

Heavy Duty Shock Absorbers

HDN, HDA Series

Overview

ITT Enidine Heavy Duty Series 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 a wide variety of stroke lengths and damping characteristics to increase equipment life and meet stringent deceleration requirements.

HDN Series

Custom-orificed design accommodates specified damping requirements. Computer generated output performance simulation is used to optimize the orifice configuration. Available in standard bore dimensions of up to 100mm and strokes over 1 524mm.

HDA Series

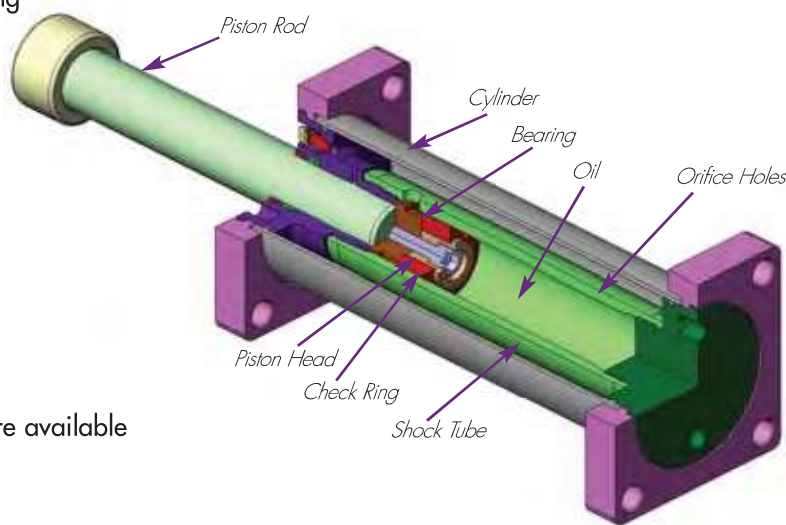
Adjustable units enable the user to modify shock absorber resistance to accommodate load velocity variations, with strokes up to 305mm. Standard adjustable configurations available.



HDN Series

Features and Benefits HDN, HDA

- Designed with environmentally friendly materials and fluids.
- Compact design smoothly and safely decelerates large energy capacity loads up to 330 000 Nm.
- Internal charged air/oil accumulator replaces mechanical return springs, providing shorter overall length and reduced weight. **Optional** Bladder Accumulator (BA) for higher cycle rates also available.
- Engineered to meet OSHA, AISE, CMAA and other safety specifications such as DIN and FEM.
- Wide variety of optional configurations including bellows, clevis mounts and safety cables.
- Painted external components provide excellent corrosion protection.
- Epoxy painting and special rod materials are available for use in highly corrosive environments.
- All sizes are fully field repairable.
- Piston rod extension sensor systems available for re-use safety requirements.
- Incorporating optional fluids and seal packages can expand standard operating temperature range from -10°C to 60°C to -40°C to 100°C.

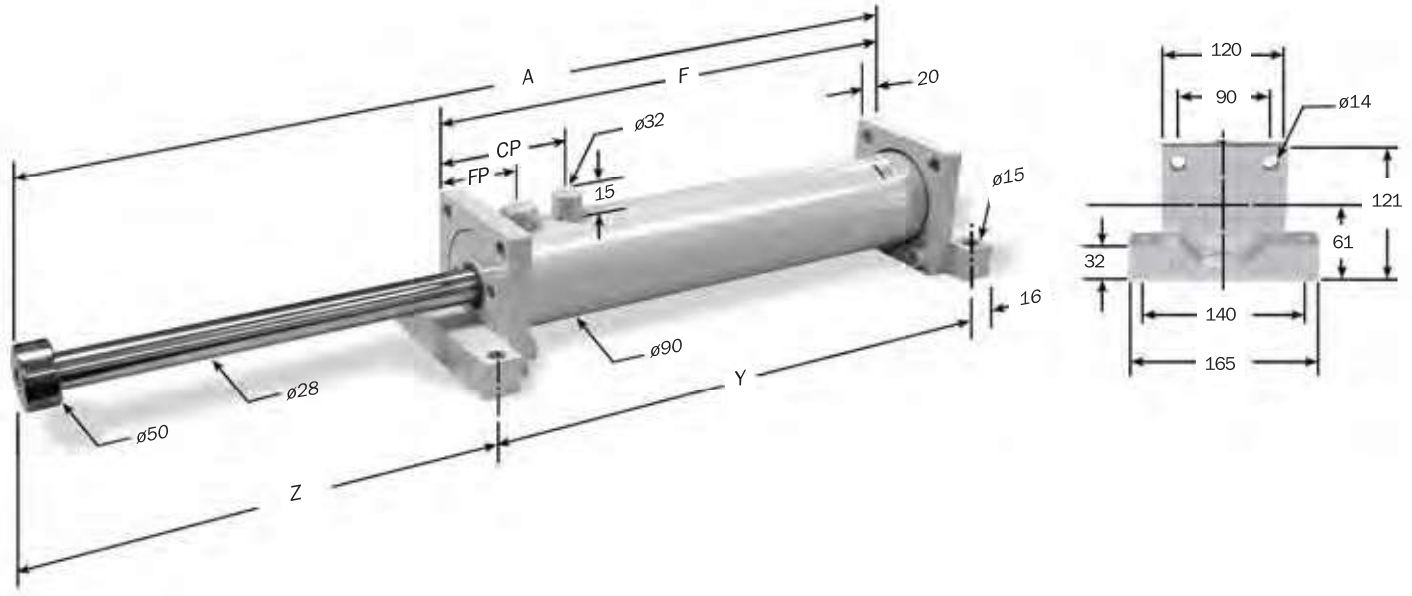


Heavy Duty Shock Absorbers

HDN 1.5 Series

HDN 1.5 x 2 → HDN 1.5 x 32 Series

Technical Data



** HDN w/o BA option contains only a single charge/fill port.
* Denotes Shock Absorber Bladder Accumulator Option.
Note: For TF, FF and FR mounting, delete front foot and dimensions.

Dimensions are in millimeters.

Catalog No./ Model	(S) Stroke mm	(E _T) Max. Nm/cycle	(E _T C) Max. Nm/hr	(F _p) Max. Shock Force N	Nominal Return Force BA*	Nominal Return Force w/o BA*	A mm	F mm	Y mm	Z mm	With BA		CP** w/o BA* mm	Mass Kg
											CP BA* mm	FP BA* mm		
HDN 1.5 x 2	50	3 200	189 000	70 060	220	320	310	208	240	86	139	86	41	10
HDN 1.5 x 4	100	6 100	368 000	70 060	220	410	410	258	290	136	139	86	41	12
HDN 1.5 x 6	150	9 100	546 700	70 060	220	450	510	308	340	186	139	86	41	12
HDN 1.5 x 8	200	12 200	732 500	70 060	220	525	613	360	392	237	139	86	41	13
HDN 1.5 x 10	250	15 200	781 000	70 060	220	600	715	411	443	288	139	86	41	14
HDN 1.5 x 12	300	18 300	877 900	70 060	220	920	817	462	494	339	139	86	41	16
HDN 1.5 x 14	350	20 900	972 900	70 060	220	1 120	918	512	544	390	139	86	41	17
HDN 1.5 x 16	400	23 300	1 069 800	60 060	220	1 120	1 019	563	595	440	139	86	41	18
HDN 1.5 x 18	450	25 300	1 166 700	47 820	220	1 120	1 121	614	646	491	139	86	41	19
HDN 1.5 x 20	500	27 200	1 263 600	38 920	220	1 120	1 223	665	697	542	139	86	41	20
HDN 1.5 x 24	600	30 500	1 457 400	27 800	220	1 120	1 427	767	799	644	139	86	41	23
HDN 1.5 x 28	713	33 600	1 649 300	21 130	220	1 120	1 629	868	900	745	139	86	41	20
HDN 1.5 x 32	813	36 500	1 839 300	16 460	220	1 120	1 830	968	1 000	846	139	86	41	23

- Notes: 1. HDN 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 ITT 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 ITT Enidine for sizing assistance.
4. Rear flange mounting of 300 mm strokes and longer not recommended. Front and rear flange or foot mount configurations are recommended.
5. Maximum cycle rate is 60 cycles/hr. for HDN with BA (Bladder Accumulator) option and 30 cycles/hr. without BA option.
6. For impact velocities over 4.5 m/s, consult factory.

