



ITT Enidine Adjustable Hydraulic Series shock absorbers offer the most flexible solutions to energy absorption application requirements when input parameters vary or are not clearly defined.

ITT Enidine's **New ECO OEM Series** adjustable hydraulic shock absorbers are an expansion of our previously released ECO Series product line. These adjustable shock absorbers provide maximum flexibility in a RoHS compliant package. By simply turning an adjustment knob, the damping force can be changed to accommodate a wide range of conditions. ITT Enidine offers the broadest range of adjustable shock absorbers and mounting accessories in the marketplace today.

The ITT Enidine **OEMXT Series** provides a low profile adjustment knob offered in imperial or metric thread configurations with stroke lengths of 25 to 150 mm for drop-in competitive interchange. **Low Range (LROEMXT) Series** products are also available to control velocities as low as 0,08 m/s and propelling forces as high as 17 790 N. OEMXT and OEM Large Series shock absorbers are fully field repairable.

Features and Benefits

- **Adjustable design lets you "fine-tune"** your desired damping and lock the numbered adjustment setting.
- **Internal orifice design** provides deceleration with the most efficient damping characteristics, resulting in the lowest reaction forces in the industry.
- **Threaded cylinders provide mounting flexibility** and increase surface area for improved heat dissipation.
- **Operational parameters can be expanded** through the use of Enidine's Low Range and High Performance products.
- **Custom orificed non-adjustable units (CBOEM)** can be engineered to meet specific application requirements or **emergency impact only requirements**.
- **Special materials and finishes** can be designed to meet specific customer requirements.
 - Optional fluids and seal packages can expand the standard operating temperature range from (-10°C to 80°C) to (-30°C to 100°C).
 - Food grade options available
- **ISO quality standards** result in reliable, long-life operation.
- **Fully field repairable units are available** in mid-bore and larger bore product ranges.

Added New Features for the ECO OEM Series

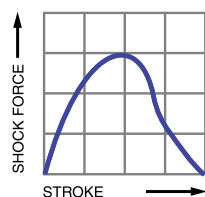
- **Environmentally friendly materials:**
 - ROHS Compliant materials
 - Bio-degradable hydraulic oil
 - Recyclable packaging materials
- **Introducing our new Enicote II surface finish:**
 - ROHS Compliant
 - Rated at 350 hours salt spray corrosion protection
- **Jam Nut included** with every shock absorber.
- **Wrench flats** promote ease of mounting
- **Capability to mount into pressure chambers**
- **Integrated positive stopping capabilities** up to 7 bar.

Adjustable Series Hydraulic Shock Absorbers

ECO OEM / OEMXT Series

Overview

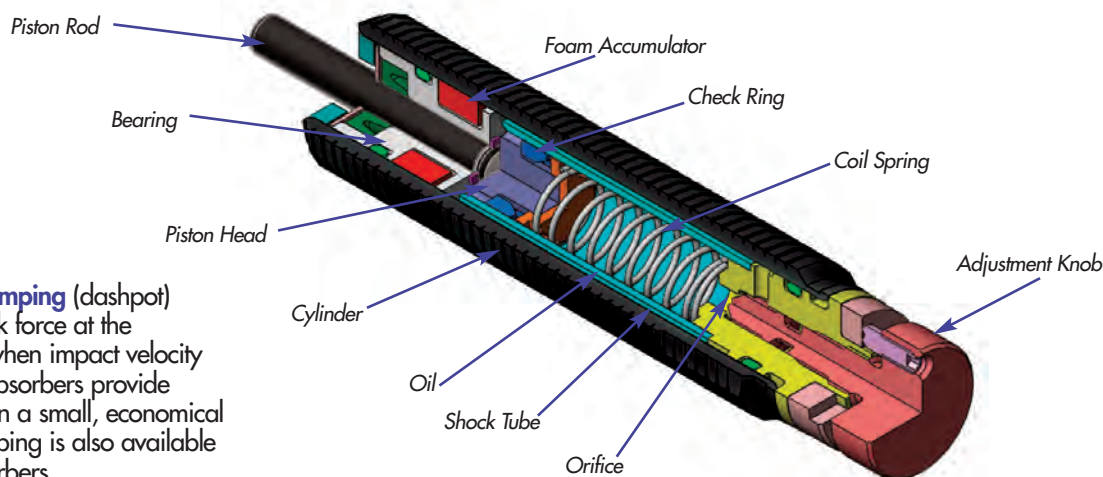
ITT Enidine Adjustable Single Orifice Shock Absorbers



Constant orifice area damping (dashpot) provides the largest shock force at the beginning of the stroke when impact velocity is highest. These shock absorbers provide high-energy absorption in a small, economical design. This type of damping is also available in adjustable shock absorbers.

