

DCV-SL – Slave unit

GFI Version A11

Introduction

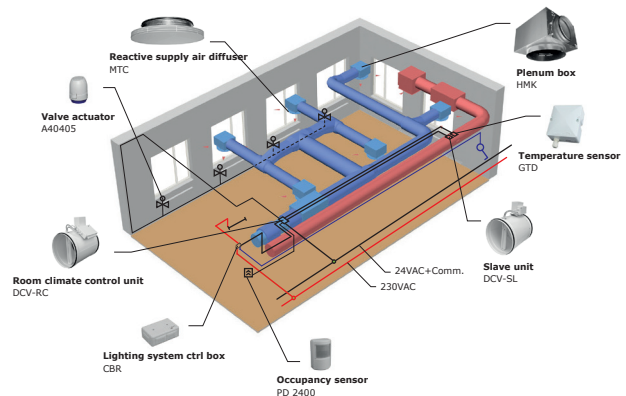
DCV-SL is a slave unit to DCV-RC or to an active diffuser. The unit consists of a damper, a damper actuator, a flow measurement device and the external flow sensor GFI.

DCV-SL is powered by its master and used for balancing one single supply air flow. See *DCV-FB* for balancing multiple supply air flows.

The circular DCV-SL (Ø125-500) is delivered factory assembled and calibrated. Other controllers are delivered as construction kits with damper, damper actuator, measurement device and flow sensor delivered separately.

Function

The flow sensor measures and sends signals to the connected control unit. Flow sensor GFI forwards control signals from the connected master to the damper actuator on DCV-SL. This is how the rate of air flows can be balanced according to setpoints.



Typical design - open plan office/classroom. The extract air is balanced by DCV-RC using slave unit DCV-SL.

DCV-SL – Circular

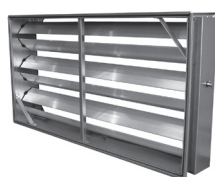


A complete control unit

The circular Ø125-500 control unit is delivered factory assembled and calibrated.

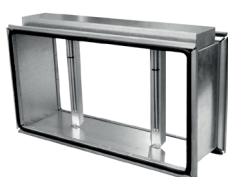
DCV-SL-630 is only available as a construction kit including a special built rectangular 700x700 damper with circular 630 mm connection and the circular measurement device SMED-630.

DCV-SL – Rectangular



Damper

+



Measuring device

+



External flow sensor GFI

+

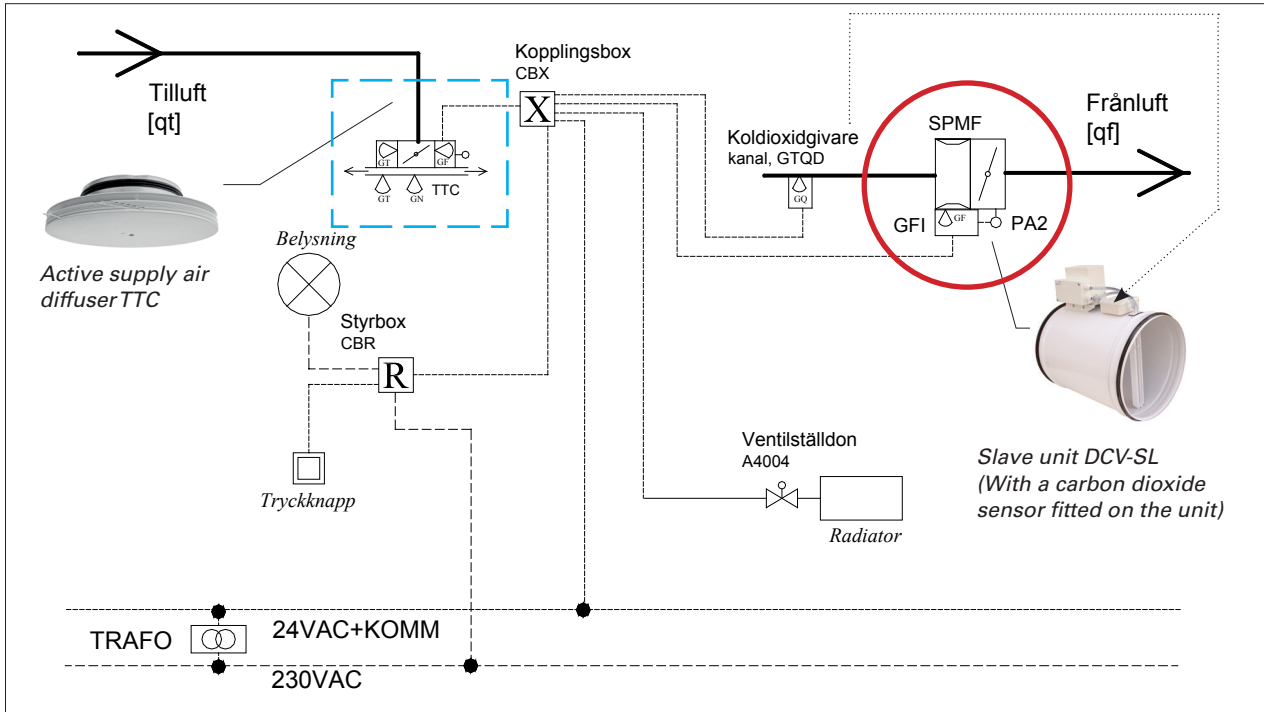


Damper actuator

DCV-SL – Slave unit

GFI Version A11

Slave unit DCV-SL connected to an active supply air diffuser (One single supply air flow to be balanced)



Example with slave unit DCV-SL connected to a system with active supply air diffuser TTC.

