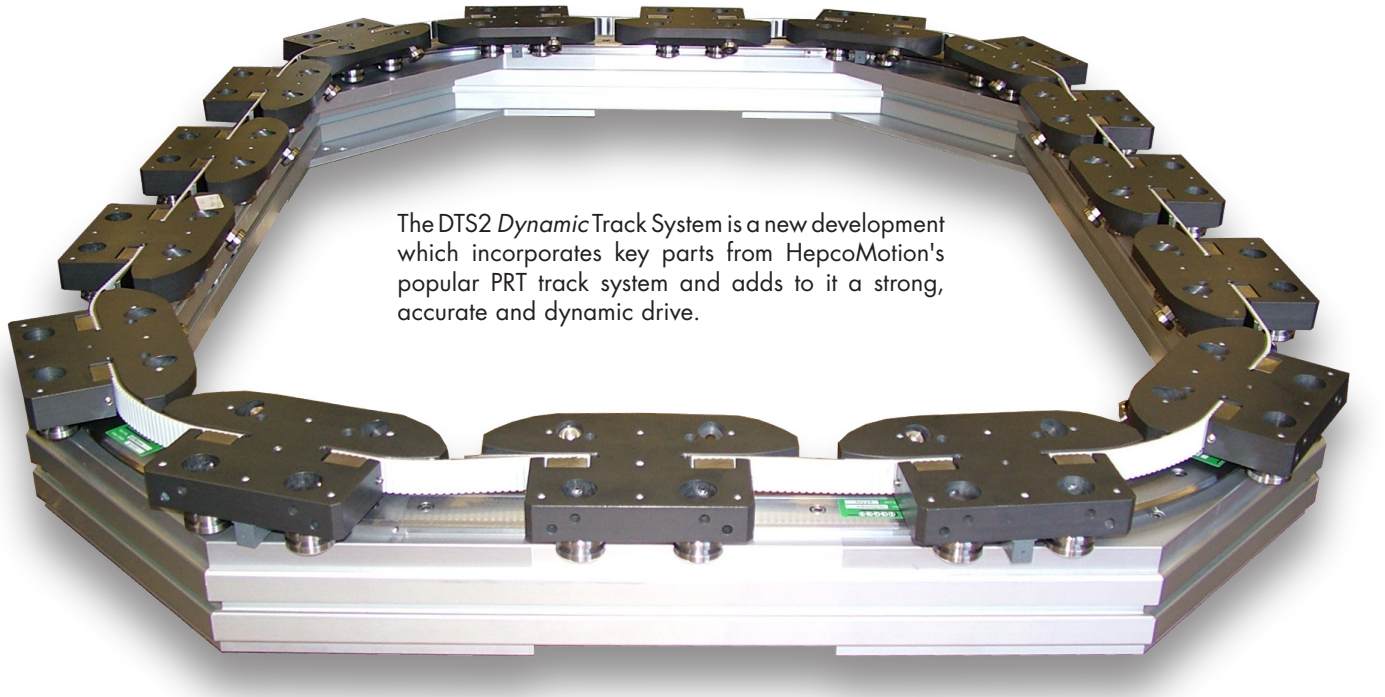
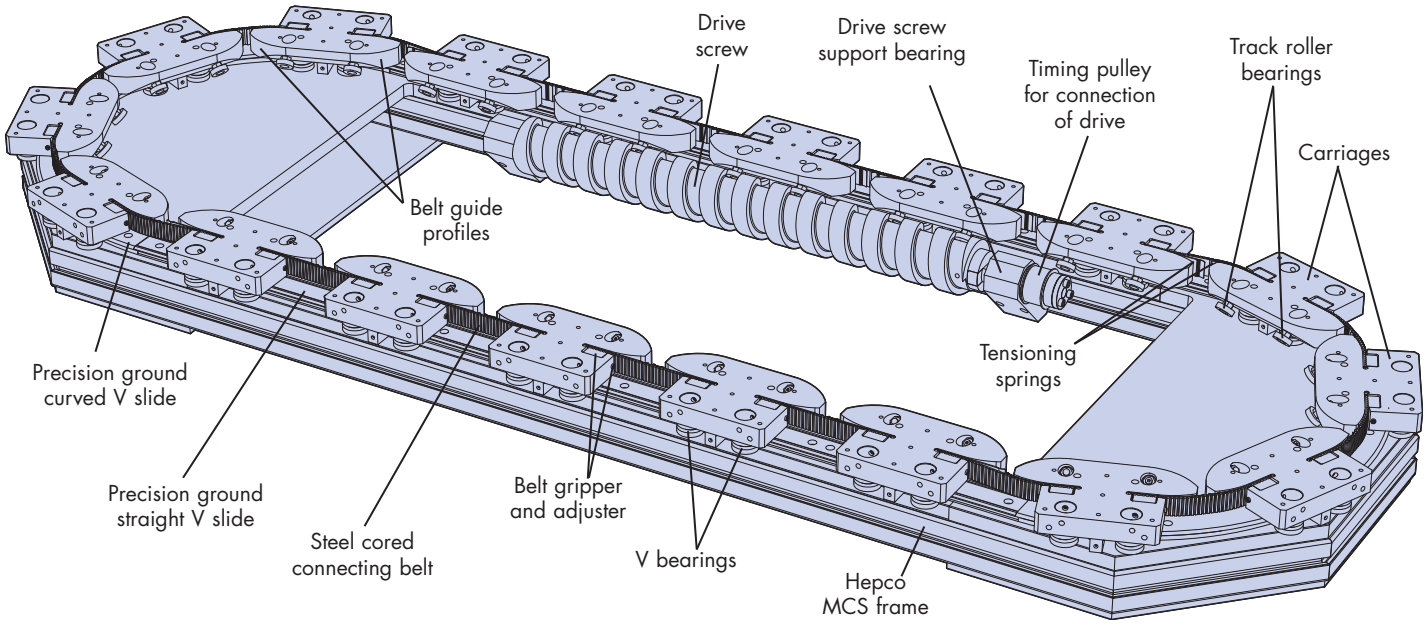
HepcoMotion DTS2 *Dynamic* Track System