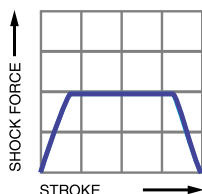
The damping force of an ITT Enidine single orifice shock absorber can be changed by turning the adjustment knob. Maximum damping force is achieved by turning the adjustment knob to eight (8), while minimum damping force is achieved by turning the adjustment knob to zero (0). Turning the adjustment knob causes the adjustment ball to increase or decrease the clearance (orifice area) between the ball and its seat, depending on rotation direction.

The internal structure of an adjustable single orifice shock absorber is shown above. When force is applied to the piston rod, the check ball is seated and the valve remains closed.



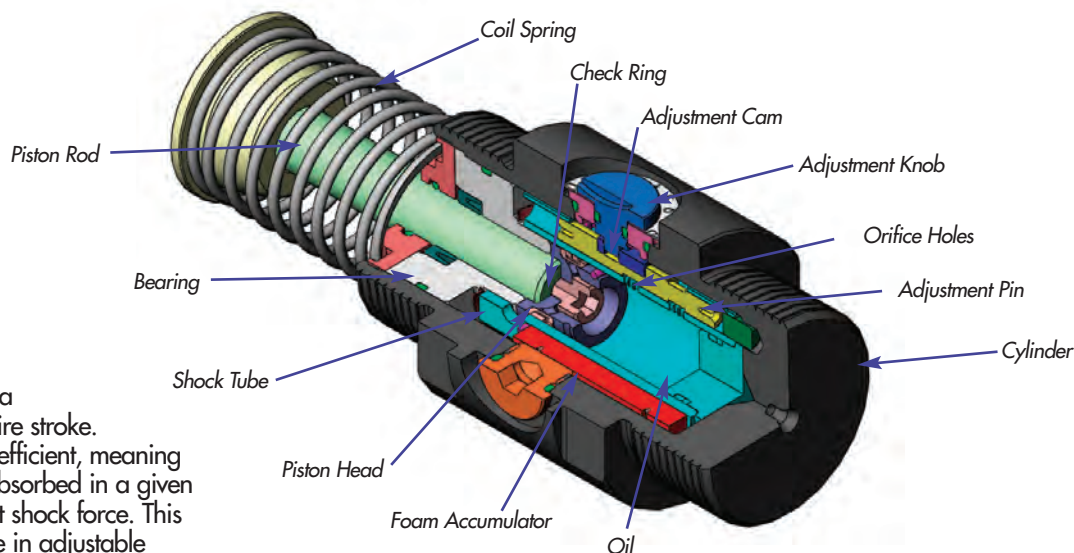
Oil is forced out of the high pressure shock tube chamber through the orifice, creating internal pressure allowing smooth, controlled deceleration of the moving load. When the load is removed, the compressed coil spring moves to reposition the piston head, the check ball unseats, opening the valve that permits rapid piston rod return to the original extended position. The closed cellular foam accumulator compensates for fluid displaced by the piston rod during compression and extension. Without the fluid displacement volume provided by the foam accumulator, the closed system would be hydraulically locked. This type of orifice design produces constant orifice area damping.

ITT Enidine Adjustable Multiple Orifice Shock Absorbers



Conventional damping allows linear deceleration by providing a constant shock force over the entire stroke. This standard design is the most efficient, meaning it allows the most energy to be absorbed in a given stroke, while providing the lowest shock force. This type of damping is also available in adjustable shock absorbers.

The adjustable multiple orifice shock absorber is similar to the principles described earlier. The check ring replaces the check ball and the adjustment feature uses an adjustment pin instead of an adjustment ball. The damping force of the shock absorber can be changed by turning the adjustment knob. Maximum damping force is achieved by turning the adjustment knob to eight (8), while minimum damping force is achieved by turning the adjustment knob to zero (0).



