

Damper with flow meter

FMDRU



Description

Applications

The flow meter is suitable both for setting up and for continuous flow measurement. It is intended for permanent installation and must therefore be specified at the design stage.

There is a separate assembly, measuring, balancing and maintenance instruction for this product.

Ø 80–630 fullfills tightness class 0 and pressure class A .

Design

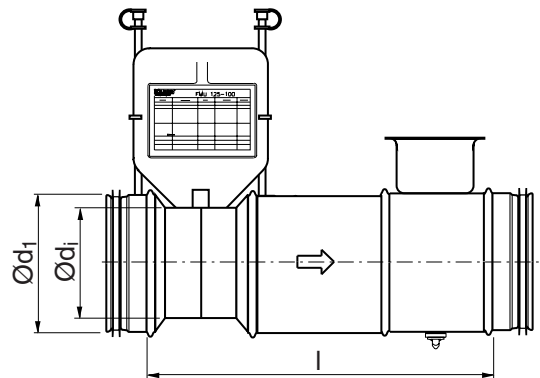
The flow meter consists of two reducers joined together, with measurement nozzles. Each nozzle has a removable plastic plug which prevents dirt from entering. It also eliminates air leakage when measurement is not done.

The unit permits insulation of up to 100 mm thickness to be installed without concealing the measurement nozzles or the label plate. The plate can be rotated for best legibility, irrespective of the way the unit is installed and can easily be removed, to be located away from the unit.

The unit also contains a regulating damper DRU to allow balancing. The cup around the damper knob allows insulation up to 50 mm thick to be used. If thicker insulation is needed, add the special insulation cup IK.

The unit has components which partly block the duct system.

Dimensions



Ød ₁ nom	Ød _i nom	l [mm]	m [kg]
80	63	300	0,78
100	80	300	0,94
125	100	310	1,21
160	125	315	1,52
200	160	380	2,20
250	200	440	3,31
315	250	570	4,92
400	315	660	7,81
500	400	845	12,0
630	500	1030	18,2

Flow meters with reductions of two dimension steps can be obtained, to give higher reading pressure in the measurement nozzles. This entails higher pressure drop and noise generation, however.

Advantages

- Has low pressure drop due to good aerodynamic design.
- Has low noise generation due to good aerodynamic design.
- Suitable for use with insulation.

Ordering example

Product	FMDRU	160	125
Dimension Ød ₁			
Dimension Ød _i			



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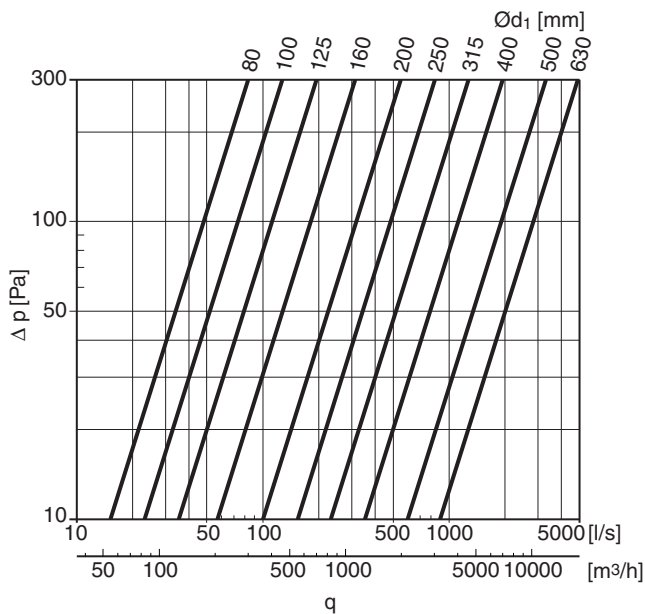
Technical data

Sound

Sound generation has been measured at the Swedish National Testing and Research Institute in an reverberation room, in accordance with ISO 5135 and ISO 3741.

Flow graph for balancing

The graph show the flow, q , as a function of the pressure difference in the measurement nozzles. Flow data for dimensioning differs from this graph.



Measurement function

Measure pressure difference, Dp , between the measurement nozzles, and use the equation on the units plate to derive the duct flow.

