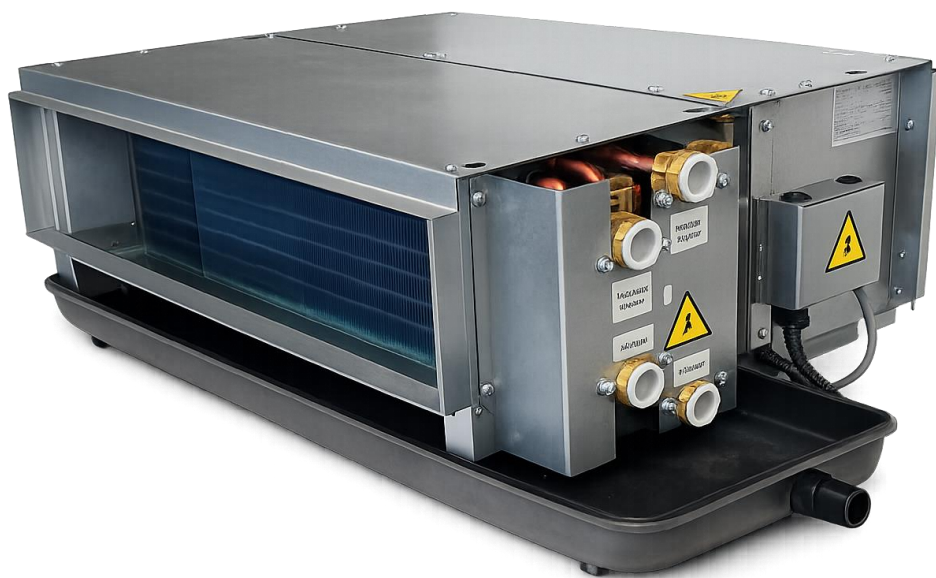


Ducted Fan Coil Units

Operation and Installation Manual



DF23 - 2-pipe systems | DF422 and DF431 - 4-pipe systems | AC and EC motor versions
Bottom air return (B) and rear air return (E) versions | sizes from 34 to 238

- All installation work must be carried out by qualified specialists.
- Read this manual carefully and follow the described procedures exactly.
- Keep this manual in a safe place for future reference.
- Our products are continuously improved. The information in this document may be changed without prior notice.
- Only qualified personnel may install and service the equipment described in this document.

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1 Identification

1.1 Document and product data

Item	Details
Document	Operation and Installation Manual
Product	DF ducted fan coil units, concealed above the ceiling
Series and sizes	DF23 (2-pipe, 3-row), DF422 (4-pipe, 2+2-row), DF431 (4-pipe, 3+1-row); sizes 34, 51, 68, 85, 102, 136, 170, 204, 238; AC and EC motor versions
Air return versions	B = bottom air return, E = rear air return
Supplier	KONVEKA, UAB, Vokiečių g. 185, LT-45251 Kaunas, Lithuania konveka.com sales@konveka.lt +370 677 06303
Year of manufacture	See the nameplate on the unit
Issue / revision	2026-09 / Rev. 01

1.2 Model designation

Position	Code	Meaning
Series	DF	Ducted fan coil unit, concealed above the ceiling
Pipe system and rows	23 422 431	2-pipe, 3-row heat exchanger 4-pipe, 2 cooling rows + 2 heating rows 4-pipe, 3 cooling rows + 1 heating row
Size	34 ... 238	Nominal air flow at high speed, m ³ /h; Size code is multiplied by 10
Air return	B E	Bottom air return Rear air return
Motor	AC EC	3-speed asynchronous motor EC motor with 3-speed command control

Example: DF23-136-B-EC = ducted fan coil unit, 2-pipe system with a 3-row heat exchanger, nominal air flow 1360 m³/h at high speed, bottom air return, EC motor.

Available configurations: heat exchanger arrangements 23 (2-pipe / 3-row), 422 (4-pipe 2+2) and 431 (4-pipe 3+1); air return types B (bottom air return) and E (rear air return); static pressure classes P1 (12/30 Pa) and P2 (30/50 Pa).

NOTE

The nameplate data take precedence over the data in this manual.

Keep this manual for the entire service life of the unit and hand it over to the operator.

2 Safety

2.1 Personnel qualifications

Fan coil units are terminal units of chilled/hot-water air-conditioning systems. They may be installed, commissioned, operated and maintained only by qualified, specially trained and authorised personnel. Electrical work may be carried out only by qualified electricians.

2.2 Residual risks

ELECTRICAL HAZARD

Before carrying out any work on the unit, disconnect the power supply. Make sure the unit is isolated and secure the local power supply point against being switched on again.

DANGER OF SCALDING

Before working on the valves or inlet and outlet pipes, shut off the heating or cooling water and allow the heating water to cool down.

DANGER FROM ROTATING PARTS

Rotating fan wheels can cause injury. Before starting any work, make sure the unit is switched off and secured against being switched on again.

DANGER FROM SUSPENDED LOADS

Wear a safety helmet and safety footwear when installing the unit at ceiling level. Ceiling installation must always be carried out by two people.

RISK OF INJURY

Wear protective gloves when moving or installing the unit. Sheet-metal edges and heat exchanger fins are sharp.

2.3 Intended use

DF ducted fan coil units are intended exclusively for ventilation, heating, filtration and cooling of indoor air using chilled or hot water as the medium. Intended use also includes compliance with this manual and the specified inspection and maintenance requirements. The user is responsible for correct use.

- Install indoors only, concealed in or above suspended ceilings, with ducted supply air
- Operate within the limits stated in the operating-limits table
- Water quality must remain within the limits stated in the water-quality table

2.4 Improper use

The unit is considered to be used improperly if it is used for a purpose not covered by this manual. In such cases the manufacturer and supplier accept no liability for any resulting damage; the user bears the entire risk. The unit must not be operated:

- for outdoor-air treatment
- in areas with an explosion hazard
- in wet locations
- in locations with high dust levels or aggressive air
- without an installed air filter
- outside the operating limits

RISK OF INJURY AND PROPERTY DAMAGE

Improper use may result in personal injury and property damage.

2.5 Operating limits

Operating limits

Unit and heat exchanger	Meaning
Max. working pressure	1,6 MPa (16 bar)
Max. water temperature	85 °C
Max. ambient temperature	40 °C
Min. ambient temperature	2 °C
Operating voltage	220-230 V AC, 1 Ph, 50 or 60 Hz
Insulation class	E
External static pressure	12 / 30 / 50 Pa
Installation	Indoors only

2.6 Water quality

Water-quality limit values for Cu/Al heat exchangers

Parameter	Symbol	Unit	Meaning
pH value (at 20 °C)			7,5 - 9
Conductivity (at 20 °C)		µS/cm	< 700
Oxygen content	O ₂	mg/l	< 0,1
Total hardness		°dH	1 - 15
Dissolved sulphur	S		not detectable
Sodium	Na ⁺	mg/l	< 100
Iron	Fe ²⁺ , Fe ³⁺	mg/l	< 0,1
Manganese	Mn ²⁺	mg/l	< 0,05
Ammonium content	NH ₄ ⁺	mg/l	< 0,1
Chloride	Cl ⁻	mg/l	< 100
Sulphate	SO ₄ ²⁻	mg/l	< 50
Nitrite	NO ₂ ⁻	mg/l	< 50
Nitrate	NO ₃ ⁻	mg/l	< 50

NOTE

In open systems, the above limit values must be observed and the water must additionally be filtered for suspended solids at the inlet; otherwise there is a risk of erosion.

Protect the unit from dust and other substances that, together with water, cause an acidic or alkaline reaction (aluminium corrosion).

3 Technical data

The following tables provide performance, electrical, acoustic, hydraulic and dimensional data for the DF range.

