

Shear Key

Seismic restrainer system for
bridges & viaducts



Dextra

www.dextragroup.com

System description

Shear key and hold down bars are a special application of Post-Tensioning smooth bar systems where a full assembly acts as a permanent seismic restrainer for the connection of elevated metro/roads precast segments.

The core accessories of the system are:

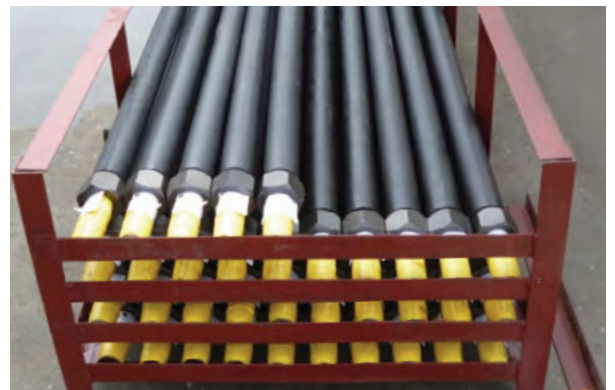
- High tensile bar with threaded ends.
- Swivel nuts.
- Swivel plates.
- Corrosion protection accessories.

Dextra can also provide the jacking service, consult us for more information.

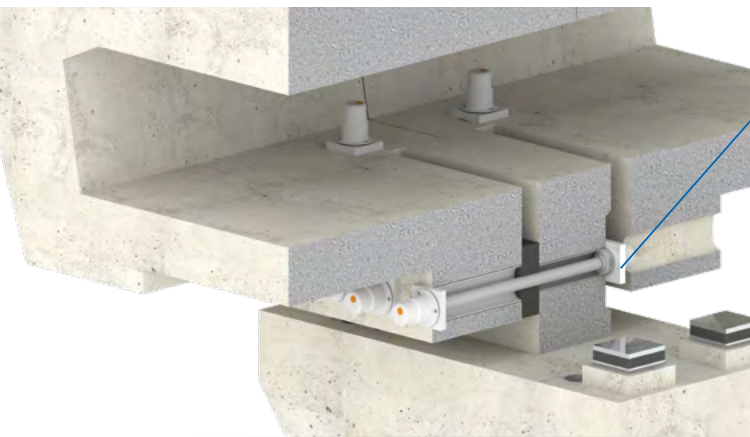


Benefits

- High ductility, fatigue resistance, impact resistance.
- Full traceability and individual bar labelling.
- Ready-to-install conditions: delivered as pre-assembled sets with factory-injected grease in HDPE duct.
- Sea-worthy packing.
- Project engineering support by Dextra dedicated Bar Systems Engineering team.



Applications



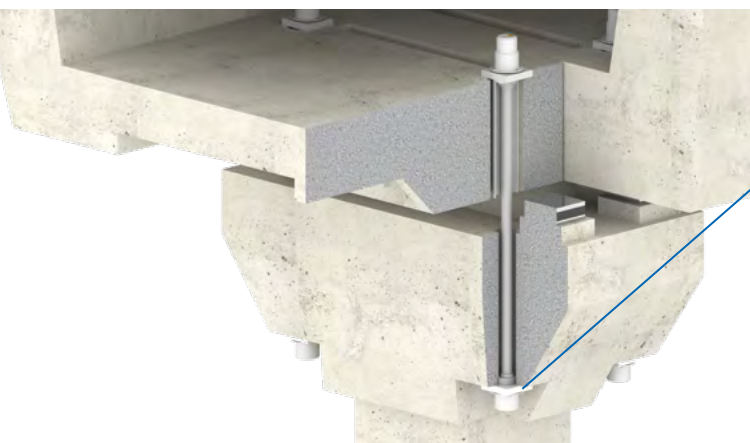
Shear key system

Bars, which are delivered in HDPE pipes already filled with grease, are inserted into the concrete reservation (created by steel pipe, supplied by others).



