NORDdamper

RPM-K Constant Air Volume Controller

For keeping and regulation of constant airflow volume in HVAC systems

Diameter from 80 to 400 mm

Airflow volume from 50 to 4500 m^3/h (14–1250 l/s)

External casing leakage class C

Casing and actuating mechanism are made of galvanized steel

ETS NORD

Contents

General

1. Description

Air flow regulators with constant flow (CAV) are designed for regulating of air supply or air exhaust in ventilation systems. They can be installed in a horizontal, vertical or inclined positions.

Adjustment of required flow is simply performed by lever with a pointer and scale. Mechanical controllers need not be connected to any external power source.

The faultless functioning of the controllers is ensured under the following conditions:

- maximum speed of air flow 10 m/s;
- maximum pressure in the duct 1000 Pa;
- the air circulation in the whole controller section must be secured as steady on whole surface.

The accuracy of the controller is ±10% for air velocities more than 4m/s and ±15-20% for air velocities less than 4m/s. Pollution, deformation of the damper body or non-steady air circulation in the all cross section of the damper can bring bigger inaccuracy.

Controllers are designed for macroclimatic areas with mild climate according to EN 60 721-3-3. Controllers are suitable for systems without abrasive, chemical and adhesive particles. Temperature in the place of installation is permitted to range from 0 °C to +50 °C.

2. Design, Dimensions and Weights

The controller consists of the casing of the controller with a control blade and control device. Controller casings and control device parts are made of galvanized plate. Regulator blade is made of aluminium plate. Damper axis, bearings and spring are made of stainless steel and sliding bearings of blade axis are stainless or bronze.

According to the customer's requirements, damper can be made of stainless material.

Control device consist of spring and shock absorber. On the top of control device box is lever with a pointer and scale for adjustment of required flow.

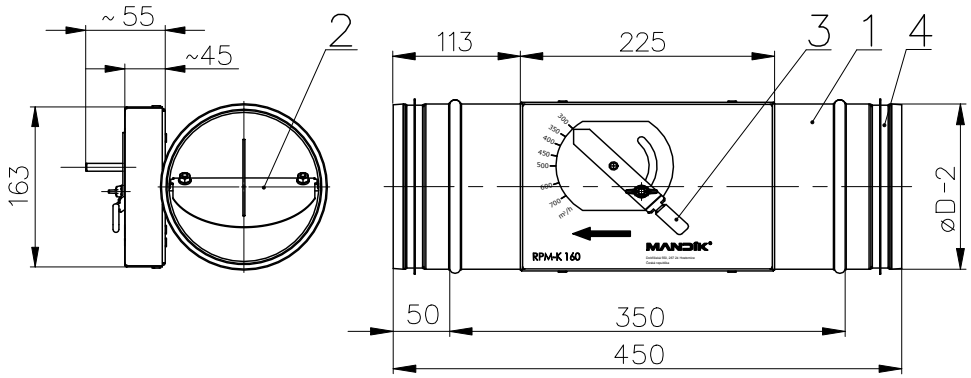
The controller is delivered without further surface treatment.

Controllers can be alternatively equipped by actuating mechanism. It enable remote adjustment of required flow. In this case actuating mechanism don't control regulator damper. Actuating mechanism control setting of lever for adjustment of required flow. If is used actuating mechanism temperature range is from 0 °C to + 50 °C.

Tab. 1. Dimensions, weights

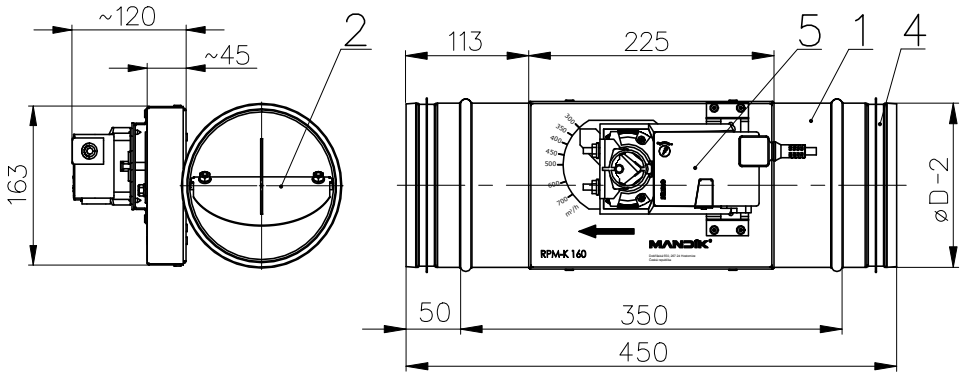
Size (mm)	Ø D	Weight (kg)				
		Spiro		Spiro with actuating mechanism		Actuating mechanism
		Without insulation	With insulation	Without insulation	With insulation	
80	80	2,3	3,7	2,8	4,3	LM
100	100	2,5	3,9	3,1	4,5	LM
125	125	2,8	4,4	3,4	5,0	LM
160	160	3,2	5,1	3,8	5,7	LM
200	200	3,8	5,9	4,4	6,5	LM
250	250	4,5	7,0	5,4	7,6	LM
315	315	5,4	8,4	6,3	9,0	LM
400	400	6,7	10,3	8,9	11,2	NM

RPM-K – spiro with rubber sealing



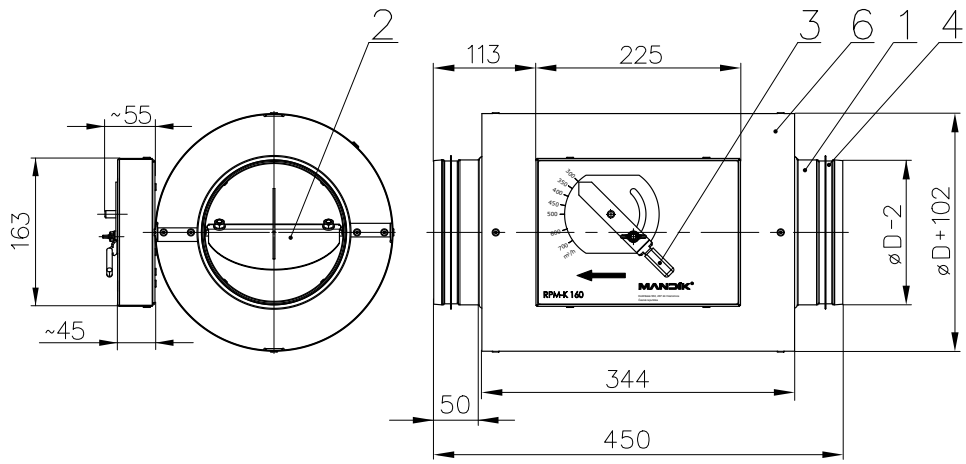
1 - Controller casing
2 - Controller blade
3 - Lever
4 - Rubber sealing