DF23 – 2-pipe, 3-row, AC motor

Model			DF23-34-B-AC DF23-34-E-AC	DF23-51-B-AC DF23-51-E-AC	DF23-68-B-AC DF23-68-E-AC	DF23-85-B-AC DF23-85-E-AC	DF23-102-B-AC DF23-102-E-AC	DF23-136-B-AC DF23-136-E-AC	DF23-170-B-AC DF23-170-E-AC	DF23-204-B-AC DF23-204-E-AC	DF23-238-B-AC DF23-238-E-AC
Air flow	m³/h	H	340	510	680	850	1020	1360	1700	2040	2380
		M	255	382	510	637	765	1122	1402	1683	1927
		L	170	255	340	425	510	850	1062	1275	1487
Total cooling capacity 7/12/27 °C	W	H	2 075	2 973	3 899	4 651	5 867	7 904	9 043	11 196	11 968
		M	1 865	2 688	3 564	4 260	5 268	7 193	8 229	10 088	10 998
		L	1 510	2 212	2 870	3 428	4 236	5 817	6 647	8 151	8 880
Sensible cooling capacity 7/12/27 °C	W	H	1 860	2 641	3 470	4 429	5 409	7 211	8 280	10 171	10 790
		M	1 672	2 387	3 171	4 057	4 857	6 562	7 535	9 164	9 916
		L	1 354	1 965	2 554	3 264	3 905	5 307	6 086	7 404	8 006
Heating capacity 45/40/20 °C	W	H	2 153	3 083	4 177	4 685	6 020	8 156	9 125	11 107	12 170
		M	1 871	2 682	3 500	4 193	5 087	6 990	7 938	9 697	10 527
		L	1 550	2 284	3 091	3 467	4 334	5 873	6 570	8 108	8 641
Power input at 12 Pa	W		28	34	55	68	87	125	152	185	205
Power input at 30 Pa	W		42	55	68	87	108	142	174	210	253
Power input at 50 Pa	W		49	66	84	100	118	174	210	250	300
Max. current	A		0,22	0,30	0,38	0,45	0,54	0,79	0,95	1,14	1,36
Sound pressure level at 12 Pa	dB(A)		34	35	38	42	43	44	46	48	49
Sound pressure level at 30 Pa	dB(A)		37	38	41	44	45	46	48	48	49
Sound pressure level at 50 Pa	dB(A)		42	44	46	47	49	50	52	54	56
Cooling water flow	l/h		357	511	671	800	1009	1359	1555	1925	2058
Heating water flow	l/h		370	530	718	806	1035	1403	1569	1910	2093
Cooling water pressure drop	kPa		20	20	20	30	40	40	40	40	50
Heating water pressure drop	kPa		19	19	20	26	38	38	37	36	46
Power supply	220-230 V / 1 Ph / 50 or 60 Hz										
External static pressure	12 / 30 / 50 Pa										
Fan type	Forward-curved centrifugal fan										
Motor type	3-speed asynchronous motor										
Insulation class	E										
Heat exchanger	Copper tubes mechanically expanded into aluminium fins; 2-pipe, 3-row										
Max. working pressure	1,6 MPa (16 bar)										
Water connections	3/4" FPT										
Condensate connection	3/4" MPT										
Unit length	mm		670	770	970	1070	1170	1370	1470	1770	1870
Unit width	mm		504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)
Unit height	mm		242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)
Dim. A	mm		640	740	940	1040	1140	1340	1440	1740	1840
Dim. B, air outlet width	mm		505	585	755	840	965	1160	1260	1510	1620
Dim. C, suspension holes	mm		475	555	725	810	935	1130	1230	1480	1590
Dim. D, air inlet width	mm		445	525	695	780	905	1100	1200	1450	1560
Net weight	kg		11.0	11.9	15.0	16.0	17.4	22.1	24.0	29.2	30.4
Gross weight	kg		12.2	13.3	16.6	17.7	19.2	24.4	26.3	32.2	33.4

The sound pressure level was measured in an acoustic room 1 m in front of and 1 m below the vertical centreline of the unit. External static pressure is measured without the filter and without the air outlet fitting. For EC units, the tables show the maximum power input and sound pressure level values; EC speed is set by command (signal) control. Dimensions are in millimetres.

DF23 – 2-pipe, 3-row, EC motor

Model			DF23-34-B-EC DF23-34-E-EC	DF23-51-B-EC DF23-51-E-EC	DF23-68-B-EC DF23-68-E-EC	DF23-85-B-EC DF23-85-E-EC	DF23-102-B-EC DF23-102-E-EC	DF23-136-B-EC DF23-136-E-EC	DF23-170-B-EC DF23-170-E-EC	DF23-204-B-EC DF23-204-E-EC	DF23-238-B-EC DF23-238-E-EC
Air flow	m³/h	H	340	510	680	850	1020	1360	1700	2040	2380
		M	255	382	510	637	765	1122	1402	1683	1927
		L	170	255	340	425	510	850	1062	1275	1487
Total cooling capacity 7/12/27 °C	W	H	2 076	2 973	3 900	4 652	5 867	7 903	9 043	11 196	11 968
		M	1 866	2 688	3 565	4 262	5 269	7 192	8 229	10 088	10 998
		L	1 511	2 212	2 871	3 429	4 236	5 817	6 647	8 151	8 880
Sensible cooling capacity 7/12/27 °C	W	H	1 861	2 641	3 471	4 431	5 410	7 210	8 281	10 171	10 789
		M	1 673	2 387	3 172	4 058	4 858	6 561	7 535	9 164	9 915
		L	1 355	1 965	2 554	3 265	3 906	5 307	6 086	7 404	8 006
Heating capacity 45/40/20 °C	W	H	2 165	3 099	4 188	4 680	6 040	8 171	9 170	11 097	12 169
		M	1 882	2 696	3 510	4 188	5 104	7 002	7 978	9 688	10 526
		L	1 559	2 296	3 099	3 463	4 349	5 883	6 602	8 101	8 640
Power input at 12 Pa	W		17	20	36	44	56	78	88	114	139
Power input at 30 Pa	W		26	34	42	51	63	91	101	140	166
Power input at 50 Pa	W		29	38	49	56	80	101	125	173	208
Max. current	A		0,13	0,17	0,22	0,25	0,36	0,46	0,57	0,79	0,95
Sound pressure level at 12 Pa	dB(A)		35	37	39	41	43	44	46	48	50
Sound pressure level at 30 Pa	dB(A)		38	40	42	44	45	46	48	50	52
Sound pressure level at 50 Pa	dB(A)		40	42	44	45	47	48	50	52	54
Cooling water flow	l/h		357	511	671	800	1009	1359	1555	1925	2058
Heating water flow	l/h		372	533	720	805	1039	1405	1577	1908	2093
Cooling water pressure drop	kPa		20	20	20	30	40	40	40	40	50
Heating water pressure drop	kPa		19	19	20	26	38	38	37	35	46
Power supply	220-230 V / 1 Ph / 50 or 60 Hz										
External static pressure	12 / 30 / 50 Pa										
Fan type	Forward-curved centrifugal fan										
Motor type	EC motor with command-based speed control										
Insulation class	E										
Heat exchanger	Copper tubes mechanically expanded into aluminium fins; 2-pipe, 3-row										
Max. working pressure	1,6 MPa (16 bar)										
Water connections	3/4" FPT										
Condensate connection	3/4" MPT										
Unit length	mm		670	770	970	1070	1170	1370	1470	1770	1870
Unit width	mm		504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)
Unit height	mm		242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)
Dim. A	mm		640	740	940	1040	1140	1340	1440	1740	1840
Dim. B, air outlet width	mm		505	585	755	840	965	1160	1260	1510	1620
Dim. C, suspension holes	mm		475	555	725	810	935	1130	1230	1480	1590
Dim. D, air inlet width	mm		445	525	695	780	905	1100	1200	1450	1560
Net weight	kg		11.4	12.5	15.5	16.5	17.9	23.9	25.7	30.7	31.6
Gross weight	kg		12.6	13.8	17.0	18.2	19.7	26.2	28.1	33.7	34.6

The sound pressure level was measured in an acoustic room 1 m in front of and 1 m below the vertical centreline of the unit. External static pressure is measured without the filter and without the air outlet fitting. For EC units, the tables show the maximum power input and sound pressure level values; EC speed is set by command (signal) control. Dimensions are in millimetres.

DF422 – 4-pipe, 2 cooling rows + 2 heating rows, AC motor

Model			DF422-34-B-AC DF422-34-E-AC	DF422-51-B-AC DF422-51-E-AC	DF422-68-B-AC DF422-68-E-AC	DF422-85-B-AC DF422-85-E-AC	DF422-102-B-AC DF422-102-E-AC	DF422-136-B-AC DF422-136-E-AC	DF422-170-B-AC DF422-170-E-AC	DF422-204-B-AC DF422-204-E-AC	DF422-238-B-AC DF422-238-E-AC
Air flow	m³/h	H	340	510	680	850	1020	1360	1700	2040	2380
		M	255	382	510	637	765	1122	1402	1683	1927
		L	170	255	340	425	510	850	1062	1275	1487
Total cooling capacity 7/12/27 °C	W	H	1 757	2 570	3 403	4 379	5 056	6 213	7 258	8 738	9 518
		M	1 579	2 324	3 111	4 012	4 540	5 653	6 605	7 873	8 748
		L	1 279	1 912	2 504	3 228	3 650	4 573	5 334	6 361	7 063
Sensible cooling capacity 7/12/27 °C	W	H	1 589	2 255	3 056	4 176	4 542	5 632	6 690	8 398	8 679
		M	1 428	2 039	2 793	3 824	4 079	5 125	6 088	7 566	7 976
		L	1 157	1 677	2 249	3 077	3 279	4 145	4 917	6 113	6 440
Heating capacity 45/40/20 °C	W	H	1 645	2 343	3 258	4 100	4 766	5 650	6 574	8 762	8 910
		M	1 433	2 037	2 730	3 666	4 032	4 842	5 721	7 650	7 707
		L	1 181	1 738	2 411	3 034	3 436	4 073	4 735	6 396	6 327
Power input at 12 Pa	W		28	34	55	68	87	125	152	185	205
Power input at 30 Pa	W		42	55	68	87	108	142	174	210	253
Power input at 50 Pa	W		49	66	84	100	118	174	210	250	300
Max. current	A		0,22	0,30	0,38	0,45	0,54	0,79	0,95	1,14	1,36
Sound pressure level at 12 Pa	dB(A)		34	35	38	42	43	44	46	48	49
Sound pressure level at 30 Pa	dB(A)		37	38	41	44	45	46	48	48	49
Sound pressure level at 50 Pa	dB(A)		42	44	46	47	49	50	52	54	56
Cooling water flow	l/h		302	442	585	753	869	1068	1248	1503	1637
Heating water flow	l/h		283	403	560	705	820	972	1131	1507	1532
Cooling water pressure drop	kPa		21	17	30	19	24	27	23	30	30
Heating water pressure drop	kPa		18	14	28	17	22	23	19	30	27
Power supply	220-230 V / 1 Ph / 50 or 60 Hz										
External static pressure	12 / 30 / 50 Pa										
Fan type	Forward-curved centrifugal fan										
Motor type	3-speed asynchronous motor										
Insulation class	E										
Heat exchanger	Copper tubes mechanically expanded into aluminium fins; 4-pipe, 2+2-row										
Max. working pressure	1,6 MPa (16 bar)										
Water connections	3/4" FPT										
Condensate connection	3/4" MPT										
Unit length	mm		670	770	970	1070	1170	1370	1470	1770	1870
Unit width	mm		504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)
Unit height	mm		242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)
Dim. A	mm		640	740	940	1040	1140	1340	1440	1740	1840
Dim. B, air outlet width	mm		505	585	755	840	965	1160	1260	1510	1620
Dim. C, suspension holes	mm		475	555	725	810	935	1130	1230	1480	1590
Dim. D, air inlet width	mm		445	525	695	780	905	1100	1200	1450	1560
Net weight	kg		11.0	11.9	15.0	16.0	17.4	22.1	24.0	29.2	30.4
Gross weight	kg		12.2	13.3	16.6	17.7	19.2	24.4	26.3	32.2	33.4

The sound pressure level was measured in an acoustic room 1 m in front of and 1 m below the vertical centreline of the unit. External static pressure is measured without the filter and without the air outlet fitting. For EC units, the tables show the maximum power input and sound pressure level values; EC speed is set by command (signal) control. Dimensions are in millimetres.