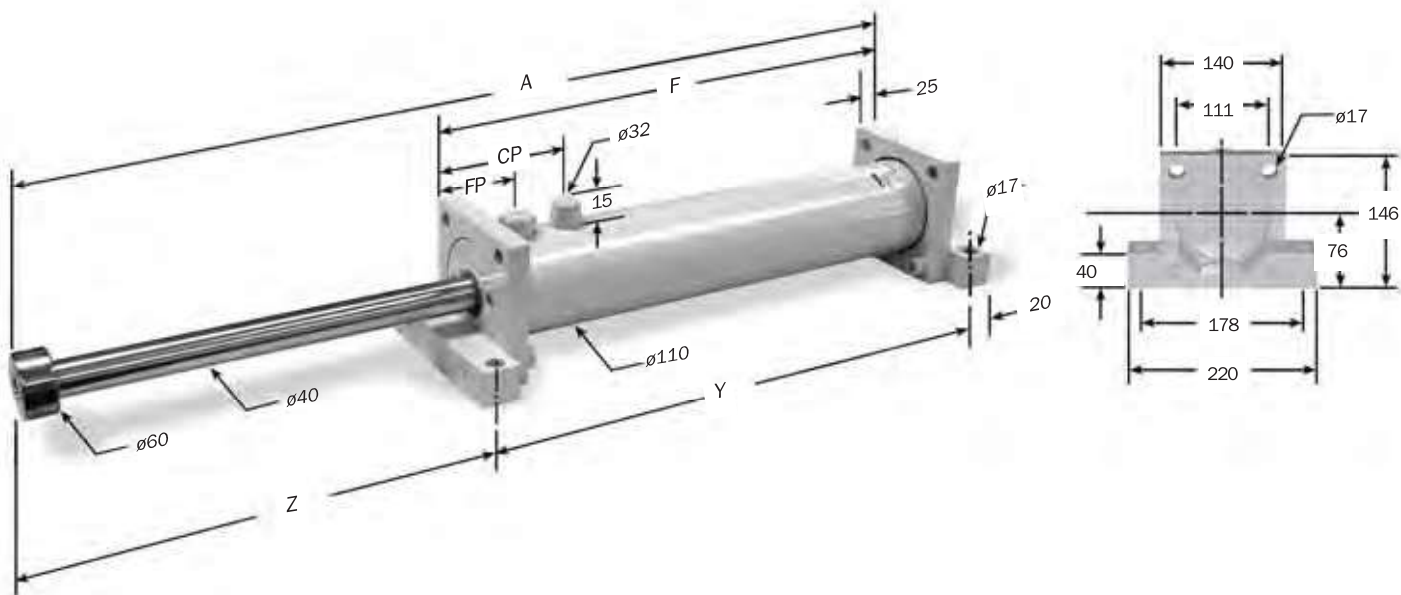
Heavy Duty Series Shock Absorber

HDN 2.0 Series

HDN 2.0 x 6 → HDN 2.0 x 56 Series

Technical Data

Heavy Duty Series



** HDN w/o BA option contains only a single charge/fill port.

* Denotes Shock Absorber Bladder Accumulator Option.

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

Dimensions are in millimeters.

Catalog No./ Model	(S) Stroke mm	(E _T) Max. Nm/cycle	(E _T C) Max. Nm/hr	(F _p) Max. Shock Force N	Nominal Return Force BA*	Nominal Return Force w/o BA*	A mm	F mm	Y mm	Z mm	With BA		CP** w/o BA*	Mass Kg
											BA* mm	BA* mm		
HDN 2.0 x 6	152	14 400	862 100	111 200	535	870	553	339	379	194	176	96	46	23
HDN 2.0 x 8	203	19 200	913 700	111 200	535	1 040	655	390	430	245	176	96	46	25
HDN 2.0 x 10	250	24 000	1 033 200	111 200	535	1 340	757	441	481	296	176	96	46	23
HDN 2.0 x 12	300	28 600	1 152 700	111 200	535	2 290	859	492	532	347	176	96	46	25
HDN 2.0 x 14	350	32 300	1 272 100	111 200	535	2 290	960	543	583	397	176	96	46	27
HDN 2.0 x 16	400	36 000	1 391 600	111 200	535	2 290	1 062	594	634	448	176	96	46	29
HDN 2.0 x 18	450	39 700	1 511 100	111 200	535	2 290	1 164	645	685	499	176	96	46	31
HDN 2.0 x 20	500	43 300	1 628 300	111 200	535	2 290	1 265	695	735	550	176	96	46	33
HDN 2.0 x 24	600	50 700	1 867 200	111 200	535	2 290	1 469	797	837	652	176	96	46	36
HDN 2.0 x 28	700	58 200	2 106 200	111 200	535	2 290	1 672	899	939	753	176	96	46	42
HDN 2.0 x 32	800	70 700	2 527 900	111 200	535	2 290	1 953	1 079	1 119	854	256	176	46	49
HDN 2.0 x 36	900	77 900	2 762 200	100 000	535	2 290	2 151	1 179	1 219	952	256	176	46	53
HDN 2.0 x 40	1 000	84 400	2 996 500	84 500	535	2 290	2 351	1 279	1 319	1 052	256	176	46	56
HDN 2.0 x 48	1 200	95 400	3 465 000	60 000	535	2 290	2 751	1 479	1 519	1 252	256	176	46	64
HDN 2.0 x 56	1 400	104 200	3 957 000	35 100	535	2 290	3 171	1 689	1 729	1 462	975	176	46	73

Notes: 1. HDN 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.

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3. The energy data listed is for ideal linear impacts only. If side load conditions exist in the application, contact ITT Enidine for sizing assistance.

4. Rear flange mounting of 300 mm strokes and longer not recommended. Front and rear flange or foot mount configurations are recommended.

5. Maximum cycle rate is 60 cycles/hr. for HDN with BA (Bladder Accumulator) option and 30 cycles/hr. without BA option.

6. For impact velocities over 4.5 m/s, consult factory.

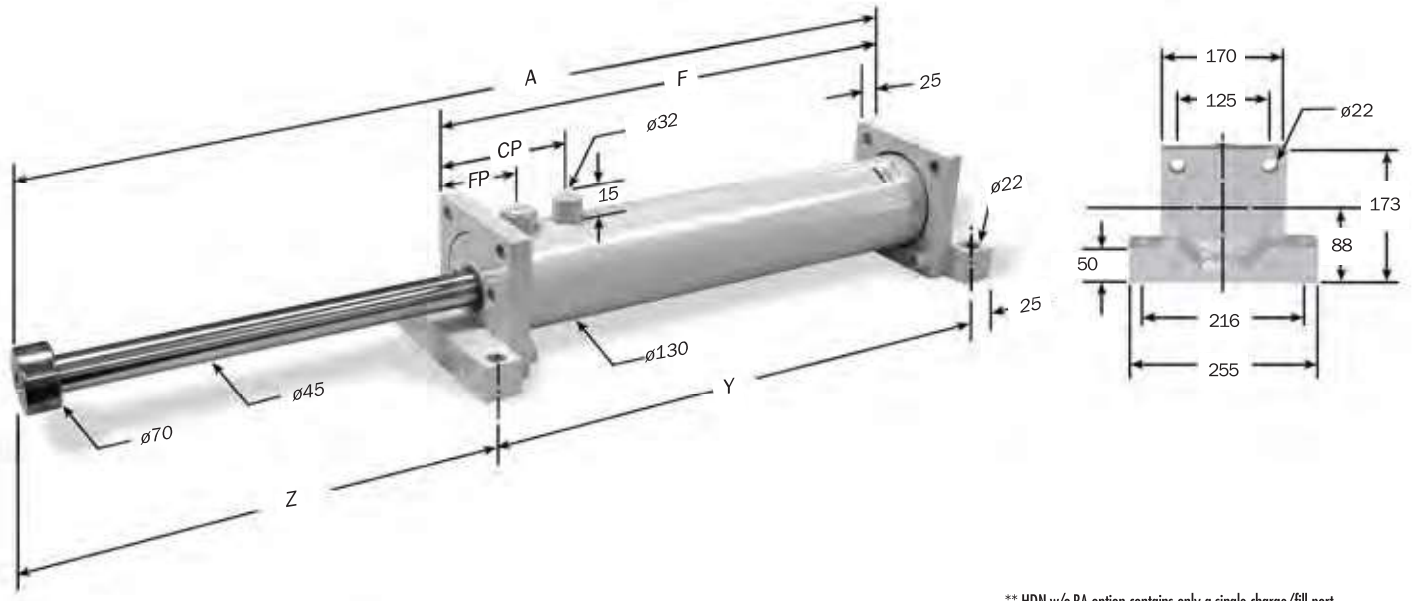
7. ** HDN 2.0 x 56 has two charge ports.

