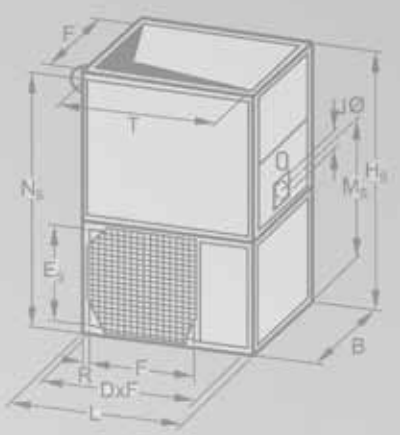
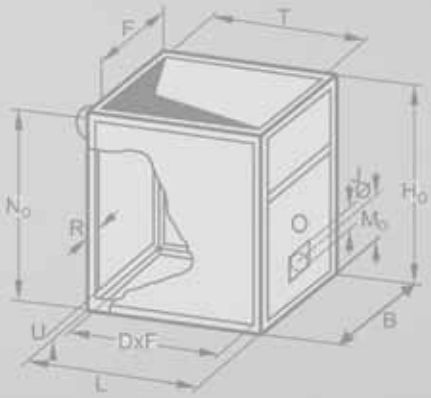
WOLF

Technical documentation

Warm air heater

WS • WO





Indirectly fired air heater WS

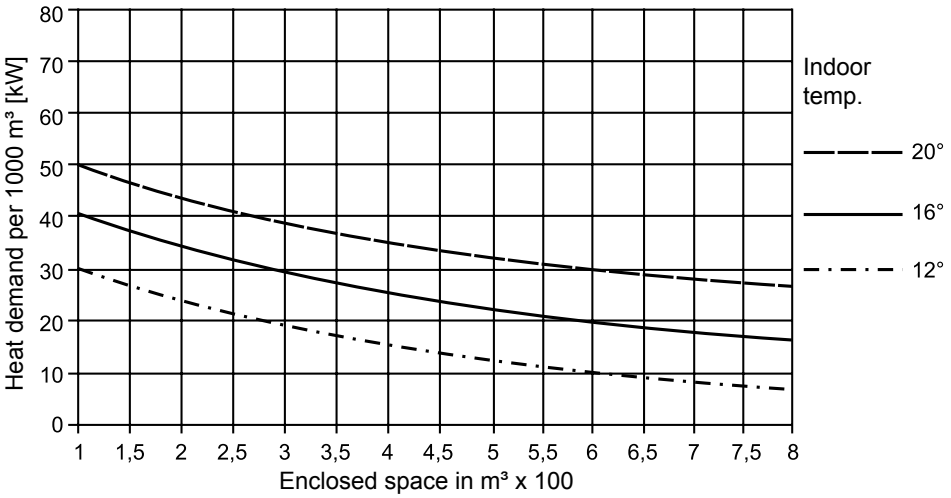
WS indirectly fired air heater to DIN 4794 for heating oil, natural gas and liqefied gas.

CE ID number:

CE 0085 AR 0130

Calculating approximate heat demand:

As the case with other heaters, it is always advisable to calculate the heat demand to DIN 4701 exactly when dimensioning indirectly fired air heaters. The heat demand can be approximated with the aid of the diagram below.



Structure:

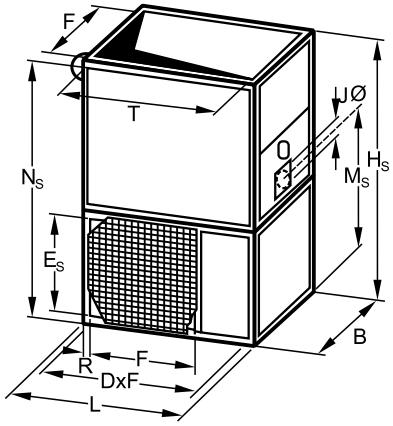
Exterior walls: 25 cm masonry or equivalent
Roofing: lightweight concrete or equivalent
Heating in recirculating-air mode

Correction factors:

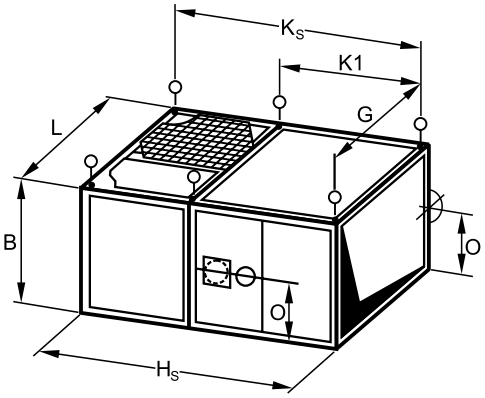
Add:	For corrugated roffing, not insulated	+ 40 %
	For corrugated roofing, thin insulation (20 mm)	+ 20 %
	For wooden roof with tar-paper or sheet metal	+ 20 %
	For metal exterior wall, not insulated	+ 20 %
	For extremely narrow buildings	+ 20 %
	For large windows in exterior wall	+ 10 %
Deduct:	For exterior wall 75 % adjoining another building	- 15 %
	For exterior wall 50 % adjoining another building	- 10 %
	For exterior wall without windows, solid brick	- 30 %
	For heated upper storey	- 30 %
	For heated annex on each side	- 10 %

