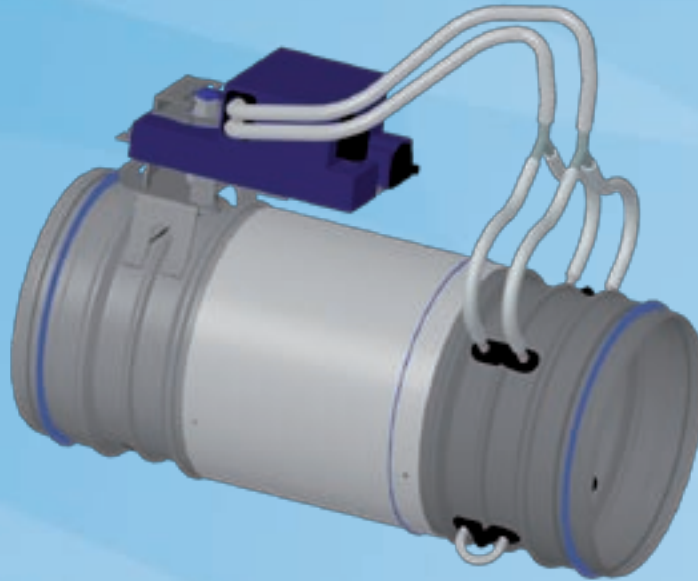


HFB

Airflow Management Damper



- Control damper for different airflow and duct pressure control applications
- Pressure-independent operation
- Galvanised steel design
- Circular duct connection equipped with integrated rubber gaskets
- Factory-set airflow range limits (min./max. airflow rates)

Product models and Accessories

- Model with shut-off operation; tightness fulfils EN 1751, class 4 requirements (HFB/G & HFB/I)
- Model with external insulation
- Several sound attenuator models
- Several airflow controller options
- Electric reheat coil options

MATERIAL

PART	MATERIAL
Casing	Galvanised steel
Damper blade	Galvanised steel
Shaft	Zinc coated steel
Bearings	Plastic
Blade gasket	EPDM rubber
Duct gaskets	1C-polyurethane hybrid
Measurement probe	Aluminium
External insulation	Mineral wool (models HFB/I, HFB/J)

Duct connection gaskets are vulcanised to the casing.

QUICK SELECTION

D [mm]	qmin(Special)		qmin(Standard)		qmax*		qnom	
	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]	[l/s]	[m³/h]
100	8	28	16	57	47	170	70	251
125	12	44	25	88	74	265	115	414
160	20	72	40	145	121	434	211	758
200	31	113	63	226	188	679	340	1226
250	49	177	98	353	295	1060	538	1936
315	78	281	156	561	468	1683	885	3188
400	126	452	251	905	754	2714	1555	5600
500	196	707	393	1414	1178	4241	2449	8818

qmin (special)

1 m/s duct velocity. Special actuator and calibration needed at the factory.

qmin (standard)

2 m/s duct velocity. Standard factory calibration

qmax

6 m/s duct velocity - recommended maximum airflow for comfort applications

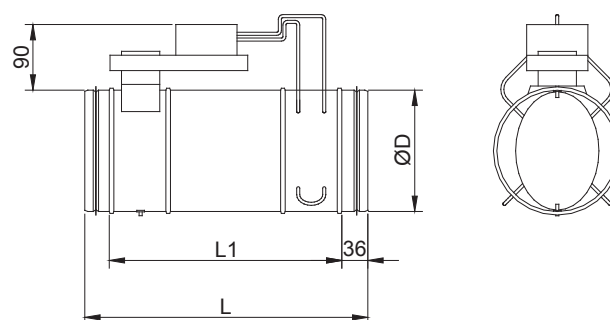
qnom

nominal airflow of airflow controller at which the control signal is maximum 10V

DIMENSIONS

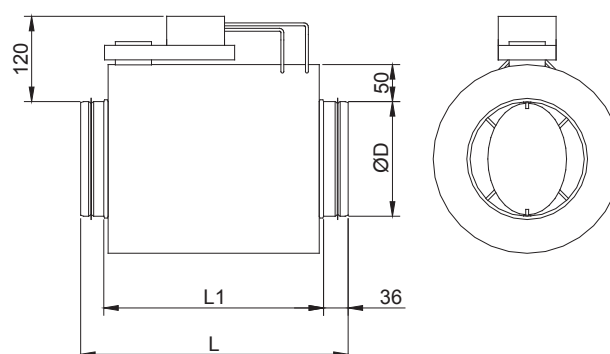
HFB/G, HFB/H

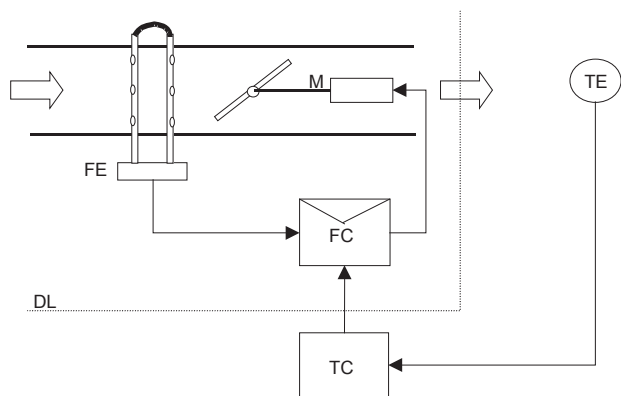
NS	L	L1	ØD
100	370	298	99
125	370	298	124
160	370	298	159
200	470	398	199
250	470	398	249
315	470	398	314
400	625	553	399
500	625	553	499



HFB/I, HFB/J

NS	L	L1	ØD
100	365	293	99
125	365	293	124
160	365	293	159
200	465	393	199
250	465	393	249
315	465	393	314
400	675	603	399
500	675	603	499





Function

The variable airflow damper HFB contains an averaging airflow measurement probe, airflow controller and actuator. Airflow is controlled based on actual flow measurement by changing the damper blade position. The airflow setpoint can be modified between factory-set minimum and maximum settings by, e.g., a room controller with an analogue signal (0...10 or 2...10 VDC). Flow control damper HFB maintains the required airflow independent of duct pressure variation.

The static pressure control damper option maintains the desired constant duct pressure based on a static pressure measurement.

Product models

The HFB airflow control damper is available in several versions.

