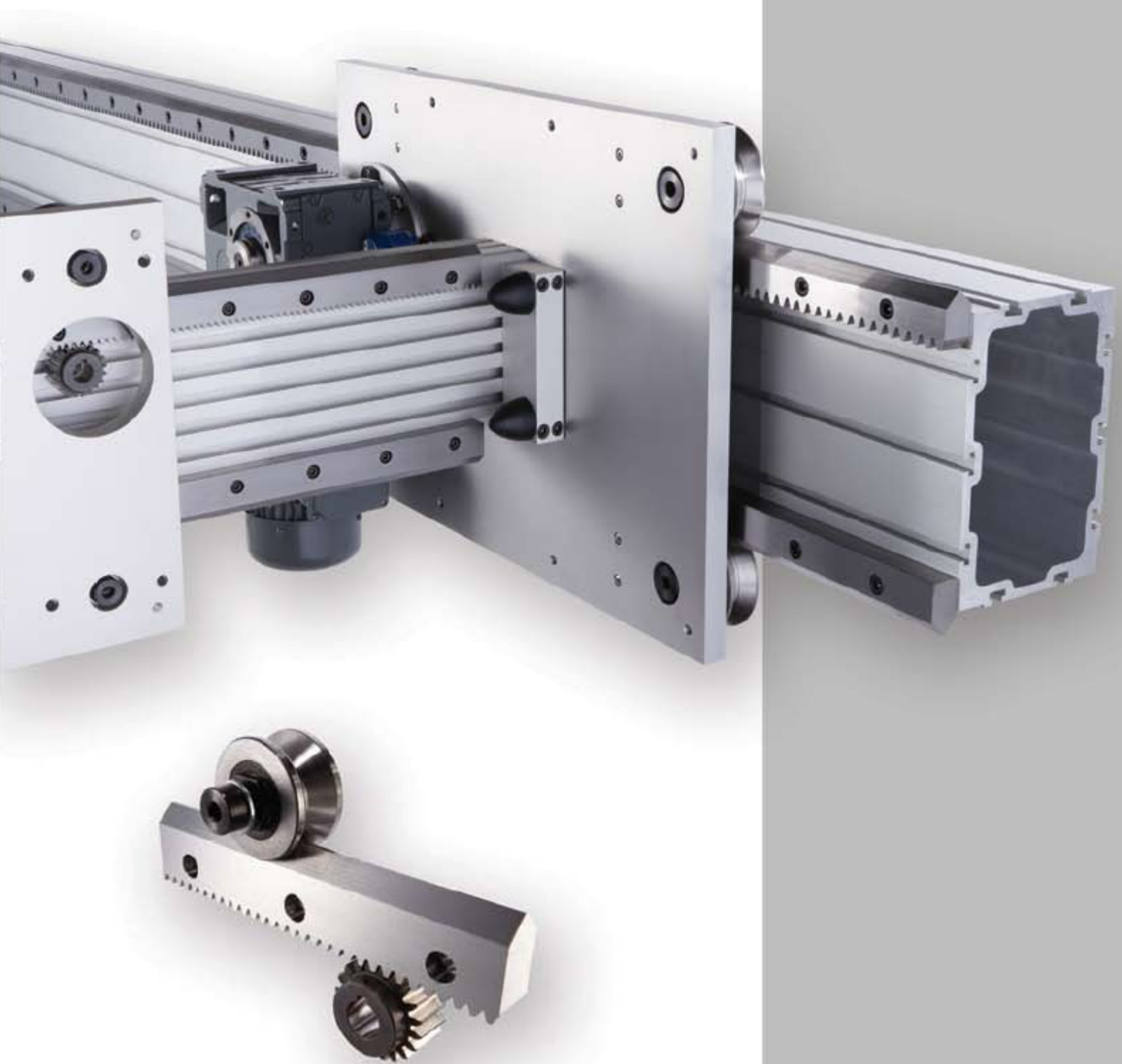
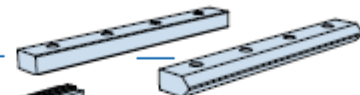
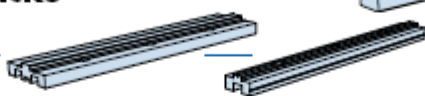

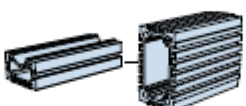
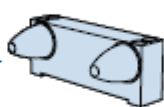
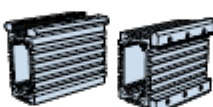

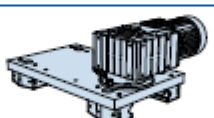

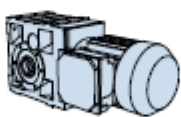
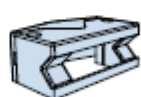
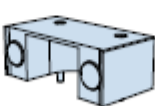
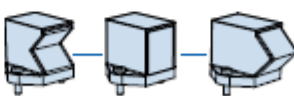



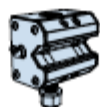



# HDS2

Heavy Duty  
Slide System



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## Introduction

HepcoMotion® HDS2 Heavy Duty Slide System, available from Bishop-Wisecarver, retains the best features from the previous HDS product line, and incorporates them in a greatly expanded range. Many new components have been added including larger bearings with increased load capacity, two sizes of construction beam, single edge V slides and flat track, as well as a range of drive options. All this, with an option for stainless steel or corrosion resistant components, enables the HDS2 range to offer a solution for most customers' applications.

Customers can choose from low cost commercial slides for general use or high precision ground slides to suit applications where accuracy and smoothness are key requirements.

Customers can save design and manufacturing time by specifying ready mounted systems complete with rack driven carriages, safe in the knowledge that everything has been designed and tested by one of the world's leading specialists in linear technology.