Dimensions / Weights WS/WO

WS with fan

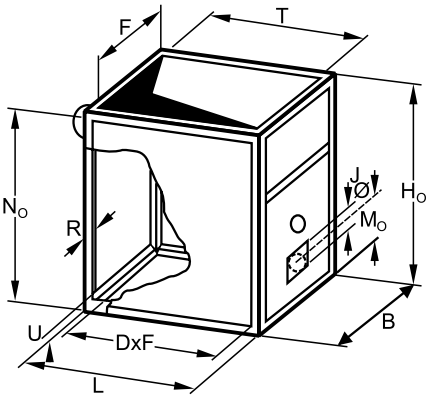


vertical

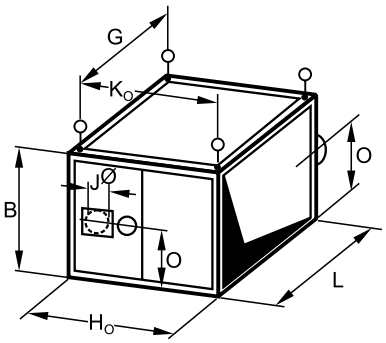


horizontal

WO without fan



vertical



horizontal

Technical data

WS/WO			40	63	100	160	250	400
External dimensions		L mm	630	800	1100	1250	1600	1600
		B mm	630	700	730	910	1090	1090
		H_S mm	1260	1410	1730	1950	2510	2630
		H_0 mm	800	910	1100	1250	1600	1600
Air inlet		E_S mm	380	420	550	580	790	910
		F mm	550	620	650	790	970	970
		R mm	40	40	40	60	60	60
		U mm	40	40	40	60	60	60
		D mm	550	720	1020	1130	1480	1480
Air outlet		F mm	550	620	650	790	970	970
		T mm	550	720	1020	1130	1480	1480
Fire tube	Length appr.	mm	97	92	101	88	140	190
		Ø mm	1480	178	178	195	245	345
		N_S mm	1075	1250	1483	1754	2250	2370
		N_0 mm	615	750	853	1054	1340	1340
		O mm	315	350	365	455	545	545
Burner connection		JØ mm	151	151	151	186	186	265
		M_S mm	715	743	945	1029	1311	1431
		M_0 mm	255	243	315	329	401	401
		O mm	315	350	365	455	545	545
Lifting lugs		G mm	600	770	1070	1210	1560	
		K_S mm	1230	1380	1700	1910	2470	-
		K_1 mm	-	-	-	1250	1600	-
		K_0 mm	770	880	1070	1210	1560	-
Burner	Tube max. length	mm	105	135	170	210	225	225
	Tube min. length	mm	70	100	120	150	150	150
	Nozz. spray angie	°	60	60	60	60	60	60
Weight	WS	kg	130	190	240	400	650	770
	WO	kg	90	130	170	270	400	450

Type selection WS/WO

Type	Heating capacity	Operating point I for fresh air approx. 60K		Operating point II for mixed air approx. 50 K		Operating point III for recirculated air approx. 40 K		Required boiler draught	Flue gas mass flow rate (kg/h)				Flue gas pipe
		Air flow 20°C	Ex. air temp. -air temp.	Air flow 20°C ●	Ex. air temp. -air temp.	Air flow 20°C ●	Ex. air temp. -air temp.		Heating oil EL	Natural gas E	Natural gas LL	Liqefied gas	
WS / WO	Q	V I	Δt_A	V II	Δt_A	V III	Δt_A	with / without turbulator	CO_2	CO_2	CO_2	CO_2	Ø
	[kW]	[m³/h]	[K]	[m³/h]	[K]	[m³/h]	[K]	[Pa]	13 %	9,5 %	9 %	11 %	[mm]
40-1	20	1000	176	1250	167	-	-	3	33	not permissible			
-2	25	1250	202	1600	191	2000	178	4	42	45	46	43	148
-3	32	1600	241	2000	226	2500	212	7	54	57	59	55	
63-1	32	1600	190	2000	176	2500	169	4	54	not permissible			
-2	40	2000	210	2500	200	3200	190	5	67	71	74	69	178
-3	50	2500	250	3200	236	4000	229	9	84	89	93	86	
100-1	50	2500	190	3200	175	-	-	5	84	89	93	86	
-2	63	3200	218	4000	200	5000	175	6	105	112	117	108	178
-3	80	1600	248	5000	225	6300	210	9	134	142	148	137	
160-1	80	4000	220	5000	206	6300	193	4	134	142	148	137	
-2	100	5000	245	6300	230	8000	210	6	167	178	185	172	195
-3	125	6300	260	8000	235	10000	220	10	209	222	231	214	
250-1	130	6300	193	8000	178	10000	165	4	222	235	245	227	
-2	160	8000	210	10000	194	12500	180	6	267	285	296	274	245
-3	200	10000	235	12500	214	16000	195	13	334	356	370	343	
-4	250	12500	252	16000	236	-	-	17	417	445	462	429	
400-1	200	10000	235	12500	214	16000	195	8	334	356	370	343	
-2	250	10000	252	16000	236	20000	212	12	417	445	462	429	345
-3	320	16000	252	25000	240	25000	221	18	534	569	591	549	

● These air flows are not suitable for fresh air opertaion. T: Delivery with turbulator

Note:

Maximum suction temperature for WS 40 °C
Minimum discharge temperature for WS/WO 40 °C
Minimum waste gas temperature in accordance with DIN 4794: 160 °C

