



SPRING HANGERS



WITZENMANN



Selection

The following table indicates the possible load (required load Fs) for each VH-size depending on the hanger travel and based on the respective nominal travel sn (50, 100 eller 200 mm). The maximum load corresponds with the nominal load Fn of the variable spring hanger. The required travel of the variable spring hanger corresponds with the vertical movement of the connected plant component due to temperature.

The load variation between cold and hot position, unavoidable in variable spring hangers, causes additional strain to the supported component. In order to limit such additional load to 25% of the operating load, the recommended working travels should not be exceeded (VGB-R 510L) which corresponds to the design criteria of the American specification MSS Standard Practices. In addition, travel reserves of at least 20% of the required travel ss or of 5 mm as absolute minimum should be added to each limit (requirement according to VGB-R 510 and KTA 3205.3).

To save money, it makes sense to choose the load range between the hot and the cold state as close as possible to the nominal load.

Example of requirement

Variable spring hanger with double lug (standard)

Operating load: Fw = 90 kN

Required travel, downwards: Ss = 25 mm

Locking at: Cold load Fk

Selection

In case of downward required travel, the operating load occurs at higher load; it is kept as close as possible to the nominal load. Result, VH-size 11, nominal travel Sn 100 mm (from recommended working travel $\geq Ss = 25$ mm) with cold load 73.2 kN. Travel reserve: 15 mm. Load variation: $\Delta F = 16.8$ kN corresponding to 19% of Fw (read from load/travel table or calculated by means of spring rate: $\Delta F = R * Ss$) Installation dimension E for preset hanger, preset distance Sv = 60 mm corresponding to hanger travel at cold load (from the following table).

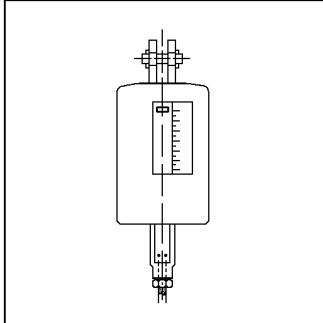
Installation dimension: $E = E^* + Sv = 705 + 60$
 $E = 765$ mm

Nominal travel Sn			VH-size															
50	100	200	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
Hanger travel Service travel mm			Required load Fs depending on travel kN															
0	5	0	0.16	0.32	0.66	1.30	2.30	3.90	6.60	10.9	16.5	23.0	33.0	43.6	66.0	92.0	132	165
2.5	5	5	0.18	0.35	0.73	1.44	2.54	4.31	7.27	12.0	18.2	25.4	36.4	48.0	72.7	101	145	182
5.0	7.5	10	0.19	0.39	0.79	1.57	2.77	4.71	7.94	13.1	19.9	27.7	39.7	52.4	79.4	111	159	199
7.5	7.5	15	0.21	0.42	0.86	1.71	3.01	5.12	8.61	14.2	21.5	30.1	43.1	56.9	86.1	120	172	215
10.0	7.5	20	0.23	0.46	0.93	1.84	3.24	5.52	9.28	15.3	23.2	32.4	46.4	61.3	92.8	130	186	232
12.5	7.5	25	0.25	0.49	1.00	1.98	3.48	5.93	9.95	16.4	24.9	34.8	49.8	65.7	99.5	139	199	249
15.0	10	30	0.26	0.52	1.06	2.11	3.71	6.33	10.6	17.5	26.6	37.1	53.1	70.1	106	148	212	266
17.5	10	35	0.28	0.56	1.13	2.25	3.95	6.74	11.3	18.6	28.2	39.5	56.5	74.5	113	158	226	282
20.0	10	40	0.30	0.59	1.20	2.38	4.18	7.14	12.0	19.7	29.9	41.8	59.8	79.0	120	167	239	299
22.5	10	45	0.31	0.63	1.26	2.52	4.42	7.55	12.6	20.8	31.6	44.2	63.2	83.4	126	177	253	316
25.0	12.5	50	0.33	0.66	1.33	2.65	4.65	7.95	13.3	22.0	33.3	46.5	66.5	87.8	133	186	266	333
27.5	12.5	55	0.35	0.69	1.40	2.79	4.89	8.36	14.0	23.1	34.9	48.9	69.9	92.2	140	195	279	349
30.0	12.5	60	0.36	0.73	1.46	2.92	5.12	8.76	14.6	24.2	36.6	51.2	73.2	96.6	146	205	293	366
32.5	12.5	65	0.38	0.76	1.53	3.06	5.36	9.17	15.3	25.3	38.3	53.6	76.6	101	153	214	306	383
35.0	15	70	0.40	0.80	1.60	3.19	5.59	9.57	16.0	26.4	40.0	55.9	79.9	105	160	224	320	400
37.5	15	75	0.42	0.83	1.67	3.33	5.83	9.98	16.7	27.5	41.6	58.3	83.3	110	167	233	333	416
40.0	15	80	0.43	0.86	1.73	3.46	6.06	10.4	17.3	28.6	43.3	60.6	86.6	114	173	242	346	433
42.5	15	85	0.45	0.90	1.80	3.60	6.30	10.8	18.0	29.7	45.0	63.0	90.0	119	180	252	360	450
45.0	15	90	0.47	0.93	1.87	3.73	6.53	11.2	18.7	30.8	46.7	65.3	93.3	123	187	261	373	467
47.5	15	95	0.48	0.97	1.93	3.87	6.77	11.6	19.3	31.9	48.3	67.7	96.7	128	193	271	387	483
50.0	15	100	0.50	1.00	2.00	4.00	7.00	12.0	20.0	33.0	50.0	70.0	100	132	200	280	400	500
Nominal travel Sn Load group LGV			Thread sizes															
			12	12	12	12	12	16	20	24	30	36	42	48	64	72	80	90