Measurement accuracy

If the velocity profile is asymmetric, the measurement values can differ from the ideal values. For this reason, the flow meter should never be located right up to any flow disturbance. The method error in the table below will differ, depending on the distance to the flow disturbance.

l_1 =straight distance before meter	Method error m_2	
Type of disturbance	5%	10%
A 90° bend		
	2· d_1	1· d_1
l_2 = straight distance after meter	1· d_1	1· d_1

Damper with flow meter

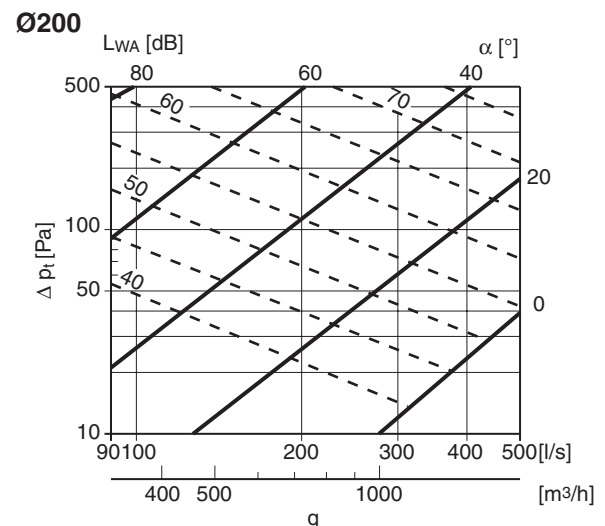
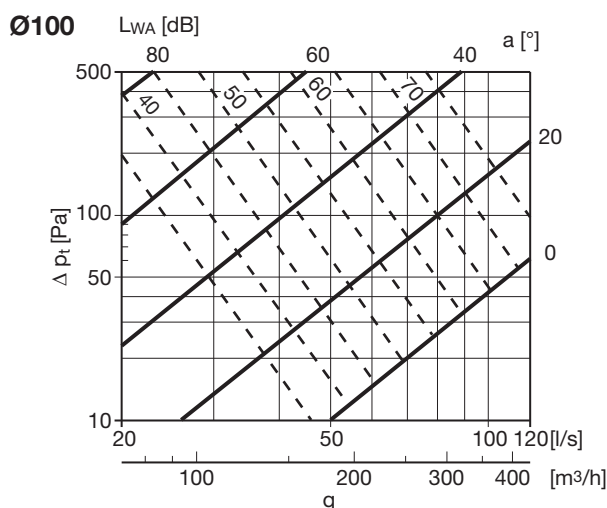
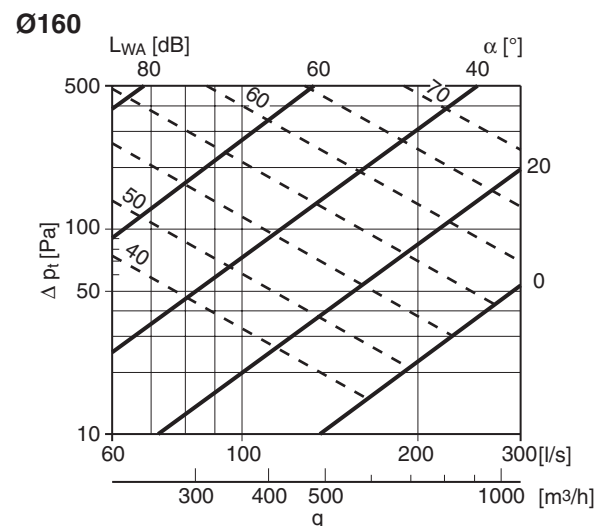
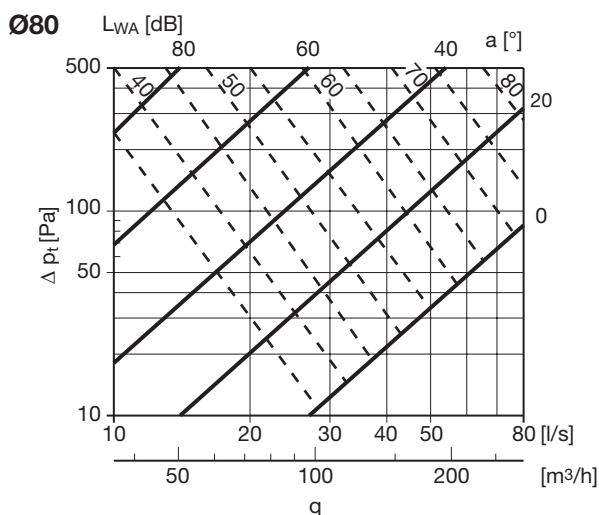
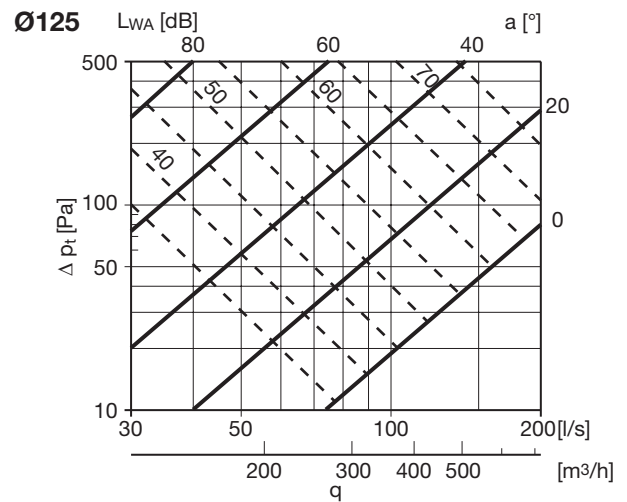
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Pressure drop graphs with sound data for dimensioning

