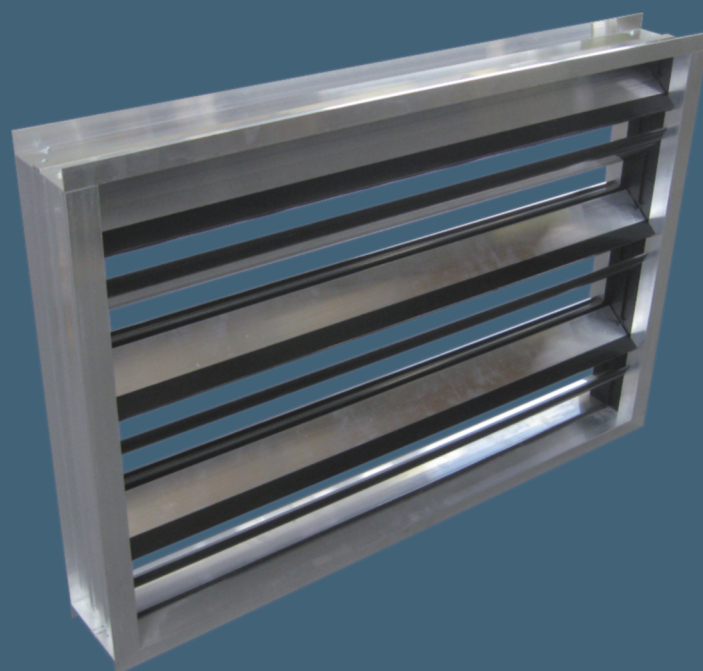


MANDÍK[®]

REGULATION DAMPER

RKALM



These technical conditions define the scope of produced dimensions and versions of "ALUMINIUM REGULATION DAMPER RKALM" ("damper"). These technical conditions apply to the manufacture, design, ordering, assembly, operation and maintenance.

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II. GENERAL

1. Description

- 1.1. The dampers consist of a aluminium frame, blades and a control actuator. Depending on used components, could be achieved requested properties. They are used to control the air flow by choking the flow.

Fig. 1 Damper RKALM



- 1.2. Damper dimensions

- dimensions from 200 x 110 to 2000 x 2010 mm
- internal leakage acc. to EN 1751 class 2, 3
- coefficient of thermal transmission per blade up to 1,3 W/m².K
(blades with thermal divide)

- 1.3. Working conditions

Maximum air circulation speed: 8 m.s⁻¹

Maximum pressure difference: 1200 Pa

Operation of the dampers does not depend on the direction of air circulation. The dampers can be located in an arbitrary position.

Dampers are suitable for ventilation systems, where air does not content any abrasive, chemical or adhesive particles.

Dampers are designed for macroclimatic areas with mild climate according to EN 60 721-3-3.

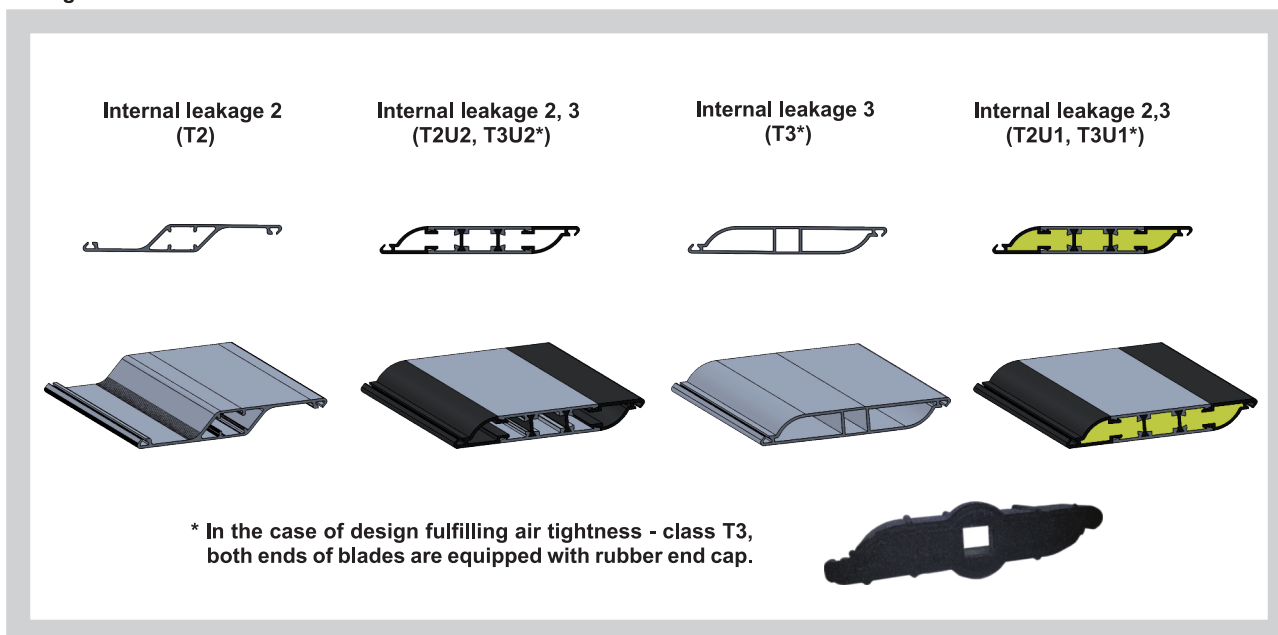
Temperature in the place of installation is permitted to range from - 20°C to + 50°C. If the electrical elements are mounted on the damper, temperature range is narrowed by the electrical elements.

2. Design

- 2.1. Damper design - internal leakage and coefficient of thermal transmission per blade

- Internal leakage class 2 - T2
- Internal leakage class 2, blades with thermal divide T2U1 (U = 1,3 W/m².K)
- Internal leakage class 2, blades with thermal divide T2U2 (U = 2,99 W/m².K)
- Internal leakage class 3 - T3
- Internal leakage class 3, blades with thermal divide - T3U1 (U = 1,3 W/m².K)
- Internal leakage class 3, blades with thermal divide - T3U2 (U = 2,99 W/m².K)

Fig. 2 Profiles of blades



2.2. Damper design - type of control

The version is designated by two digits.

Tab. 2.1.1. Damper design

Version of damper – type of control	Additional two digits
Manually controlled	.01
To fit actuator drive	.09
Actuator with emergency function 230V	.43*
Actuator controlled 230V, two point regulation - without position signal	.45
Actuator controlled 230V, two point regulation - with position signal	.46
Actuator with emergency function 230V - with position signal	.48*
Actuator with emergency function 24V	.53*
Actuator controlled 24V, two point regulation - without position signal	.55
Actuator controlled 24V, two point regulation - with position signal	.56
Actuator controlled 24V SR with smooth regulation	.57
Actuator with emergency function 24V - with position signal	.58*

* design is available on request, is necessary to specify the position of the damper blade (open or closed) without voltage.