		Spring rates R in N/mm															
Nominelsize	50	6.8	13.6	26.8	54	94	162	268	442	670	940	1340	1768	2680	3760	5360	6700
	100	3.4	6.8	13.4	27	47	81	134	221	335	470	670	884	1340	1880	2680	3350
	200	1.7	3.4	6.7	13.5	23.5	40.5	67	110.5	167.5	235	335	442	670	940	1340	1675

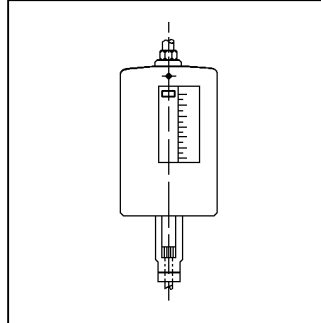


FHD



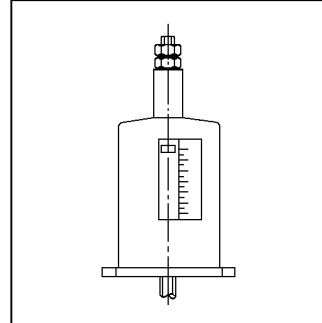
Variable spring hangers with double lug (including bolt) is suitable for direct connection to a hanging suspension structure – only by means of Weld-Tech or clamp lugs without additional connecting parts. The load can be set by turning the hanger turnbuckle.

FHG



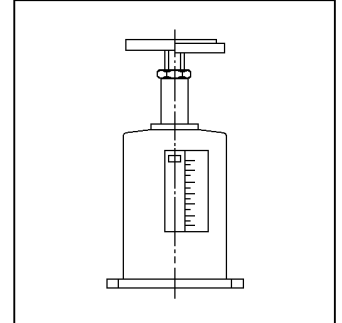
Variable spring hangers with threaded connection are suitable for installation at a required level by inserting a fitting threaded rod as vertical connection to the superior steel structure. This rod is connected to the suspension structure by a clevis and a weld or clamp lug, or by use of a square plate with spherical washer, by means of hexnuts. The load can be set by turning the hanger turnbuckle.

FHS



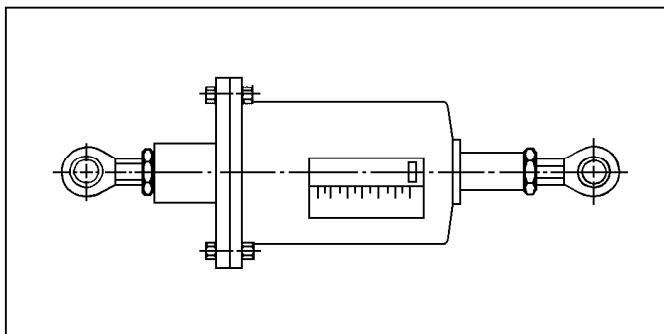
Variable spring hangers for continuous tie rods are suitable for mounting on the suspending steel structure, to which they are fixed by bolts. The load is transferred by the through-rod and the screwed-on nuts. The load can be set by turning the nuts.

FSS/FSP



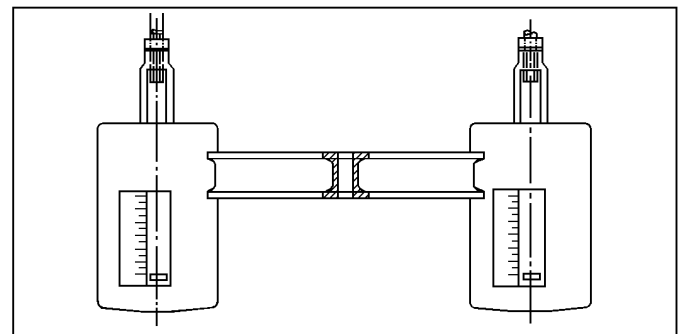
Variable spring supports with supporting plate absorb load from above. They are mounted on the steel structure by fixing the foot plate with bolts. The load is transferred to the support plate of the spring supports by a sliding or insulation shoe with flat contact surface. If lateral movements may occur, supports with PTFE slide plate (type range FSP) should be selected.

FSG



Angulating spring support absorb the load as compression force and transfer it to the suspension by spherical sway heads. Greater lateral shifting of the components to be suspended, combined with low lateral forces are thus made possible. The use of these devices is acceptable only if the inherent stiffness of the component to be suspended is sufficient to secure it in its position.

FDT



Trapeze-type hangers are suitable for the supporting of pipes near the underneath suspension steel structure. Pipes can be equipped with a suitable pipe shoe and then be placed on the trapeze. The load can be set by turning the hanger turnbuckle.



**Variable Spring Hanger with double lug
Type FHD**

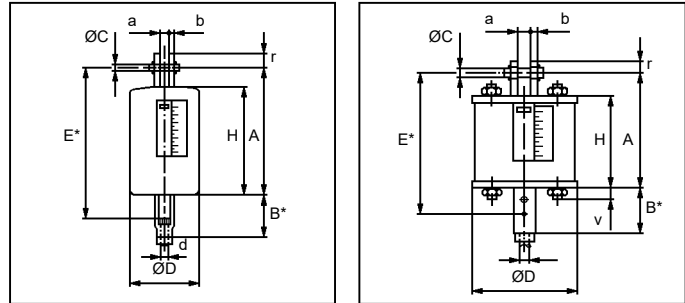
Standard version:

Hanger preset, galvanized housing and connecting parts, alkyd-painted spring.

Options:

Hanger not preset, hot-dip galvanized housing and additional terosone coating of the spring, inch thread.

