HEAVY DUTY SERIES

These large-bore hydraulic shock absorbers protect equipment from large impacts in applications such as automated storage and retrieval systems as well as overhead bridge and trolley cranes. They are available in wide variety of stroke lengths and damping characteristics to increase equipment life and meet stringent deceleration requirements.

Features and Benefits

- *Compact design smoothly and safely decelerates large energy capacity loads up to 8 million in-lbs per cycle.*
- *Engineered to meet OSHA, AISE, CMMA and other safety specifications such as DIN and FEM.*
- *Internal air charged bladder accumulator replaces mechanical return springs, providing shorter overall length and reduced weight.*
- *Wide variety of optional configurations including bellows, clevis mounts and safety cables.*
- *Available in standard adjustable or custom-orificed non-adjustable models.*
- *Optional fluids and seal packages available to expand standard operating temperature range from (-10° C to 60° C) to (-40° C to 100° C).*
- *All sizes are fully field repairable.*
- *Piston rod return sensor available.*
- *Zinc plated external components provide enhanced corrosion protection. Epoxy painting and special rod materials are available for use in highly corrosive environments.*

HD / HDA HD / HDA HD / HDA HD / HDA HD / HDA HD / HDA

HD
Custom-orificed design accommodates specified damping requirements. Computer simulated impact is used to optimize the orifice configuration.

HDA
Adjustable units enable user to change shock absorber resistance. Standard adjustable configurations available.

OPTIONAL SENSOR AVAILABLE
PAGE 50

Applications

Today's high speed automatic storage and retrieval systems and other heavy duty material handling applications require Enidine's expertly engineered HD products. Available in bore diameters up to 150mm and strokes up to 1 200mm. Other sizes are available upon request.

The Enidine Heavy Duty (HD) Series Hydraulic Shock Absorbers are designed to handle moving loads in a multitude of applications. The unique air charged bladder/accumulator system eliminates a coil spring needed for piston rod return. The short overall length to stroke ratio lets designers fit the HD into smaller areas. Adjustable units are available for applications requiring change, and custom-orificed non-adjustable models are recommended for meeting industry specifications such as OSHA, AISE, CMMA, DIN, FEM and other standards. Enidine's engineering department utilizes its own computer simulation software to illustrate reaction forces and velocity as they relate to stroke and time.

Shock Absorber Sizing

1. Determine load weight (Kg), impact velocity (m/sec), propelling force (N) if any, cycles per hour and stroke (mm) required.

2. Calculate total energy per cycle (Nm/c) and total energy per hour (Nm/hr). Consult this catalog's sizing section (pages 72-77) for assistance if required.

3. Compare the calculated total energy per cycle (Nm/c) and total energy per hour (Nm/hr), to the values listed in the HD/HDA Series Engineering Data charts. For HDA selection, the impact velocity must be below 3,3 m/sec.

4. Select the appropriate HD/HDA model.

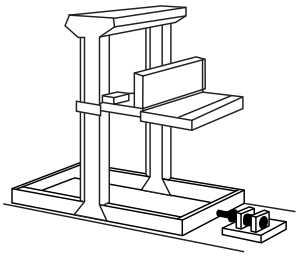
Example: Horizontal Application

1. Weight (W): 25 000 Kg
Velocity (V): 1.1 m/sec
Propelling Force (F_D): 1 500 N
Cycles/Hour (C): 10 cycles/hr
Stroke (S): 125 mm

2. Total Energy/Cycle (E_T): 18 670 Nm/c
Total Energy/Hour (E_TC): 186 700 Nm/hr

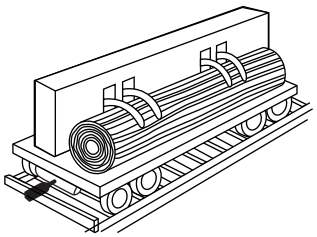
3. Compare total energy per cycle (18 670 Nm/c) and total energy per hour (186 700 Nm/hr) to the HD/HDA series Engineering Data charts (pages 44-49).

4. Selection: HD 3.0 x 5 (HDA is not appropriate because maximum in-lbs per cycle are exceeded).



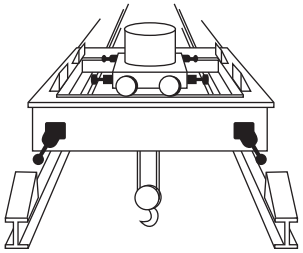
STACKER CRANE

Shock absorbers, designed to meet custom operational requirements, provide reliable, positive deceleration and prevent potential tipping of a computer-operated stacker crane, under runaway conditions.



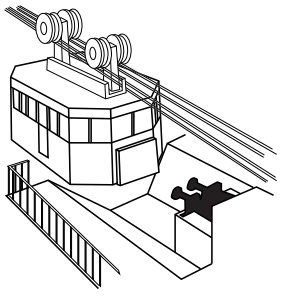
LOG PROCESSING

Standard HD's installed on high speed, double-acting log processing machinery cushion log carrier's end of travel to protect logs and machinery from damage.