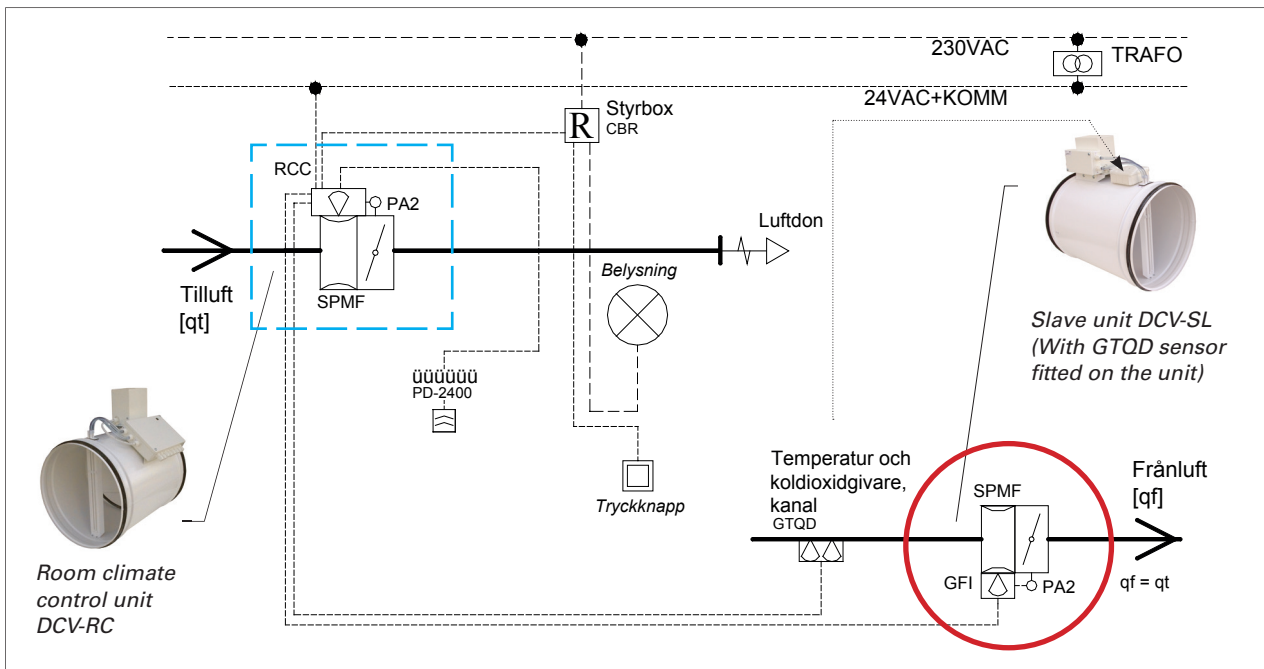


Slave unit DCV-SL with included products



Master control unit

DCV-RC with slave unit DCV-SL (One single supply air flow to be balanced)



Example with slave unit DCV-SL connected to a system with room climate control unit DCV-RC.

DCV-SL – Slave unit

GFI Version A11

Included products

The listed products below are included in DCV-SL. The measurement device is either circular or rectangular. Look up each product description for technical specifications.

External airflow sensor GFI

- Built in sensor connected with hoses to the measurement device
- No network connection

Circular damper with measurement device SPMF

- Double measurement outlet
- Throttled damper

Rectangular damper JSPM

without measurement device

- Louvre damper

Rectangular measurement device SMRD

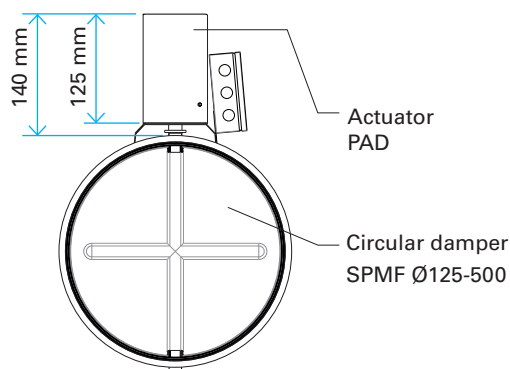
- Double measurement outlet

Damper actuator PAD

- Handles Lindinvent manufactured rectangular dampers with a maximum height of 700 mm and circular dampers from Ø125 to Ø630 mm

Accessory to control units

DCV-SL is used as an accessory to either room climate control unit DCV-RC or to an active supply air diffuser. Look up each product description for technical specifications.



Critical DCV-SL measures.

Order format

Circular Ø125-500

Slave unit, Lindinvent AB,
type **DCV-SL-[Damper size][Material]**

State circular damper size:

Damper size = 125, 160, 200, 250, 315, 400, 500

State material:

Material = Galvanised (G), Epoxy coated (E).
Omitted material indication = Galvanised

Example: DCV-SL-250G (A circular DCV-SL built on SPMF-250 galvanised. The unit can be ordered assembled or as a construction kit.)

Circular connection Ø630

Slave unit, Lindinvent AB
type **DCV-SL-630(700x700)-[Material]**

State material:

Material = Galvanised (G)
Omitted material indication = Galvanised

Example: DCV-SL-630(700x700)-G

(DCV-SL 630 is delivered as a construction kit in which the special rectangular damper JSPM 700x700 with a 630 mm circular duct connection, the circular flow measurement device SMED 630, a damper actuator and the external airflow sensor GFI are each delivered separately.)

Rectangular

Slave unit, Lindinvent AB
type **DCV-SL-[HxB]-[Material]**

State damper size JSPM and SMRD:

HXB = 200x200 -> 2000x2000 mm
in intervals of 100 mm

State material:

Material = Galvanised (G)
Omitted material indication = Galvanised

Exempel: DCV-SL-200x400-G

(A rectangular DCV-SL to be delivered as a construction kit built on damper JSPM 200x400 and measurement device SMRD 200x400. All ingoing parts are delivered separately.)

GFI – External flow sensor

Introduction

GFI measures the rate of air flow using a measurement device and sends signals to the connected controller. GFI is part of the smart damper measurement unit DCV-MU.

Function

The external flow sensor measures the rate of air flow and sends signals to the connected controller.

GFI is also equipped to forward control signals to a damper actuator. This feature is only in use when GFI is connected to either a room climate controller RCC or an active diffuser, see slave unit DCV-SL.

Calibration

GFI is factory calibrated: Duct dimension is entered at configuration on site.

Technical specifications

General

Dimensions

130 x 70 x 40 mm (LxBxH, excluding cable glands)

Material

Polyester coated steel plate encapsulation

Colour

RAL 9003

IP classification

IP54 encapsulation

Electrical system

Power supply

(Powered by connected control unit)
24 VAC

Output

0.6 VA

CE marking

Fulfills EMC and low voltage directives



GFI – The external flow sensor.

Air flow regulation

Flow sensor

GFI consists of a flow sensor assembled on a circuit board in a steel plate encapsulation.

Measurement interval

Rec.: 0.2-6.0 m/s (comfort); 0.5-6.0 m/s (lab.)