**2D & 3D CAD files available**

Please visit [www.bwc.com/3dcad.php](http://www.bwc.com/3dcad.php)

## Features and Benefits

- Low cost **commercial, precision** ground and **stainless steel systems** available
- **Spur** or **helical rack** & pinion options for ease of driving
- **Unique wiping action** expels dirt and debris in harsh environments
- Available as assembled units or in component form, providing **maximum flexibility** of design
- Versatile construction beams for multiple design options
- System capacities up to **68kN**
- Can operate without lubrication, ideal for food machinery and clean applications
- Slides and tracks available in one piece up to **4 meters long**, saves on assembly time
- Long lengths comprising replaceable segments, reduces downtime in the event of damage
- Flat tracks overcome necessity for parallel installation
- **Simple** alignment facility to achieve parallelism of V slides
- Works in any plane and orientation for unrestricted use in machine construction

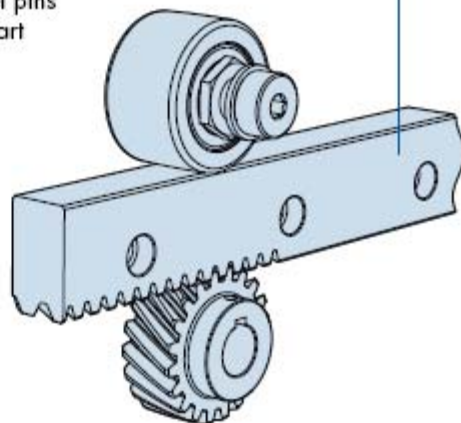
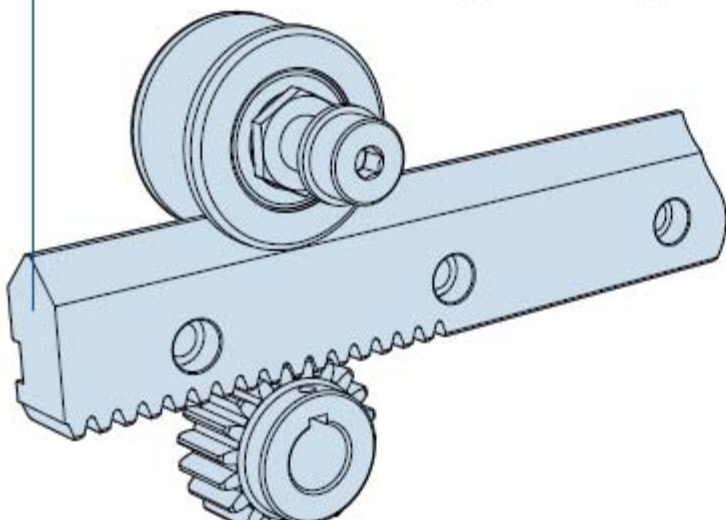
## System Composition

The HDS2 system comprises a versatile family of slides, flat tracks, construction beams and other components, which will meet the requirements of the most demanding applications.

2 to 7 provide an overview of the comprehensive HDS2 system. The slides and flat tracks may be attached to a suitable section, or they may be used in conjunction with back plates to give a ready made support profile. Slides and flat tracks can also be fitted to construction beams in many positions to provide a versatile all-in-one guide, drive and construction element.

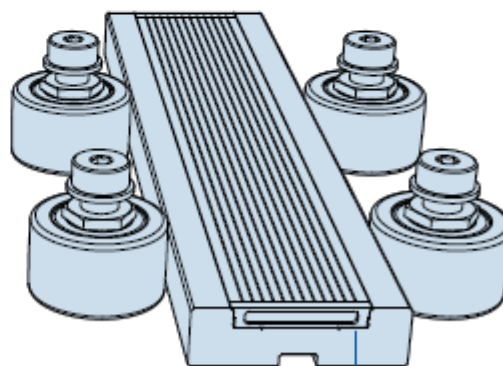
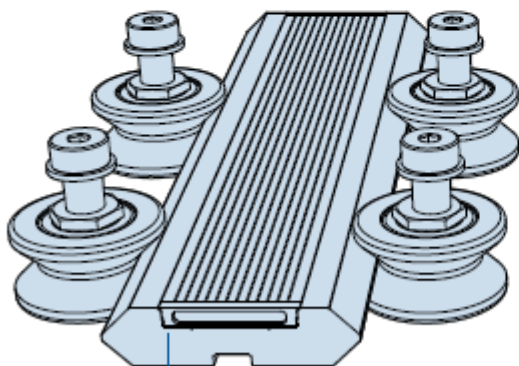
### \* Single Edge V Slide / Single Edge Flat Track 14 & 45 •

- \*• Precision ground, low cost commercial, and stainless steel versions available
- \*• Available up to 4 meters long, unlimited lengths achieved by butting
- \*• Optional long lengths comprising replaceable short segments
- \*• Deep hardened running faces for maximum wear resistance
- \*• Unhardened center allows customizing
- \*• Spur and helical rack cut options provide means of driving
- \*• Optional keyway for location and alignment via key or dowel pins
- \*• Narrow rail with register face for convenience of spacing apart
- \*• Common V angle allows many bearing / slide combinations
- \*• Attractive corrosion inhibiting finish on all unground faces



### \* Double Edge V Slide / Double Edge Flat Track 15 & 45 •

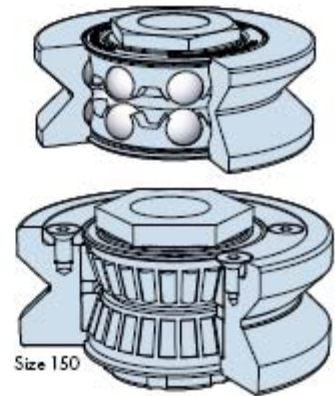
- \*• One piece construction with built in parallelism
- \*• Precision ground, low cost commercial, and stainless steel versions available
- \*• Available up to 4 meters long, unlimited lengths achieved by butting
- \*• Optional long lengths comprising replaceable short segments
- \*• Deep hardened running faces for maximum wear resistance
- \*• Unhardened center allows customizing
- \*• Lightened center with attractive debris cover
- \*• Keyway for location and alignment via key or dowel pins
- \*• Common V angle allows many bearing / slide combinations
- \*• Attractive corrosion inhibiting finish on all unground faces



## \* V Bearings / Track Rollers □18-21 ●

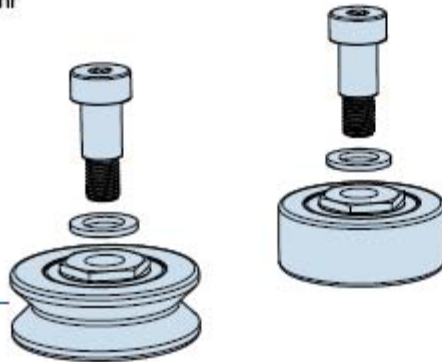
### Bearing & Roller common features □18-21

- \*● Special raceway conformity and low radial clearance, for slide applications
- \*● Double row bearings for tolerance of debris and high load capacity
- \*● Load capacity up to **50kN** each
- \*● Can be installed and removed without disengaging the carriage
- \*● Nitrile sealed for lifetime lubrication, inhibits ingress of liquids and contaminants
- \*● All options available in stainless steel
- Permits out of parallel installation
- Crowned contact face to overcome misalignment