OVERHEAD CRANE

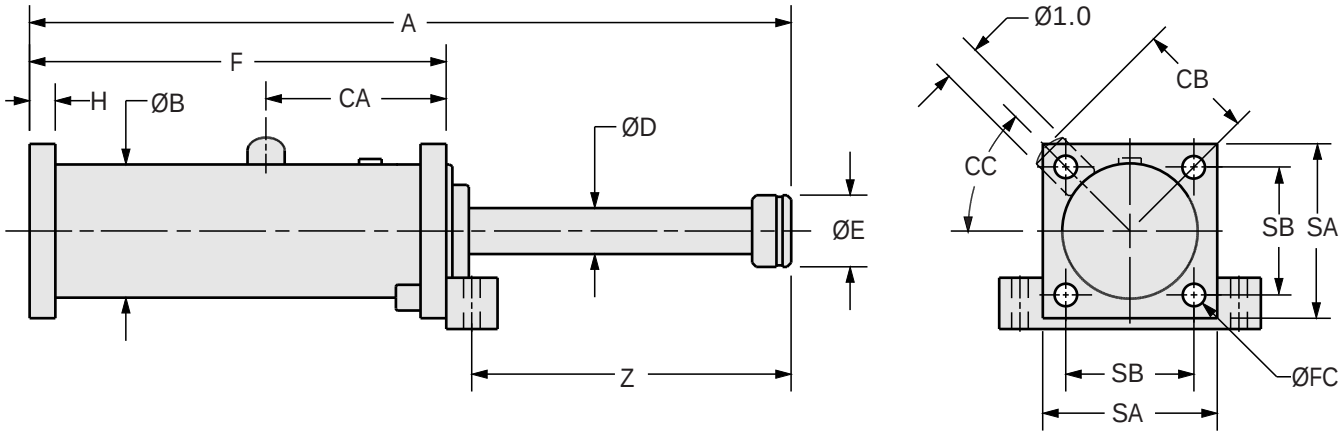
Shock absorbers softly yet quickly decelerate trolley movement and serve as safety stops when mounted at each end of an overhead crane bridge (can be designed to meet safety standards).



TRANSPORT EQUIPMENT

Jarring of passengers and cargo is eliminated when HD shock absorbers are installed at end positions of cable and other transport systems.

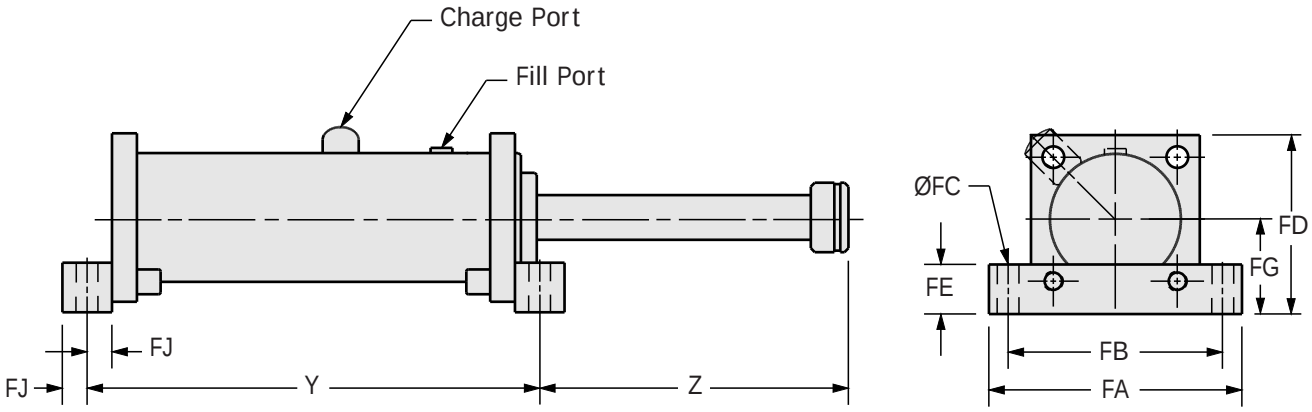
Engineering Data



Note: For TF, FF and FR mounting delete front foot and dimensions.

Catalog No. (Model)	Basis Number	Bore Size mm	(S) Stroke mm	HD		(F_P) Max. Shock Force N	Flange Dimensions			Model Weight Kg	
				(E_T) Max. Nm Per Cycle	(E_TC) Max. Nm Per Hour		SA	SB	Rec. Bolt Size		
HD 1.5 x 4	31530	40	100	5 950	357 000	70 000	120	90	M12	11	
HD 1.5 x 6	31531	40	150	8 930	535 800	70 000	120	90	M12	12	
HD 1.5 x 8	31532	40	200	11 900	714 000	70 000	120	90	M12	13	
HD 1.5 x 10	31533	40	250	14 900	839 181	70 000	120	90	M12	14	
HD 1.5 x 12	31534	40	300	17 800	939 646	70 000	120	90	M12	16	
HD 1.5 x 14	31535	40	350	20 800	1 038 141	70 000	120	90	M12	17	
HD 1.5 x 16	31536	40	400	20 400	1 138 606	60 000	120	90	M12	18	
HD 1.5 x 18	31537	40	450	18 300	1 098 000	48 000	120	90	M12	19	
HD 1.5 x 20	31538	40	500	16 500	990 000	39 000	120	90	M12	20	
HD 1.5 x 24	31539	40	600	14 200	852 000	28 000	120	90	M12	23	
HD 2.0 x 10	30310	50	250	24 000	1 062 482	110 000	140	111	M16	23	
HD 2.0 x 12	30311	50	300	28 000	1 185 355	110 000	140	111	M16	25	
HD 2.0 x 14	30312	50	350	32 700	1 308 227	110 000	140	111	M16	27	
HD 2.0 x 16	30313	50	400	37 400	1 431 099	110 000	140	111	M16	29	
HD 2.0 x 18	30314	50	450	42 000	1 553 971	110 000	140	111	M16	31	
HD 2.0 x 20	30315	50	500	46 800	1 674 434	110 000	140	111	M16	33	
HD 2.0 x 24	30316	50	600	56 100	1 920 178	110 000	140	111	M16	36	
HD 2.0 x 28	31881	50	700	65 500	2 165 922	110 000	140	111	M16	42	
HD 2.0 x 32	31882	50	800	74 800	2 599 589	110 000	140	111	M16	49	
HD 2.0 x 36	31883	50	900	76 500	2 840 514	100 000	140	111	M16	53	
HD 2.0 x 40	31884	50	1000	73 100	3 081 440	86 000	140	111	M16	56	
HD 2.0 x 48	31885	50	1200	61 200	3 563 292	60 000	140	111	M16	64	

Notes:
1. HD shock absorbers will function satisfactorily at 5% of their maximum rated energy per cycle. If less than these values, a smaller model should be specified.
2. It is recommended that the customer consult with Enidine for safety related overhead crane applications.
3. The energy data listed is for ideal linear impacts only. If side load conditions exist in the application, contact Enidine for sizing assistance.