DF422 – 4-pipe, 2 cooling rows + 2 heating rows, EC motor

Model			DF422-34-B-EC DF422-34-E-EC	DF422-51-B-EC DF422-51-E-EC	DF422-68-B-EC DF422-68-E-EC	DF422-85-B-EC DF422-85-E-EC	DF422-102-B-EC DF422-102-E-EC	DF422-136-B-EC DF422-136-E-EC	DF422-170-B-EC DF422-170-E-EC	DF422-204-B-EC DF422-204-E-EC	DF422-238-B-EC DF422-238-E-EC
Air flow	m³/h	H	340	510	680	850	1020	1360	1700	2040	2380
		M	255	382	510	637	765	1122	1402	1683	1927
		L	170	255	340	425	510	850	1062	1275	1487
Total cooling capacity 7/12/27 °C	W	H	1 797	2 585	3 505	4 417	5 113	6 111	7 234	8 742	9 519
		M	1 616	2 337	3 204	4 046	4 592	5 561	6 583	7 876	8 748
		L	1 308	1 923	2 580	3 255	3 692	4 498	5 317	6 365	7 063
Sensible cooling capacity 7/12/27 °C	W	H	1 598	2 262	2 990	4 136	4 719	5 620	6 637	8 005	8 596
		M	1 437	2 045	2 734	3 787	4 237	5 114	6 040	7 212	7 900
		L	1 164	1 683	2 201	3 047	3 407	4 137	4 878	5 828	6 378
Heating capacity 45/40/20 °C	W	H	1 743	2 535	3 361	4 131	5 070	5 810	6 777	8 493	9 111
		M	1 519	2 203	2 815	3 692	4 290	4 979	5 896	7 415	7 881
		L	1 251	1 881	2 486	3 057	3 655	4 189	4 880	6 201	6 469
Power input at 12 Pa	W		17	20	36	44	56	78	88	114	139
Power input at 30 Pa	W		26	34	42	51	63	91	101	140	166
Power input at 50 Pa	W		29	38	49	56	80	101	125	173	208
Max. current	A		0,13	0,17	0,22	0,25	0,36	0,46	0,57	0,79	0,95
Sound pressure level at 12 Pa	dB(A)		35	37	39	41	43	44	46	48	50
Sound pressure level at 30 Pa	dB(A)		38	40	42	44	45	46	48	50	52
Sound pressure level at 50 Pa	dB(A)		40	42	44	45	47	48	50	52	54
Cooling water flow	l/h		309	445	603	760	879	1051	1244	1503	1637
Heating water flow	l/h		300	436	578	710	872	999	1165	1461	1567
Cooling water pressure drop	kPa		22	17	32	19	25	27	23	30	30
Heating water pressure drop	kPa		21	17	30	17	24	24	20	28	28
Power supply	220-230 V / 1 Ph / 50 or 60 Hz										
External static pressure	12 / 30 / 50 Pa										
Fan type	Forward-curved centrifugal fan										
Motor type	EC motor with command-based speed control										
Insulation class	E										
Heat exchanger	Copper tubes mechanically expanded into aluminium fins; 4-pipe, 2+2-row										
Max. working pressure	1,6 MPa (16 bar)										
Water connections	3/4" FPT										
Condensate connection	3/4" MPT										
Unit length	mm		670	770	970	1070	1170	1370	1470	1770	1870
Unit width	mm		504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)
Unit height	mm		242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)
Dim. A	mm		640	740	940	1040	1140	1340	1440	1740	1840
Dim. B, air outlet width	mm		505	585	755	840	965	1160	1260	1510	1620
Dim. C, suspension holes	mm		475	555	725	810	935	1130	1230	1480	1590
Dim. D, air inlet width	mm		445	525	695	780	905	1100	1200	1450	1560
Net weight	kg		12.8	14.1	17.0	18.0	19.4	26.7	28.4	33.2	33.8
Gross weight	kg		14.0	15.4	18.5	19.7	21.2	29.0	30.8	36.2	36.8

The sound pressure level was measured in an acoustic room 1 m in front of and 1 m below the vertical centreline of the unit. External static pressure is measured without the filter and without the air outlet fitting. For EC units, the tables show the maximum power input and sound pressure level values; EC speed is set by command (signal) control. Dimensions are in millimetres.

DF431 – 4-pipe, 3 cooling rows + 1 heating row, AC motor

Model			DF431-34-B-AC DF431-34-E-AC	DF431-51-B-AC DF431-51-E-AC	DF431-68-B-AC DF431-68-E-AC	DF431-85-B-AC DF431-85-E-AC	DF431-102-B-AC DF431-102-E-AC	DF431-136-B-AC DF431-136-E-AC	DF431-170-B-AC DF431-170-E-AC	DF431-204-B-AC DF431-204-E-AC	DF431-238-B-AC DF431-238-E-AC
Air flow	m³/h	H	340	510	680	850	1020	1360	1700	2040	2380
		M	255	382	510	637	765	1122	1402	1683	1927
		L	170	255	340	425	510	850	1062	1275	1487
Total cooling capacity 7/12/27 °C	W	H	2 075	2 972	3 900	4 652	5 868	7 904	9 042	11 197	11 969
		M	1 865	2 687	3 565	4 262	5 269	7 192	8 229	10 088	11 000
		L	1 510	2 211	2 870	3 429	4 236	5 817	6 646	8 151	8 881
Sensible cooling capacity 7/12/27 °C	W	H	1 860	2 639	3 470	4 431	5 410	7 211	8 280	10 171	10 791
		M	1 672	2 386	3 172	4 058	4 858	6 562	7 535	9 164	9 917
		L	1 354	1 963	2 554	3 265	3 906	5 307	6 086	7 404	8 007
Heating capacity 45/40/20 °C	W	H	1 025	1 333	1 920	2 438	3 150	3 412	4 206	5 096	6 112
		M	893	1 159	1 609	2 180	2 665	2 924	3 660	4 449	5 287
		L	736	989	1 421	1 804	2 271	2 460	3 029	3 720	4 340
Power input at 12 Pa	W		28	34	55	68	87	125	152	185	205
Power input at 30 Pa	W		42	55	68	87	108	142	174	210	253
Power input at 50 Pa	W		49	66	84	100	118	174	210	250	300
Max. current	A		0,22	0,30	0,38	0,45	0,54	0,79	0,95	1,14	1,36
Sound pressure level at 12 Pa	dB(A)		34	35	38	42	43	44	46	48	49
Sound pressure level at 30 Pa	dB(A)		37	38	41	44	45	46	48	48	49
Sound pressure level at 50 Pa	dB(A)		42	44	46	47	49	50	52	54	56
Cooling water flow	l/h		357	511	671	800	1009	1359	1555	1925	2058
Heating water flow	l/h		176	229	330	419	542	587	723	876	1051
Cooling water pressure drop	kPa		20	20	20	30	40	40	40	40	50
Heating water pressure drop	kPa		7	16	23	39	34	21	25	33	40
Power supply	220-230 V / 1 Ph / 50 or 60 Hz										
External static pressure	12 / 30 / 50 Pa										
Fan type	Forward-curved centrifugal fan										
Motor type	3-speed asynchronous motor										
Insulation class	E										
Heat exchanger	Copper tubes mechanically expanded into aluminium fins; 4-pipe, 3+1-row										
Max. working pressure	1,6 MPa (16 bar)										
Water connections	3/4" FPT										
Condensate connection	3/4" MPT										
Unit length	mm		670	770	970	1070	1170	1370	1470	1770	1870
Unit width	mm		504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)
Unit height	mm		242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)
Dim. A	mm		640	740	940	1040	1140	1340	1440	1740	1840
Dim. B, air outlet width	mm		505	585	755	840	965	1160	1260	1510	1620
Dim. C, suspension holes	mm		475	555	725	810	935	1130	1230	1480	1590
Dim. D, air inlet width	mm		445	525	695	780	905	1100	1200	1450	1560
Net weight	kg		12.8	14.1	17.0	18.0	19.4	26.7	28.4	33.2	33.8
Gross weight	kg		14.0	15.4	18.5	19.7	21.2	29.0	30.8	36.2	36.8

The sound pressure level was measured in an acoustic room 1 m in front of and 1 m below the vertical centreline of the unit. External static pressure is measured without the filter and without the air outlet fitting. For EC units, the tables show the maximum power input and sound pressure level values; EC speed is set by command (signal) control. Dimensions are in millimetres.