3. Dimensions and weights

3.1. Dimensions, airflow (effective) area, weights

Tab. 3.1.1. Dimensions, airflow (effective) area, weights

A x B	Number of blades	Sef [m ²]	Weight [kg]		A x B	Number of blades	Sef [m ²]	Weight [kg]	
			T3, T2U, T3U	T2				T3, T2U, T3U	T2
200 x 110	1	0,0168	2	2	280 x 310	3	0,0709	3,5	3,5
x 210	2	0,0337	2,5	2,5	x 410	4	0,0946	4,5	4,5
x 310	3	0,0505	3,5	3	x 510	5	0,1182	5,5	5
x 410	4	0,0673	4	4	x 610	6	0,0327	6	6
x 510	5	0,0841	5	4,5	x 710	7	0,0505	7	6,5
x 610	6	0,1010	5,5	5	x 810	8	0,0673	8	7,5
x 710	7	0,1178	6,5	6	x 910	9	0,0663	9	8,5
x 810	8	0,1346	7	6,5	x 1010	10	0,0841	10	9
x 910	9	0,1514	8	7,5	x 1110	11	0,0831	10,5	10
x 1010	10	0,1683	9	8,5	x 1410	14	0,1010	13	12
x 1110	11	0,1851	9,5	9	x 1510	15	0,1000	14,5	13
x 1410	14	0,2356	12	11	x 1610	16	0,1000	15	14
x 1510	15	0,2524	13	12	x 1810	18	0,1178	16,5	15,5
x 1610	16	0,2692	13,5	13	x 2010	20	0,1168	18,5	17
x 1810	18	0,3029	15	14	300 x 110	1	0,1168	2	2
x 2010	20	0,3365	16,5	15,5	x 210	2	0,1346	3	3
225 x 110	1	0,0190	2	2	x 310	3	0,2009	4	3,5
x 210	2	0,0379	2,5	2,5	x 410	4	0,2692	4,5	4,5
x 310	3	0,0569	3,5	3,5	x 510	5	0,3365	5,5	5
x 410	4	0,0758	4	4	x 610	6	0,0368	6,5	6
x 510	5	0,0948	5	4,5	x 710	7	0,0569	7	6,5
x 610	6	0,1137	5,5	5,5	x 810	8	0,0758	8	7,5
x 710	7	0,1327	6,5	6	x 910	9	0,0747	9,5	8,5
x 810	8	0,1517	7,5	7	x 1010	10	0,0948	10	9,5
x 910	9	0,1706	8,5	8	x 1110	11	0,0937	11	10
x 1010	10	0,1896	9	8,5	x 1410	14	0,1137	13,5	12,5
x 1110	11	0,2085	10	9,5	x 1510	15	0,1126	14,5	13,5
x 1410	14	0,2654	12	11,5	x 1610	16	0,1126	15,5	14
x 1510	15	0,2844	13,5	12,5	x 1810	18	0,1327	17	15,5
x 1610	16	0,3033	14	13	x 2010	20	0,1316	19	17
x 1810	18	0,3412	15,5	14,5	315 x 110	1	0,1316	2	2
x 2010	20	0,3791	17	16	x 210	2	0,1517	3	3
250 x 110	1	0,0211	2	2	x 310	3	0,1316	4	3,5
x 210	2	0,0422	3	2,5	x 410	4	0,1065	5	4,5
x 310	3	0,0569	3,5	3,5	x 510	5	0,1331	5,5	5
x 410	4	0,0843	4,5	4	x 610	6	0,1598	6,5	6
x 510	5	0,1054	5	5	x 710	7	0,1864	7,5	7
x 610	6	0,1265	6	5,5	x 810	8	0,2130	8	7,5
x 810	8	0,1687	7,5	7	x 910	9	0,2396	9,5	8,5
x 910	9	0,1898	8,5	8	x 1010	10	0,2663	10,5	9,5
x 1010	10	0,2109	9,5	9	x 1110	11	0,2929	11	10,5
x 1110	11	0,2320	10,5	9,5	x 1410	14	0,3728	13,5	12,5
x 1410	14	0,2952	12,5	11,5	x 1510	15	0,3994	15	13,5
x 1510	15	0,3163	13,5	13	x 1610	16	0,4260	15,5	14,5
x 1610	16	0,3374	14,5	13,5	x 1810	18	0,4793	17,5	16
x 1810	18	0,3796	16	15	x 2010	20	0,5325	19	17,5
x 2010	20	0,4217	17,5	16,5	355 x 110	1	0,0300	2,5	2,5
280 x 110	1	0,0236	2	2	x 210	2	0,0601	3	3
x 210	2	0,0473	3	3	x 310	3	0,0901	4	4

A x B	Number of blades	Sef [m²]	Weight [kg]		A x B	Number of blades	Sef [m²]	Weight [kg]	
			T3, T2U, T3U	T2				T3, T2U, T3U	T2
355 x 410	4	0,1201	5	4,5	500 x 1010	10	0,4239	12,5	11,5
x 510	5	0,1502	6	5,5	x 1110	11	0,4663	13,5	12
x 610	6	0,1802	7	6,5	x 1410	14	0,5934	16,5	15
x 710	7	0,2102	7,5	7	x 1510	15	0,6358	18	16
x 810	8	0,2403	8,5	8	x 1610	16	0,6782	19	17
x 910	9	0,2703	10	9	x 1810	18	0,7630	21	19
x 1010	10	0,3003	11	10	x 2010	20	0,8477	23,5	20,5
x 1110	11	0,3304	11,5	10,5	550 x 110	1	0,0466	3	3
x 1410	14	0,4205	14,5	13	x 210	2	0,0933	4	4
x 1510	15	0,4505	15,5	14	x 310	3	0,1399	5	4,5
x 1610	16	0,4805	16,5	15	x 410	4	0,1866	6	5,5
x 1810	18	0,5406	18	16,5	x 510	5	0,2332	7,5	6,5
x 2010	20	0,6007	20	18	x 610	6	0,2799	8,5	7,5
400 x 110	1	0,0339	2,5	2,5	x 710	7	0,3265	9,5	8,5
x 210	2	0,0677	3,5	3	x 810	8	0,3732	10,5	9,5
x 310	3	0,1016	4,5	4	x 910	9	0,4198	12	11
x 410	4	0,1355	5,5	5	x 1010	10	0,4665	13	12
x 510	5	0,1693	6	5,5	x 1110	11	0,5131	14,5	12,5
x 610	6	0,2032	7	6,5	x 1410	14	0,6531	17,5	15,5
x 710	7	0,2371	8	7,5	x 1510	15	0,6997	19	17
x 810	8	0,2709	9	8	x 1610	16	0,7464	20	18
x 910	9	0,3048	10,5	9,5	x 1810	18	0,8396	22	19,5
x 1010	10	0,3387	11,5	10,5	x 2010	20	0,9329	24,5	21,5
x 1110	11	0,3725	12,5	11	560 x 110	1	0,0475	3	3
x 1410	14	0,4741	15	13,5	x 210	2	0,0950	4	4
x 1510	15	0,5080	16,5	15	x 310	3	0,1425	5	5
x 1610	16	0,5419	17,5	15,5	x 410	4	0,1900	6,5	5,5
x 1810	18	0,6096	19	17,5	x 510	5	0,2375	7,5	6,5
x 2010	20	0,6773	21	19	x 610	6	0,2850	8,5	7,5
450 x 110	1	0,0381	2,5	2,5	x 710	7	0,3325	9,5	8,5
x 210	2	0,0763	3,5	3,5	x 810	8	0,3800	10,5	9,5
x 310	3	0,1144	4,5	4,5	x 910	9	0,4275	12	11
x 410	4	0,1525	5,5	5	x 1010	10	0,4750	13,5	12
x 510	5	0,1906	6,5	6	x 1110	11	0,5225	14,5	13
x 610	6	0,2288	7,5	7	x 1410	14	0,6650	17,5	15,5
x 710	7	0,2669	8,5	8	x 1510	15	0,7125	19	17
x 810	8	0,3050	9,5	8,5	x 1610	16	0,7600	20	18
x 910	9	0,3431	11	10	x 1810	18	0,8550	22,5	20
x 1010	10	0,3813	12	11	x 2010	20	0,9500	24,5	21,5
x 1110	11	0,4194	13	11,5	600 x 110	1	0,0509	3	3
x 1410	14	0,5338	16	14,5	x 210	2	0,1018	4,5	4
x 1510	15	0,5719	17	15,5	x 310	3	0,1527	5,5	5
x 1610	16	0,6100	18	16,5	x 410	4	0,2036	6,5	6
x 1810	18	0,6863	20	18	x 510	5	0,2545	7,5	7
x 2010	20	0,7625	22	20	x 610	6	0,3054	9	8
500 x 110	1	0,0424	3	2,5	x 710	7	0,3563	10	9
x 210	2	0,0848	4	3,5	x 810	8	0,4073	11	10
x 310	3	0,1272	5	4,5	x 910	9	0,4582	12,5	11,5
x 410	4	0,1695	6	5,5	x 1010	10	0,5091	14	12,5
x 510	5	0,2119	7	6,5	x 1110	11	0,5600	15	13
x 610	6	0,2543	8	7	x 1410	14	0,7127	18,5	16
x 710	7	0,2967	9	8	x 1510	15	0,7636	20	17,5
x 810	8	0,3391	10	9	x 1610	16	0,8145	21	18,5
x 910	9	0,3815	11,5	10,5	x 1810	18	0,9163	23,5	20,5