Heavy Duty Series Shock Absorber

HDN 3.0 Series

Technical Data

HDN 3.0 x 2 → HDN 3.0 x 60 Series



Dimensions are in millimeters.

** HDN w/o BA option contains only a single charge/fill port.
* Denotes Shock Absorber Bladder Accumulator Option.
Note: For TF, FF and FR mounting, delete front foot and dimensions.

Catalog No./ Model	(S) Stroke mm	(E _T) Max. Nm/cycle	(E _T C) Max. Nm/hr	(F _P) Max. Initial Shock Force N	Nominal Return Force BA* N	Nominal Return Force w/o BA* N	A (mm)	F (mm)	Y (mm)	Z (mm)	CP BA* mm	FP BA* mm	CP** w/o BA* mm	Mass Kg
HDN 3.0 x 2	50	9 600	578 500	222 400	670	1 130	336	203	253	108	128	61	46	21
HDN 3.0 x 3	75	14 600	659 000	222 400	710	1 810	387	229	279	133	128	61	46	22
HDN 3.0 x 5	125	24 200	805 700	222 400	735	2 895	489	280	330	184	128	61	46	25
HDN 3.0 x 8	200	35 700	1 021 500	222 400	755	2 895	640	355	405	260	128	61	46	29
HDN 3.0 x 10	250	43 200	1 168 300	222 400	780	2 895	742	406	456	311	128	61	46	32
HDN 3.0 x 12	300	50 700	1 315 000	222 400	780	2 895	844	457	507	362	128	61	46	35
HDN 3.0 x 14	350	62 900	1 605 700	222 400	800	2 895	995	558	608	412	178	111	46	43
HDN 3.0 x 16	400	70 400	1 752 400	222 400	800	2 895	1 097	609	659	463	178	111	46	45
HDN 3.0 x 18	450	77 900	1 899 200	222 400	800	2 895	1 199	660	710	514	178	111	46	48
HDN 3.0 x 20	500	85 400	2 046 000	222 400	800	2 895	1 301	711	761	565	178	111	46	51
HDN 3.0 x 24	600	100 300	2 336 600	222 400	800	2 895	1 504	812	862	667	178	111	46	57
HDN 3.0 x 28	700	115 300	2 630 100	222 400	800	2 895	1 707	914	964	768	178	111	46	62
HDN 3.0 x 32	800	130 200	2 920 700	180 200	800	2 895	1 910	1 015	1 065	870	178	161	46	68
HDN 3.0 x 36	900	147 700	3 349 500	160 100	800	2 895	2 156	1 164	1 214	967	228	161	46	77
HDN 3.0 x 40	1 000	159 600	3 637 200	140 000	800	2 895	2 356	1 264	1 314	1 067	228	161	46	85
HDN 3.0 x 48	1 200	179 700	4 212 800	95 600	825	2 895	2 756	1 464	1 514	1 267	228	161	46	94
HDN 3.0 x 56	1 400	196 700	4 788 300	55 600	825	2 895	3 156	1 664	1 714	1 467	947	161	46	103
HDN 3.0 x 60	1 500	206 800	5 116 300	53 200	825	2 895	3 384	1 778	1 828	1 580	1 004	161	46	106
HDN 3.0 x 64	1 629	217 100	5 210 400	53 200	825	2 895	3 688	1 980	2 030	1 683	439/1 527	260	46	110
HDN 3.0 x 72	1 830	238 000	6 242 000	53 200	825	2 895	4 089	2 180	2 230	1 884	439/1 727	260	46	118

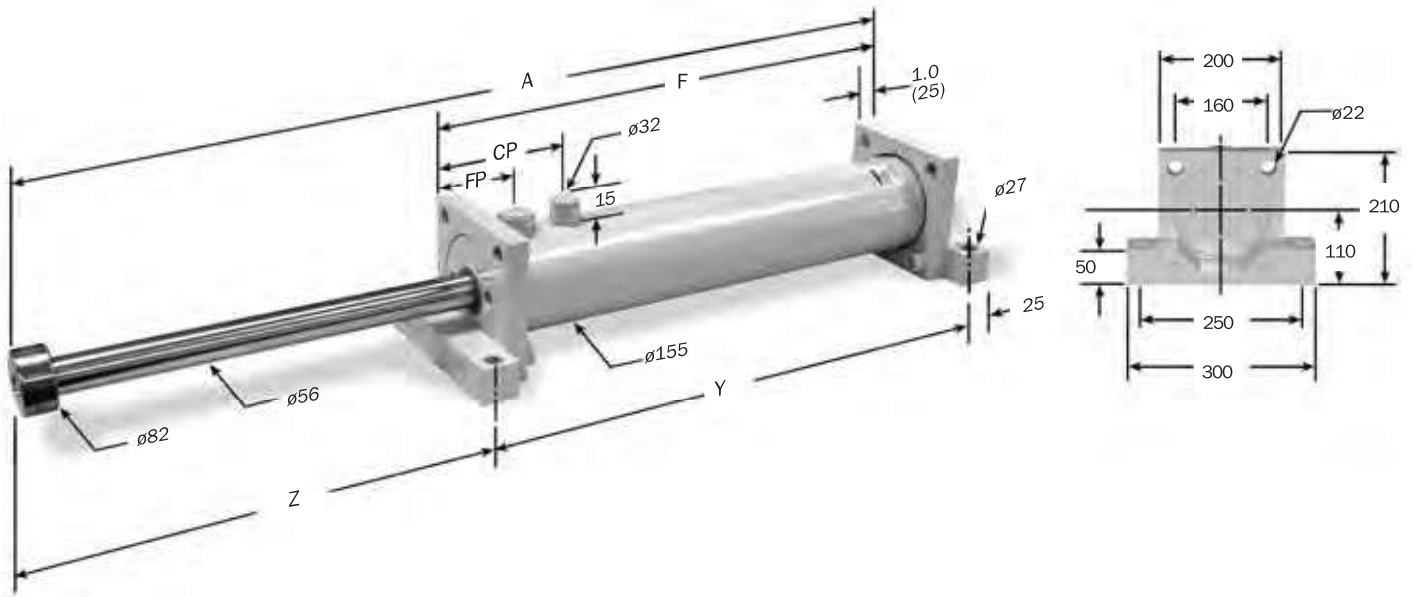
- Notes: 1. HDN shock absorbers will function satisfactorily at 5% of their maximum rated energy per cycle. If less than these values, a smaller model should be specified.
2. It is recommended that the customer consult ITT Enidine for safety-related overhead crane applications.
3. The energy data listed is for ideal linear impacts only. If side load conditions exist in the application, contact ITT Enidine for sizing assistance.
4. Rear flange mounting of 300 mm strokes and longer not recommended. Front and rear flange or foot mount configurations are recommended.
5. Maximum cycle rate is 60 cycles/hr. for HDN with BA (Bladder Accumulator) option and 30 cycles/hr. without BA option.
6. For impact velocities over 4.5 m/s, consult factory.
7. ** HDN 3.0 x 56 and HDN 3.0 x 60 have 2 charge ports.

Heavy Duty Series Shock Absorber

HDN 3.5 Series

HDN 3.5 x 2 → HDN 3.5 x 56 Series

Technical Data



** HDN w/o BA option contains only a single charge/fill port.

* Denotes Shock Absorber Bladder Accumulator Option.

