

The world's smallest and lightest torque limiter damper (TLD) for HEV

e-WAD e-Unity

EXEDY

In Mass Production
Under Development

Features

Structure

- Achieves weight reduction and cost reduction by reducing the diameter of the skeleton and combining it with the shape of the flywheel

Damper

- Set e-WAD and e-Unity compatible with in-line 3-cylinder and in-line 4-cylinder engines
- Multi-function AC / DC hysterical mechanism achieves both resonance suppression and fuel efficiency improvement

Limiter

- High heat capacity limiter structure realizes reliable power transmission and system protection

Productivity

- Achieves parent-child taking of multiple parts

Reference exhibition



e-WAD

Positive / negative asymmetry AC/DC



e-Unity

with integrated flywheel

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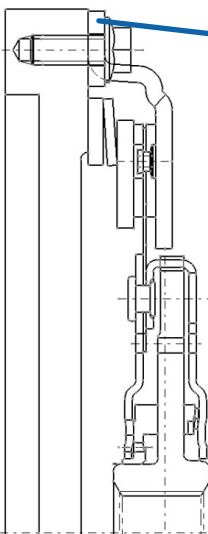
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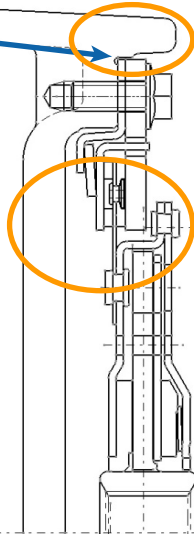
Structure

Smaller skeleton diameter and redistribution of flywheel inertia

Conventional product

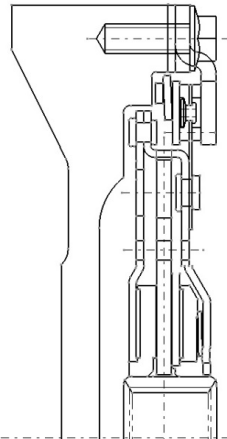


Development product



Application Compatible with small cars

WSCAE005

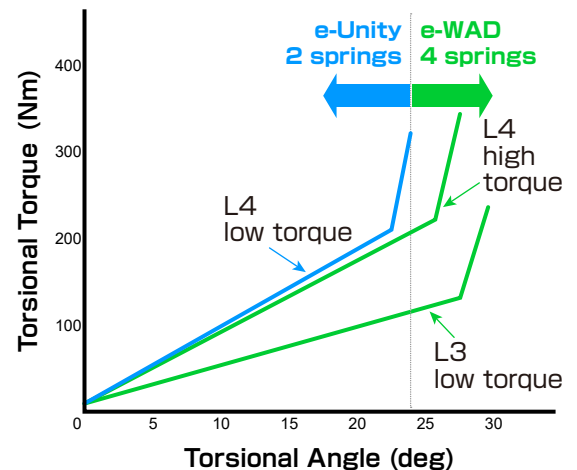
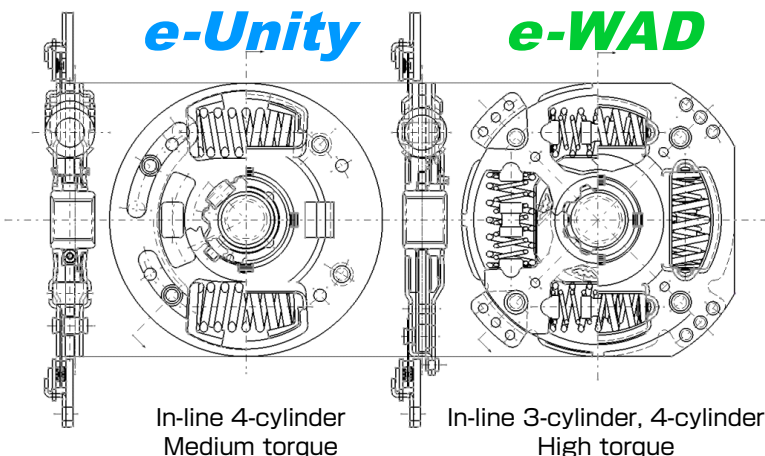


By devising the fastening method of the damper parts, the outer diameter is reduced by overlapping the limiter and the axial direction. The shortage of inertia is covered by the outer diameter and axial dimensions of the flywheel, achieving both weight reduction and cost reduction.

