Weather Resistant Louvres
Multileaf Dampers

Contents

Cover picture:

First class powder coatings for

- **W Weather Resistant Louvres**
  made of galvanised sheet steel
- **AW and AWK Weather Resistant Louvres**
  made of extruded aluminium profiles

Available for all sizes and colours

Standard colours available in accordance with RAL-CLASSIC

JK Multileaf Dampers

Steel, galvanised

JK multileaf dampers made of galvanised sheet steel are control and shut-off dampers for ventilation and air conditioning systems. With hollow blades profiled for optimum flow with linkage and galvanised actuator spindles in plastic or brass bushings; 180 mm or 120 long frame with canted connecting flanges. With adjusting lever, manual locking device or electrical actuators.

JK multileaf damper
with electrical actuator FM

Summary of types

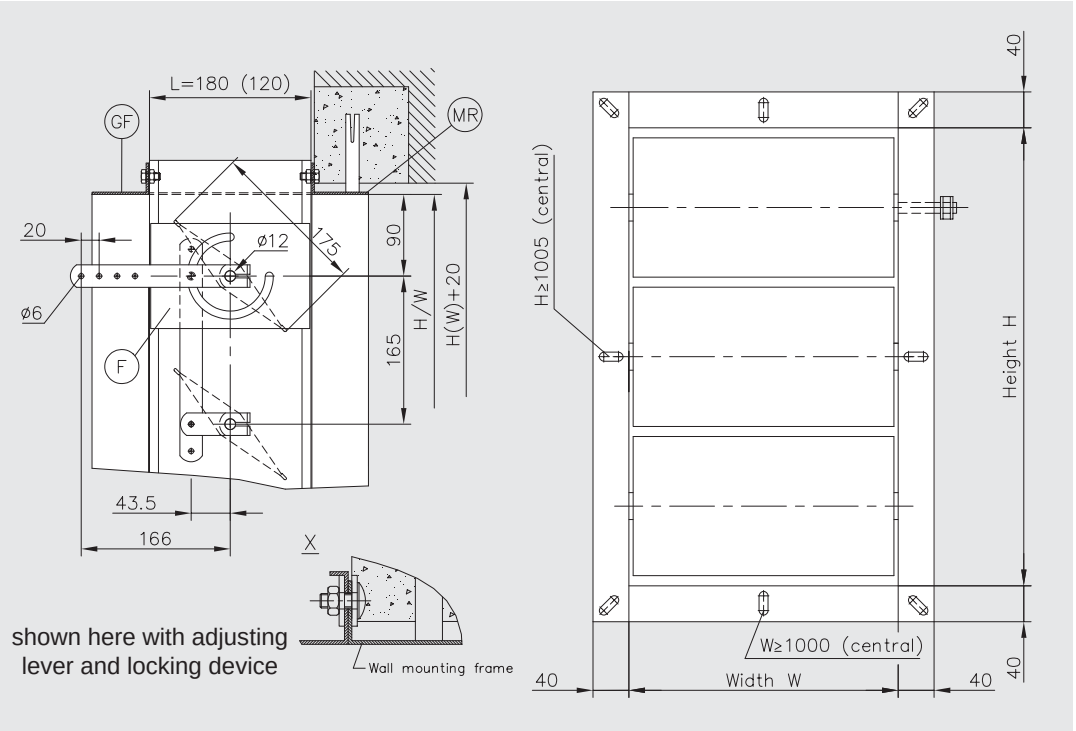
Blade coupling	Blade bearing	Length L 120 mm*)	Length L 180 mm
opposed with external linkage	plastic	**JK-N120G**	**JK-N180G**
	brass	**JK-M120G**	**JK-M180G**
parallel with external linkage	plastic	**JK-N120**	**JK-N180**
	brass	**JK-M120**	**JK-M180**
parallel with internal linkage	plastic	**JK-N120I**	**JK-N180I**
	brass	**JK-M120I**	**JK-M180I**

*) **Note: Blades are longer than the frame!**

Accessories

MR Wall mounting frame
made of galvanised sheet steel

GF Counter flange
made of galvanised sheet steel



shown here with adjusting lever and locking device

Sizes W x H

Width W [mm]	Height H [mm]
400	180
600	263
800	345
1000	428
1200	510
1400	675
1600	840
1800	1005
2000	1170
	1335
	1500
	1665
	1830
	1995

All W and H dimensions can be combined.

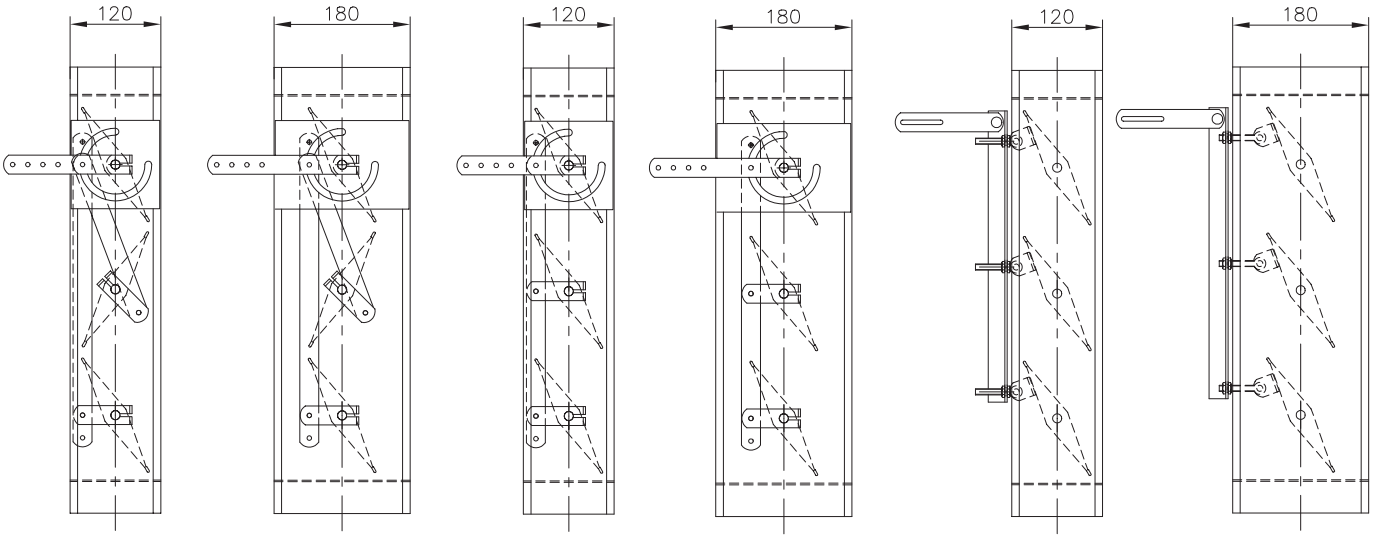
Intermediate dimensions in 1 mm steps are available for 180 mm lengths.

JK Multileaf Dampers

Actuators

Blade coupling - The actuator spindle is always on the uppermost blade -

In addition, the fifth blade with effect from H = 840 mm and the ninth blade with effect from H = 1500 mm are designed to include an actuator spindle. Adjusting devices can also be added by the customer on site!



opposed with external linkage*) | parallel with external linkage*) | parallel with internal linkage

*) On the operation side the blade setting is visible from the outside by way of notches in the spindle.

Electrical actuators

Multileaf dampers with externally located linkage are available with the following factory-installed electrical actuators:

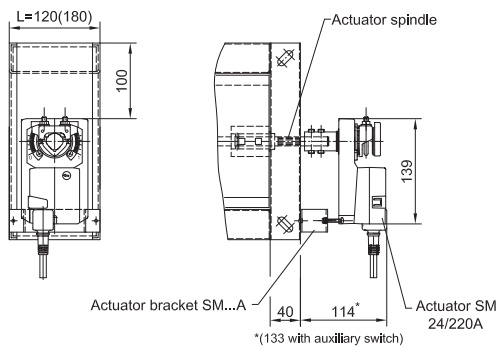
Electrical reversible actuators SM24A and SM220A, which open or close the multileaf dampers on 24V direct or alternating voltage or 230V alternating voltage at a driving torque of 20*) [Nm]. The current actuator setting is retained in the event of a power failure.

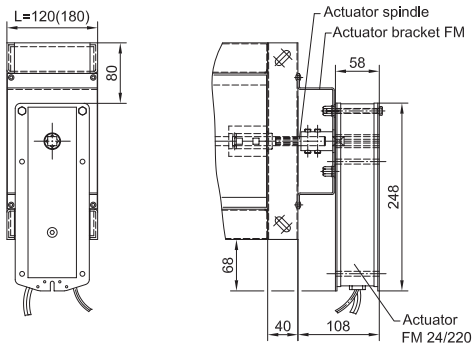
Further data ⇒ see page 8

Electrical spring return actuators FM24 and FM220, which open the multileaf dampers on 24V direct or alternating voltage or 230V alternating voltage at a driving torque of 18*) [Nm]. In the event of power failure the multileaf dampers close with a driving torque of 12*) [Nm].

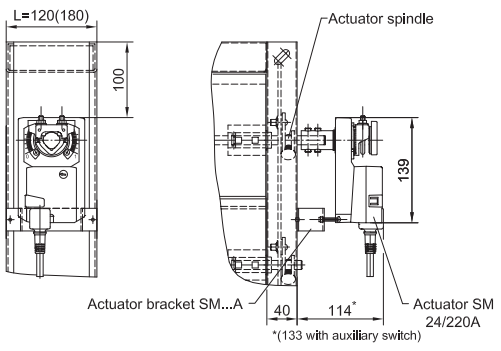
Further data ⇒ see page 8

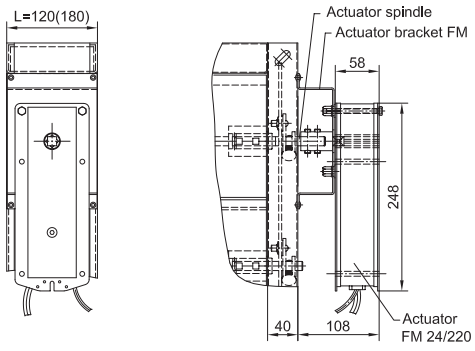
Actuator attachment for multileaf damper height H = 180 mm





Actuator attachment for multileaf damper height H > 180 mm



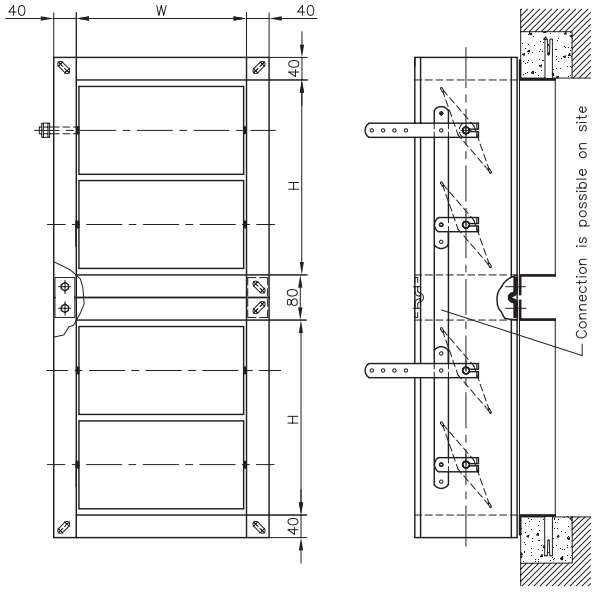


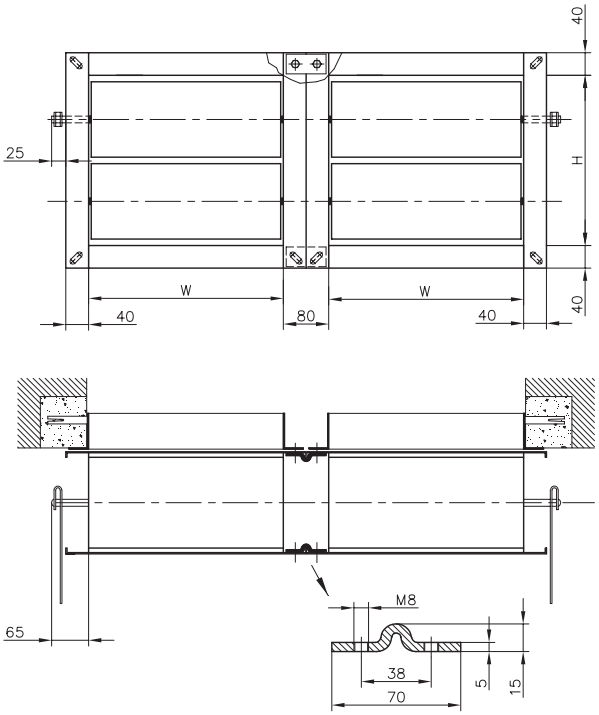
*) Required driving torques ⇒ see page 6; suitable actuators must be installed on site if these actuators are unable to provide the specified torque.

JK Multileaf Dampers

Installation, details, accessories

Vertical / horizontal assembly with straps

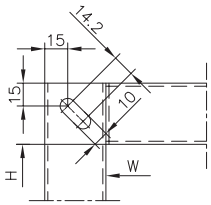




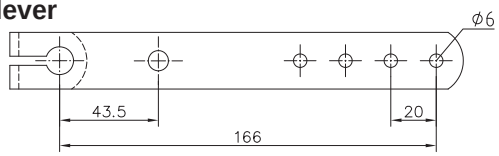
Recommendations:

- Use a separate actuator for each multileaf damper!
- Install multileaf dampers with horizontally arranged blades!

Corner drill hole in connecting frame



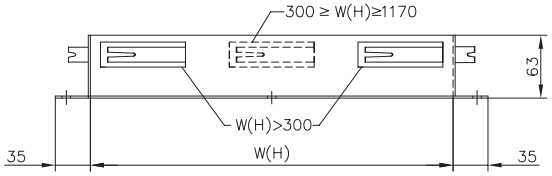
Adjusting lever



Accessories

MR Wall mounting frame made of galvanised sheet steel, punched, canted, corner welded with several wall clamps for cementing into wall.

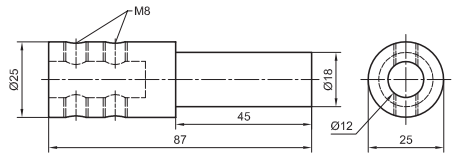
GF Counter flange made of galvanised sheet steel, punched, canted and corner welded.



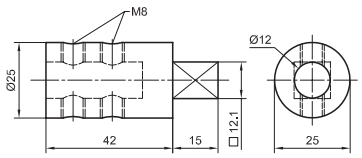
Counter flanges are without wall clamps!