RPM-K – with actuating mechanism



1 - Controller casing
2 - Controller blade
4 - Rubber sealing
5 - Actuating mechanism

RPM-K – spiro with rubber sealing and insulation



1 - Controller casing
2 - Controller blade
3 - Lever
4 - Rubber sealing
6 - Insulation cover

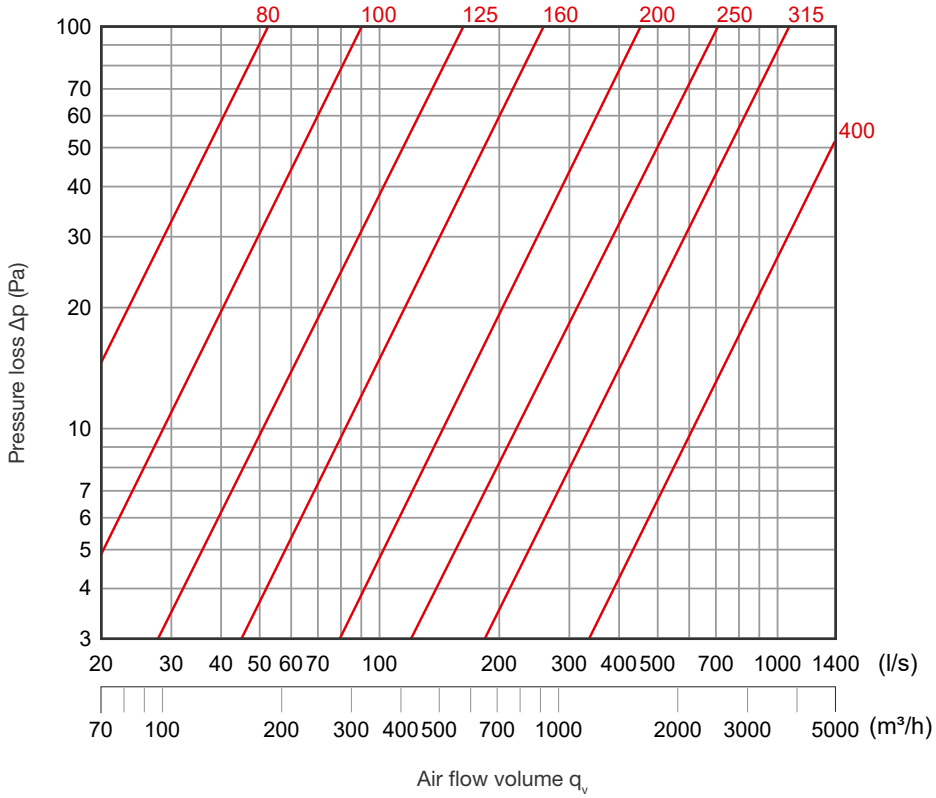
3. Technical Data

Tab. 2. Air volume and controller parameters

Size d (mm)	Air volume (l/s)		Air volume (l/s)	Maz. inaccuracy (%)	Min. press. difference (Pa)
	Minimum	Maximum			
80	14	56	14	20	100
			28	15	100
			42	10	100
			56	10	120
100	22	83	22	18	50
			42	15	60
			69	10	80
			83	10	90
125	35	139	35	18	50
			56	15	60
			97	10	70
			139	10	90
160	56	250	56	18	50
			111	15	70
			194	10	80
			250	10	90
200	83	361	83	18	50
			139	15	60
			250	10	70
			361	10	80
250	139	556	139	15	50
			222	12	70
			333	10	80
			556	10	90
315	222	778	222	15	50
			333	10	70
			556	10	80
			778	10	90
400	333	1250	333	15	50
			556	10	70
			833	10	80
			1250	10	90

3.1 Pressure Loss

The values are valid when the damper of the controller is completely open.



3.2 Noise Data

The noise arising due to the flow of air volume controller is listed in the following tables.

q_v (m^3/h) – air flow volume
L_{WA} (dB(A)) – total level of acoustic power corrected by filter A
Δp_{st} (Pa) – pressure differential
L_W (dB/Okt.) – level of acoustic power in the octave band
f_m (Hz) – mean frequencies in the octave bands

Tab. 3. Sound power level inside the pipeline at pressure difference 50 Pa

Size d (mm)	q_v		Δp_{st} = 50 Pa L_W (dB/Okt.) f_m (Hz)								L_{WA} (dB(A))
	m^3/h	l/s	63	125	250	500	1000	2000	4000	8000	
80	50	14	48	38	32	32	35	31	23	<15	38
	100	28	54	45	41	38	39	34	28	18	43
	150	42	60	52	48	44	43	39	35	23	48
	200	56	66	58	54	49	46	42	39	28	52
100	80	22	49	39	33	33	36	32	24	<15	39
	155	43	56	47	43	40	41	37	30	20	45
	225	63	62	54	50	46	45	41	37	26	50
	300	83	67	59	56	51	48	44	41	30	54

Size d (mm)	q_v		Δp_{st} = 50 Pa L_W (dB/Okt.) f_m (Hz)								L_{WA} (dB(A))
	m³/h	l/s	63	125	250	500	1000	2000	4000	8000	
125	125	35	50	40	34	34	37	33	26	<15	40
	250	69	58	49	46	43	44	40	33	22	47
	380	106	64	56	52	48	47	44	40	28	52
	500	139	70	62	58	53	50	46	43	32	56
160	200	56	54	44	38	38	41	37	29	18	44
	430	119	59	50	46	45	44	40	34	23	48
	650	181	65	57	53	49	48	44	40	28	53
	900	250	68	61	57	52	49	45	42	31	55
200	300	83	53	43	37	37	40	36	29	17	43
	630	175	60	51	47	44	45	41	35	24	49
	960	267	66	58	54	50	49	45	41	29	54
	1300	361	72	64	60	55	52	48	45	34	58
250	500	139	54	44	38	38	41	37	29	18	44
	1000	278	60	51	47	44	45	41	34	24	49
	1500	417	66	58	54	50	49	46	42	30	54
	2000	556	72	64	60	55	52	48	45	34	58
315	800	222	55	45	39	39	42	38	30	19	45
	1500	418	62	53	49	46	47	43	36	25	51
	2150	597	66	58	54	50	49	45	41	30	54
	2800	778	74	66	62	57	54	50	47	36	60
400	1200	333	38	28	22	22	25	21	<15	<15	28
	2300	639	41	32	28	25	26	22	15	<15	30
	3400	944	44	36	32	28	27	23	19	<15	32
	4500	1250	47	39	35	30	27	23	20	<15	33