Max.: 8.0 m/s

Measurement time: 3 ms

Measurement accuracy:

Either $\pm 4\%$ or ± 2 l/s [The greater value counts]

Speed

Change regulated within 4 s (95% within 3 s)

Input and output signals

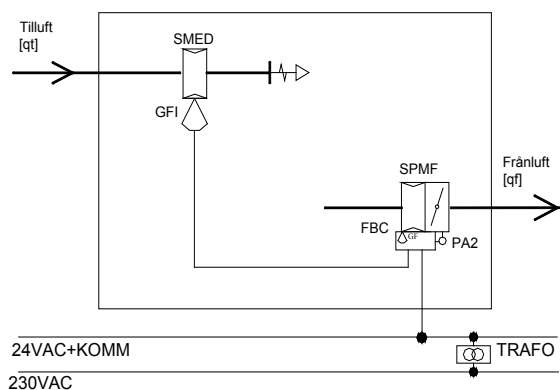
Input signals

(Only used when GFI is part of a slave unit, see DCV-SL)

1 x (0-10 VDC for damper actuator control)

Output signals

1 x 1-6 VDC



Example of diagram with external flow sensor GFI installed on measuring device SMED. GFI on SMED can be ordered as a smart damper package, see measurement unit DCV-MU.

SPMF – Circular damper with airflow measurement device

Introduction

SPMF is a measurement and throttle damper with actuator bracket adapted for Lindinvent damper actuators. The damper requires very low torque and this makes rapid and accurate regulation possible.

Function

SPMF is used together with a flow sensor* for control of airflow even at very low air speeds. The damper is equipped with a measurement device with a double outlet for airflow measurement.

Ordering information

Circular damper with airflow measurement device, Lindinvent AB, SPMF-XXX-Material

Size: XXX = 125, 160, 200, 250, 315, 400, 500

Material: Galvanised (G), Epoxy coated (E),
(Omitted material description = G)

Example: SPMF-250-E

Technical specifications

General

Sizes: Ø125–Ø500 mm

Seal class 2 according to VVS AMA.

Recommended measurement range*:

0.2 - 6.0 m/s (Comfort); 0.5 - 6.0 m/s (Lab);

Max.: 8.0 m/s

*) Applies in conjunction with Lindinvent's flow sensors and controllers.

Measurement accuracy:

Either ± 4% or ± 2 l/s [The greater value counts]

Range of air flow: See page 2, Diagram 1

Colour: RAL 9003 (applies to epoxy coated).

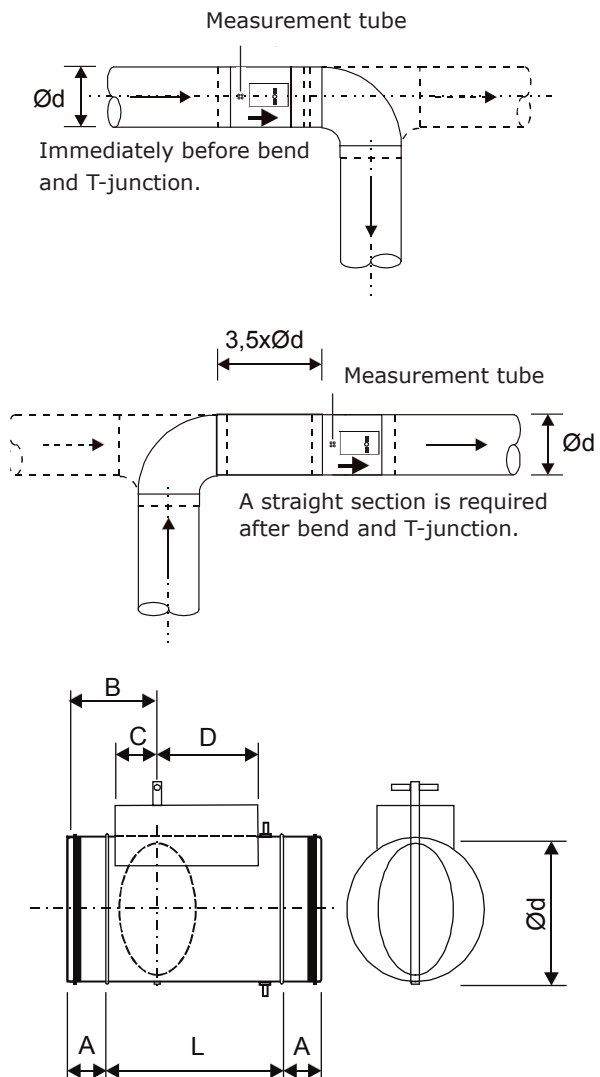
Dimensions & K factors

Ød	A	B	C	D	L	K factor
125	40	90	44	100	190	9.9
160	40	95	44	100	220	14.7
200	40	95	44	100	240	22.6
250	50	105	44	100	260	35.6
315	50	105	44	100	310	57.0
400	60	115	47	103	350	94.6
500	60	115	47	103	410	156



SPMF - Circular damper with airflow measurement device.

Installation



SPMF – Circular damper with airflow measurement device

Material

The damper is manufactured in galvanised steel plate and is equipped with a rubber seal ring. The unit is also available in (internally and externally) epoxy coated steel plate.

Weight

Ø/mm	125	160	200	250	315	400	500
weight/kg	1	1.5	2	2.5	4.5	6	9.6

Noise generation

Sound power level: $L_w = (L_{WA} + K_0)$ dB

Total A-weighted sound power level: L_{WA} dB(A)

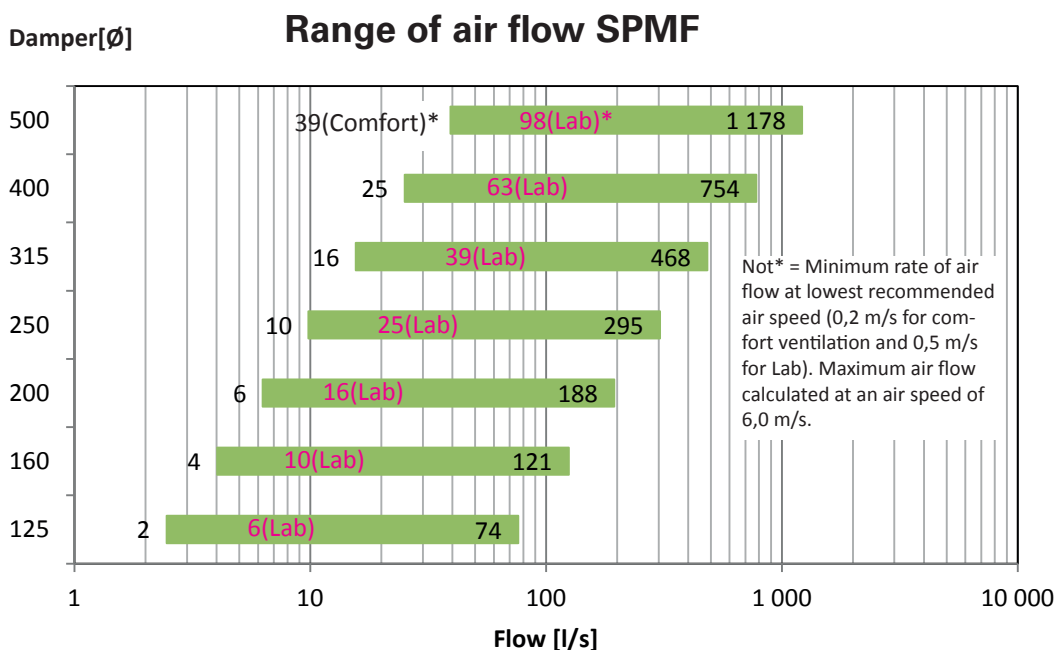
L_{WA} dB(A) is read from diagram 2 to 8 on page 3 to 5.