Order example: FDH 11.100.42 (standard)



VH size	Nominal travel Sn mm	Nominal load Fn kN	Type FHD...	Spring rate R N/mm	Load group LGV	Instal. dimen. E* mm	Main dimensions				Connection dimensions						Weight ca. kg
							A mm	B* mm	D mm	H mm	a mm	b mm	c mm	d mm	r mm	v mm	
01	50	0.5	01.050.12	6.8	12	225	190	85	110	160	15	5	12	M12	12		3
	100		01.100.12	3.4		300	265			235							4
	200		01.200.12	1.7		470	435			405							5
02	50	1	02.050.12	13.6	12	225	190	85	110	160	15	5	12	M12	12		3
	100		02.100.12	6.8		300	265			235							4
	200		02.200.12	3.4		470	435			405							5
03	50	2	03.050.12	26.8	12	230	195	85	120	165	15	5	12	M12	12		4
	100		03.100.12	13.4		300	265			235							5
	200		03.200.12	6.7		480	445			415							8
04	50	4	04.050.12	54.0	12	230	195	85	120	165	15	5	12	M12	12		4
	100		04.100.12	27.0		300	265			235							5
	200		04.200.12	13.5		480	445			415							8
05	50	7	05.050.12	94.0	12	285	245	85	155	205	20	6	12	M12	20		8
	100		05.100.12	47.0		380	340			300							10
	200		05.200.12	23.5		610	570			530							15
06	50	12	06.050.16	162.0	16	295	245	110	155	205	20	6	16	M16	20		9
	100		06.100.16	81.0		390	340			300							11
	200		06.200.16	40.5		620	570			530							19
07	50	20	07.050.20	268.0	20	340	285	130	180	240	24	8	20	M20	25		17
	100		07.100.20	134.0		440	385			340							22
	200		07.200.20	67.0		685	630			585							32
08	50	33	08.050.24	442.0	24	410	335	160	230	280	30	10	24	M24	30		32
	100		08.100.24	221.0		525	450			395							39
	200		08.200.24	110.5		795	720			665							63
09	50	50	09.050.30	670.0	30	500	425	175	260	345	48	15	33	M30	50		54
	100		09.100.30	335.0		635	560			480							67
	200		09.200.30	167.5		980	905			825							101
10	50	70	10.050.36	940	36	500	425	180	260	345	48	15	40	M36	50		59
	100		10.100.36	470		635	560			480							77
	200		10.200.36	235		980	905			825							117
11	50	100	11.050.42	1340	42	560	480	205	280	400	48	15	45	M42	50		101
	100		11.100.42	670		705	625			545							126
	200		11.200.42	335		1095	1015			935							186
12	50	132	12.050.48	1768	48	485	485	200	490	295	50	20	50	M48	90	30	206
	100		12.100.48	884		595	405			405							236
	200		12.200.48	442		870	870			680							311
13	50	200	13.050.64	2680	64	610	495	270	560	365	50	20	70	M64	100	35	318
	100		13.100.64	1340		745	630			500							363
	200		13.200.64	670		1090	975			845							501
14	50	280	14.050.72	3760	72	640	535	265	620	385	50	25	80	M72	120	40	460
	100		14.100.72	1880		775	670			520							528
	200		14.200.72	940		1115	1010			860							692
15	50	400	15.050.80	5360	80	715	610	270	720	440	60	25	90	M80	135	50	730
	100		15.100.80	2680		860	755			585							832
	200		15.200.80	1340		1250	1145			975							1086
16	50	500	16.050.90	6700	90	955	610	525	720	440	60	25	100	M90	150	50	816
	100		16.100.90	3350		1100	755			585							912
	200		16.200.90	1675		1490	1145			975							1222

*Measurements refer to initial position at minimum load (not preset); the distance changes exactly the same as the preset travel.



Variable Spring Hanger with threaded connection Type FHG

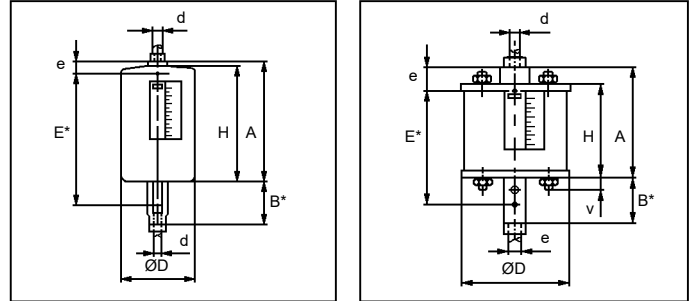
Standard version:

Hanger preset, galvanized housing and connecting parts, alkyd-painted spring.

Options:

Hanger not preset, hot-dip galvanized housing and additional terrosone coating of the spring, inch thread.

Order example: FHG 11.100.42 (standard)