A x B	Number of blades	Sef [m²]	Weight [kg]		A x B	Number of blades	Sef [m²]	Weight [kg]	
			T3, T2U, T3U	T2				T3, T2U, T3U	T2
600 x 2010	20	1,0181	25,5	22,5	710 x 610	6	0,3617	9,5	8,5
630 x 110	1	0,0535	3	3	x 710	7	0,4220	11	9,5
x 210	2	0,1069	4,5	4	x 810	8	0,4822	12,5	11
x 310	3	0,1604	5,5	5	x 910	9	0,5425	14	12
x 410	4	0,2139	6,5	6	x 1010	10	0,6028	15	13,5
x 510	5	0,2673	8	7	x 1110	11	0,6631	16,5	14,5
x 610	6	0,3208	9	8	x 1410	14	0,8439	20	17,5
x 710	7	0,3742	10,5	9	x 1510	15	0,9042	21,5	19
x 810	8	0,4277	11,5	10	x 1610	16	0,9645	23	20
x 910	9	0,4812	13	11,5	x 1810	18	1,0850	25,5	22
x 1010	10	0,5346	14	12,5	x 2010	20	1,2056	28	24,5
x 1110	11	0,5881	15,5	13,5	750 x 110	1	0,0637	3,5	3,5
x 1410	14	0,7485	19	16,5	x 210	2	0,1274	5	4,5
x 1510	15	0,8019	20,5	18	x 310	3	0,1911	6	5,5
x 1610	16	0,8554	21,5	19	x 410	4	0,2547	7,5	6,5
x 1810	18	0,9623	24	21	x 510	5	0,3184	9	8
x 2010	20	1,0693	26	23	x 610	6	0,3821	10	9
650 x 110	1	0,0552	3,5	3	x 710	7	0,4458	11,5	10
x 210	2	0,1103	4,5	4	x 810	8	0,5095	12,5	11
x 310	3	0,1655	5,5	5	x 910	9	0,5732	14,5	12,5
x 410	4	0,2207	7	6	x 1010	10	0,6369	15,5	13,5
x 510	5	0,2758	8	7	x 1110	11	0,7006	17	15
x 610	6	0,3310	9	8	x 1410	14	0,8916	21	18
x 710	7	0,3862	17,5	15,5	x 1510	15	0,9553	22,5	19,5
x 810	8	0,4413	22	19,5	x 1610	16	1,0190	23,5	20,5
x 910	9	0,4965	24,5	21,5	x 1810	18	1,1464	26,5	23
x 1010	10	0,5517	3	3	x 2010	20	1,2737	29	25
x 1110	11	0,6068	4	4	800 x 110	1	0,0679	3,5	3,5
x 1410	14	0,7723	5	5	x 210	2	0,1359	5	4,5
x 1510	15	0,8275	5,5	5	x 310	3	0,2038	6,5	6
x 1610	16	0,8827	5	5	x 410	4	0,2718	8	7
x 1810	18	0,9930	6	5,5	x 510	5	0,3397	9	8
x 2010	20	1,1033	6,5	6	x 610	6	0,4077	10,5	9
700 x 110	1	0,0594	6,5	5,5	x 710	7	0,4756	12	10,5
x 210	2	0,1189	7,5	6,5	x 810	8	0,5436	13	11,5
x 310	3	0,1783	8,5	7,5	x 910	9	0,6115	15	13
x 410	4	0,2377	9,5	8,5	x 1010	10	0,6795	16,5	14
x 510	5	0,2971	10,5	9,5	x 1110	11	0,7474	17,5	15,5
x 610	6	0,3566	13,5	12	x 1410	14	0,9513	21,5	19
x 710	7	0,4160	17,5	15,5	x 1510	15	1,0192	23,5	20
x 810	8	0,4754	22,5	20	x 1610	16	1,0872	24,5	21,5
x 910	9	0,5348	24,5	21,5	x 1810	18	1,2230	27,5	23,5
x 1010	10	0,5943	3	3	x 2010	20	1,3589	30	26
x 1110	11	0,6537	4,5	4	900 x 110	1	0,0765	4	4
x 1410	14	0,8320	5,5	5	x 210	2	0,1529	5,5	5
x 1510	15	0,8914	5,5	5,5	x 310	3	0,2294	7	6,5
x 1610	16	0,9508	5,5	5	x 410	4	0,3059	8,5	7,5
x 1810	18	1,0697	6	5,5	x 510	5	0,3823	10	8,5
x 2010	20	1,1885	6,5	6	x 610	6	0,4588	11,5	10
710 x 110	1	0,0603	6,5	6	x 710	7	0,5353	13	11
x 210	2	0,1206	7,5	7	x 810	8	0,6117	14	12,5
x 310	3	0,1808	9	8	x 910	9	0,6882	16	14
x 410	4	0,2411	10	9	x 1010	10	0,7647	17,5	15
x 510	5	0,3014	11	10	x 1110	11	0,8411	19	16,5