Dimensions are in millimeters.

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

Catalog No./ Model	(S) Stroke mm	(E _T) Max. Nm/cycle	(E _T C) Max. Nm/hr	(F _P) Max. Shock Force N	Nominal Return Force BA*	Nominal Return Force w/o BA*	A mm	F mm	Y mm	Z mm	With BA		CP** w/o BA* mm	Mass Kg
											CP BA* mm	FP BA* mm		
HDN 3.5 x 2	50	13 000	781 000	300 250	960	2 020	354	244	294	85	134	77	52	33
HDN 3.5 x 4	100	26 000	993 500	300 250	1 020	2 710	456	295	345	136	134	77	52	37
HDN 3.5 x 6	150	38 800	1 161 900	300 250	1 160	4 480	556	345	395	186	134	77	52	41
HDN 3.5 x 8	200	50 900	1 333 600	300 250	1 180	4 480	658	396	446	237	134	77	52	45
HDN 3.5 x 10	250	60 800	1 505 400	300 250	1 200	4 480	760	447	497	288	134	77	52	49
HDN 3.5 x 12	300	70 800	1 677 200	300 250	1 200	4 480	862	498	548	339	134	77	52	53
HDN 3.5 x 16	400	90 500	2 017 300	300 250	1 225	4 480	1 064	599	649	440	134	77	52	60
HDN 3.5 x 20	500	118 800	2 546 100	300 250	1 225	4 480	1 323	756	806	542	189	132	52	74
HDN 3.5 x 24	600	138 700	2 889 600	300 250	1 250	4 480	1 527	858	908	644	189	132	52	81
HDN 3.5 x 28	700	158 500	3 229 700	300 250	1 250	4 480	1 729	959	1 009	745	189	132	52	89
HDN 3.5 x 32	800	178 400	3 573 200	300 250	1 250	4 480	1 933	1 061	1 111	847	189	132	52	97
HDN 3.5 x 36	900	198 300	3 916 800	260 200	1 250	4 480	2 137	1 163	1 213	949	189	132	52	105
HDN 3.5 x 40	1 000	216 800	4 256 900	215 700	1 250	4 480	2 339	1 264	1 314	1 050	189	132	52	112
HDN 3.5 x 48	1 200	247 200	4 930 500	155 700	1 250	4 480	2 739	1 464	1 514	1 250	189	132	52	128
HDN 3.5 x 56	1 400	273 300	5 604 000	112 500	2 100	4 480	2 739	1 464	1 514	1 250	908	132	52	128

Notes: 1. HDN 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 ITT 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 ITT Enidine for sizing assistance.

4. Rear flange mounting of 300 mm strokes and longer not recommended. Front and rear flange or foot mount configurations are recommended.

5. Maximum cycle rate is 60 cycles/hr. for HDN with BA (Bladder Accumulator) option and 30 cycles/hr. without BA option.

6. For impact velocities over 4.5 m/s, consult factory.

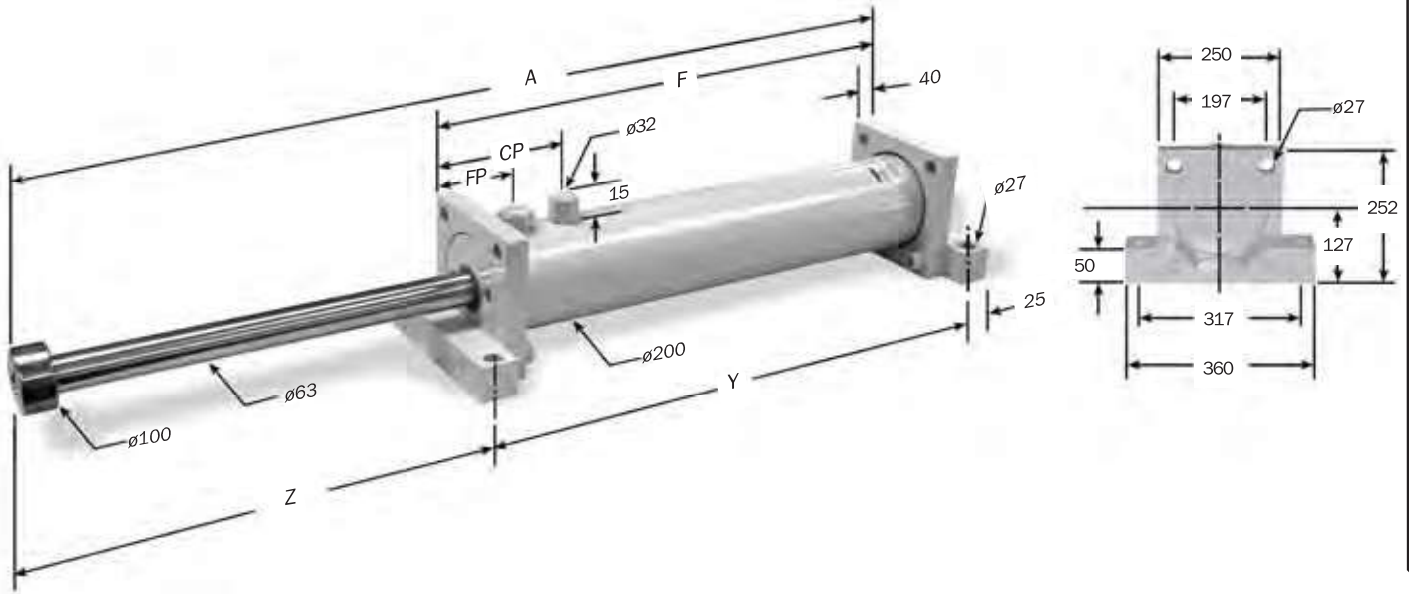
7. ** HDN 3.5 x 56 has two charge ports.

Heavy Duty Series Shock Absorber

HDN 4.0 Series

HDN 4.0 x 2 → HDN 4.0 x 48 Series

Technical Data



** HDN w/o BA option contains only a single charge/fill port.
* Denotes Shock Absorber Bladder Accumulator Option.
Note: For TF, FF and FR mounting, delete front foot and dimensions.

Dimensions are in millimeters.

Catalog No./ Model	(S) Stroke mm	(E _T) Max. Nm/cycle	(E _{T-C}) Max. Nm/hr	(F _P) Max. Shock Force N	Nominal Return Force BA*	Nominal Return Force w/o BA*	A mm	F mm	Y mm	Z mm	With BA			Mass Kg
											CP BA* mm	FP BA* mm	CP** w/o BA* mm	
HDN 4.0 x 2	50	15 700	943 700	355 900	1 100	1 900	430	294	344	111	206	108	64	64
HDN 4.0 x 4	100	31 200	1 534 300	355 900	1 200	2 160	532	345	395	162	206	108	64	70
HDN 4.0 x 6	150	46 279	1 756 700	355 900	1 200	3 050	632	395	445	212	206	108	64	76
HDN 4.0 x 8	200	62 000	1 987 900	355 900	1 200	4 370	735	447	497	263	206	108	64	82
HDN 4.0 x 10	250	77 100	2 210 300	355 900	1 200	5 465	836	497	547	314	206	108	64	87
HDN 4.0 x 12	300	92 600	1 855 100	355 900	1 225	4 440	1 032	642	692	365	300	202	64	108
HDN 4.0 x 16	400	123 100	3 304 300	355 900	1 225	5 650	1 234	743	793	466	300	202	64	120
HDN 4.0 x 20	500	154 000	3 757 900	355 900	1 245	5 145	1 438	845	895	568	300	202	64	131
HDN 4.0 x 24	600	184 800	4 211 500	355 900	1 245	5 675	1 642	947	997	670	300	202	64	144
HDN 4.0 x 28	700	215 100	4 660 700	355 900	1 245	5 675	1 844	1 048	1 098	771	300	202	64	157
HDN 4.0 x 32	800	240 500	5 114 300	355 900	1 245	5 675	2 048	1 150	1 200	873	300	202	64	170
HDN 4.0 x 36	900	265 900	5 567 900	355 900	1 245	5 675	2 252	1 252	1 302	975	300	202	64	183
HDN 4.0 x 40	1 000	289 900	6 017 100	355 900	1 245	5 675	2 454	1 353	1 403	1 076	300	202	64	195
HDN 4.0 x 48	1 200	329 300	6 919 900	200 000	1 245	5 675	2 854	1 556	1 606	1 273	300	202	64	220

- Notes: 1. HDN 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 ITT 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 ITT Enidine for sizing assistance.
4. Rear flange mounting of 300 mm strokes and longer not recommended. Front and rear flange or foot mount configurations are recommended.
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6. For impact velocities over 4.5 m/s, consult factory.