VH size	Nominal travel Sn mm	Nominal load Fn kN	Type FHD...	Spring rate R N/mm	Load group LGV	Instal. dimen. E* mm	Main dimensions				Connecting dimensions			Weight ca. kg
							A mm	B mm	D mm	H mm	d mm	e mm	v mm	
01	50	0.5	01.050.12	6.8	12	180	170	85	110	160	M12	27		3
	100		01.100.12	3.4		255	245			235				4
	200		01.200.12	1.7		425	415			405				5
02	50	1	02.050.12	13.6	12	180	170	85	110	160	M12	27		3
	100		02.100.12	6.8		255	245			235				4
	200		02.200.12	3.4		425	415			405				6
03	50	2	03.050.12	26.8	12	185	175	85	120	165	M12	27		4
	100		03.100.12	13.4		255	245			235				5
	200		03.200.12	6.7		435	425			415				7
04	50	4	04.050.12	54.0	12	185	175	85	120	165	M12	27		4
	100		04.100.12	27.0		255	245			235				5
	200		04.200.12	13.5		435	425			415				8
05	50	7	05.050.12	94.0	12	225	220	85	155	205	M12	33		8
	100		05.100.12	47.0		320	315			300				10
	200		05.200.12	23.5		550	545			530				15
06	50	12	06.050.16	162.0	16	235	220	110	155	205	M16	35		9
	100		06.100.16	81.0		330	315			300				11
	200		06.200.16	40.5		560	545			530				18
07	50	20	07.050.20	268.0	20	265	250	130	180	240	M20	44		17
	100		07.100.20	134.0		365	350			340				21
	200		07.200.20	67.0		610	595			585				32
08	50	33	08.050.24	442.0	24	320	300	160	230	280	M24	55		31
	100		08.100.24	221.0		435	415			395				39
	200		08.200.24	110.5		705	685			665				63
09	50	50	09.050.30	670.0	30	380	375	175	260	345	M30	67		53
	100		09.100.30	335.0		515	510			480				65
	200		09.200.30	167.5		860	855			825				99
10	50	70	10.050.36	940	36	375	375	180	260	345	M36	70		57
	100		10.100.36	470		510	510			480				74
	200		10.200.36	235		855	855			825				115
11	50	100	11.050.42	1340	42	435	425	205	280	400	M42	72		99
	100		11.100.42	670		580	570			545				124
	200		11.200.42	335		970	960			935				184
12	50	132	12.050.48	1768	48	345	350	200	490	295	M48	75	30	196
	100		12.100.48	884		455	460			405				226
	200		12.200.48	442		730	735			680				301
13	50	200	13.050.64	2680	64	460	435	270	560	365	M64	90	35	306
	100		13.100.64	1340		595	570			500				351
	200		13.200.64	670		940	915			845				489
14	50	280	14.050.72	3760	72	470	455	265	620	385	M72	90	40	452
	100		14.100.72	1880		605	590			520				507
	200		14.200.72	940		945	930			860				671
15	50	400	15.050.80	5360	80	525	515	270	720	440	M80	95	50	696
	100		15.100.80	2680		670	660			585				798
	200		15.200.80	1340		1060	1050			975				1055
16	50	500	16.050.90	6700	90	765	515	525	720	440	M90	95	50	781
	100		16.100.90	3350		910	660			585				876
	200		16.200.90	1675		1300	1050			975				1186

*Measurements refer to initial position at minimum load (not preset); the distance changes exactly the same as the preset travel.



**Variable Spring Hanger with continuous tie rod
Type FHS**

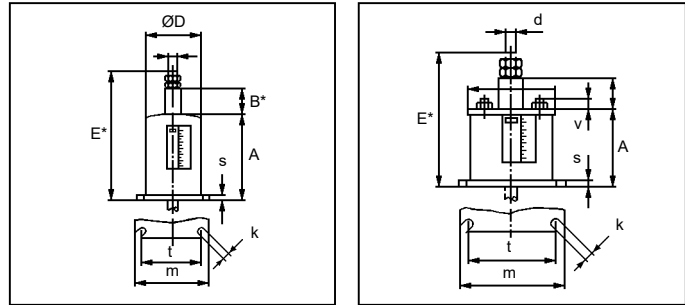
Standard version:

Hanger preset, galvanized housing and connecting parts, alkyd-painted spring.

Options:

Hanger not preset, hot-dip galvanized housing and additional terosone coating of the spring, inch thread.

Order example: FHS 11.100.42 (standard)



VH size	Nominal travel Sn mm	Nominal load Fn kN	Type FHS...	Spring rate R N/mm	Load group LGV	Instal. dimen. E* mm	Main dimensions			Connecting dimensions						Weight ca. kg
							A mm	B* mm	D mm	d mm	k mm	m mm	s mm	t mm	v mm	
01	50	0.5	01.050.12	6.8	12	255	160	70	110	M12	12	130	8	95		3
	100		01.100.12	3.4		385	235	120								4
	200		01.200.12	1.7		660	405	230								6
02	50	1	02.050.12	13.6	12	255	160	70	110	M12	12	130	8	95		3
	100		02.100.12	6.8		385	235	120								4
	200		02.200.12	3.4		660	405	230								6
03	50	2	03.050.12	26.8	12	260	165	70	120	M12	14	150	10	110		4
	100		03.100.12	13.4		385	235	125								6
	200		03.200.12	6.7		670	415	230								8
04	50	4	04.050.12	54.0	12	260	165	70	120	M12	14	150	10	110		5
	100		04.100.12	27.0		385	235	125								6
	200		04.200.12	13.5		670	415	230								9
05	50	7	05.050.12	94.0	12	310	205	75	155	M12	18	190	12	130		10
	100		05.100.12	47.0		455	300	125								12
	200		05.200.12	23.5		790	530	230								17
06	50	12	06.050.16	162.0	16	315	205	75	155	M16	18	190	12	130		10
	100		06.100.16	81.0		465	300	130								13
	200		06.200.16	40.5		800	530	235								20
07	50	20	07.050.20	268.0	20	355	240	75	180	M20	23	220	12	160		17
	100		07.100.20	134.0		505	340	125								21
	200		07.200.20	67.0		860	585	235								32
08	50	33	08.050.24	442.0	24	425	280	95	230	M24	23	270	15	200		35
	100		08.100.24	221.0		585	395	140								43
	200		08.200.24	110.5		965	665	250								67
09	50	50	09.050.30	670.0	30	500	345	90	260	M30	27	300	15	215		56
	100		09.100.30	335.0		685	480	140								69
	200		09.200.30	167.5		1130	825	240								103
10	50	70	10.050.36	940	36	510	345	90	260	M36	27	300	15	215		59
	100		10.100.36	470		700	480	140								76
	200		10.200.36	235		1140	825	240								114
11	50	100	11.050.42	1340	42	580	400	90	280	M42	27	340	20	250		104
	100		11.100.42	670		780	545	145								127
	200		11.200.42	335		1265	935	245								186
12	50	132	12.050.48	1768	48	480	300	80	490	M48	27	530	25	460	30	202
	100		12.100.48	884		635	410	130								233
	200		12.200.48	442		1020	685	240								310
13	50	200	13.050.64	2680	64	575	370	85	560	M64	27	590	30	520	35	338
	100		13.100.64	1340		755	505	130								384
	200		13.200.64	670		1210	850	235								511
14	50	280	14.050.72	3760	72	610	390	85	620	M72	27	640	35	580	40	446
	100		14.100.72	1880		735	525	130								511
	200		14.200.72	940		1240	865	240								670
15	50	400	15.050.80	5360	80	680	450	85	720	M80	33	760	40	680	50	698
	100		15.100.80	2680		875	595	135								796
	200		15.200.80	1340		1370	985	235								1045
16	50	500	16.050.90	6700	90	695	450	85	720	M90	33	760	40	680	50	735
	100		16.100.90	3350		895	595	135								852
	200		16.200.90	1675		1380	985	235								1143

*Measurements refer to initial position at minimum load (not preset); the distance changes exactly the same as the preset travel.