Plates are installed and active end nut is tightened by the use of an hydraulic jack to put the system under tension.

This will ensure minimal displacement in case of a seismic event.



Hold down system

This system is similar to the Shear Key in components and installation.

It is positioned vertically to connect the precast girder to the pier.



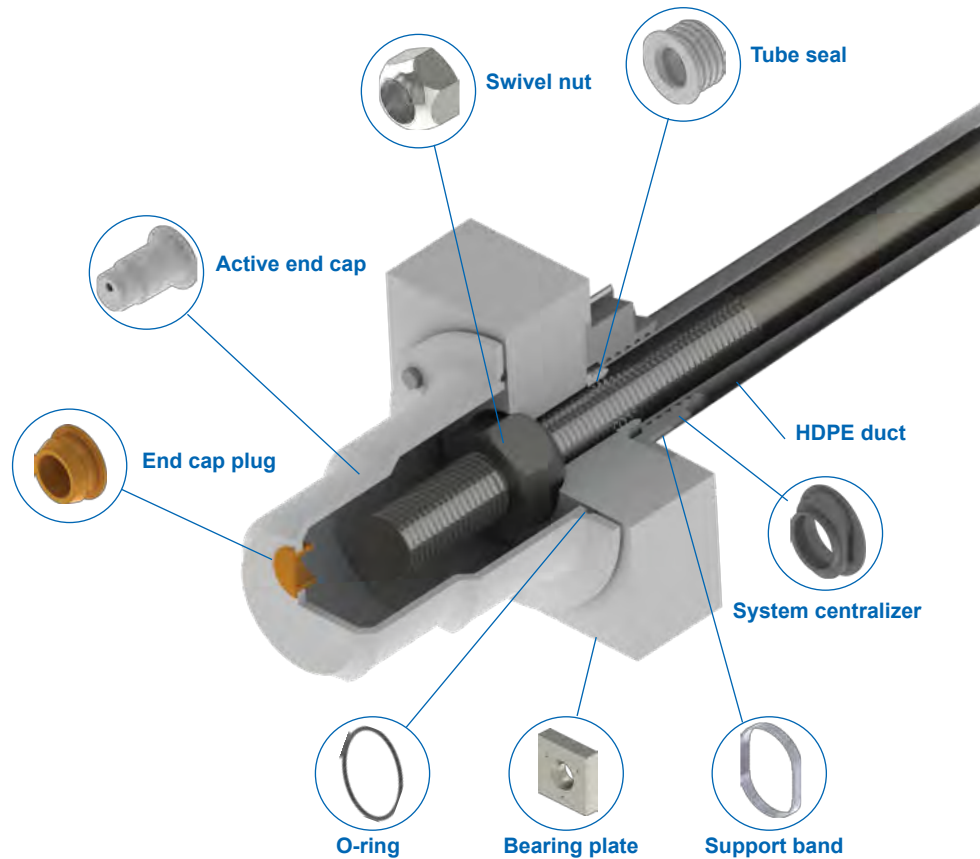
System accessories

Dextra system is inclusive of all accessories.

As a permanent external and unbonded system. Shear key systems require the following corrosion protection measures:

- Smooth HDPE duct filled with grease (factory-injected and controlled at our facility).
- Protection cap installation injected with grease (at site after jacking).

The steel pipe used to create recess hole in the concrete is not supplied by Dextra but can be sourced locally as per dimensions detailed in the specification section.



Specification & dimensions

Our Shear Key bar systems and hold down bar systems are available with their full range of accessories for grade 1050/1200 and come in two diameters: 37 mm (thread M39) and 43 mm (thread M45).