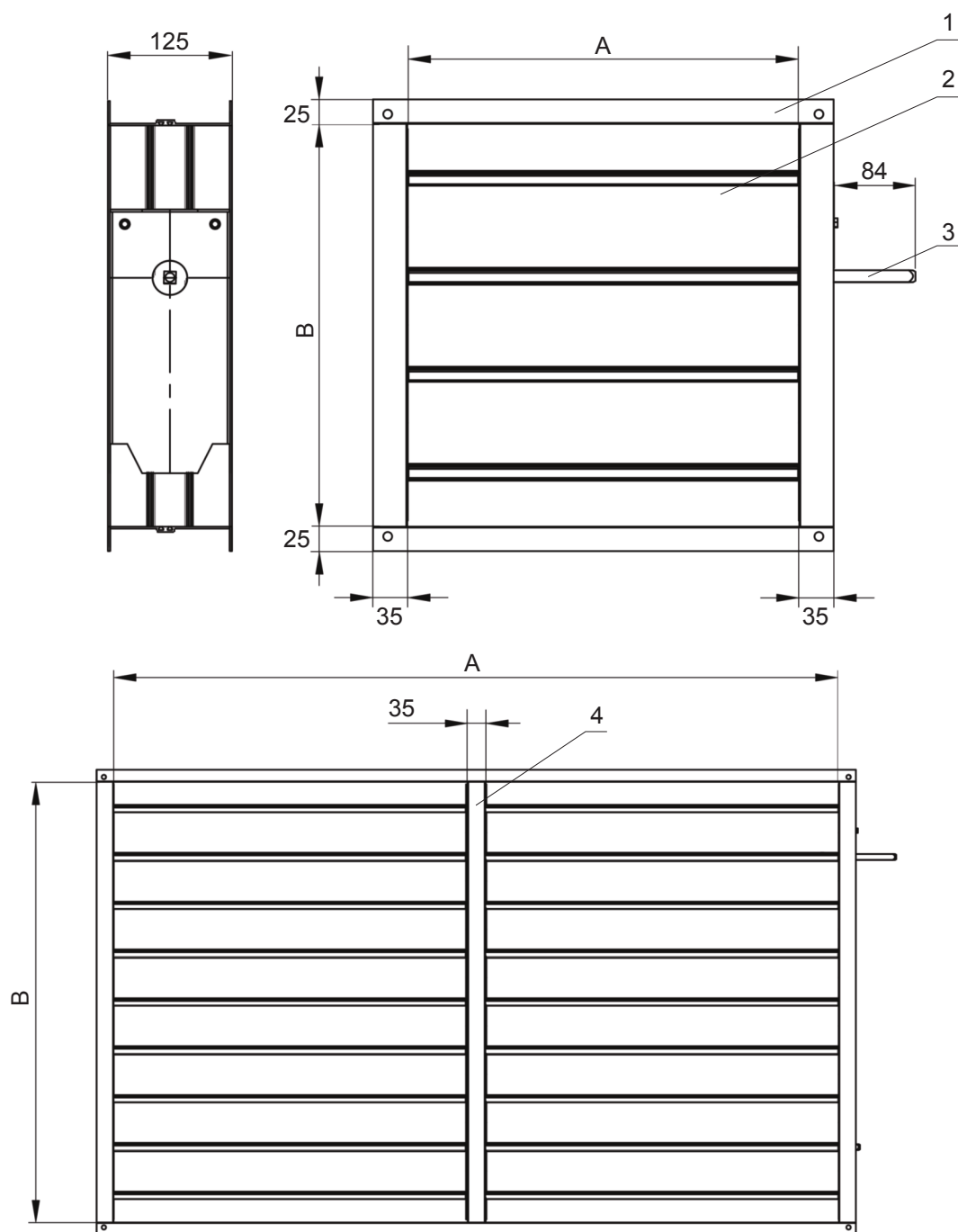
A x B	Number of blades	Sef [m²]	Weight [kg]		A x B	Number of blades	Sef [m²]	Weight [kg]	
			T3, T2U, T3U	T2				T3, T2U, T3U	T2
900 x 1410	14	1,0705	23,5	20	1400 x 510	5	0,5953	13,5	11,5
x 1510	15	1,1470	25	21,5	x 610	6	0,7144	15,5	13
x 1610	16	1,2235	26,5	23	x 710	7	0,8335	17,5	15
x 1810	18	1,3764	29,5	25	x 810	8	0,9525	19,5	16,5
x 2010	20	1,5293	32,5	27,5	x 910	9	1,0716	21,5	18,5
1000 x 110	1	0,0850	4,5	4	x 1010	10	1,1907	23,5	20
x 210	2	0,1700	6	5,5	x 1110	11	1,3097	25,5	21,5
x 310	3	0,2550	7,5	6,5	x 1410	14	1,6669	31,5	26,5
x 410	4	0,3399	9	8	x 1510	15	1,7860	34	28,5
x 510	5	0,4249	10,5	9,5	x 1610	16	1,9051	35,5	30
x 610	6	0,5099	12	10,5	x 1810	18	2,1432	39,5	33
x 710	7	0,5949	13,5	12	x 2010	20	2,3813	43,5	36,5
x 810	8	0,6799	15	13	1500 x 610	12	0,7464	18,5	16,5
x 910	9	0,7649	17	15	x 710	14	0,8707	21	18,5
x 1010	10	0,8499	18,5	16	x 810	16	0,9951	23,5	20,5
x 1110	11	0,9349	20,5	17,5	x 910	18	1,1195	26,5	23
x 1410	14	1,1898	25	21,5	x 1010	20	1,2439	29	25
x 1510	15	1,2748	27	23	x 1110	22	1,3683	31,5	27
x 1610	16	1,3598	28,5	24	x 1410	28	1,7415	38,5	33,5
x 1810	18	1,5298	31,5	27	x 1510	30	1,8659	41,5	36
x 2010	20	1,6997	34,5	29,5	x 1610	32	1,9903	44	38
1100 x 110	1	0,0935	4,5	4,5	x 1810	36	2,2391	49	42
x 210	2	0,1870	6,5	6	x 2010	40	2,4878	53,5	46
x 310	3	0,2805	8	7	1600 x 610	12	0,7975	19,5	17
x 410	4	0,3740	9,5	8,5	x 710	14	0,9304	22	19
x 510	5	0,4675	11,5	10	x 810	16	1,0633	24,5	21,5
x 610	6	0,5610	13	11	x 910	18	1,1962	27,5	24
x 710	7	0,6545	14,5	12,5	x 1010	20	1,3291	30	26
x 810	8	0,7481	16,5	14	x 1110	22	1,4620	32,5	28,5
x 910	9	0,8416	18,5	15,5	x 1410	28	1,8608	40,5	34,5
x 1010	10	0,9351	20	17	x 1510	30	1,9937	43,5	37
x 1110	11	1,0286	21,5	18,5	x 1610	32	2,1266	46	39,5
x 1410	14	1,3091	26,5	22,5	x 1810	36	2,3924	51	43,5
x 1510	15	1,4026	28,5	24	x 2010	40	2,6582	56	48
x 1610	16	1,4961	30	25,5	1800 x 610	12	0,8997	21	18,5
x 1810	18	1,6831	33,5	28,5	x 710	14	1,0497	24	20,5
x 2010	20	1,8701	37	31	x 810	16	1,1996	26,5	23
1250 x 110	1	0,1063	5	5	x 910	18	1,3496	30	26
x 210	2	0,2126	7	6,5	x 1010	20	1,4995	32,5	28
x 310	3	0,3189	9	8	x 1110	22	1,6495	35,5	30,5
x 410	4	0,4251	10,5	9,5	x 1410	28	2,0993	43,5	37
x 510	5	0,5314	12,5	11	x 1510	30	2,2493	47	40
x 610	6	0,6377	14	12	x 1610	32	2,3992	49,5	42
x 710	7	0,7440	16	13,5	x 1810	36	2,6991	55	47
x 810	8	0,8503	18	15	x 2010	40	2,9990	60,5	51,5
x 910	9	0,9566	20	17	2000 x 610	12	1,0020	23	19,5
x 1010	10	1,0629	22	18,5	x 710	14	1,1689	25,5	22
x 1110	11	1,1692	23,5	20	x 810	16	1,3359	28,5	24,5
x 1410	14	1,4880	29	24,5	x 910	18	1,5029	32	27,5
x 1510	15	1,5943	31	26,5	x 1010	20	1,6699	35	30
x 1610	16	1,7006	33	28	x 1110	22	1,8369	38	32,5
x 1810	18	1,9132	36,5	30,5	x 1410	28	2,3379	47	39,5
x 2010	20	2,1257	40	33,5	x 1510	30	2,5049	50,5	42,5
1400 x 110	1	0,1191	5,5	5,5	x 1610	32	2,6719	53,5	45
x 210	2	0,2381	7,5	7	x 1810	36	3,0059	59	50
x 310	3	0,3572	9,5	8,5	x 2010	40	3,3398	65	55
x 410	4	0,4763	11,5	10					

Atypical dimensions are supplied only for the dampers with the blades in design T2 and T3.

S_{ef} - effective area for fully opened damper.

The weights listed in the table are valid for the basic version (manually controlled). The weight of the servo actuator must be added to all other versions - see table 5.1.1. and 5.1.2.

Fig. 3 Damper dimensions



Position:

- 1. Damper body
- 2. Damper blade

- 3. Control rod
- 4. Divider (only for dampers where A > 1400)