**Variable Spring Hanger
Type FSS with supporting plate made of steel
Type FSP with PTFE layer**

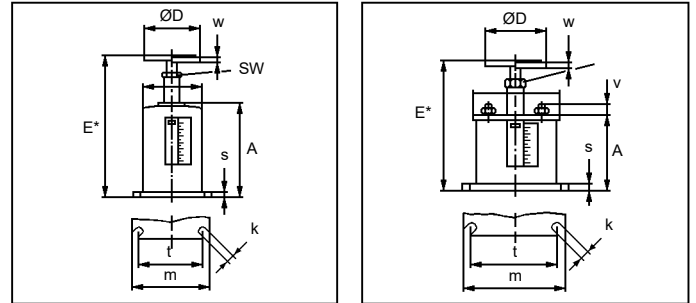
Standard version:

Hanger preset, galvanized housing and connecting parts, alkyd-painted spring.

Options:

Hanger not preset, hot-dip galvanized housing and additional terosone coating of the spring, inch thread.

Order example: FSS 11.100.42 (standard)



VH size	Nominal travel S _n mm	Nominal load F _n kN	Type FSS... FSP...	Spring rate R N/mm	Load group LGV	Instal. dimen. E* mm	Main dimens.		Connecting dimensions							Width of nuts SW mm	Weight ca. kg
							A mm	D mm	k mm	m mm	p mm	s mm	t mm	v mm	w mm		
01	50	0.5	01.050.12	6.8	Non relevant	190	160	110	12	130	70	8	95	12	36	4	
	100		01.100.12	3.4		280	235									5	
	200		01.200.12	1.7		480	405									6	
02	50	1	02.050.12	13.6		190	160	110	12	130	70	8	95	12	36	4	
	100		02.100.12	6.8		280	235									5	
	200		02.200.12	3.4		480	405									7	
03	50	2	03.050.12	26.8		200	165	120	14	150	70	10	110	12	36	5	
	100		03.100.12	13.4		285	235									6	
	200		03.200.12	6.7		490	415									9	
04	50	4	04.050.12	54.0		200	165	120	14	150	70	10	110	12	36	5	
	100		04.100.12	27.0		285	235									7	
	200		04.200.12	13.5		490	415									10	
05	50	7	05.050.12	94.0		245	205	155	18	190	100	12	130	15	55	12	
	100		05.100.12	47.0		355	300									14	
	200		05.200.12	23.5		610	530									19	
06	50	12	06.050.16	162.0		245	205	155	18	190	100	12	130	15	55	12	
	100		06.100.16	81.0	355	300	15										
	200		06.200.16	40.5	610	530	22										
07	50	20	07.050.20	268.0	275	240	180	23	220	100	12	160	15	55	19		
	100		07.100.20	134.0	390	340									23		
	200		07.200.20	67.0	665	585									34		
08	50	33	08.050.24	442.0	320	280	230	23	270	120	15	200	20	85	40		
	100		08.100.24	221.0	440	395									48		
	200		08.200.24	110.5	745	665									73		
09	50	50	09.050.30	670.0	390	345	260	27	300	120	15	215	20	95	63		
	100		09.100.30	335.0	535	480									76		
	200		09.200.30	167.5	905	825									110		
10	50	70	10.050.36	940	390	345	260	27	300	150	15	215	20	95	67		
	100		10.100.36	470	535	480									87		
	200		10.200.36	235	905	825									122		
11	50	100	11.050.42	1340	445	400	280	27	340	150	20	250	20	95	113		
	100		11.100.42	670	605	545									136		
	200		11.200.42	335	1020	935									195		
12	50	132	12.050.48	1768	425	300	490	27	530	150	25	460	30	25	145		
	100		12.100.48	884	550	410									257		
	200		12.200.48	442	860	685									334		
13	50	200	13.050.64	2680	495	370	560	27	590	180	30	520	35	25	145		
	100		13.100.64	1340	645	505									410		
	200		13.200.64	670	1020	850									537		
14	50	280	14.050.72	3760	515	390	620	27	640	200	35	580	40	25	145		
	100		14.100.72	1880	665	525									539		
	200		14.200.72	940	1040	865									698		
15	50	400	15.050.80	5360	590	450	720	33	760	260	40	680	50	40	145		
	100		15.100.80	2680	750	595									842		
	200		15.200.80	1340	1170	985									1089		
16	50	500	16.050.90	6700	590	450	720	33	760	260	40	680	50	40	145		
	100		16.100.90	3350	750	595									897		
	200		16.200.90	1675	1170	985									1188		

*Measurements refer to initial position at minimum load (not preset); the distance changes exactly the same as the preset travel.



**Angulating Spring Support
Type FSG**

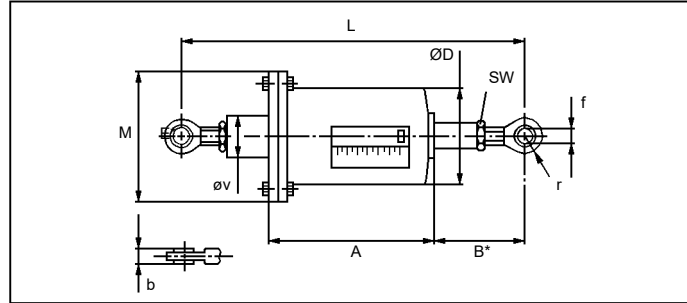
Standard version:

Hanger preset, galvanized housing and connecting parts, alkyd-painted spring.