Turning the adjustment knob rotates the adjustment cam within the shock absorber. The cam, in turn, moves the adjustment pin in the shock tube, closing or opening the orifice holes. By closing the orifice holes, the total orifice area of the shock absorber is reduced, thus increasing the damping force of the shock absorber. The adjustable shock absorber enables the user to change the damping force of the unit, should input conditions change, while still maintaining a conventional-type damping curve. Low velocity range (LR) series configurations are available for controlling velocities that fall below the standard adjustable range.

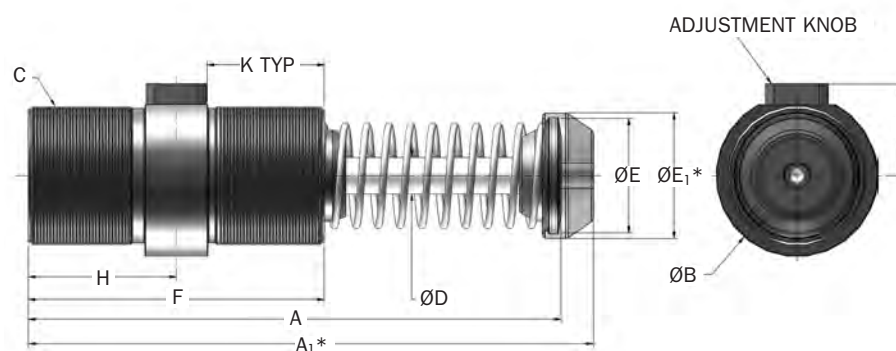
Adjustable Series Hydraulic Shock Absorbers

OEM Large-Bore Series

OEM 3.0M → OEM 4.0M Series

Technical Data

Standard



*Note: A₁ and E₁ apply to urethane striker cap accessory.

Catalog No./Model	(S) Stroke mm	Optimal Velocity Range m/s	E _T Max. Nm/c	E _T C Max. Nm/hr	F _p Max. Reaction Force N	Nominal Coil Spring Force		F _D Max. Propelling Force N	Mass Kg
						Extended N	Compressed N		
OEM 3.0M x 2	50	0,3-4,3	2 300	372 000	67 000	110	200	12 000	7,0
OEM 3.0M x 3.5	90	0,3-4,3	4 000	652 000	67 000	110	200	12 000	9,1
OEM 3.0M x 5	125	0,3-4,3	5 700	933 000	67 000	71	200	12 000	10,9
OEM 3.0M x 6.5	165	0,3-4,3	7 300	1 215 000	67 000	120	330	12 000	13,6
OEM 4.0M x 2	50	0,3-4,3	3 800	1 503 000	111 000	225	290	21 000	15,0
OEM 4.0M x 4	100	0,3-4,3	7 700	1 808 000	111 000	155	290	21 000	18,2
OEM 4.0M x 6	150	0,3-4,3	11 500	2 102 000	111 000	135	310	21 000	20,0
△ OEM 4.0M x 8	200	0,3-4,3	15 400	2 407 000	111 000	180	355	21 000	30,0
△ OEM 4.0M x 10	250	0,3-4,3	19 200	2 712 000	111 000	135	355	21 000	33,0

Note: △ = Non-standard lead time items, contact ITT Enidine.

Catalog No./Model	A mm	A ₁ mm	B mm	C	D mm	E mm	E ₁ mm	F mm	H mm	J mm	K mm
OEM 3.0M x 2	245	265	98	M85 x 2.0	22	69	76	140	70	58	51
OEM 3.0M x 3.5	323	343	98	M85 x 2.0	22	69	76	179	90	58	71
OEM 3.0M x 5	399	419	98	M85 x 2.0	22	69	76	217	109	58	71
OEM 3.0M x 6.5	494	514	98	M85 x 2.0	22	81	81	256	128	58	71
OEM 4.0M x 2	313	335	127	M115 x 2.0	35	88	95	203	102	74	80
OEM 4.0M x 4	414	436	127	M115 x 2.0	35	88	95	254	127	74	105
OEM 4.0M x 6	516	538	127	M115 x 2.0	35	88	95	305	153	74	108
△ OEM 4.0M x 8	643	665	127	M115 x 2.0	35	88	95	356	178	74	108
△ OEM 4.0M x 10	745	767	127	M115 x 2.0	35	88	95	406	203	74	108

Notes: 1. All shock absorbers will function satisfactorily at 5% of their maximum rated energy per cycle. If less than 5%, a smaller model should be specified.

2. For mounting accessories, see pages 32.

3. Rear flange mounting of OEM 3.0M x 6.5, OEM 4.0M x 8 and OEM 4.0M x 10 models not recommended when mounting horizontally.

