

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.

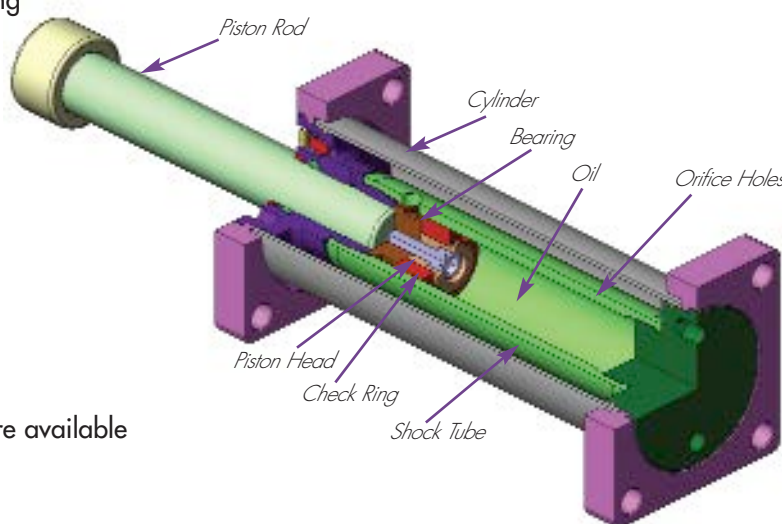
HDA Series

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



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.
- Zinc plated 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 .

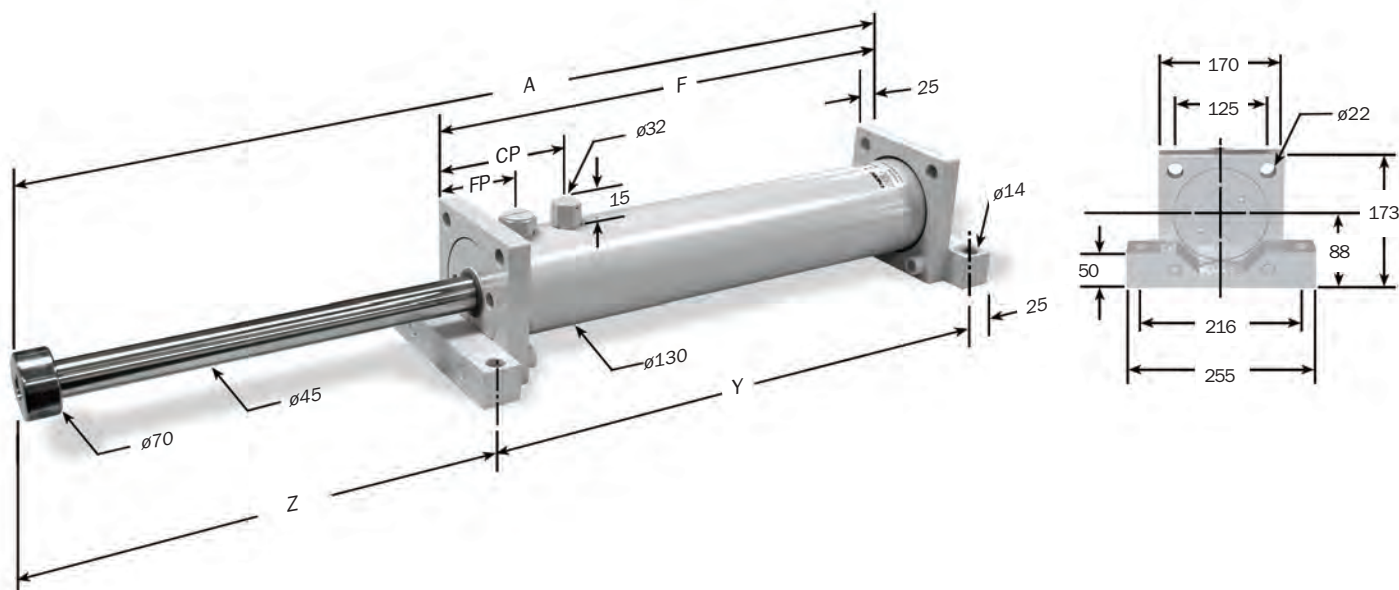


Heavy Duty Adjustable Series Shock Absorber

HDA 3.0 Series

HDA 3.0 x 2 → HDA 3.0 x 12 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 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.