The DTS2 *Dynamic* Track System is a new development which incorporates key parts from HepcoMotion's popular PRT track system and adds to it a strong, accurate and dynamic drive.

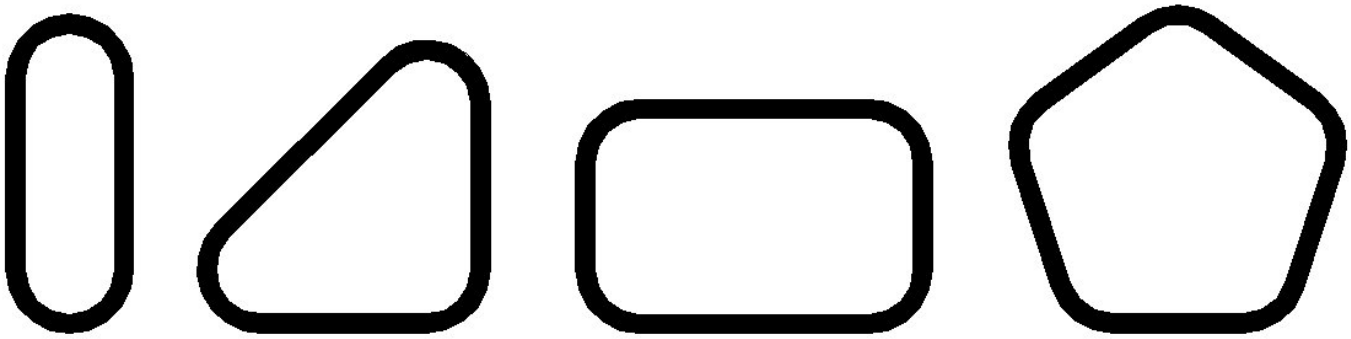
The broad principle is similar to the existing Hepco DTS Driven Track System. Load bearing carriages are mechanically driven around a closed circuit of straight and curved rails. The novel approach taken to provide the drive is quite different to the original DTS, and provides important benefits in many cases. The DTS2 design is patent pending (UK patent application 07 09 483.2, other countries planned). The DTS2 is complementary to the existing DTS, which will continue to be the right choice in many cases, but the DTS2 will be able to perform well in applications where the original design was unsuitable.