4. △ = Non-standard lead time items, contact ITT Enidine.

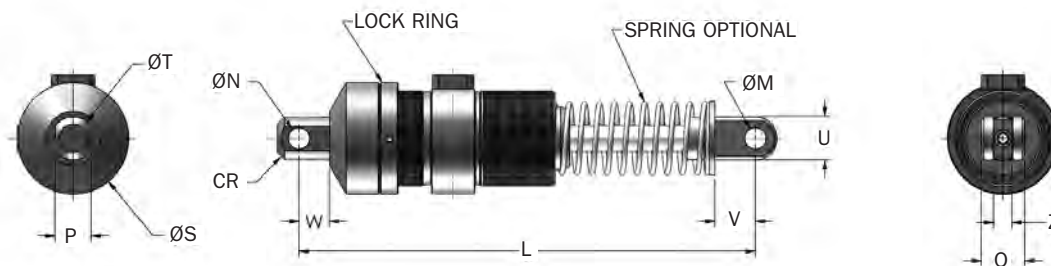
Adjustable Series Hydraulic Shock Absorbers

OEM Large-Bore Series

OEM 3.0M → OEM 4.0M Series

Accessories

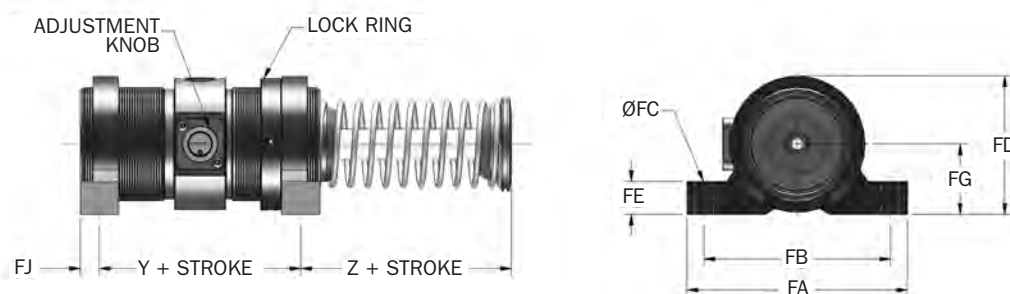
Clevis Mount



Catalog No./Model	(S) Stroke mm	L mm	M mm	N mm	P mm	Q mm	S mm	T mm	U mm	V mm	W mm	Z mm	CR mm	Mass Kg
Δ OEM 3.0M x 2 CM (S)	50	325,0	19,07 +0,25/0	19,07 +0,25/0	31,7 0/-0,3	38,0	98,0	38,1	38,1	36,0	26,0	16,0 +0,5/0	23,0	8,66
Δ OEM 3.0M x 3.5 CM (S)	90	402,0	19,07 +0,25/0	19,07 +0,25/0	31,7 0/-0,3	38,0	98,0	38,1	38,1	36,0	26,0	16,0 +0,5/0	23,0	10,70
Δ OEM 3.0M x 5 CM (S)	125	479,0	19,07 +0,25/0	19,07 +0,25/0	31,7 0/-0,3	38,0	98,0	38,1	38,1	36,0	26,0	16,0 +0,5/0	23,0	12,52
Δ OEM 3.0M x 6.5 CM (S)	165	574,0	19,07 +0,25/0	19,07 +0,25/0	31,7 0/-0,3	38,0	98,0	38,1	38,1	36,0	26,0	16,0 +0,5/0	23,0	15,24
Δ OEM 4.0M x 2 CM (S)	50	432,0	25,42 +0,25/0	25,42 +0,25/0	38,1 0/-0,3	90,5	127,0	57,2	51,0	51,0	44,0	38,2 +0,5/0	35,0	19,23
Δ OEM 4.0M x 4 CM (S)	100	533,0	25,42 +0,25/0	25,42 +0,25/0	38,1 0/-0,3	90,5	127,0	57,2	51,0	51,0	44,0	38,2 +0,5/0	35,0	22,41
Δ OEM 4.0M x 6 CM (S)	150	635,0	25,42 +0,25/0	25,42 +0,25/0	38,1 0/-0,3	90,5	127,0	57,2	51,0	51,0	44,0	38,2 +0,5/0	35,0	24,22
Δ OEM 4.0M x 8 CM (S)	200	762,0	25,42 +0,25/0	25,42 +0,25/0	38,1 0/-0,3	90,5	127,0	57,2	51,0	51,0	44,0	38,2 +0,5/0	35,0	34,20
Δ OEM 4.0M x 10 CM (S)	250	864,0	25,42 +0,25/0	25,42 +0,25/0	38,1 0/-0,3	90,5	127,0	57,2	51,0	51,0	44,0	38,2 +0,5/0	35,0	37,37

Notes: 1. "S" indicates model is supplied with spring.
2. Δ = Non-standard lead time items, contact ITT Enidine.

