

Heavy Duty Series Shock Absorber

HD Series

Overview

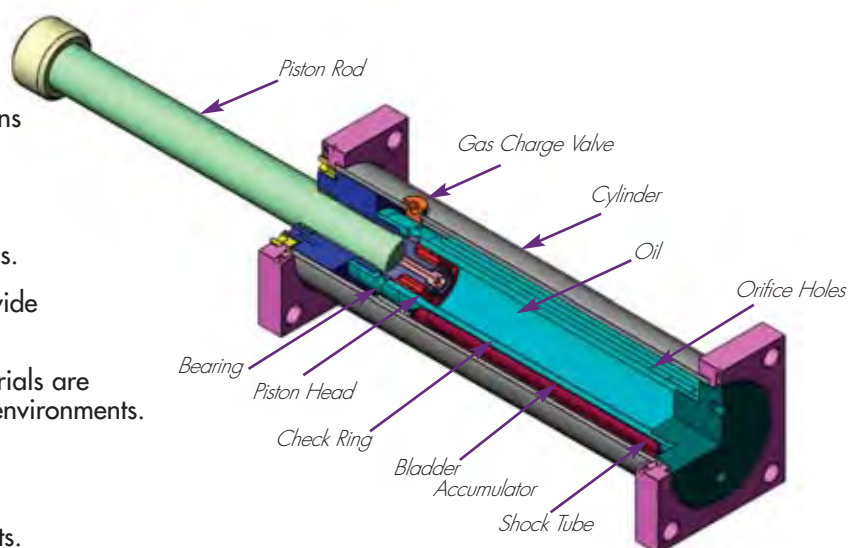
HD Series

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 .



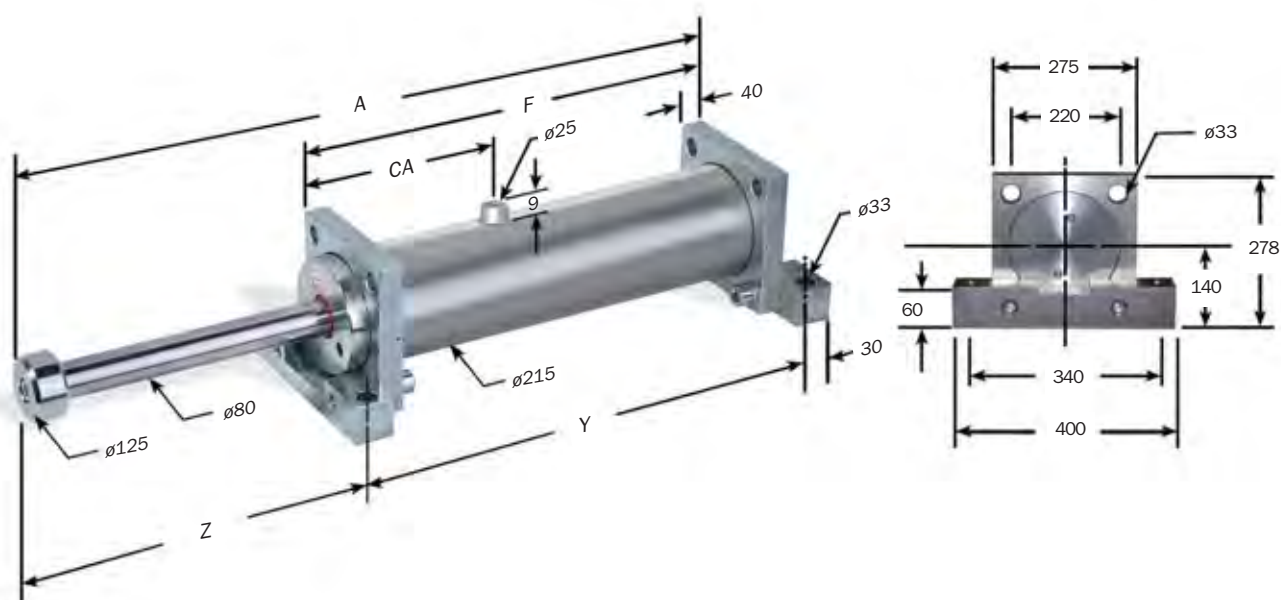
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ENGINEERED FOR LIFE

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.