Drive / Sound pressure level for WS
Unit resistance for WO

WS Motor capacity, Fan speed, Sound pressure level

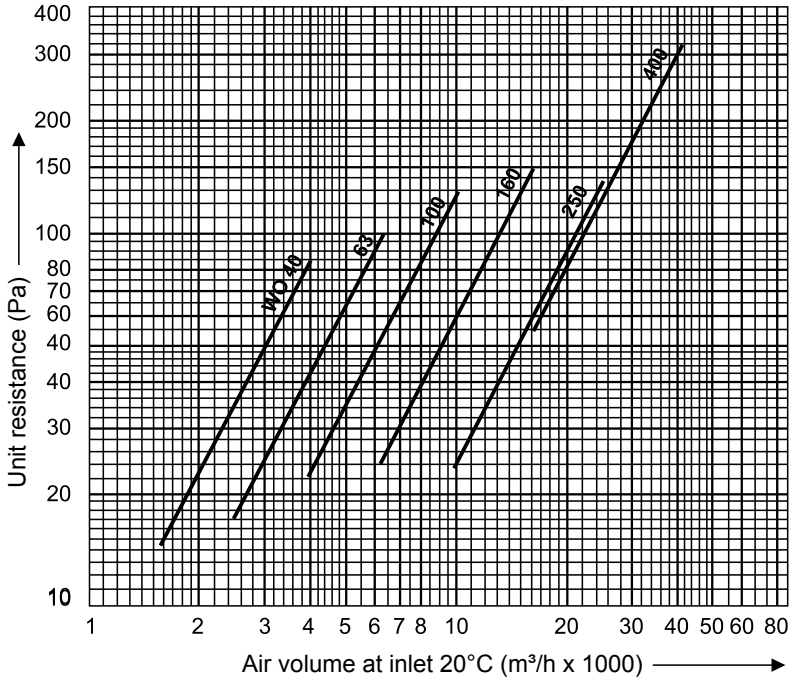
External pressure		free discharge up to 25 Pa			50 Pa			100 Pa			200 Pa			300 Pa			400 Pa		
Type	Air volume m³/h	Motor kW	Venti min⁻¹	Lp dBA	Motor kW	Venti min⁻¹	Lp dBA	Motor kW	Venti min⁻¹	Lp dBA	Motor kW	Venti min⁻¹	Lp dBA	Motor kW	Venti min⁻¹	Lp dBA	Motor kW	Venti min⁻¹	Lp dBA
WS 40	1 000	0,37[-1]		49	0,37[-1]		50	0,37[-1]		52	0,37[-1]		56	0,37[-3]		57			
1-3	1 250	0,37[-1]		50	0,37[-1]		51	0,37[-2]		53	0,37[-2]		57	0,37[-3]		58			
	1 600	0,37[-2]		51	0,37[-2]		52	0,37[-2]		54	0,37[-2]		58	0,37[-3]		59			
	2 000	0,37[-2]		52	0,37[-3]		53	0,37[-3]		59	0,37[-3]		59						
	2 500	0,37[-3]		53	0,37[-3]		55	0,37[-3]		60									
WS 63	1 600													0,55[-1]		54	0,55[-3]	56	
1-3	2 000										0,55[-1]		53	0,55[-2]		55	0,55[-3]	57	
	2 500	0,55[-1]		47	0,55[-1]		49	0,55[-1]		52	0,55[-2]		54	0,55[-3]		56			
	3 200	0,55[-3]		49	0,55[-2]		51	0,55[-2]		53	0,55[-3]		55						
	4 000	0,55[-3]		50															
WS 100	2 500	0,37	490	55	0,37	610	55	0,37	770	55	0,37	770	57	0,55	1000	60	0,75	1120	63
1-3	3 200	0,37	680	58	0,37	770	58	0,55	880	59	0,55	880	61	0,75	1120	64	1,1	1410	66
	4 000	0,55	770	64	0,75	900	64	0,75	900	65	1,1	1120	66	1,5	1260	66	1,5	1420	67
	5 000	1,1	1000	67	1,1	1000	67	1,5	1260	69	1,5	1260	69	2,2	1430	70	2,2	1430	70
	6 300	2,2	1260	69	2,2	1400	70												
WS 160	4 000	0,37	435	54	0,37	490	54	0,55	610	55	0,75	690	57	1,1	810	61	1,1	810	64
1-3	5 000	0,55	560	54	0,55	560	55	0,75	690	57	1,1	800	62	1,5	910	64	2,2	1010	67
	6 300	1,1	620	58	1,1	700	58	1,5	800	60	1,5	900	63	2,2	980	65	2,2	1010	67
	8 000	1,5	800	64	2,2	880	64	2,2	900	65	2,2	1010	66	3,0	1145	67	3,0	1250	68
	10 000	3,0	900	67	3,0	1010	68												
WS 250	6 300	0,55	360	61	0,55	410	62	0,75	500	65	1,1	625	67	1,5	720	69	1,5	720	70
1-4	8 000	1,1	400	62	1,1	450	63	1,1	555	66	1,5	635	68	2,2	720	70	2,2	800	71
	10 000	1,5	500	63	1,5	550	65	1,5	550	66	2,2	715	69	3,0	800	70	3,0	800	72
	12 500	2,2	570	64	2,2	570	66	3,0	710	67	3,0	800	70	5,5	800	71	5,5	925	73
	16 000	5,5	800	66	5,5	870	67	5,5	870	68	5,5	870	71						
WS 400	10 000	1,5	285	67	1,5	330	67	2,2	410	68	2,2	510	69	3,0	575	70	3,0	640	70
1-3	12 500	2,2	330	68	2,2	410	68	2,2	460	69	3,0	570	70	4,0	640	71	4,0	715	71
	14 000	2,2	410	69	3,0	460	69	3,0	510	70	4,0	570	71	4,0	650	71	5,5	715	71
	16 000	3,0	460	69	3,0	515	70	4,0	570	70	4,0	635	71	5,5	720	72	5,5	720	72
	18 000	4,0	530	70	4,0	560	70	5,5	600	71	5,5	660	72	7,5	720	72	7,5	760	73
	20 000	5,5	580	70	5,5	640	71	5,5	640	71	7,5	720	72	7,5	730	73	11	830	74
	25 000	11	735	72	11	740	73	11	740	73									

WS 40 and WS 63: Operating points are achieved through switch board or by connection to one of the motor steps [-1), -2), -3)]
Sound pressure level in dB(A) at 2 m distance with free air inlet/outlet.

The air volume is reduced by about 17 % in the case of duct air filters or 2 filter frames; suction with filter frame is not permissible!