Flange Foot Mount

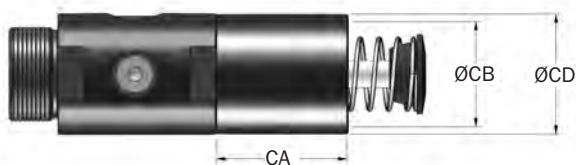


Catalog No./Model	Part Number	Model Ref	J mm	Y mm	Z mm	FA mm	FB mm	FC mm	FD mm	FE mm	FG mm	FJ mm	FK mm	Bolt Size mm	Mass kg	Notes
FM M85 x 2	2F3330	OEM 3.0M	58	81,0	59,0	165,0	139,7	13,5	103,0	25,4	52,3	14,1	28,7	M12	1 984	1
FM M115 x 2	2F3720	OEM 4.0M	74	190,5	37,0	203,2	165,0	16,8	149,4	38,0	79,5	16,0	50,8	M16	3 900	2

Notes: 1. OEM 3.0M x 6,5, Z dimension is 77,7mm.
2. OEM 4.0M x 8 and 4.0M x 10M, Z dimension is 62,0mm.
3. For rear foot mount, dimension FJ is 22,4mm.

Stop Collar (SC)

(LR)OEMXT $\frac{3}{4}$ → (LR)OEMXT 2.0M

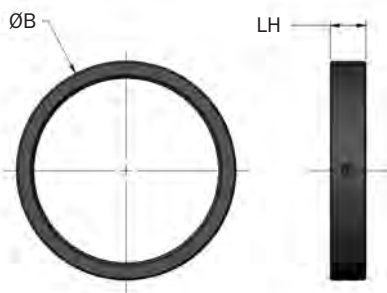


Catalog No./Model	Part Number	Model Ref	CA mm	CB mm	CD mm	Mass g
Δ SC M2 $\frac{1}{2}$ - 12*	8KE2940	(LR)OEMXT $\frac{3}{4}$	49,0	49,0	56,5	340
Δ SC M2 $\frac{1}{2}$ - 12 x 2	8KE3010	(LR)OEMXT 1 $\frac{1}{8}$ x 2 & 4	63,0	65,0	76,0	652
Δ SC M2 $\frac{1}{2}$ - 12 x 6	8KE3012	(LR)OEMXT 1 $\frac{1}{8}$ x 6	93,0	65,0	76,0	936
Δ SC M42 x 1.5 x 1	8K2940	(LR)OEMXT 1.5M x 1	62,0	49,0	56,0	397
Δ SC M42 x 1.5 x 2	8K2941	(LR)OEMXT 1.5M x 2	75,0	49,0	56,0	539
Δ SC M42 x 1.5 x 3	8K2942	OEMXT 1.5M x 3	87,0	49,0	56,0	652
Δ SC M64 x 2 x 2	M93010057	(LR)OEMXT 2.0M x 2	89,0	65,0	76,0	936
Δ SC M64 x 2 x 4	M93011057	OEMXT 2.0M x 4	114,0	65,0	76,0	1 191
Δ SC M64 x 2 x 6	M93012057	OEMXT 2.0M x 6	143,0	65,0	76,0	1 475

Notes: 1. * Do not use with urethane striker cap.

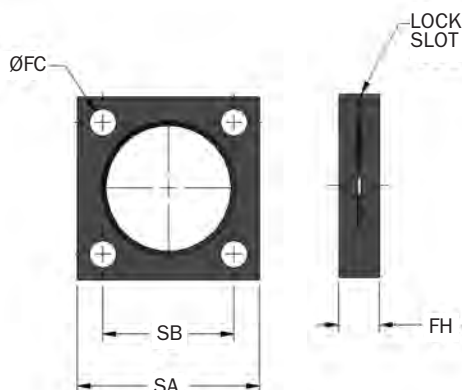
2. Δ = Non-standard lead time items, contact ITT Enidine.