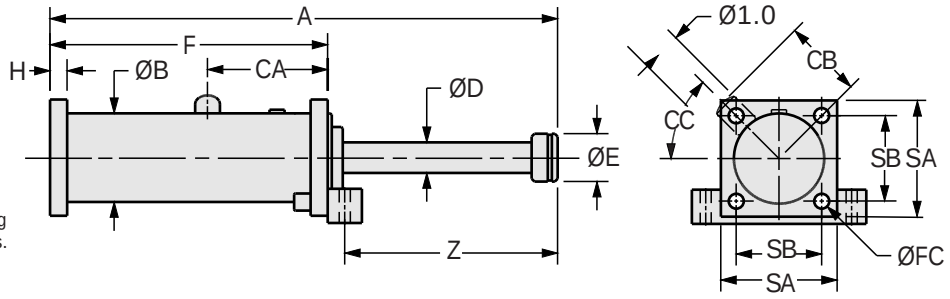


	A	B	D	E	F	H	Y	Z	Foot Mount Dimensions FA	FB	FC	FD	FE	FG	FJ	Charge Port Dimensions CA	CB	CC	Catalog No. (Model)
	410	90	28	50	258	20	290	136	165	140	14	125	32	65	16	144	80	45ß	**HD 1.5 x 4**
	510	90	28	50	308	20	340	186	165	140	14	125	32	65	16	144	80	45ß	**HD 1.5 x 6**
	613	90	28	50	360	20	392	237	165	140	14	125	32	65	16	144	80	45ß	**HD 1.5 x 8**
	715	90	28	50	411	20	443	288	165	140	14	125	32	65	16	144	80	45ß	**HD 1.5 x 10**
	817	90	28	50	462	20	494	339	165	140	14	125	32	65	16	144	80	45ß	**HD 1.5 x 12**
	918	90	28	50	512	20	544	390	154	140	14	125	32	65	16	144	80	45ß	**HD 1.5 x 14**
	1 019	90	28	50	563	20	595	440	165	140	14	125	32	65	16	144	80	45ß	**HD 1.5 x 16**
	1 121	90	28	50	614	20	646	491	165	140	14	125	32	65	16	144	80	45ß	**HD 1.5 x 18**
	1 223	90	28	50	665	20	697	542	165	140	14	125	32	65	16	144	80	45ß	**HD 1.5 x 20**
	1 427	90	28	50	767	20	799	644	165	140	14	125	32	65	16	144	80	45ß	**HD 1.5 x 24**
	757	110	40	60	441	25	481	296	220	178	17	146	40	76	20	184	91	30ß	**HD 2.0 x 10**
	859	110	40	60	492	25	532	347	220	178	17	146	40	76	20	184	91	30ß	**HD 2.0 x 12**
	960	110	40	60	543	25	583	397	220	178	17	146	40	76	20	184	91	30ß	**HD 2.0 x 14**
	1 062	110	40	60	594	25	634	448	220	178	17	146	40	76	20	184	91	30ß	**HD 2.0 x 16**
	1 164	110	40	60	645	25	685	499	220	178	17	146	40	76	20	184	91	30ß	**HD 2.0 x 18**
	1 265	110	40	60	695	25	735	550	220	178	17	146	40	76	20	184	91	30ß	**HD 2.0 x 20**
	1 469	110	40	60	797	25	837	652	220	178	17	146	40	76	20	184	91	30ß	**HD 2.0 x 24**
	1 672	110	40	60	899	25	939	753	220	178	17	146	40	76	20	184	91	30ß	**HD 2.0 x 28**
	1 953	110	40	60	1 079	25	1 119	854	220	178	17	146	40	76	20	265	91	30ß	**HD 2.0 x 32**
	2 151	110	40	60	1 179	25	1 219	952	220	178	17	146	40	76	20	265	91	30ß	**HD 2.0 x 36**
	2 351	110	40	60	1 279	25	1 319	1 052	220	178	17	146	40	76	20	265	91	30ß	**HD 2.0 x 40**
	2 751	110	40	60	1 479	25	1 519	1 252	220	178	17	146	40	76	20	265	91	30ß	**HD 2.0 x 48**

All dimensions in millimeters.

4. Rear flange mounting of 300 mm strokes and longer not recommended, mount both flanges.
5. Nominal return force for HD 1.5 models: 280 N
6. Nominal return force for HD 2.0 x 10 through 28 models: 440 N
7. Nominal return force for HD 2.0 x 32 through 48 models: 560 N

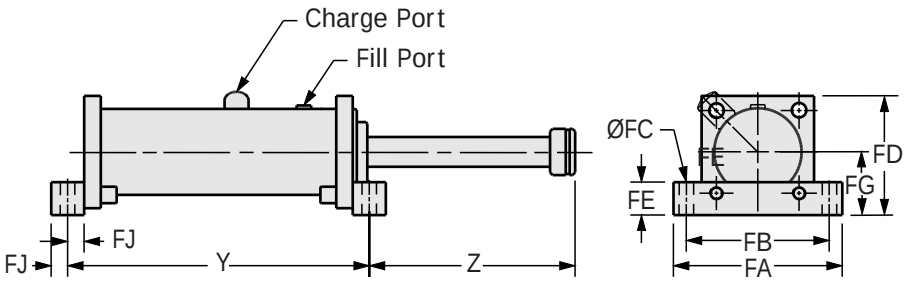
Engineering Data



Note: For TF, FF and FR mounting delete front foot and dimensions.