Fig. 4 Damper dimensions

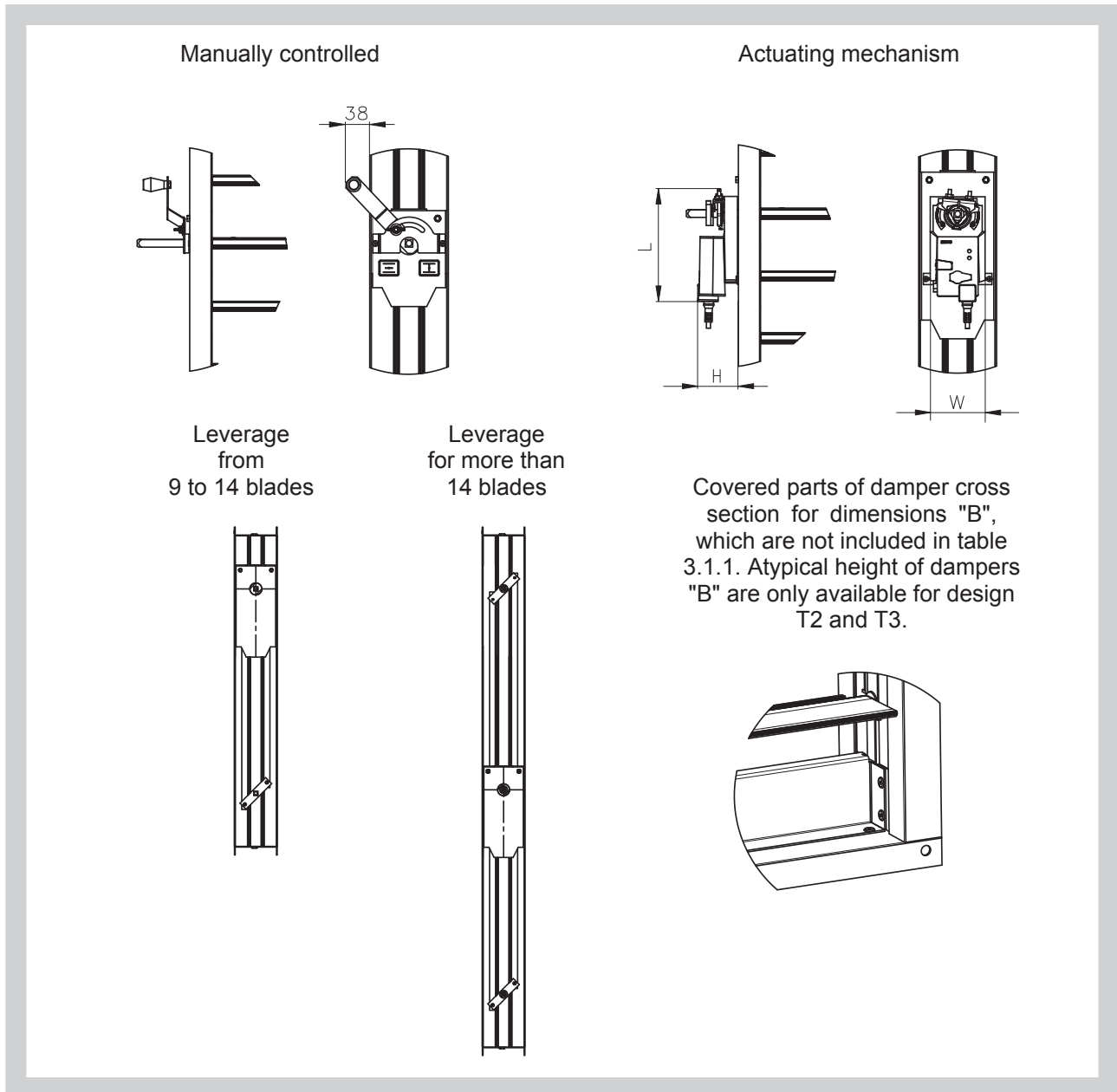
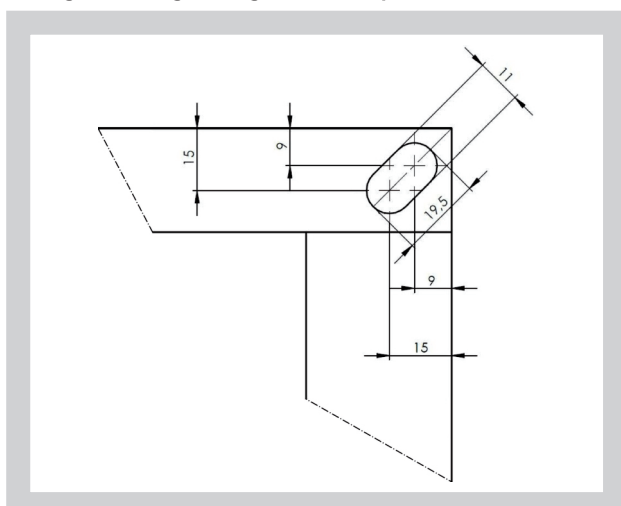


Fig. 5 Flange of regulation damper



3.2. Dampers are provided square-shaped pin of cross-section 12x12 mm,

4. Placement and installation

- 4.1. The dampers are designed to be installed into the air duct. The blades can be used in any orientation.
- 4.2. The actuator requires a 250 mm clearance (minimum).

III. TECHNICAL DATA

5. Electrical elements, wiring diagram

- 5.1. Types and weights of servo actuators for control of dampers

Tab. 5.1.1. Type of actuating mechanism for individually dampers T2 a T2U

Dampers	Type of servo actuator	Position signal	Torque	Weight of actuator [kg]	Dimensions L x H x W
Up to 1 m ²	Belimo LM 230A-S (.46)	YES	5 Nm	0,6	116 x 64 x 88
	Belimo LM 230A (.45)	NO		0,5	
	Belimo LM 24A-S (.56)	YES		0,6	
	Belimo LM 24A (.55)	NO		0,5	
	Belimo LM 24A-SR (.57)	YES		0,5	
Up to 2 m ²	Belimo NM 230A-S (.46)	YES	10 Nm	0,85	124 x 62 x 80
	Belimo NM 230A (.45)	NO		0,8	
	Belimo NM 24A-S (.56)	YES		0,85	
	Belimo NM 24A (.55)	NO		0,75	
	Belimo NM 24A-SR (.57)	YES		0,8	
Up to 4 m ²	Belimo SM 230A-S (.46)	YES	20 Nm	1,1	139 x 64 x 88
	Belimo SM 230A (.45)	NO		1,05	
	Belimo SM 24A-S (.56)	YES		1,05	
	Belimo SM 24A (.55)	NO		1	
	Belimo SM 24A-SR (.57)	YES		1,05	

Tab. 5.1.2. Type of actuating mechanism for individually dampers T3 a T3U

Dampers	Type of servo actuator	Position signal	Torque	Weight of actuator [kg]	Dimensions L x H x W
Up to 1 m ²	Belimo NM 230A-S (.46)	YES	10 Nm	0,85	124 x 62 x 80
	Belimo NM 230A (.45)	NO		0,80	
	Belimo NM 24A-S (.56)	YES		0,85	
	Belimo NM 24A (.55)	NO		0,75	
	Belimo NM 24A-SR (.57)	YES		0,80	
Up to 2 m ²	Belimo SM 230A-S (.46)	YES	20 Nm	1,10	139 x 64 x 88
	Belimo SM 230A (.45)	NO		1,05	
	Belimo SM 24A-S (.56)	YES		1,05	
	Belimo SM 24A (.55)	NO		1,00	
	Belimo SM 24A-SR (.57)	YES		1,05	
Up to 4 m ²	Belimo GM 230A-S (.46)	YES	40 Nm	1,80	179 x 70 x 116
	Belimo GM 230A (.45)	NO		1,70	
	Belimo GM 24A-S (.56)	YES		1,80	
	Belimo GM 24A (.55)	NO		1,70	
	Belimo GM 24A-SR (.57)	YES		1,70	

5.2. Supply voltage and power input.

Tab. 5.2.1. Supply voltage and power input

Type of actuator	Supply voltage	Power input		
		In operation	Resting position	Dimensioning
LM 230A, LM 230A-S	AC 100 ... 240 V, 50/60 Hz	1,5 W	0,4 W	4 VA
LM 24A, LM 24A-S	AC 24 V, 50/60 Hz; DC 24 V	1,0 W	0,2 W	2 VA
LM 24A-SR	AC 24 V, 50/60 Hz; DC 24 V	1,0 W	0,4 W	2 VA
NM 230A, NM 230A-S	AC 100 ... 240 V, 50/60 Hz	2,5 W	0,6 W	6 VA
NM 24A, NM 24A-S	AC 24 V, 50/60 Hz; DC 24 V	1,5 W	0,2 W	3,5 VA
NM 24A-SR	AC 24 V, 50/60 Hz; DC 24 V	2,0 W	0,4 W	4 VA
SM 230A, SM 230A-S	AC 100 ... 240 V, 50/60 Hz	2,5 W	0,6 W	6 VA
SM 24A, SM 24A-S	AC 24 V, 50/60 Hz; DC 24 V	2,0 W	0,2 W	4 VA
SM 24A-SR	AC 24 V, 50/60 Hz; DC 24 V	2,0 W	0,4 W	4 VA
GM 230A, GM 230A-S	AC 100 ... 240 V, 50/60 Hz	4,5 W	2,0 W	7 VA
GM 24A, GM 24A-S	AC 24 V, 50/60 Hz; DC 24 V	4,5 W	2,0 W	7 VA
GM 24A-SR	AC 24 V, 50/60 Hz; DC 24 V	4,5 W	2,0 W	7 VA

5.3. Wiring diagram of servo actuators Belimo

Fig. 6 Wiring diagram of servo actuators Belimo LM 230A, NM 230A, SM 230A a GM 230A