Lock Ring (LR)



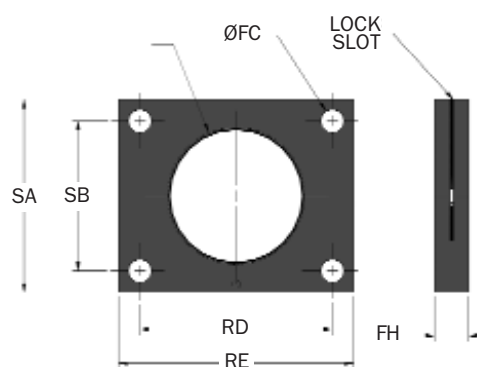
Catalog No./Model	Part Number	Model Ref	B mm	LH mm	Mass g
LR 1 $\frac{3}{4}$ - 12	F8E2940049	(LR)OEMXT $\frac{3}{4}$	50,8	9,6	85
LR 2 $\frac{1}{2}$ - 12	F8E3010049	(LR)OEMXT 1 $\frac{1}{8}$	73,0	12,7	114
LR M42 x 1.5	F82940049	(LR)OEMXT 1.5M	50,8	9,6	85
LR M64 x 2	F83010049	(LR)OEMXT 2.0M	73,0	12,7	114
LR M85 x 2	F83330049	(LR)OEM 3.0M	98,2	16,0	226
LR M115 x 2	F83720049	(LR)OEM 4.0M	126,7	22,4	397

Square Flange (SF)



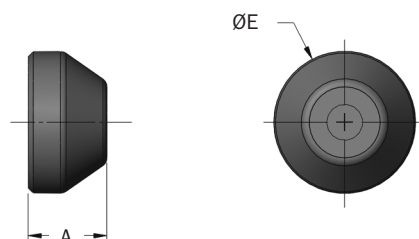
Catalog No./Model	Part Number	Model Ref	FC mm	FH mm	SA mm	SB mm	Bolt Size mm	Mass g
SF 1 $\frac{3}{4}$ - 12	M4E2940129	(LR)OEMXT $\frac{3}{4}$	8,6	12,7	57,2	41,4	M8	140
SF 2 $\frac{1}{2}$ - 12	M4E3010129	(LR)OEMXT 1 $\frac{1}{8}$	10,4	15,7	88,9	69,9	M10	570
SF M42 x 1.5	M42940129	(LR)OEMXT 1.5M	8,6	12,7	57,2	41,4	M8	140
SF M64 x 2	M43010141	(LR)OEMXT 2.0M	10,4	15,7	88,9	69,9	M10	570
SF M85 x 2	M43330141	OEM 3.0M	13,5	19,0	101,6	76,2	M13	680
SF M115 x 2	M43720141	OEM 4.0M	16,5	25,4	139,7	111,3	M16	1 590

Rectangular Flange (RF)



Catalog No./Model	Part Number	Model Ref	FC mm	FH mm	RD mm	RE mm	SA mm	SB mm	Bolt Size mm	Mass g
RF 1 3/4 -12	M5E2940129	(LR)OEMXT 3/4	8,6	12,7	60,5	76,2	57,2	41,4	M8	260
RF M42 x 1.5	M52940129	(LR)OEMXT 1.5M	8,6	12,7	60,5	76,2	57,2	41,4	M8	260
RF M85 x 2	M53330129	OEM 3.0M	13,5	19,1	101,6	127,0	101,6	76,2	M13	1 040

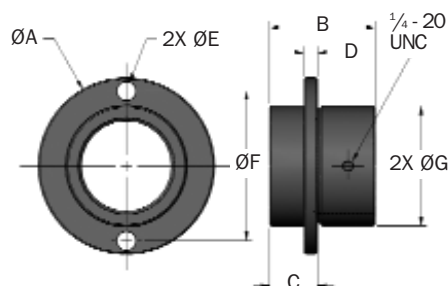
Urethane Striker Cap (UC)



Catalog No./Model	Part Number	Model Ref	A mm	E ₁ mm	Mass g
UC 2940	C92940079	(LR)OEMXT 3/4	24,5	44,5	14
UC 3010	C93010079	(LR)OEMXT 1 1/8	24,1	57,0	23
UC 2940	C92940079	(LR)OEMXT 1.5M	24,5	44,5	14
UC 3010	C93010079	(LR)OEMXT 2.0M	24,1	57,0	23
UC 3330	C93330079	OEM 3.0M	31,4	76,0	85
UC 3720	C93720079	OEM 4.0M	37,5	95,0	170

Note: For complete shock absorber dimension with urethane striker cap, refer to engineering data, pages 27-31.