Catalog No. (Model)	Base Number	Bore Size mm	(S) Stroke mm	HD		HDA		(F_P) Max. Shock Force N	Flange Dimensions			Model Weight Kg
				(E_T) Max. Nm Per Cycle	(E_TC) Max. Nm Per Hour	(E_T) Max. Nm Per Cycle	(E_TC) Max. Nm Per Hour		SA	SB	Rec. Bolt Size	
HD (A) 3.0 x 2	30320	75	50	9 350	561 000	4 500	270 000	220 000	170	125	M20	18
HD (A) 3.0 x 3	30321	75	75	14 000	669 412	6 800	408 000	220 000	170	125	M20	19
HD (A) 3.0 x 5	30322	75	125	23 400	814 689	11 300	678 000	220 000	170	125	M20	22
HD (A) 3.0 x 8	30323	75	200	37 400	1 028 331	18 100	1 056 816	220 000	170	125	M20	26
HD 3.0 x 10	30324	75	250	46 800	1 173 607	NA	NA	220 000	170	125	M20	29
HD (A) 3.0 x 12	30325	75	300	56 100	1 318 884	27 200	1 347 370	220 000	170	125	M20	32
HD 3.0 x 14	30326	75	350	65 500	1 606 589	NA	NA	220 000	170	125	M20	40
HD 3.0 x 16	30327	75	400	74 800	1 749 017	NA	NA	220 000	170	125	M20	42
HD 3.0 x 18	30328	75	450	84 200	1 897 142	NA	NA	220 000	170	125	M20	45
HD 3.0 x 20	30329	75	500	93 500	2 042 419	NA	NA	220 000	170	125	M20	48
HD 3.0 x 24	30330	75	600	112 200	2 330 124	NA	NA	220 000	170	125	M20	54
HD 3.0 x 28	30331	75	700	130 900	2 620 677	NA	NA	220 000	170	125	M20	59
HD 3.0 x 32	30332	75	800	122 400	2 908 382	NA	NA	180 000	170	125	M20	65
HD 3.0 x 36	31889	75	900	122 400	3 315 726	NA	NA	160 000	170	125	M20	74
HD 3.0 x 40	31890	75	1 000	119 000	3 600 582	NA	NA	140 000	170	125	M20	80
HD 3.0 x 48	31891	75	1 200	97 900	4 170 294	NA	NA	96 000	170	125	M20	91
HD (A) 4.0 x 2	30340	100	50	15 100	906 000	13 500	810 000	355 000	250	197	M24	64
HD (A) 4.0 x 4	30341	100	100	30 200	1 503 152	27 000	1 546 721	355 000	250	197	M24	70
HD (A) 4.0 x 6	30342	100	150	45 300	1 721 000	40 500	1 764 569	355 000	250	197	M24	76
HD (A) 4.0 x 8	30343	100	200	60 400	1 947 562	54 000	1 991 131	355 000	250	197	M24	82
HD (A) 4.0 x 10	30344	100	250	75 400	2 165 410	67 500	2 208 980	355 000	250	197	M24	87
HD 4.0 x 12	30345	100	300	90 500	2 797 169	NA	NA	355 000	250	197	M24	108
HD 4.0 x 16	30346	100	400	120 700	3 237 222	NA	NA	355 000	250	197	M24	120
HD 4.0 x 20	30347	100	500	150 900	2 681 633	NA	NA	355 000	250	197	M24	131
HD 4.0 x 24	30348	100	600	181 000	4 126 043	NA	NA	355 000	250	197	M24	144
HD 4.0 x 28	30349	100	700	211 200	4 566 096	NA	NA	355 000	250	197	M24	157
HD 4.0 x 32	30350	100	800	241 400	5 010 506	NA	NA	355 000	250	197	M24	170
HD 4.0 x 36	30351	100	900	271 600	5 454 916	NA	NA	355 000	250	197	M24	183
HD 4.0 x 40	30352	100	1 000	246 500	5 894 969	NA	NA	290 000	250	197	M24	195
HD 4.0 x 48	34450	100	1 200	204 000	6 766 361	NA	NA	200 000	250	197	M24	220

Notes:
1. HD shock absorbers will function satisfactorily at 5% of their maximum rated energy per cycle. HDA models will function satisfactorily at 10% of their maximum rated energy per cycle. If less than these values, a smaller model should be specified.
2. It is recommended that the customer consult with Enidine for safety related overhead crane applications.
3. The energy data listed is for ideal linear impacts only. If side load conditions exist in the application, contact Enidine for sizing assistance.
4. Rear flange mounting of 300 mm strokes and longer not recommended, mount both flanges.