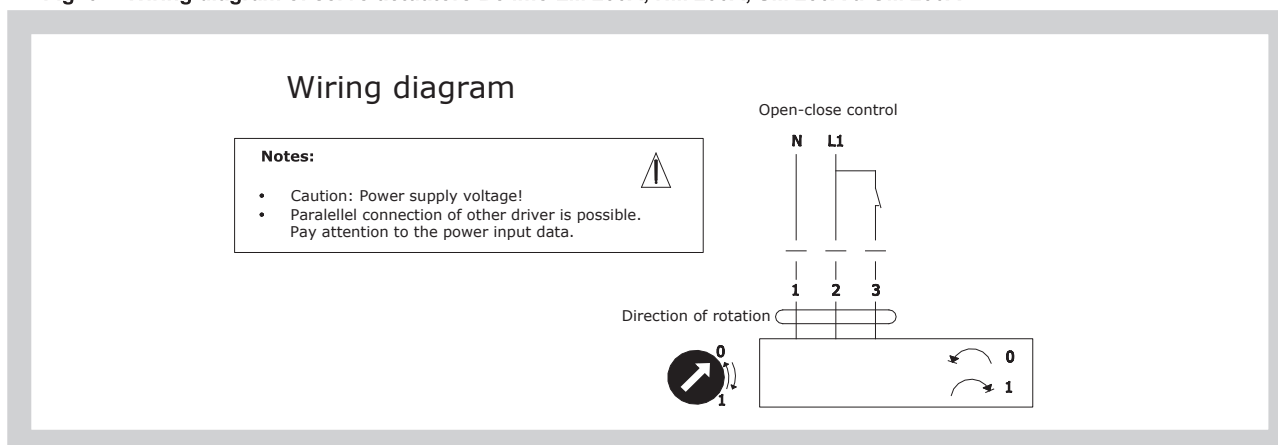


Fig. 7 Wiring diagram of servo actuators Belimo LM 230A-S, NM 230A-S, SM 230A-S a GM 230A-S

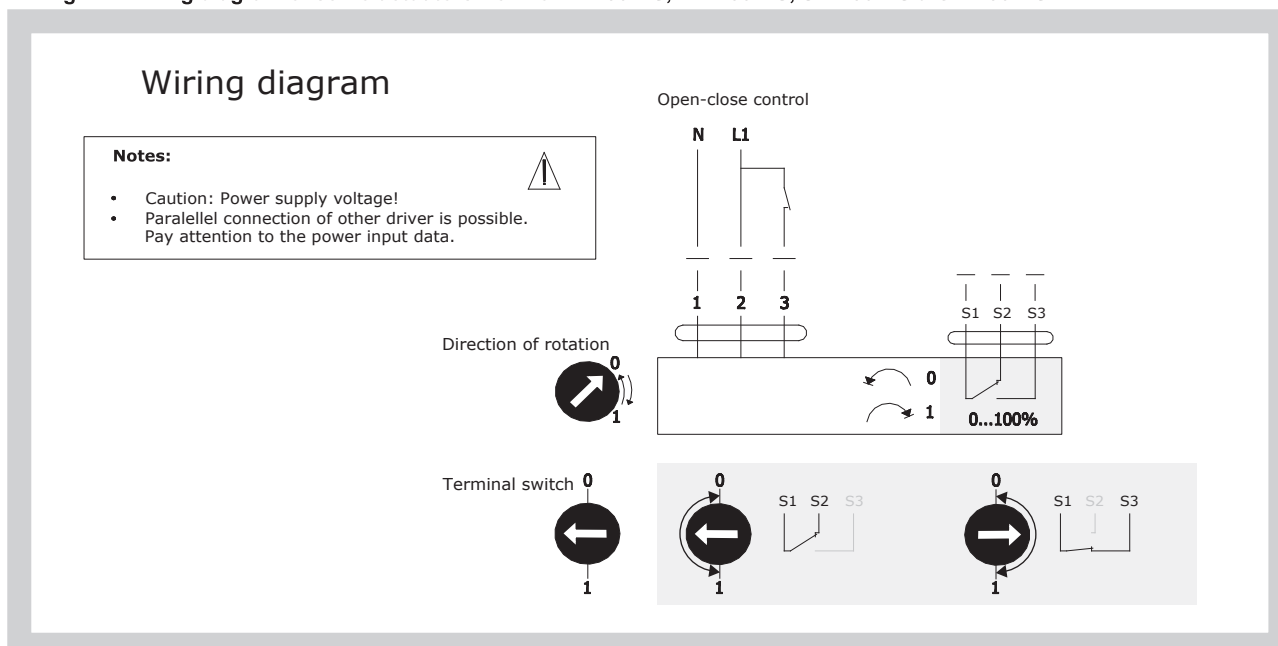


Fig. 8 Wiring diagram of servo actuators Belimo LM 24A, NM 24A, SM 24A a GM 24A

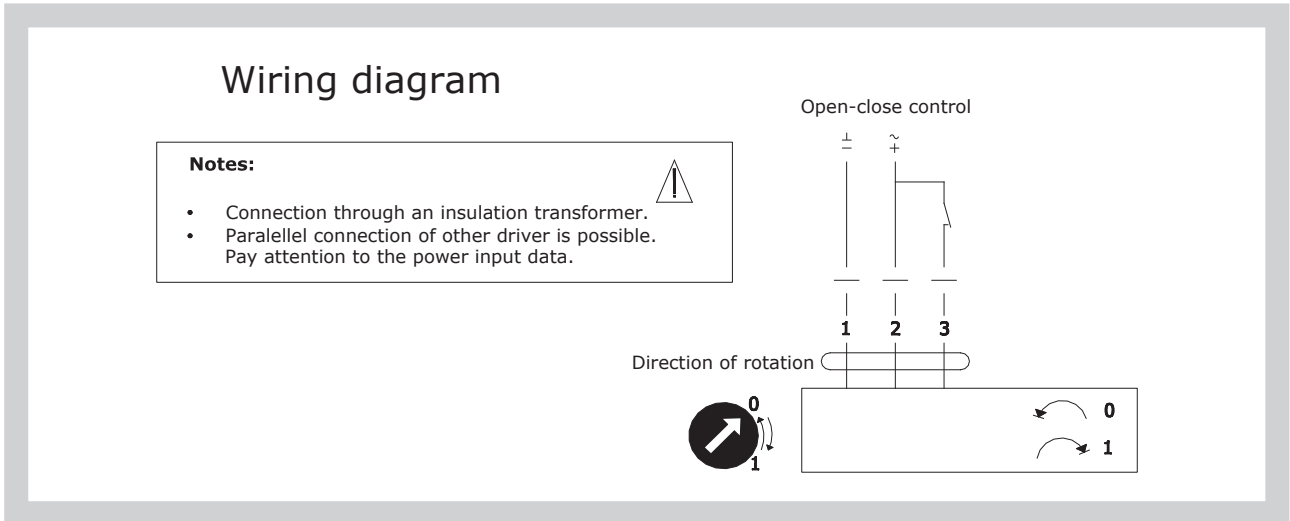


Fig. 9 Wiring diagram of servo actuators Belimo LM 24A-S, NM 24A-S, SM 24A-S a GM 24A-S