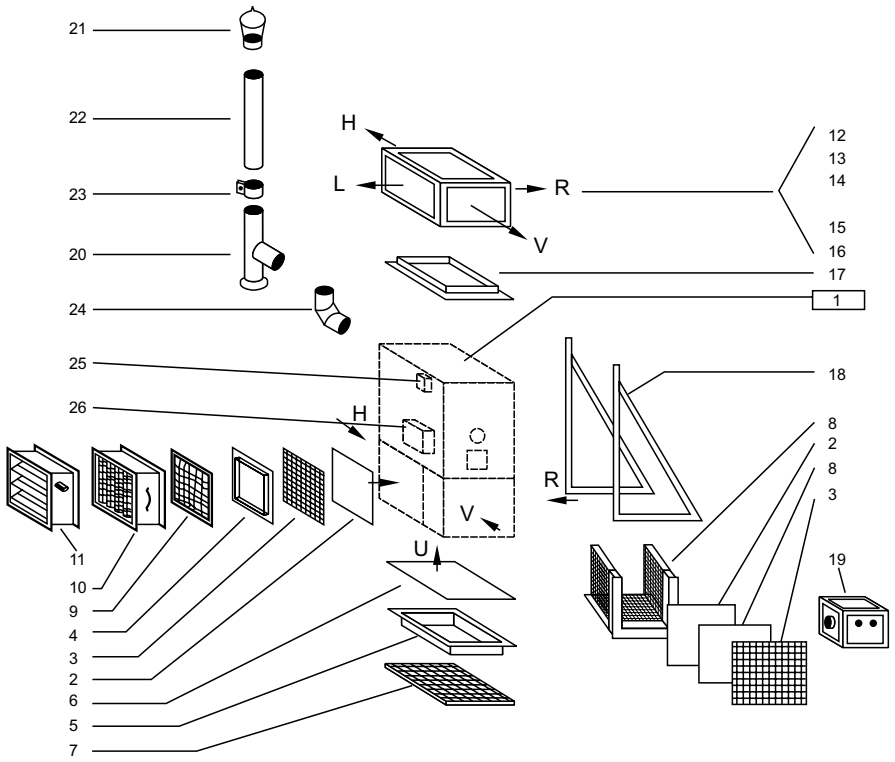
WO Unit resistance

with flow across
the whole cross section



Fitting options of accessories WS

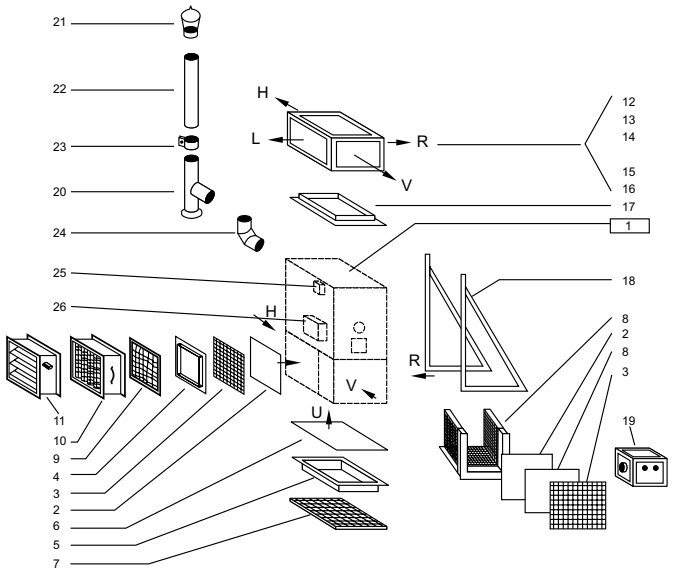
demonstrated on a vertical unit



1	Warm air heater WS - vertical / horizontal		WS 40/63 front	WS 40/63 back	WS 40/63 right	WS 40/63 left	WS 40/63 top bottom	WS 100-400 front	WS 100-400 back	WS 100-400 right	WS 100-400 left	WS 100-400 top bottom
	Air inlet											
2	Dummy plate		F	B	R	L	-	-	B	R	L	-
3	Air intake grille		F	B	R	L	-	-	B	R	L	-
4 / 5	Duct connection frame		-	-	-	-	Bo	-	-	-	-	Bo
6	Dummy plate		-	-	-	-	Bo	-	-	-	-	Bo
7	Air intake grille		-	-	-	-	Bo	-	-	-	-	Bo
8	Slide-in filter with mat and inspection door		F	-	-	-	-	-	-	-	-	-
9	Filter frame with mat		-	-	-	-	-	-	B	R	L	-
10	Duct air filter with mat		-	-	-	-	-	-	B	R	L	-
11	Damper		F	B	R	L	-	-	B	R	L	-
	Air outlet											
12	Air outlet hood	with 2 grilles	F	B	R	L	-	F	B	R	L	-
13		with 3 grilles										
14		with 4 grilles	F	B	R	L	-	F	B	R	L	-
15	Duct connection hood	broad side	-	-	R	L	-	-	-	R	L	-
16		narrow side	F	-	-	-	-	F	-	-	-	-
17	Duct connection frame		-	-	-	-	Bo	-	-	-	-	T
	Other accessories											
18	Set of brackets for horizontal appliance											
19	Combustion air intake hood											
	(switch board at the fronst is not possible)											
-	Set of lifting lugs for horizontal appliance WS 40 to WS 250											
-	Cleaning brush											
	Smoke tubes											
20	Smoke tube branche											
21	Smoke tube rain protection hood											
22	Smoke tube 1000 mm length, pluggable up to WS 250											
23	Smoke tube sleeve for WS 400											
24	Smoke tube bend 90°C with soot door											
	Electrical accessories											
25	Double and safety thermostat											
26	Switch board fitted below double and safety thermostat		-	-	R	L	-	-	-	R	L	-
	For any further accessories see Chapter Accessories.											