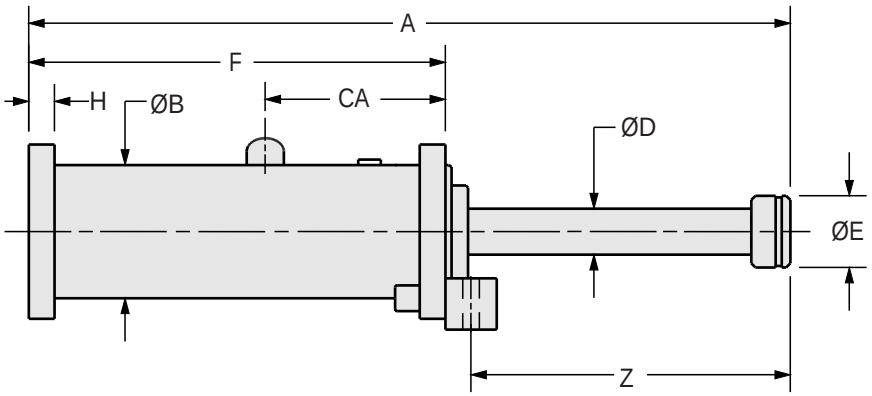


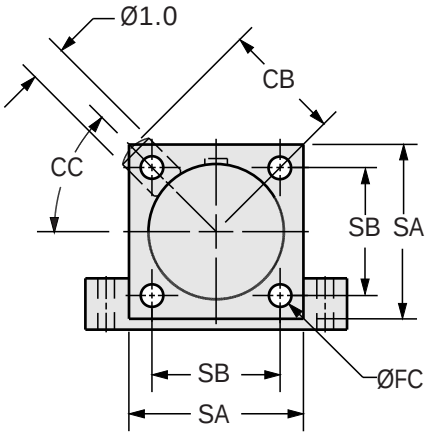
	A	B	D	E	HD F	HDA F	H	HD Y	HDA Y	HD Z	HDA Z	Foot Mount Dimensions FA	FB	FC	FD	FE	FG	FJ	Charge Port Dimensions CA	CB	CC	Catalog No. (Model)
	336	130	45	70	203	213	25	253	263	108	98	255	216	22	173	50	88	25	134	101	30ß	**HD (A) 3.0 x 2**
	387	130	45	70	229	239	25	279	289	133	123	255	216	22	173	50	88	25	134	101	30ß	**HD (A) 3.0 x 3**
	489	130	45	70	280	290	25	330	340	184	174	255	216	22	173	50	88	25	134	101	30ß	**HD (A) 3.0 x 5**
	640	130	45	70	355	365	25	405	415	260	250	255	216	22	173	50	88	25	134	101	30ß	**HD (A) 3.0 x 8**
	742	130	45	70	406	NA	25	456	NA	311	NA	255	216	22	173	50	88	25	134	101	30ß	**HD 3.0 x 10**
	844	130	45	70	457	467	25	507	517	362	352	255	216	22	173	50	88	25	134	101	30ß	**HD (A) 3.0 x 12**
	995	130	45	70	558	NA	25	608	NA	412	NA	255	216	22	173	50	88	25	184	101	30ß	**HD 3.0 x 14**
	1 097	130	45	70	609	NA	25	659	NA	463	NA	255	216	22	173	50	88	25	184	101	30ß	**HD 3.0 x 16**
	1 199	130	45	70	660	NA	25	710	NA	514	NA	255	216	22	173	50	88	25	184	101	30ß	**HD 3.0 x 18**
	1 301	130	45	70	711	NA	25	761	NA	565	NA	255	216	22	173	50	88	25	184	101	30ß	**HD 3.0 x 20**
	1 504	130	45	70	812	NA	25	862	NA	667	NA	255	216	22	173	50	88	25	184	101	30ß	**HD 3.0 x 24**
	1 707	130	45	70	914	NA	25	964	NA	768	NA	255	216	22	173	50	88	25	184	101	30ß	**HD 3.0 x 28**
	1 910	130	45	70	1 015	NA	25	1 065	NA	870	NA	255	216	22	173	50	88	25	184	101	30ß	**HD 3.0 x 32**
	2 156	130	45	70	1 164	NA	25	1 214	NA	967	NA	255	216	22	173	50	88	25	234	101	30ß	**HD 3.0 x 36**
	2 356	130	45	70	1 264	NA	25	1 314	NA	1 067	NA	255	216	22	173	50	88	25	234	101	30ß	**HD 3.0 x 40**
	2 756	130	45	70	1 464	NA	25	1 514	NA	1 267	NA	255	216	22	173	50	88	25	234	101	30ß	**HD 3.0 x 48**
	430	200	63	100	294	304	40	344	354	111	101	360	317	27	252	50	127	25	220	133	155ß	**HD (A) 4.0 x 2**
	532	200	63	100	345	355	40	395	405	162	152	360	317	27	252	50	127	25	220	133	155ß	**HD (A) 4.0 x 4**
	632	200	63	100	395	405	40	445	455	212	202	360	317	27	252	50	127	25	220	133	155ß	**HD (A) 4.0 x 6**
	735	200	63	100	447	457	40	497	507	263	253	360	317	27	252	50	127	25	220	133	155ß	**HD (A) 4.0 x 8**
	836	200	63	100	497	507	40	547	557	314	304	360	317	27	252	50	127	25	220	133	155ß	**HD (A) 4.0 x 10**
	1 032	200	63	100	642	NA	40	692	NA	365	NA	360	317	27	252	50	127	25	310	133	30ß	**HD 4.0 x 12**
	1 234	200	63	100	743	NA	40	793	NA	466	NA	360	317	27	252	50	127	25	310	133	30ß	**HD 4.0 x 16**
	1 438	200	63	100	845	NA	40	895	NA	568	NA	360	317	27	252	50	127	25	310	133	30ß	**HD 4.0 x 20**
	1 642	200	63	100	947	NA	40	997	NA	670	NA	360	317	27	252	50	127	25	310	133	30ß	**HD 4.0 x 24**
	1 844	200	63	100	1 048	NA	40	1 098	NA	771	NA	360	317	27	252	50	127	25	310	133	30ß	**HD 4.0 x 28**
	2 048	200	63	100	1 150	NA	40	1 200	NA	873	NA	360	317	27	252	50	127	25	310	133	30ß	**HD 4.0 x 32**
	2 252	200	63	100	1 252	NA	40	1 302	NA	975	NA	360	317	27	252	50	127	25	310	133	30ß	**HD 4.0 x 36**
	2 454	200	63	100	1 353	NA	40	1 403	NA	1 076	NA	360	317	27	252	50	127	25	310	133	30ß	**HD 4.0 x 40**
	2 854	200	63	100	1 553	NA	40	1 603	NA	1 276	NA	360	317	27	252	50	127	25	310	133	30ß	**HD 4.0 x 48**

All dimensions in millimeters.

5. Nominal return force for HD 3.0 x 2 through 28 models: 550 N
6. Nominal return force for HD 3.0 x 32 through 48 models: 710 N
7. Nominal return force for HD 4.0 models: 1 090 N
8. HDA models which have an impact velocity below 0.8 m/sec, please contact Enidine for sizing assistance.