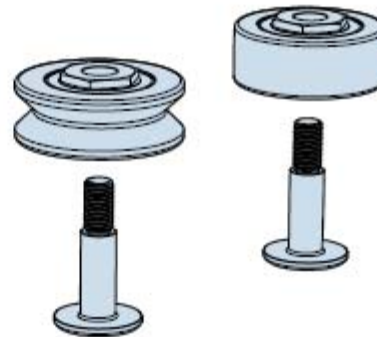
### Through hole fixing

- Bolt lengths to suit plate thickness from 7 to 40mm
- Concentric (fixed) or eccentric (adjustable) studs
- Can be installed and removed without carriage disengagement



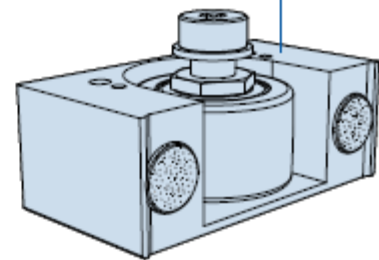
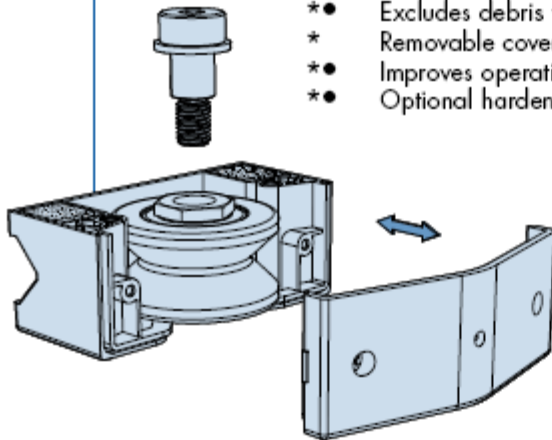
### Blind hole fixing

- For mounting into thick plates or where access to opposite side is restricted
- Concentric (fixed) or eccentric (adjustable) studs
- Can be installed and removed without removing slide



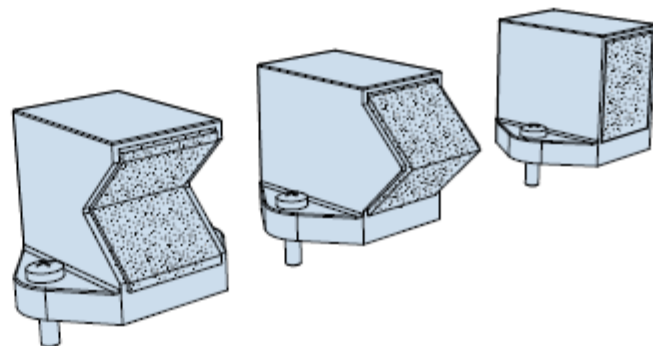
## \* V Bearing Cap Wiper / Roller Cap Wiper □32-33 ●

- \*● Lubricates contact faces reducing wear
- \*● In many cases re-lubrication is unnecessary
- \*● Excludes debris from bearing contact faces
- \* Removable cover allows adjustment of system without disassembly
- \*● Improves operational safety
- \*● Optional hardened stainless steel scraper



### Lubricators □34

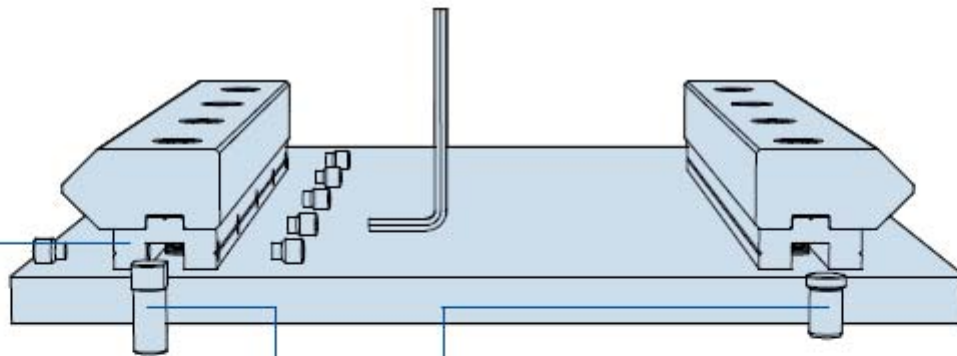
- Lubricates systems - increasing load and life
- Lightly sprung felt wiper ensures low friction
- Versions to fit slide, track, V bearing and track rollers
- Blind and through hole fixing



## \* Low Narrow / Low Wide Back Plates □16-17 ●

- \*● Strong construction in light weight aluminum
- \*● Profiles to suit single and double edge slides
- \* Adjustable alignment option to obtain parallelism of the system
- \*● Easily incorporated into customer's design

- \*● Will attach to T-slot positions of construction beams
- \*● Key locations for attachment of slide and for mounting
- \*● Supplied clear anodized
- \*● Manufactured to precision extrusion tolerances

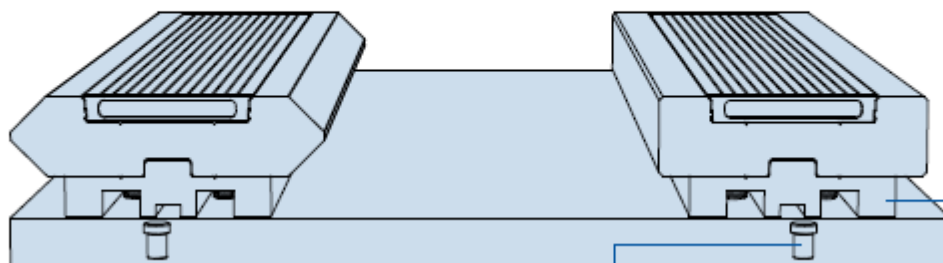


### Back plate alignment dowel



- Adjustable alignment in conjunction with jacking screw, ensures parallelism between slides or tracks