DF431 – 4-pipe, 3 cooling rows + 1 heating row, EC motor

Model			DF431-34-B-EC DF431-34-E-EC	DF431-51-B-EC DF431-51-E-EC	DF431-68-B-EC DF431-68-E-EC	DF431-85-B-EC DF431-85-E-EC	DF431-102-B-EC DF431-102-E-EC	DF431-136-B-EC DF431-136-E-EC	DF431-170-B-EC DF431-170-E-EC	DF431-204-B-EC DF431-204-E-EC	DF431-238-B-EC DF431-238-E-EC
Air flow	m³/h	H	340	510	680	850	1020	1360	1700	2040	2380
		M	255	382	510	637	765	1122	1402	1683	1927
		L	170	255	340	425	510	850	1062	1275	1487
Total cooling capacity 7/12/27 °C	W	H	2 074	2 973	3 899	4 652	5 867	7 903	9 042	11 196	11 969
		M	1 865	2 688	3 564	4 262	5 269	7 192	8 228	10 087	11 000
		L	1 510	2 212	2 870	3 429	4 236	5 817	6 646	8 151	8 881
Sensible cooling capacity 7/12/27 °C	W	H	1 859	2 641	3 469	4 431	5 410	7 210	8 279	10 170	10 791
		M	1 672	2 387	3 171	4 058	4 858	6 561	7 534	9 163	9 917
		L	1 354	1 965	2 553	3 265	3 906	5 307	6 085	7 404	8 007
Heating capacity 45/40/20 °C	W	H	1 024	1 337	1 909	2 419	3 214	3 447	4 230	5 008	6 173
		M	892	1 162	1 599	2 162	2 719	2 954	3 680	4 372	5 340
		L	735	992	1 412	1 790	2 317	2 485	3 046	3 656	4 383
Power input at 12 Pa	W		17	20	36	44	56	78	88	114	139
Power input at 30 Pa	W		26	34	42	51	63	91	101	140	166
Power input at 50 Pa	W		29	38	49	56	80	101	125	173	208
Max. current	A		0,13	0,17	0,22	0,25	0,36	0,46	0,57	0,79	0,95
Sound pressure level at 12 Pa	dB(A)		35	37	39	41	43	44	46	48	50
Sound pressure level at 30 Pa	dB(A)		38	40	42	44	45	46	48	50	52
Sound pressure level at 50 Pa	dB(A)		40	42	44	45	47	48	50	52	54
Cooling water flow	l/h		357	511	670	800	1009	1359	1555	1925	2058
Heating water flow	l/h		176	230	328	416	553	593	727	861	1062
Cooling water pressure drop	kPa		20	20	20	30	40	40	40	40	50
Heating water pressure drop	kPa		7	16	23	38	35	22	25	32	41
Power supply	220-230 V / 1 Ph / 50 or 60 Hz										
External static pressure	12 / 30 / 50 Pa										
Fan type	Forward-curved centrifugal fan										
Motor type	EC motor with command-based speed control										
Insulation class	E										
Heat exchanger	Copper tubes mechanically expanded into aluminium fins; 4-pipe, 3+1-row										
Max. working pressure	1,6 MPa (16 bar)										
Water connections	3/4" FPT										
Condensate connection	3/4" MPT										
Unit length	mm		670	770	970	1070	1170	1370	1470	1770	1870
Unit width	mm		504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)	504 (B) 520 (E)
Unit height	mm		242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)	242 (B) 230 (E)
Dim. A	mm		640	740	940	1040	1140	1340	1440	1740	1840
Dim. B, air outlet width	mm		505	585	755	840	965	1160	1260	1510	1620
Dim. C, suspension holes	mm		475	555	725	810	935	1130	1230	1480	1590
Dim. D, air inlet width	mm		445	525	695	780	905	1100	1200	1450	1560
Net weight	kg		12.8	14.1	17.0	18.0	19.4	26.7	28.4	33.2	33.8
Gross weight	kg		14.0	15.4	18.5	19.7	21.2	29.0	30.8	36.2	36.8

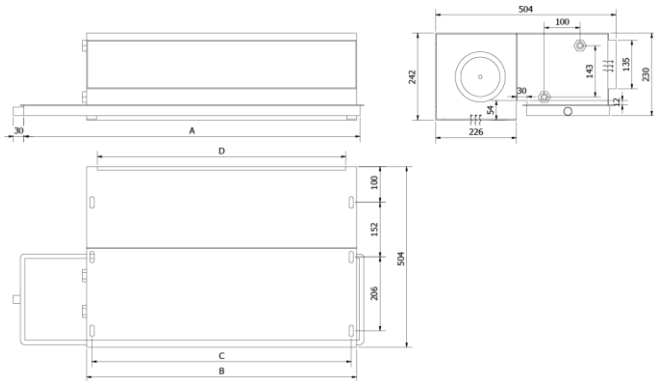
The sound pressure level was measured in an acoustic room 1 m in front of and 1 m below the vertical centreline of the unit. External static pressure is measured without the filter and without the air outlet fitting. For EC units, the tables show the maximum power input and sound pressure level values; EC speed is set by command (signal) control. Dimensions are in millimetres.

DIMENSIONS (2-pipe)

BOTTOM AIR RETURN

DF23-...-B-AC

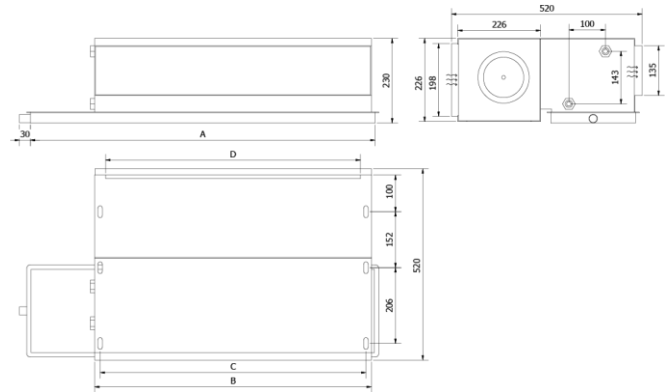
DF23-...-B-EC



REAR AIR RETURN

DF23-...-E-AC

DF23-...-E-EC



Model	DF23-34-B DF23-34-E	DF23-51-B DF23-51-E	DF23-68-B DF23-68-E	DF23-85-B DF23-85-E	DF23-102-B DF23-102-E	DF23-136-B DF23-136-E	DF23-170-B DF23-170-E	DF23-204-B DF23-204-E	DF23-238-B DF23-238-E
A	640	740	940	1040	1140	1340	1440	1740	1840
B	505	585	755	840	965	1160	1260	1510	1620
C	475	555	725	810	935	1130	1230	1480	1590
D	445	525	695	780	905	1100	1200	1450	1560

DIMENSIONS (4-pipe)

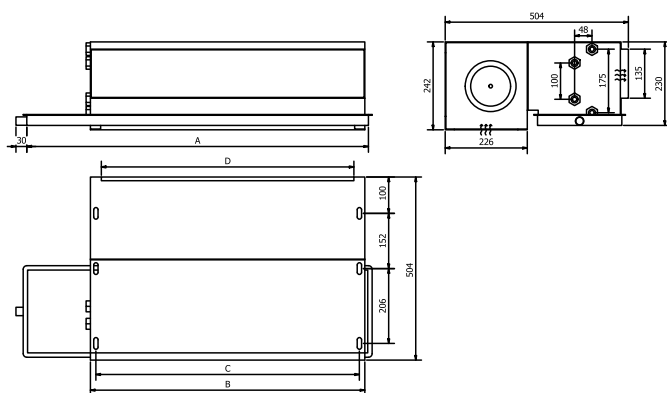
BOTTOM AIR RETURN

DF422-...-B-AC

DF422-...-B-EC

DF431-...-B-AC

DF431-...-B-EC



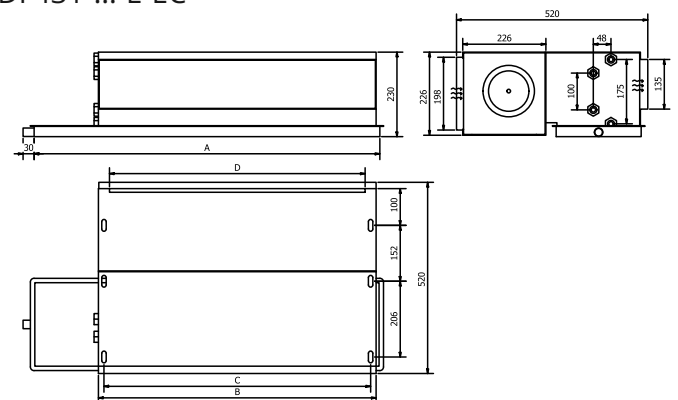
REAR AIR RETURN

DF422-...-E-AC

DF422-...-E-EC

DF431-...-E-AC

DF431-...-E-EC



Model	DF422-34-B DF422-34-E	DF422-51-B DF422-51-E	DF422-68-B DF422-68-E	DF422-85-B DF422-85-E	DF422-102-B DF422-102-E	DF422-136-B DF422-136-E	DF422-170-B DF422-170-E	DF422-204-B DF422-204-E	DF422-238-B DF422-238-E
A	640	740	940	1040	1140	1340	1440	1740	1840
B	505	585	755	840	965	1160	1260	1510	1620
C	475	555	725	810	935	1130	1230	1480	1590
D	445	525	695	780	905	1100	1200	1450	1560

4 Installation

4.1 Delivery inspection

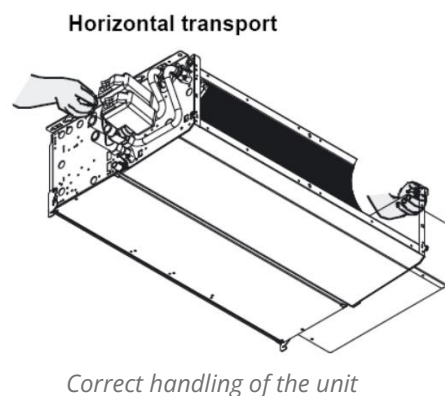
Each fan coil unit is packed in a corrugated cardboard box. On receipt, inspect the goods as follows.