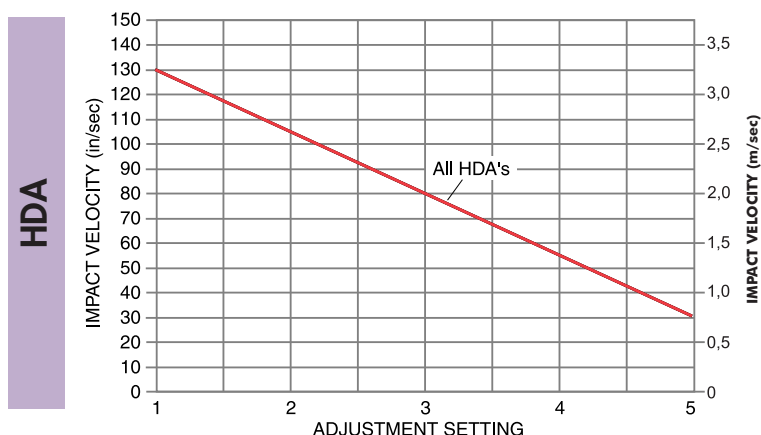
5. Maximum cycle rate is 60 cycles/hr.

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

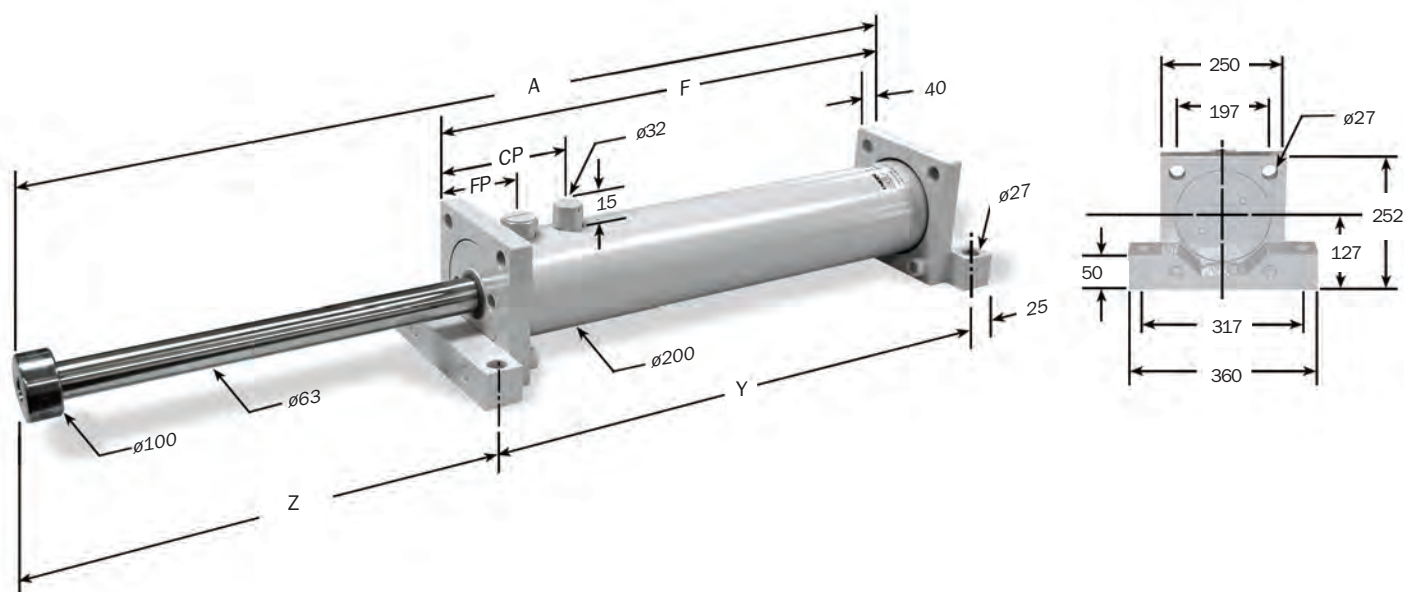
1. Impact Velocity: 2 m/s
2. Intersection Point: Adjustment Setting 3
3. Useable Adjustment Setting Range: 1 to 3

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.