### Back plate location dowel

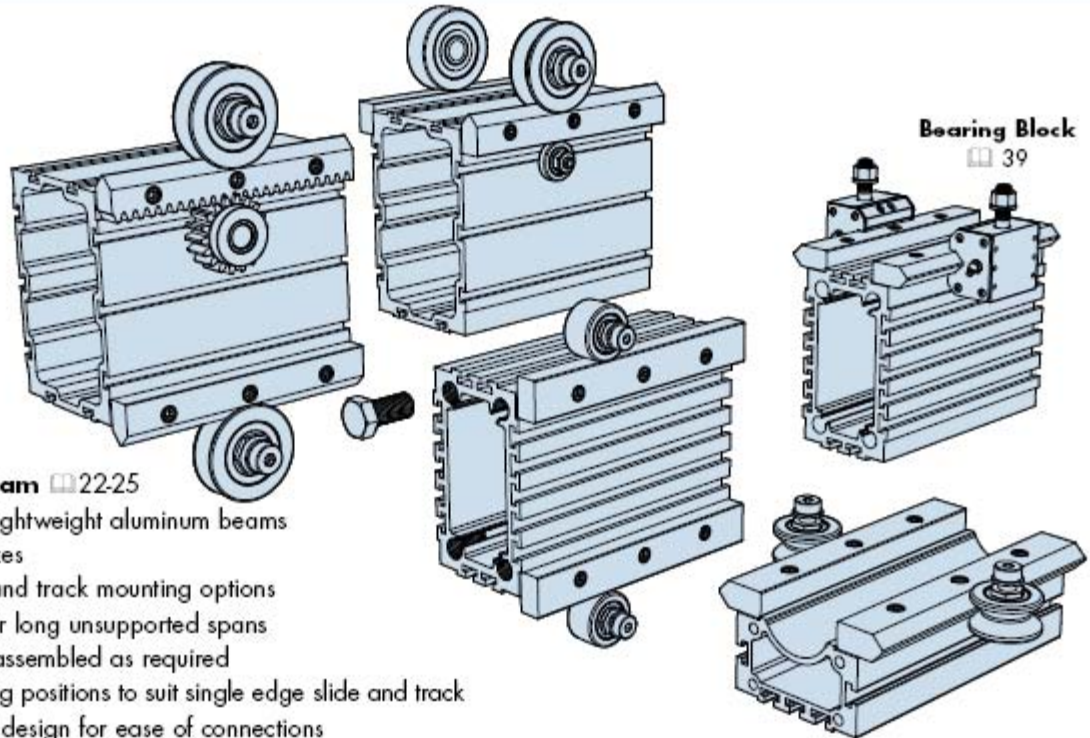
- Simple means of location and alignment, provides datum location



### Back plate location dowel

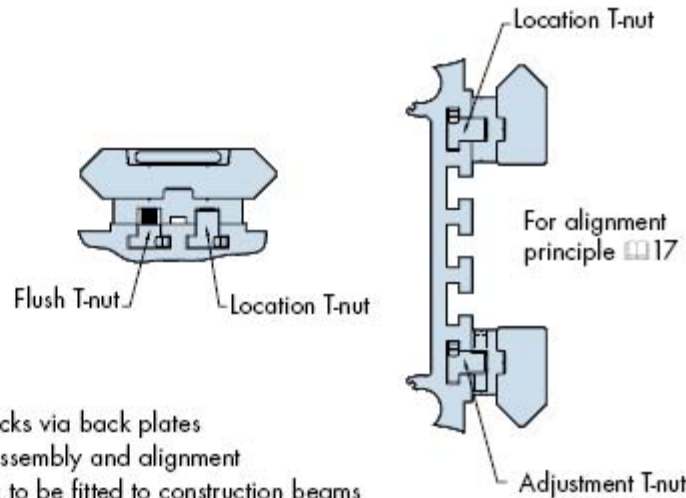
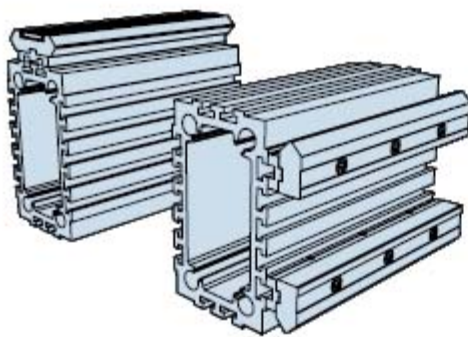
- \*● Spaces V slide and flat track away from mounting surface to allow the use of bearings, rollers and cap wipers
- \*● Male key for location on V slide and flat tracks
- \*● Female keyway for location using customer own key section or dowel pins
- High wide  & high narrow  back plates available □16-17 to suit slides with bearing blocks □39

## System Composition



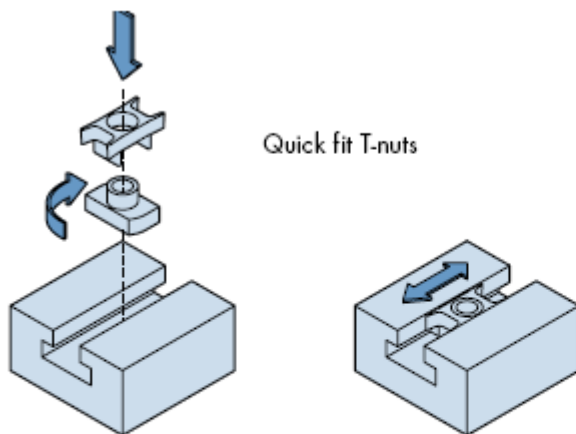
### Construction Beam 22-25

- High strength lightweight aluminum beams
- Three useful sizes
- Multiple slide and track mounting options
- Stiff sections for long unsupported spans
- Supplied fully assembled as required
- Corner mounting positions to suit single edge slide and track
- Common T-slot design for ease of connections
- Plastic T-slot cover and metal end covers available



### T-Slot Fixing 16,17 & 25

- Multiple T-slot positions for attaching slides and tracks via back plates
- Use of location and adjustment T-nuts for ease of assembly and alignment
- Enables the use of double edge slide and flat track to be fitted to construction beams



### T-Nuts 38

- Simple means of attaching components
- Plastic or spring retainer prevents loss of position
- Location type fits into the back plate keyway
- Adjustment type for ease of alignment
- Multiple thread sizes are available