- Before accepting delivery, check the packaging for visible damage
- If the box is damaged, unpack it immediately and inspect the unit and accessories. If the unit is damaged, note this on the delivery note and refuse acceptance
- Check for concealed damage. If concealed damage is found, do not move the unit, stop unloading and take photographs
- Notify the carrier and arrange a joint inspection by the carrier and the recipient
- Do not carry out any repairs until the carrier representative has inspected and confirmed the damage
- Once the damage has been confirmed, contact the supplier regarding replacement

4.2 Transport

RISK OF UNIT DAMAGE AND PERSONAL INJURY
Wear protective gloves - sharp edges may cause injury
The fan coil unit must be carried by at least two people
For palletised deliveries, use only lifting and transport equipment with sufficient load capacity
Secure the load during transport to prevent it from tipping over or falling

Transport and lift the unit horizontally, holding it by both sides of the upper unit casing. Never lift the unit by the water connections, condensate tray or electrical box. Unit weights are given in the technical data.



4.3 Temporary storage

- Store the unit in its original packaging
- The storage area must be weather-protected, dry and dust-free
- Relative humidity must be between 50 and 85 %
- Storage temperature must be between -10 °C and +50 °C
- Do not stack units higher than the number of layers indicated on the packaging

4.4 Preparation for installation

DANGER FROM ELECTRICAL CURRENT

Before drilling, make sure there are no electrical cables or pipes at the intended drilling location.

RISK OF INJURY

Falling parts and sharp edges may cause injury

Wear a safety helmet, safety footwear and protective gloves when installing the unit

Ceiling installation must always be carried out by two people

NOTE

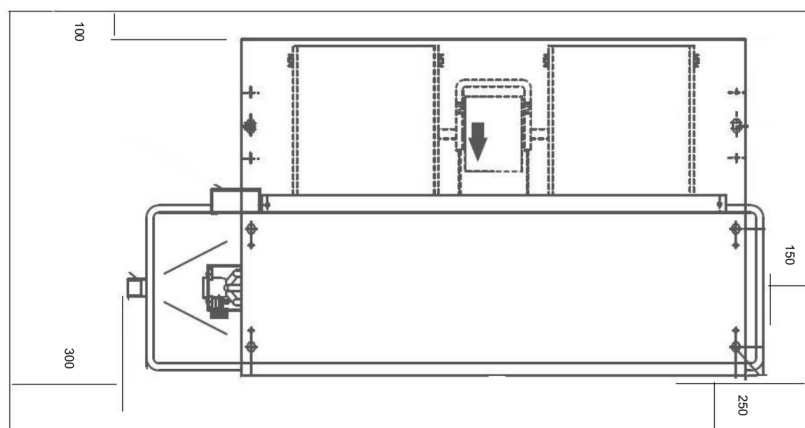
During installation, the unit must not be mechanically deformed or twisted in any mounting position.

4.4.1 Installation location

- The ceiling or mounting structure must be capable of supporting the weight of the unit including all accessories
- Install the unit indoors only, in an enclosed space
- The type, condition and ambient temperature of the installation location must be suitable for the unit
- The entire suspended-ceiling space must be dry and adequately protected from moisture and humid air, with no openings to the outside
- Electrical wiring must be prepared and accessible for connection within the suspended ceiling
- Coordinate all wall and ceiling openings with the architect or structural engineer and the building contractor

4.4.2 Recommended service opening

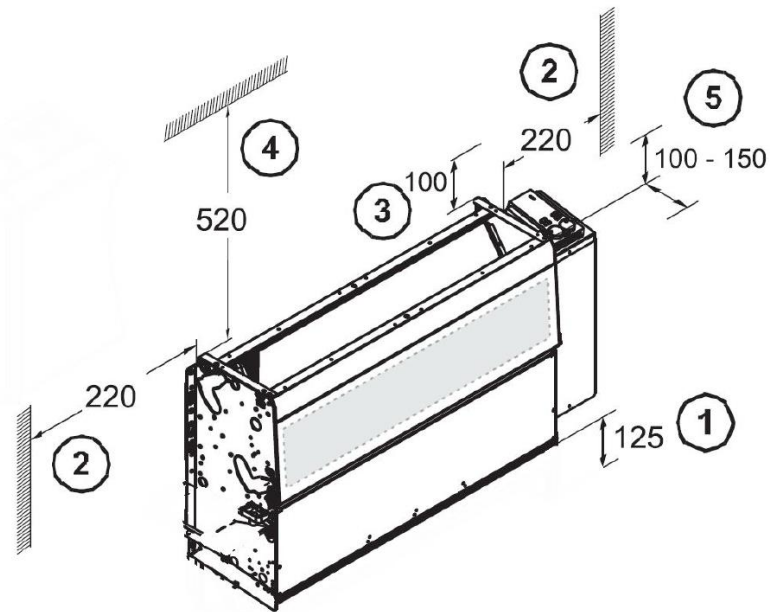
To allow all required servicing and maintenance work, provide a service opening in the suspended ceiling at least as large as shown below. Where additional accessories are installed, larger or additional openings may be required, and access to the filter must be ensured.



Recommended service opening

4.4.3 Installation clearances

Depending on the model and installation, pipes may be connected from the left or right. Observe the installation clearances shown below and leave sufficient space for pipes, valves, wiring and filter removal. If access to the connections is uncertain, allow more installation space.



Installation clearances

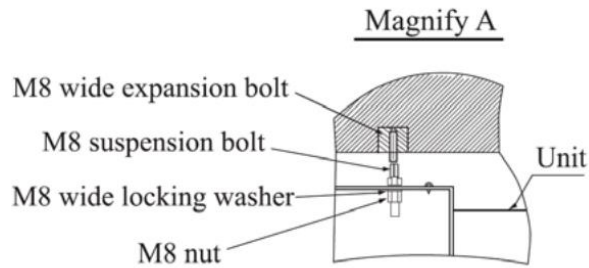
4.5 Unit installation

4.5.1 Precautions

- Provide sufficient space for installation and maintenance. Removable ceiling panels or service openings must be provided for regular maintenance
- Before installation, determine the routing of the pipework and electrical wiring and leave sufficient space for connections
- Make sure the suspension structure is suitable for the unit weight
- All units must be levelled to ensure proper condensate drainage and correct operation
- The connected ductwork must match the external static pressure rating of the unit
- Thermal insulation of chilled-water valves and pipework is the installer's responsibility

4.5.2 Suspension

Suspend the unit from the structural ceiling using four M8 suspension bolts, two on each side. Use anchor bolts in existing ceilings; in new ceilings use cast-in bolts or site-prepared embedded parts. Suspension bolts must be made of high-quality corrosion-protected carbon steel or stainless steel.



Suspension bolt, washers and nuts

1. Transfer the suspension-hole dimensions from the technical data to the ceiling
2. Install the suspension bolts and verify that the structure can support the unit weight
3. Hang the unit on the suspension brackets
4. Level the unit in all directions using a spirit level by adjusting the nuts up or down
5. Tighten the nuts above and below each bracket to secure the unit

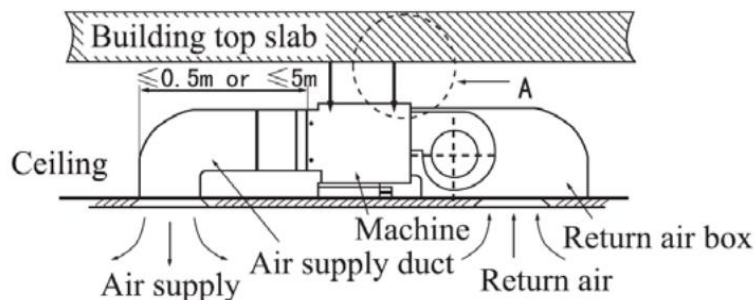
NOTE

To ensure complete drainage from the condensate tray, install the unit with an approximately 5 mm slope towards the condensate drain connection and a 0–2 mm slope towards the front of the unit

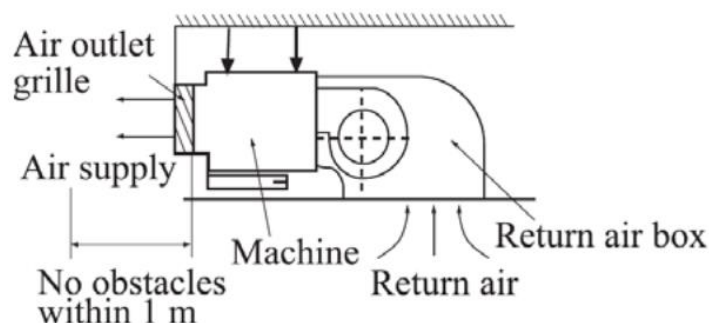
The suspension must not transmit vibration to the structure. For lightweight ceiling structures, use vibration isolators between the bracket and the bolt

4.6 Duct connection

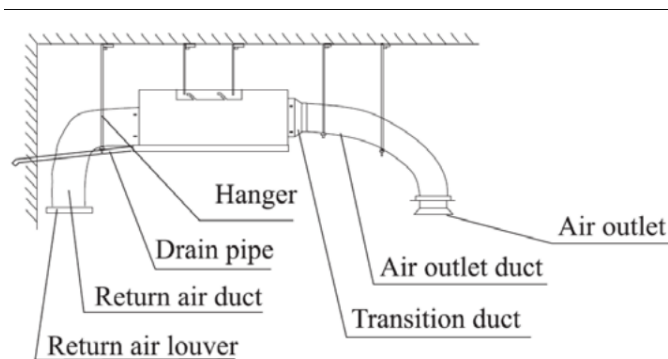
Galvanised sheet-steel air ducts supplied by the installer are connected to the unit air inlet and outlet flanges. Insert the duct into the flange and secure it with screws or rivets. If the duct and flange are different sizes, connect them with a site-made transition. Use flexible connections at the unit to prevent fan vibration from being transmitted to the duct system.