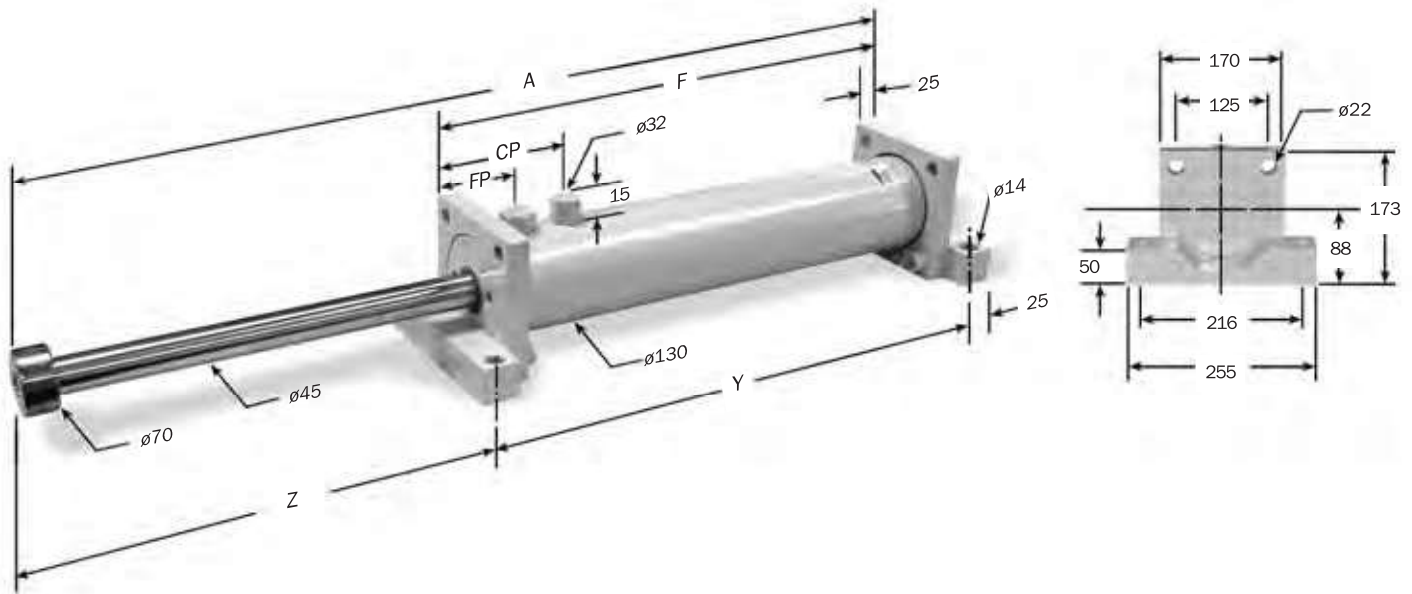
Heavy Duty Adjustable Series Shock Absorber

HDA 3.0 Series

HDA 3.0 x 2 → HDA 3.0 x 12 Series

Technical Data

Heavy Duty Series



Dimensions are in millimeters.

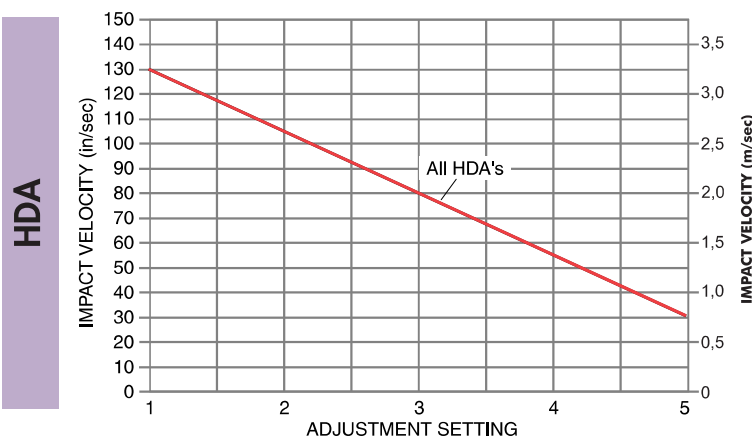
Note: For TF, FF and FR mounting, delete front foot and dimensions.

Catalog No./ Model	(S) Stroke mm	(E ₁) Max. Nm/cycle	(E ₁ C) Max. Nm/hr	(F _p) Max. End Shock Force N	Nominal Return Force BA* N	A mm	F mm	Y mm	Z mm	With BA		Mass Kg
										CP* mm	FP* mm	
HDA 3.0 x 2	50	4 500	271 200	222 400	660	336	213	263	98	112	61	21
HDA 3.0 x 3	75	6 800	406 700	222 400	710	387	239	289	123	112	61	22
HDA 3.0 x 5	125	11 300	677 900	222 400	730	489	290	340	174	112	61	25
HDA 3.0 x 8	200	18 100	1 050 300	222 400	765	640	365	415	250	112	61	29
HDA 3.0 x 10	250	22 600	1 197 100	222 400	775	742	416	466	301	112	61	32
HDA 3.0 x 12	300	27 200	1 343 800	222 400	775	844	467	517	352	112	61	35

- Notes: 1. HDA 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 ITT 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 ITT Enidine for sizing assistance.
 4. Rear flange mounting of 300 mm strokes and longer not recommended. Front and rear flange or foot mount configurations are recommended.
 5. Maximum cycle rate is 60 cycles/hr.
 6. HDA models which have an impact velocity below .8 m/sec, please contact ITT Enidine for assistance.
 7. Maximum allowable applied propelling force: 111 200 N

Adjustment Techniques

Useable Adjustment Setting Range



After properly sizing an HDA shock absorber, the useable range of adjustment settings can be determined:

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 as determined in step 2.

EXAMPLE: HDA Series

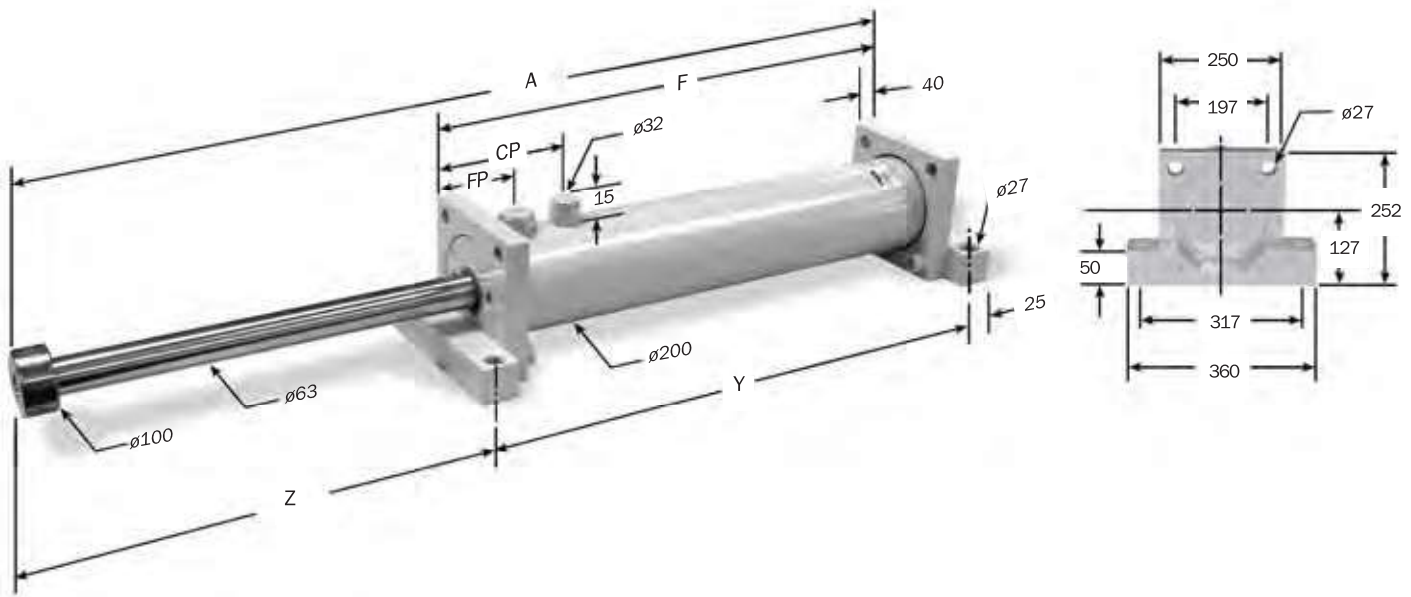
1. Impact Velocity: 2 m/s
2. Intersection Point: Adjustment Setting 3
3. Useable Adjustment Setting Range: 1 to 3