Spindle extensions for customer-supplied actuators

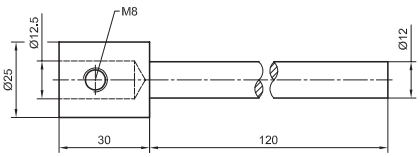
Extension for SM actuators



Extension for FM actuators



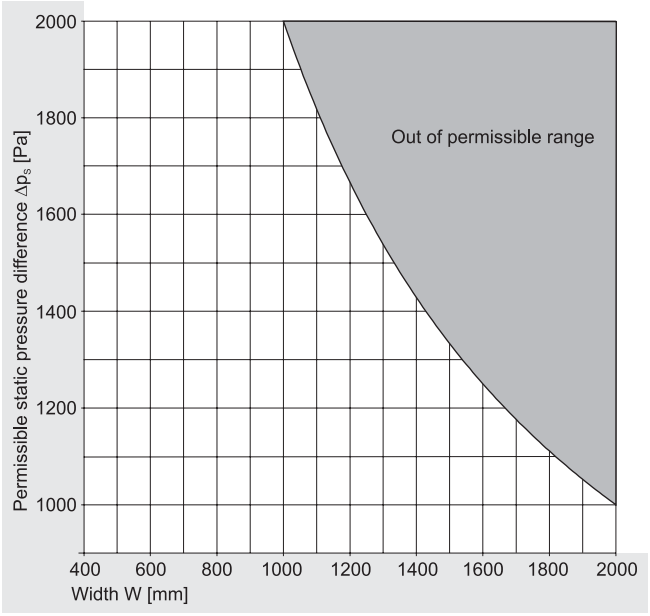
L150 extension for lever



JK Multileaf Dampers

Range of application, driving torques, leakage, pressure drop, sound power level

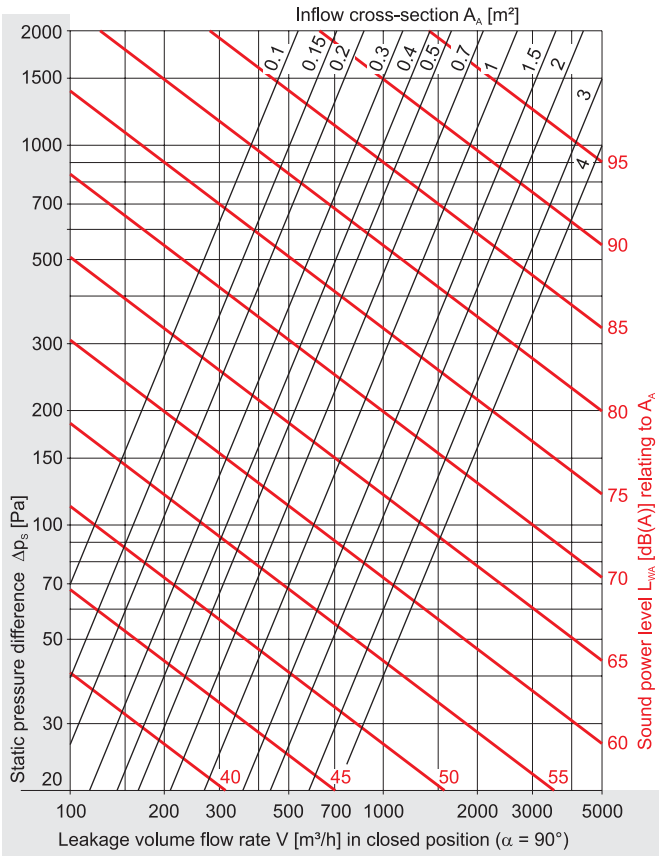
The **permissible pressure difference** depends on the width W and the leakage volume flow rate of the multileaf damper in closed position:

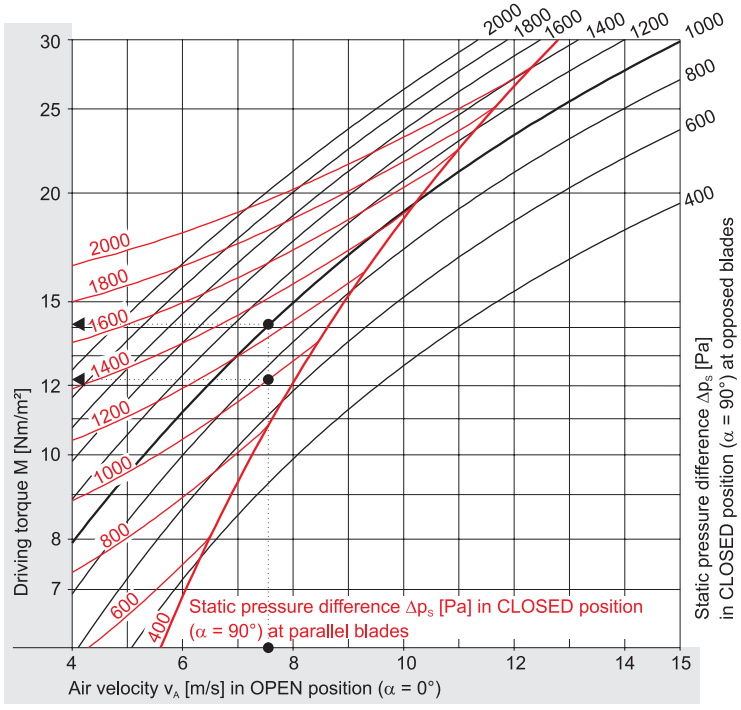


The **permissible temperature** depends on the bearing material:

JK-N: -20°C to +100°C

JK-M: -20°C to +110°C





- The driving torques required to close the multileaf dampers when air flow is present are generally significantly less (reference value: 50%) than those required to open the multileaf dampers!
- **The permissible driving torque per actuator spindle is limited to 35 [Nm].**

The **required driving torque** depends on the operating characteristics of the fan and duct network. The pressure may rise on increasing restriction of the volume flow rate by way of a shut-off damper; normally the volume flow rate reduces simultaneously and the flow velocity in the multileaf damper drops in relation to the inflow cross-section; however it rises in relation to the free cross-section. At the respective operating point to be set, a non-constant driving torque is required over the adjustment range from $0° \leq \alpha \leq 90°$ for the activation of the multileaf damper. An actuator must apply the maximum arising driving torque in order to allow unhindered travel across the entire adjustment angle range.

The driving torque which can be read in the nomogram opposite is required for multileaf dampers in ventilation systems with quadratic system operating characteristics and conventional fans. The basic variables are the maximum flow velocity in the fully open multileaf damper and the pressure difference present in the closed position.

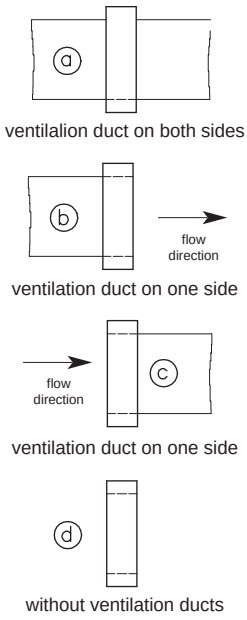
Example

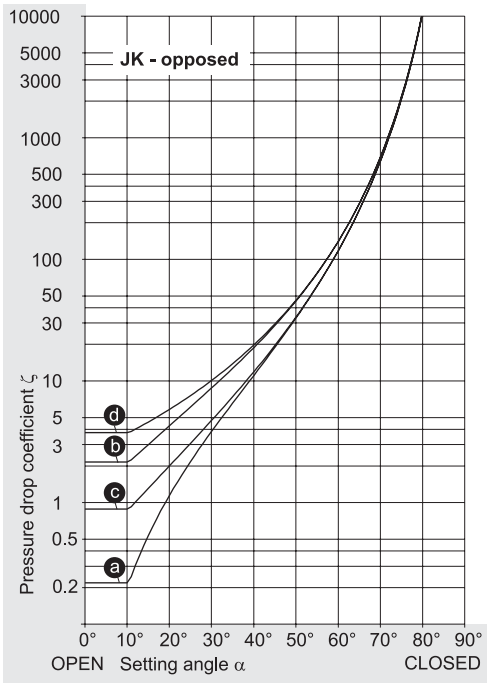
Flow velocity	v_A	=	7.5 [m/s]
Pressure difference	Δp_S	=	1000 [Pa]
Driving torque per m² inflow cross-section A_A			
• opposed	M	≈	14 [Nm/m²]
• parallel	M	≈	12 [Nm/m²]

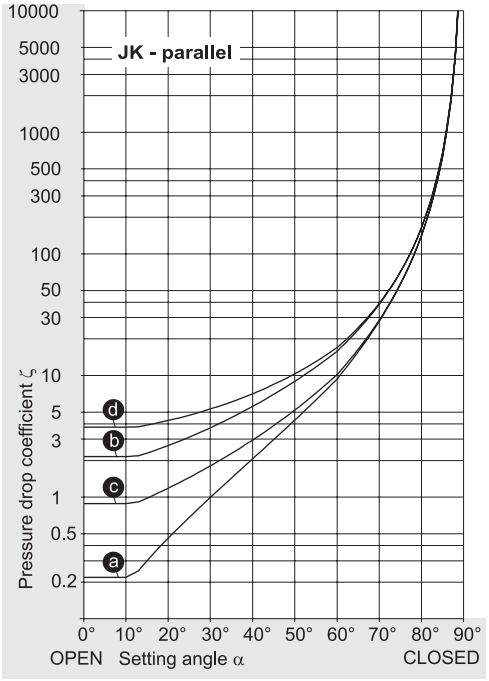
JK Multileaf Dampers

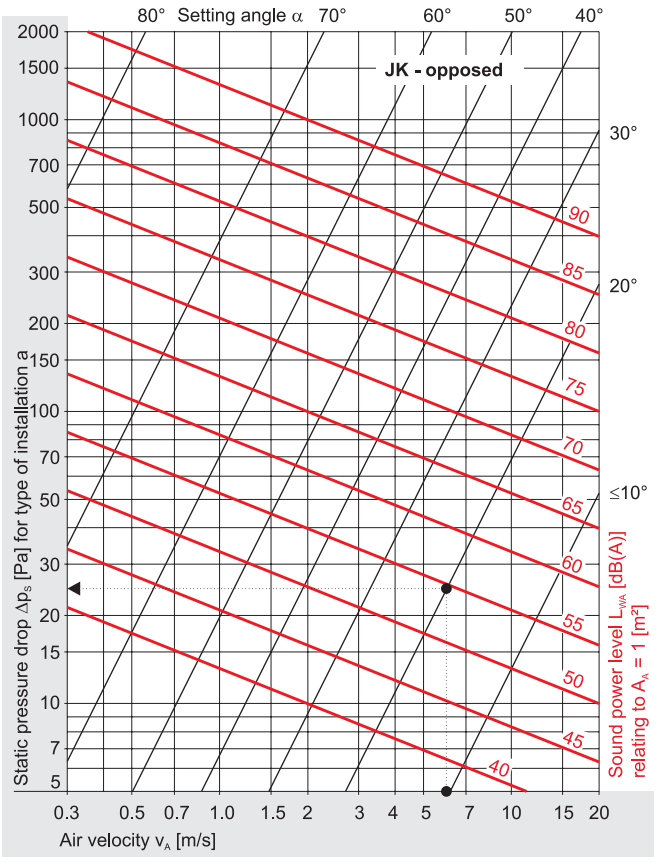
Pressure drop coefficients ζ, pressure drop, sound power level

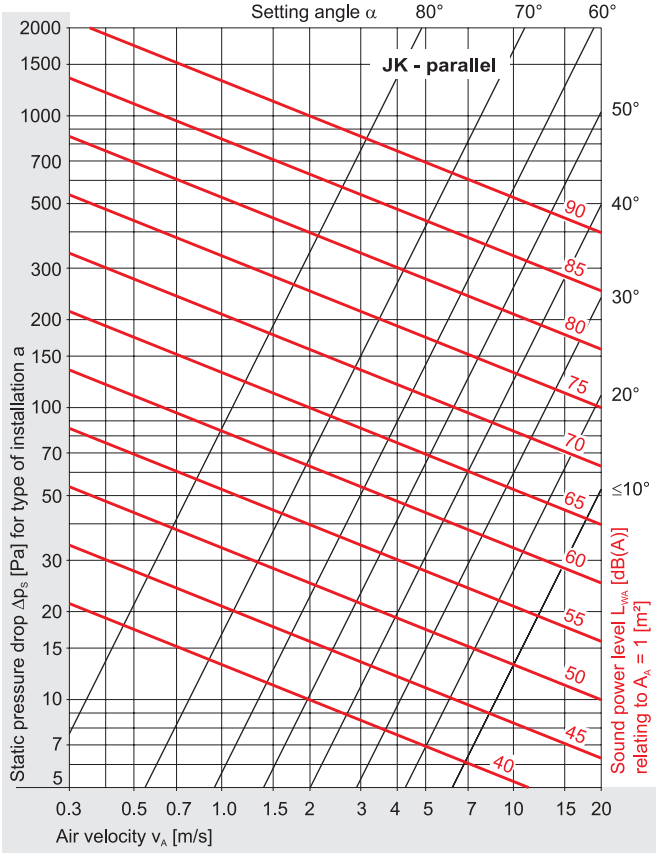
Pressure drop coefficients ζ for installation type:











Example (JK - opposed)

Setting angle	α	=	20 °	Pressure drop (type of installation a)	Δp_S	=	24 [Pa]
Air velocity	v_A	=	6 [m/s]	Sound power level	L_{WA}	=	55 [dB(A)]*)

*) Sound power levels are referenced to A_A = 1 [m²]; correction values for other inflow cross-sections ⇒ see page 8

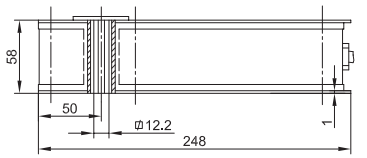
JK Multileaf Dampers

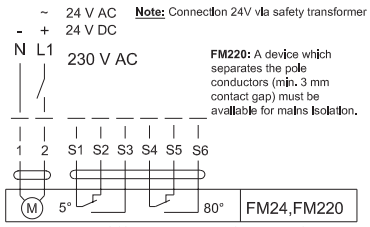
Electrical actuators, nomenclature

Technical data for factory installed actuators

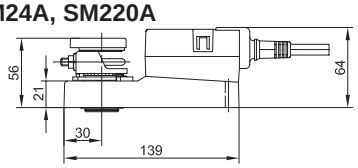
	SM24A	SM220A	FM24	FM220
Input voltage	24V AC / DC	100 to 240V AC	24V AC / DC	230V AC
tolerance range AC	± 20%	–15%, +10%	± 20%	±14%
tolerance range DC	± 20%		–10%, +20%	
Torque				
motor	≥20 Nm	≥20 Nm	≥18 Nm	≥18 Nm
spring return			≥12 Nm	≥12 Nm
Running time for 90°				
motor	150 s	150 s	140 s	140 s
spring return			~16 s	~16 s
Power input	4 VA	6 VA	10 VA	12.5 VA
Power consumption				
motoring	2 W	2.5 W	7 W	8 W
holding	0.2 W	0.6 W	2 W	3 W
Degree of protection	IP 54	IP 54	IP 54	IP 54
Connecting cable 0.75 mm²	approx. 1 m	approx. 1 m	approx. 1 m	approx. 1 m
motor	3 wire	3 wire	2 wire	2 wire
auxiliary switch			6 wire	6 wire
auxiliary switch S1A	3 wire	3 wire		
auxiliary switch S2A	6 wire	6 wire		
Ambient temperature	-30°C to + 50°C			

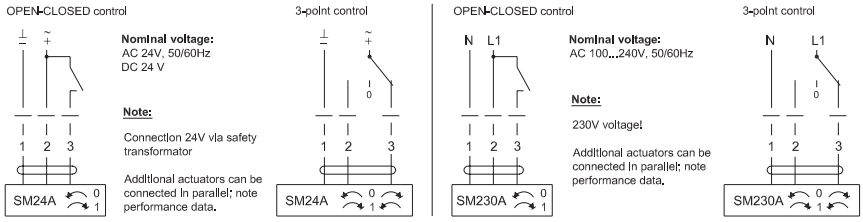
FM24, FM220 with integrated limit switches



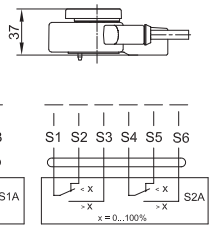


SM24A, SM220A





Auxiliary switches S1A, S2A



Nomenclature

A_A	[m²]	=	inflow cross-section $A_A = W \cdot H$
V	[m³/h]	=	volume flow rate, leakage volume flow rate
v_A	[m/s]	=	flow velocity relating to A_A (inflow velocity)
α		=	setting angle multileaf damper OPEN: $\alpha = 0°$ CLOSED: $\alpha = 90°$
ζ		=	pressure drop coefficient relating to A_A pressure drop $\Delta p_S = \zeta \cdot \rho/2 \cdot v_A^2$
ρ		=	medium density ($\rho_{dry\ air\ 20°C,\ 1\ bar} = 1.188$ [kg/m³])
Δp_S	[Pa]	=	static pressure drop, static pressure difference
L_{WA}	[dB(A)]	=	A-weighted sound power level
ΔL	[dB]	=	correction to L_{WA} relating to $A_A = 1$ [m²] $L_{WA} = L_{WA\text{-}1m^2} + \Delta L$ [dB]
M	[Nm/m²]	=	driving torque M_{total} [Nm] = M_{1m^2} [Nm/m²] · A_A [m²]

For other inflow cross-sections the following ΔL corrections must be added in the case of sound power levels relating to an inflow cross-section of $A_A = 1$ [m²]:

A_A [m²]	ΔL [dB]
0.10	-10
0.25	-6
0.40	-4
0.50	-3
0.60	-2
1.00	0
1.25	+1
1.60	+2
2.00	+3
2.50	+4
3.20	+5
4.00	+6

JK Multileaf Dampers

Order information

JK - __ - __ - __ - __ - __ - __ - __ - __

Multileaf damper with

plastic bushings	N
brass bushings	M
length 180 mm[1)]	180
length 120 mm	120

Size

nominal size[1)] W x H ..... x .....