Return-air plenum and supply duct in suspended ceiling



Supply-air grille arrangement, with no obstructions within 1 m



Typical duct arrangement

NOTE

Always make sure that the duct length and fittings are suitable for the unit external static pressure class (12, 30 or 50 Pa)

The distance from the duct outlet to the supply-air grille depends on the actual duct length and the grille used.

Install the ducts so that they can be removed for cleaning the unit

4.7 Pipe connection

DANGER OF SCALDING FROM LEAKING HEAT-TRANSFER MEDIUM

Before installing the site pipework and hydraulic connection to the fan coil unit, the heating and cooling water must be shut off and secured against accidental opening.

NOTE

Water connections for all sizes are 3/4" FPT

At the start of installation, remove the caps from the water inlet and outlet pipes

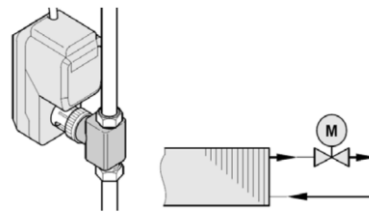
When tightening, hold the heat exchanger connection with a second wrench to prevent twisting the heat exchanger header

Once all connections are made, tighten all threaded joints and check that they are free from mechanical stress

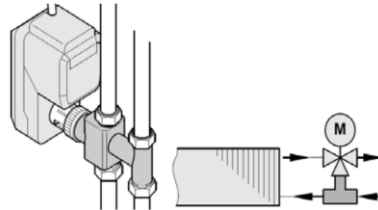
Arrange the connections so that the heat exchanger can be disconnected at any time for cleaning or removal

4.7.1 Valve connection

Units are supplied without valves. When valves are installed on site, the water inlet and outlet arrangement depends on the position of the water connections and the valves used. A 4-pipe unit has two sets of water connections and therefore requires two valve sets, one for the cooling circuit and one for the heating circuit.



Two-way valve arrangement

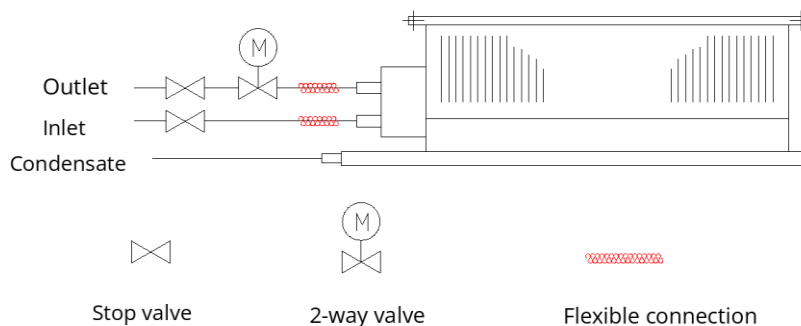


Three-way valve arrangement

ACTUATOR SUPPLY VOLTAGE

The A230NC thermoelectric actuator is a 230 V type. A 24 V actuator must never be connected to a 230 V output. If a 24 V actuator is required, it must be supplied from a separate 24 V safety transformer and switched via an interposing relay.

4.7.2 Water inlet and outlet connection



Water and condensate connections

Symbols in the figure from left: shut-off valve, motorised two-way valve, flexible connection.

NOTE

The water inlet is the lower connection and the water outlet is the upper connection; also see the label on the side of the unit

Flexible connections must be used at the water inlet and outlet connections

Shut-off valves must be installed in the inlet and outlet pipework

An air vent valve must be installed at the highest point of the water system

A drain valve must be installed at the lowest point of the water system

All connected pipework carrying chilled water must be insulated against condensation, with particular care at the insulation ends

4.7.3 Condensate drain connection

The condensate drain installed by the installer is connected to the 3/4" MPT condensate connection on the condensate tray. Connect it without mechanical stress.

- Route the condensate pipe with a continuous slope of at least 1:100
 - Where the condensate pipe is connected to the drainage system, install a trap in accordance with local drainage requirements. A trap is not required where the pipe is unpressurised or discharges outdoors
 - The condensate drain installed by the installer is connected to the 3/4" MPT condensate connection on the condensate tray. Connect it without mechanical stress. Install the unit itself with an approximately 5 mm slope towards the condensate drain.
 - Insulate the condensate pipe to prevent condensation forming on its outer surface
- Tighten all pipe connections to prevent leakage and test the drain with water before closing the ceiling
- Clean the condensate tray after installation to ensure free drainage

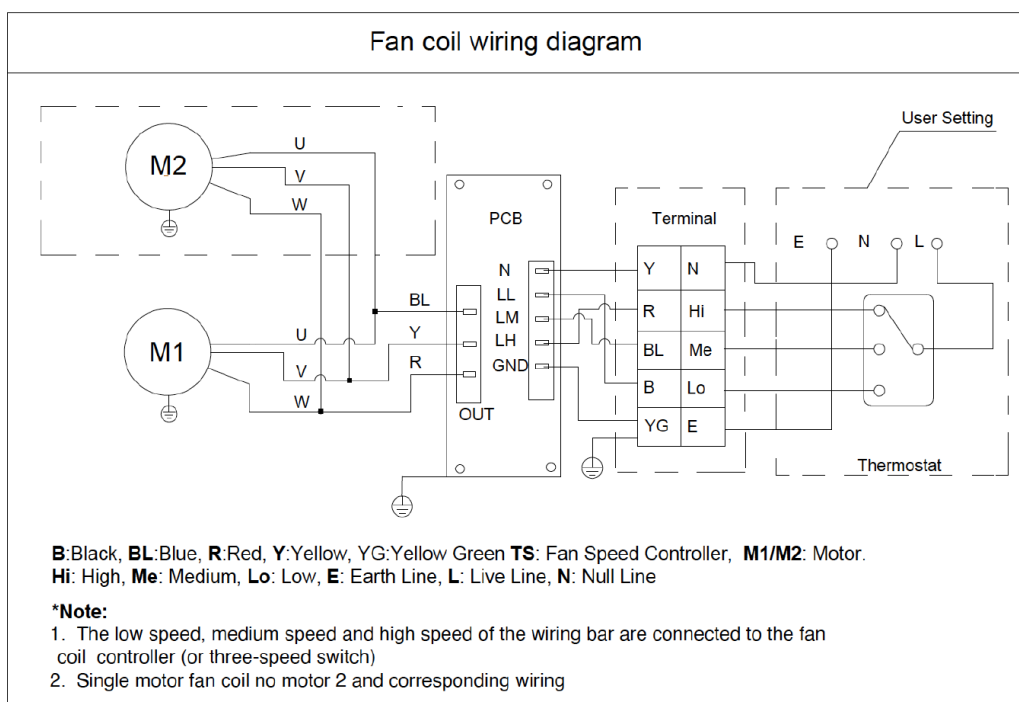
4.8 Electrical installation

DANGER FROM ELECTRICAL CURRENT

Disconnect the power supply before starting any installation work

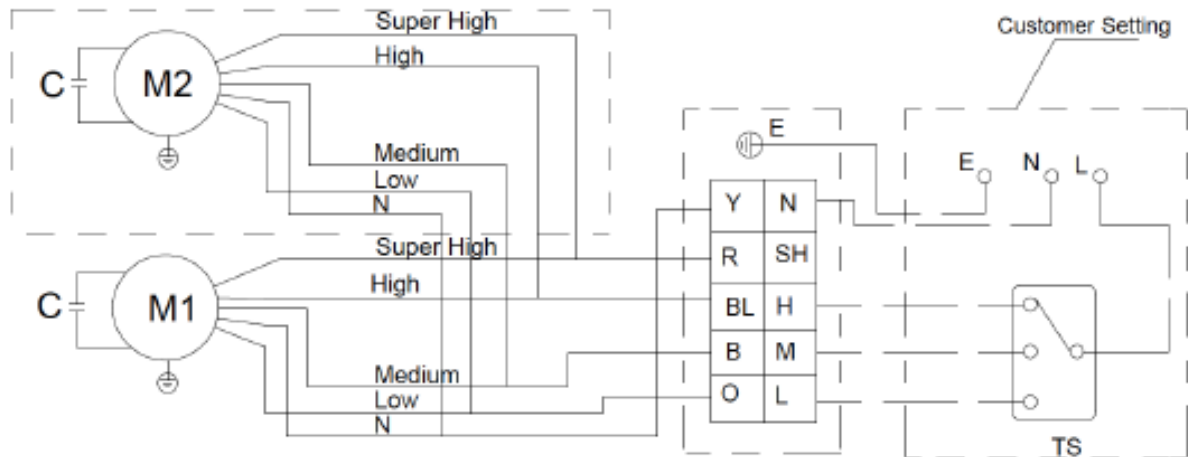
Electrical installation may be carried out only by qualified electricians in accordance with this manual