The correction factor [K_0] in dB is read from Table 1, below.

Table 1: Correction K_0 dB

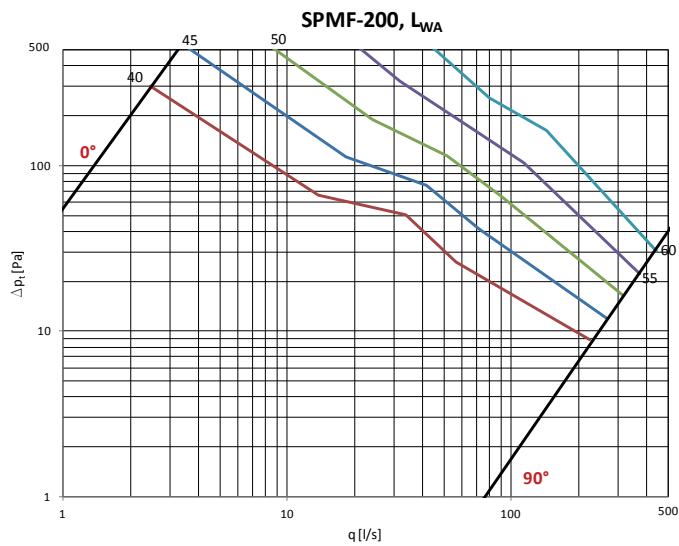
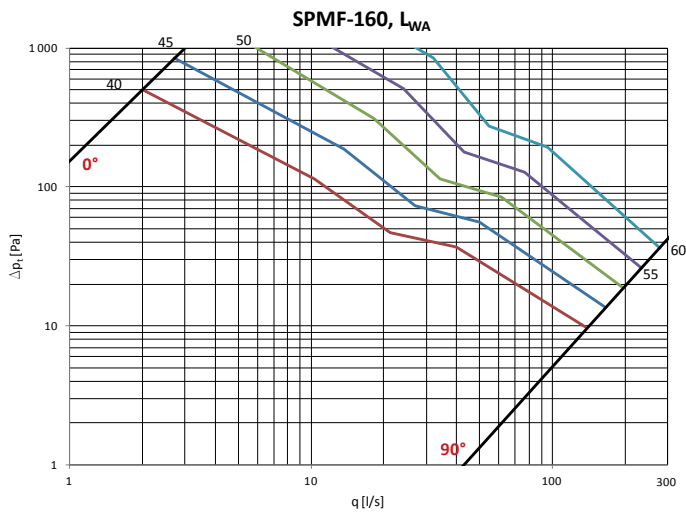
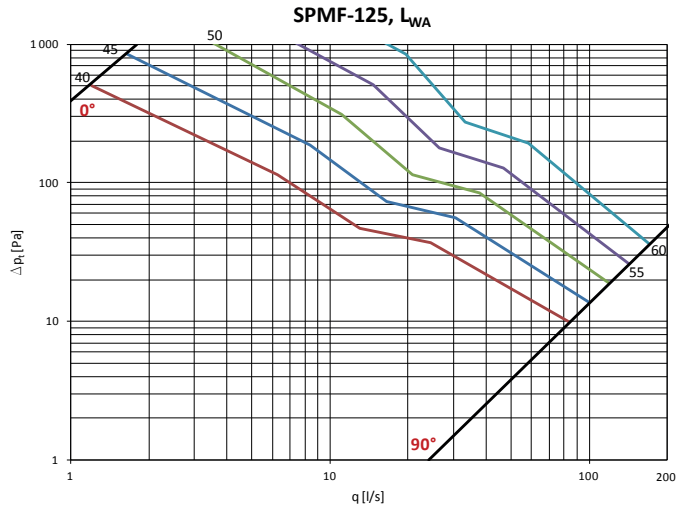
Size	Octave band [Hz]							
	63	125	250	500	1000	2000	4000	8000
125	13	13	10	3	-6	-10	-17	-23
160	12	9	8	2	-6	-11	-17	-23
200	14	8	6	0	-4	-9	-15	-21
250	15	9	7	0	-5	-10	-16	-24
315	15	8	5	1	-5	-11	-16	-24
400	12	7	4	0	-4	-12	-15	-23
500	11	5	5	1	-4	-12	-15	-22
Tolerance ±	6	4	3	3	3	3	3	3