Options:

Hanger not preset, hot-dip galvanized housing and additional terosone coating of the spring, inch thread.

Order example: SG 06.100.0800.00 (standard)



VH size	Nominal travel Sn mm	Nominal load Fn kN	Type FSG...	Spring rate R N/mm	Load group LGV	Main dimensions					Connecting dimensions			Width of nuts SW mm
						A mm	B* mm	D mm	M mm	V mm	b mm	f mm	r mm	
01	100	0.5	01.100. 1) .12	3.4	Non relevant	245	215	105	130	50	10	12	19	30
02	100	1	02.100. 1) .12	6.8		245	215	105	130	50	10	12	19	30
03	100	2	03.100. 1) .12	13.4		245	215	115	150	50	10	12	19	30
04	100	4	04.100. 1) .12	27.0		245	215	115	150	50	10	12	19	30
05	100	7	05.100. 1) .12	47.0		315	245	140	190	70	16	20	30	46
06	100	12	06.100. 1) .16	81.0		315	245	140	190	70	16	20	30	46
07	100	20	07.100. 1) .20	134.0		350	250	170	220	85	16	20	30	46
08	100	33	08.100. 1) .24	221.0		415	280	220	270	100	20	25	43	60
09	100	50	09.100. 1) .30	335.0		510	280	250	300	100	20	25	43	60
10	100	70	10.100. 1) .36	470.0		510	280	250	300	100	22	30	43	60
11	100	100	11.100. 1) .42	670.0		570	290	280	340	125	22	30	43	60

1) Insert nominal length E* in this position (four-digit).

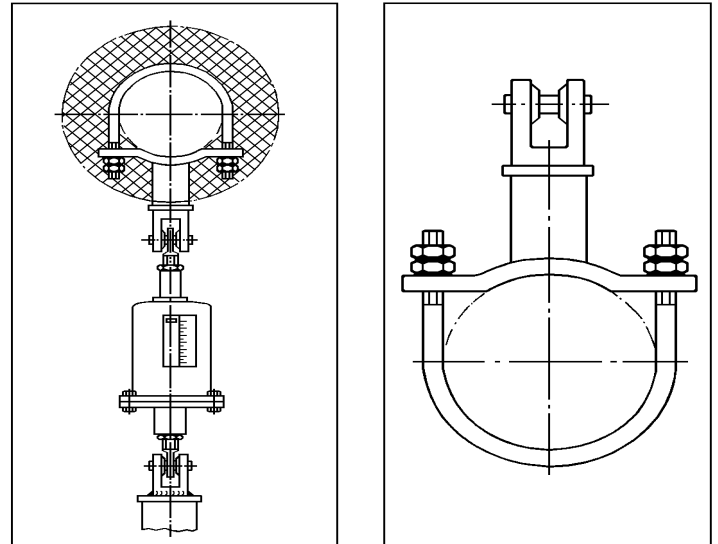
VH size	Installation dimension E* mm										
	600	700	800	900	1000	1200	1400	1600	1800	2000	2200
	Weight ca. kg										
01	6.2	6.5	6.8	7.1	7.4	8.0	8.6	9.3	9.9	10.5	11.1
02	6.5	6.8	7.1	7.4	7.7	8.3	8.9	9.2	10.2	10.8	11.4
03	8.3	8.7	9.0	9.3	9.6	10.2	10.8	11.4	12.1	12.7	13.3
04	8.8	9.2	9.5	9.8	10.1	10.7	11.3	11.9	12.6	13.2	13.8
05		16.2	16.8	17.4	18.1	19.3	20.5	21.8	23.0	24.3	25.5
06		17.0	17.6	18.2	18.9	20.1	21.3	22.6	23.8	25.1	26.3
07		27.5	28.6	29.7	30.8	32.9	35.1	37.3	39.4	41.6	43.8
08				58.5	59.8	62.4	65.0	67.5	70.1	72.7	75.2
09					90.6	93.2	95.8	98.3	101.0	103.0	106.0
10					98.7	101.0	104.0	106.0	109.0	111.0	114.0
11					160.0	164.0	167.0	170.0	174.0	177.0	180.0

*Measurements refer to initial position at minimum load (not preset); the distance changes exactly the same as the preset travel.



**Connections for Angulating Spring Support
(Type FSG)**

For connection of these supports to pipes and steel constructions, special mounting parts, clamps and brackets are available. The design of these parts enables the supporting of dynamic load without any problems.



**Bracket (with bolts)
Type MBW**

The brackets are designed for welding: They allow the required angularity of 6 gr.

Bracket:

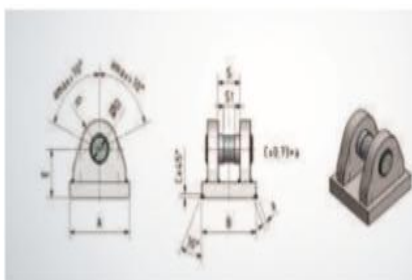
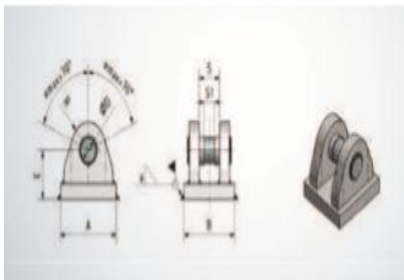
Material:

Weldable - C25

Surface: Jack with primer
(standard) or without protection

Order example: MBS 025
(standard)