The solid lines show the pressure drop, Δp_t , across the unit as a function of flow, q .

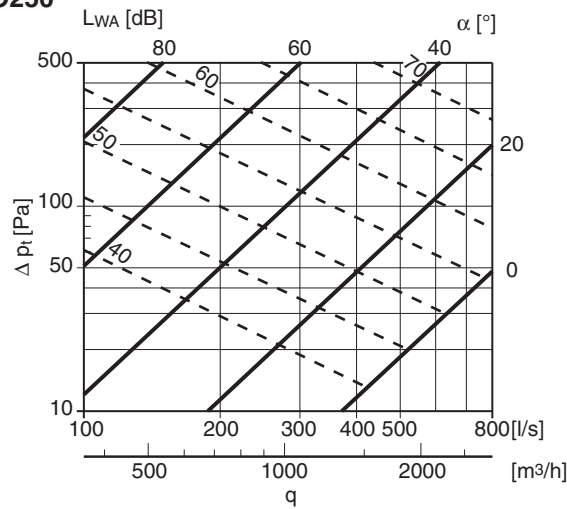
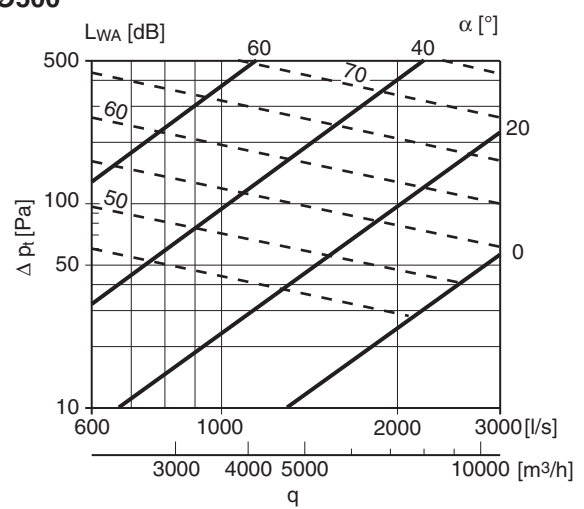
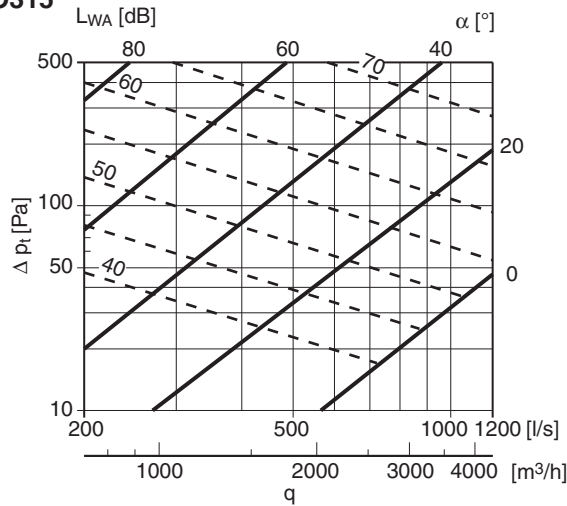
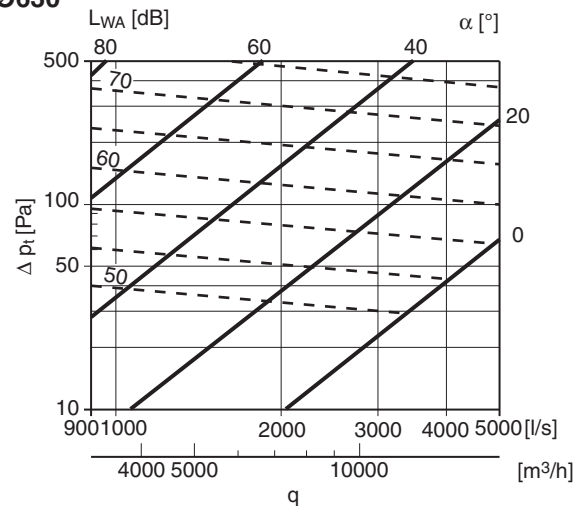
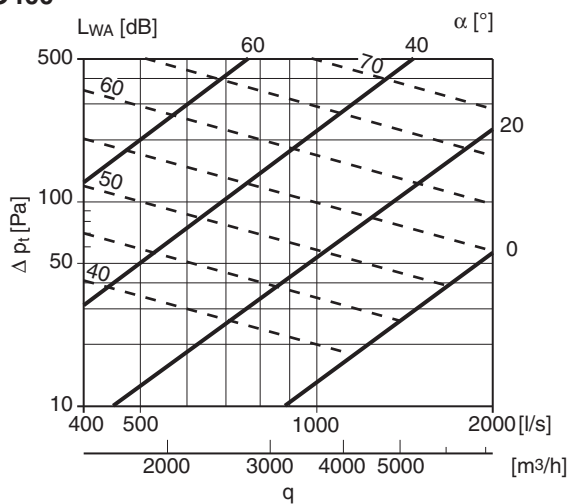
The dashed lines give the A-weighted sound power data, L_{WA} , in dB to the duct.