Diagram 1, Range of air flow for comfort ventilation and lab applications



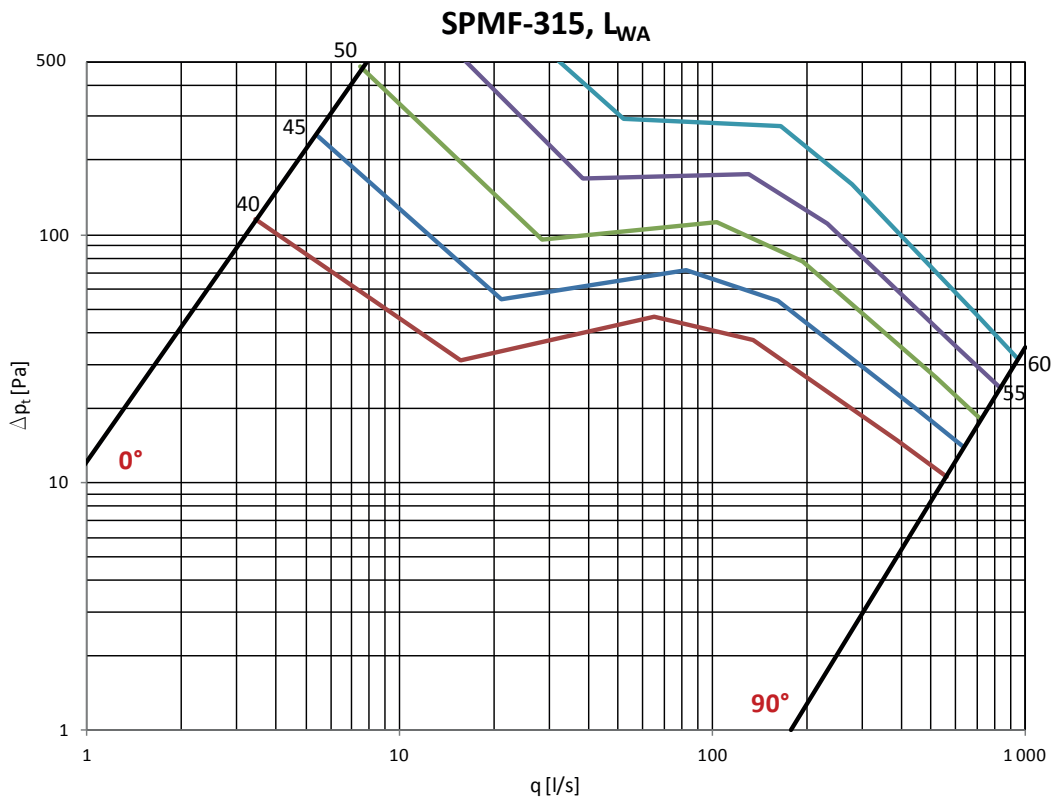
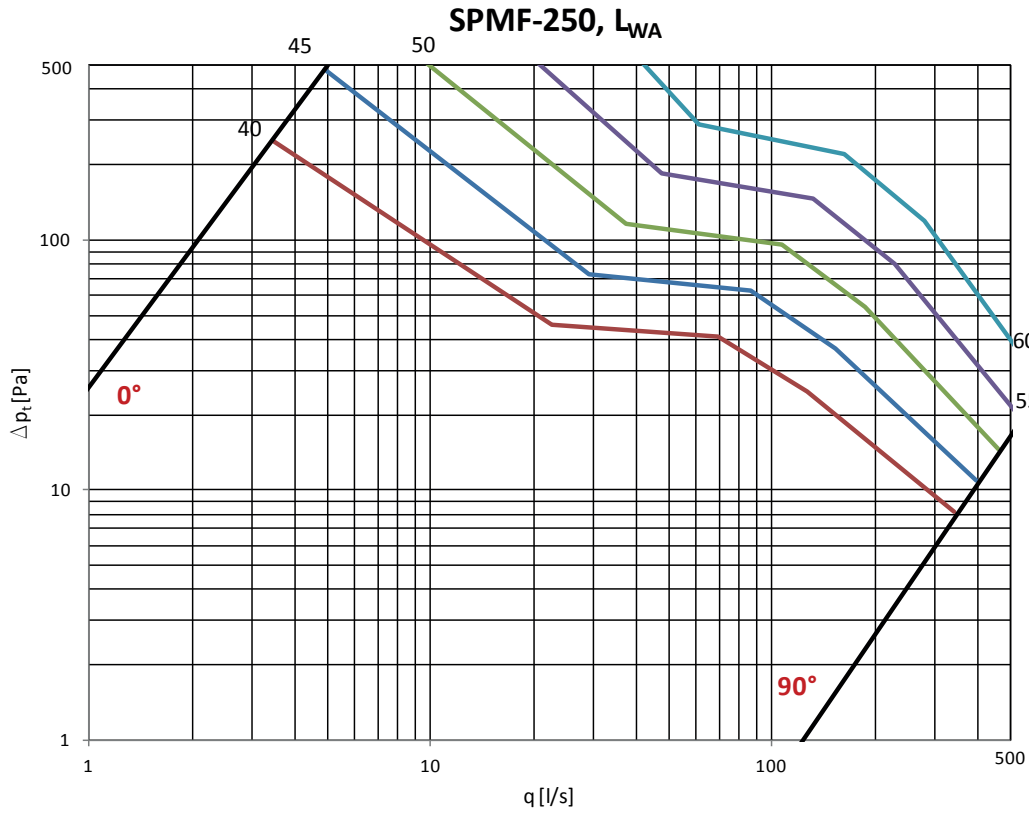
SPMF – Circular damper with airflow measurement device