Tab. 4. Sound power level inside the pipeline at pressure difference 100 Pa

Size d (mm)	q_v		Δp_{st} = 100 Pa L_W (dB/Okt.) f_m (Hz)								L_{WA} (dB(A))
	m³/h	l/s	63	125	250	500	1000	2000	4000	8000	
80	50	14	52	42	36	36	39	35	27	15	42
	100	28	58	49	45	42	43	39	32	21	47
	150	42	64	56	52	48	47	43	39	27	52
	200	56	70	62	58	53	50	46	43	32	56
100	80	22	53	43	37	37	40	36	28	16	43
	155	43	60	51	47	44	45	41	34	23	49
	225	63	66	58	54	50	49	45	41	29	54
	300	83	72	64	60	55	52	48	45	34	58
125	125	35	55	45	39	39	42	38	30	18	45
	250	69	63	54	50	47	48	44	37	26	52
	380	106	69	61	57	53	52	48	44	32	57
	500	139	74	66	62	57	55	50	47	36	61

Size d (mm)	q_v		Δp_{st} = 100 Pa L_W (dB/Okt.) f_m (Hz)								L_{WA} (dB(A))
	m³/h	l/s	63	125	250	500	1000	2000	4000	8000	
160	200	56	58	48	42	42	45	41	33	21	48
	430	119	64	55	51	48	49	45	38	27	53
	650	181	69	61	57	53	52	48	44	32	57
	900	250	74	66	62	57	54	50	47	36	60
200	300	83	58	48	42	42	45	41	33	21	48
	630	175	65	56	52	49	50	46	39	28	54
	960	267	70	62	58	54	53	49	45	33	58
	1300	361	76	68	64	59	56	52	49	38	62
250	500	139	59	49	43	43	46	42	34	22	49
	1000	278	65	56	52	49	50	46	39	28	54
	1500	417	71	63	59	55	54	50	46	34	59
	2000	556	76	68	64	59	56	52	49	38	62
315	800	222	60	50	44	44	47	43	35	23	50
	1500	417	66	57	53	50	51	47	40	29	55
	2150	597	71	63	59	55	54	50	46	34	59
	2800	778	78	70	65	59	57	53	51	40	63
400	1200	333	67	58	54	51	52	48	41	30	56
	2300	639	70	62	58	54	55	51	45	33	59
	3400	944	73	65	60	57	58	53	49	36	62
	4500	1250	76	68	64	60	59	55	51	39	64

Tab. 5. Sound power level inside the pipeline at pressure difference 250 Pa

Size d (mm)	q_v		Δp_{st} = 250 Pa L_W (dB/Okt.) f_m (Hz)								L_{WA} (dB(A))
	m³/h	l/s	63	125	250	500	1000	2000	4000	8000	
80	50	14	58	48	42	42	45	41	33	21	48
	100	28	64	55	51	48	49	45	38	27	53
	150	42	70	62	58	54	53	49	45	33	58
	200	56	76	68	64	59	56	52	49	38	62
100	80	22	59	49	43	43	46	42	34	22	49
	155	43	65	56	52	49	50	46	39	28	54
	225	63	73	65	61	56	55	52	48	36	60
	300	83	77	69	65	60	57	53	50	39	63
125	125	35	64	54	48	47	50	47	39	27	53
	250	69	69	60	56	53	54	50	43	32	58
	380	106	75	67	63	59	58	54	50	38	63
	500	139	81	73	69	64	61	58	55	44	67
160	200	56	66	56	50	50	53	49	41	29	56
	430	119	72	63	59	56	57	53	46	35	61
	650	181	77	69	65	61	60	56	52	40	65
	900	250	79	73	69	64	63	55	53	42	68

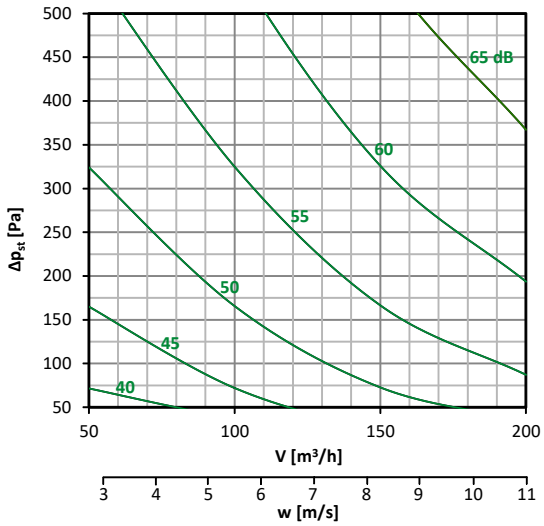
Size d (mm)	q_v		Δp_{st} = 250 Pa L_W (dB/Okt.) f_m (Hz)								L_{WA} (dB(A))
	m³/h	l/s	63	125	250	500	1000	2000	4000	8000	
200	300	83	67	57	51	51	54	50	42	30	57
	630	175	72	63	59	56	57	53	46	35	61
	960	267	77	69	65	61	60	56	52	40	65
	1300	361	81	73	69	64	61	57	54	43	67
250	500	139	68	58	52	52	55	51	43	31	58
	1000	278	72	63	59	58	58	53	46	35	62
	1500	417	77	69	65	62	61	57	52	40	66
	2000	556	82	74	70	65	63	58	55	44	69
315	800	222	68	58	52	52	55	51	43	31	58
	1500	417	74	65	61	58	59	55	48	37	63
	2150	597	78	70	66	62	61	57	53	41	66
	2800	778	82	74	70	65	63	58	55	44	69
400	1200	333	73	64	58	58	60	57	50	37	64
	2300	639	75	67	63	61	62	58	50	38	66
	3400	944	77	69	66	63	65	59	51	41	68
	4500	1250	81	74	70	66	65	61	56	44	70