Engineering Data

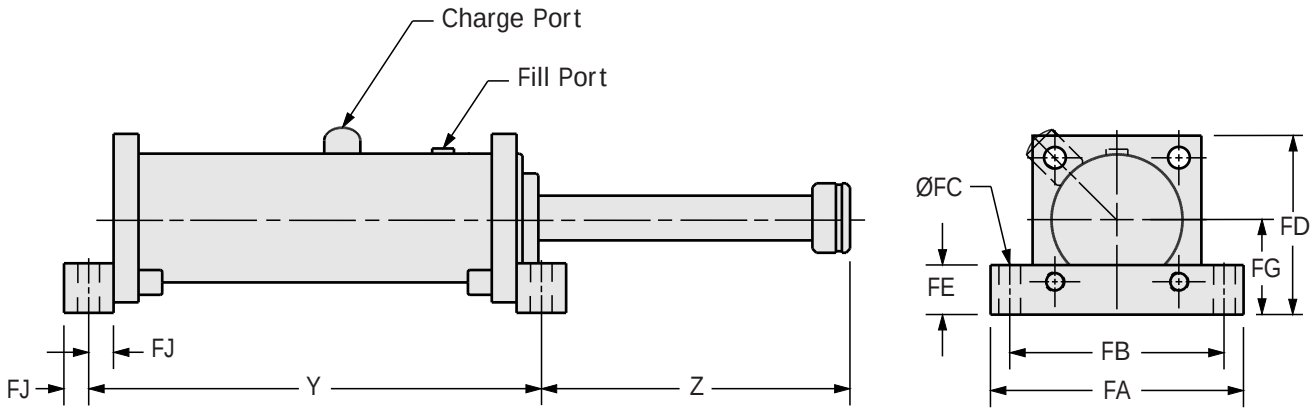




Note: For TF, FF and FR mounting delete front foot and dimensions.

Catalog No. (Model)	Base Number	Bore Size mm	(S) Stroke mm	HD		HDA		(F_p) Max. Shock Force N	Flange Dimensions			Model Weight Kg	
				(E_T) Max. Nm Per Cycle	(E_TC) Max. Nm Per Hour	(E_T) Max. Nm Per Cycle	(E_TC) Max. Nm Per Hour		SA	SB	Rec. Bolt Size		
HD (A) 5.0 x 4	30360	125	100	46 700	1 762 621	37 000	1 809 624	550 000	275	220	M30	87	
HD (A) 5.0 x 6	30361	125	150	70 000	2 002 337	56 000	2 049 340	550 000	275	220	M30	94	
HD (A) 5.0 x 8	30362	125	200	93 500	2 242 053	74 500	2 289 057	550 000	275	220	M30	101	
HD (A) 5.0 x 10	30363	125	250	117 000	2 477 070	93 500	2 524 073	550 000	275	220	M30	108	
HD (A) 5.0 x 12	30364	125	300	140 000	2 716 786	112 000	2 763 789	550 000	275	220	M30	114	
HD 5.0 x 16	30365	125	400	187 000	3 196 219	NA	NA	550 000	275	220	M30	128	
HD 5.0 x 20	30366	125	500	234 000	4 145 684	NA	NA	550 000	275	220	M30	158	
HD 5.0 x 24	30367	125	600	280 000	4 625 117	NA	NA	550 000	275	220	M30	171	
HD 5.0 x 28	30368	125	700	327 000	5 099 849	NA	NA	550 000	275	220	M30	185	
HD 5.0 x 32	30369	125	800	374 000	5 579 282	NA	NA	550 000	275	220	M30	198	
HD 5.0 x 40	30370	125	1 000	467 000	6 533 447	NA	NA	550 000	275	220	M30	225	
HD 5.0 x 48	32340	125	1 200	418 000	7 487 613	NA	NA	410 000	275	220	M30	242	
HD (A) 6.0 x 4	30380	160	100	76 500	2 404 568	61 000	2 464 532	900 000	330	260	M36	164	
HD (A) 6.0 x 6	30381	160	150	114 000	2 704 389	91 500	2 764 353	900 000	330	260	M36	175	
HD (A) 6.0 x 8	30382	160	200	153 000	3 004 211	122 000	3 064 175	900 000	330	260	M36	186	
HD (A) 6.0 x 10	30383	160	250	191 000	3 316 025	152 500	3 375 989	900 000	330	260	M36	196	
HD (A) 6.0 x 12	30384	160	300	224 000	3 621 843	183 000	3 681 807	900 000	330	260	M36	207	
HD 6.0 x 16	30385	160	400	306 000	4 233 478	NA	NA	900 000	330	260	M36	228	
HD 6.0 x 20	30386	160	500	382 000	4 845 114	NA	NA	900 000	330	260	M36	250	
HD 6.0 x 24	30387	160	600	459 000	6 086 375	NA	NA	900 000	330	260	M36	309	
HD 6.0 x 30	30388	160	750	573 000	6 997 832	NA	NA	900 000	330	260	M36	341	
HD 6.0 x 36	30389	160	900	688 500	7 915 285	NA	NA	900 000	330	260	M36	373	
HD 6.0 X 42	30390	160	1 050	803 000	8 826 743	NA	NA	900 000	330	260	M36	405	
HD 6.0 x 48	30391	160	1 200	805 000	9 744 196	NA	NA	790 000	330	260	M36	438	

Notes:
1. HD shock absorbers will function satisfactorily at 5% of their maximum rated energy per cycle. HDA models will function satisfactorily at 10% of their maximum rated energy per cycle. If less than these values, a smaller model should be specified.
2. It is recommended that the customer consult with Enidine for safety related overhead crane applications.
3. The energy data listed is for ideal linear impacts only. If side load conditions exist in the application, contact Enidine for sizing assistance.
4. Rear flange mounting of 300 mm strokes and longer not recommended, mount both flanges.