- Electrical connections must be made in accordance with the applicable wiring diagram. The binding diagram is the one attached to the inside of the electrical-box cover of the supplied unit
- Check the nameplate before connecting the power supply. Incorrect supply voltage will damage the motor
- The grounding point provided on the unit must be connected to the building grounding system
- All electrical connections must comply with local electrical requirements
- The wiring diagrams do not include protective measures. Applicable standards and regulations must be observed and coordinated with the local electricity supplier
- Wire the motorised valves and room thermostat according to their own installation instructions and connect them correctly to the unit



Wiring diagram, EC units

Wiring Diagram for 30 Pa unit

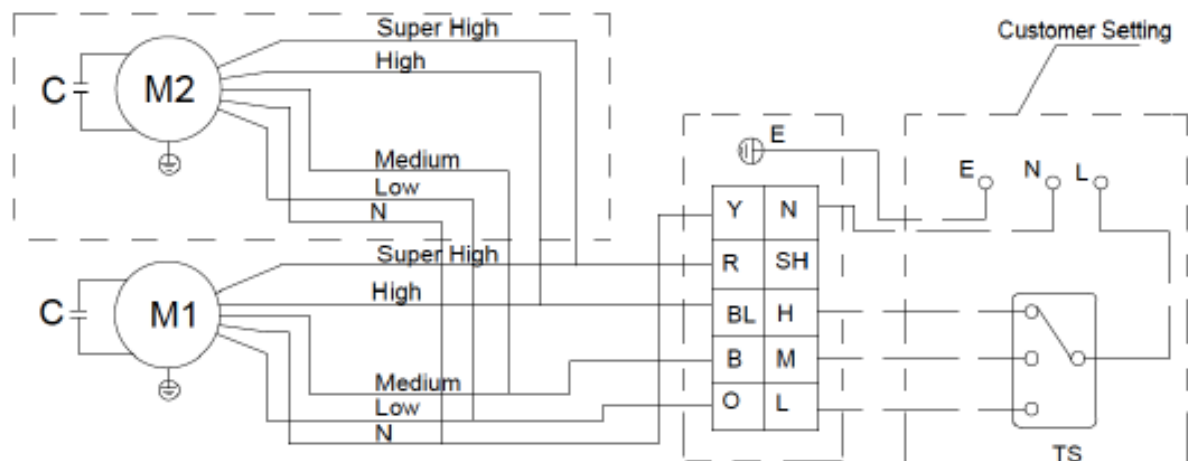


B:Black, **BL:**Blue, **O:**Orange, **R:**Red, **Y:**Yellow, **TS:** Fan Speed Controller, **C:**Capacitor, **M1/M2:**Four Speed Motor. **SH:** Super High, **H:** High, **M:** Medium, **L:** Low, **E:** Earth Line, **L:** Live Line, **N:** Null Line

***Note:**

1. Wiring between speed terminals to speed controller
2. Components in dashed part may not exist in some models
3. Product Static Pressure 12Pa: wiring L, M, H (Low, Medium and High)
Product Static Pressure 30 Pa: wiring M, H, SH (Medium, High and Super High)

Wiring Diagram for 50 Pa unit



B:Black, **BL:**Blue, **O:**Orange, **R:**Red, **Y:**Yellow, **TS:** Fan Speed Controller, **C:**Capacitor, **M1/M2:**Four Speed Motor. **SH:** Super High, **H:** High, **M:** Medium, **L:** Low, **E:** Earth Line, **L:** Live Line, **N:** Null Line

***Note:**

1. Wiring between speed terminals to speed controller
2. Components in dashed part may not exist in some models
3. Product Static Pressure 30 Pa: wiring L, M, H (Low, Medium and High)
Product Static Pressure 50 Pa: wiring M, H, SH (Medium, High and Super High)

Wiring diagram, AC units

UNIT DAMAGE

Incorrect wiring can permanently damage the fan motor. Connect the unit strictly in accordance with the diagram attached to the electrical box.

5 Commissioning

SAFETY

The warnings in Section 2 apply in full: electrical hazard, danger of scalding and danger from rotating parts. Before carrying out any work on the unit, electrically isolate it, secure it against being switched on again, shut off the heat-transfer medium and allow it to cool.

5.1 Commissioning requirements

After installation, the installer must check and confirm the following. This manual has been read in full and the operators are familiar with the unit and able to operate it.

- The fan coil unit is electrically isolated
- The entire fan coil system has been installed mechanically and electrically
- The air ducts are fully connected and securely fastened
- All water pipes have been flushed and are free of deposits and foreign objects
- The system has been pressure-tested (recommended test pressure 2,4 MPa for at least 10 minutes) and filled with clean water
- The fan coil unit is properly secured, installed and levelled, with a slope towards the condensate drain
- The valves, actuators and room thermostat have been manually checked in accordance with their own instructions
- All water connections are tightened
- All electrical connections have been checked against the applicable wiring diagram and the terminal screws tightened
- The heat exchanger, condensate tray, condensate drain and filter are clean

NOTE

When the system is filled for the first time, air remains in the pipework and accumulates at the highest point of the water system. If unusual noise is heard due to trapped air, open the air vent until the water flows steadily, then close it again.

5.2 Commissioning

1. Switch on the power and check low, medium and high fan speed in sequence
2. Vent the heat exchanger and pipework
3. Set the fan speed (using the command-control thermostat) so that the air flow and external static pressure match the designed duct system
4. Balance the water flow using the regulating valve to the design flow stated in the technical data
5. Check that condensate drains freely by pouring water into the condensate tray

6. Adjust the supply-air grilles to achieve even air distribution
7. Check operation of the valve actuators in heating and cooling modes
8. Run the unit at high speed for 24 hours and check its operation again

If unusual noise or behaviour occurs, switch off the unit and recheck the points above before continuing.

UNIT DAMAGE

If the unit is not used in winter, drain the water from inside the unit after commissioning to prevent the pipes from cracking due to ice formation.

5.3 Handover

- Record the commissioning results and settings made
- Instruct the operator on how to use the room thermostat and how to clean the filter
- Hand this manual over to the operator and draw attention to the maintenance intervals
- Point out that the unit must not be operated without the filter installed

6 Operation and maintenance

6.1 Daily operation

The unit is controlled by a compatible 3-speed room thermostat. Recommended controllers are listed in Section 9.1. The EC version is controlled by a compatible 3-speed room thermostat. On/off, operating mode, room temperature setpoint and fan speed are selected on the thermostat; follow the instructions supplied with it. During normal use, no other operator intervention is required.

- Set a moderate room temperature. Every degree of excessive cooling or overheating noticeably increases energy consumption
- Pay particular attention to the temperature setting in areas occupied by elderly people, children or ill persons.
- Keep the supply- and return-air grilles unobstructed. Blocking or covering them reduces performance and may cause condensate to enter the duct
- When the unit serves a room with openable windows, keep the windows closed while the unit is operating
- A brief power interruption or nearby lightning strike may disturb the electronics. If this occurs, switch the power off and on again

6.2 Seasonal changeover and shutdown

- Before the cooling season, check that the condensate tray and condensate pipe are clean and that the filter has been cleaned
- Before the heating season, check that the heat exchanger has been vented
- If the unit is taken out of service in winter or the building is left unheated, drain the water from the unit and pipework to prevent frost damage
- For extended shutdown, disconnect the unit from the power supply and close the shut-off valves

6.3 Operating restrictions

RISK OF INJURY AND PROPERTY DAMAGE
Do not insert fingers or any objects into the air inlet or outlet. The fan rotates at high speed and may cause serious injury
Do not clean the unit with water. Water may cause a short circuit and damage the unit
Do not operate the unit without the filter installed
Do not remove any unit covers. All work behind the covers is service work and may be carried out only by trained personnel
Do not modify the unit or its wiring

6.4 Maintenance

The DF ducted fan coil unit is a high-quality, reliable unit. Nevertheless, regular servicing and inspection by technical specialists are required to ensure continuous operation and performance. Wear and replacement parts (fan blower, fan motor and terminal block; for EC units also the PCB and electrical box), with size-specific order codes, are listed in a separate spare-parts list - FCCLB for AC units and FCDCLB for EC units - available from the supplier.

NOTE
Maintenance may be carried out only by trained technical personnel in accordance with this manual and applicable regulations
Before any maintenance work, disconnect the unit from the power supply, secure it against being switched on again, shut off the heat-transfer medium and allow it to cool
The warranty becomes void if damage to the unit is attributable to failure to carry out the specified maintenance and inspections
A written maintenance log must be kept

6.5 Maintenance schedule

Maintenance intervals

Component / activity	Quarterly	Annually
Filter inspection and cleaning	•	
Check that the condensate tray is clean and drains freely	•	
Check the condensate drain and its slope		•
Clean the condensate tray		•
Clean the heat exchanger		•
Inspect the fan wheel and fan housing		•
Check threaded water-pipe connections		•
Vent the heat exchanger		•
Check electrical connections		•
Check grounding		•
Check the setting and operation of all valves		•
Check the unit casing for corrosion		•

6.6 Filter cleaning

The filter has the greatest influence on unit performance and sound level during operation. A clogged filter reduces air flow and capacity and may cause condensate to enter the duct.