Diagram 2-4, SPMF L_{WA} Ø125 - Ø200



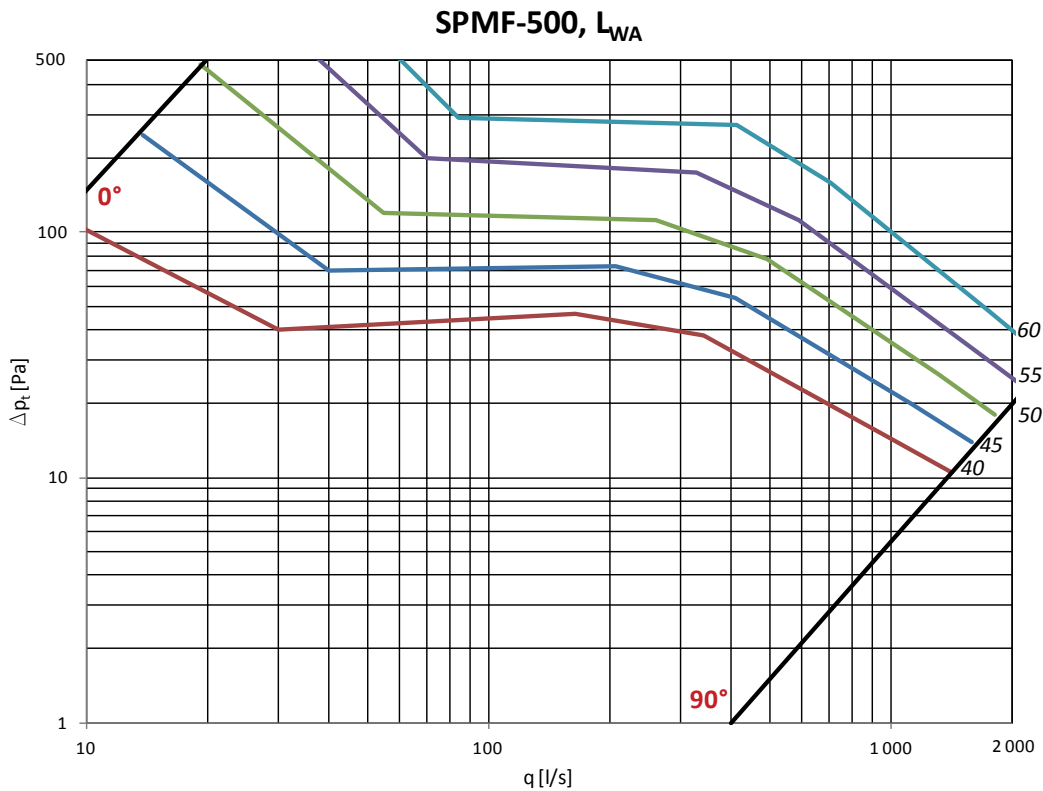
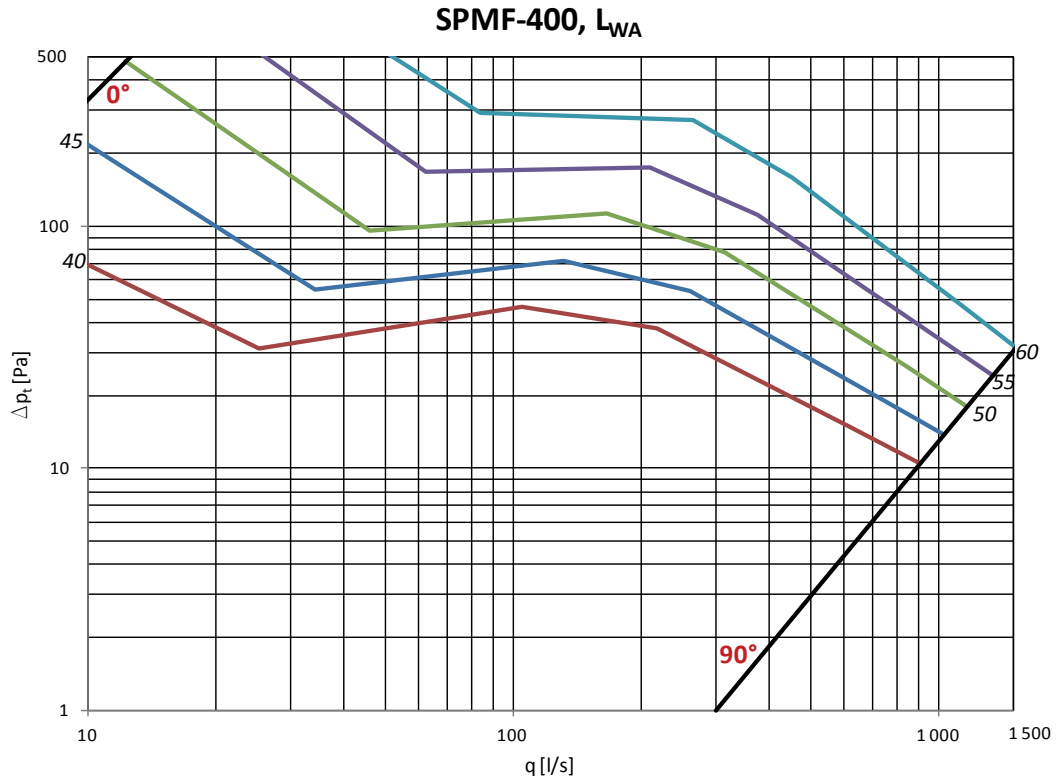
SPMF – Circular damper with airflow measurement device

Diagram 5-6, SPMF L_{WA} Ø250 och Ø315



SPMF – Circular damper with airflow measurement device

Diagram 7-8, SPMF L_{WA} Ø400 och Ø500



JSPM – Rectangular damper

Introduction

JSPM is a louvre damper with a motor bracket adapted to Lindinvent damper actuators.

Function

The damper is used for controlling air flow and static duct pressure.

Ordering information

Rectangular damper without measurement device, Lindinvent AB, type **JSPM-BxH-Material**.

Size: BxH = 200x200 -> 2000x2000 mm
(Measures in intervals of 100 mm)

Material: Galvanised (G)
(Omitted material description => G)

Example: JSPM-400x300-G

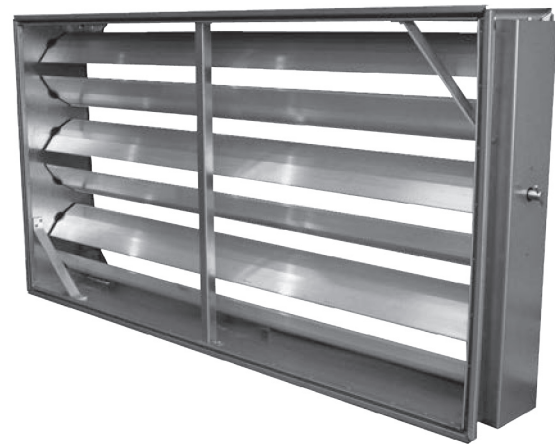
JSPM is available with circular fitting $\varnothing 630$ och $\varnothing 800$. Use either of the following descriptions: *JSPM-700x700/630* or *JSPM-800x800/800*.

Technical specifications

General

Dimensions

BxH = 200x200 -> 2000x2000 mm
in intervals of 100 mm



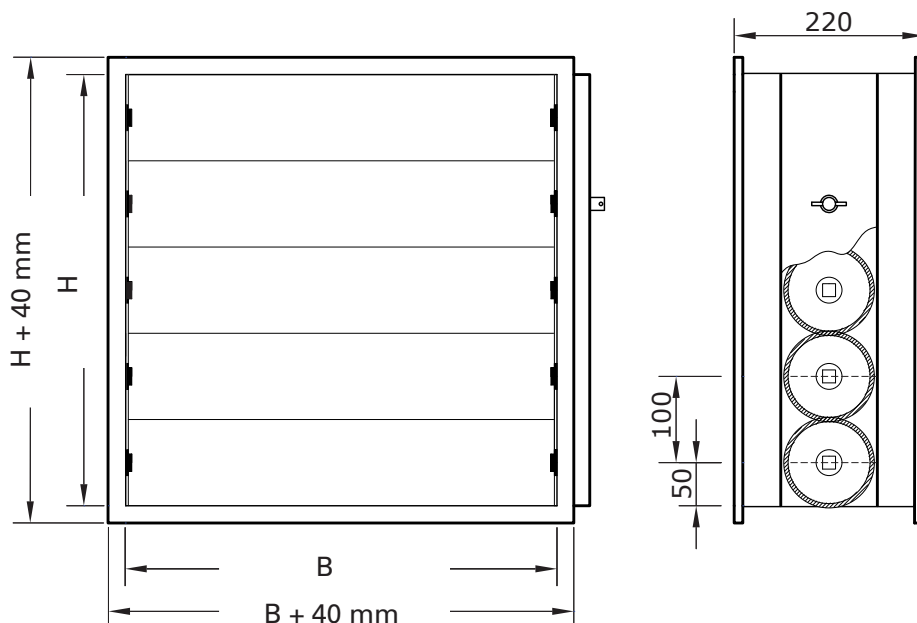
JSPM in size 1200x600 mm.