Fitting options of accessories WO

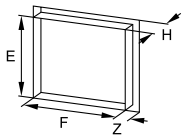
demonstrated on a vertical unit



			WO 40-400			
			front	right	left	top bottom
1	Warm air heater WS - vertical / horizontal					
	Air inlet					
2	Dummy plate		-	-	-	-
3	Duct connection frame		-	-	-	Bo
	Air outlet					
4	Air outlet hood	with 2 grilles	F	R	L	-
5		with 3 grilles				
6		with 4 grilles	F	R	L	-
7	Duct connection hood	broad side	-	R	L	-
8		narrow side	F	-	-	-
9	Duct connection frame		-	-	-	T
	Other accessories					
10	Combustion air intake hood					
-	Set of lifting lugs for horizontal appliance WS 40 to WS 250					
-	Cleaning brush					
	Smoke tubes					
11	Smoke tube branche					
12	Smoke tube rain protection hood					
13	Smoke tube 1000 mm length, pluggable up to WS 250					
14	Smoke tube sleeve for WS 400					
15	Smoke tube bend 90°C with soot door					
-	Smoke tube insulation (on inquiry)					
	Electrical accessories					
16	Double and safety thermostat					
	For any further accessories see chapter accessories.					

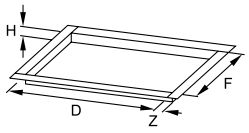
Accessories - Dimensons WS/WO

Duct connction frame air inlet lateral/at the rear



WS/WO	40	63	100	160	250	400
F	530	600	630	770	950	950
E	360	400	530	560	770	890
Z	30	30	30	30	30	30
H	26	26	26	26	26	26
appr. kg	2	2,5	2,5	3	3,5	3,5

Duct connction frame air inlet at the bottom

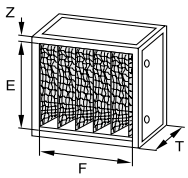


WS/WO	40	63	100	160	250	400
clear width - F	530	600	630	770	950	950
clear width - D	530	700	1000	11110	1460	1460
Z	30	30	30	30	30	30
H	26	26	26	26	26	26
appr. kg	2	2,5	3,5	4	5	5

Spare filter mats for slide-in and frame filters

WS/WO	40	63	100	160	250	400
length	1220	1380	720	880	1060	1060
height	650	820	620	670	880	1000

Duct air filters with filter mat

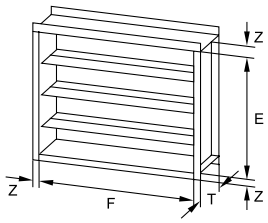


WS/WO	40	63	100	160	250	400
E	-	-	550	580	790	910
F	-	-	650	790	970	970
T	-	-	300	340	340	340
Z	-	-	40	60	60	60
appr. kg	-	-	30	50	65	72

Spare filter mat for duct air filter

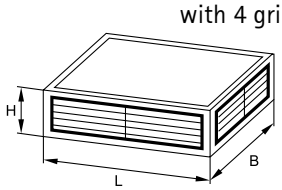
WS/WO	40	63	100	160	250	400
length	-	-	1880	2290	3020	3020
height		-	535	590	810	925

Damper



WS/WO	40	63	100	160	250	400
F	530	600	630	770	950	950
E	360	400	530	560	770	890
T	120	120	120	120	120	120
Z	26	26	26	26	26	26
appr. kg	5	7	8	13	15	23

Air outlet hood with 2 grilles
with 3 grilles narrow and/or
with 4 grilles broad side

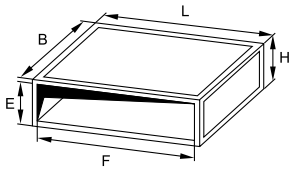


Grille with
adjustable blades

WS/WO	40	63	100	160	250	400
L	630	800	1100	1250	1600	1600
B	630	700	730	910	1090	1090
H	200	200	300	300	420	420
appr. kg	17	22	32	53	57	57

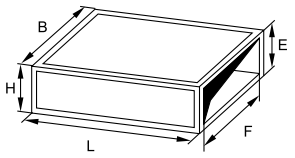
Accessories - Dimensons WS/WO

Duct connction hood — broad side



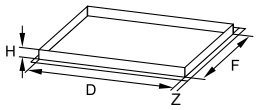
WS/WO	40	63	100	160	250	400
L	630	800	1100	1250	1600	1600
B	630	700	730	910	1090	1090
H	300	300	300	300	420	420
E	220	220	220	180	300	300
F	550	720	1020	1130	1480	1480
appr. kg	20	24	32	53	57	57

Duct connction hood — narrow side



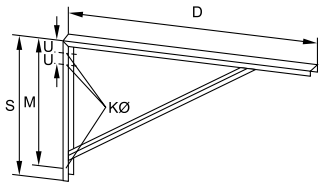
WS/WO	40	63	100	160	250	400
L	630	800	1100	1250	1600	1600
B	630	700	730	910	1090	1090
H	300	300	400	500	700	700
E	220	220	320	380	580	580
F	550	620	650	790	970	970
appr. kg	20	24	40	70	90	90

Duct connction frame — air outlet



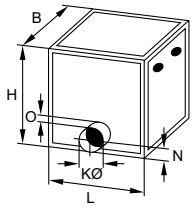
WS/WO	40	63	100	160	250	400
F	530	600	630	770	950	950
D	530	700	1000	1110	1460	1460
Z	30	30	30	30	30	30
H	26	26	26	26	26	26
appr. kg	2	2,5	3,5	4	5	5

Bracket



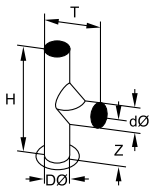
WS/WO	40	63	100	160	250	400
D	1300	1450	1650	2000	-	-
S	500	500	800	1000	-	-
M	450	450	740	900	-	-
U	50	50	60	80	-	-
K Ø	14	14	14	18	-	-
appr. kg (set)	16	18	21	60	-	-

Combustion air intake hood — Combustion air intake left or right, interchangeable