The blade gasket enables airtight shut-off operation, and external insulation is used to attenuate radiated sound into the space.

MODEL	FEATURE	TIGHTNESS
HFB/G	With blade gasket	EN 1751, class 4
HFB/I	With blade gasket and 50 mm external insulation	EN 1751, class 4
HFB/H	No blade gasket	
HFB/J	No blade gasket, with 50 mm external insulation	

Minimum torque requirements for HFB product models:

HFB/G HFB/I 100...250	5 Nm
HFB/G HFB/I 315...500	10 Nm
HFB/H HFB/J	5 Nm

Control units (CU)

The HFB airflow control damper can be equipped with several different control units for either airflow or duct pressure control.

Airflow control

- For supply and exhaust installations
- Complete shut-off function (HFB/G and HFB/I)
- Maximum differential pressure over the damper of 1000 Pa
- Operating range: ambient temperature of 0 to 50 °C
- Ambient relative humidity < 95%, non-condensing

Airflow controller options:

EC = Halton LMV-D2-MP HI

EE = Halton NMV-D2-MP HI

ED = Belimo VRD2 + NM24A-V

EG = Siemens GLB181.1E/3

Controllers EE and ED include a dynamic differential pressure sensor with a low bypass airflow rate through the sensor element. Therefore, these controllers are not to be used in highly contaminated environments. The pressure sensor of the EG unit is based on a membrane with no flow through the sensor element.

Controller ED includes two potentiometers for minimum and maximum airflow setpoint adjustment (ranges: minimum = 0...80% and maximum = 30...100%).

The adjustable airflow control range is presented in the table below. For airflow controllers EE and EG, the highest available minimum airflow rate equals the specified maximum airflow rate.

For the ED controller, the highest minimum airflow rate is 80% of the specified maximum airflow rate.

NS	qv_min EC&EE&EG		qv_min ED		qv_max EC,EE, ED, EG		qv_nominal	
	l/s	m³/h	l/s	m³/h	l/s	m³/h	l/s	m³/h
100	16...70	57...251	16...56	57...201	21...70	75...251	70	251
125	25...115	88...414	25...92	88...332	35...115	124...414	115	414
160	40...211	145...758	40...169	145...607	63...211	228...758	211	758
200	63...340	226...1 226	63...272	226...981	102...340	368...1 226	340	1 226
250	98...538	353...1 936	98...430	353...1 548	161...538	581...1 936	538	1 936
315	156...885	561...3 188	156...708	561...2 550	266...885	956...3 188	885	3 188
400	251...1 555	905...5 600	251...1 244	905...4 480	467...1 555	1 680...5 600	1 555	5 600
500	393...2 449	1 414...8 818	393...1 960	1 414...7 055	735...2 449	2 645...8 818	2 449	8 818

Pressure control

- For supply and exhaust installations
- Complete shut-off function (HFB/G and HFB/I)
- Static pressure setpoint range of 30...100 Pa or 90...300 Pa
- Maximum differential pressure over the damper of 500 Pa
- Operating range: ambient temperature of 0 to 50 °C
- Ambient relative humidity < 95%, non-condensing

Static pressure controller options:

ES = Belimo VRP-STP + VFP-100 + NM24A-V (setpoint range: 30...100 Pa)

ER = Belimo VRP-STP + VFP-300 + NM24A-V (setpoint range: 90...300 Pa)

Both controllers, ES and ER, include a potentiometer for static pressure setpoint adjustment (range: 30...100%).

Sound attenuators (SA)

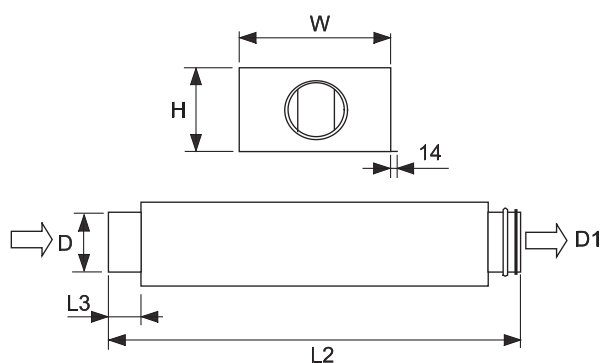
Sound attenuators are available with optional outlet diameters with mineral wool (MW) or polyester fibre (PEF) insulation materials and with 600 mm and 1000 mm lengths. Optionally the attenuator can be equipped with an access panel for cleaning and inspection purposes.

H1...H8 Attenuator without access panel
H11...H18 Attenuator with access panel

The connection (D1) is female type for direct connection to the HFB airflow control damper. The duct connection (D2) is male type and either damper size or one size larger. Technical information is based on bigger of the duct connections (D2).

	DIAMETER D1<= D2	MATERIAL	LENGTH mm	ACCESS PANEL
H1	D1 = D2	MW	600	No
H2	D1 = D2	MW	1000	No
H3	D1 = D2	PEF	600	No
H4	D1 = D2	PEF	1000	No
H5	D1 < D2	MW	600	No
H6	D1 < D2	MW	1000	No
H7	D1 < D2	PEF	600	No
H8	D1 < D2	PEF	1000	No
H11	D1 = D2	MW	600	Yes
H12	D1 = D2	MW	1000	Yes
H13	D1 = D2	PEF	600	Yes
H14	D1 = D2	PEF	1000	Yes
H15	D1 < D2	MW	600	Yes
H16	D1 < D2	MW	1000	Yes
H17	D1 < D2	PEF	600	Yes
H18	D1 < D2	PEF	1000	Yes

Attenuator dimensions



The picture above describes supply air installation. In exhaust installation the airflow direction is vice versa, from D2 to D1.