Material

The damper is manufactured as standard in galvanised steel plate, but can also be obtained in stainless steel as a special version.

Installation

The JSPM is delivered as standard with guide for connection to rectangular duct. Construction measurement = 220 mm.



JSPM – Rectangular damper

TEKNISKA DATA

Ljudeffektnivå: L_w dB

Ljudtrycksnivå: L_{PA} dB (A)
(avläses ur diagram 1 för 1 m² frontarea. Kanalanslutet inlopp.)

Korr: K_0 dB ur tabell 1
 K_x dB ur tabell 1

Tabell 1 Korrektion K_0 dB J (vid 1 m² frontarea)

Vinkelställning* α	Oktavband							
	63	125	250	500	1000	2000	4000	8000
10 - 20°	-4	-6	-8	-8	-9	-12	-16	-19
30 - 40°	-5	-5	-7	-8	-10	-10	-13	-15
50 - 60°	-6	-4	-5	-7	-9	-9	-10	-12

Tol. ± 3 dB * 90° = stängda spjällblad

Diagram 1 (1 m² frontarea) kanalansl. inlopp

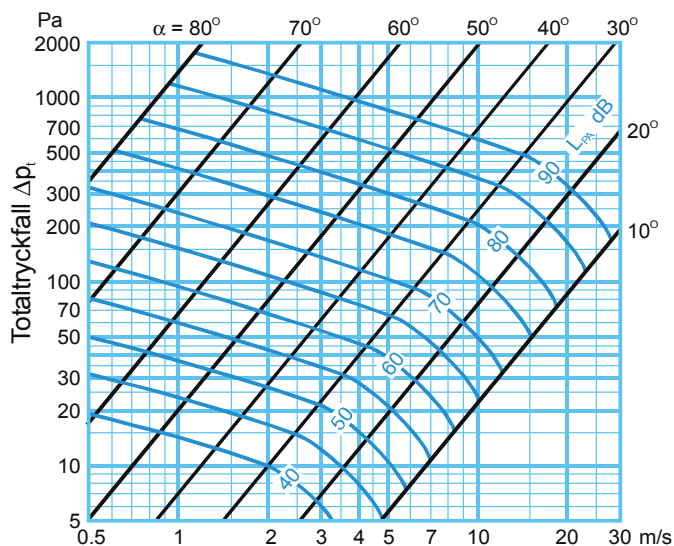
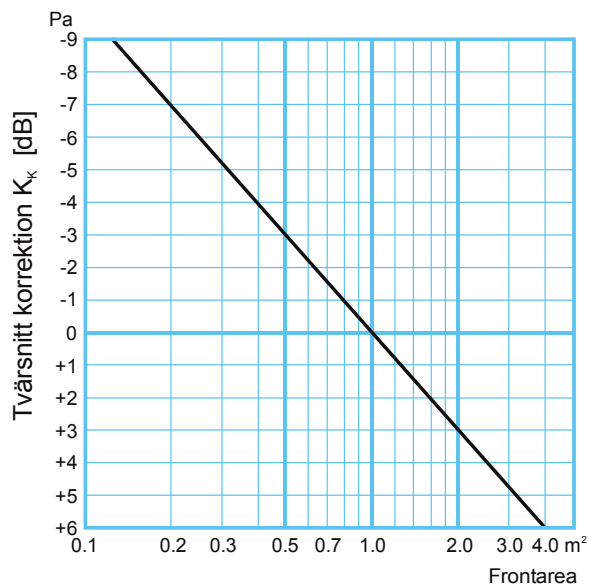


Diagram 2 tvärsnitt korrektion K_x



SMRD – Rectangular airflow measurement device

Introduction

SMRD is a measurement unit for rectangular ducts equipped with one to four measurement flanges coupled to a double measurement outlet.

Ordering information

Rectangular airflow measurement device,
Lindinvent AB, type **SMRD-BxH-Material**

Size: BxH = 200x200 -> 2000x2000 mm
(in intervals of 100 mm)

Material: Galvanised (G)

Examples: SMRD-400x200-G

Technical specifications

General

Dimensions

BxH = 200x200 -> 2000x2000 mm
(in intervals of 100 mm)

Pressure drop

Pressure drop according to *Diagram 1* on page 2.

Measurement range

Recommended*:

0.2 - 6.0 m/s (Comfort)

0.5 - 6.0 m/s (Lab)

Max.: 8.0 m/s

*Applies in conjunction with Lindinvent's flow sensors and controllers.

Measurement accuracy

Either $\pm 4\%$ or ± 2 l/s [The greater value counts]



SMRD in size 500x200 mm.

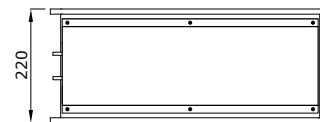
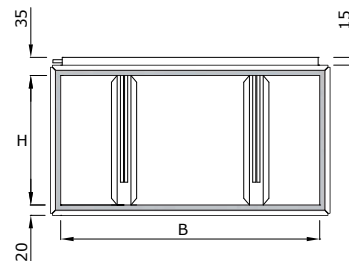
Installation

The SMRD has guides for connection to rectangular ducts. Construction measurement = 220 mm.