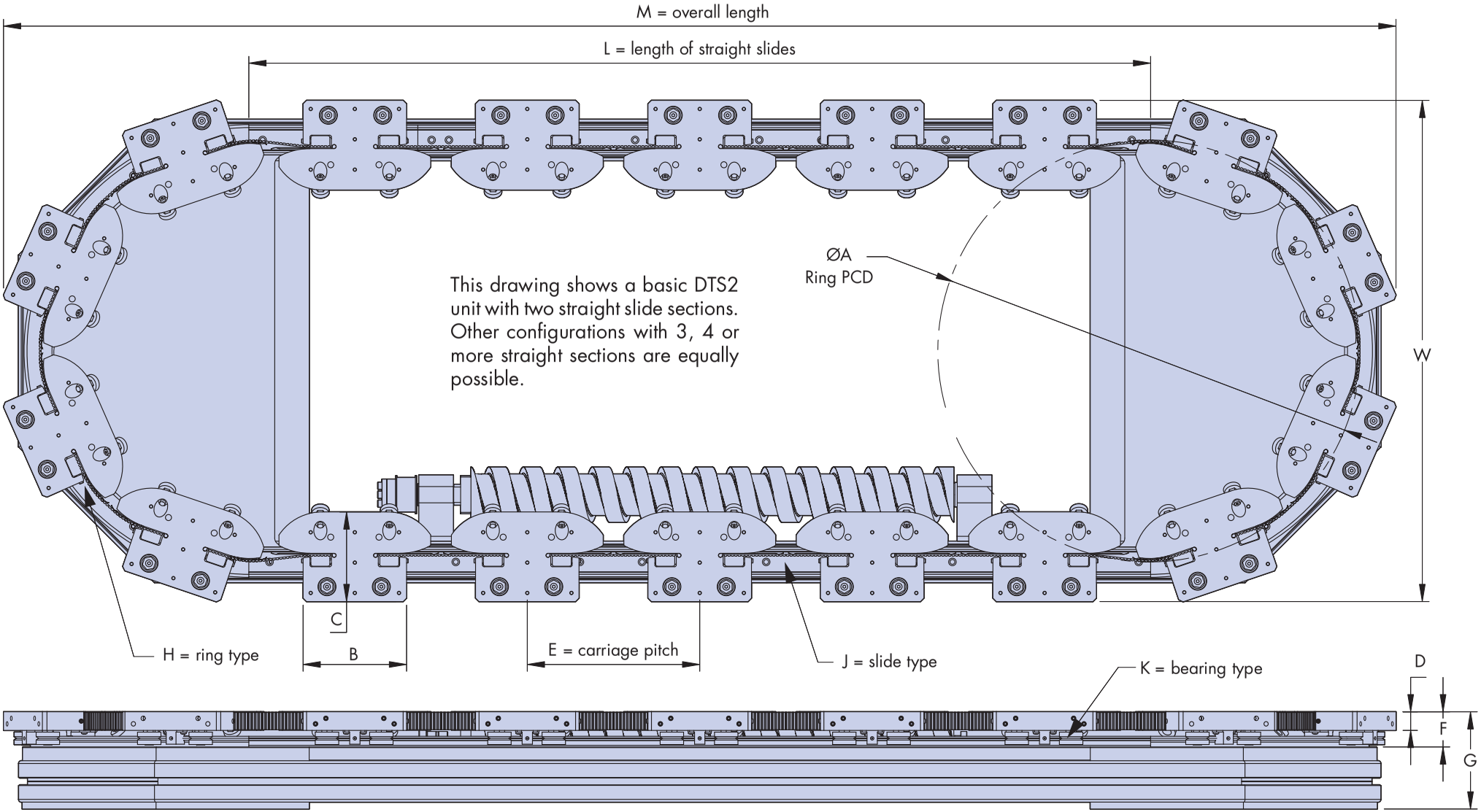
Construction of the DTS2



Key Features and Benefits of the DTS2

- **Strong Drive.** DTS2 carriages can accept high driving forces (much higher than DTS). They are linked by extremely strong steel cables encapsulated in a polyurethane toothed belt.
- **Smooth Motion.** The speed of the carriages is the same on the curved segments as it is on the straights, resulting in a smooth motion. The carriages on the curved sections of the original DTS move faster than those on the straight sections, so the carriages experience a pronounced acceleration and deceleration at every joint between straight and curved sections.
- **High Speed.** The smooth motion, uniformity of carriage speed and inherent balance of the DTS2 make it suitable for high speed use. Constant linear speeds of 3m/s are possible.
- **Rapid Indexing.** The speed and strength of the drive mean that the DTS2 is well suited to indexing applications with high accelerations.
- **Good Positional Accuracy.** The precision straight and curved slides ensure that carriages are guided to a high degree of precision. The drive provides rigid positioning along the track and repeatability of 0.1 - 0.2mm depending on system size. The pitching of carriages along the straight sections is held to similar tolerances. Applications requiring even better accuracy may be satisfied by the addition of an auxiliary carriage locking system.
- **Broad Range of Sizes.** Standard designs exist based on Hepco PRT ring sizes R25-351, R44-612 & R76-1033. These provide typical working loads of respectively 20, 40 & 80kg per carriage. The operating principle is easily applied to other sizes included in the Hepco HDRT (Heavy Duty Track System) which has a much higher load capacity.
- **Simple & Compact.** There are fewer components in the DTS2 than in the earlier DTS design, making the new product simpler and much less deep than its predecessor.
- **Cost Effective.** The high performance and simple design makes for a cost effective product.
- **Stainless Steel Version.** The DTS2 is available in stainless steel, with all track, bearings, springs and fasteners in stainless steel. Carriages will normally be made in aluminium alloy with a food compatible corrosion resistant coating.
- **Carriages Will Not Disengage.** In the original DTS design, a feature was engineered into the carriage drive to disengage the carriages from the drive belt in the event of an overload. This prevents damage to the belt connections, which is an awkward and costly failure. The much superior drive strength of the DTS2 means that this approach is not necessary, but it would normally be recommended to have a mechanical or software torque limit in the drive to avoid a mechanical failure in the event of a jam-up condition.
- **Flexible Configuration.** The DTS2 track can take any shape made from straight and curved sections. The curved slides must be of a single radius, there must be no 'S' bends, and at least one straight section must be over a minimum length to accommodate the drive. Examples of possible configurations are shown below.





System Part Number	A Ring PCD	B		C	D	E		F	G	H Rings	J Slides	K Bearings	L min	M min	W