Tab. 6. Sound power level inside the pipeline at pressure difference 500 Pa

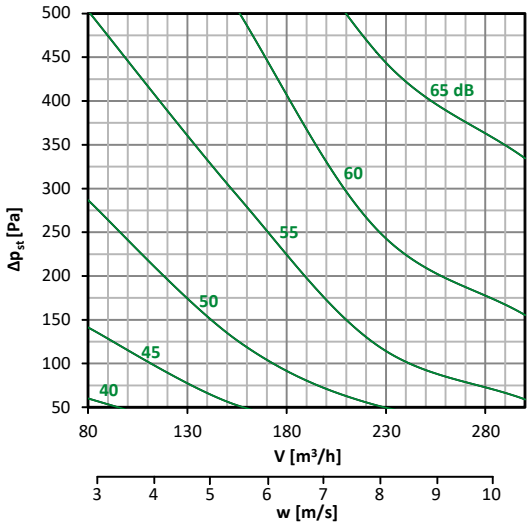
Size d (mm)	q_v		Δp_{st} = 500 Pa L_W (dB/Okt.) f_m (Hz)								L_{WA} (dB(A))
	m³/h	l/s	63	125	250	500	1000	2000	4000	8000	
80	50	14	64	54	48	48	51	47	39	27	54
	100	28	70	61	57	54	55	51	44	33	59
	150	42	76	68	64	60	59	55	51	39	64
	200	56	82	74	70	65	62	58	55	44	68
100	80	22	65	55	49	49	52	48	40	28	55
	155	43	71	62	58	55	56	52	45	34	60
	225	63	78	70	66	62	61	57	53	41	66
	300	83	83	75	71	66	63	60	57	46	69
125	125	35	71	61	55	54	57	54	46	34	60
	250	69	76	67	63	60	61	57	50	39	65
	380	106	82	74	70	66	65	61	57	45	70
	500	139	87	79	75	70	67	63	60	49	73
160	200	56	72	62	56	56	59	55	47	35	62
	430	119	79	70	66	63	63	60	53	42	67
	650	181	83	75	71	67	66	62	58	46	71
	900	250	88	80	76	71	68	64	61	50	74
200	300	83	74	64	58	58	61	57	49	37	64
	630	175	79	70	66	63	64	60	53	42	68
	960	267	83	75	71	67	66	62	58	46	71
	1300	361	87	79	75	70	67	63	60	49	73

Size d (mm)	q_v		Δp_{st} = 500 Pa L_W (dB/Okt.) f_m (Hz)								L_{WA} (dB(A))
	m³/h	l/s	63	125	250	500	1000	2000	4000	8000	
250	500	139	76	66	60	60	63	59	51	39	66
	1000	278	80	71	67	64	65	61	54	43	69
	1500	417	84	76	72	68	67	63	59	47	72
	2000	556	88	80	76	71	68	64	61	50	74
315	800	222	76	66	60	60	63	59	51	39	66
	1500	417	80	71	67	66	66	61	54	43	70
	2150	597	85	77	73	68	67	64	60	48	72
	2800	778	88	80	76	71	68	64	61	50	74
400	1200	333	79	70	65	66	68	62	53	42	71
	2300	639	83	74	70	68	69	65	58	47	73
	3400	944	86	76	73	70	71	66	59	48	75
	4500	1250	88	81	77	73	72	68	64	51	77