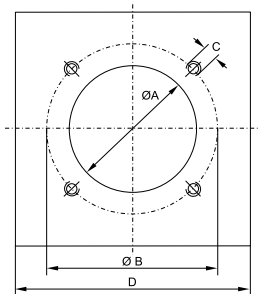
WS/WO	40	63	100	160	250	400
B	630	630	630	800	1000	100
L	460	460	460	630	830	830
H	630	630	630	800	1000	1000
N	315	315	315	270	300	300
O	25	25	25	30	30	30
K Ø	229	229	229	322	404	404
appr. kg	33	33	33	45	68	68

Smoke tube branch — with soot collector



WS/WO	40	63	100	160	250	400
H	540	590	590	700	900	1080
T	300	340	340	400	510	690
Z	215	250	250	300	390	390
internal d Ø	150	180	180	200	250	350
external D Ø	146	179	179	199	249	349
appr. kg	15	18	18	21	29	48

Burner plate — bored



WS/WO	ØA	ØB	C	D	E	plate type
40/63/100	120	150	M 8	210	210	A
40/63/100	130	170	M 8	210	210	B
160/250/400	130	150	M 8	320	320	C
160/250/400	150	170	M 8	320	320	D
160/250/400	150	200	M10	320	320	E

Accessories - Control elements WS/WO

Double and safety thermostat fitted

2 capillaries 350 mm length for fan, burner and burner safety control with restart locking divice.
Breaking capacity: 15 A, 230 V, 50 Hz

Terminal box fitted (for WS 40-400)

for connection of the double and safety thermostat as well as the fan to the terminal box

Room thermostat

in plastic casing for on-surface installation.
Breaking capacity: 10 A at 230 V, 50 Hz, thermal return.
Temperature range + 5 to + 30 °C, switch temperature difference 0,5 °C.

Room thermostat industrial version

in plastic casing 150 x 110 x 72 mm for on-surface installation.
Switching capacity 16(4) A at 230 V / 50 Hz
Temperature range 0 - 40 °C
Switching differential ±0,75 K
Degree of saturation IP 54
Part. No. 27 35 300

Room thermostat clock

Plastic housing, 132 x 82 x 32 mm for socket installation,
daytime and night-time temperatures can be set separately.
Temperature decrease adjustable 2 - 10 K
Switching capacity: 10(4) A at 230 V / 50 Hz
Temperature range 5 - 40 °C
Switching differential ±0,1 - 3 K
Degree of protection IP 20
Part.No. 27 44 079

Time switch daily and weekly programm and power reserve

for installation in switch board.
Breaking capacity: 16 A at 230 V, 50 Hz.

Hours run meter
for installation in switch board.

in plastic case, front frame 48 x 48 mm
five-digit meter.
Connection: 230 V, 50 Hz

Servomotor

to control fresh air or return air damper open/shut.
Connection: 230 V, 50 Hz.

Switch board WS

Switch board

- Terminal box for single speed function of WS 40 and WS 63
- 3-speed with „summer-off-winter" switch for WS 40-63
- single-speed with „summer-off-winter" switch for WS 100-400
- 2-speed with „summer-off-winter" switch and speed selection switch for WS 100-400 (incl. control for burner 2-stage)

Technical data

	Switch board Type			Starting mode direct	Y-Δ	delayed	fuse
	kW		V/Hz	A	A	A	A
WS 40 3-speed	0,37	-	230/50	3,0	-	-	10
WS 63 3-speed	0,55	-	230/50	6,7	-	-	16
	0,37	-	400/50	1,15	-	-	4
WS 100-400	0,55	-	400/50	1,5	-	-	6
single-speed	0,75	-	400/50	1,95	-	-	6
	1,1	-	400/50	2,8	-	-	10
	1,5	-	400/50	3,7	-	-	10
	2,2	-	400/50	5,1	-	-	16
	3,0	-	400/50	6,8	-	-	16
	4,0	-	400/50	9,0	5,2	-	20
	5,5	-	400/50	11,7	6,8	-	20
	7,5	-	400/50	15,6	9,1	-	25
	11,0	-	400/50	22,4	13,0	-	35
WS 100-400	0,37/0,11	-	400/50	1,45/0,65	-	-	6
2-speed	0,50/0,15	-	400/50	1,75/0,78	-	-	6
separate winding	0,75/0,27	-	400/50	2,70/160	-	-	10
1500/1000 min^{-1}	1,00/0,30	-	400/50	3,40/1,75	-	-	10
	1,50/0,50	-	400/50	4,40/2,40	-	-	10
	2,00/0,70	-	400/50	6,00/3,10	-	-	10
	3,00/0,90	-	400/50	7,50/3,40	-	-	16
	3,80/1,14	-	400/50	-	-	9,8/4,3	16
	5,00/1,70	-	400/50	-	-	13,5/6,0	20
	7,20/2,50	-	400/50	-	-	18,0/7,9	25
	9,00/3,00	-	400/50	-	-	23,0/9,7	35
WS 100-400	0,30/0,06	-	400/50	1,20/0,54	-	-	6
2-speed	0,50/0,10	-	400/50	1,80/0,75	-	-	10
Dahlander	0,70/0,15	-	400/50	2,35/1,00	-	-	10
1500/750 min^{-1}	1,00/0,22	-	400/50	3,10/1,40	-	-	16
	1,40/0,33	-	400/50	4,20/2,00	-	-	16
	2,00/0,45	-	400/50	5,30/2,50	-	-	16
	2,40/0,55	-	400/50	6,50/3,00	-	-	16
	3,60/0,90	-	400/50	-	-	9,70/4,7	16
	5,00 /1,40	-	400/50	-	-	12,70/7,5	20
	6,10/1,40	-	400/50	-	-	16,00/7,5	25
	9,00/2,20	-	400/50	-	-	20,50/10,3	35

Switch board accessories:

Built-in hours run meter
Built-in time switch with daily and weekly program and power reserve
Design for threephase current burner up to 2,2 kW (WS 160-400)
Control for servomotor open/shut

Special design WS/WO

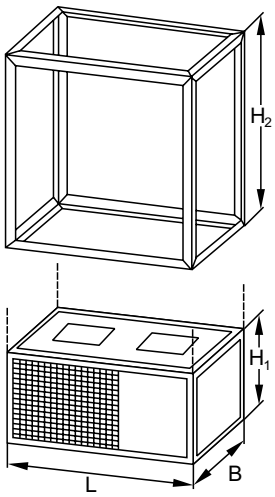
Dismountable units

General:
All dismountable warm air heaters are assembled and then dissassembled in the factory. Each component is marked to facilitate assembly on site. The casing panels are delivered together with the necessary bolts.