D1/D2	D1/D2	L nominal	L mm	L2 mm	A mm	H mm	MW Weight kg	PEF Weight kg
100/100		600	626	22	252	154	5.1	4.6
		1000	1036	22	252	165	7.8	7.0
125/125	100/125	600	626	22	265	179	5.7	5.1
		1000	1036	22	265	179	8.6	7.6
160/160	125/160	600	626	22	282	214	6.5	5.7
		1000	1036	22	282	214	9.8	8.6
200/200	160/200	600	626	22	341	254	8.2	7.2
		1000	1036	22	341	254	12.3	10.7
250/250	200/250	600	626	32	392	304	10.0	8.8
		1000	1036	32	392	304	14.8	12.8
315/315	250/315	600	626	32	458	369	12.3	10.7
		1000	1036	32	458	369	18.0	15.4
400/400	315/400	600	626	57	519	455	18.9	16.9
		1000	1036	57	519	455	27.6	24.1
500/500	400/500	600	626	57	702	555	28.6	24.2
		1000	1036	57	702	555	39.1	36.1
500/630		600	626	67	832	685	32.3	28.4
		1000	1036	67	832	685	50.3	43.8

Attenuation data

Material, Mineral wool (MW), frequency band (Hz)

D2	L = 600								L = 1000							
	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
100	8	14	18	30	46	47	41	33	12	20	27	42	50	50	50	50
125	6	12	16	27	47	46	40	27	13	15	23	41	50	50	50	35
160	8	10	13	25	37	39	28	20	9	12	21	35	44	50	46	30
200	9	15	13	22	33	34	25	17	9	11	21	36	45	50	33	19
250	6	7	11	18	27	27	18	14	8	9	19	29	41	40	21	16
315	5	5	11	15	19	15	12	8	7	7	18	25	38	28	18	12
400	3	2	9	14	20	15	9	7	4	6	15	22	34	22	13	12
500	4	6	7	10	15	11	8	5	5	8	13	28	44	40	25	18
630	2	3	8	17	25	20	16	12	4	6	16	22	27	22	19	11

Material, Polyester fibre (PEF), frequency band (Hz)

D2	L = 600								L = 1000							
	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
100	9	12	15	20	33	34	37	29	15	17	24	32	43	40	41	40
125	9	11	14	18	33	29	32	24	14	16	23	29	43	43	44	37
160	8	10	12	17	30	24	26	20	12	13	17	25	37	40	39	30
200	6	8	10	18	28	26	23	17	9	12	17	28	40	41	34	23
250	6	7	9	16	22	22	18	12	9	10	15	24	34	36	27	19
315	5	6	10	17	20	17	13	8	8	10	15	25	31	28	20	13
400	2	3	8	11	17	13	8	6	4	6	12	19	27	21	11	10
500	4	6	7	10	14	11	8	5	5	8	10	17	24	19	10	9
630	2	3	6	9	12	10	7	5	4	6	9	14	21	17	10	9

Reheat coils (RH)

Electric reheat coil

The HFB electric reheat coil is available for duct sizes 100...400 mm, and it is always a single-phase heater (230 VAC, less than 16 A).

Two electric reheater options are available:

- RM = Electric reheater without internal heating controller, PWM control signal input (230 VAC, pulse width modulation)
- RC = Electric reheater with internal heating controller, 0...10-VAC control signal input

Both heaters (RM and RC) have two internal overheating protection devices connected in series, one automatic and one with manual reset. This increases heater safety.

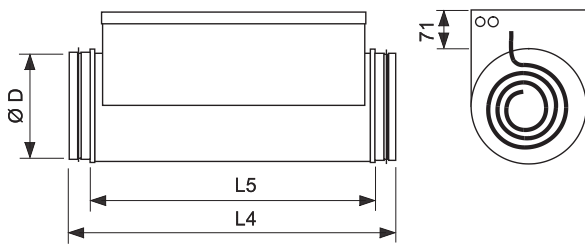
The RC heater also includes a built-in alarm relay

with potential-free changeover contact for remote alarm monitoring. The alarm is triggered by manual overheating protection or heater power loss.

Ensure that the airflow velocity is above 2 m/s to guarantee proper control function when selecting the airflow control damper and reheat coil.

Electric duct heater operation shall always be interlocked with the fan or with airflow rate measurement through the heater. The power supply to the duct heater must be switched off if the fan is switched off or airflow rate is too low. This function can be connected to the duct heater power supply (switch I for both heaters RM and RC), or in the case of the RC heater, also with potential-free contact P.

Dimensions

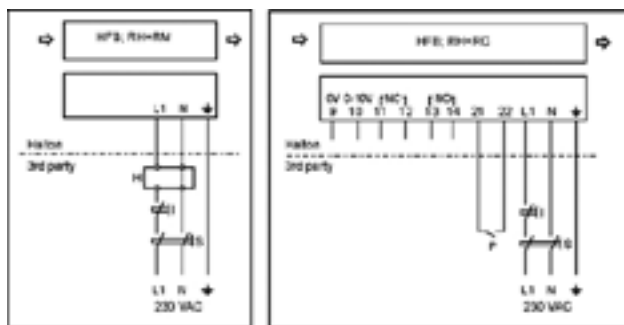


SIZE	D (mm)	L (mm)	L1 (mm)
100	99	375	291
125	124	375	291
160	159	375	291
200	199	375	291
250	249	375	291
315	314	375	291
400	399	375	291

Heating capacity

NS	Power W	qv_min v m/s	qv l/s	qv m³/h	dT (max) K	qv_max example v m/s	qv l/s	qv m³/h	dT (max) K
100	600	2.0	16	57	32	6.0	47	170	11
125	900	2.0	25	88	31	6.0	74	265	10
160	1500	2.0	40	145	31	6.0	121	434	10
200	2100	2.0	63	226	28	6.0	188	679	9
250	3000	2.0	98	353	25	6.0	295	1060	8
315	3000	2.1	156	561	16	6.0	468	1683	5
400	3000	2.0	251	905	10	6.0	754	2714	3

Electrical information



CODE DESCRIPTION

- Halton Delivered by Halton
- 3rd party Delivered by a third party
- S All-pole switch for power supply
- I Fan interlock switch
- P Airflow or duct pressure interlock switch
- H Heating power controller
- L1 230 VAC live
- N Neutral
- 0 Protective earthing

Heater power supply switch (S)	All-pole switch, 230 VAC, max. 16 A
Fan interlock function (I)	230 VAC, max. 16 A
Airflow or duct pressure interlock (P)	Potential-free contact
- Indication	10 V, max. 500 mA
- Contact open	Heating disabled
- Contact closed	Heating enabled
Heating power controller H	PWM
- Voltage	230 VAC, max. 16 A, according to heater power
- On/off cycle	60 s recommended
Control signal input 9, 10	
- Voltage	0...10 VDC
- Internal impedance	100 ohms
Alarm output 11, 12 (NC) and 13, 14 (NO)	Potential-free contact
- Max. indication voltage	230 VAC
- Max. current	500 mA
- NC	Contact closed if manual overheating protection is triggered or in the event of power failure
- NO	Contact open if manual overheating protection is triggered or in the event of power failure
Overheating protection	
- Automatic reset	Triggered at 60 °C, reset at 48 °C
- Manual reset	Triggered at 120 °C