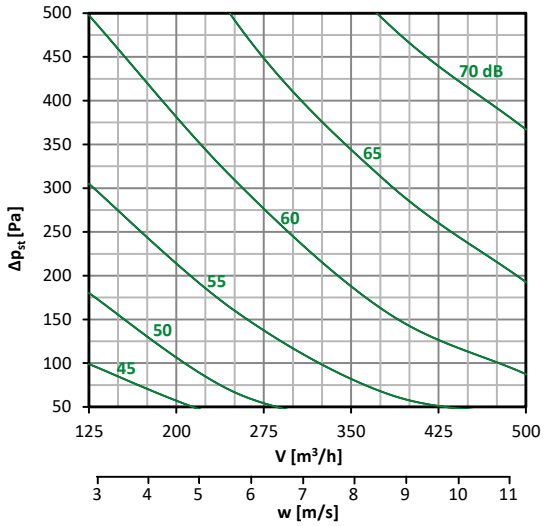
RPM-K 80



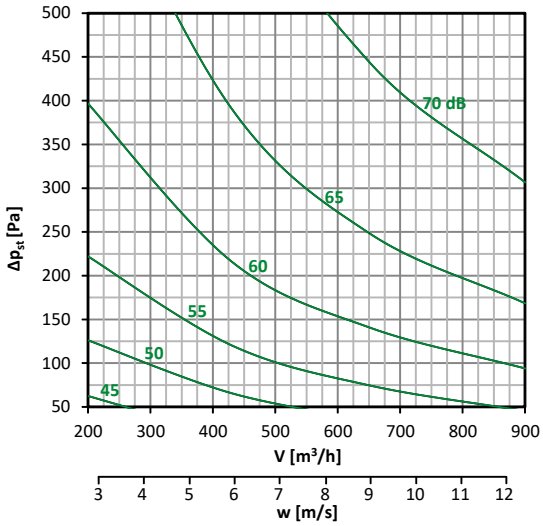
RPM-K 100



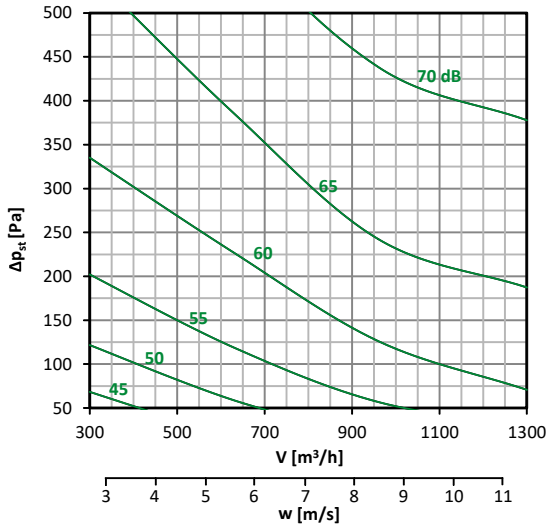
RPM-K 125



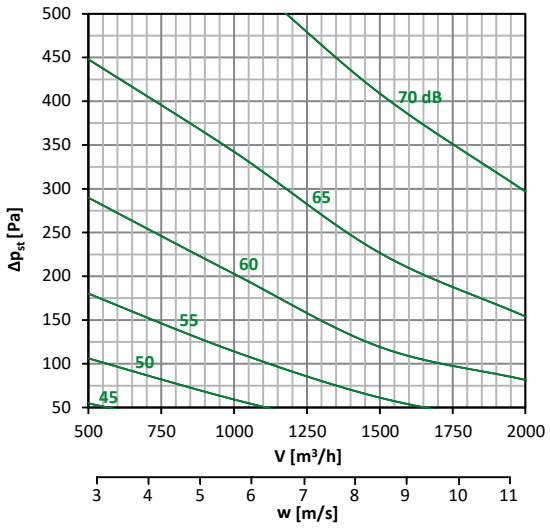
RPM-K 160



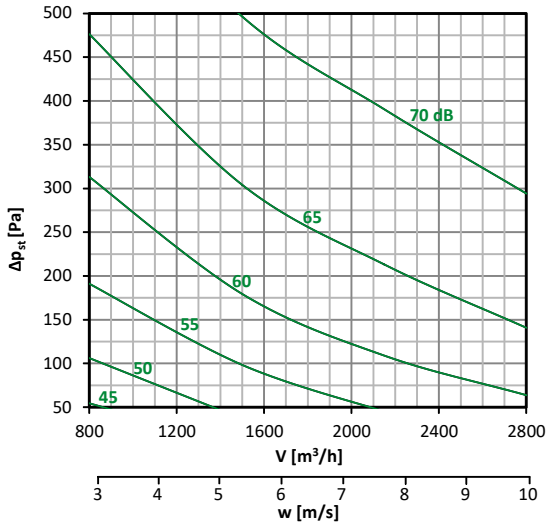
RPM-K 200



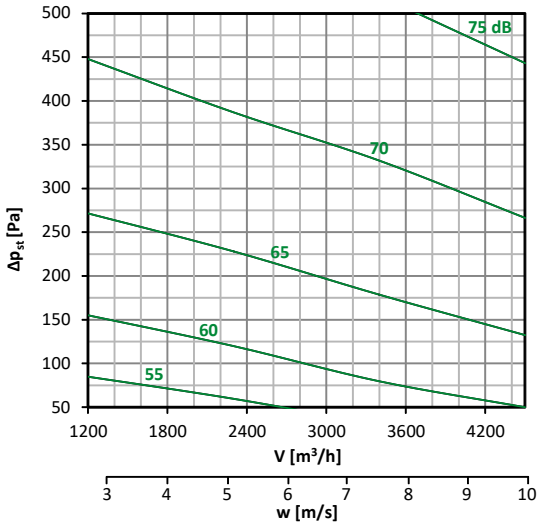
RPM-K 250



RPM-K 315



RPM-K 400



3.3 Radiated noise – without insulation

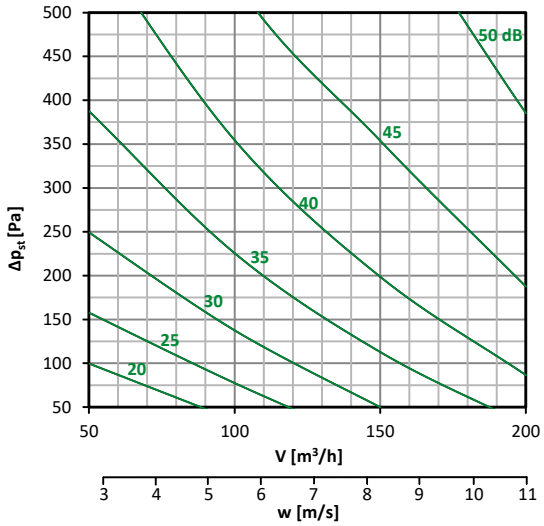
q_v (m^3/h) – air flow volume
L_{WA} (dB(A)) – total level of acoustic power corrected by filter A
Δp_{st} (Pa) – pressure differential

Tab. 7. Sound power level radiated outside the pipeline – without insulation

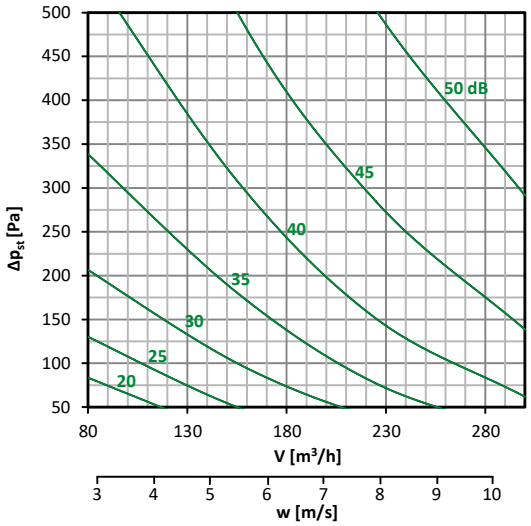
Size d (mm)	q_v		L_{WA} (dB(A)) Δp_{st} = 50 Pa	L_{WA} (dB(A)) Δp_{st} = 100 Pa	L_{WA} (dB(A)) Δp_{st} = 250 Pa	L_{WA} (dB(A)) Δp_{st} = 500 Pa
	m^3/h	l/s				
80	50	14	<15	20	30	39
	100	28	22	27	36	44
	150	42	30	34	42	48
	200	56	37	41	47	52
100	80	22	16	22	32	39
	155	43	25	30	38	45
	225	63	32	37	44	50
	300	83	39	43	49	54

Size d (mm)	q_v		L_{WA} (dB(A)) Δp_{st} = 50 Pa	L_{WA} (dB(A)) Δp_{st} = 100 Pa	L_{WA} (dB(A)) Δp_{st} = 250 Pa	L_{WA} (dB(A)) Δp_{st} = 500 Pa
	m³/h	l/s				
125	125	35	19	24	34	42
	250	69	27	32	40	47
	380	106	32	37	44	50
	500	139	37	41	47	53
160	200	56	32	36	43	49
	430	119	36	40	47	53
	650	181	40	45	51	57
	900	250	44	48	54	60
200	300	83	32	36	44	50
	630	175	36	41	48	54
	960	267	42	46	52	57
	1300	361	46	50	55	60
250	500	139	31	36	46	53
	1000	278	36	41	50	57
	1500	417	42	46	53	59
	2000	556	45	49	56	61
315	800	222	33	38	47	53
	1500	417	39	44	52	57
	2150	597	44	49	56	61
	2800	778	48	53	59	64
400	1200	333	37	42	50	57
	2300	639	42	47	54	60
	3400	944	47	51	57	62
	4500	1250	51	55	60	64