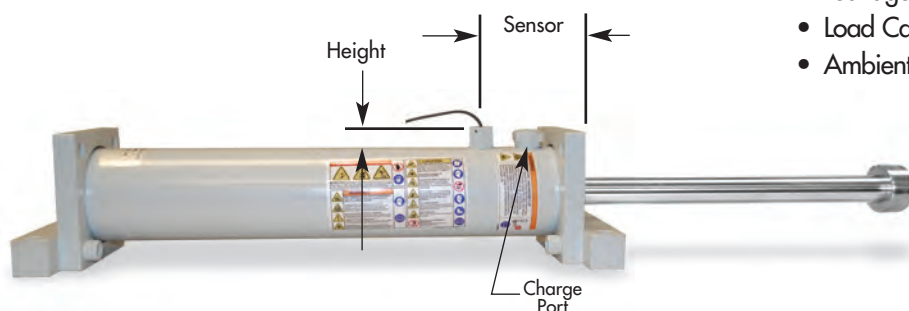
5. Maximum cycle rate is 60 cycles/hr.

6. HDA models which have an impact velocity below .8 m/sec., please contact Enidine for assistance.

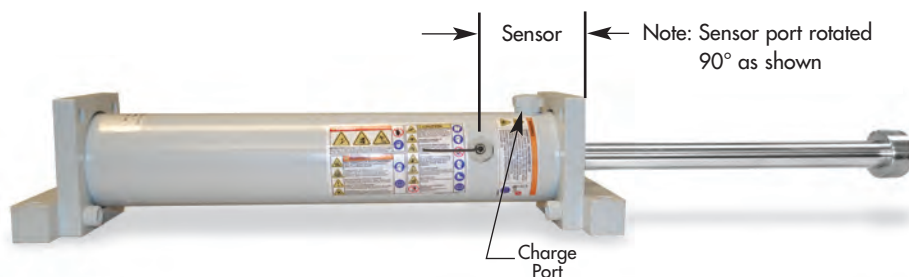
7. Maximum allowable applied propelling force: 177 900 N

Optional Piston Rod Return Sensor

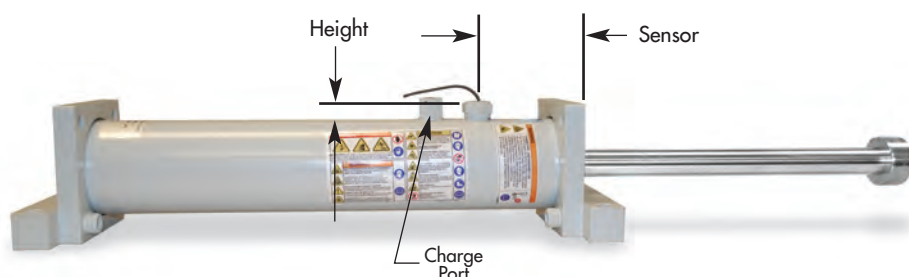
- Magnetic proximity sensor indicates complete piston rod return with 3 m long cable.
- If complete piston rod does not return the circuit remains open. This can be used to trigger a system shut-off.
- Contact ITT Enidine for other available sensor types.
- Sensor port in line with charge port on models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



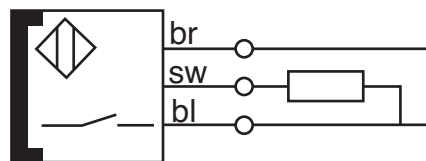
HDN 1.5, 2.0 and 4.0



HDN 3.0 and 3.5



HDN 1.5, 2.0, 3.0, 3.5 and 4.0 BA

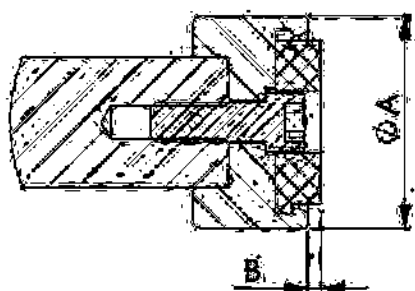
Sensor Specifications

- 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 Example

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

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

1 2 3 4 5

Ordering Code Example for Heavy Duty Shock Absorbers

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

Notes

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