SOUND DATA, AIRBORNE NOISE

HFB/G & HFB/I	qv		F (Hz)								F (Hz)								F (Hz)											
	m³/h	l/s	m/s	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k	Pa	dB(A)	
100	47	13	1.7	45	43	47	43	38	30	25	9	40	46	50	51	51	53	59	25	8	57	47	52	52	52	56	63	26	8	61
	158	44	5.6	45	49	50	47	44	44	33	5	46	48	58	61	59	56	60	51	10	60	48	62	66	67	61	67	62	14	67
	212	59	7.5	43	50	51	49	46	47	39	7	48	49	61	61	56	58	64	51	8	63	50	64	66	65	63	71	62	12	69
	263	73	9.3	44	52	55	53	50	52	44	7	53	48	61	62	58	59	66	55	9	64	51	66	67	62	64	74	61	9	72
125	79	22	1.8	37	40	45	45	40	32	25	6	41	39	50	50	54	61	54	26	4	58	39	55	51	57	68	61	22	2	65
	266	74	6.0	46	53	52	49	45	45	38	8	47	51	62	60	59	56	58	57	13	60	53	63	63	64	61	62	64	15	65
	349	97	7.9	46	53	54	51	47	45	39	10	49	49	68	62	60	59	65	61	13	65	53	69	65	65	63	68	69	15	69
	436	121	9.9	46	54	56	53	50	48	43	11	51	48	68	64	61	60	67	62	14	66	50	74	68	65	66	75	72	15	74
160	137	38	1.9	38	41	47	46	41	38	31	8	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	457	127	6.3	48	51	51	48	47	46	41	11	48	47	58	60	58	63	64	62	24	65	49	59	64	64	69	74	74	23	75
	601	167	8.3	48	53	53	50	50	49	43	10	51	49	60	61	59	63	65	64	22	66	49	63	65	63	71	74	74	29	75
	749	208	10.3	47	54	55	52	51	51	44	10	52	52	62	63	60	63	67	66	19	67	51	65	66	64	71	75	76	27	76
200	220	61	1.9	44	39	45	44	47	45	37	7	46	45	39	50	58	63	60	58	12	63	45	39	52	65	70	65	66	15	69
	734	204	6.5	49	51	50	48	48	47	43	14	49	50	56	58	57	64	67	69	26	69	50	58	61	61	72	77	82	30	80
	972	270	8.6	51	54	53	50	51	50	46	14	52	53	59	59	59	64	67	68	24	69	52	62	62	63	71	77	82	31	80
	1210	336	10.7	52	56	55	53	53	52	49	13	54	57	62	61	61	64	67	68	23	68	56	64	64	64	71	77	81	30	80
250	353	98	2.0	40	40	44	42	41	39	36	15	42	41	45	51	58	60	57	60	24	61	42	47	52	67	68	62	69	25	69
	1181	328	6.7	48	50	51	48	47	45	41	17	48	49	57	57	58	58	58	57	33	60	48	59	59	58	62	64	64	41	65
	1559	433	8.8	51	52	53	51	50	49	44	15	51	53	60	61	59	62	61	62	31	63	51	62	62	62	66	67	68	40	69
	1940	539	11.0	53	54	55	53	52	52	47	11	54	55	62	63	61	64	64	65	29	66	55	65	66	65	69	70	72	38	72
315	576	160	2.1	43	42	42	40	38	34	29	16	39	45	46	52	60	71	70	68	17	71	46	48	57	67	81	81	79	20	82
	1915	532	6.8	49	52	50	48	47	45	43	17	48	51	60	59	58	59	60	62	29	63	50	62	61	63	65	67	70	41	70
	2531	703	9.0	51	56	54	51	51	50	49	18	53	53	62	61	60	61	63	66	30	66	53	65	64	65	67	70	74	36	73
	3146	874	11.2	51	59	56	55	54	55	54	19	57	54	65	63	62	63	66	69	30	69	55	68	66	67	69	73	77	36	76
400	943	262	2.1	43	38	38	35	35	30	25	8	35	44	44	55	58	68	72	69	15	72	-	-	-	-	-	-	-	-	-
	3139	872	6.9	49	54	51	49	47	44	44	20	48	50	62	58	59	57	55	55	33	58	49	66	59	61	59	59	59	50	62
	4147	1152	9.2	49	57	54	51	51	48	48	20	52	52	64	61	61	60	59	61	33	63	53	68	65	66	65	64	66	40	67
	5159	1433	11.4	48	59	56	55	55	52	52	19	56	51	66	64	62	62	62	65	33	66	54	70	67	68	68	67	71	40	71
500	1490	414	2.1	44	33	39	37	42	39	34	1	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4968	1380	7.0	53	57	52	50	48	44	43	20	49	50	65	56	56	52	49	48	39	54	50	71	56	57	52	51	49	57	58
	6563	1823	9.3	56	60	56	53	52	49	50	22	54	55	67	63	61	59	56	57	32	61	54	73	64	64	60	58	58	47	63
	8161	2267	11.5	56	60	57	56	57	52	51	21	57	57	70	66	64	63	60	64	34	65	57	73	69	68	66	63	67	39	68

Room attenuation 4 dB

D duct connection diameter

qv airflow rate

v air velocity

dP pressure drop

F frequency, (mean value of octave band)

LpA sound pressure level

Sound data with attenuator, airborne noise

HFB + H1-600 and HFB + H1-1000

Attenuation material is mineral wool. Sound data with polyester fibre (PEF) and different inlet size (IL) than outlet size (OL) is available from Halton hit or by adding the following correction to data presented above.

Correction tables:

Difference between attenuation using mineral wool and polyester fibre. Insulation materials and respectively model with inlet diameter smaller than outlet diameter.

Sound data is found on the next page.