2 components - on extra price

WS/WO 40-63
Fan section complete
Upper section not split up
Heating furnace not split up

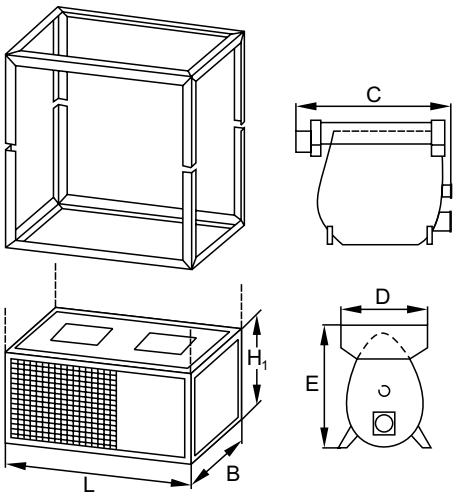
WS/WO 100-400
Fan section complete
Upper section with built in heating furnace



several compon. - on extra price

WS/WO 40-63
Fan section complete
Upper section split up
Heating furnace not split up

WS/WO 100-400
Fan section complete
Upper section split up in the middle
Heating furnace not split up



Dimensions

WS/WO		40	63	100	160	250	400
External casing	L mm	630	800	1100	1250	1600	1600
	B mm	630	700	730	910	1090	1090
	H_1 mm	460	500	630	700	910	1030
	H_2 mm	800	910	1100	1250	1600	1600
Heating furnace	C mm	777	932	1243	1388	1755	1825
	D mm	539	615	638	790	1004	1004
	E mm	722	870	925	1105	1410	1410
Weight heating furnace	Kg	50	75	100	170	330	340

Further dismountable parts:
E.g. heating furnace split up, on inquiry and on extra price.

Assembly:
Install fan section vertically and without torsion, attach heat insulation at the bores using screws, fix panels ai rtight at the bores using screws.

Note WS/WO

Thermostats

for burner control:

Warm air heaters may only be operated with 2 thermostats which switch off the burner independently.

One thermostat is constructed as monitoring device and the other as safety thermostat with restart locking device.

for fan control:

After the burner has been switched off, the fan must continue operation until the combustion chamber has cooled down sufficiently.

Warm air heaters by Wolf fulfill both requirements by means of double and safety thermostats.

Smoke tubes

If smoke tubes are used as steel chimneys, they are subject to approval of the respective building authorities.

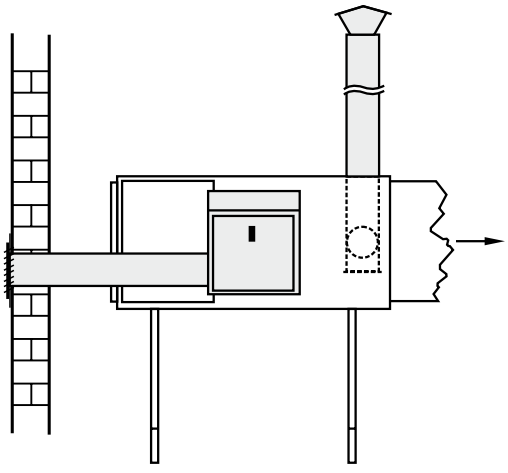
Combustion air intake hood

In special cases, the combustion air must be taken in from outside via an airtight duct system.

e. g.: in car repair workshops or if the pressure between combustion chamber and installation room differs significantly.

The installations of warm air heaters in garages is only allowed for fresh air operation (recirculated air operation is not permitted).

Be sure to observe regulations for garages!



Gas-fired units

All types and sizes of units included in this list can also be operated with natural and liquid petroleum gas. The maximum load may not exceed that of oil-fired units.

The flame image, i. e. the combustion nucleus must have characteristics similar to those of an oil burner with a 60° nozzle.

Assembly/Commissioning - Maintenance WS/WO

Installation

In accordance with the valid local and general directives on warm air heaters and the directives of the Brandversicherungskammer.

Foundation

Möglichst auf Betonsockel (Höhe 100-150 mm). Bei betoniertem Boden direkt auf dem Boden möglich.

Space required

For the installation and possibly exchange of

a) fans with drive	front or right or left
b) thermostats	left or right
c) switch board	left or right
d) burner	front
Cleaning of heating compartments	back and front

Flue gas guidance

Horizontal flue gas guidance as short as possible. Observe wall thickness and insulation.

Double and safety thermostat

If the thermostat was not installed and adjusted at the factory, fix to the casing with bolts at the holes punched out laterally.

The sensor shall be positioned at least 40 mm in air direction behind the heating compartments.

The thermostat shall be adjusted so that: Fan on at 40° C
Fan off at 35° C
Burner off at max. BO° C

The safety thermostat shall be adjusted so that it will turn off the burner at 100° C and will be locked by a restart locking device.

Tasks before starting operation

Tighten bolts, in case they were loosened during transport.

Check V-belt tension, tighten if necessary.

Check direction and axial alignment of fan rotor.

Open air intake and air outlet dampers.

Check oil reserve, control gas pressure, open shut-off valves.

Screw in fuses for burner and fan motor.

Observe operating instructions of the manufacturer of burner and air suction fan.