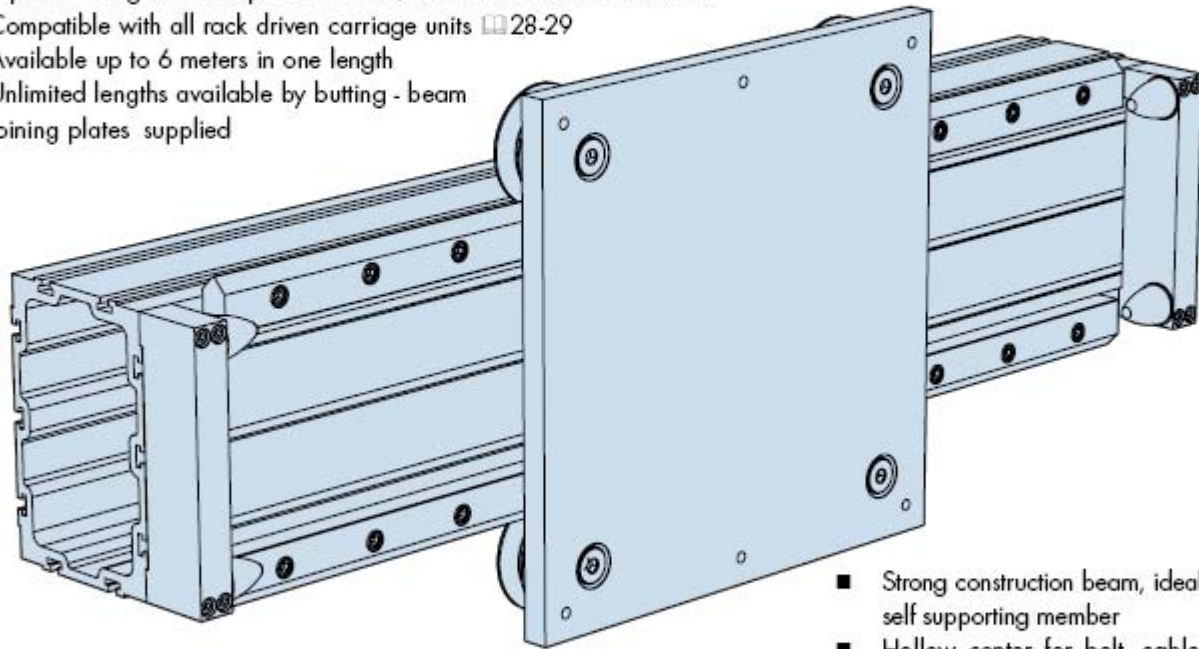


## System Composition

The HDS2 range has been greatly extended to include assembled carriages, three sizes of construction beam, larger capacity bearings and a host of improved features. This also provides flexibility for many sizes and types of heavy duty components to be interchanged in order to achieve a comprehensive combination of space and performance possibilities.

### Assembled Beams with Carriages [24-25](#)

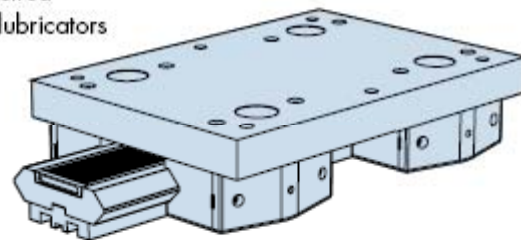
- Fully assembled factory built beam with ready adjusted carriage
- Available for all opposing corner mounted V slide options for all sizes of beam
- Optional integrated bumper units with / without access for drive belt
- Compatible with all rack driven carriage units [28-29](#)
- Available up to 6 meters in one length
- Unlimited lengths available by butting - beam joining plates supplied



- Strong construction beam, ideal as self supporting member
- Hollow center for belt, cable or chain return

### Carriages [26-27](#)

- Factory adjusted to double edge slide or beam assembly as required
- Available with bearings only, or with addition of cap wipers or lubricators
- Hardened stainless steel scrapers available for cap wipers
- Tapped holes in convenient positions for attachment purposes
- Compatible with both precision ground and commercial slides
- Corrosion resistant options available on all sizes



### Rack Driven Carriage Unit [28-29](#)

- High performance carriage with drive pinion and optional geared motor
- Fine adjustment facility for pinion ensures low backlash

- Sizes to suit all beams
- Optional automatic rack lubrication

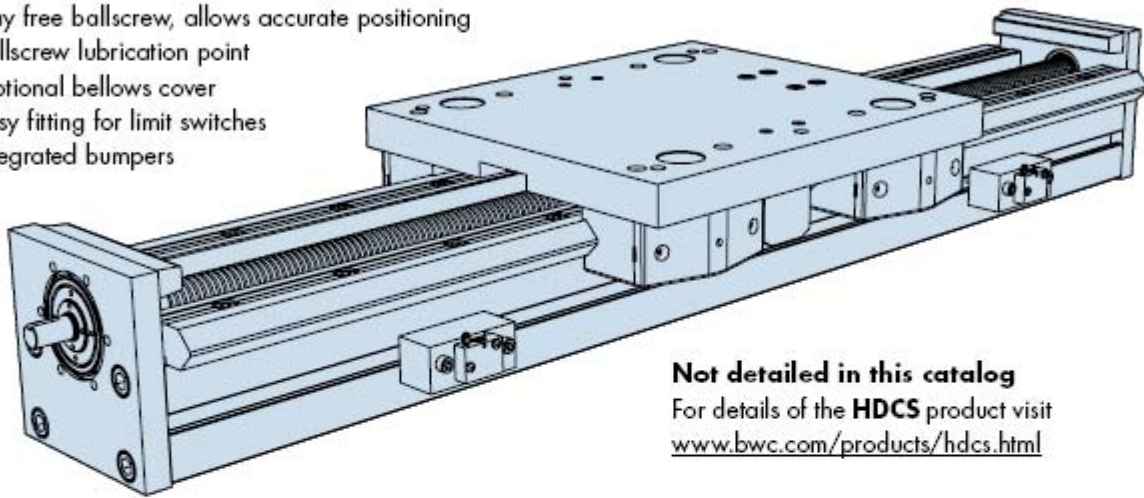




## System Composition

### HDCS - Heavy Duty Compact Screw Driven Unit

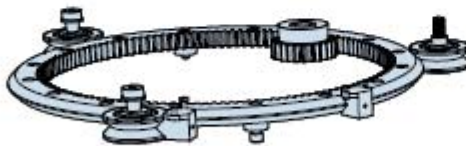
- High performance linear transmission
- High capacity, high precision
- Compact high strength aluminum beam
- Play free ballscrew, allows accurate positioning
- Ballscrew lubrication point
- Optional bellows cover
- Easy fitting for limit switches
- Integrated bumpers