Other diameters and grades may also be supplied, please consult us for more information.

| Thread Size | Bar diameter | Critical Cross Section Area | Linear weight | Load capacity for Carbon Steel Grade 1050/1200 | | Recess holes | | Plate dimensions (Square) |
|-------------|--------------|-----------------------------|---------------|--|---------------|---------------------|------------------------|---------------------------|
| | | | | Yield load | Ultimate load | Active end (Oblong) | Passive end (Circular) | |
| | (mm) | (mm ²) | (kg/m) | (kN) | (kN) | (mm) | (mm) | (mm) |
| M39 | 37 | 976 | 8.44 | 1,025 | 1,171 | 170x90mm | 100mm | 250x250x60 |
| M45 | 43 | 1,307 | 11.40 | 1,372 | 1,568 | 170x90mm | 100mm | 250x250x60 |

High tensile bars

- High strength steel bar dia 37 (M39) or 43 (M45).
- Yield stress $F_y > 1050$ MPa.
- Tensile stress $F_u > 1200$ MPa.
- Elongation after fracture (A) $> 10\%$ (Using gauge length $5.65 \sqrt{S_0}$).
- Resilience at $20^\circ\text{C} > 50$ Joules.
- Relaxation $< 3.5\%$.
- Fatigue resistance of the bars :
 - Mean stress : $0.57 F_y$
 - Stress range : $\pm 0.03 F_y$
 - 4 million cycles
 - After 4 million cycles, no breaking at less than $0.80 F_y$.
 - The threading of the bars shall be made by rolling method (cold forming).

Duct

The duct shall be made of HDPE.
External diameter 63mm, 5mm thick.
Duct must be factory injected with grease.

Cap

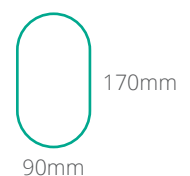
The ends of the bars shall be equipped with protection caps filled up with grease at site and fixed on repartition plate by screws.

Repartition plate

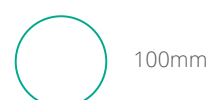
S355 JO quality or equivalent
Restrainers fixed to plates by means of spherical nuts to allow slight rotation.
Plate must be coating with 3 layer paint system with minimum DFT of 300 microns.

Recess hole

Active end should have a oblong shape.



Passive end should have a circular shape.

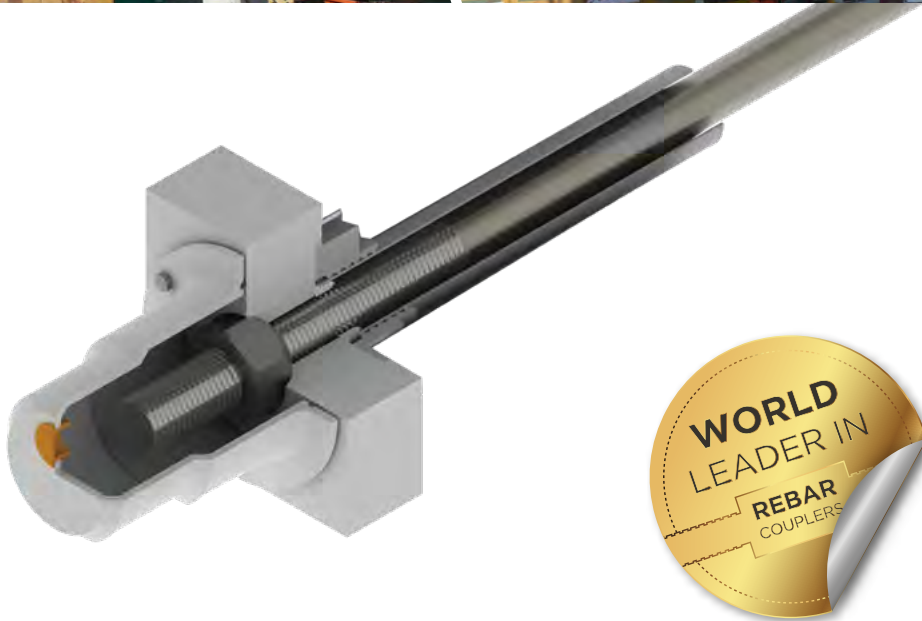




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