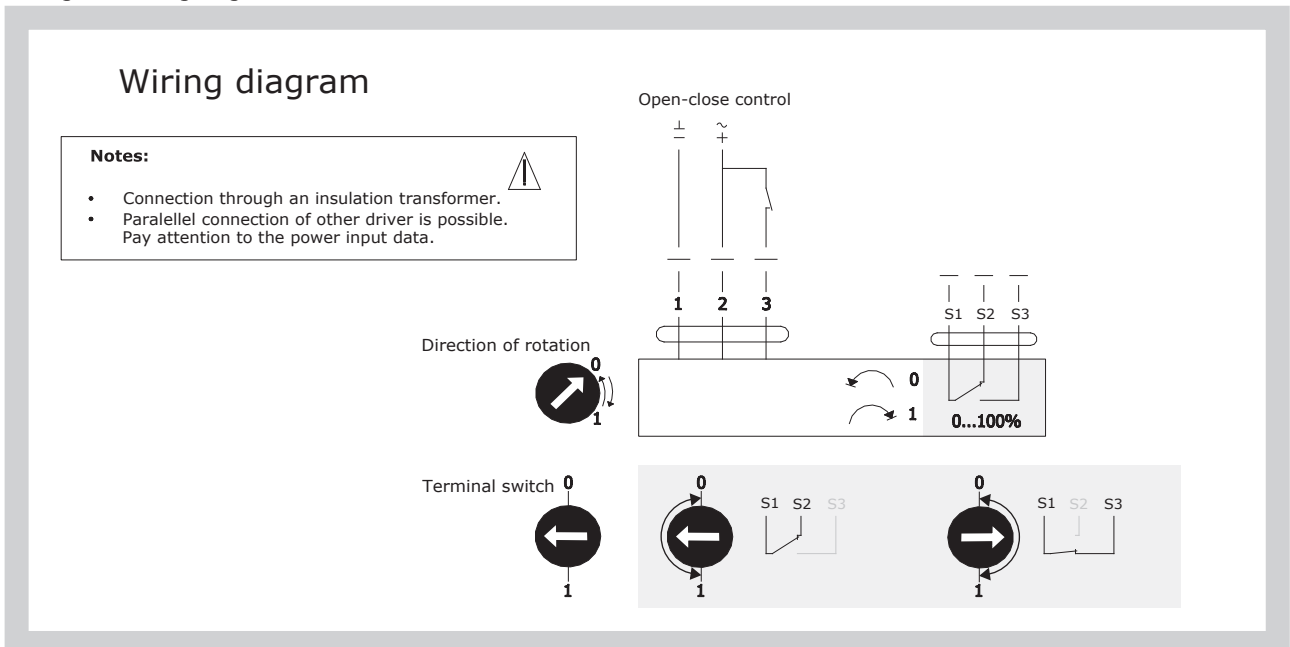
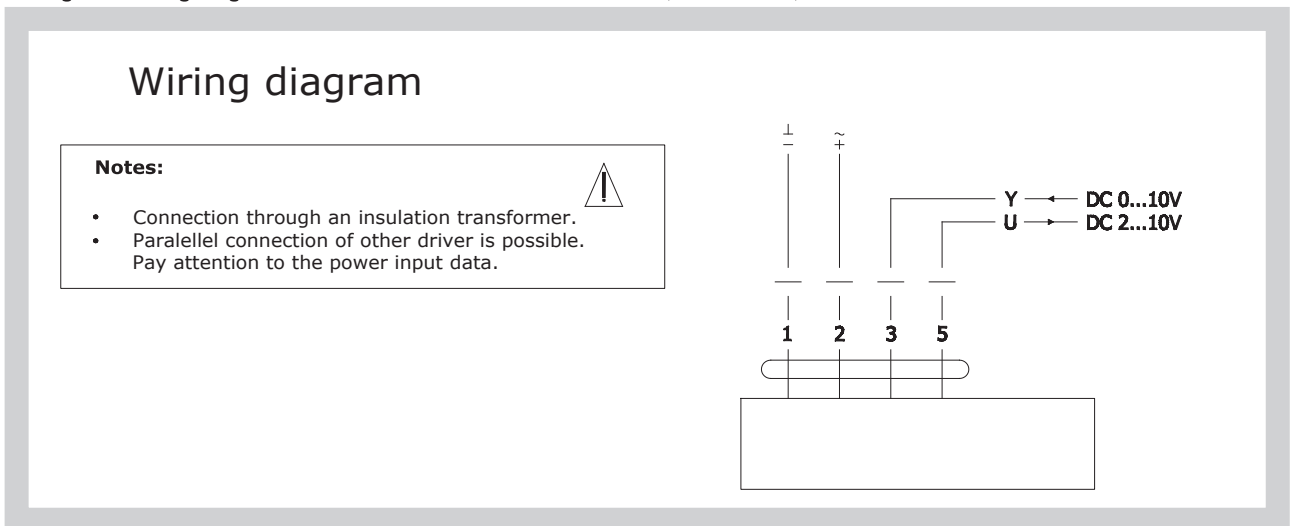


Fig. 10 Wiring diagram of servo actuators Belimo LM 24A-SR, NM 24A-SR, SM 24A-SR a GM 24A-SR