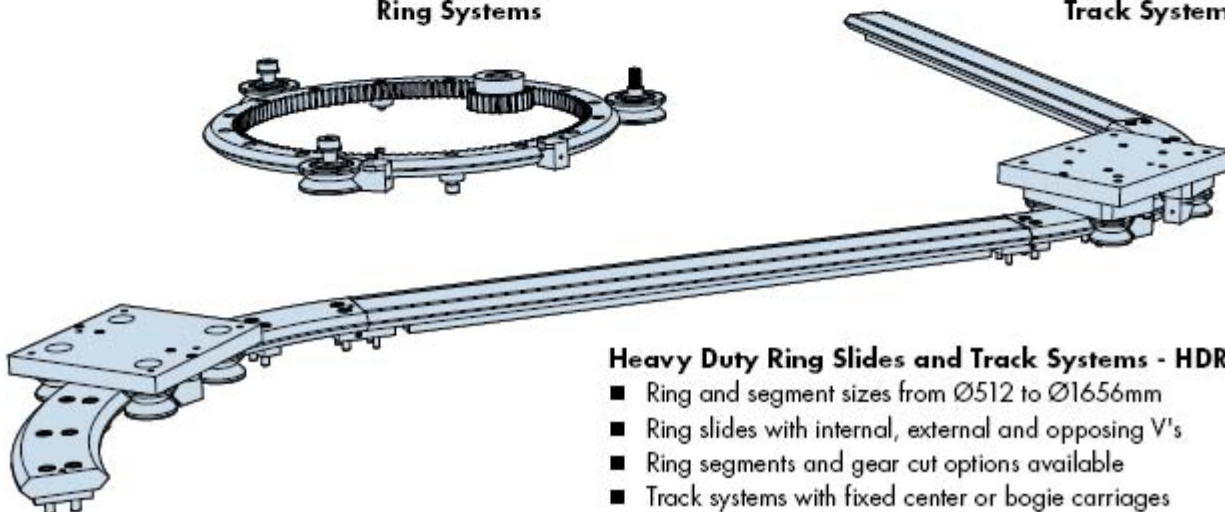
**Not detailed in this catalog**

For details of the HDCS product visit [www.bwc.com/products/hdcs.html](http://www.bwc.com/products/hdcs.html)

### Ring Systems



### Track Systems



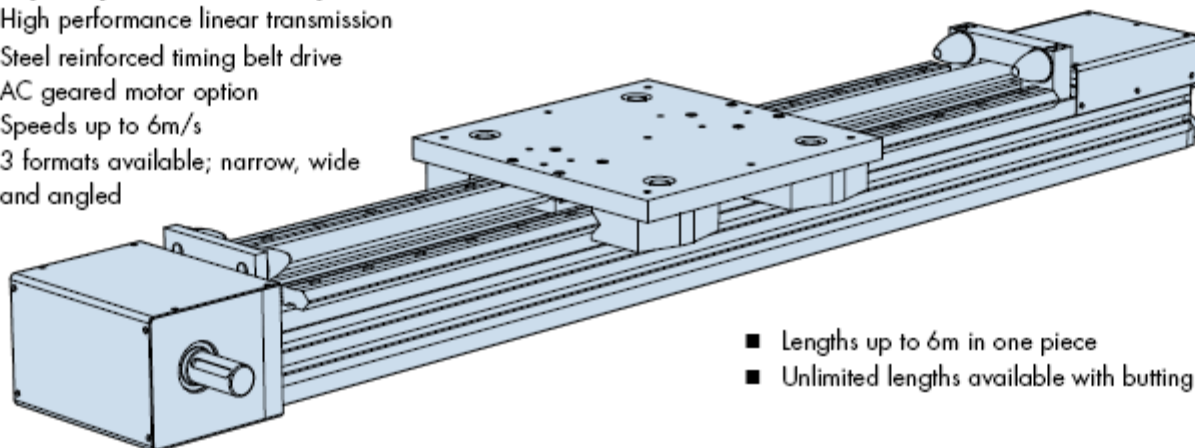
### Heavy Duty Ring Slides and Track Systems - HDRT

- Ring and segment sizes from  $\text{Ø}512$  to  $\text{Ø}1656\text{mm}$
- Ring slides with internal, external and opposing V's
- Ring segments and gear cut options available
- Track systems with fixed center or bogie carriages

**Not detailed in this catalog.** For details of the HDRT product visit [www.bwc.com/products/hdrt.html](http://www.bwc.com/products/hdrt.html)

### Heavy Duty Driven Linear System - HDLS

- High performance linear transmission
- Steel reinforced timing belt drive
- AC geared motor option
- Speeds up to  $6\text{m/s}$
- 3 formats available; narrow, wide and angled



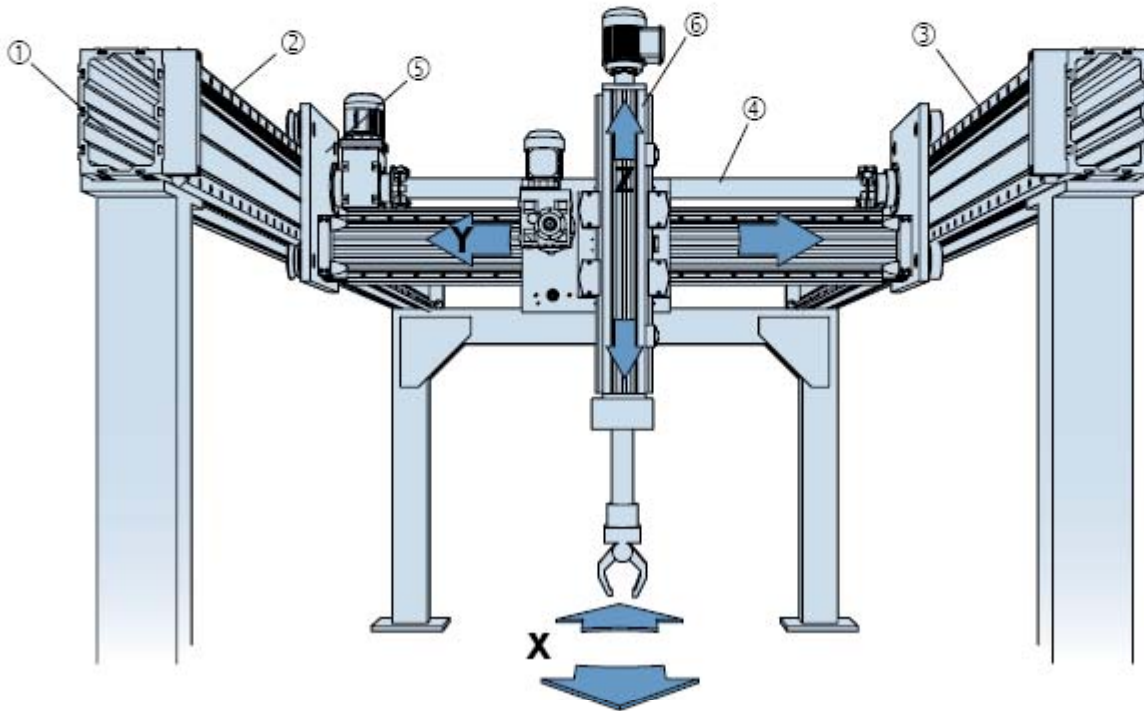
- Lengths up to  $6\text{m}$  in one piece
- Unlimited lengths available with butting