	Conventional product	Development product
TLD	4.4kg	3.5kg
F/W	6.5kg	7.2kg
Total	10.9kg	10.7kg

Damper

Two types of wide-angle and low-rigidity damper bodies are available.



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Damper

Multi-function AC / DC hysteresis mechanism

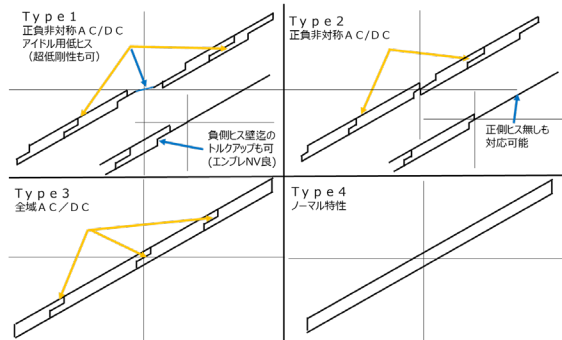
- Achieves 4 types of characteristics with different friction plate shapes (Types 1 to 4)
- Improved compatibility of HEV systems (series parallel, series, series with direct connection), resonance suppression and improved fuel efficiency

Comparison of compatible affinity due to difference in twist characteristics

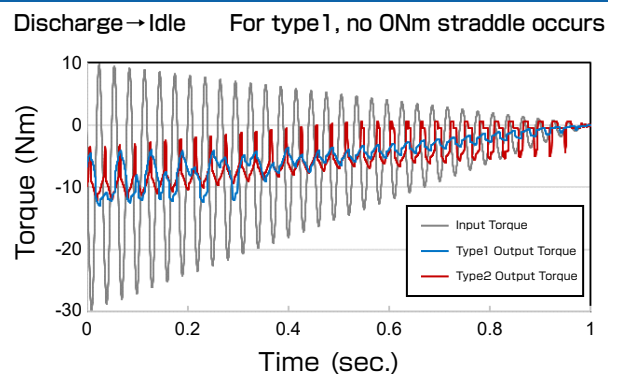
開発段階	種類	特性	フリクションプレート形状	始動	停止	発電走行	放電	発電→アイドル	放電→アイドル	アイドル
開発中	Type1	正負非対称 AC/DC & 低ヒス アイドル超低剛性		◎	○	◎	◎	◎	◎	◎
量産中	Type2	正負非対称 AC/DC 正側AC有り		◎	◎	◎	◎	△	○	○
開発中		正負非対称 AC/DC 正側ヒス無し		○	○	◎	◎	◎	○	○
開発中	Type3	全域AC/DC		○	◎	◎	◎	△	△	○
量産中	Type4	ノーマル特性	—	◎	◎	○	○	△	△	△

Pre-Damper

Characteristics of twisting characteristics

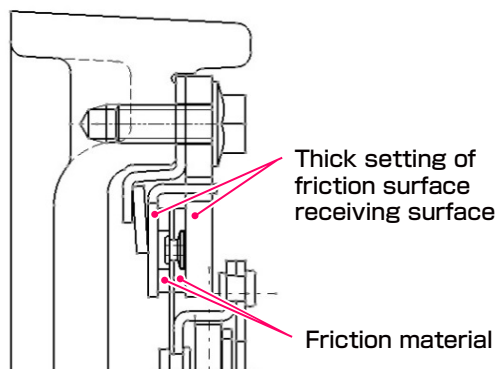


Simulation result: Discharge → Idle



Limiter

Thick friction surface receiving surface, Achieves long life and stable characteristics



Productivity

Improve productivity by parent-child taking of multiple parts and progressive press

(Parent and child parts of the same color in the figure below)