Type	FN	E	S	S1	A	B	Ø D H7	R	a=0°	a=30°	a=70°	Weight
-	kN	mm	mm	mm	mm	mm	mm	mm				kg
MBW 0003-3	3	26	13,5	9,5	34	34	10	10	4	4	4	0,3
MBW 0008-3	8	35	15,5	10,5	55	65	10	15	4	4	4	0,5
MBW 0013-3	13	40	18,5	12,5	65	80	15	17,5	4	4	4	1
MBW 0032-3	32	50	30,5	16,5	100	110	20	22,5	4	4	4	2,8
MBW 0045-3	45	60	35,5	20,5	120	120	25	30	4	4	4	3,8
MBW 0078-3	78	70	40,5	25,5	140	140	35	30	4	4	4	6,8
MBW 0130-3	130	85	55,5	32,5	180	180	45	45	4	4	4	13,8
MBW 0180-3	180	105	64,5	35,5	210	210	50	58	4	4	4	22,8
MBW 0234-3	234	120	70,5	44,5	260	240	60	65	4	4	4	36,5
MBW 0380-3	380	140	80,5	49,5	340	280	70	75	4	4	5	64,2
MBW 0600-3	600	155	90,5	55,5	420	300	80	90	4	5	6	85,5
MBW 0750-3	750	170	120	61,7	320	290	90	100	6	8	9	88,3
MBW 0900-3	900	170	120	61,7	350	288	90	105	6	9	10	96,2
BW 1000-3	1000	200	120	71,7	360	300	100	110	6	10	11	118,6
BW 1250-3	1250	200	135	71,7	460	315	110	120	6	10	11	151
BW 1750-3	1750	225	135	86,9	470	330	120	135	8	13	15	200,5
BW 2000-3	2000	245	165	91,9	540	370	140	165	8	13	15	271,8
BW 2500-3	2500	265	205	106,9	560	410	160	180	10	14	17	325,8
BW 3000-3	3000	300	210	107,2	650	500	180	200	10	14	17	482,9
MBW 4000-3	4000	320	230	132,2	850	550	200	230	11	15	17	689,4





Trapeze Hanger Selection

Selection

The following table shows the possible loads for the 11 VH-sizes of trapeze hangers, depending on the hanger travel and on the nominal travel S_n på 50, 100 eller 200 mm. The maximum load equals the nominal load F_n of the trapeze hanger and will therefore amount to twice the load of single hangers.

For calculation of the required load F_s , the loads resulting from weight of pipe shoe (F_A) and trapeze (F_r), and from the active weight of the hangers (F_H) (1 kg equals approx. 0,01 kN) must be added to the load of the pipe.

The other selection criteria correspond to those for single hangers FHG.

Example of requirement:

Trapeze hanger, hot-dip galvanized

Metric connection thread

Span: $L=800$ mm

Pipe shoe: LUR 350.170

Hot load: $F_w=30$ kN

Required travel, upwards: $S_s=25$ mm

Preset at cold load F_k

Selection

In case of upward required travel where hot load occurs at a lower value than the cold load, a hanger size should be selected which has a cold load as close as possible to the nominal load. Result: VH-size 07, nominal travel: $S_n = 100$ kN (from recommended working travel $S_s = 25$ mm). Required hot load: $F_s=F_w+F_a+F_t+F_h = 30+0,2+0,2+0,2^*$, $F_s = 30.6$ kN, Preset load: 37.3 kN, Travel reserve: $S_r = 10$ mm. Load variation: $WF 25.268=6.7$ kN, corresponding 22% of F_w . Cold load: $F_k=37.3-0,9 =36.4$ kN

*) active load taken from tables page 3.4.1.11

Nominal travel S_n				Load													
50		100		200		01	02	03	04	05	06	07	08	09	10	11	
Hanger travel		Service travel		Required load F_s depending on travel													
mm				kN													
0	5	0	10	0	20	0.32	0.64	1.32	2.60	4.60	7.80	13.2	21.8	33.0	46.0	66.0	
2.5		5		10		0.35	0.71	1.45	2.87	5.07	8.61	14.5	24.0	36.4	50.7	72.7	
5.0		10		20	30	0.39	0.78	1.59	3.14	5.54	9.42	15.9	26.2	39.7	55.4	79.4	
7.5		15	15	30		0.42	0.84	1.72	3.41	6.01	10.2	17.2	28.4	43.1	60.1	86.1	
10.0	8	20		40		0.46	0.91	1.86	3.68	6.48	11.0	18.6	30.6	46.4	64.8	92.8	
12.5		25		50		0.49	0.98	1.99	3.95	6.95	11.9	19.9	32.9	49.8	69.5	99.5	
15.0		30		60	40	0.52	1.05	2.12	4.22	7.42	12.7	21.2	35.1	53.1	74.2	106.0	
17.5		35	20	70		0.56	1.12	2.26	4.49	7.89	13.5	22.6	37.3	56.5	78.9	113.0	
20.0	10	40		80		0.59	1.18	2.39	4.76	8.36	14.3	23.9	39.5	59.8	83.6	120.0	
22.5		45		90		0.63	1.25	2.53	5.03	8.83	15.1	25.3	41.7	63.2	88.3	126.0	
25.0		50		100	50	0.66	1.32	2.66	5.30	9.30	15.9	26.6	43.9	66.5	93.0	133.0	
27.5		55	25	110		0.69	1.39	2.79	5.57	9.77	16.7	27.9	46.1	69.9	97.7	140.0	
30.0	13	60		120		0.73	1.46	2.93	5.84	10.2	17.5	29.3	48.3	73.2	102.0	146.0	
32.5		65		130		0.76	1.52	3.06	6.11	10.7	18.3	30.6	50.5	76.6	107.0	153.0	
35.0		70		140		0.80	1.59	3.20	6.38	11.2	19.1	32.0	52.7	79.9	112.0	160.0	
37.5		75		150		0.83	1.66	3.33	6.65	11.7	20.0	33.3	55.0	83.3	117.0	167.0	
40.0		80		160		0.86	1.73	3.46	6.92	12.1	20.8	34.6	57.2	86.6	121.0	173.0	
42.5	15	85	30	170	60	0.90	1.80	3.60	7.19	12.6	21.6	36.0	59.4	90.0	126.0	180.0	
45.0		90		180		0.93	1.86	3.73	7.46	13.1	22.4	37.3	61.6	93.3	131.0	187.0	
47.5		95		190		0.97	1.93	3.87	7.73	13.5	23.2	38.7	63.8	96.7	135.0	193.0	
50.0		100		200		1.00	2.00	4.00	8.00	14.0	24.0	40.0	66.0	100.0	140.0	200.0	
Nominal travel S_n				Nominal load F_n in kN													
Load group LGV				12	12	12	12	12	16	20	24	30	36	42			