**Not detailed in this catalog.** For details of the HDLS product visit [www.bwc.com/products/hdls.html](http://www.bwc.com/products/hdls.html)

## Application Examples

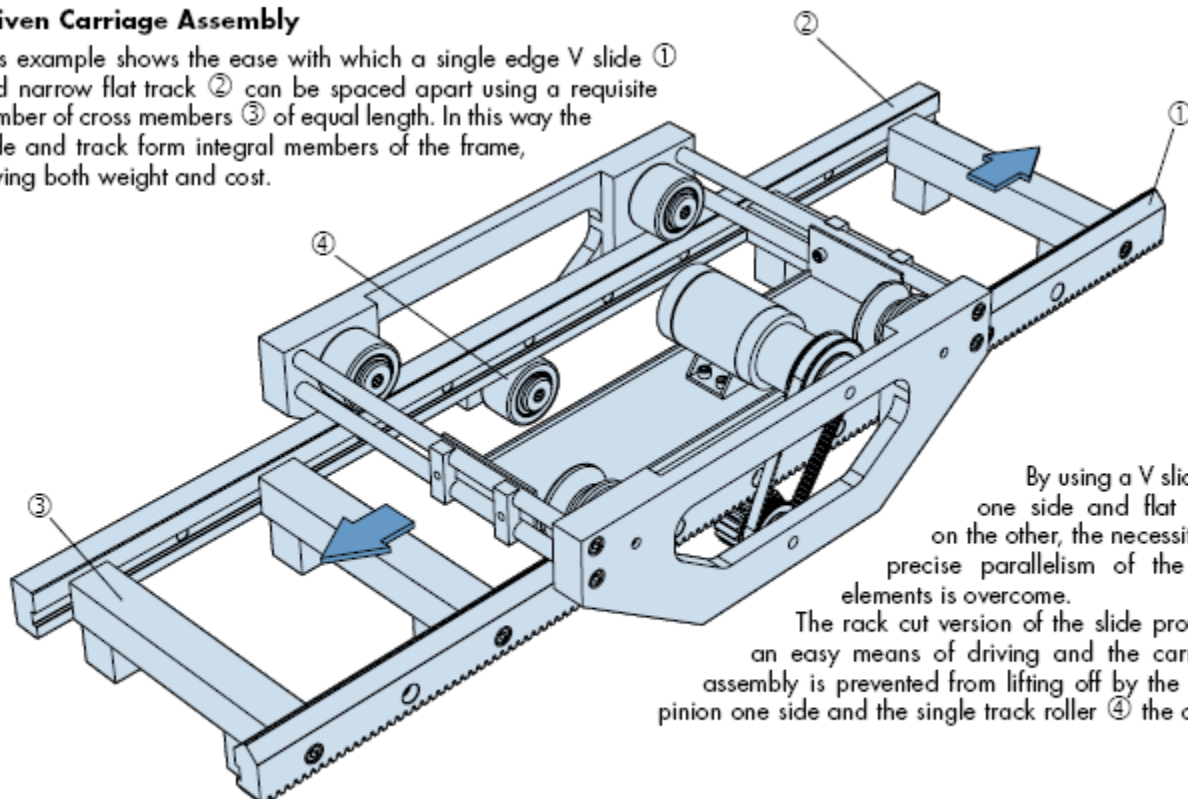
### Gantry Robot

The HDS2 system contains all the major components to produce high capacity gantry systems such as that shown below. The extreme rigidity of the construction beams ① allow for long unsupported spans up to 6m depending on load. The use of V slides ② on one side of the X axis and flat tracks ③ on the other makes allowances for the variation in parallelism between the two beams. The common drive shaft ④ allows for the Y axis to be driven from both X axis beams, via the integrated racks on both the V slide and flat tracks. The ends of the Y axis beam have been tapped to allow direct connection into the driven carriages ⑤ on the X axis. Both X and Y axis beams have been fitted with bumper units for end of stroke protection. The Z axis incorporates an HDCS unit ⑥, which is driven via a ballscrew. This provides both the precision and capacity required for this type of application.



### Driven Carriage Assembly

This example shows the ease with which a single edge V slide ① and narrow flat track ② can be spaced apart using a requisite number of cross members ③ of equal length. In this way the slide and track form integral members of the frame, saving both weight and cost.



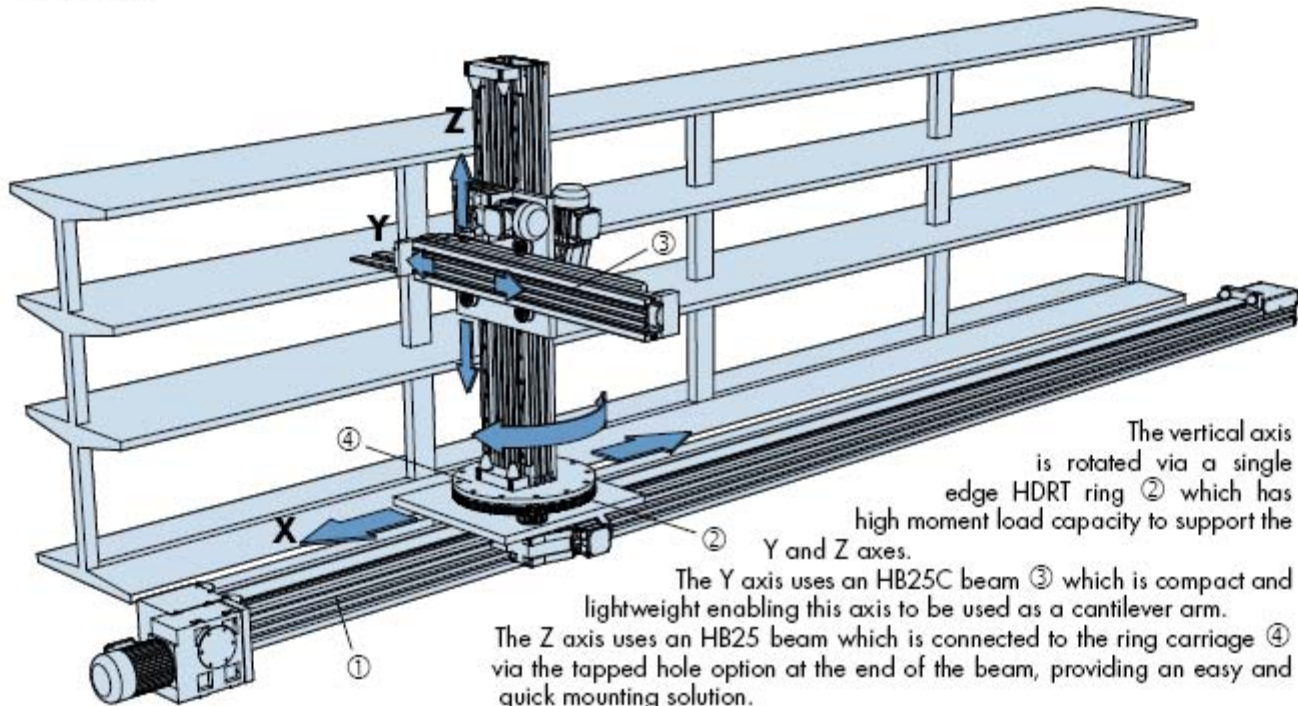
By using a V slide on one side and flat track on the other, the necessity for precise parallelism of the two elements is overcome.