Mineral wool - polyester fibre and inlet < outlet

L=600, SIZE D(mm)	100	125	160	200	250	315	400	500
Mineral wool -PEF	+5	+5	-4	+3	+1	-1	+1	+1
Mineral wool IL<OL	-2	-3	-1	-6	-5	-2	-2	+4
PEF IL<OL	-2	+2	+1	+4	+3	+4	+1	+1

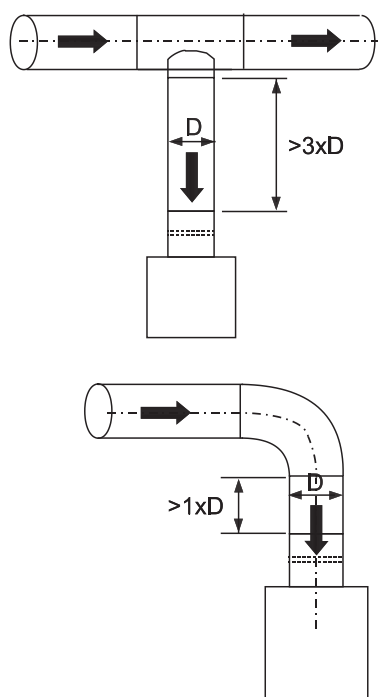
Mineral wool - polyester fibre and inlet < outlet

L=1000, SIZE D(mm)	100	125	160	200	250	315	400	500
Mineral wool -PEF	+5	+1	+4	+1	-2	-1	+2	+6
Mineral wool IL<OL	+4	+3	+3	+9	+3	+3	-6	+3
PEF IL<OL	+1	+5	+1	+5	+4	+8	+1	+1

Installation

Safety distances

The airflow control damper is installed taking into account the required safety distances. Install the unit into ductwork in such a way that the air flow direction through the unit is as indicated with the arrow in the unit casing.



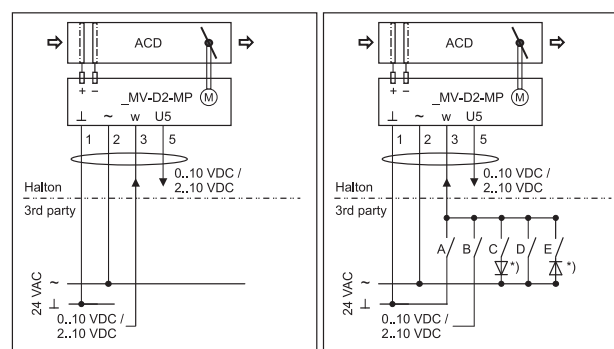
For the pressure control damper the minimum safety distance for the static measurement tab after the control damper is $5 \times D$. However, typically the pressure sensor position is halfway along or in the last third of the duct branch length. Please refer to job drawings.

Wiring

The wiring shall be carried out in accordance with local regulations and by professional technicians.

For the power supply of all control options, a safety-isolating transformer shall be used.

HFB; CU=EC (LMV-D2-MP HI), CU=EE (NMV-D2-MP HI) - typical and all wiring options



CODE DESCRIPTION

Halton	Delivered by Halton
3 rd party	Delivered by a third party
ACD	HFB
1 (L)	24 VAC system neutral
2 (~)	24 VAC live
3 (w)	2...10- or 0...10-VDC airflow setpoint signal input
5 (U5)	2...10- or 0...10-VDC airflow feedback signal output
*)	Diode 1N 4007

Operating mode

There are two control modes available: 0...10 VDC and 2...10 VDC. The main difference between these modes is in low airflow control operation and in shut-off function.

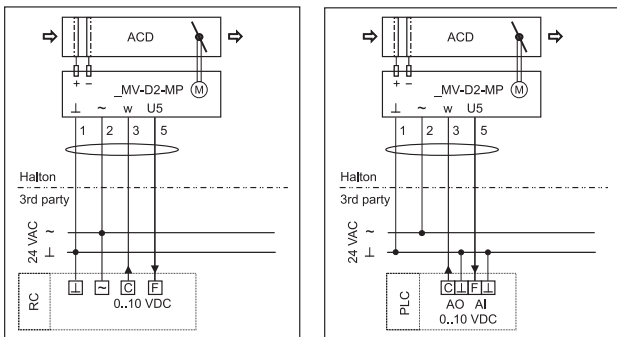
2...10 VAC	0...10 VAC	A	B	C	D	E	
CLOSE	qv_min	ON	Off	Off	Off	Off	
qv_min	qv_min	Off	Off	Off	Off	Off	Constant flow
Variable qv_min...qv_max	Variable qv_min...qv_max	Off	ON	Off	Off	Off	
$0.5 \times (qv_{max} - qv_{min}) + qv_{min}$	$0.5 \times (qv_{max} - qv_{min}) + qv_{min}$	Off	Off	ON	Off	Off	Constant flow
qv_max	qv_max	Off	Off	Off	ON	Off	Constant flow
OPEN	OPEN	Off	Off	Off	Off	ON	

Shut-off with control signal w:

In addition to relay override command situations, the damper will be fully closed if:

- 0...10 VDC: the HFB minimum airflow is set to 0% (0 dm³/s or 0 m³/h) and control signal w falls below 0.5 VDC
- 2...10 VDC: HFB control signal w falls below 0.1 VDC
- Both 0...10 VDC and 2...10 VDC: the airflow setpoint voltage falls below a value corresponding to an air velocity of less than 1.5 m/s

Example: HFB; CU=EC (LMV-D2-MP HI), CU=EE (NMV-D2-MP HI) - variable airflow control with a room controller or a building management system

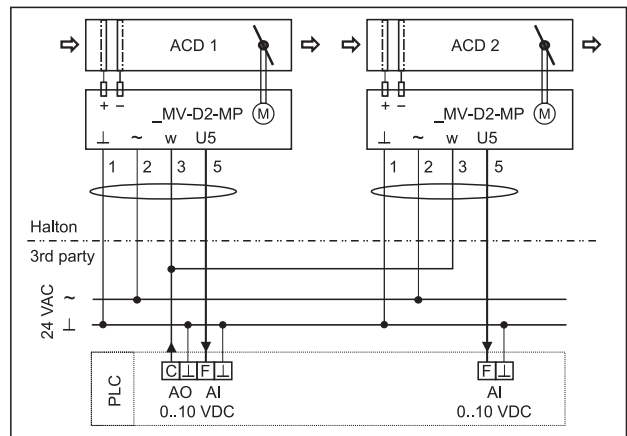


CODE DESCRIPTION

- Halton Delivered by Halton
- 3rd party Delivered by a third party
- ACD HFB
- 1 (L) 24 VAC system neutral
- 2 (~) 24 VAC live
- 3 (w) 0...10-VDC airflow setpoint signal input
- 5 (U5) 0...10-VDC airflow feedback signal output
- RC Room controller
- PLC Building management system
- C (AO) Airflow setpoint control signal
- F (AI) Actual airflow feedback input