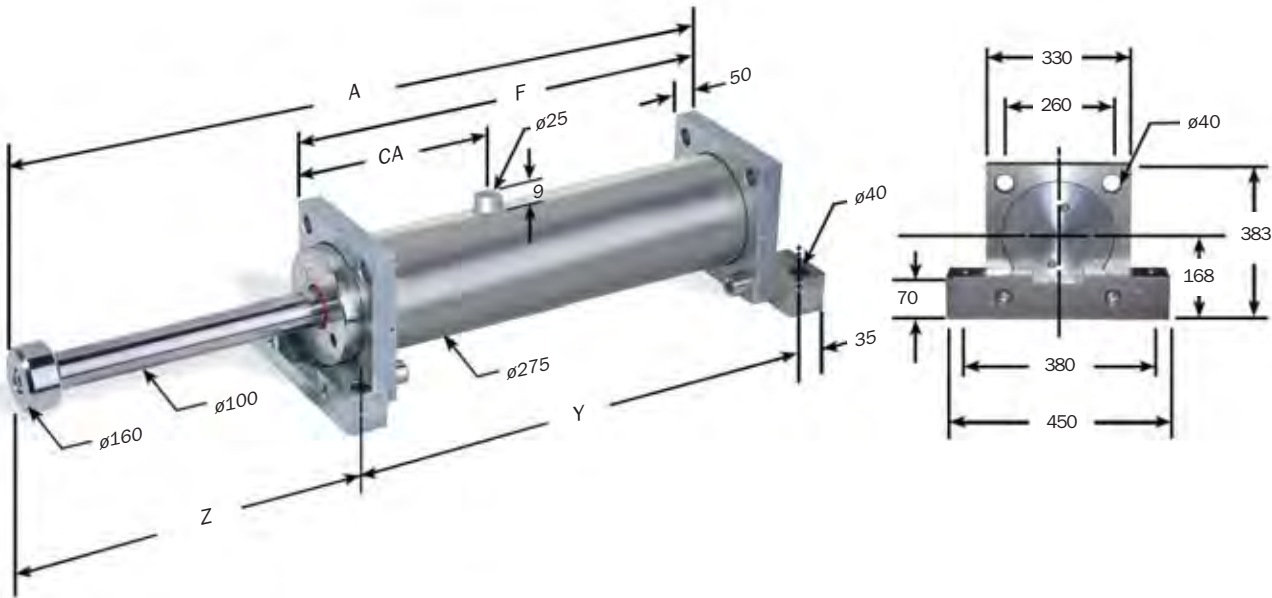
6. For impact velocities over 4.5 m/s, consult factory.

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.
- 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. 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