Heavy Duty Adjustable Series Shock Absorber

HDA 4.0 Series

HDA 4.0 x 2 → HDA 4.0 x 10 Series

Technical Data



Dimensions are in millimeters.

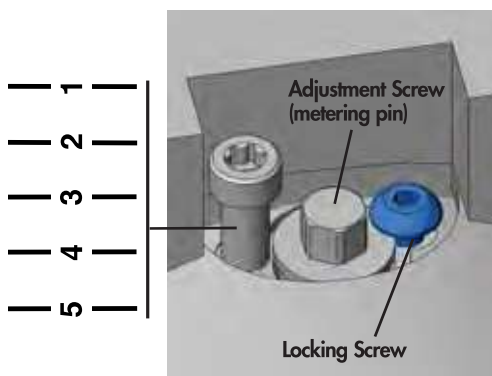
Note: For TF, FF and FR mounting, delete front foot and dimensions.

Catalog No./ Model	(S) Stroke mm	(E _T) Max. Nm/cycle	(E _T C) Max. Nm/hr	(F _P) Max. End Shock Force N	Nominal Return Force BA* N	A mm	F mm	Y mm	Z mm	With BA		Mass Kg
										CP* mm	FP* mm	
HDA 4.0 x 2	50	13 600	813 500	355 900	1 125	430	304	354	101	180	108	64
HDA 4.0 x 4	100	27 100	1 578 800	355 900	1 125	532	355	405	152	180	108	70
HDA 4.0 x 6	150	40 700	1 801 100	355 900	1 125	632	405	455	202	180	108	76
HDA 4.0 x 8	200	54 200	2 032 400	355 900	1 125	735	457	507	253	180	108	82
HDA 4.0 x 10	250	67 800	2 254 700	355 900	1 125	836	507	557	304	180	108	87

- Notes: 1. HDA 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 ITT 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 ITT Enidine for sizing assistance.
 4. Rear flange mounting of 300 mm strokes and longer not recommended. Front and rear flange or foot mount configurations are recommended.
 5. Maximum cycle rate is 60 cycles/hr.
 6. HDA models which have an impact velocity below .8 m/sec., please contact Enidine for assistance.
 7. Maximum allowable applied propelling force: 177 900 N

Damping Force

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



Adjustment Technique

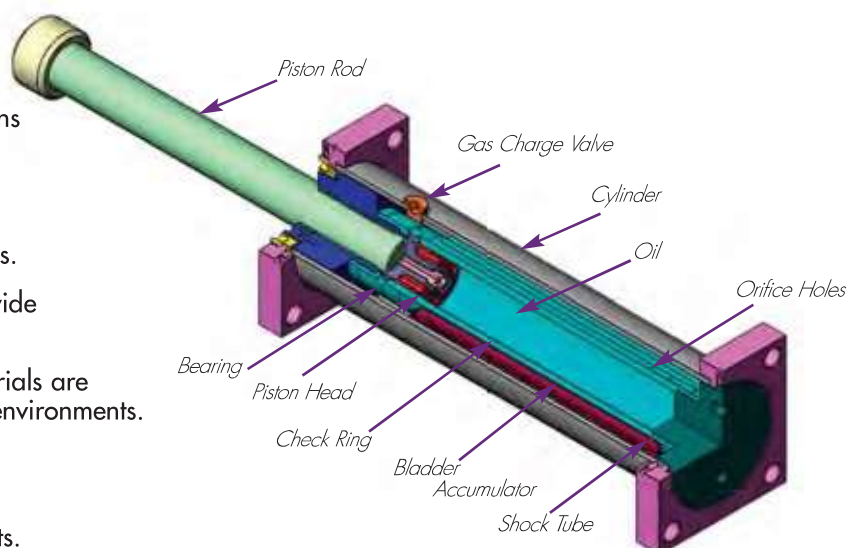
1. Loosen button head lock screw.
2. Set adjustment screw to desired setting.
3. Tighten button head lock screw on shoulder of adjustment screw.

HD Series

Custom-orificed design accommodates specified damping requirements. Computer generated output performance simulation is used to optimize the orifice configuration. Available in standard bore dimensions of up to 5 in. (125mm) and 6 in. (156mm) with strokes over 60 in. (1525mm).

**Features and Benefits HD**

- Compact design smoothly and safely decelerates large energy capacity loads up to 900 000 Nm.
- Engineered to meet OSHA, AISE, CMAA 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.
- Zinc plated external components provide enhanced corrosion protection.
- Epoxy painting and special rod materials are available for use in highly corrosive environments.
- All sizes are fully field repairable.
- Piston rod extension sensor systems available for reuse safety requirements.
- Incorporating optional fluids and seal packages can expand standard operating temperature range from -10°C to 60°C to -40°C to 100°C .

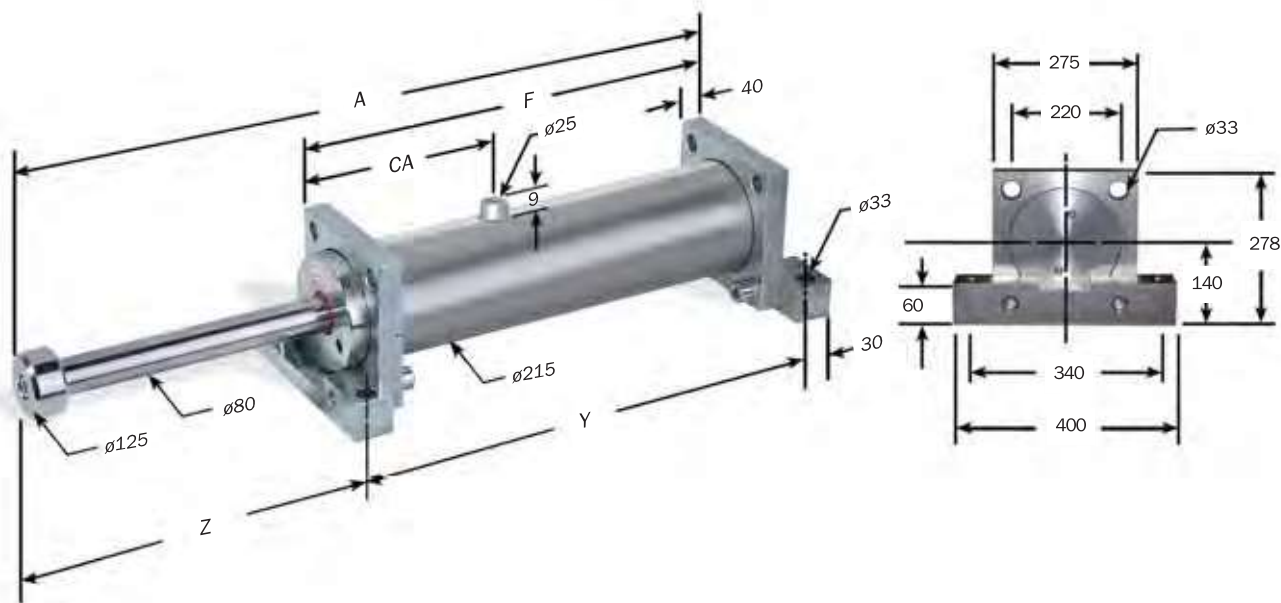


Heavy Duty Series Shock Absorber

HD 5.0 Series

HD 5.0 x 4 → HD 5.0 x 48 Series

Technical Data



Dimensions are in millimeters.