Controls after starting operation

Check current consumption of the fan motor(s). It must not exceed the rated current as specified on motor name plate. Adjust overcurrent relay accordingly and carry out operation test by taking out a fuse (only necessary for threephase current).

Measure chimney draught. Perform flue gas analysis.

Attention: Depending on the type of construction of the chimney, the flue gas temperature must be adjusted so as to prevent damage. Minimum flue gas temperature in accordance with DIN 4794: 1600 C.

Check sealing of the casing panels, tighten screws if necessary.

Check air volume in units with duct connection.

Switch off warm air heater only via room thermostat or control switch of the burner. Fan will continue operation for some time and is turned off automatically after the heating furnace has cooled down. Only then can the main electricity supply be turned off.

Maintenance

Cleaning of the heating furnace:

In the case of oil-fired appliances, at the end of each heating season, if possible, or with the appearance of a soot layer.

In the case of gas-fired appliances, at intervals of several years.

Cleaning apertures become accessible by taking off front and rear insulating panels.

Seal apertures tightly after cleaning.

Casing, suction grille, discharge grille, fan casing and fan rotor must be cleaned at least once a year. (Do not use corrosive agents!)

V-belt must be tightened several times during the first year of operation.

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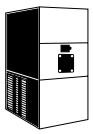
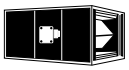
Offer/Order No. / /	Date of delivery:	
Company: Customer No.:	Date of order:	Ex warehouse
	Order No.:	
	Comm.: Pos.:	
	Employee:	
	Address of delivery:	☐ collective transport
		☐ by rail-express
		☐ by rail-part load
		☐ forwarding agency
	Advide note tel..	☐ collection

Warm air heater

Basic unit

	Type	Heating cap. (kW)	Air vol. (m³/h)	ext. Pr (Pa)	Pieces	Price	Total price
	...../...../...../.....						


vertical ☐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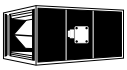
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Motor V										kW			
..... A										min⁻¹			
Fan										min⁻¹			
Motor pulley									Bg.	mm Ø			
Fan pulley									Bg.	mm Ø			
V-belt length										mm			
				front	back	right	left	top	bottom				
Air inlet													
Air outlet													

G = grille H = hood o = open
F = filter F = frame
P = plate D = damper

Air inlet	Duct connection frame												
	Slide-in filter with mat and inspection door												
	Duct air filter with mat												
	Damper												
	Manual lever with lock												
	Filter frame with mat												
	Dummy plate bottom												
Air outlet	Duct connection hood												
	Air outlet hood with grille												
	Duct connection hood												
Other acces.	Set of brackets for horizontal design												
	Explosion-proof hood as burner casing												
	Set of lifting lugs for horizontal design												
	Turbulator												
Smoke tubes	Smoke tube branch with soot collector												
	Smoke tube rain protection hood												
	Smoke tube 1000 mm length, pluggable up to WSIWO 250												
	Smoke tube sleeve from WSIWO 400 on												
	Smoke tube bend 90· with soot door												
Electric fittings	Double and safety thermostat, fitted												
	Terminal box, fitted												
	Room thermostat												
	Room thermostat with on/off switch												
	Room thermostat clock with daily and weekly programm												
	Servomotor 230 V open/shut, fitted												
Switch board	Switch board Type												
	with hours run meter												
	with contactor control for threephase current burner/ampere												
	with time switch with daily/weekly program and power reserve												
	with actuator control												
Assembly	Wiring complete												
	Burner plate type A☐ B☐ C☐ D☐ E☐												
	Burner plate special design												
	Bumer assembly with wiring												

Terms of payment:	Total	
Other:	ex factory unpacked	
	freight / packaging	
	Total	

Place: Date: Signature:

☐ Check the appropriate boxes of fill in the space provided referred view on the burner

Specification

Pos.	Pieces		Single price	Total price

WS 40-63

Warm air heaters by Wolf for oil, natural and liquid petroleum gas, as vertical or horizontal unit.

Heating furnace partially consists of alloyed, heat resistant steel. Cleaning apertures are accessible from the burner and the smoke tube side. Inspection door is positioned above the burner opening. External casing consists of galvanized sheet steel with heat insulation.

With fitted double inlet radial fan. Fan has a particularly low noise level, impeller is balanced statically and dynamically and fitted onto a vibrationfree motor.

Heating capacity	kW.....	Safety and double thermostat
Air volume	m^3/h.....	Terminal box
Additional pressure	Pa.....	Switch board , 3-stage, fan operation
Motor capacity	kW.....	Wiring complete
Voltage	V.....	.....
Manufacture	Wolf	
Type	.....	

WS 100-400

Warm air heaters by Wolf for oil, natural and liquid petroleum gas, as vertical or horizontal unit.

Heating furnace partially consists of alloyed, heat resistant steel. Cleaning apertures are accessible from the burner and the smoke tube side. Inspection door is positioned above the burner opening. External casing consists of galvanized sheet steel with heat insulation.

With fitted, double inlet radial fan, impeller statically and dynamically balanced, shaft with strong roller bearing. Motor equipped with tension spindle, drive via pulleys and V-belts.

Heating capacity	kW.....	Safety and double thermostat
Air volume	m^2/h.....	Switch board
Additional pressure	Pa.....	Wiring complete
Motor capacity	kW.....	.....
Voltage	V.....	.....
Manufacture	Wolf	
Type	.....	

W0 40-400

Warm air heaters by Wolf for oil, natural and liquid petroleum gas, as vertical or horizontal unit.

Heating furnace partially consists of alloyed, heat resistant steel. Cleaning apertures are accessible from the burner and the smoke tube side. Inspection door is positioned above the burner opening. External casing consists of galvanized sheet steel with heat insulation.

Heating capacity	kW.....	Safety and double thermostat
Air volume	m^2/h.....	.....
Unit ressistance	Pa.....	.....
Manufacture	Wolf	
Type	.....	

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