⇒ see page 3

opposed linkage	G
parallel linkage	-
internal linkage[2)]	I

Accessories

1GF	with 1 counter flange
2GF	with 2 counter flanges

⇒ see page 5

MR	with wall mounting frame

⇒ see page 5

Adjusting devices[2)]

⇒ see page 4 and page 8

F	locking device

Actuators 20 [Nm][3)]

SM220A	100 to 240V AC
SM220A-S1A	100 to 240V AC and 1 auxiliary switch
SM220A-S2A	100 to 240V AC and 2 auxiliary switches
SM24A	24V AC / DC
SM24A-S1A	24V AC / DC and 1 auxiliary switch
SM24A-S2A	24V AC / DC and 2 auxiliary switches

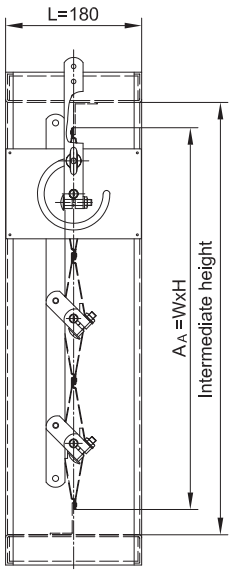
Spring return actuators 18 [Nm] / 12 [Nm][3)]

FM220	230V AC and integrated limit switches
FM24	24V AC/DC and integrated limit switches

Spindle extensions for customer-supplied actuators

SM	∅18 mm for SM actuators
FM	12 x 12 mm for FM actuators
L150	∅ 12 mm, 150 mm long for

[1)] **Intermediate dimensions** can be delivered for frames with a length of 180 mm. The blade spacing of 165 mm is retained and the remaining gaps between the upper / lower blades and the frame are filled with angle profiles.



Straps for combining two JK multileaf dampers must be ordered separately:

U-LU1	for widths < 1000 mm	same width arranged one upon the other!
U-LU2	for widths ≥ 1000 mm	
U-LN1	for heights < 1005 mm	same heigth arranged alongside!
U-LN2	for heights ≥ 1005 mm	

[2)] In this design the actuators are in the air flow! Factory installed adjusting devices are not available in this case.

[3)] Actuators with greater driving torques to be supplied by customer!

JK Multileaf Dampers

Specification text

Multileaf dampers made of galvanised sheet steel are control and shut-off dampers for ventilation and air conditioning systems. With hollow blades profiled for optimum flow, external opposed / external parallel / internal parallel **linkage, galvanised actuator spindles in** plastic / brass **bushings. All-around, canted frame with** 120 mm / 180 mm **length and with connecting flanges for installation between ducts, on walls or ceilings. With** adjusting lever and locking device / electrical actuator / electrical spring return actuator / with auxiliary switches. With wall mounting frame and counter flange / counter flanges. Also includes connecting straps required to install two multileaf dampers either one upon the other / alongside.

..... **pieces**

Volume flow rate: ..... **m³/h**

Manufacturer: **WILDEBOER®**

Type: **JK**

Dimension W x H ... x ... **mm**

Complete with fasteners **supply:** .....

install: .....

Delete text in non-bold type as required!

JL Multileaf Dampers

Steel, galvanised

JL multileaf dampers, airtight in accordance with DIN 1946-4 and leak tightness class 4 according to EN 1751 at 100 [Pa] static pressure difference, are control and shut-off dampers made of galvanised sheet steel for ventilation and air conditioning systems, especially in hospitals. The sealed, opposed hollow blades profiled for optimum flow and connected via linkage turn in special brass bushings on a 180 mm long frame with canted connection flanges. Actuation is either manual by way of adjusting levers or with electrical actuators.

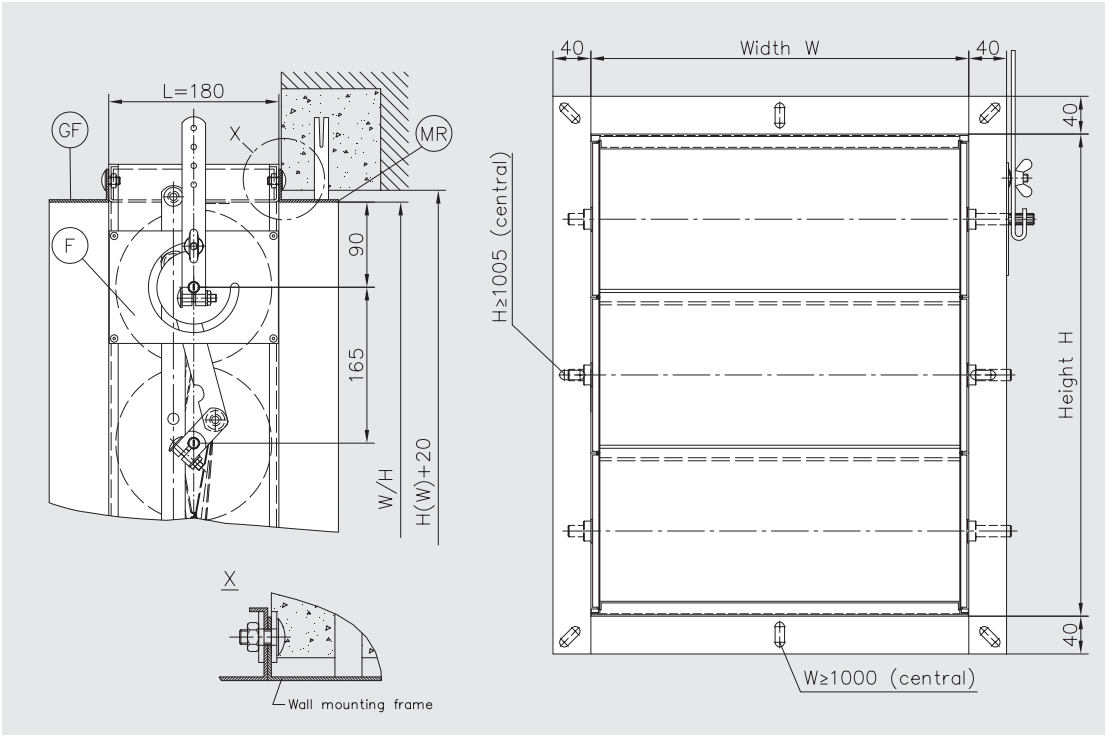
Type-tested by the Brunswick Institute for Materials Testing.

JL multileaf damper
with electrical actuator FM

Accessories

MR Wall mounting frame
made of galvanised sheet steel

GF Counter flange
made of galvanised sheet steel



Sizes W x H

Width W [mm]	Height H [mm]
200	180
300	345
400	510
500	675
600	840
700	1005
800	1170
1000	1335
1200	1500
1400	1665
1600	1830
1800	1995
2000	

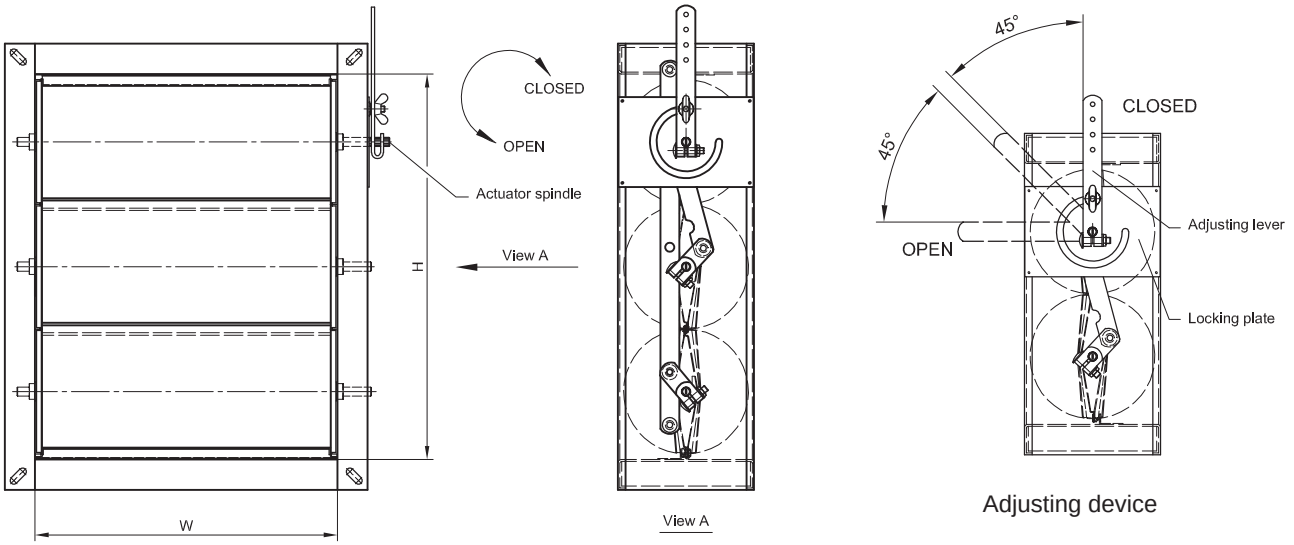
All W and H dimensions can be combined,
but H = 180 [mm] only with W ≤ 1000 [mm]

JL Multileaf Dampers

Actuators

Actuator spindles

In the case of JL multileaf dampers which have only one actuator spindle, this is located on the uppermost blade. For heights from 1005 mm there are two actuator spindles; these are suitably distributed between the top and bottom halves; as a result the driving torque is evenly distributed across all blades.



Electrical actuators

JL multileaf dampers are available with the following factory-installed electrical actuators:

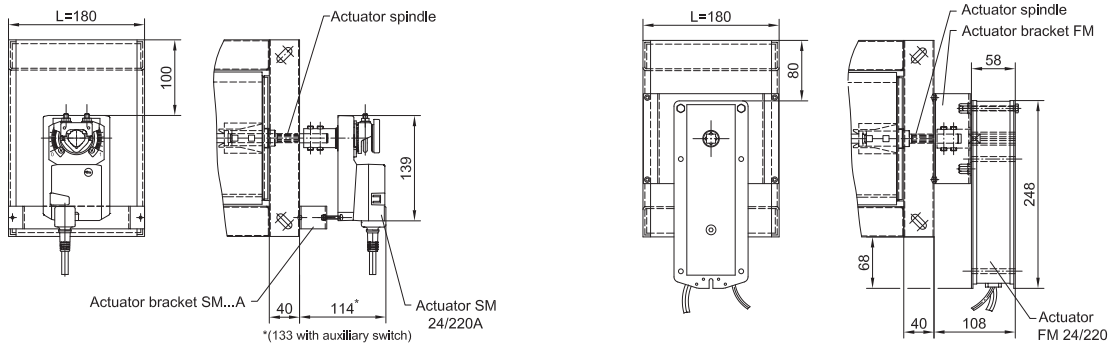
Electrical reversible actuators SM24A and SM220A, which open or close the multileaf dampers on 24V direct or alternating voltage or 230V alternating voltage at a driving torque of 20*) [Nm]. The current actuator setting is retained in the event of a power failure.

Further data ⇒ see page 15

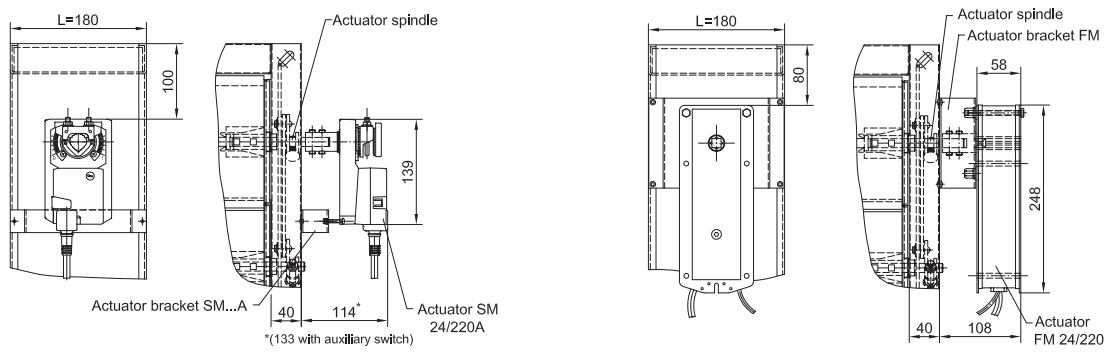
Electrical spring return actuators FM24 and FM220, which open the multileaf dampers on 24V direct or alternating voltage or 230V alternating voltage at a driving torque of 18*) [Nm]. In the event of power failure the multileaf dampers close with a driving torque of 12*) [Nm].

Further data ⇒ see page 15

Actuator attachment for multileaf damper height H = 180 mm



Actuator attachment for multileaf damper height H > 180 mm

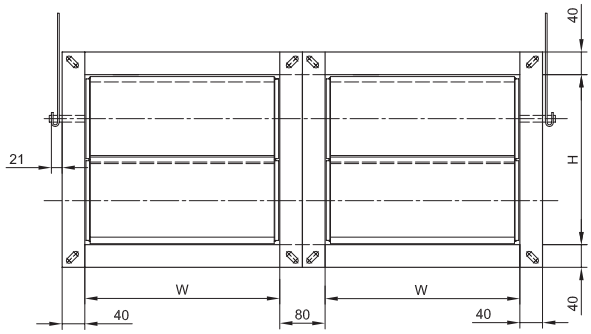


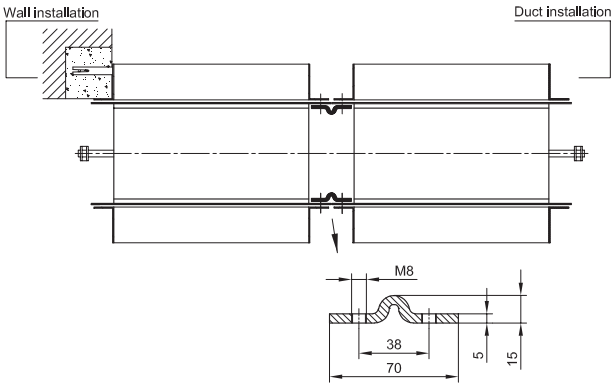
*) Required driving torques ⇒ see page 14; greater driving torques require two actuators!

JL Multileaf Dampers

Installation, details, accessories

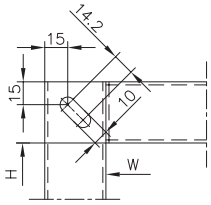
Horizontal assembly with straps



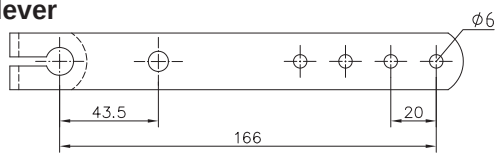


Use always separate actuators for each multileaf damper!