Stop Collar With Flange (SCF)



Catalog No./Model	Part Number	Model Ref	A mm	B mm	C _{±0.002} mm	D mm	E mm	F mm	G mm	Bolt Size mm	Mass g
Δ SCF 1 3/4 -12	M98640300	OEMXT 3/4	83	49,3	22,4	6,4	8,6	70	56	8	638

Notes: 1. Locking set screw feature provided as standard.

2. Δ = Non-standard lead time items, contact ITT Enidine.

Adjustable Series Hydraulic Shock Absorbers

ECO OEM/OEMXT/OEM Large Bore Series

Adjustment Techniques

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

1. Locate the intersection point of the application's impact velocity and the selected model graph line.
2. The intersection is the **maximum** adjustment setting to be used. Adjustments **exceeding this maximum suggested setting could overload the shock absorber.**
3. The useable adjustment setting range is from the 0 setting to the **maximum** adjustment setting as determined in step 2.

Example: OEM 1.25M x 1

1. Impact Velocity: 1,0 m/s
2. Intersection Point: Adjustment Setting 5
3. Useable Adjustment: Setting Range 0 to 5

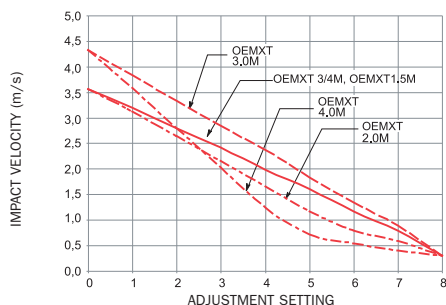
Example: (LR)OEMXT 2.0M x 2

1. Impact Velocity: .5 m/s
2. Intersection Point: Adjustment Setting 3
3. Useable Adjustment: Setting Range 0 to 3

Useable Adjustment Setting Range

Position 0 provides minimum damping force.
Position 8 provides maximum damping force.

OEMXT Large

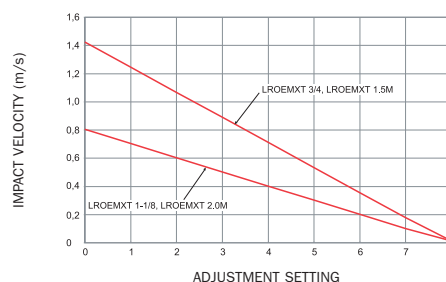


180° adjustment with setscrew locking. OEMXT 3.0M – OEM 4.0M



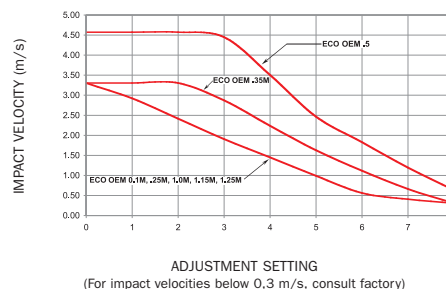
360° adjustment with setscrew locking. OEMXT 1.5M and OEMXT 2.0M

(LR)OEMXT Large



360° adjustment with setscrew locking (LR)OEMXT 1.5M and (LR)OEMXT 2.0M

ECO OEM Small Series

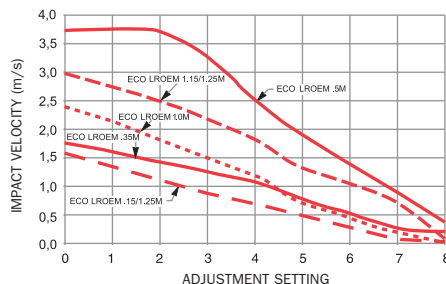


180° adjustment with setscrew locking ECO OEM 0.1M - ECO OEM 0.5M



360° adjustment with setscrew locking ECO OEM 1.0M

ECO (LR)OEM Small Series



180° adjustment with setscrew locking ECO (LR)OEM 0.15M - ECO (LR)OEM 0.5M



360° adjustment with setscrew locking ECO (LR)OEM 1.0M



Automotive Manufacturing Applications



Bottling Applications



Automation/Sorting Applications