6. Pressure lost

6.1. Pressure lost depending on the angle of damper blade

Diagram 6.1.1. Regulation damper inserted into the duct T2

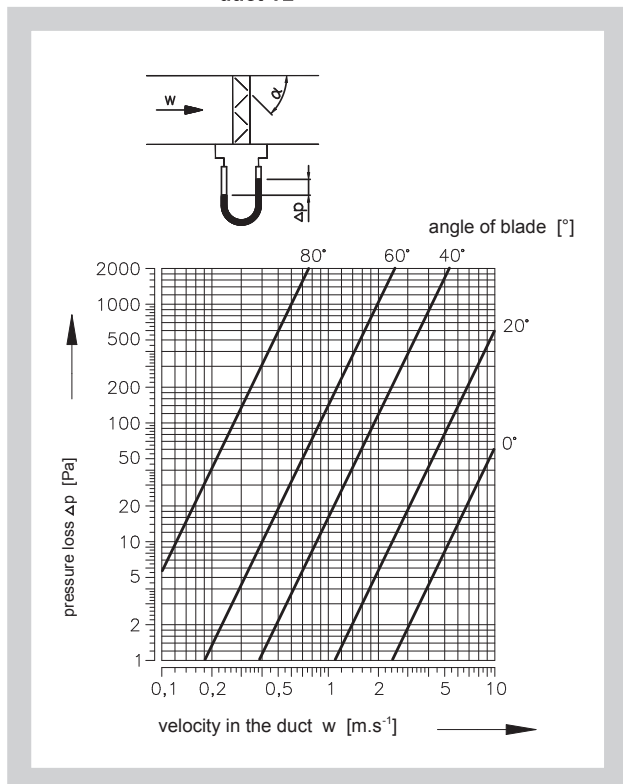


Diagram 6.1.2. Regulation damper attached to the end of the duct T2

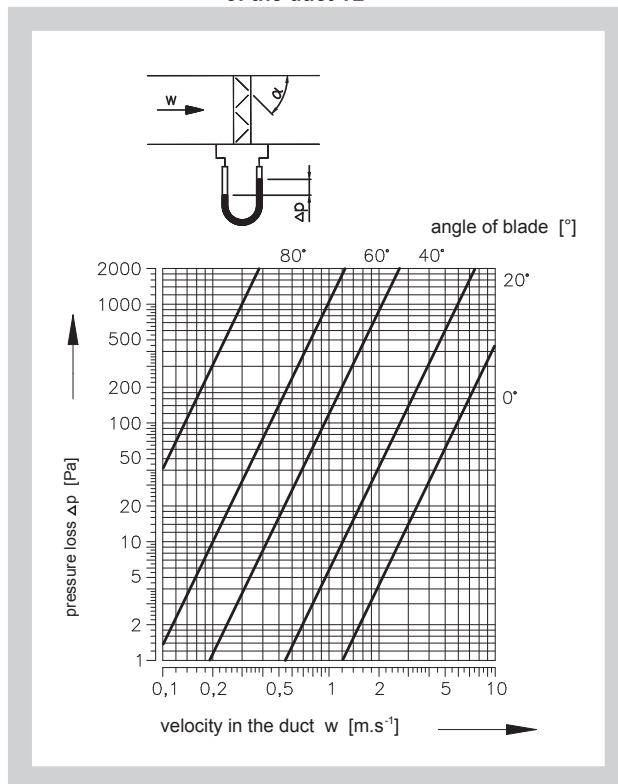


Diagram 6.1.3. Regulation damper inserted into the duct T2U, T3, T3U

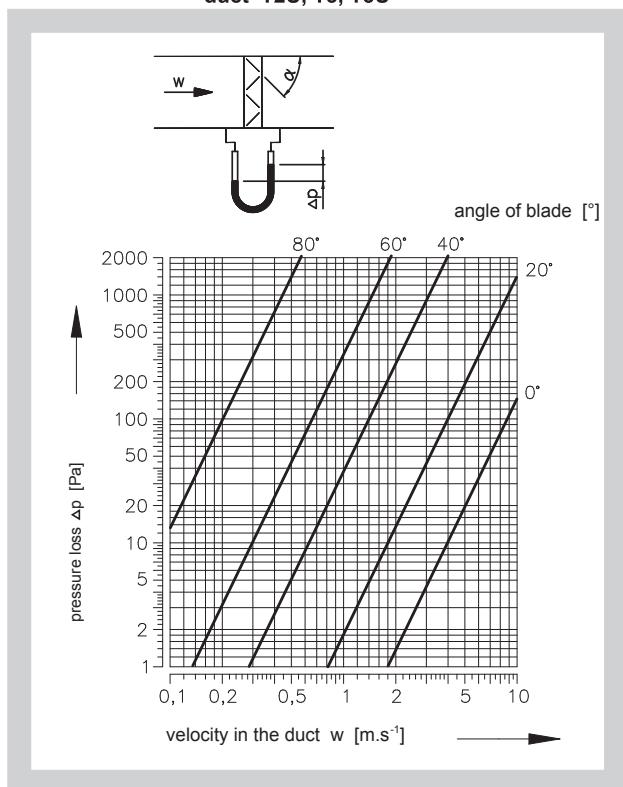
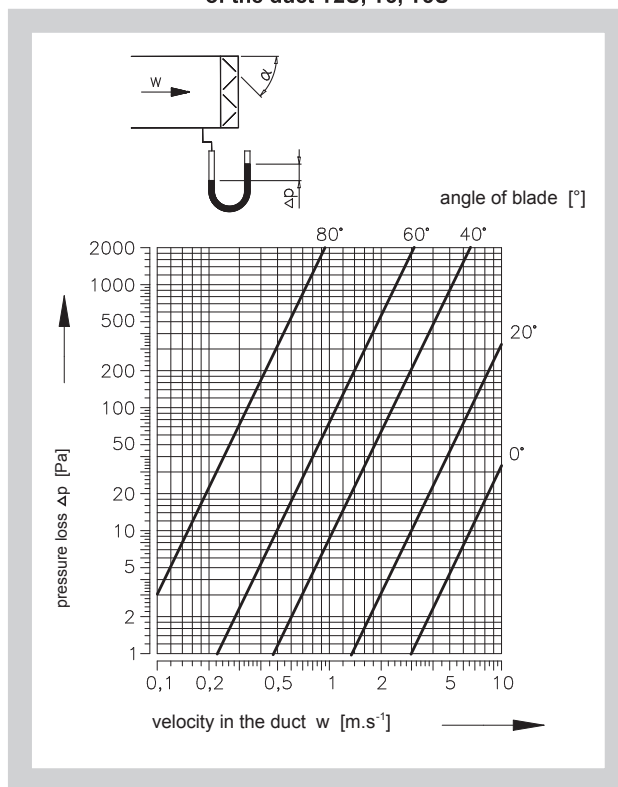


Diagram 6.1.4. Regulation damper attached to the end of the duct T2U, T3, T3U



\dot{V} [m³.h⁻¹] volumetric airflow
 w [m.s⁻¹] velocity of air flow

Δp [Pa] pressure lost at $\rho = 1,2 \text{ kg.m}^{-3}$
 α [°] angle of blade

IV. MATERIAL, FINISHING

7. Material

- 7.1. The frame and blades are made of aluminium EN AW 6060 T6, the pins are made of plastic, the pins for actuating are made of galvanized steel. Gears are made of polypropylene.

Gasket for dampers with internal leakage class 2 is made of TPE-V + PP.

Gasket for dampers with internal leakage class 3 is made of TPE-V.

- 7.2. The damper has no other surface treatment.

V. INSTALLATION, OPERATION, INSPECTION AND TESTING

8. Incorrect use

- 8.1. RKALM damper is not intended to be used in:
- outdoors, without appropriate protection against effects of weather conditions
 - in rooms with high humidity, freezy conditions or with impact of aggressive or dusty air
 - in area with risk of explosive atmosphere

9. Installation

- 9.1. Installation of RKALM must be provided by professional mechanic on the wall or on the air ductwork.

Electrical connections (wiring) have to be installed according to wiring diagram, by professional electrician.

When the installation is ready, then anyone **must be prevented against inserting of hands or fingers in between opened blades**, by for example protection grills on both sites.

Condensing water or freeze in between blades must be pre-empted, while it may damage the functionality of the damper.

The RKALM with electric actuator can be operated also manually when needed, by pushing the black button and turning the orange ring or using the inner screwdriver inserted into the white plastic wheel. This will allow to turn manually the actuator and consequently the blades (Fig. 11).

Fig. 11



10. Maintenance

- 10.1.** RKALM damper is maintenance free.
Actuating mechanism and the operational systems should be only checked in open and close positions once per year.
The aim of this regular check is to ensure, that there is no grime or other extraneous elements blocking repositioning of blades (in both ON/OFF extreme positions).
The damper should be subject of regular cleaning process.

11. Inspection

- 11.1.** Dimensions are checked using regular rulers according to the standard applicable to dimensions without defined tolerances used in air-handling and ventilation sectors.
- 11.2.** Intraoperational inspections of the parts and main dimensions according to the drawing documentation are performed.

12. Testing

- 12.1.** After assembly, the operation of the blade and of electrical actuators is performed.

VI. PACKING, TRANSPORT, STORAGE

13. Logistical data

- 13.1.** The delivery includes a complete damper including the control mechanism.
- 13.2.** The dampers are transported as bulk cargo, using suitable covered means of transport. When agreed upon with the manufacturer, the dampers can be loaded onto pallets or wooden crates. Dampers must be protected from mechanical damage during transport and storage. If packing is used, it is non-returnable and its price is not included in the price of the damper.
- 13.3.** If not otherwise agreed, the handover is considered when the goods is forwarded to the carrier.
- 13.4.** The dampers must be stored in the indoor 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.

VII. ASSEMBLY

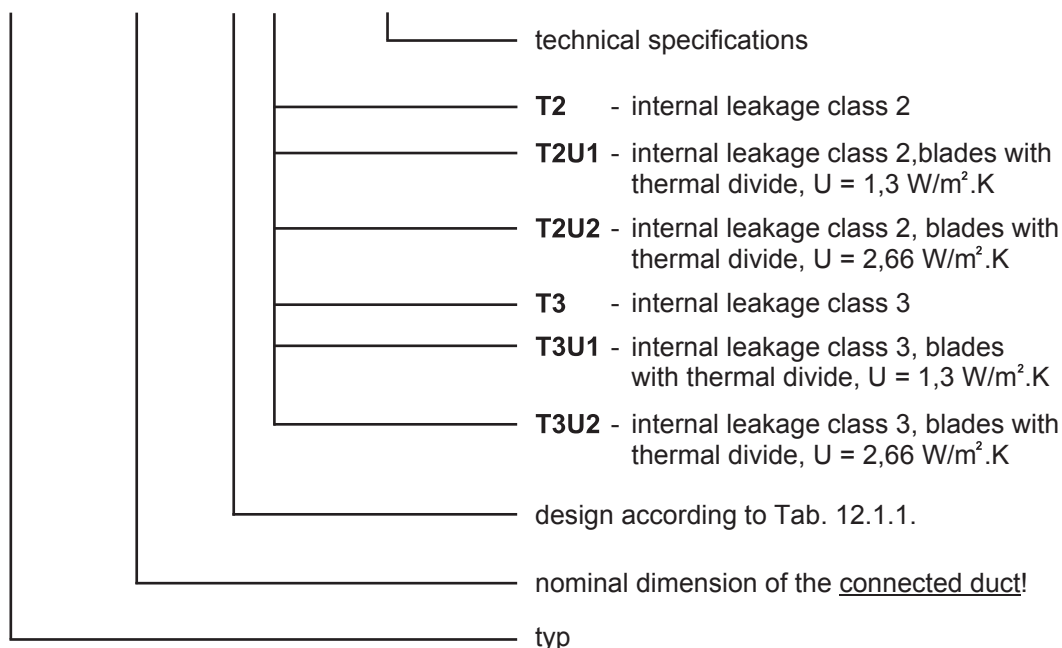
14. Assembly

- 14.1.** The assembly consists of installation of the damper into the air duct, with connection of optional servo actuator to the mains.

VIII. ORDERING INFORMATION

12. Ordering key

RKALM 500x410 - .45/T2 TPM 119/16



Tab. 12.1.1. Damper design

Version of damper – type of control	Additional two digits
Manually controlled	.01
To fit actuator drive	.09
Actuator with emergency function 230V	.43*
Actuator controlled 230V, two point regulation - without position signal	.45
Actuator controlled 230V, two point regulation - with position signal	.46
Actuator with emergency function 230V - with position signal	.48*
Actuator with emergency function 24V	.53*
Actuator controlled 24V, two point regulation - without position signal	.55
Actuator controlled 24V, two point regulation - with position signal	.56
Actuator controlled 24V SR with smooth regulation	.57
Actuator with emergency function 24V - with position signal	.58*

* design is available on request, is necessary to specify the position of the damper blade (open or closed) without voltage.

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