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

Catalog No./ Model	(S) Stroke mm	(E _T) Max. Nm/cycle	(E _T C) Max. Nm/hr	(F _P) Max. Shock Force N	Nominal Return Force BA* N	A mm	F mm	Y mm	Z mm	CA mm	Mass Kg
HD 5.0 x 4	100	46 700	1 762 621	550 000	1 760	591	37.5	435	186	230	87
HD 5.0 x 6	150	70 000	2 002 337	550 000	1 760	693	426	486	237	230	94
HD 5.0 x 8	200	93 500	2 242 053	550 000	1 760	795	477	537	288	230	101
HD 5.0 x 10	250	117 000	2 477 070	550 000	1 760	895	527	587	338	230	108
HD 5.0 x 12	300	140 000	2 716 786	550 000	1 760	997	578	638	389	230	114
HD 5.0 x 16	400	187 000	3 196 219	550 000	1 760	1 201	680	740	491	230	128
HD 5.0 x 20	500	234 000	4 145 684	550 000	1 760	1 504	882	942	592	230	158
HD 5.0 x 24	600	280 000	4 625 117	550 000	1 760	1 708	984	1 044	694	230	171
HD 5.0 x 28	700	327 000	5 099 849	550 000	1 760	1 910	1 085	1 145	795	230	185
HD 5.0 x 32	800	374 000	5 579 282	550 000	1 760	2 114	1 187	1 247	897	230	198
HD 5.0 x 40	1 000	467 000	6 533 447	550 000	1 760	2 520	1 390	1 450	1 100	231	225
HD 5.0 x 48	1 200	535 800	7 487 613	410 000	1 760	2 920	1 590	1 650	1 300	230	242

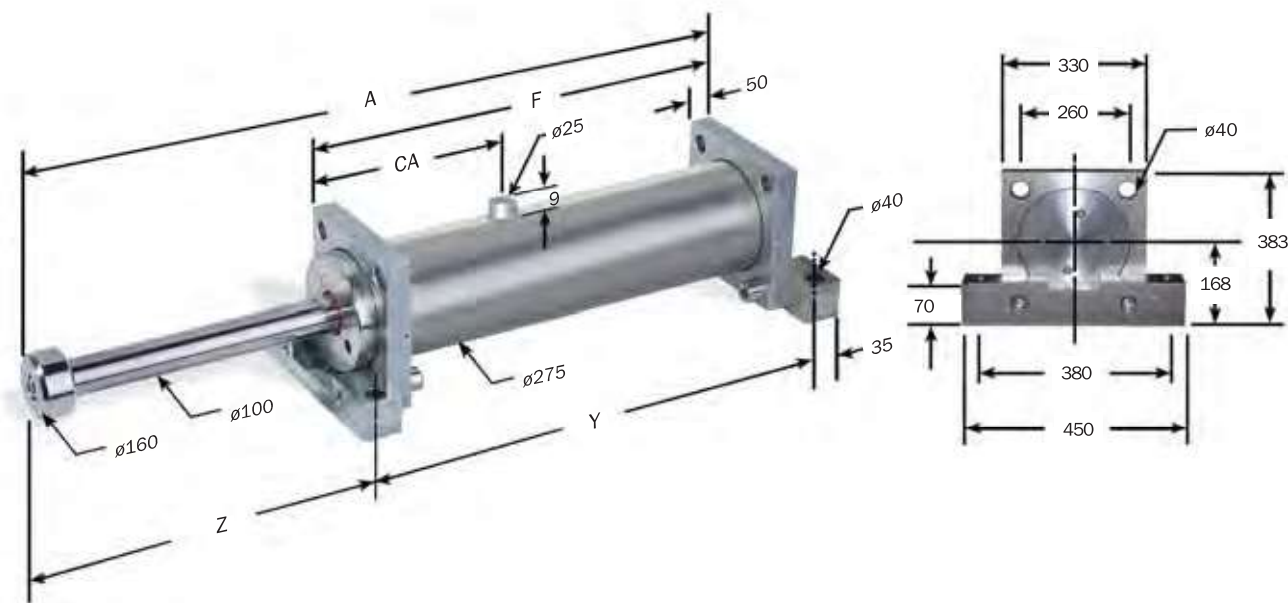
- Notes: 1. HD shock absorbers will function satisfactorily at 5% of their maximum rated energy per cycle.
HDA models will function satisfactorily at 10% of their maximum rated energy per cycle. If less than these values, a smaller model should be specified.
2. It is recommended that the customer consult ITT 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 ITT Enidine for sizing assistance.
4. Rear flange mounting of 300 mm strokes and longer not recommended. Front and rear flange or foot mount configurations are recommended.
5. Maximum cycle rate is 60 cycles/hr.
6. For impact velocities over 4.5 m/s, consult factory.

Heavy Duty Series Shock Absorber

HD 6.0 Series

HD 6.0 x 4 → HD 6.0 x 48 Series

Technical Data



Dimensions are in millimeters.

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

Catalog No./ Model	(S) Stroke mm	(E _T) Max. Nm/cycle	(E _T -C) Max. Nm/hr	(F _P) Max. Shock Force N	Nominal Return Force BA* N	A mm	F mm	Y mm	Z mm	CA mm	Mass Kg
HD(A) 6.0 x 4	100	76 500	2 404 568	900 000	2 750	637	391	461	211	197	164
HD(A) 6.0 x 6	150	114 000	2 704 389	900 000	2 750	737	441	511	261	197	175
HD(A) 6.0 x 8	200	153 000	3 004 211	900 000	2 750	839	492	562	312	197	186
HD(A) 6.0 x 10	250	191 000	3 316 025	900 000	2 750	941	543	613	363	197	196
HD(A) 6.0 x 12	300	224 000	3 621 843	900 000	2 750	1 043	594	664	414	197	207
HD 6.0 x 16	400	306 000	4 233 478	900 000	2 750	1 246	696	766	515	197	228
HD 6.0 x 20	500	382 000	4 845 114	900 000	2 750	1 450	798	868	617	197	250
HD 6.0 x 24	600	459 000	6 086 375	900 000	2 750	1 769	1 015	1 085	719	312	309
HD 6.0 x 30	750	573 000	6 997 832	900 000	2 750	2 073	1 167	1 237	871	312	341
HD 6.0 x 36	900	688 500	7 915 285	900 000	2 750	2 379	1 320	1 390	1 024	312	373
HD 6.0 X 42	1 050	803 000	8 826 743	900 000	2 750	2 683	1 472	1 542	1 176	312	405
HD 6.0 x 48	1 200	898 200	9 744 196	750 000	2 750	2 989	1 625	1 695	1 329	312	438

- Notes: 1. HD shock absorbers will function satisfactorily at 5% of their maximum rated energy per cycle.
 HD(A) 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 ITT 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 ITT Enidine for sizing assistance.
 4. Rear flange mounting of 300 mm strokes and longer not recommended. Front and rear flange or foot mount configurations are recommended.
 5. HDA models which have an impact velocity below .8 m/sec., please contact ITT Enidine for sizing assistance.
 6. Maximum cycle rate is 60 cycles/hr.
 7. For impact velocities over 4.5 m/s, consult factory.