Corner drill hole in connecting frame



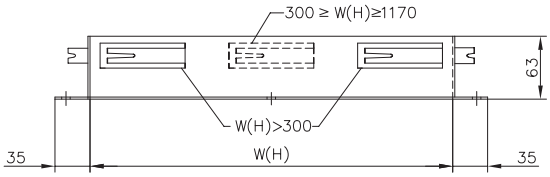
Adjusting lever



Accessories

MR Wall mounting frame made of galvanised sheet steel, punched, canted, corner welded with several wall clamps for cementing into wall.

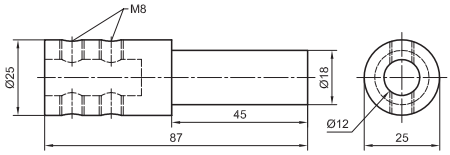
GF Counter flange made of galvanised sheet steel, punched, canted and corner welded.



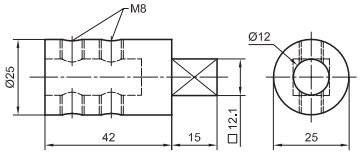
Counter flanges are without wall clamps!

Spindle extensions for customer-supplied actuators

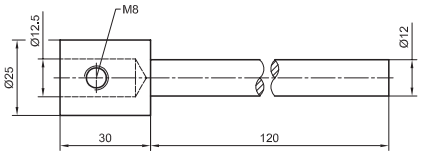
Extension for SM actuators



Extension for FM actuators



L150 extension for lever



JL Multileaf Dampers

Driving torques, pressure drop coefficients ζ, pressure drop, sound power level

Actuators

W / H	≤ 840	1005	1170	1335	1500	1665	1830	1995
200								
300								
400								
500								
600								
700								
800								
1000								
1200								
1400								
1600								
1800								
2000								

1 actuator

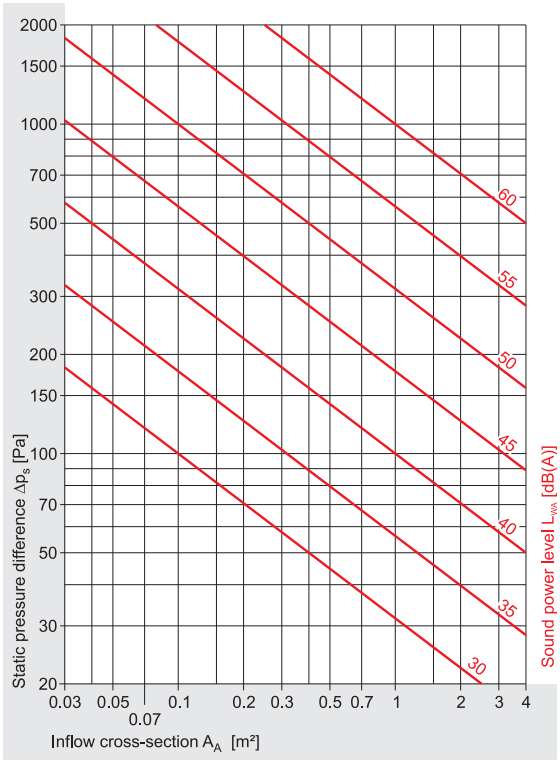
2 actuators

The indicated number of actuators each having a driving torque of at least 15 [Nm] are required to operated the multileaf dampers.

Example

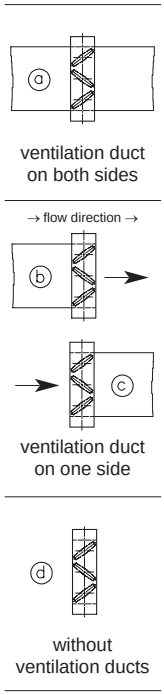
Width W = 800 [mm] Actuator 1 piece
Height H = 840 [mm] Driving torque M ≥ 15 [Nm]

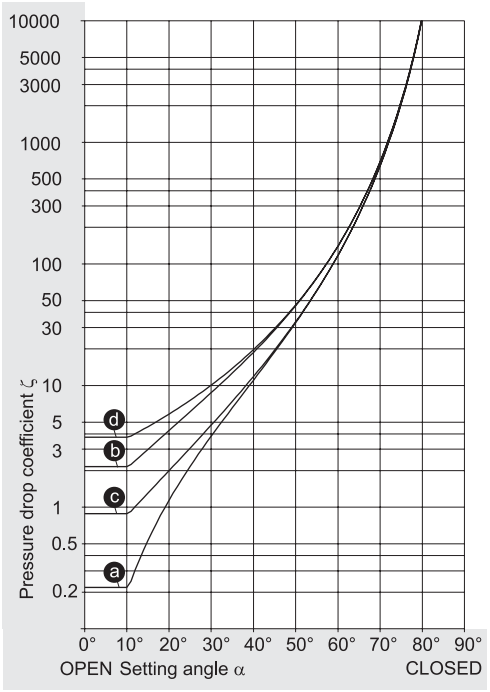
JL closed: sound power level



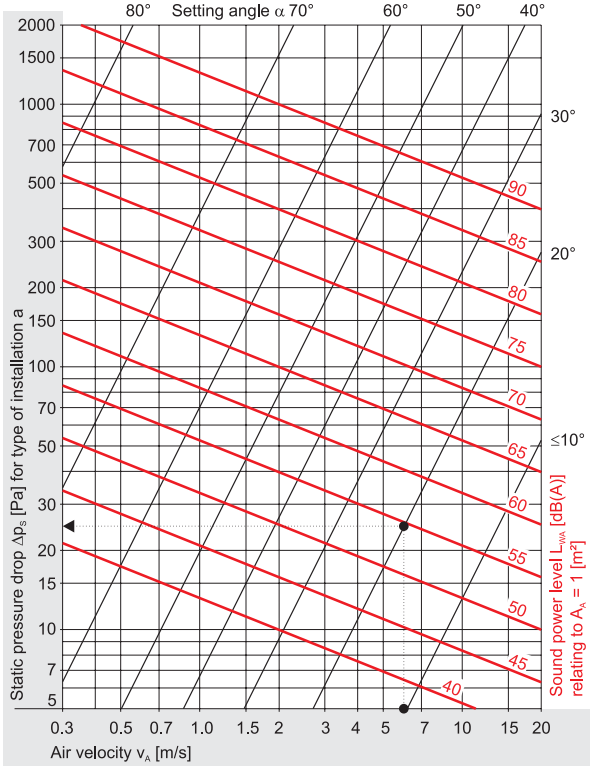
ζ - coefficients for pressure drop

Type of installation:





JL open: sound power level



Example

Setting angle α = 20 ° Pressure drop (type of installation a) Δp_S = 24 [Pa]
Air velocity v_A = 6 [m/s] Sound power level L_{WA} = 55 [dB(A)]*)

*) Sound power levels are referenced to A_A = 1 [m²]; correction values for other inflow cross-sections ⇒ see page 15

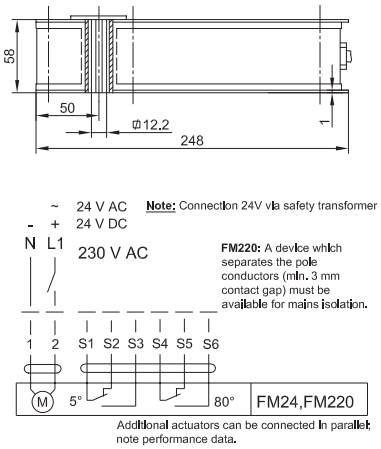
JL Multileaf Dampers

Electrical actuators, nomenclature

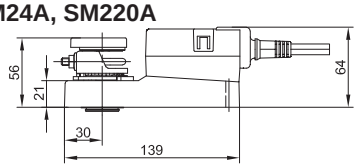
Technical data for factory installed actuators

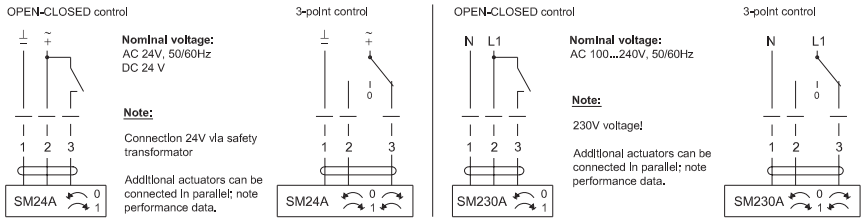
	SM24A	SM220A	FM24	FM220
Input voltage	24V AC / DC	100 to 240V AC	24V AC / DC	230V AC
tolerance range AC	± 20%	–15%, +10%	± 20%	±14%
tolerance range DC	± 20%		–10%, +20%	
Torque				
motor	≥20 Nm	≥20 Nm	≥18 Nm	≥18 Nm
spring return			≥12 Nm	≥12 Nm
Running time for 90°				
motor	150 s	150 s	140 s	140 s
spring return			~16 s	~16 s
Power input	4 VA	6 VA	10 VA	12.5 VA
Power consumption				
motoring	2 W	2.5 W	7 W	8 W
holding	0.2 W	0.6 W	2 W	3 W
Degree of protection	IP 54	IP 54	IP 54	IP 54
Connecting cable 0.75 mm²	approx. 1 m	approx. 1 m	approx. 1 m	approx. 1 m
motor	3 wire	3 wire	2 wire	2 wire
auxiliary switch			6 wire	6 wire
auxiliary switch S1A	3 wire	3 wire		
auxiliary switch S2A	6 wire	6 wire		
Ambient temperature	-30°C to + 50°C			

FM24, FM220 with integrated limit switches

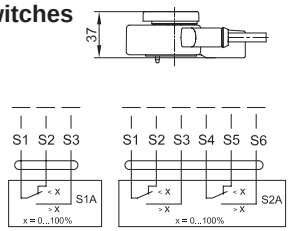


SM24A, SM220A





Auxiliary switches S1A, S2A



Nomenclature

A_A [m²] = inflow cross-section $A_A = W \cdot H$

A_{free} [m²] = free cross-section, $A_{free} \approx 82\%\ A_A$

V [m³/h] = volume flow rate, leakage volume flow rate

v_A [m/s] = flow velocity relating to A_A (inflow velocity)

α = setting angle
multileaf damer OPEN: α = 0°
CLOSED: α = 90°

ζ = pressure drop coefficient relating to A_A
pressure drop $\Delta p_S = \zeta \cdot \rho/2 \cdot v_A^2$

ρ = medium density ($\rho_{dry\ air\ 20°C,\ 1\ bar}$ = 1.188 [kg/m³])

Δp_S [Pa] = static pressure drop, static pressure difference

L_{WA} [dB(A)] = A-weighted sound power level

ΔL [dB] = correction to L_{WA} relating to A_A = 1 [m²]
$L_{WA} = L_{WA\text{-}1m^2} + \Delta L$ [dB]

M [Nm/m²] = driving torque
M_{total} [Nm] = M_{1m^2} [Nm/m²] · A_A [m²]

For other inflow cross-sections the following ΔL corrections must be added in the case of sound power levels relating to an inflow cross-section of A_A = 1 [m²]:

A_A [m²]	ΔL [dB]
0.10	-10
0.25	-6
0.40	-4
0.50	-3
0.60	-2
1.00	0
1.25	+1
1.60	+2
2.00	+3
2.50	+4
3.20	+5
4.00	+6

JL Multileaf Dampers

Order information, installation notes

JL - __ - __ - __ - __

Size

nominal size W x H ..... x .....

⇒ see page 11

Accessories

1GF with 1 counter flange

2GF with 2 counter flanges

⇒ see page 13

MR with wall mounting frame

⇒ see page 13

Adjusting devices

One or two actuator spindles are available depending on width and height; hence the same number of locking devices / actuators is required!

⇒ see page 14 and page 15

F locking device (standard)

Actuators 20 [Nm][3)]

SM220A	100 to 240V AC
SM220A-S1A	100 to 240V AC and 1 auxiliary switch
SM220A-S2A	100 to 240V AC and 2 auxiliary switches
SM24A	24V AC / DC
SM24A-S1A	24V AC / DC and 1 auxiliary switch
SM24A-S2A	24V AC / DC and 2 auxiliary switches

Spring return actuators 18 [Nm] / 12 [Nm][3)]

FM220	230V AC and integrated limit switches
FM24	24V AC/DC and integrated limit switches

Spindle extensions for customer-supplied actuators

SM	∅18 mm for SM actuators
FM	12 x 12 mm for FM acutators
L150	∅ 12 mm, 150 mm long for adjusting lever

Straps for combining two JL multileaf dampers must be ordered separately:

U-LU1	for widths < 1000 mm	same width arranged one upon the other!
U-LU2	for widths ≥ 1000 mm	
U-LN1	for heights < 1005 mm	same heigth arranged alongside!
U-LN2	for heights ≥ 1005 mm	

Installation notes

JL multileaf dampers can be used for:

temperatures: -20°C to +90°C

pressure differences Δp_s: to 2500 [Pa]

The multileaf dampers must be installed with spindle in horizontal alignment, strain-free and sealed between counter flanges or on wall mounting frame, in order to guarantee air tightness and compliance with the required driving torques.

Avoid constant exposure to the effects of UV light.

JL Multileaf Dampers

Specification text

Multileaf dampers made of galvanised sheet steel. Air-tight in accordance with DIN 1946-4 and leak tightness class 4 according to EN 1751 at 100 Pa static pressure difference. Type-tested. For use as control or shut-off dampers in ventilation and air conditioning systems. Hygienically smooth, opposed hollow blades profiled for optimum flow in special brass bushings and 180 mm long all-around canted frame. Connection flanges for installation between ducts and on walls or ceilings. With adjusting lever and locking device / electrical actuator / electrical spring return actuator / with auxiliary switches. With wall mounting frame and counter flange / counter flanges. Also includes connecting straps required to install two multileaf dampers either one upon the other / alongside.

..... **pieces**

Volume flow rate: ..... **m³/h**

Manufacturer: **WILDEBOER®**

Type: **JL**

Dimension W x H ....x.... **mm**

Complete with fasteners **supply:** .....

install: .....

Delete text in non-bold type as required!

JL Multileaf Dampers

Notes

UK, UE Pressure Relief Dampers

Steel, galvanised, with aluminium blades

UK

UE

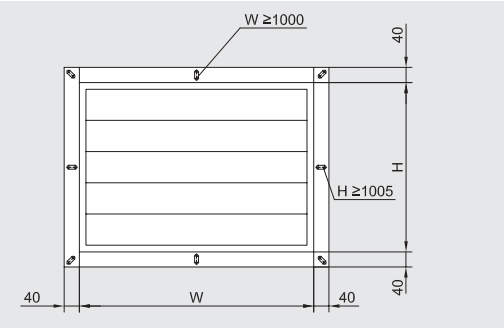
Pressure relief dampers for ventilation and air conditioning systems. Made of galvanised sheet steel with stable, self-actuating extruded aluminium profile blades with grooved, elastic seals and plastic bearing journals.
The blades are not coupled together.

UK pressure relief dampers with 120 mm long flange frame for installation between ventilation ducts and on walls within a building.

Accessories

MR **Wall mounting frame**
made of galvanised sheet steel

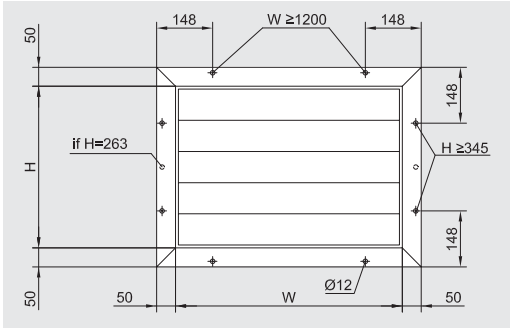
GF **Counter flange**
made of galvanised sheet steel



UE pressure relief dampers with blind frame for installation in walls.