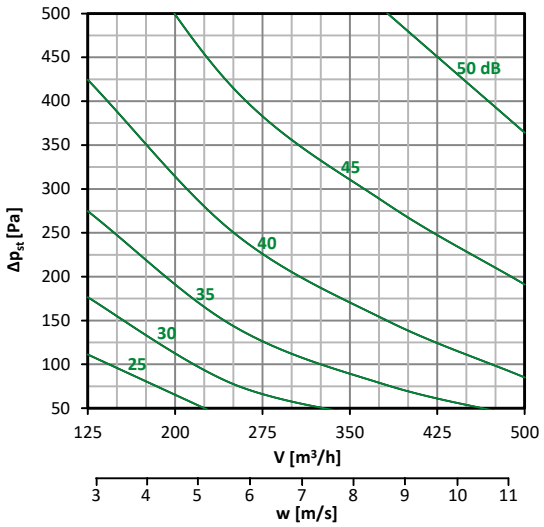
RPM-K 80, without insulation



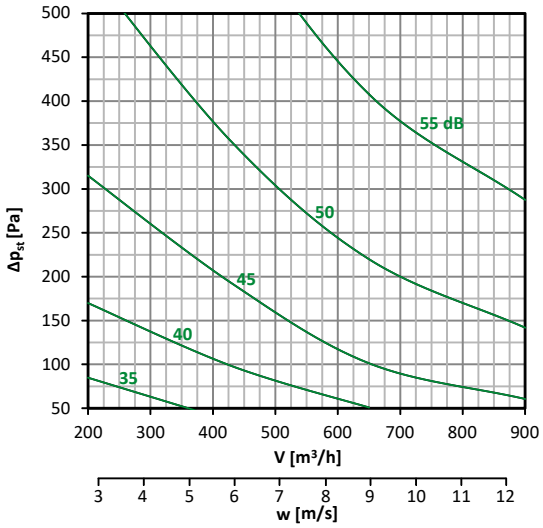
RPM-K 100, without insulation



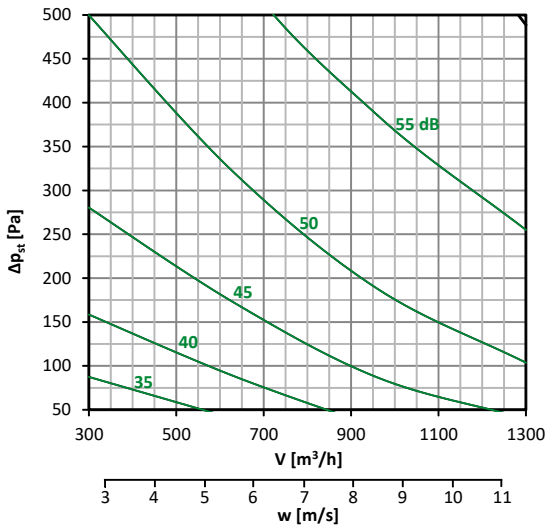
RPM-K 125, without insulation



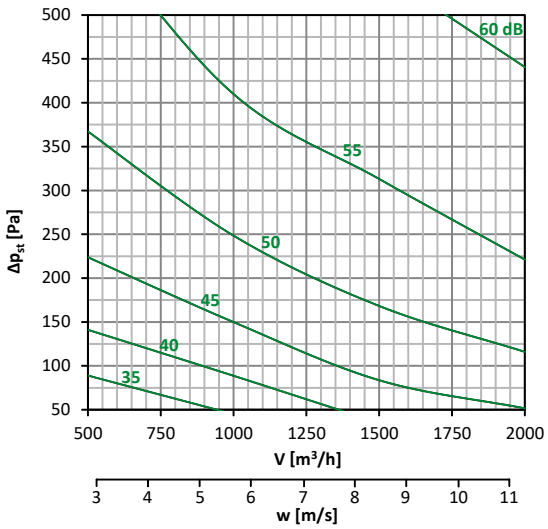
RPM-K 160, without insulation



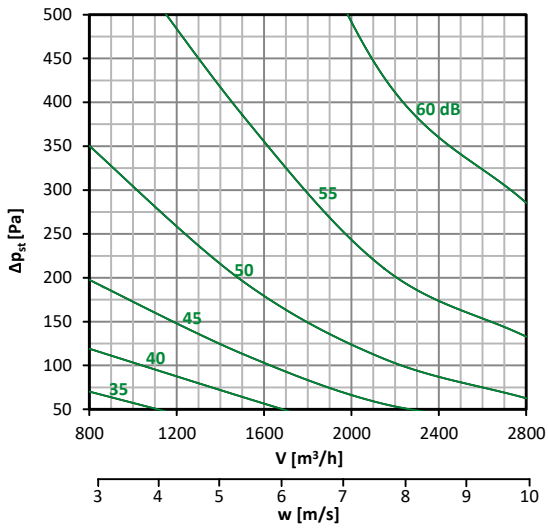
RPM-K 200, without insulation



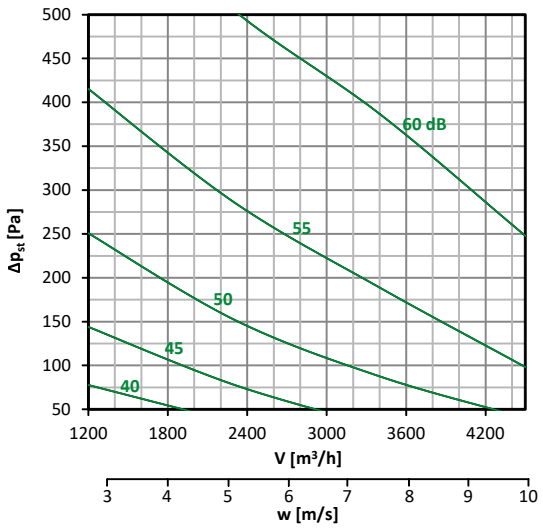
RPM-K 250, without insulation



RPM-K 315, without insulation



RPM-K 400, without insulation



3.4 Radiated noise – with insulation

q_v (m^3/h) – air flow volume
L_{WA} (dB(A)) – total level of acoustic power corrected by filter A
Δp_{st} (Pa) – pressure differential