1. Disconnect the unit from the power supply and secure it against being switched on again
2. Open the service access and remove the filter from the return-air chamber
3. Dry-clean the filter using a vacuum cleaner set to medium or low power, or wash it in lukewarm water with a mild detergent
4. Allow the washed filter to dry completely before reinstalling it
5. Replace the filter if the mesh is damaged or contamination cannot be removed
6. Reinstall the filter and close the chamber before switching the unit on again

NOTE
In dusty locations, during the first months after handover of a new building, and in units with a high outdoor-air proportion, the filter must be checked more frequently than quarterly.

6.7 Annual maintenance

6.7.1 Condensate system

- Before the start of the cooling season, check the condensate tray and condensate connection for contamination
- Check the slope of the external condensate pipe and, if fitted, clean and refill the trap
- Check free drainage by pouring water into the condensate tray

6.7.2 Heat exchanger and fan

- Check the fins for contamination and damage. Clean the heat exchanger with compressed air or a soft brush in the direction of the fins, or with a dedicated heat-exchanger cleaner suitable for copper and aluminium
- Do not use alkaline or acidic cleaning agents and do not straighten the fins with a hard tool
- Check that the fan wheel is clean, undamaged and rotates freely by hand
- Vent the heat exchanger

6.7.3 Pipework and electrical connections

- Check that all threaded pipe connections are secure. When tightening, hold the connection with a second wrench
- Open the electrical box and check that all connections are securely fixed in the terminals
- Check the unit grounding with a suitable measuring instrument
- Close the electrical box again

7 Troubleshooting

Deviations from normal operating conditions indicate a fault and must be investigated by maintenance personnel. The tables below provide a starting point for possible causes and corrective actions. Actions marked with an asterisk may be carried out only by a qualified specialist.

SAFETY

Before carrying out any troubleshooting on the unit, disconnect it from the power supply, secure it against being switched on again, shut off the heat-transfer medium and allow it to cool.

7.1 Fan does not operate

Possible cause	Remedy
Unit not switched on	Switch on the unit using the thermostat
No supply voltage	Check the fuse and power supply
Cables not connected or terminal loose	Check and connect the cables
No speed signal from thermostat	Check thermostat wiring and setting

7.2 Unit is too noisy

Possible cause	Remedy
Fan speed is set too high for the duct system	Select a lower fan speed and check that the duct-system resistance matches the unit external static pressure class.
Air inlet or outlet blocked	Remove the obstruction and check that the ducts are not kinked
Filter dirty	Clean or replace the filter
Air in the heat exchanger	Vent the heat exchanger and pipework
Fan bearings noisy	Replace the fan

7.3 Insufficient cooling or heating

Possible cause	Remedy
Air volume flow too low	Select a higher speed and check the duct system
Filter dirty	Clean or replace the filter
Heat exchanger dirty	Clean the heat exchanger
Water flow too low	Check the pump and hydraulic balancing
Valve does not open	Check the actuator and its wiring
Incorrect water temperature	Check the chiller or boiler, circulation pump and changeover

7.4 Water leakage at unit

Possible cause	Remedy
Condensate tray or drain blocked	Clean the condensate tray and drain
Condensate pipe has no slope or trap is empty	Correct the slope; clean and fill the trap
Chilled-water pipes are inadequately insulated	Insulate the pipes
Unit not levelled	Install the unit with a slope towards the drain
Heat exchanger or connection leaking	Check and tighten the connections; if the heat exchanger is leaking, replace it

8 Disposal and conformity

8.1 Decommissioning and disposal

1. Disconnect the unit from the power supply and secure it against being switched on again
2. Close the water connections and completely drain the heat exchanger and condensate tray
3. Disconnect the electrical and hydraulic connections and the ducts
4. Remove the unit. Work at ceiling level must be carried out by two people
5. Separate the materials - galvanised and painted sheet steel, copper, aluminium, plastic, insulation and electronic components - and dispose of them in accordance with applicable national requirements

Electrical and electronic components must not be disposed of with household waste. They must be taken to an authorised collection point in accordance with Directive 2012/19/EU (WEEE) and applicable national legislation.

8.2 Nameplate

The nameplate is attached to the unit casing and shows the model designation, serial number, rated voltage and frequency, power input, current, protection class and year of manufacture. The nameplate data take precedence over the data in this manual.

8.3 Warranty

Item	Details
Warranty period	12 months
Start of warranty period	Date of sale
Conditions	Installation, commissioning and maintenance in accordance with this manual, carried out by qualified personnel; maintenance recorded in writing; water quality complies with the limit values specified in Section 2.6; the unit is operated within the specified operating limits.

The warranty does not cover:

- damage caused by transport, storage or handling after delivery
- installation, commissioning or repair carried out by unqualified personnel
- operation outside the operating limits or for an unintended purpose
- water quality that does not comply with the limit values specified in Section 2.6, and resulting corrosion, scaling or blockage
- frost damage and damage caused by water not being drained
- failure to carry out the specified maintenance, especially cleaning of the filter and condensate system
- operation without an installed filter
- unauthorised modification of the unit or use of non-original spare parts
- damage caused by the power supply, such as overvoltage or lightning, or by the building installation
- normal wear parts, such as the filter

Claims procedure: notify the supplier of the fault without undue delay after discovery, stating the model designation and serial number from the nameplate, date of sale, installation location and description of the fault, and attach photographs and the maintenance record. Do not dismantle the unit until the supplier has responded. The supplier will decide whether the unit is to be repaired, replaced or compensated.

8.4 Conformity

The unit is CE marked. The EU Declaration of Conformity is supplied with the unit and can also be obtained from the supplier on request.

9 Accessories

The accessories listed below are suitable for DF ducted fan coil units. They are ordered separately.

9.1 Accessory overview

Code	Product	Data
TVSP15	Thermostatic valve, straight	Thread 1/2"; Kvs 2,0; PN10; operating temperature from -10 °C to +120 °C
LS15	Shut-off valve, straight	Thread 1/2"; Kvs 2,0; PN10; operating temperature from -10 °C to +120 °C
LA15	Shut-off valve, angled	Thread 1/2"; Kvs 2,0; PN10; operating temperature from -10 °C to +120 °C
A230NC	Thermoelectric actuator	230 V AC; IP54; connection thread M30 × 1,5 mm; housing PC/ABS; normally closed
TW230-3	Room thermostat, AC units	88 × 88 × 43 mm; 230 V AC, max. 3 A; 1,5 W; 5-35 °C; 3 fan speeds; weekly schedule
FC280	Room thermostat, EC units	88 × 88 × 43 mm; 230 V AC, max. 3 A; 1,5 W; 5-35 °C; fan control; weekly schedule

NOTE

The valve connection thread is 1/2", while the heat exchanger connections are 3/4" FPT. Provide the required reducer or connection kits on site.

9.2 Valve selection

The valves listed above have Kvs 2,0. The tables below show the Kvs required for an approximate 15 kPa pressure drop across the control valve at the design water flow, calculated from $\Delta p = (Q / Kvs)^2$, where Q is expressed in m³/h and Δp in bar. The last row shows the minimum connection size for a water velocity not exceeding 1,2 m/s.

DF23 - one valve per unit

Size	34	51	68	85	102	136	170	204	238
Design flow (l/h)	375	539	707	825	1055	1404	1616	1993	2164
Required Kvs	1,0	1,4	1,8	2,1	2,7	3,6	4,2	5,1	5,6
Δp with Kvs 2,0 (kPa)	3,5	7,3	12,5	17,0	27,8	49,3	65,3	99,3	117,1
Min. connection	DN15	DN15	DN15	DN15	DN20	DN20	DN25	DN25	DN25

DF422 - one valve per circuit

Size	34	51	68	85	102	136	170	204	238
Design flow, cooling (l/h)	328	471	629	776	926	1132	1303	1600	1727
Required Kvs	0,8	1,2	1,6	2,0	2,4	2,9	3,4	4,1	4,5
Design flow, heating (l/h)	283	419	555	689	833	984	1143	1391	1499
Required Kvs	0,7	1,1	1,4	1,8	2,2	2,5	3,0	3,6	3,9
Min. connection	DN15	DN15	DN15	DN15	DN20	DN20	DN20	DN25	DN25

DF431 - one valve per circuit

Size	34	51	68	85	102	136	170	204	238
Cooling flow (l/h)	377	539	710	817	1056	1407	1605	2002	2150
Required Kvs, cooling	1,0	1,4	1,8	2,1	2,7	3,6	4,1	5,2	5,6
Min. connection, cooling	DN15	DN15	DN15	DN15	DN20	DN20	DN20	DN25	DN25
Heating flow (l/h)	160	213	303	387	497	531	671	808	928
Required Kvs, heating	0,4	0,5	0,8	1,0	1,3	1,4	1,7	2,1	2,4
Min. connection, heating	DN15	DN15	DN15	DN15	DN15	DN15	DN15	DN15	DN15

If the calculated Kvs differs significantly from that of the installed valve, check the hydraulic balancing of the circuit. An oversized valve provides poor control at part load.