Accessories

MR **Wall mounting frame**
made of galvanised sheet steel



Sizes W x H

Width W [mm]	Height H [mm]
200	263
400	345
600	428
800	510
1000	675
1200	840
1400	1005
1600	1170
	1335
	1500
	1665

All W and H dimensions can be combined.

UK, UE Pressure Relief Dampers

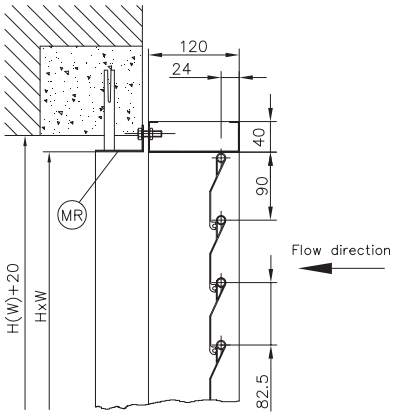
Details, installation, pressure drop, sound power level

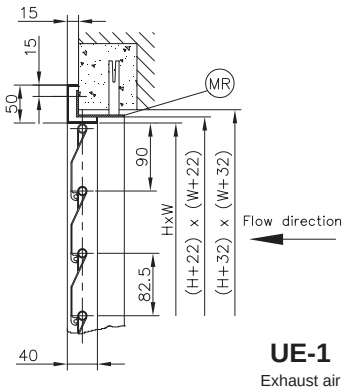
Installation: UK

Customers can reverse the flow direction by twisting the pressure relief damper blades.

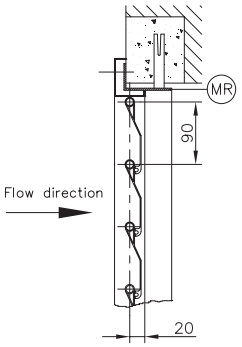
Installation: UE

Customers cannot change the specified flow directions on site; they must be specially ordered.



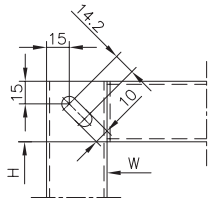


UE-1
Exhaust air
- blowing -



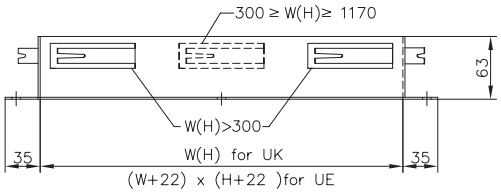
UE-2
Supply air
- suction -

Corner drill hole in UK connecting frame

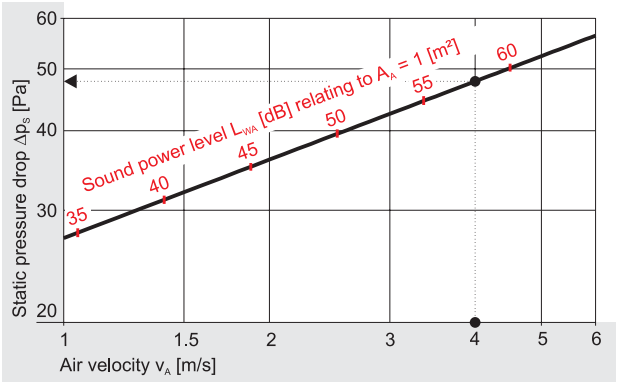


MR wall mounting frame for UK and UE

GF counter flange for UK (without wall clamps)



Pressure drop, sound power level



A_A [m²]	ΔL [dB]
0.10	-10
0.25	-6
0.40	-4
0.50	-3
0.60	-2
1.00	0
1.25	+1
1.60	+2
2.00	+3
2.50	+4

The sound power levels in the nomogram are referenced to a inflow cross-section of A_A = 1 [m²].
ΔL corrections must be added for other inflow cross-sections.

Example

Volume flow rate	V	=	7775 [m³/h]
Width	W	=	800 [mm]
Height	H	=	675 [mm]
⇒ Inflow section	A_A	=	0.54 [m²]

⇒ Inflow velocity
v_A = 7775 / 3600 / 0.54 = 4 [m/s]

⇒ from the nomogram:

Pressure drop	Δp_S	=	48 [Pa]
Sound power level relating to A_A = 1 [m²]	L_{WA}	=	58 [dB(A)]

⇒ from the table:

Correction value	ΔL	=	-3 [dB]
Sound power level relating to A_A	L_{WA}	=	55 [dB(A)]

Nomenclature

A_A	[m²]	=	inflow cross-section $A_A = W \cdot H$
V	[m³/h]	=	volume flow rate V [m³/h] = v_A [m/s] · 3600 [s/h] · A_A [m²]
v_A	[m/s]	=	flow velocity relating to A_A (inflow velocity)
Δp_S	[Pa]	=	static pressure drop
L_{WA}	[dB(A)]	=	A-weighted sound power level
ΔL	[dB]	=	correction to L_{WA} relating to A_A = 1 [m²] $L_{WA} = L_{WA\text{-}1m^2} + \Delta L$ [dB]

UK, UE Pressure Relief Dampers

Order information, installation notes

- - -

Pressure relief damper

with flange frame	UK
with blind frame, for exhaust air	UE-1
with blind frame, for supply air	UE-2

Size

nominal size W x H ..... x .....

⇒ see page 19

Accessories

1GF	with 1 counter flange*)
2GF	with 2 counter flanges*)

⇒ see page 20

MR with wall mounting frame

⇒ see page 20

*) only for UK

Straps for combining two UK pressure relief dampers must be ordered separately:

U-LU1	for widths < 1000 mm	same width arranged one upon the other!
U-LU2	for widths ≥ 1000 mm	
U-LN1	for heights < 1005 mm	same heigth arranged alongside!
U-LN2	for heights ≥ 1005 mm	

Straps for combining two wall mounting frames for UE pressure relief dampers must be ordered separately:

Z-LU1	for widths < 1000 mm	same width arranged one upon the other!
Z-LU2	for widths ≥ 1000 mm	
Z-LN1	for heights < 1005 mm	same heigth arranged alongside!
Z-LN2	for heights ≥ 1005 mm	

Installation notes

Pressure relief dampers can be used for:

temperatures:	-20°C	to	+70°C
pressure differences:		to	500 [Pa]
inflow velocities:		to	5 [m/s]

Back pressure due to wind or uneven inflows can lead to fluctuations in pressure.
In extreme cases this can cause undesired noises.

UK, UE Pressure Relief Dampers

Specification text

Pressure relief dampers for ventilation and air conditioning systems. Flange frame 120 mm long made of galvanised sheet steel for installation in ventilation ducts and on walls, with individual, self-actuating, opening and closing extruded aluminium profile blades with grooved, elastic seals and plastic bearing journals. With wall mounting frame and with counter flanges.

..... **pieces**

Volume flow rate: ..... **m³/h**

Manufacturer: **WILDEBOER®**

Type: **UK**

Dimension W x H .... x .... **mm**

Complete with fasteners **supply:** .....

install: .....

Pressure relief dampers for intake and exhaust air openings in ventilation and air conditioning systems. Blind frame made of galvanised sheet steel for installation in walls, with individual, self-actuating, opening and closing extruded aluminium profile blades with grooved, elastic seals and plastic bearing journals. Screw mounting via drill holes in frame and with wall mounting frame.

..... **pieces**

Volume flow rate: ..... **m³/h**

Manufacturer: **WILDEBOER®**

Type: **UE**

Dimension W x H .... x .... **mm**

Complete with fasteners **supply:** .....

install: .....

Delete text in non-bold type as required!

AWK Weather Resistant Louvres

Aluminium anodised

AWK weather resistant louvres for outside air and exhaust air from ventilation and air conditioning systems. Profiled, water-repellent blades in an all-around frame for installation in external walls. Frame and blades made of extruded aluminium profiles with anodised natural colour finish; permanently mounted stainless steel protective grille with approx. 16 mm mesh size on the rear side and with countersunk holes.

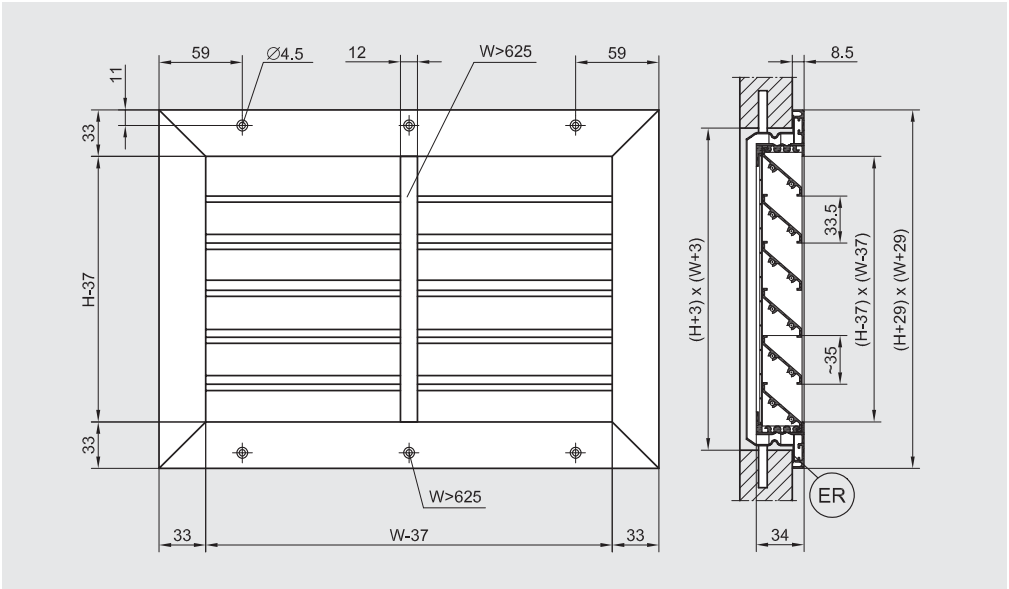
Special design:

AWK-F with additional anti-fly wire made of aluminium with approx. 1 mm mesh size

Accessories:

ER Installation subframe

Shown here is a powder coated version without centre bar.



Installation opening without installation subframe: (W - 10 mm) x (H - 10 mm)

Sizes W x H

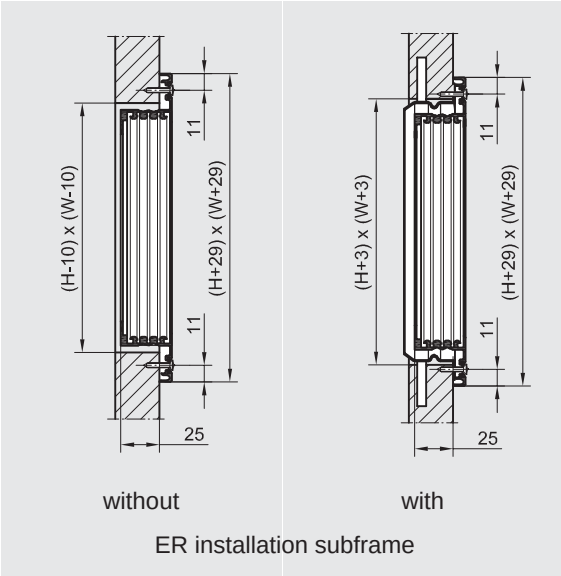
Width W [mm]	Height H [mm]
225	125
325	225
425	325
525	425
625	525
825	
1025	
1225	

All W and H dimensions can be combined.

Note: Weather resistant louvres protect wall openings against the penetration of impurities, provided these are unable to penetrate the mesh on the protective grille, and the effects of direct rain. In the case of strong winds, especially at great heights, it may not be possible to fully prevent the penetration of a small amount of rain or snow. Therefore actions should be taken to provide suitable drainage in the building.

AWK Weather Resistant Louvres

Installation, installation subframe, nomenclature, pressure drop, sound power level

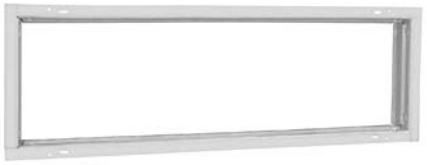


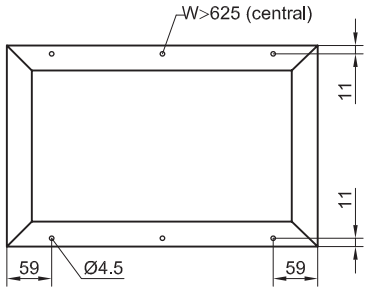
Installation with raised countersunk head screws 4.2 x 16 DIN 7973; with or without installation subframe.

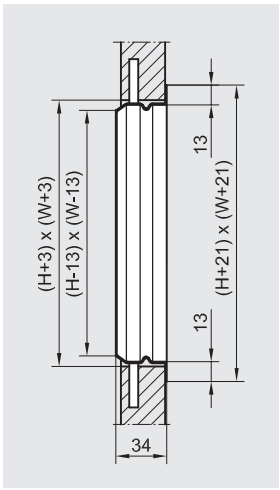
ER installation subframe

Installation subframe with wall clamps, made of profiled, galvanised sheet steel with pluggable corner joints.

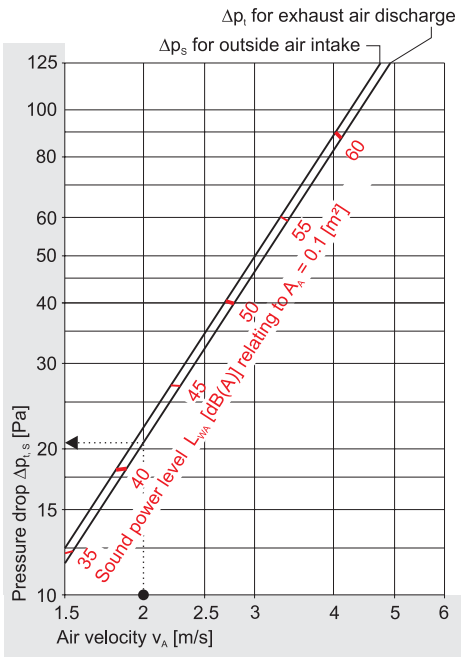
Nominal W and H sizes correspond to weather resistant louvres.







Pressure drop, sound power level



These sound power levels are applicable to an inflow cross-section A_A = 0.1 [m²].
ΔL corrections must be added as required.