Flow data for balancing differs from these graphs.



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Ø250

Ø500

Ø315

Ø630

Ø400


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Sound generation

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Sound generation

dim Ød ₁	Pressure loss [Pa]	Velocity app. 5 [m/s]								Velocity app. 10 [m/s]								Velocity app. 15 [m/s]							
		Centre frequency [Hz]								Centre frequency [Hz]								Centre frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k	63	125	250	500	1k	2k	4k	8k
80		Flow 25 [l/s]								Flow 50 [l/s]								Flow 75 [l/s]							
	500	64	65	62	59	57	56	52	51	68	76	76	70	64	61	59	56	71	80	80	73	67	63	61	58
	300	61	62	58	55	52	50	45	43	65	75	75	67	61	57	53	49	68	79	77	68	63	58	55	52
	200	59	60	56	51	47	46	40	38	63	75	74	64	58	53	48	44	67	78	75	64	59	54	51	47
	100	56	56	51	45	40	38	30	28	59	74	72	59	52	47	40	35	63	76	71	58	53	48	42	38
	50	52	52	47	40	33	30	21	18	56	73	71	54	47	41	32	26	Pressure loss exceeds 50 [Pa]							
100		Flow 40 [l/s]								Flow 80 [l/s]								Flow 120 [l/s]							
	500	64	63	62	58	56	55	53	54	67	76	76	69	63	60	61	61	70	81	82	70	66	64	64	64
	300	61	60	58	54	51	50	46	46	65	76	76	65	59	55	56	56	68	81	80	65	62	60	60	59
	200	59	58	55	51	47	46	40	40	62	75	75	62	55	51	52	53	65	81	79	61	58	57	56	55
	100	56	54	51	45	40	40	31	30	59	75	75	57	49	44	46	46	62	81	78	54	52	51	50	49
	50	52	50	46	39	34	33	22	20	55	75	74	52	43	37	39	40	Pressure loss exceeds 50 [Pa]							
125		Flow 60 [l/s]								Flow 120 [l/s]								Flow 180 [l/s]							
	500	66	64	62	59	56	56	54	53	72	76	75	68	63	60	61	59	75	81	79	71	66	63	63	61
	300	63	61	58	55	51	51	47	45	69	75	73	65	59	56	55	53	73	79	76	67	62	59	58	56
	200	61	59	56	51	47	47	42	40	67	74	71	62	56	52	50	49	71	78	74	63	58	55	53	51
	100	57	55	51	46	41	40	33	30	64	72	69	57	50	45	43	41	67	76	70	57	52	49	46	43
	50	53	51	46	40	35	32	25	21	60	71	66	51	44	38	36	34	Pressure loss exceeds 50 [Pa]							
160		Flow 100 [l/s]								Flow 200 [l/s]								Flow 300 [l/s]							
	500	66	63	61	57	54	54	53	52	77	78	73	67	63	59	59	58	80	81	76	71	66	62	61	59
	300	63	60	57	53	50	49	47	45	75	77	70	63	59	54	54	53	78	79	72	67	62	57	55	53
	200	61	58	55	50	47	45	42	40	74	75	68	60	56	50	49	48	76	77	69	64	58	53	50	48
	100	58	54	50	45	41	38	34	31	71	73	64	55	51	43	42	41	74	74	63	59	53	46	42	39
	50	55	51	45	39	36	31	26	23	69	71	60	50	46	36	34	33	71	71	58	54	47	39	34	31
200		Flow 150 [l/s]								Flow 300 [l/s]								Flow 450 [l/s]							
	500	71	68	65	61	58	58	57	55	75	77	70	63	60	54	54	53	80	82	78	71	67	65	66	63