MODE	VOLTAGE OF w, VDC	FUNCTION
0...10 VDC	0.0...0.5	Minimum airflow (closed if qv_min = 0%)
	0.5...10.0	Modulating, qv_min ... qv_max
	10.0	Maximum airflow
2...10 VDC	0.0...0.1	Damper closed
	0.1...2.0	Minimum airflow
	2.0...10.0	Modulating, qv_min...qv_max
	10.0	Maximum airflow

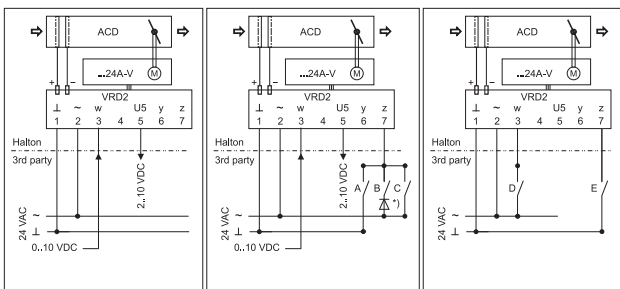
Example: HFB; CU=EC (LMV-D2-MP HI), CU=EE (NMV-D2-MP HI) - parallel airflow control with a building management system



CODE DESCRIPTION

- Halton Delivered by Halton
- 3rd party Delivered by a third party
- ACD1 HFB supply
- ACD2 exhaust
- 1 (L) 24 VAC system neutral
- 2 (~) 24 VAC live
- 3 (w) 0...10-VDC airflow setpoint signal input
- 5 (U5) 0...10-VDC airflow feedback signal output
- PLC Building management system
- C (AO) Airflow setpoint control signal
- F (AI) Actual airflow feedback input

HFB; CU=ED (VRD2 + NM24-V) - typical, override and constant airflow



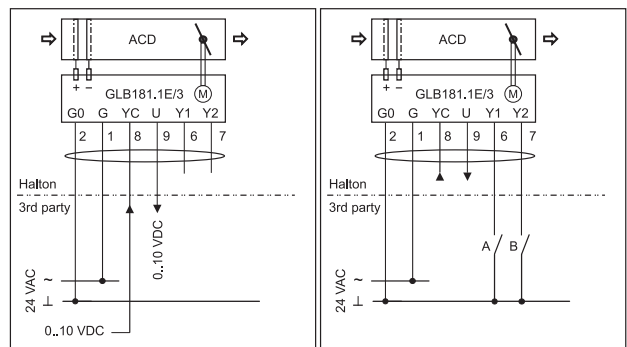
CODE DESCRIPTION

- Halton Delivered by Halton
- 3rd party Delivered by a third party
- ACD HFB
- 1 (L) 24 VAC system neutral
- 2 (~) 24 VAC live
- 3 (w) 2...10- or 0...10-VDC airflow setpoint signal input
- 5 (U5) 2...10- or 0...10-VDC airflow feedback signal output
- 6 y Actuator signal
- 7 z Override input
- *) Diode 1N 4007

OVERRIDE	A	B	C
CLOSED	ON	Off	Off
Variable flow	Off	Off	Off
Min. flow	Off	ON	Off
Max. flow	Off	Off	ON

CONSTANT FLOW	D	E
CLOSED	Off	ON
Min. flow	Off	Off
Max. flow	ON	Off

HFB; CU=EG (GLB181.1E/3) - typical VAV application and constant airflow

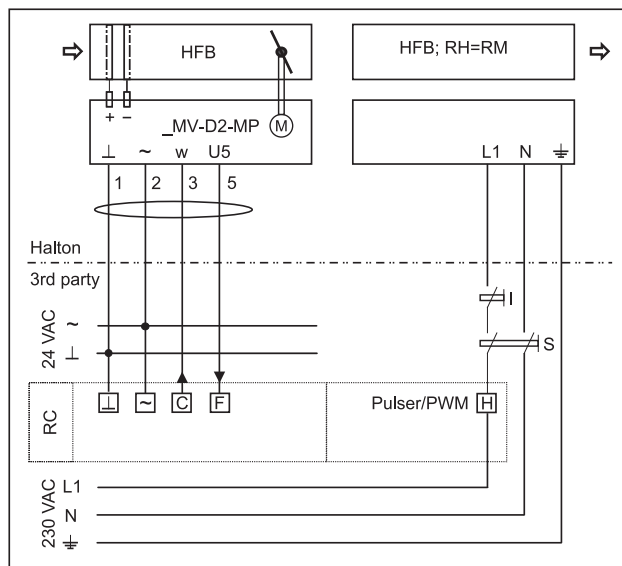


CODE DESCRIPTION

- Halton Delivered by Halton
- 3rd party Delivered by a third party
- ACD HFB
- 2 (G0) 24 VAC system neutral
- 1 (G) 24 VAC live
- 8(YC) 2...10- or 0...10-VDC airflow setpoint signal input
- 9 (U) 2...10- or 0...10-VDC airflow feedback signal output
- 6 (Y1) Override input
- 7 (Y2) Override input

CONSTANT FLOW	A	B
CLOSED	Off	ON
Min. flow	Off	Off
Max. flow	ON	ON
OPEN	ON	Off

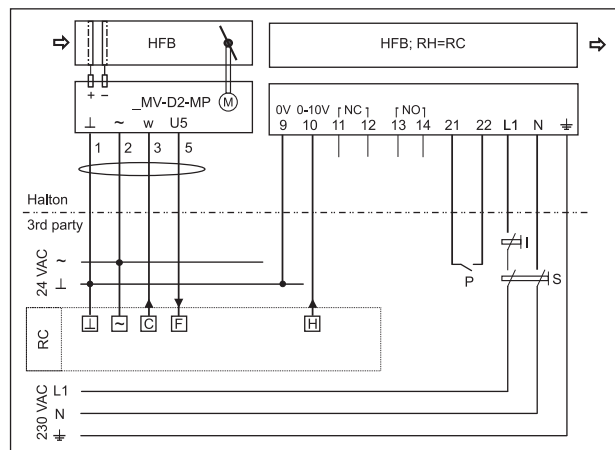
HFB; CU=EC, RH=RM - cooling with airflow and heating with electric heater