Free cross-sections A_{free} [m²]

Height H [mm] \ Width W [mm]	225	325	425	525	625	825	1025	1225
125	0,006	0,009	0,013	0,016	0,019	0,025	0,031	0,038
225	0,015	0,023	0,032	0,040	0,048	0,063	0,079	0,095
325	0,025	0,038	0,051	0,063	0,076	0,100	0,126	0,151
425	0,034	0,052	0,069	0,087	0,105	0,138	0,173	0,208
525	0,043	0,066	0,088	0,111	0,133	0,175	0,220	0,265

Inflow cross-sections A_A [m²]

Height H [mm] \ Width W [mm]	225	325	425	525	625	825	1025	1225
125	0,010	0,015	0,021	0,026	0,031	0,042	0,053	0,064
225	0,029	0,044	0,060	0,075	0,090	0,121	0,152	0,182
325	0,048	0,073	0,098	0,124	0,149	0,200	0,250	0,301
425	0,066	0,102	0,137	0,172	0,208	0,278	0,349	0,420
525	0,085	0,131	0,176	0,221	0,267	0,357	0,448	0,539

Correction values ΔL [dB] = L_{WA} - L_{WA} relating to A_A = 0.1[m²]

Height H [mm] \ Width W [mm]	225	325	425	525	625	825	1025	1225
125	-10,0	-8,1	-6,8	-5,8	-5,0	-3,8	-2,8	-2,0
225	-5,4	-3,5	-2,3	-1,3	-0,4	+0,8	+1,8	+2,6
325	-3,2	-1,4	-0,1	+0,9	+1,7	+3,0	+4,0	+4,8
425	-1,8	+0,1	+1,4	+2,4	+3,2	+4,4	+5,4	+6,2
525	-0,7	+1,2	+2,5	+3,4	+4,3	+5,5	+6,5	+7,3

Nomenclature

Δp_t [Pa] = total pressure drop (for exhaust air discharge)

Δp_S [Pa] = static pressure drop (for outside air intake)

A_{free} [m²] = free cross-section

A_A [m²] = inflow cross-section
$A_A = (W - 0.037\ m) \cdot (H - 0.072\ m)$

v_A [m/s] = flow velocity relating to A_A

V [m³/h] = volume flow rate

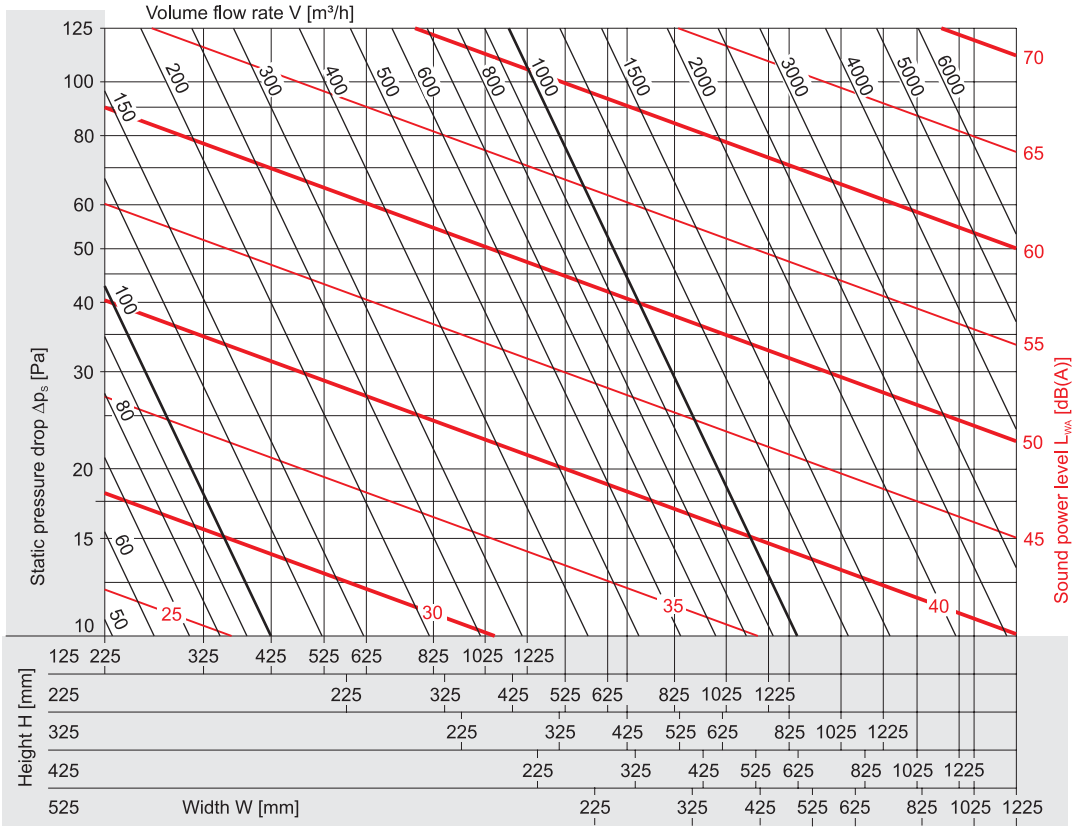
L_{WA} [dB(A)] = A-weighted sound power level

ΔL [dB] = correction value to L_{WA} relating to A_A = 0.1 [m²]

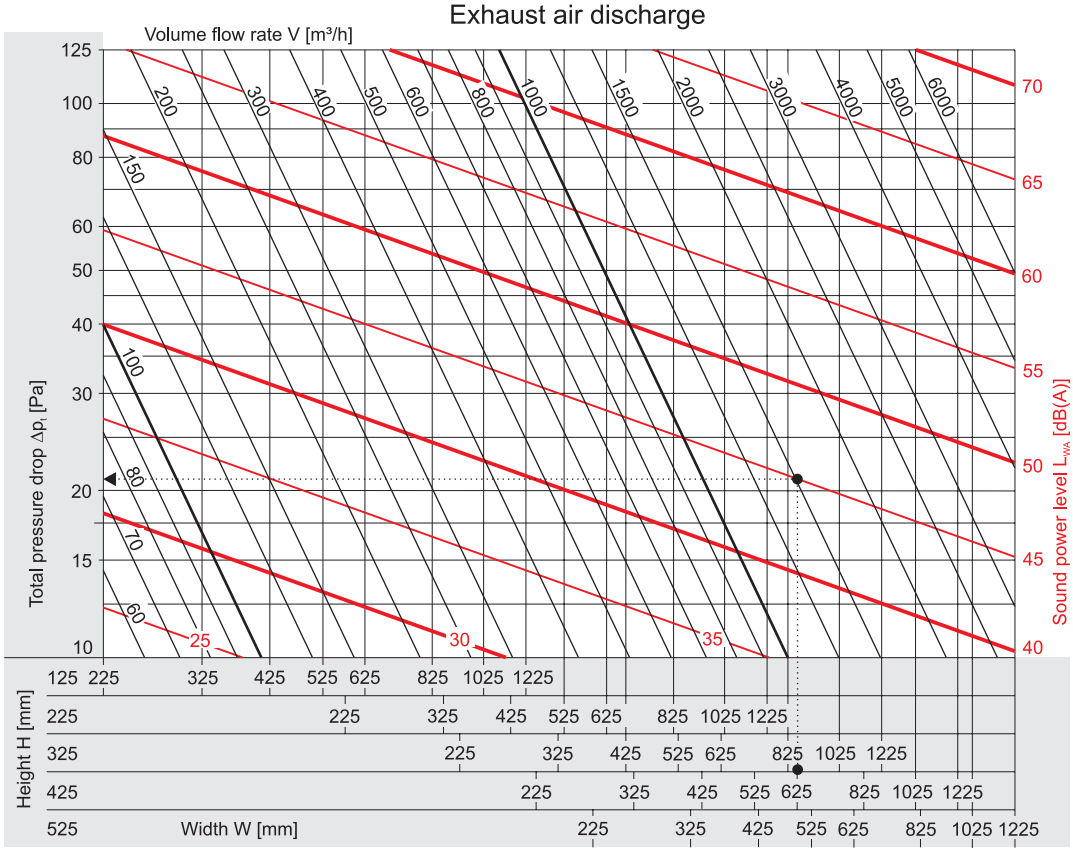
AWK Weather Resistant Louvres

Selection

Outside air intake



Exhaust air discharge



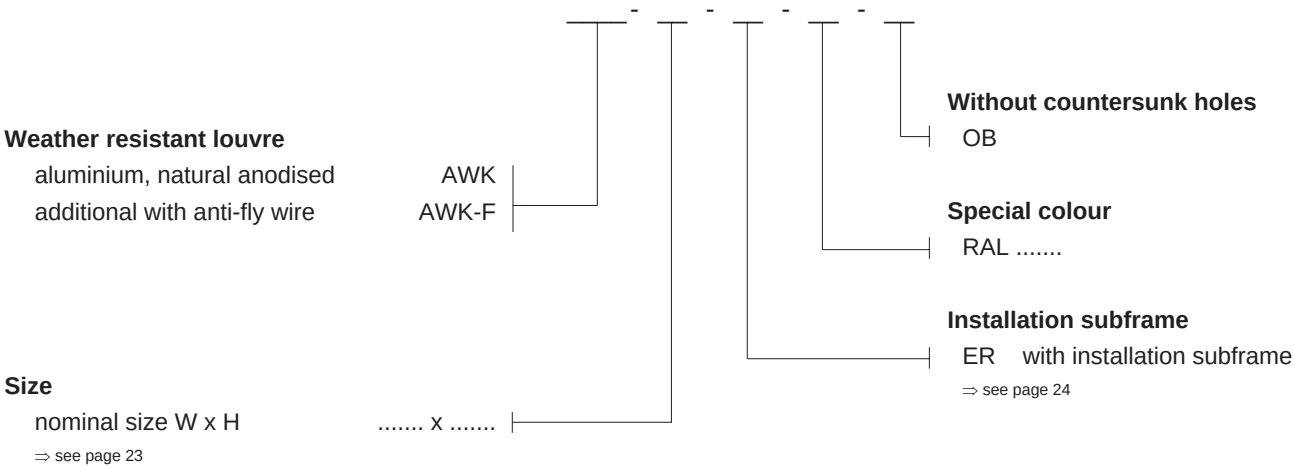
Example

Volume flow rate
V = 1500 [m³/h]
Sound power level
L_{WA} = 45 [dB(A)]
Width
W = 625 [mm]
Height
H = 425 [mm]
Pressure drop
Δp_t = 21 [Pa]

Alternatively, inflow velocity
v_A = 1500 [m³/h] / 3600 / 0.208 [m²]
v_A = 2.00 [m/s]
is calculated from inflow cross-section
A_A = 0.208 [m²].
For this inflow velocity v_A the nomogram on page 24 gives a sound power level
L_{WA} = 41.8 [dB(A)] relating to A_A = 0.1 [m²], which is to be corrected by
ΔL = +3.2 [dB] to
L_{WA} = 45 [dB(A)]

AWK Weather Resistant Louvres

Order information, specification text



Weather resistant louvres made of natural anodised aluminium profiles for outside air intake and exhaust air. With all-around profile front frame, horizontal, water-repellent profile blades and permanently mounted stainless steel protective grille with approx. 16 mm mesh size on the rear size and with additional anti-fly wire made of aluminium with approx. 1 mm mesh size. Fastening with screws in countersunk holes and with installation subframe made of galvanised sheet steel.

..... **pieces**

Volume flow rate: ..... **m³/h**

Manufacturer: **WILDEBOER®**

Type: **AWK**

Dimension W x H .....x..... **mm**

Complete with fasteners **supply:** .....

install: .....

Delete text in non-bold type as required!

W, AW, AWE Weather Resistant Louvres

Steel / Aluminium / Aluminium anodised

Weather resistant louvres for outside air and exhaust air from ventilation and air conditioning systems. Profiled, water-repellent blades in an all-around frame for installation in external walls and with permanently mounted stainless steel protective grille with approx. 16 mm mesh size on the rear side. The free cross-sectional area is approx. 60% of the inflow cross section A_A.

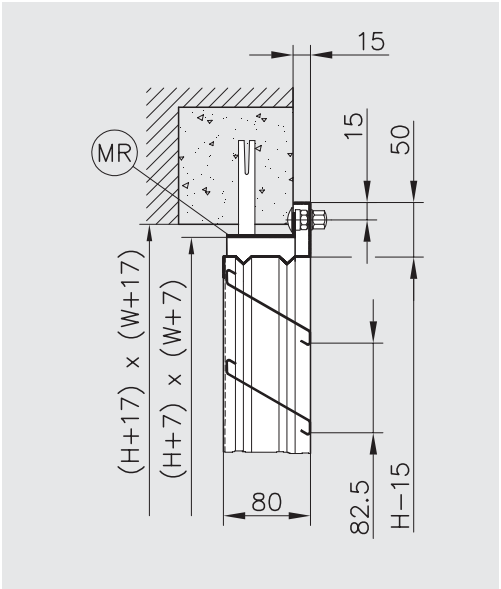
W with frame and blades made of galvanised sheet steel

AW with frame and blades made of extruded aluminium profiles with untreated surfaces

AWE with frame and blades made of extruded aluminium profiles with natural anodised surfaces

Accessories

MR **Wall mounting frame**
made of galvanised sheet steel



Installation opening with wall mounting frame: W x H

Sizes W x H

Width W [mm]	Height H [mm]
(300)	345 (428)
400 (500)	510 (593)
600 (700)	675 (758)
800 (900)	840 (923)
1000 (1100)	1005 (1088)
1200 (1300)	1170 (1253)
1400 (1500)	1335 (1418)
1600 (1700)	1500 (1583)
1800 (1900)	1665 (1748)
2000 (2100)	1830 (1913)
	1995 (2078)

All W and H dimensions can be combined

Dimensions in () are intermediate dimensions, especially for combinations

The specified sizes are standard dimensions with 82.5 mm blade spacing.

W weather resistant louvres are also **available as standard** in

- **widths** from **300 to 2100 mm** and
- **heights** from **345 to 2078 mm**

with any desired dimension in 1 mm steps and with a maximum of 25 blades.

Blade spacing is adjusted automatically to the height. Hence intermediate dimensions may have somewhat larger or smaller blade spacing.

AW and AWE weather resistant louvres are also **available as standard** in

- **widths** from **300 to 2100 mm**

with any desired dimension in 1 mm steps.

Note: Weather resistant louvres protect wall openings against the penetration of impurities, provided these are unable to penetrate the mesh on the protective grille, and the effects of direct rain. In the case of strong winds, especially at great heights, it may not be possible to fully prevent the penetration of a small amount of rain or snow. Therefore actions should be taken to provide suitable drainage in the building.

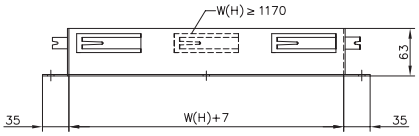
W, AW, AWE Weather Resistant Louvres

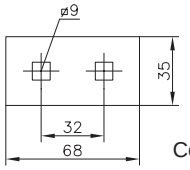
Accessories, pressure drop, sound power level, nomenclature

Accessories

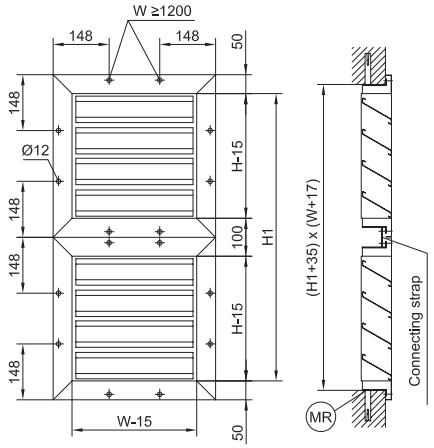
MR Wall mounting frame made of galvanised sheet steel, punched, canted, corner welded with several wall clamps for cementing.

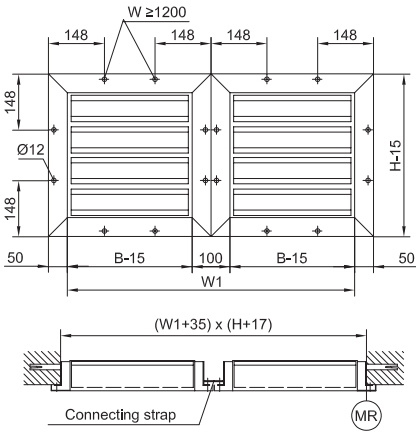
- Connecting straps with screws for horizontal assembly of two wall mounting frames with the same height.
- Connecting straps with screws for vertical assembly of two wall mounting frames with the same width.