	300	67	64	60	57	53	53	50	47	74	75	68	60	56	50	49	48	77	79	74	67	63	60	60	57
	200	65	61	57	53	49	49	45	42	71	73	68	61	56	53	52	50	74	77	71	63	58	56	55	52
	100	60	56	52	48	43	41	36	32	66	69	64	55	50	46	45	42	70	71	66	57	52	50	48	44
	50	55	52	46	42	37	34	28	23	62	66	60	50	44	38	37	34	65	69	51	50	46	41	40	35
250		Flow 250 [l/s]								Flow 500 [l/s]								Flow 750 [l/s]							
	500	69	66	64	61	57	59	58	56	79	76	72	67	62	61	64	63	83	81	76	72	65	64	67	66
	300	66	63	60	58	53	54	53	49	77	73	68	63	57	56	59	58	81	77	72	68	60	59	61	60
	200	64	60	57	55	49	50	49	44	75	70	65	60	53	52	54	53	78	74	69	65	56	55	57	55
	100	60	56	52	50	43	44	41	34	72	65	59	54	47	45	47	46	75	69	63	60	50	48	50	47
	50	56	51	47	45	37	37	34	25	69	61	54	49	40	38	39	38	71	64	58	55	43	41	42	39
315		Flow 400 [l/s]								Flow 800 [l/s]								Flow 1200 [l/s]							
	500	76	71	67	62	60	60	60	57	82	79	74	68	66	64	65	63	86	83	77	71	68	66	69	64
	300	72	67	62	58	55	55	54	49	78	75	69	64	61	58	49	57	82	79	72	66	63	61	62	58
	200	69	64	59	55	51	50	48	44	74	72	66	60	57	54	54	51	78	75	69	62	59	56	57	53
	100	63	58	53	49	45	43	39	34	69	66	60	54	51	46	46	43	73	67	62	56	52	51	49	44
	50	58	52	47	43	39	36	30	24	63	61	54	48	44	38	38	34	67	64	56	49	45	41	41	36
400		Flow 600 [l/s]								Flow 1200 [l/s]								Flow 1800 [l/s]							
	500	78	71	66	61	58	59	59	55	83	78	72	67	65	64	65	62	88	82	76	71	68	67	68	64
	300	73	67	61	57	54	54	53	48	77	73	67	62	60	59	59	56	84	78	71	66	64	62	63	58
	200	69	63	58	54	51	50	48	43	73	69	63	58	56	54	54	51	80	74	67	63	60	58	59	53
	100	63	56	51	48	45	43	39	34	65	62	56	52	50	47	46	42	74	68	60	56	54	50	52	45
	50	56	50	45	43	40	36	31	25	58	55	49	45	43	39	38	34	68	62	54	50	48	43	45	37
500		Flow 1000 [l/s]								Flow 2000 [l/s]								Flow 3000 [l/s]							
	500	81	75	69	64	61	63	63	59	87	81	73	68	67	66	67	64	91	84	76	71	69	68	72	66
	300	76	70	64	60	57	57	57	51	82	75	67	63	62	60	61	58	86	79	70	66	64	62	64	59
	200	73	66	61	57	54	52	51	45	78	71	63	59	57	55	56	53	82	74	66	62	59	57	59	54
	100	66	59	53	51	48	45	42	35	71	64	55	53	51	47	47	44	75	62	58	55	52	52	51	45
	50	60	53	47	45	42	37	33	26	65	56	48	46	44	38	39	35	69	60	51	49	45	40	43	36
630		Flow 1500 [l/s]								Flow 3000 [l/s]								Flow 4500 [l/s]							
	500	88	81	74	68	66	67	67	62	91	84	75	70	70	69	70	66	93	86	77	71	71	70	76	67
	300	82	75	68	63	61	60	60	54	85	78	69	65	65	62	63	59	87	80	71	65	65	63	66	60
	200	78	71	64	59	57	55	54	47	80	73	64	61	60	57	58	53	82	75	66	60	60	57	60	54
	100	70	63	56	53	51	46	43	36	72	65	56	54	53	48	48	43	73	67	58	52	51	48	51	44
	50	63	56	49	46	44	38	33	25	64	57	48	47	46	39	39	33	65	59	50	44	43	38	42	34