Heavy Duty Series Shock Absorber

Mounting and Accessories for HDN, HD, HDA Series

Mounting and Accessories

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



CM: Clevis Mount

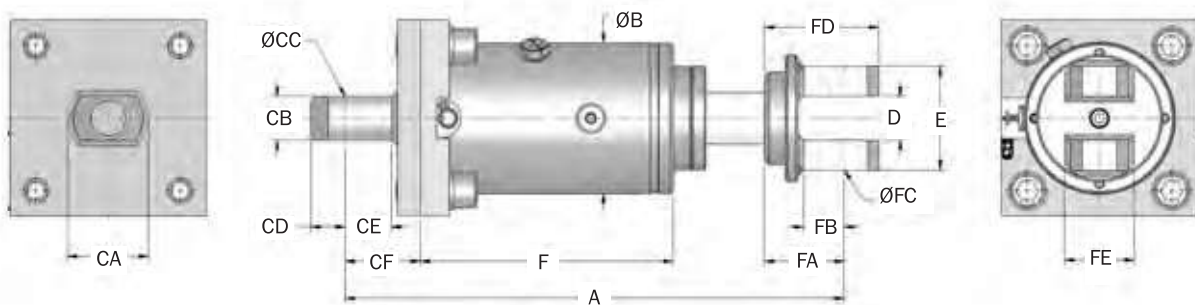


FR: Rear Flange

Note: Rear flange mounting not recommended for stroke lengths above 12 inches. (300 mm)

HD(A) 3.0 x 2 → HD(A) 4.0 x 10 Series

Clevis Mounts (CM)



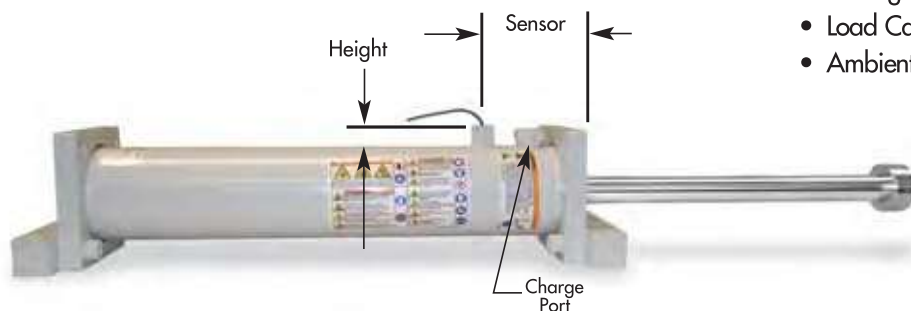
Note: Piston clevis dimensions are typical both ends on HD(A) 4.0 models.

Dimensions are in millimeters.

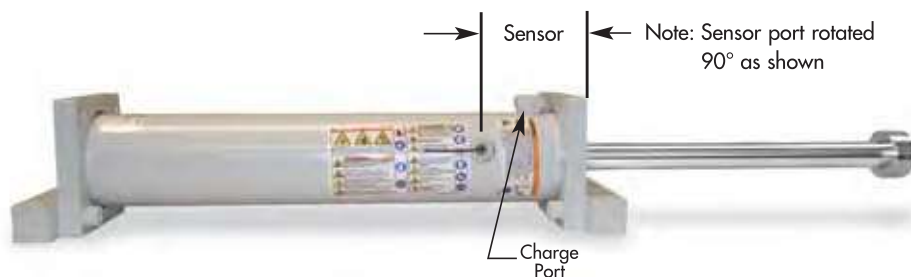
Catalog No./ Model	A mm	B mm	D mm	E mm	HD/HDN F mm	HDA F mm	Cylinder Clevis Dimensions						Piston Clevis Dimensions				
							CA mm	CB mm	CC mm	CD mm	CE mm	CF mm	FA mm	FB mm	FC mm	FD mm	FE mm
HD(A) 3.0 x 2	432	130	38	90	202	235	60	38	25	30	37	65	69	32	25	99	50
HD(A) 3.0 x 3	483	130	38	90	229	261	60	38	25	30	37	65	69	32	25	99	50
HD(A) 3.0 x 5	585	130	38	90	280	312	60	38	25	30	37	65	69	32	25	99	50
HD(A) 3.0 x 8	736	130	38	90	350	387	60	38	25	30	37	65	69	32	25	99	50
HD(A) 3.0 x 10	838	130	38	90	406	438	60	38	25	30	37	65	69	32	25	99	50
HD(A) 3.0 x 12	940	130	38	90	457	489	60	38	25	30	37	65	69	32	25	99	50
HD(A) 4.0 x 2	570	200	65	140	294	304	-	-	-	-	-	90	100	60	50	150	100
HD(A) 4.0 x 4	672	200	65	140	345	355	-	-	-	-	-	90	100	60	50	150	100
HD(A) 4.0 x 6	772	200	65	140	395	405	-	-	-	-	-	90	100	60	50	150	100
HD(A) 4.0 x 8	875	200	65	140	477	457	-	-	-	-	-	90	100	60	50	150	100
HD(A) 4.0 x 10	976	200	65	140	497	507	-	-	-	-	-	90	100	60	50	150	100

Optional Piston Rod Return Sensor

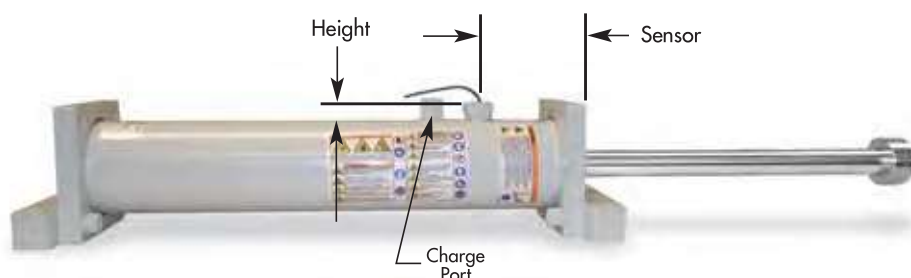
- Magnetic proximity sensor indicates complete piston rod return with 3 m long cable.
- If complete piston rod does not return the circuit remains open. This can be used to trigger a system shut-off.
- Contact ITT Enidine for other available sensor types.
- Sensor port in line with charge port on models HDN 1.5, 2.0 and 4.0. Location offset 90° for models HDN 3.0 and 3.5.



HDN 1.5, 2.0 and 4.0

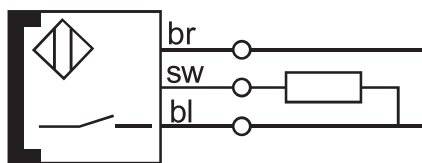


HDN 3.0 and 3.5



HDN 1.5, 2.0, 3.0, 3.5 and 4.0 BA

Sensor Specifications



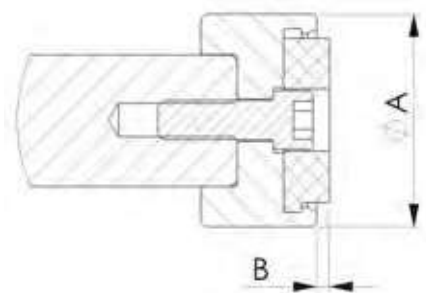
- Voltage 10 - 30V
- Load Current ≤ 200 mA
- Leakage Current ≤ 80 mA
- Load Capacitance ≤ 1.0 mF
- Ambient Temperature: -35° to 71°C

Model	Sensor mm	Height mm
HDN 1.5	86	20
HDN 2.0 x 6-28	96	16
HDN 2.0 x 32-56	176	
HDN 4.0 x 2-10	108	9
HDN 4.0 x 12-48	202	

Model	Sensor mm	Height mm
HDN 3.0 x 2-12	61	15
HDN 3.0 x 14-32	111	
HDN 3.0 x 36-60	161	
HDN 3.5 x 2-16	77,4	9
HDN 3.5 x 20-56	132,4	

Model	Sensor mm	Height mm
HDN 1.5	86	20
HDN 2.0 x 6-28	96	16
HDN 2.0 x 32-56	176	
HDN 3.0 x 2-12	61	15
HDN 3.0 x 14-32	111	
HDN 3.0 x 36-60	161	
HDN 3.5 x 2-16	77	9
HDN 3.5 x 20-56	132	
HDN 4.0 x 2-10	108	
HDN 4.0 x 12-48	202	

Urethane Cap



Model	Dia. A mm	B mm
HDN 1.5	60	4
HDN 2.0	65	4
HDN 3.0	70	4