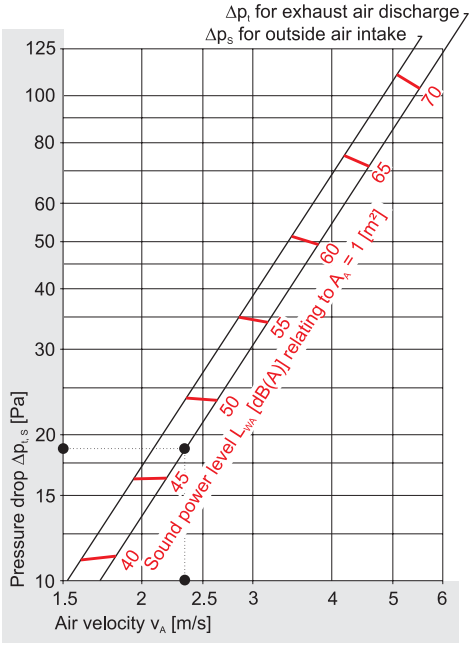
Connecting strap





Weather resistant louvres are also available without drill holes in the front frame.

Pressure drop, sound power level



These sound power levels relating to inflow cross-section A_A = 1 [m²]. ΔL corrections must be added for other inflow cross-sections:

A_A [m²]	ΔL [dB]
0.10	-10
0.25	-6
0.40	-4
0.50	-3
0.60	-2
1.00	0
1.25	+1
1.60	+2
2.00	+3
2.50	+4
3.20	+5
4.00	+6

$$L_{WA} = L_{WA\text{-}1m^2} + \Delta L \text{ [dB]}$$

Example

Exhaust air volume flow rate V = 5000 [m³/h]

Sound power level L_{WA} = 45 [dB(A)]

⇒ from the nomogram page 29:

Width W = 800 [mm]

Height H = 840 [mm]

Pressure drop Δp_t = 19 [Pa]

Alternatively, inflow velocity

v_A = 5000 [m³/h] / 3600 [s/h] / 0.6 [m²] = 2.3 [m/s]

is calculated from inflow cross-section

A_A = 0.8 [m] · (0.84 [m] - 0.1 [m]) = 0.6 [m²].

For this inflow velocity v_A and at the same pressure drop Δp as before, a sound power level

L_{WA} = 47 [dB(A)] relating to A_A = 1 [m²]

can be read from the nomogram opposite, which must be corrected by

ΔL = -2 [dB] to

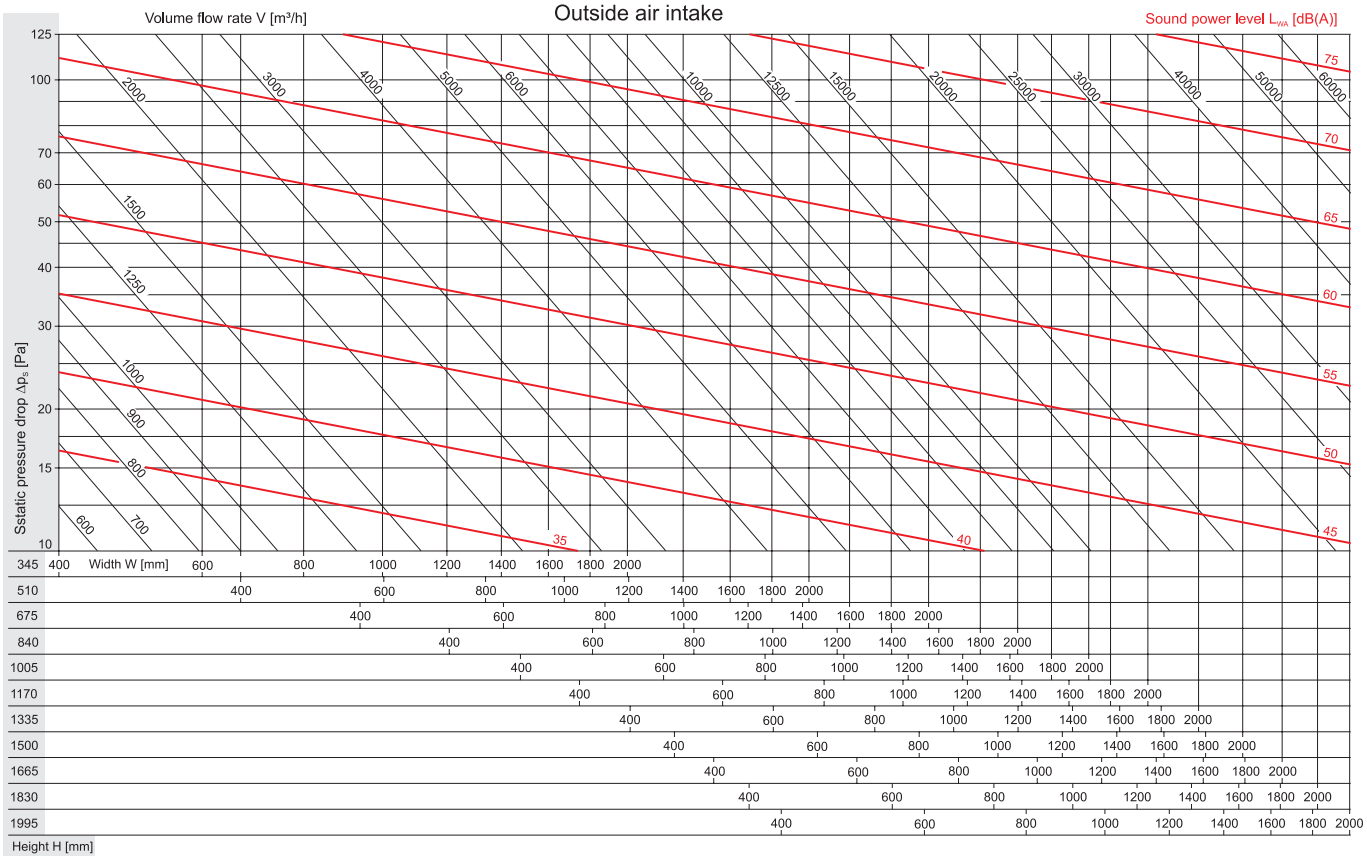
L_{WA} = 45 [dB(A)] relating to A_A

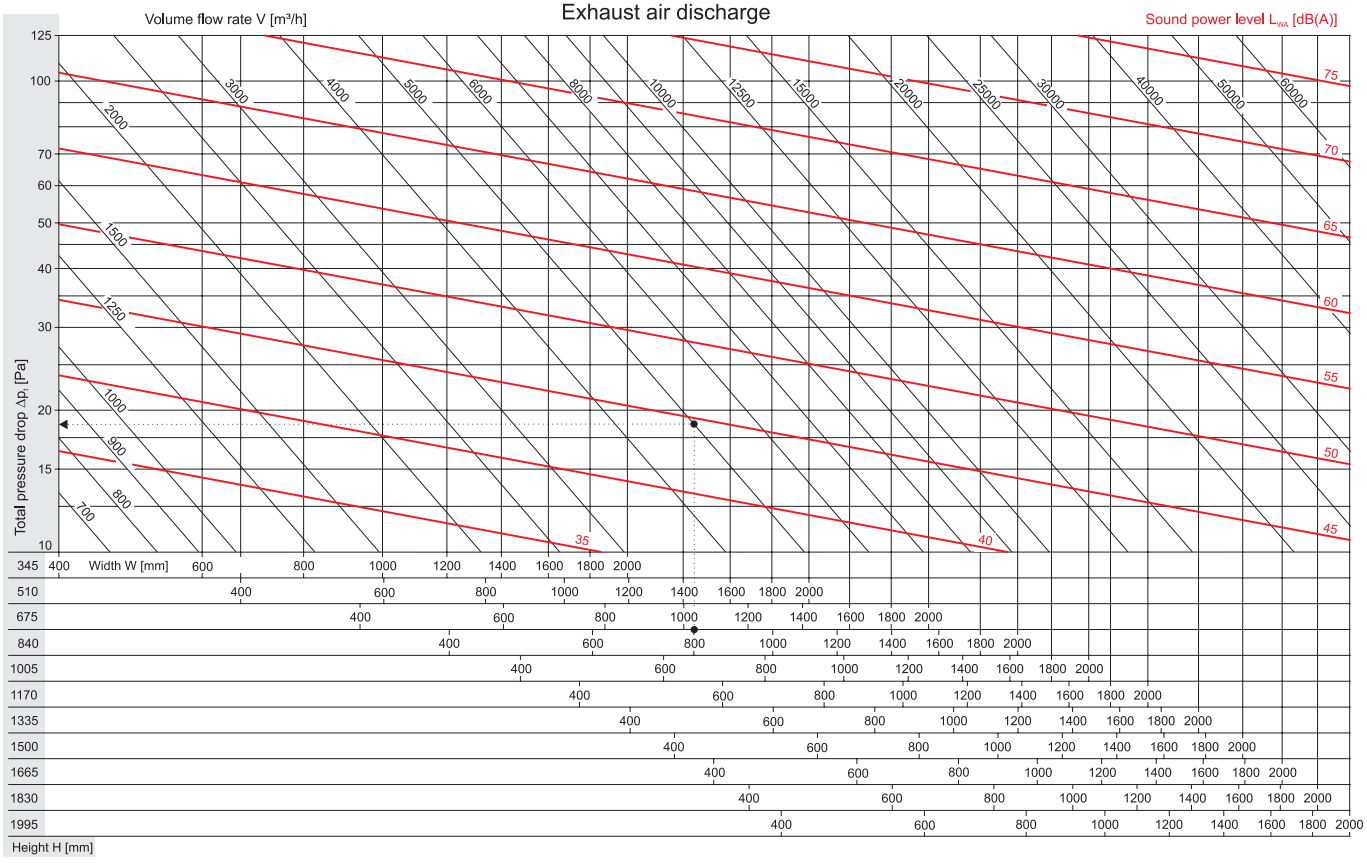
Nomenclature

A_A	[m²]	=	inflow cross-section A_A = W · (H - 0.1 [m])
V	[m³/h]	=	volume flow rate
v_A	[m/s]	=	flow velocity relating to A_A
Δp_t	[Pa]	=	total pressure drop (for exhaust air discharge)
Δp_s	[Pa]	=	static pressue drop (for outside air intake)
L_{WA}	[dB(A)]	=	A-weighted sound power level
ΔL	[dB]	=	correction to L_{WA} relating to A_A = 1 [m²]

W, AW, AWE Weather Resistant Louvres

Selection





W, AW, AWE Weather Resistant Louvres

Order information, specification text

Weather resistant louvre*)

- steel, galvanised — W
- aluminium, untreated — AW
- aluminium, natural anodised — AWE

Size

- nominal size W x H ..... x .....

⇒ see page 27

Wall mounting frame*)

- with wall mounting frame — MR

⇒ see page 28

Special colour (only for W and AW)

RAL .....

Front frame drill holes*)

if not required:
without front frame drill holes

*) The following accessories are provided for **fastening** of weather resistant louvres:

- with front frame drill holes and no wall mounting frame: galvanised hexagonal bolts and plastic dowels
- with front frame drill holes and wall mounting frame: galvanised mushroom head bolts and galvanised cap nuts
- without front frame drill holes: none - mounting accessories must be provided by the customer

Straps for combining two wall mounting frames for weather resistant louvres must be ordered separately:

Z-LU1	for widths < 1000 mm	same width arranged one upon the other!
Z-LU2	for widths ≥ 1000 mm	
Z-LN1	for heights < 1005 mm	same heigth arranged alongside!
Z-LN2	for heights ≥ 1005 mm	

Weather resistant louvres to protect against the direct penetration of rain and coarse impurities, for outside air intake and exhaust air. Made of galvanised steel, with all-around profile front frame, horizontal, water-repellent profile blades and permanently mounted stainless steel protective grille with 16 mm mesh size on the rear side. Screw mounting via drill holes in frame and with wall mounting frame made of galvanised sheet steel.

..... **pieces**

Volume flow rate: ..... **m³/h**

Manufacturer: **WILDEBOER®**

Type: **W**

Dimension W x H .....x..... **mm**

Complete with fasteners **supply:** .....

install: .....

Weather resistant louvres to protect against the direct penetration of rain and coarse impurities, for outside air intake and exhaust air. Made of untreated / natural anodised **aluminium, with all-around profile front frame, horizontal, water-repellent profile blades and permanently mounted stainless steel protective grille with 16 mm mesh size on the rear side.** Screw mounting via drill holes in frame and with wall mounting frame made of galvanised sheet steel.

..... **pieces**

Volume flow rate: ..... **m³/h**

Manufacturer: **WILDEBOER®**

Type: AW / AWE

Dimension W x H .....x..... **mm**

Complete with fasteners **supply:** .....

install: .....

Delete text in non-bold type as required!

Weather Resistant Louvre Combinations

Steel / Aluminium / Aluminium anodised

Weather resistant louvre combination for outside air and exhaust air. Profiled, water-repellent blades in an all-around frame for installation in external walls. Permanently mounted stainless steel protective grille with 16 mm mesh size.

W weather resistant louvres with frame and blades made of galvanised sheet steel

AW weather resistant louvres with frame and blades made of extruded aluminium profiles with untreated surfaces

AWE weather resistant louvres with frame and blades made of extruded aluminium profiles with natural anodised surfaces

Mounted on the rear side:

JK Multileaf dampers made of galvanised sheet steel, with hollow blades profiled for optimum flow with linkage and galvanised actuator spindles in plastic or brass bushings; 180 mm long frame with canted connecting flanges:

Blade coupling	Blade bearing	Length L 180 mm
opposed with external linkage	plastic	**JK-N180G**
	brass	**JK-M180G**
parallel with external linkage	plastic	**JK-N180**
	brass	**JK-M180**
parallel with internal linkage	plastic	**JK-N180I**
	brass	**JK-M180I**

JL Multileaf dampers, airtight in accordance with DIN 1946-4 and leak tightness class 4 according to EN 1751 at 100 [Pa] static pressure difference. Made of galvanised sheet steel. The sealed, opposed hollow blades profiled for optimum flow and connected via linkage turn in special brass bushings on a 180 mm long frame with canted connection flanges.

UK Pressure relief dampers with self-actuating extruded aluminium profile blades with grooved, elastic seals and plastic bearing journals and 120 mm long frame made of galvanised sheet steel with canted connecting flanges. The blades are not coupled together. Only available to width W = 1600 mm and heigth H = 1665 mm.

Size W x H

Width W [mm]	Height H [mm]
400	345
600	510
800	675
1000	840
1200	1005
1400	1170
1600	1335
1800*)	1500
2000*)	1665
	1830*)
	1995*)

All W and H dimensions can be cominded.

*) Note size restrictions!

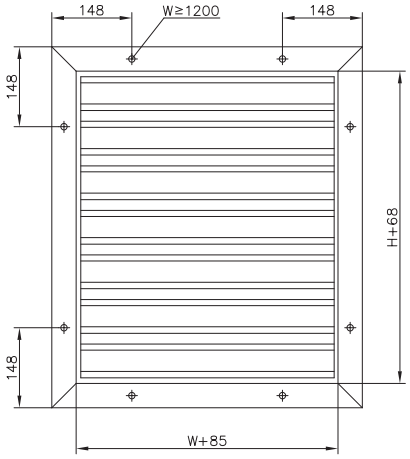
Note:
Weather resistant louvres protect wall openings against the penetration of impurities, provided these are unable to penetrate the mesh on the protective grille, and the effects of direct rain. In the case of strong winds, especially at great heights, it may not be possible to fully prevent the penetration of a small amount of rain or snow. Therefore actions should be taken to provide suitable drainage in the building.

Weather Resistant Louvre Combinations

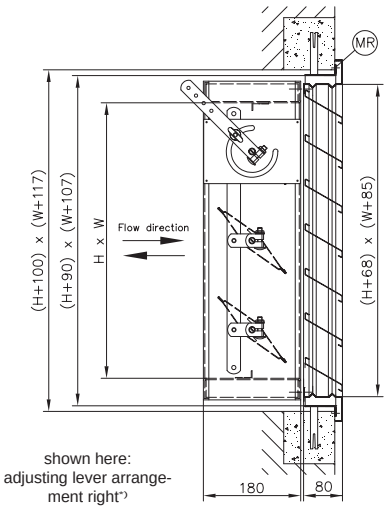
Designs, dimensions

Weather resistant louvre combinations consist of W, AW and AWE weather resistant louvres and permanently mounted JK multileaf dampers, JL multileaf dampers or UK pressure relief dampers on the rear side.

