 • Electrical aspects, e.g. circuits [2018.01]
- 11/89 • Arrangement or mounting of control or safety devices [2018.01]

- 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) [4, 2006.01]

- 13/00 Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening** [1, 2006.01]
- 13/02 • Ducting arrangements [1, 2006.01]
- 13/04 • • Air-mixing units (F24F 13/06 takes precedence) [1, 2006.01]
- 13/06 • • Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser [1, 2006.01]
- 13/062 • • • having one or more bowls or cones diverging in the flow direction [3, 2006.01]
- 13/065 • • • formed as cylindrical or spherical bodies which are rotatable [3, 2006.01]
- 13/068 • • • formed as perforated walls, ceilings or floors (F24F 13/078 takes precedence) [3, 2006.01]
- 13/072 • • • of elongated shape, e.g. between ceiling panels [3, 2006.01]
- 13/075 • • • having parallel rods or lamellae directing the outflow, e.g. the rods or lamellae being individually adjustable (F24F 13/072 takes precedence) [3, 2006.01]
- 13/078 • • • combined with lighting fixtures [3, 2006.01]
- 13/08 • Air-flow control members, e.g. louvres, grilles, flaps or guide plates (F24F 7/013, F24F 13/06 take precedence) [1, 3, 2006.01]
- 13/10 • • movable, e.g. dampers [1, 2006.01]
- 13/12 • • • built-up of sliding members [1, 2006.01]
- 13/14 • • • built-up of tilting members, e.g. louvre [1, 2006.01]
- 13/15 • • • • with parallel simultaneously tiltable lamellae [3, 2006.01]
- 13/16 • • • built-up of parallelly-movable plates [1, 2006.01]
- 13/18 • • specially adapted for insertion in flat panels, e.g. in door or window-pane [1, 2006.01]
- 13/20 • Casings or covers [5, 2006.01]
- 13/22 • Means for preventing condensation or evacuating condensate [5, 2006.01]
- 13/24 • Means for preventing or suppressing noise [5, 2006.01]

- 13/26 • Arrangements for air-circulation by means of induction, e.g. by fluid coupling or thermal effect [6, 2006.01]
- 13/28 • Arrangement or mounting of filters [6, 2006.01]
- 13/30 • Arrangement or mounting of heat-exchangers [6, 2006.01]
- 13/32 • Supports for air-conditioning, air-humidification or ventilation units [6, 2006.01]

Indexing scheme associated with group F24F 11/00, relating to control inputs, e.g. measured or estimated values or parameters [2018.01]

110/00 Control inputs relating to air properties [2018.01]

- 110/10 • Temperature [2018.01]
- 110/12 • • of the outside air [2018.01]
- 110/20 • Humidity [2018.01]
- 110/22 • • of the outside air [2018.01]
- 110/30 • Velocity [2018.01]
- 110/32 • • of the outside air [2018.01]
- 110/40 • Pressure, e.g. wind pressure [2018.01]
- 110/50 • Air quality properties [2018.01]
- 110/52 • • of the outside air [2018.01]
- 110/60 • • Odour [2018.01]
- 110/62 • • Tobacco smoke [2018.01]
- 110/64 • • Airborne particle content [2018.01]
- 110/65 • • Concentration of specific substances or contaminants [2018.01]
- 110/66 • • • Volatile organic compounds [VOC] [2018.01]
- 110/68 • • • Radon [2018.01]
- 110/70 • • • Carbon dioxide [2018.01]
- 110/72 • • • Carbon monoxide [2018.01]
- 110/74 • • • Ozone [2018.01]
- 110/76 • • • Oxygen [2018.01]
- 110/80 • • Electric charge [2018.01]

120/00 Control inputs relating to users or occupants [2018.01]

- 120/10 • Occupancy [2018.01]
- 120/12 • • Position of occupants [2018.01]
- 120/14 • • Activity of occupants [2018.01]
- 120/20 • Feedback from users [2018.01]

130/00 Control inputs relating to environmental factors not covered by group F24F 110/00 [2018.01]

- 130/10 • Weather information or forecasts [2018.01]
- 130/20 • Sunlight [2018.01]
- 130/30 • Artificial light [2018.01]
- 130/40 • Noise [2018.01]

140/00 Control inputs relating to system states [2018.01]

- 140/10 • Pressure [2018.01]
- 140/12 • • Heat-exchange fluid pressure [2018.01]
- 140/20 • Heat-exchange fluid temperature [2018.01]
- 140/30 • Condensation of water from cooled air [2018.01]
- 140/40 • Damper positions, e.g. open or closed [2018.01]
- 140/50 • Load [2018.01]
- 140/60 • Energy consumption [2018.01]