	A	B	D	E	HD F	HDA F	H	HD Y	HDA Y	HD Z	HDA Z	Foot Mount Dimensions FA	FB	FC	FD	FE	FG	FJ	Charge Port Dimensions CA	CB	CC	Catalog No. (Model)
	591	215	80	125	375	385	40	435	445	186	176	400	340	33	278	60	140	30	230	143	25ß	**HD (A) 5.0 x 4**
	693	215	80	125	426	436	40	486	496	237	227	400	340	33	278	60	140	30	230	143	25ß	**HD (A) 5.0 x 6**
	795	215	80	125	477	487	40	537	547	288	278	400	340	33	278	60	140	30	230	143	25ß	**HD (A) 5.0 x 8**
	895	215	80	125	527	537	40	587	597	338	328	400	340	33	278	60	140	30	230	143	25ß	**HD (A) 5.0 x 10**
	997	215	80	125	578	588	40	638	648	389	379	400	340	33	278	60	140	30	230	143	25ß	**HD (A) 5.0 x 12**
	1 201	215	80	125	680	NA	40	740	NA	491	NA	400	340	33	278	60	140	30	230	143	25ß	**HD 5.0 x 16**
	1 504	215	80	125	882	NA	40	942	NA	592	NA	400	340	33	278	60	140	30	330	143	25ß	**HD 5.0 x 20**
	1 708	215	80	125	984	NA	40	1 044	NA	694	NA	400	340	33	278	60	140	30	330	143	25ß	**HD 5.0 x 24**
	1 910	215	80	125	1 085	NA	40	1 145	NA	795	NA	400	340	33	278	60	140	30	330	143	25ß	**HD 5.0 x 28**
	2 114	215	80	125	1 187	NA	40	1 247	NA	897	NA	400	340	33	278	60	140	30	330	143	25ß	**HD 5.0 x 32**
	2 520	215	80	125	1 390	NA	40	1 450	NA	1 100	NA	400	340	33	278	60	140	30	330	143	25ß	**HD 5.0 x 40**
	2 920	215	80	125	1 590	NA	40	1 650	NA	1 300	NA	400	340	33	278	60	140	30	330	143	25ß	**HD 5.0 x 48**
	637	275	100	160	391	401	50	461	471	211	201	450	380	40	333	70	168	35	197	170	30ß	**HD (A) 6.0 x 4**
	737	275	100	160	441	451	50	511	521	261	251	450	380	40	333	70	168	35	197	170	30ß	**HD (A) 6.0 x 6**
	839	275	100	160	492	502	50	562	572	312	302	450	380	40	333	70	168	35	197	170	30ß	**HD (A) 6.0 x 8**
	941	275	100	160	543	553	50	613	623	363	353	450	380	40	333	70	168	35	197	170	30ß	**HD (A) 6.0 x 10**
	1 043	275	100	160	594	604	50	664	674	414	404	450	380	40	333	70	168	35	197	170	30ß	**HD (A) 6.0 x 12**
	1 246	275	100	160	696	NA	50	766	NA	515	NA	450	380	40	333	70	168	35	197	170	30ß	**HD 6.0 x 16**
	1 450	275	100	160	798	NA	50	868	NA	617	NA	450	380	40	333	70	168	35	197	170	30ß	**HD 6.0 x 20**
	1 769	275	100	160	1 015	NA	50	1 085	NA	719	NA	450	380	40	333	70	168	35	312	170	30ß	**HD 6.0 x 24**
	2 073	275	100	160	1 167	NA	50	1 237	NA	871	NA	450	380	40	333	70	168	35	312	170	30ß	**HD 6.0 x 30**
	2 379	275	100	160	1 320	NA	50	1 390	NA	1 024	NA	450	380	40	333	70	168	35	312	170	30ß	**HD 6.0 x 36**
	2 683	275	100	160	1 472	NA	50	1 542	NA	1 176	NA	450	380	40	333	70	168	35	312	170	30ß	**HD 6.0 x 42**
	2 989	275	100	160	1 625	NA	50	1 695	NA	1 329	NA	450	380	40	333	70	168	35	312	170	30ß	**HD 6.0 x 48**

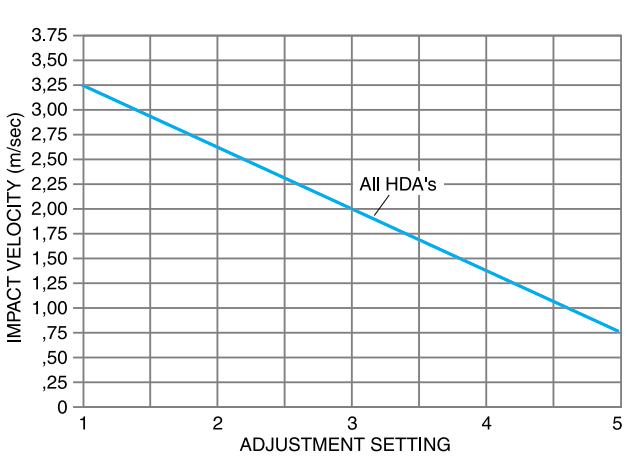
All dimensions in millimeters.

5. Nominal return force for HD 5.0 models: 1 760 N
6. Nominal return force for HD 6.0 models: 2 750 N
7. HDA models which have an impact velocity below 0.8 m/sec, please contact Enidine for sizing assistance.

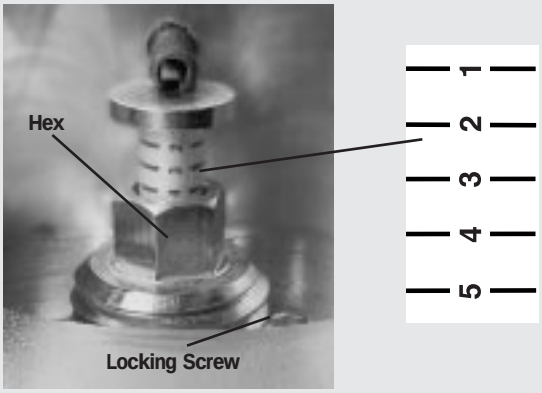
Useable Adjustment Settings

HDA

Useable Adjustment Setting Range
Red lines are model's maximum allowable propelling force.