CODE DESCRIPTION

- Halton Delivered by Halton
- 3rd party Delivered by a third party
- RH RM electric reheater
- 1 (⊥) 24 VAC system neutral
- 2 (~) 24 VAC live
- 3 (w) 2...10- or 0...10-VDC airflow setpoint signal input
- 5 (U5) 2...10- or 0...10-VDC airflow feedback signal output
- RC Room controller
- C Airflow setpoint control signal for cooling
- F Actual airflow feedback input
- S All-pole switch for power supply
- I Fan interlock switch
- H Heating power output, 230 VAC PWM, 60-second cycle time recommended
- L1 230 VAC live
- N Neutral
- 0 Protective earthing

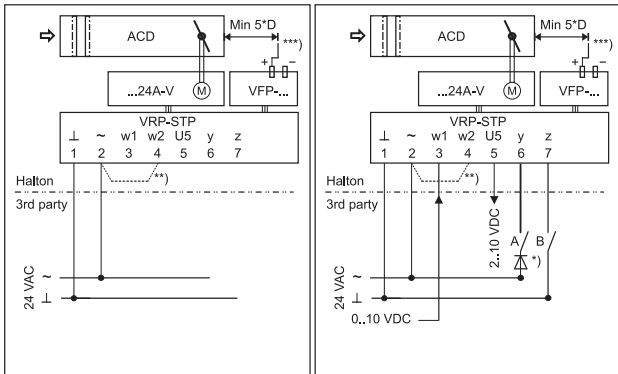
HFB; CU=EC, RH=RC - cooling with airflow and heating with electric heater



CODE DESCRIPTION

- Halton Delivered by Halton
- 3rd party Delivered by a third party
- RH RC electric reheater
- 1 (⊥) 24 VAC system neutral
- 2 (~) 24 VAC live
- 3 (w) 2...10- or 0...10-VDC airflow setpoint signal input
- 5 (U5) 2...10- or 0...10-VDC airflow feedback signal output
- RC Room controller
- C Airflow setpoint control signal for cooling
- F Actual airflow feedback input
- S All-pole switch for power supply
- I Fan interlock switch
- H Heating power output, 0...10 VDC
- P Airflow or duct pressure interlock switch
- L1 230 VAC live
- N Neutral
- 0 Protective earthing
- 9 24 VAC system neutral
- 10 Heating power input, 0...10 VAC
- 11,12 Alarm output (NC), potential-free, contact closed in alarm
- 13,14 Alarm output (NO), potential-free, contact open in alarm
- 21,22 Airflow or duct pressure interlock indication

HFB; CU=ES or CU=ER - duct pressure control



VERRIDE	A	B
CLOSED	Off	ON
Pressure control	Off	Off
OPEN	ON	Off

CODE DESCRIPTION

- Halton Delivered by Halton
- 3rd party Delivered by a third party
- ACD HFB
- 1 (⊥) 24 VAC system neutral
- 2 (~) 24 VAC live
- 3 (w) 2...10- or 0...10-VDC pressure setpoint signal input
- 5 (U5) 2...10- or 0...10-VDC pressure feedback signal output
- 6 y Actuator signal
- 7 z Override input
- *) Diode 1N 4007
- ***) Jumper 2-4 factory-fitted for potentiometer setpoint; remove if 2...10-VDC input w1 is used
- ***) Minimum safety distance for pressure tab after pressure control damper: 5 x D

The pressure controller has a setpoint potentiometer for pressure setpoint adjustment.

Although the absolute minimum safety distance for

the static measurement tab after the pressure control damper is 5 x D, please refer to job drawings for the correct location of the static pressure measurement point.

Commissioning

Airflow control

Nominal airflow rates of the HFB are presented in the table.

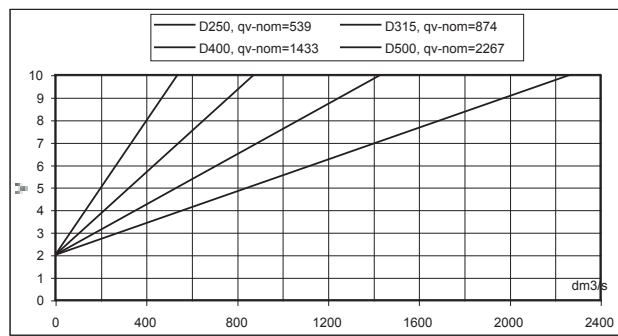
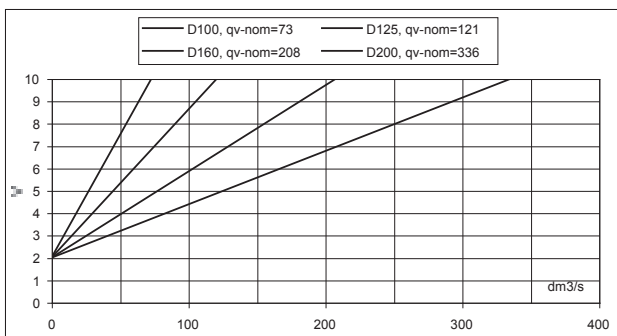
NS	qv_nominal
100	70 l/s 251 m ³ /h
125	115 l/s 414 m ³ /h
160	211 l/s 758 m ³ /h
200	340 l/s 1226 m ³ /h

NS	qv_nominal
250	538 l/s 1936 m ³ /h
315	885 l/s 3188 m ³ /h
400	1555 l/s 5600 m ³ /h
500	2449 l/s 8818 m ³ /h

The actual measured airflow rate (qv) can be defined by the controller feedback signal (U or U5) and airflow controller nominal airflow (qv_nom).