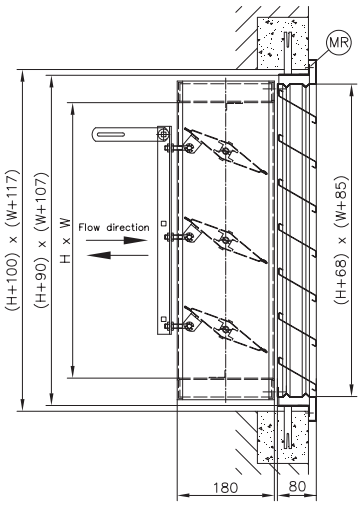
The units are factory assembled from standard products.



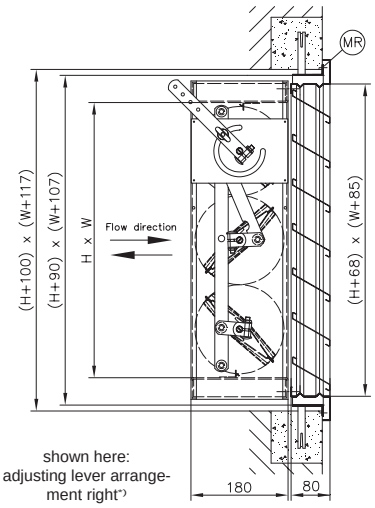
W, AW, AWE
Weather Resistant Louvres



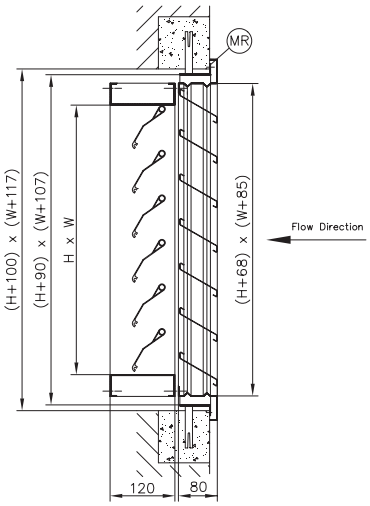
combined **with JK-N (M) 180 (G)**



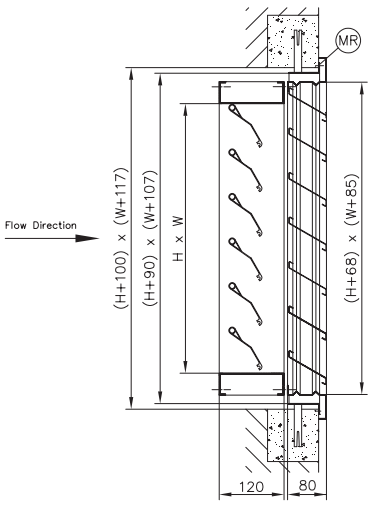
combined **with JK-N (M) 180 I**



combined **with JL**



combined **with UK1**
- suction -



combined **with UK2**
- blowing -

*) optinal: adjusting lever also deliverable on left.

All illustrations are shown with MR wall mounting frame.

Installation openings without wall mounting frame: (W + 100 mm) · (H + 93 mm)

Note: It may be necessary to temporarily disassemble the adjusting lever or actuators!

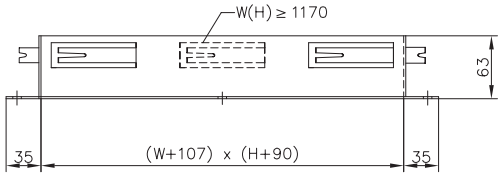
Weather Resistant Louvre Combinations

Accessories, pressure drop, sound power level, nomenclature

Accessories

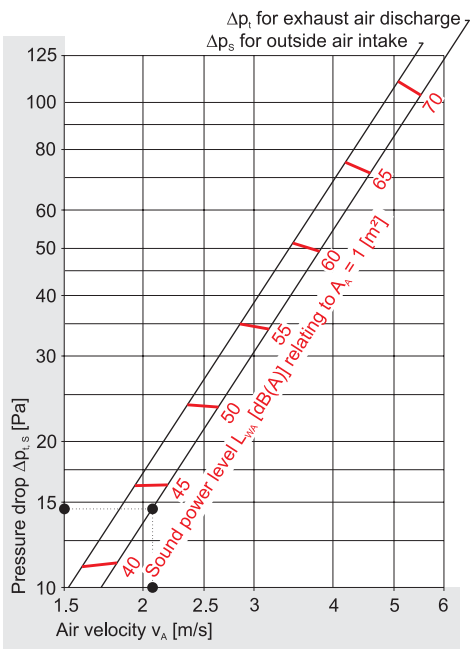
MR Wall mounting frame made of galvanised sheet steel, punched, canted, corner welded with several wall clamps for cementing.

GF Counter flange made of galvanised sheet steel, punched, canted and corner welded.



Counter flanges are without wall clamps!

Pressure drop, sound power level for weather resistant louvres



These sound power levels relating to inflow cross-section A_A = 1 [m²]. ΔL corrections must be added for other inflow cross-sections:

A_A [m²]	ΔL [dB]
0.10	-10
0.25	-6
0.40	-4
0.50	-3
0.60	-2
1.00	0
1.25	+1
1.60	+2
2.00	+3
2.50	+4
3.20	+5
4.00	+6

$L_{WA} = L_{WA\text{-}1m^2} + \Delta L$ [dB]

Example

Exhaust air volume flow rate	V	=	5000 [m³/h]
Sound power level	L_{WA}	=	45 [dB(A)]
Width	W	=	800 [mm]
Heigth	H	=	840 [mm]
Pressure drop	Δp_t	=	14 [Pa]

Alternatively, inflow velocity

v_A = 5000 [m³/h] / 3600 [s/h] / 0.67 [m²] = 2.1 [m/s]

is calculated from inflow cross-section

A_A = 0.8 [m] · 0.84 [m] = 0.67 [m²].

For this inflow velocity v_A and at the same pressure drop Δp as before, a sound power level

L_{WA} = 43 [dB(A)] relating to A_A = 1 [m²]

can be read from the nomogram opposite, which must be corrected by

ΔL = -2 [dB] to

L_{WA} = 41 [dB(A)] relating to A_A

The pressure drops of the attached shut-off dampers must be added. This and other technical data can be found in the respective product brochures.

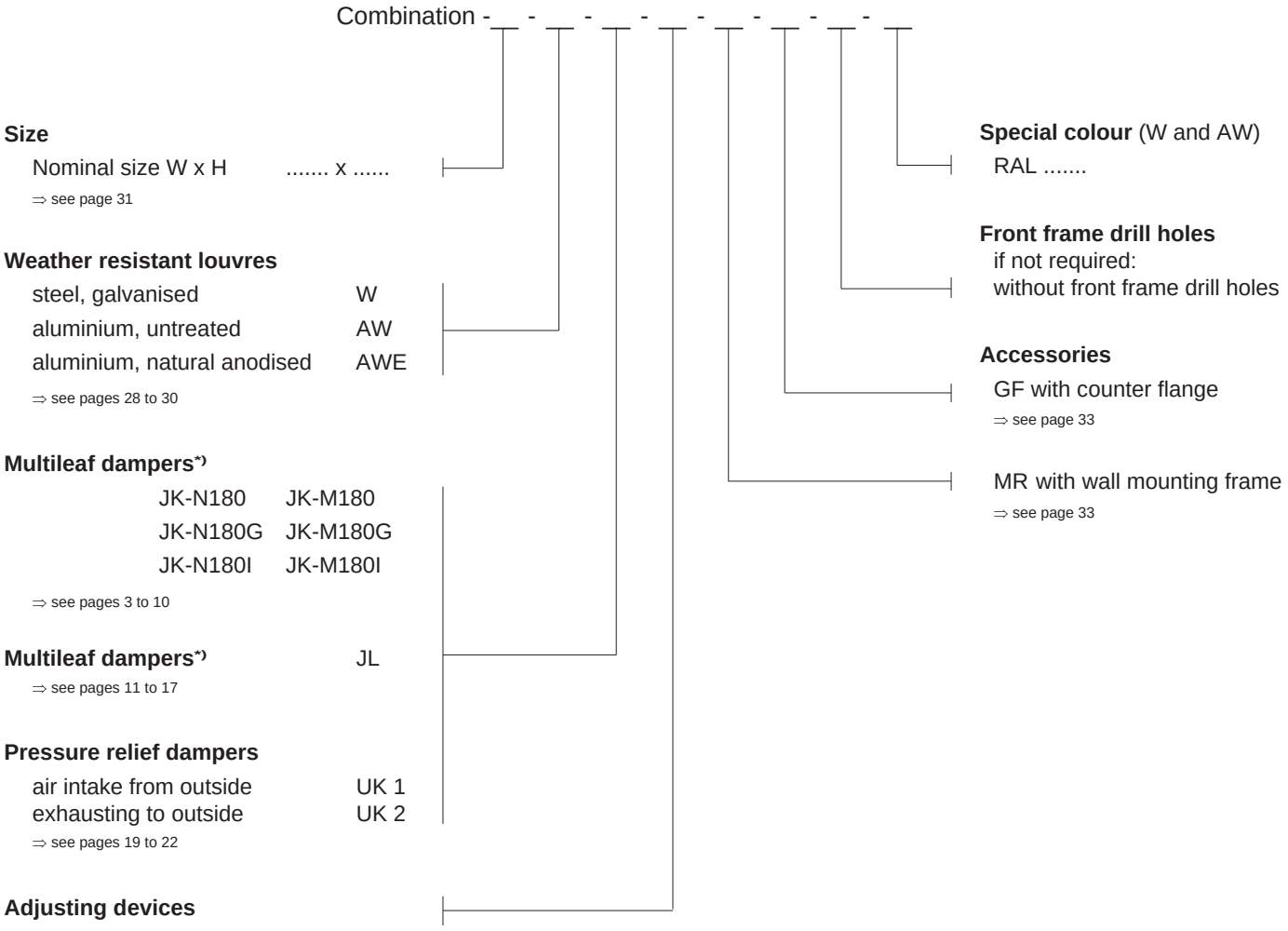
The highest of the sound power values for the weather resistant louvre or the attached shut-off damper should be used. If both values are approximately the same and do not differ by more than 7 [dB], +3 [dB] must be added to the highest value to obtain the total sound power level.

Nomenclature

A_A	[m²]	=	inflow cross-section A_A = W · H
V	[m³/h]	=	volume flow rate V [m³/h] = v_A [m/s] · 3600 [s/h] · A_A [m²]
v_A	[m/s]	=	flow velocity relating to A_A
Δp_t	[Pa]	=	total pressure drop (for exhaust air discharge)
Δp_s	[Pa]	=	static pressure drop (for outside air intake)
L_{WA}	[dB(A)]	=	A-weighted sound power level
ΔL	[dB]	=	correction to L_{WA} relating to A_A = 1 [m²]

Weather Resistant Louvre Combinations

Order information



*) Indicate where appropriate: adjusting lever on left
⇒ see page 32

Weather Resistant Louvre Combinations

Specification text

Weather resistant louvres to protect against the direct penetration of rain and coarse impurities, for outside air intake and exhaust air. Made of galvanised steel / untreated aluminium / natural anodised aluminium, **with all-around profile front frame, horizontal, water-repellent profile blades and permanently mounted stainless steel protective grille with 16 mm mesh size on the rear side.** Screw mounting via drill holes in frame and with wall mounting frame made of galvanised sheet steel. **With mounted**

Text for JK

Multileaf damper made of galvanised sheet steel with hollow blades profiled for optimum flow, external opposed / external parallel / internal parallel **linkage, galvanised actuator spindles in** plastic / brass **bushings. All-around, canted frame with 180 mm length and with connecting flanges for installation on ducts. With adjusting lever,** locking device and counter flange made of galvanised sheet steel.

Text for JL

Multileaf damper made of galvanised sheet steel. Airtight in accordance with DIN 1946-4 and leak tightness class 4 according to EN 1751 at 100 [Pa] static pressure difference. Hygienically smooth, opposed hollow blades profiled for optimum flow in special brass bushings and 180 mm long all-around canted frame and with connecting flange for installation on ducts. With adjusting lever and locking device, counter flange made of galvanised sheet steel.

Text for UK

Pressure relief damper with 120 mm long flange frame made of galvanised sheet steel, for installation on ventilation ducts. With individual, self-actuating, opening and closing extruded aluminium profile blades with grooved, elastic seals and plastic bearing journals. With counter flange.

..... **pieces**

Volume flow rate: ..... **m³/h**

Manufacturer: **WILDEBOER®**

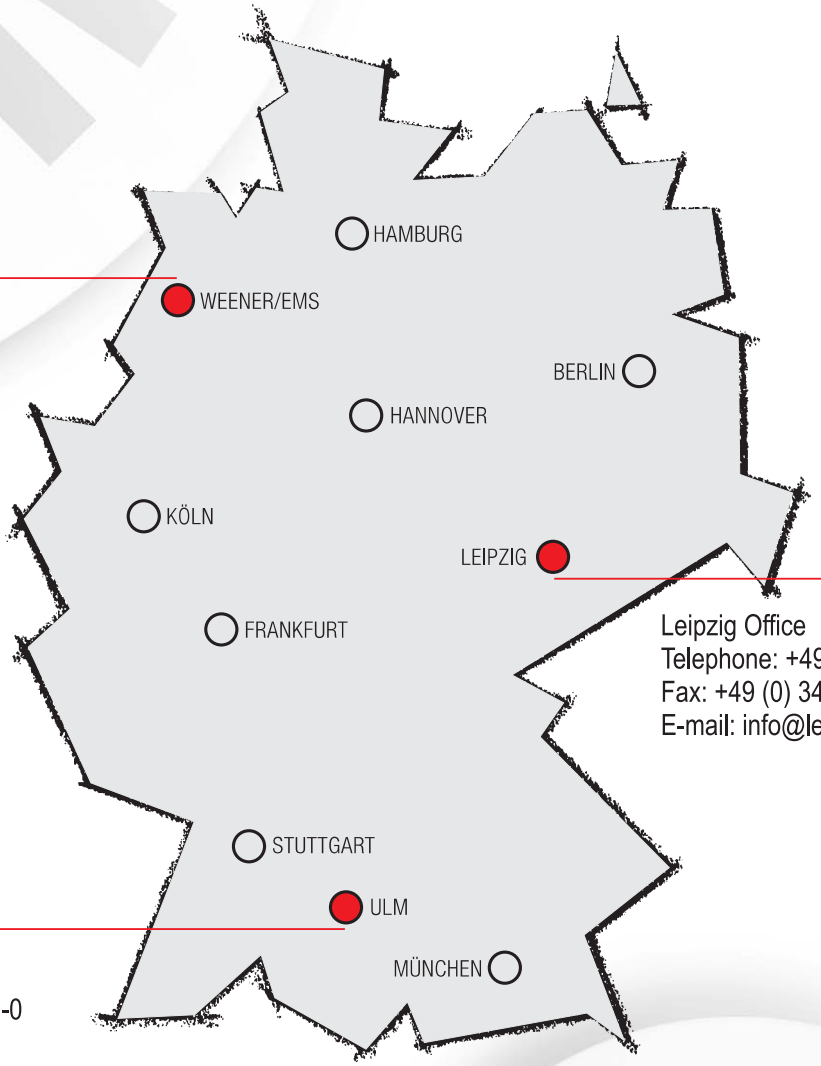
Type: .....

Dimension W x H .....x..... **mm**

Complete with fasteners **supply:** .....
install: .....

Delete text in non-bold type as required!

INNOVATIVE • PRACTICAL • EFFICIENT



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