Damping Force
Position 1 provides minimum damping force.
Position 5 provides maximum damping force.



Adjustment is accomplished by turning the hex. Once the desired setting has been reached, lock in place by tightening the locking screw.

After properly sizing a HDA shock absorber, useable range of adjustment settings can be determined for fine tuning:

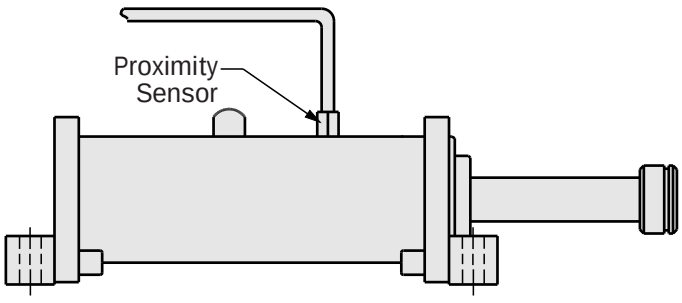
1. Locate the intersection point of the application's impact velocity and the HDA model graph line.
2. The intersection is the maximum adjustment setting to be used. Adjustments exceeding this setting could overload the shock absorber.
3. The useable adjustment setting range is from setting 1 to the maximum adjustment setting.

EXAMPLE: HDA

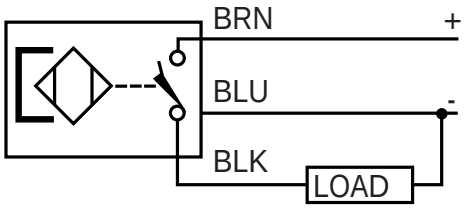
1. Impact velocity:	2.00 m/sec
2. Intersection point:	Adjustment setting 3
3. Useable adjustment setting range:	1 to 3

Optional Piston Rod Return Sensor

- 3 meter long, cable type, magnetic proximity sensor indicates complete piston rod return.
- If complete piston rod return does not occur the circuit remains open. This can be used to trigger a system shut-off.
- Contact Enidine for other available sensor types.



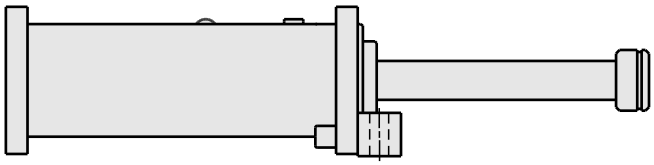
Sensor Specifications



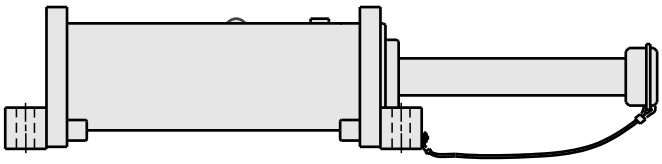
- Voltage 10 - 30V
- Load Current ≤ 200 mA
- Leakage Current ≤ 80 µA
- Load Capacitance ≤ 1.0 µF

Mounting Methods

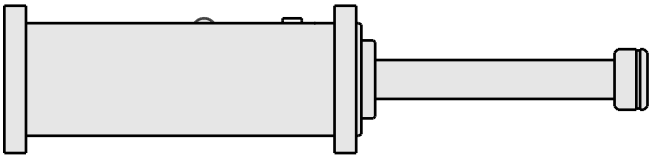
Typical mounting methods are shown below. Special mounting requirements can be accommodated upon request.



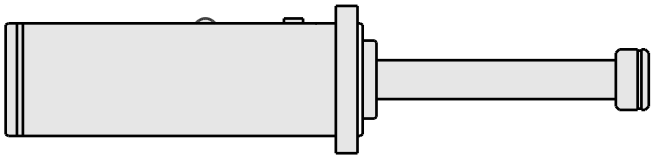
TM: Rear Flange Front Foot Mount



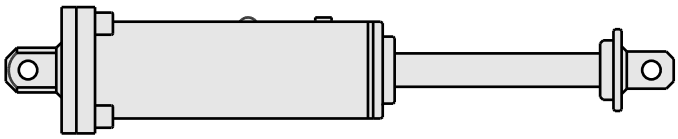
FM: Front and Rear Foot Mount
Also shown is optional safety cable, typically used in overhead applications.



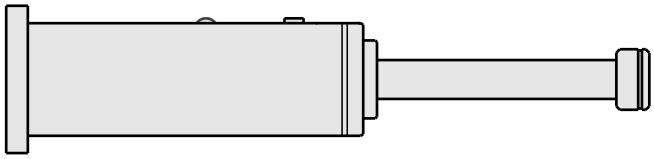
TF: Front and Rear Flanges



FF: Front Flange



Clevis Mounting Option
(Consult Enidine)



FR: Rear Flange

Note: Rear flange mounting not recommended for stroke lengths above 300 millimeters.

HD / HDA Ordering Information

Note: HD models are custom-designed, therefore all information must be provided to Enidine for unique part number assignment.

Example:

4	HD 3.0 x 5	TM	C	30322	APPLICATION DATA
Select quantity	Select HD (Non-Adjustable) or HDA (Adjustable) Catalog No. from Engineering Data Chart	Select mounting method • TM (Rear flange front foot mount) • FM (Front and rear foot mount) • TF (Front and rear flanges) • FF (Front flange) • FR (Rear flange)	Options • C (Sensor + cable) • SC (Safety cable)	Base Number Reference	Specify for HD models only • Vertical or horizontal motion • Weight • Impact velocity • Propelling force (if any) • Cycles / Hr • Other (temperature or other environmental conditions, safety standards, etc.)

CERTIFIED ENIDINE ISO 9001