Tab. 8. Sound power level radiated outside the pipeline – with insulation

Size d (mm)	q_v		L_{WA} (dB(A)) Δp_{st} = 50 Pa	L_{WA} (dB(A)) Δp_{st} = 100 Pa	L_{WA} (dB(A)) Δp_{st} = 250 Pa	L_{WA} (dB(A)) Δp_{st} = 500 Pa
	m^3/h	l/s				
80	50	14	<15	<15	<15	<15
	100	28	<15	<15	<15	<15
	150	42	<15	<15	15	20
	200	56	<15	<15	17	22
100	80	22	<15	<15	<15	<15
	155	43	<15	<15	<15	15
	225	63	<15	<15	19	22
	300	83	<15	<15	20	25
125	125	35	<15	<15	<15	15
	250	69	<15	<15	15	20
	380	106	<15	17	24	28
	500	139	18	21	28	30
160	200	56	<15	<15	19	22
	430	119	<15	18	26	30
	650	181	20	23	32	35
	900	250	21	25	31	37
200	300	83	<15	15	20	22
	630	175	16	19	25	30
	960	267	22	26	34	38
	1300	361	25	29	36	40
250	500	139	<15	15	23	27
	1000	278	16	20	28	33
	1500	417	24	28	36	42
	2000	556	27	31	39	44
315	800	222	<15	16	22	27
	1500	417	18	22	28	34
	2150	597	25	29	35	41
	2800	778	29	33	38	45
400	1200	333	19	22	28	32
	2300	639	24	27	33	37
	3400	944	30	33	39	43
	4500	1250	33	36	42	46

4. Electrical Components, Wiring Diagrams

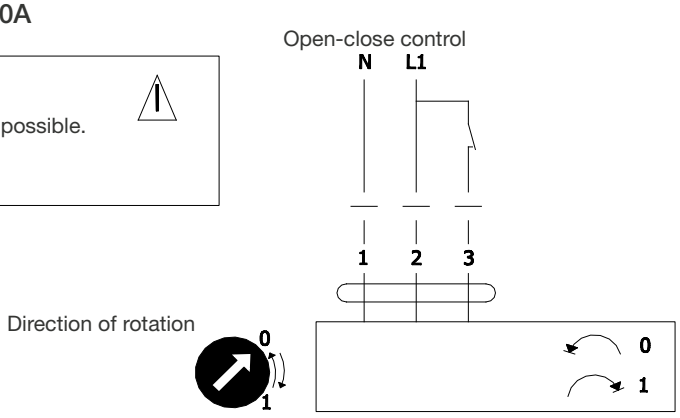
4.1 Parameters of Actuating Mechanism

Actuating mechanism	Position indication	Torque	Weight (kg)	Nominal voltage	Power consumption		
					In operation	At rest	Dimensioning
Belimo LM 230A	NO	5 Nm	0,5	AC 100 ... 240 V, 50/60 Hz	1,5 W	0,4 W	4 VA
Belimo LM 230A-S	YES	5 Nm	0,6	AC 100 ... 240 V, 50/60 Hz	1,5 W	0,4 W	4 VA
Belimo NM 230A	NO	10 Nm	0,75	AC 100 ... 240 V, 50/60 Hz	2,5 W	0,6 W	5,5 VA
Belimo NM 230A-S	YES	10 Nm	0,85	AC 100 ... 240 V, 50/60 Hz	2,5 W	0,6 W	6 VA
Belimo LM 24A	NO	5 Nm	0,5	AC 24 V, 50/60 Hz; DC 24 V	1 W	0,2 W	2 VA
Belimo LM 24A-S	YES	5 Nm	0,6	AC 24 V, 50/60 Hz; DC 24 V	1 W	0,2 W	2 VA
Belimo NM 24A	NO	10 Nm	0,75	AC 24 V, 50/60 Hz; DC 24 V	1,5 W	0,2 W	3,5 VA
Belimo NM 24A-S	YES	10 Nm	0,85	AC 24 V, 50/60 Hz; DC 24 V	1,5 W	0,2 W	4 VA
Belimo LM 24A-SR	YES	5 Nm	0,85	AC 24 V, 50/60 Hz; DC 24 V	1,0 W	0,4 W	2 VA
Belimo NM 24A-SR	YES	10 Nm	0,80	AC 24 V, 50/60 Hz; DC 24 V	2,0 W	0,4 W	4 VA

4.2 Wiring Diagrams

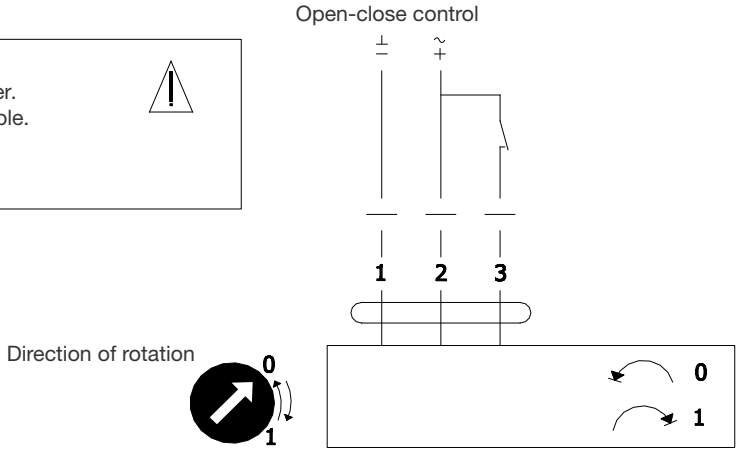
Actuating mechanism Belimo LM(NM) 230A

Notes:
- Caution: Power supply voltage!
- Paralellel connection of other driver is possible. Pay attention to the power input data.



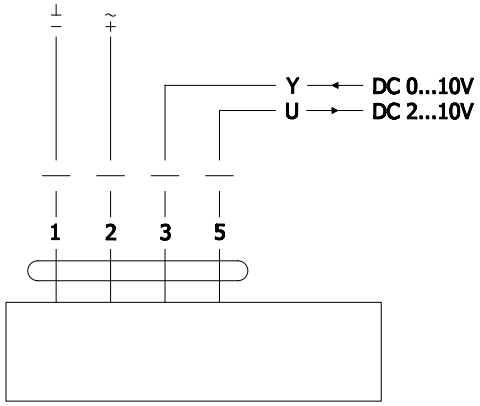
Actuating mechanism Belimo LM(NM) 24A

Notes:
- Connection through an insulation transformer.
- Paralellel connection of other driver is possible. Pay attention to the power input data.