		Standard	Compact			Standard	Compact								
DTS2 S ...	351	165	120	90	22	235-300	175-235	41	131	TR25-351	TNS25	RSJ25(DR)	450	876	429
DTS2 M ...	612	200	150	130	27	320-400	250-320	51	141	TR44-612	TNM44	RSJ34(DR)	600	1324	727
DTS2 L ...	1033	320	250	200	35	480-600	400-480	55.5	145.5	TR76-1033	TNL76	RSJ54(DR)	850	2068	1218

Note: DTS2 units of other sizes are possible, including larger, stronger units based on Hepco's HDRT heavy duty track system. Please conact Hepco for details.

Design Guidelines

The DTS2 has many advantages over other designs, but it does have its limitations, and in some cases the original DTS design will be the right solution. When specifying the DTS2, the following factors should be borne in mind.

- **Minimum Carriage Spacing.** The clearance between carriages reduces on the curves, and this means that the carriage spacing on the straights is subject to a minimum figure, see the table on the previous page.

- **Maximum Carriage Spacing.** The path of the belt must follow approximately the line of the track, but this is not possible if carriages are too widely spaced. See maximum carriage spacing in the table on the previous page. NOTE: sometimes it will be possible to have an intermediate carriage to support the belt if a wider spacing of main carriages is needed.

- **Overall System Length.** The driving force is exerted by the drive screw to the carriages engaged in the screw, and this drags round the whole train. This works very well with small and medium sizes systems, but in large systems and ones with heavy loads, the cumulative effect of carriage friction and driving forces can exceed the capability of belt and springs. In many such cases, more than one drive screw can be incorporated. Providing that the drive screws are not on the same straight section, and that they are timed together, then the torque and driving forces will be evenly distributed between them. In a typical DTS2 system, up to 40 carriages can be driven per drive screw, depending on the loads and application.

- **Drive Screw Selection.** Many applications will work well with the standard drive screw which is made in a high quality, cam grade engineering plastic. Some busy and heavily loaded applications will benefit from using a heavy duty drive screw. This uses a very exotic grade of material which gives substantially improved durability in demanding applications.

- **Systems Without Drive Screws.** The arrangement of drive screw and track roller bearings is a robust and flexible drive means, and is particularly suitable for systems driven by servo and other types of electric motor. Other drive methods are possible, including the use of air cylinders which can be arranged to make a very simple and cost-effective indexing drive - contact Hepco for details.

The above represents a very basic introduction to the issues which will influence the specification of a DTS2 unit. It is not comprehensive, and if there is an application which might benefit from DTS2 technology, then this should be discussed with Hepco's Technical Sales Team, who will be well placed to provide comprehensive advice.

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