SIGNAL	FORMULA	CONTROLLER TYPE AND MODE	TERMINALS SYSTEM NEUTRAL	TERMINALS SIGNAL
0...10 VDC	$qv=qv_nom * U/10$	HFB; CU=EC (LMV-D2-MP HI), mode 0...10V HFB; CU=EE (NMV-D2-MP HI), mode 0...10V HFB; CU=EG (GLB181.1E/3)	1 (⊥) 2(G0)	5 (U5) 9 (U)
2...10 VDC	$qv=qv_nom * (U-2)/8$	HFB; CU=EC (LMV-D2-MP HI), mode 2...10V HFB; CU=EE (NMV-D2-MP HI), mode 2...10V HFB; CU=ED (VRD2+NM24-V)	1 (⊥) 1 (⊥)	5 (U5) 5 (U5)

The actual airflow rate can also be determined from the pictures.



The actual airflow rate can be calculated as a function of differential pressure at the measurement probe and the measurement probe k factor. The proper k factor can be found in an attachment for the product.

$$q_v = k * \sqrt{\Delta P_m}$$

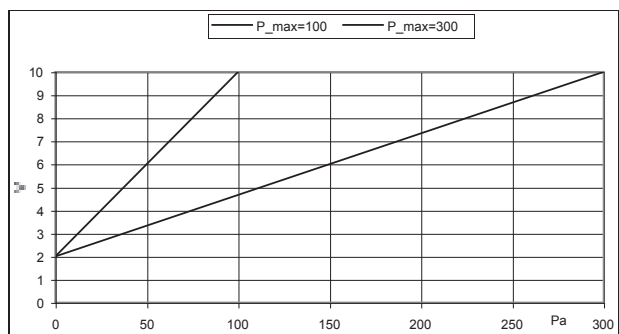
- q_v actual airflow rate [l/s]
- k k value of the product
- ΔP_m differential pressure of measurement probe [Pa]

The EC, EE and EG airflow controllers are equipped with a dynamic pressure differential sensor, and there is a low airflow rate through the pressure sensor. Therefore, a manual manometer cannot be connected

in parallel with the airflow controller for differential pressure measurement. If a manometer will be used, the airflow controller power supply shall be switched off in order to stop damper movement during measurement of airflow probe differential pressure. Note that the duct pressure might vary during the measurement.

The EG airflow controller is equipped with a static membrane pressure sensor including automatic zero point calibration, and there is no airflow through the differential pressure sensor of the controller. Therefore, a manual differential measurement manometer can be connected in parallel to the airflow controller (for example with tube T-branches) and both measurements can operate in parallel with continuous control.

The actual duct static pressure can also be read from the picture.



Duct pressure control

The actual measured airflow rate can be defined by the controller feedback signal and airflow controller nominal airflow.

SIGNAL	FORMULA	CONTROLLER TYPE AND MODE	TERMINALS SYSTEM	TERMINALS SIGNAL
2...10 VDC	P _{st} =100 Pa * (U-2)/8 P _{st} =300 Pa * (U-2)/8	HFB;CU=ES (VRP-STP+VFP-100) HFB;CU=ER (VRP-STP+VFP-300)	1 (⊥) 1 (⊥)	5 (U5) 5 (U5)

Suggested specifications

The pressure-independent variable airflow control damper shall be made of galvanised steel, with an airflow measurement probe of aluminium.

The tightness of the control damper in closed position shall conform to EN1751/4.

Duct connection shall include integral airtight rubber gaskets.

The management damper section shall contain airflow measurement, flow controller and damper actuator. Design airflow range limits shall be calibrated at the factory.

Controller settings shall be adjustable on site with a PC or a handheld tool.

The airflow controller shall have control signal input 0...10 VDC or 2 ...10 VDC and output 0...10 VDC for airflow feedback.

Supply power shall be 24 VAC.

The damper shall be equipped with a sound attenuator in order to meet the sound level requirement for the room. As an optional extra, the sound attenuator shall have an access panel for cleaning purposes.

The airflow controller shall comprise an electric reheat coil with power supply of 230 VAC. Incorporated within the reheat coil shall be a safety overheat thermostat with both automatic and manual reset. As an option, the heater may include an opto-isolated 0...10-VDC control signal input.

Product code

HFB/S-D

S = Model

G	Damper with blade gasket
H	Damper without blade gasket
I	Blade gasket, insulation 50 mm
J	No blade gasket, insulation 50 mm

D = Diameter of duct connection

100, 125, 160, 200, 250, 315, 400, 500

Specifics and accessories

MA = Material

CS	Steel
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CU = Control unit

EC	LMV-D2-MP HI (Belimo)
EE	NMV-D2-MP HI (Belimo)
ED	VRD2+NM24 (Belimo)
EG	GLB181.1E/3 (Siemens)
ES	VRP-STP+VFP-100+NM24A-V
ER	VRP-STP+VFP-300+NM24A-V

SA = Sound attenuator, connection sizes

NA	Not assigned
H1	L = 600 mm; Outlet = inlet; Mineral wool
H2	L = 1000 mm; Outlet = inlet; Mineral wool
H3	L = 600 mm; Outlet = inlet; Polyester fibre
H4	L = 1000 mm; Outlet = inlet; Polyester fibre
H5	L = 600 mm; Outlet > Inlet; Mineral wool
H6	L = 1000 mm; Outlet > inlet; Mineral wool
H7	L = 600 mm; Outlet > inlet; Polyester fibre
H8	L = 1000 mm; Outlet > inlet; Polyester fibre
H11	L = 600 mm; Outlet = inlet; Mineral wool; Access panel
H12	L = 1000 mm; Outlet = inlet; Mineral wool; Access panel
H13	L = 600 mm; Outlet = inlet; Polyester fibre; Access panel
H14	L = 1000 mm; Outlet = inlet; Polyester fibre; Access panel
H15	L = 600 mm; Outlet > Inlet; Mineral wool; Access panel
H16	L = 1000 mm; Outlet > inlet; Mineral wool; Access panel
H17	L = 600 mm; Outlet > inlet; Polyester fibre; Access panel
H18	L = 1000 mm; Outlet > inlet; Polyester fibre; Access panel

RH = Electric reheat coil

NA	Not assigned
RM	Electric reheater with PWM control signal input (230 VAC, pulse width modulation)
RC	Electric reheater with 0...10-VAC control signal input

Code example

HFB/G-100, MA=CS, CU=EE, SA=NA, RH=NA