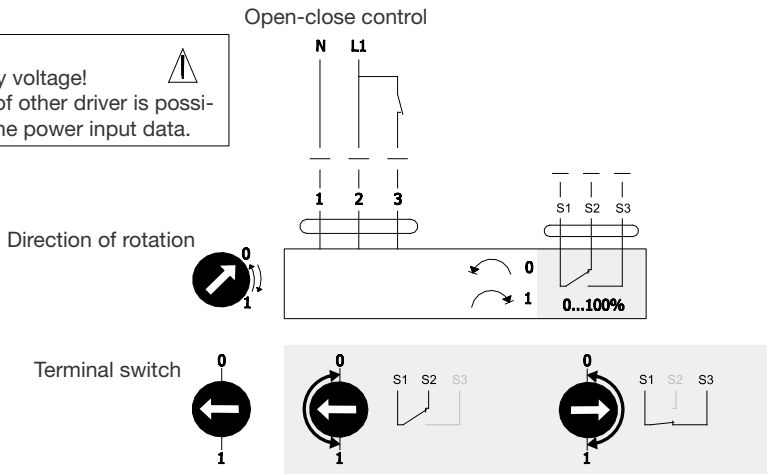
Actuating mechanism Belimo LM(NM) 24A-SR

Notes:
- Connection through an insulation transformer.
- Paralellel connection of other driver is possible. Pay attention to the power input data.



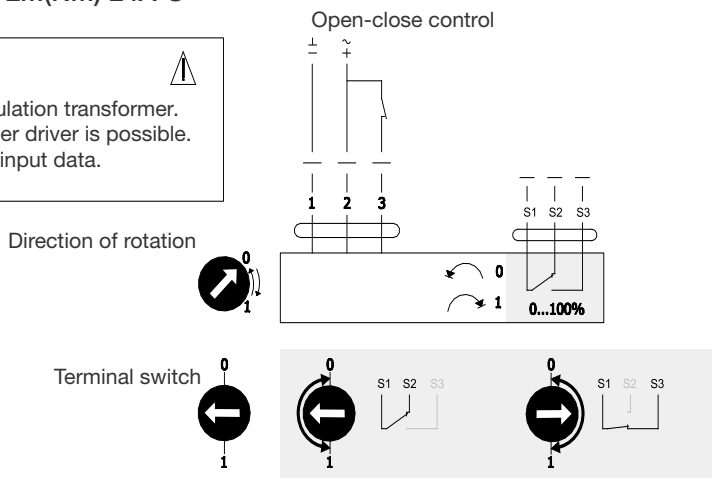
Actuating mechanism Belimo LM(NM) 230A-S

Notes:
- Caution: Power supply voltage!
- Paralellel connection of other driver is possible. Pay attention to the power input data.



Actuating mechanism Belimo LM(NM) 24A-S

Notes:
- Connection through an insulation transformer.
- Paralellel connection of other driver is possible. Pay attention to the power input data.



5. Product Marking

RPM-K d I .57

Marking

Size d (mm)

Insulation
- I - with insulation
- - without insulation

Design
- .01 - manually controlled
- .45 - actuating mechanism 230V, open-close control
- .46 - actuating mechanism 230V, open-close control, with limit switch
- .55 - actuating mechanism 24V, open-close control
- .56 - actuating mechanism 24V, open-close control, with limit switch
- .57 - actuating mechanism 24V SR modulating control

Example: RPM-K 160 I .57

6. Placement

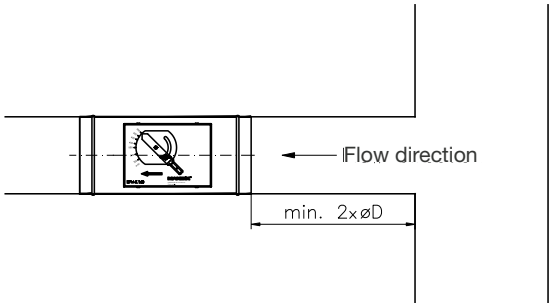
Air flow regulators are designed for installation in ventilation ducts. The operating position is vertical, horizontal or inclined. To ensure proper operation, the regulator (CAV) must be installed with horizontal position of its blade´s axis.

Controller has to be installed depending of flow direction (it is labeled by arrow on the top of control device box).

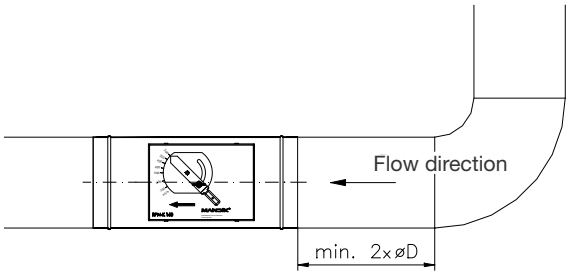
For faultless functioning has to be the air circulation in the whole controller section must be secured as steady on whole surface. Distance between controller and duct elements (bends, double branch joints etc.) has to be minimal 2×ØD.

The controller body should not be deformed in the course of installation.

Recommended distance from double branch joint



Recommended distance from bend



7. Inspection, Testing

The appliance is constructed and preset by the manufacturer, its operation is dependent on proper installation and adjustment.

All devices are tested terms of safety and operability after production.

8. Transportation and Storage

Controllers are transported by box freight vehicles without direct weather impact, there must not occur any sharp shocks and ambient temperature must not exceed +40°C. Controllers must be protected against mechanic damages when transported and manipulated. During transportation, the controller blade must be in the „CLOSED" position.

Dampers are stored indoor in environment without any aggressive vapours, gases or dust. Indoor temperature must be in the range from -5°C to +40°C and maximum relative humidity 80%. Dampers must be protected against mechanic damages when transported and manipulated.

ETS NORD

ETS NORD AS

Address: Peterburi tee 53
11415 Tallinn
Estonia

Phone: +372 680 7360

info@etsnord.ee
www.etsnord.ee

ETS NORD Finland

Address: Pakkasraitti 4
04360 Tuusula
Finland

Phone: +358 40 184 2842

info@etsnord.fi
www.etsnord.fi

ETS NORD Sweden

Address: Järsjögatan 7
692 35 Kumla
Sweden

Phone: +46 19 554 20 50

Address: Pinjegatan 5
213 63 Malmö
Sweden

Phone: +46 40 94 68 70

Address: Förrådsvägen 5
151 58 Södertälje
Sweden

Phone: +46 8 550 301 40

info@etsnord.se
www.etsnord.se

ETS NORD International

info@etsnord.com
www.etsnord.com

Let's move the air ***together!***