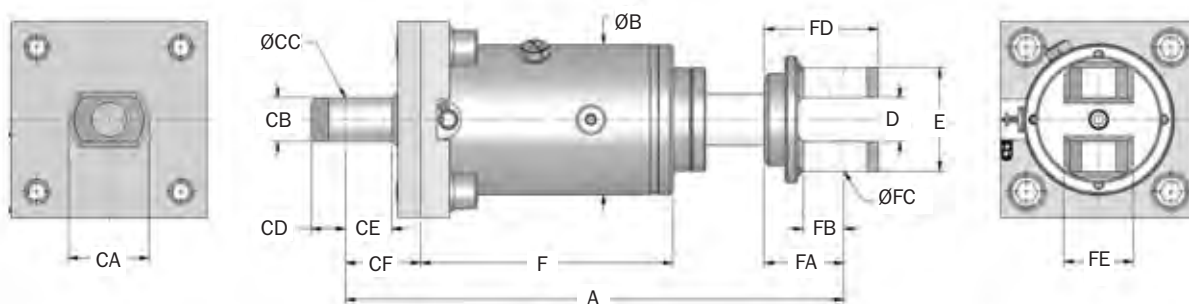


FR: Rear Flange

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

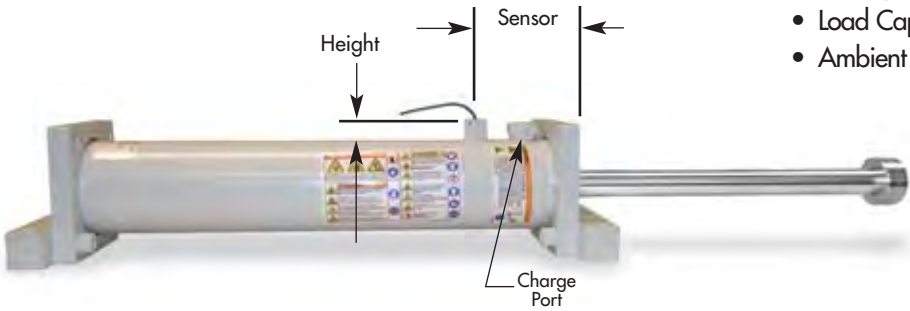
Heavy Duty Series Shock Absorber

Mounting and Accessories for HDN, HD, HDA Series

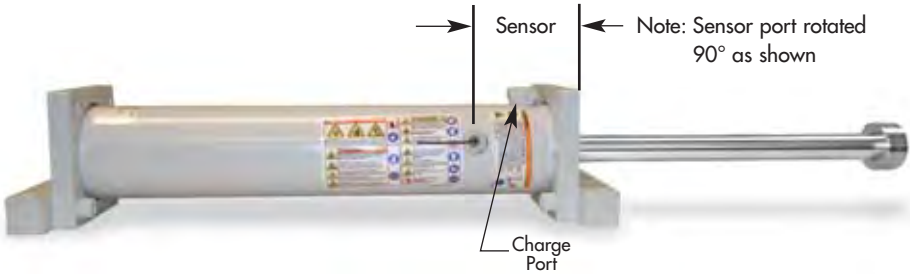
Mounting and Accessories

Optional Piston Rod Return Sensor

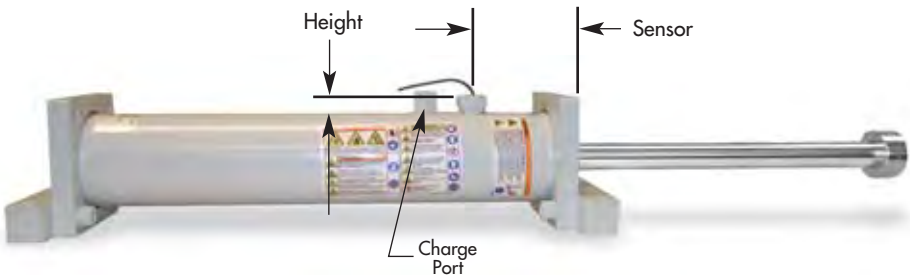
- Magnetic proximity sensor indicates complete piston rod return with 3 m long cable.
- If complete piston rod does not return the circuit remains open. This can be used to trigger a system shut-off.
- Contact ITT Enidine for other available sensor types.
- Sensor port in line with charge port on models 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

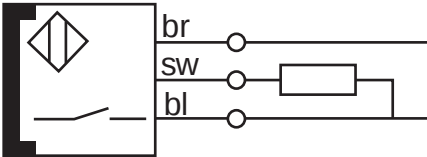


HDN 3.0 and 3.5



HDN 1.5, 2.0, 3.0, 3.5 and 4.0 BA

Sensor Specifications



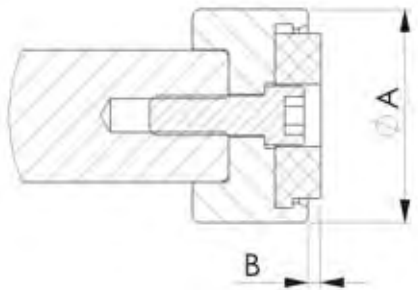
- Voltage 10 - 30V
- Load Current ≤ 200 mA
- Leakage Current ≤ 80 mA
- Load Capacitance ≤ 1.0 mF
- Ambient Temperature: -35° to 71°C

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

Ordering/Notes

Ordering Example

Note: HDN/HD/HDA models are custom-orificed, therefore all information must be provided to ITT Enidine for unique part number assignment.

4 - HDN 2.0 x 24 - TM - C - APPLICATION DATA

Ordering Code Example for Heavy Duty Shock Absorbers

1 - Quantity	4 - Mounting Method	Application Data (Required for HDN/HD Models) See Worksheet page 20 Vertical or horizontal motion Weight Impact velocity Propelling force (if any) Cycles/Hr Other (temperature or other environmental conditions, safety standards, etc.)
2 - Model Selection	TM (Rear flange front foot mount)	
HDN (Non-Adjustable)	FM (Front and rear foot mount)	
HD (Non-Adjustable)	TF (Front and rear flanges)	
HDA (Adjustable)	FF (Front flange)	
	FR (Rear flange)	
3 - Model Size	CM (Metric devis mount)	
Select Size from Engineering Data Chart	5 - Options	
HDN - 1.5, 2.0, 3.0, 3.5, 4.0 Bore Sizes (pages. 8-12)	C (Sensor cable)	
HDA - 3.0, 4.0 Bore Sizes (pages. 13-14)	P (Sensor plug) - See Page 18	
HD - 5.0, 6.0 Bore Sizes (pages. 16-17)	SC (Safety cable)	
	BA (Bladder Accumulator)	
	UC (Urethane Cap)	

Notes

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