The instrument can be installed directly before bends, T-junctions and dampers. After bends, a straight section of 3.5 times the equivalent diameter is required. The equivalent diameter, d_e , is calculated using the following formula:

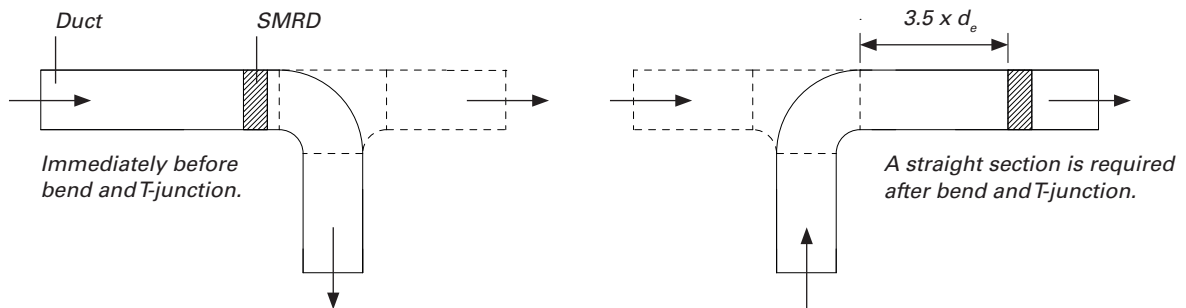
$$d_e = 1.30 \times ((B \times H)^{0.625}) / (B + H)^{0.25}$$

Measures



SMRD – Rectangular airflow measurement device

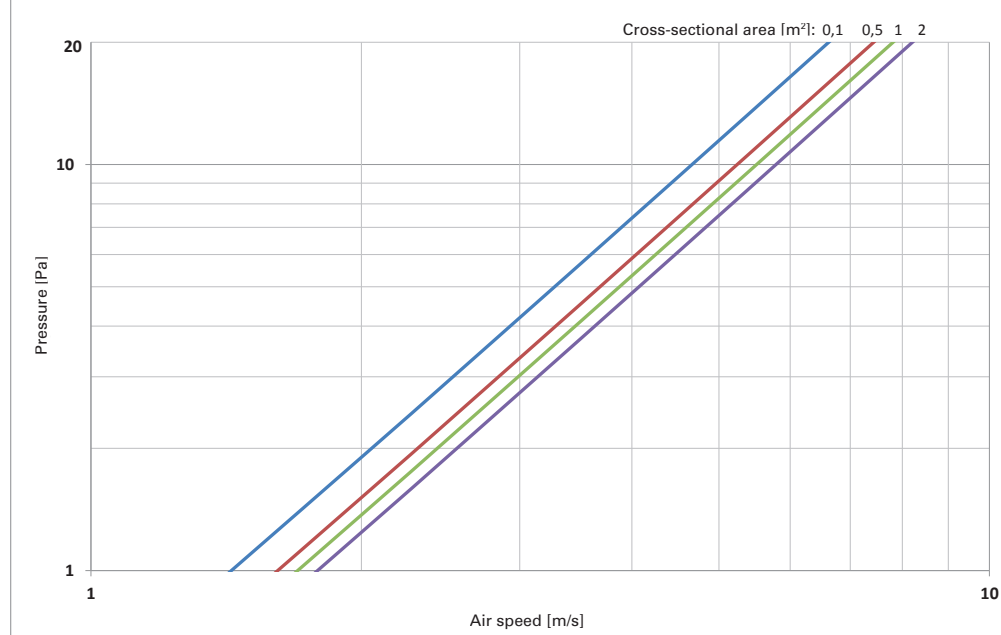
Positioning at installation



SMRD can be placed directly before bend and T-junction but requires a straight section of $3.5 \times d_e$ (Equivalent diameter, see page 1) after bend and T-junction.

Pressure drop

Diagram1. Pressure drop SMRD



K-faktorer

Tabell 2. Ett urval K-faktorer

Dimension	K-faktor	Dimension	K-faktor	Dimension	K-faktor	Dimension	K-faktor	Dimension	K-faktor
300x200	45,4	600x200	104	800x200	144	1000x200	170	1200x300	303
300x300	82,2	600x300	151	800x300	202	1000x300	249	1200x400	388
400x200	105	600x400	205	800x400	282	1000x400	345	1200x500	447
300x200	45,4	600x500	254	800x500	346	1000x500	416	1200x600	522
400x300	102	600x600	293	800x600	397	1000x600	472	1200x800	685
400x400	120	600x800	389	800x800	518	1000x800	570	1200x1000	884
500x200	81,8	700x300	173	900x300	239	1000x1000	836	1400x500	565
500x300	129	700x400	227	900x400	284	1100x400	350	1400x800	715
500x400	154	700x500	257	900x900	645			1600x300	403
500x500	208	700x600	326					1600x400	542
								1600x600	518

PAD – Damper actuator

Introduction

Damper actuator PAD is installed on dampers with actuator brackets. It controls circular dampers with dimensions from Ø125 to Ø630 mm and rectangular dampers with a maximum height of 700 mm. (See *Torque* below)

PAD is activated by receiving signals from the connected controller.

Function

PAD is provided with both power and control signal via connected controller. When the control voltage is varied, it causes rotation in the damper axle link.

Technical specifications

General

Dimensions

143/111 x 73 x 125 mm (LxBxH)

Material

Gearbox in metal

Epoxy coated steel plate encapsulation

Weight

Nett weight 1.3 kg

Miscellaneous

High performance potentiometer

Delivered with 3 m white shielded cable pre-installed.

Colour

RAL 9003

IP classification

IP42 encapsulation

Lifetime

> 5,000,000 strokes

Electrical system

Power supply

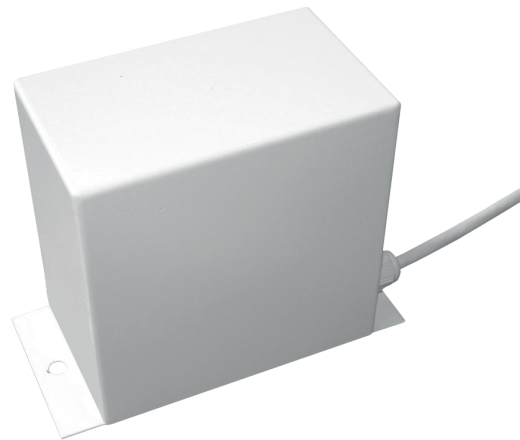
24 VAC

Output

10 VA (at 8 Nm)

CE marking

Fulfils EMC and low voltage directives



PAD - Damper actuator.

Regulation

Operating time 0-90° 2 s

Torque

Up to 8 Nm (The actuator can handle Lindinvent manufactured rectangular dampers with a maximum height of 700 mm and circular dampers from Ø125 to Ø630 mm.)

Noise

Normal operating position: < 45 dB(A)

Loaded operating position: < 52 dB(A)

Input and output signals

Input signals

1 x 0-10 VDC control signal

Output signals

1 x 0-9 VDC feedback signal