Spring rates R in N/mm													
Nominal travel		50	13.6	27.2	53.6	108.0	188.0	324.0	536.0	884.0	1340.0	1880.0	2680.0
		100	6.8	13.6	26.8	54.0	94.0	162.0	268.0	442.0	670.0	940.0	1340.0
		200	3.4	6.8	13.4	27.0	47.0	81.0	134.0	221.0	335.0	470.0	670.0



Trapeze Hanger

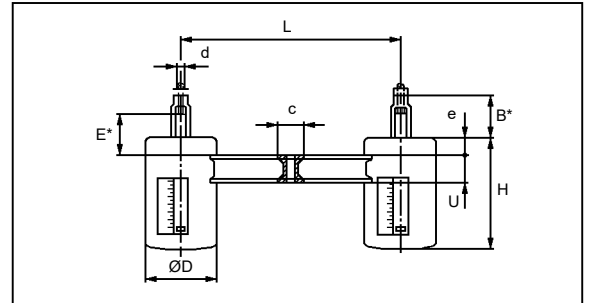
Standard version:

Hanger preset, galvanized housing and connecting parts, alkyd-painted spring.

Options:

Hanger not preset, terrosone coating of the spring, inch thread.

Order example: FDT 07.100.0800.20 (standard)



Dimensions and weight of hangers													Dimensions and weight of trapeze										
Wdt size	Elongation travel Sn mm	Nominal beload Fn kN	Type FDT...	Spring rate R N/mm	Load groupe LGV	Insert diameter E* mm	Main dimensions					Weight ca. kg	Dim. in mm Weight in kg	Span provide mm									
							B* mm	D mm	H mm	d mm	e mm			600	800	1000	1200	1400	1600	1800	2000		
01	50	1	01.050. 1) .12	13.6	12	60	85	110	235	M12	20	4	C	90	90	90	90						
	100		01.100. 1) .12	6.8		5						U	60	60	60	60							
	200		01.200. 1) .12	3.4		7						Weight	5	7	10	12							
02	50	2	02.050. 1) .12	27.2	12	60	85	110	235	M12	20	4	C	90	90	90	90						
	100		02.100. 1) .12	13.6		5						U	60	60	60	60							
	200		02.200. 1) .12	6.8		7						Weight	5	7	10	12							
03	50	4	03.050. 1) .12	53.6	12	60	85	120	235	M12	20	5	C	90	90	90	90						
	100		03.100. 1) .12	26.8		6						U	60	60	60	60							
	200		03.200. 1) .12	13.4		9						Weight	5	7	9	12							
04	50	8	04.050. 1) .12	108.0	12	60	85	120	235	M12	20	5	C	90	120	120	120						
	100		04.100. 1) .12	54.0		6						U	60	80	80	80							
	200		04.200. 1) .12	27.0		9						Weight	5	13	16	20							
05	50	14	05.050. 1) .12	188.0	12	65	85	155	300	M12	25	8	C	125	125	125	135						
	100		05.100. 1) .12	94.0		11						U	80	80	80	100							
	200		05.200. 1) .12	47.0		16						Weight	9	12	16	24							
06	50	24	06.050. 1) .16	324.0	16	75	110	155	300	M16	25	8	C	125	135	145	145	155					
	100		06.100. 1) .16	162.0		11						U	80	100	120	120	140						
	200		06.200. 1) .16	81.0		16						Weight	9	15	25	30	42						
07	50	40	07.050. 1) .20	536.0	20	85	130	180	340	M20	30	14	C	140	150	160	160	170					
	100		07.100. 1) .20	268.0		18						U	100	120	140	140	160						
	200		07.200. 1) .20	134.0		26						Weight	10	18	28	34	48						
08	50	66	08.050. 1) .24	884.0	24	105	160	230	395	M24	30	27	C		175	185	185	195	205				
	100		08.100. 1) .24	442.0		33						U		160	180	180	200	220					
	200		08.200. 1) .24	221.0		45						Weight		24	37	46	63	84					
09	50	100	09.050. 1) .30	1340.0	30	110	175	260	480	M30	35	40	C		185	195	205	215	215	225			
	100		09.100. 1) .30	670.0		48						U		180	200	220	240	240	260				
	200		09.200. 1) .30	335.0		68						Weight		27	41	59	80	94	122				
10	50	140	10.050. 1) .36	1880.0	36	105	180	260	480	M36	35	40	C			215	225	225	235	245	245		
	100		10.100. 1) .36	940.0		48						U			240	260	260	280	300	300			
	200		10.200. 1) .36	470.0		68						Weight			54	77	92	118	149	167			
11	50	200	11.050. 1) .42	2680.0	42	120	205	280	545	M40	40	78	C			230	240	250	250	250	250		
	100		11.100. 1) .42	1340.0		88						U			280	280	300	320	320	320			
	200		11.200. 1) .42	670.0		113						Weight			61	84	111	167	190	214			

1) Insert span in mm. 2) Active weight of both hangers, total weight of hangers see FHG page 3.4.1.5.

*Measurements refer to initial position at minimum load (not preset); the distance changes exactly the same as the preset travel.