The rack cut version of the slide provides an easy means of driving and the carriage assembly is prevented from lifting off by the drive pinion one side and the single track roller ④ the other.

## Application Examples

### Pick and Place Application

This example shows a four axis pick and place system using a combination of HDS2, HDLS and HDRT parts. HDLS and HDRT are related products featured on page 7 and detailed in separate catalogs. The X axis comprises the HDLS unit ① which is driven via a steel reinforced timing belt and incorporates an HB25 beam. It is ideally suited to high speed applications of this nature.



### Cable Tensioning Application

This example shows 8 x THJR95 V bearings ① mounted on a special carriage plate supporting the cable clamp. The widely spaced pairs of bearings give very high moment load capacity, with the inner set providing additional capacity at the point of greatest load. The outermost bearings on one side are the concentric type, the rest are the eccentric type. This allows the system to be adjusted such that all bearings share the load equally. The bearings run on single edge V slides ② spaced wide apart on a custom built back plate which provides high moment load capacity in the other direction.

Bishop-Wisecarver can provide parts to customer drawings such as the back plate and carriage shown in this application. This allows customers to receive fully built assemblies, with factory set bearings.

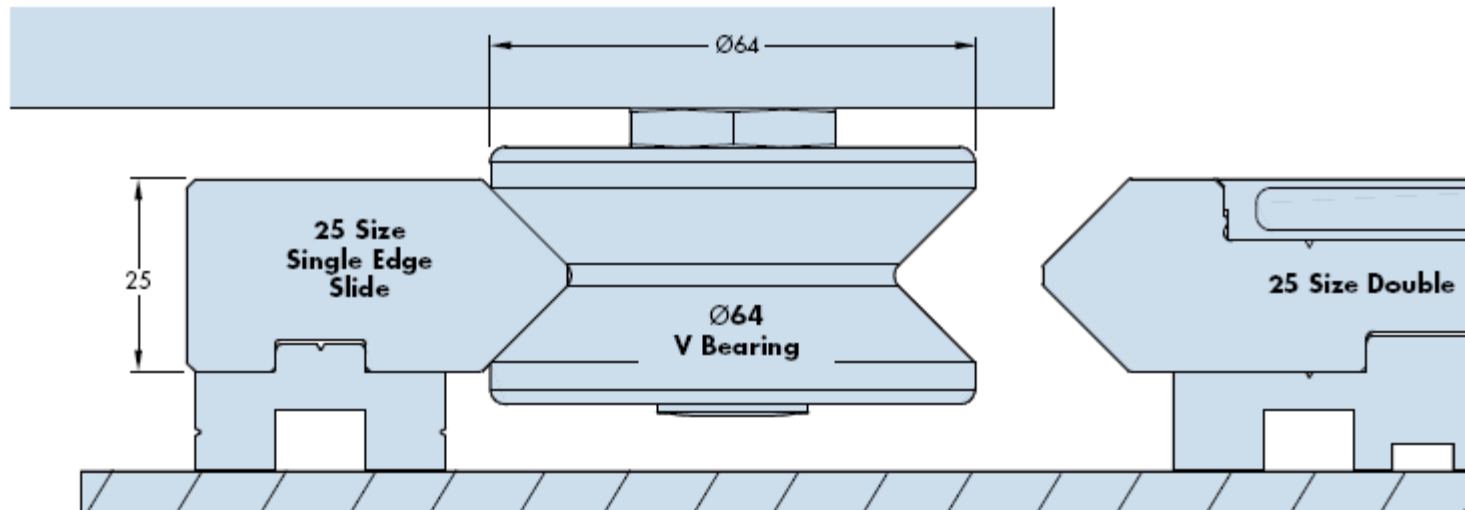
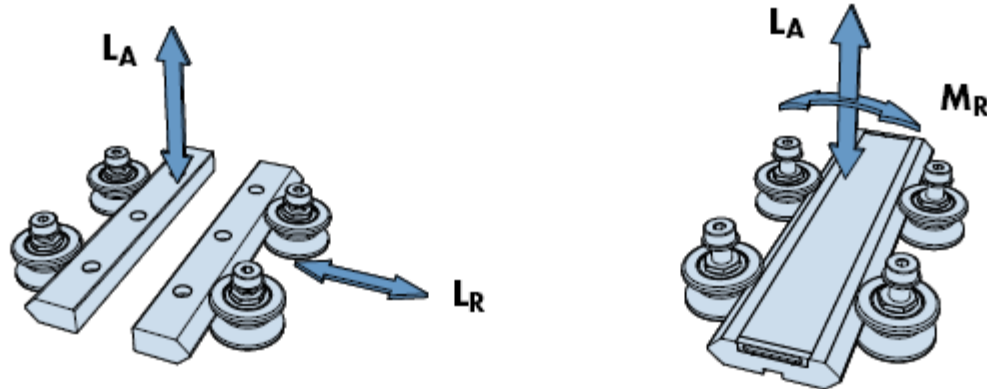
## Full Size Illustrations For Initial Selection

Full size illustrations of the basic V slide systems and flat track systems and load capacities are shown on this and the following three pages as a guide to facilitate initial selection. Once a choice has been made, customers should refer to individual component pages for dimensions and to 42-44 for comprehensive details on load and life. Combinations other than shown in this section are possible. Please refer to the Mix & Match tables on 46-47. A wide range of other components complementary to the V slide systems and flat track systems are illustrated on the system composition 2-7 cross referenced to the relevant component pages.

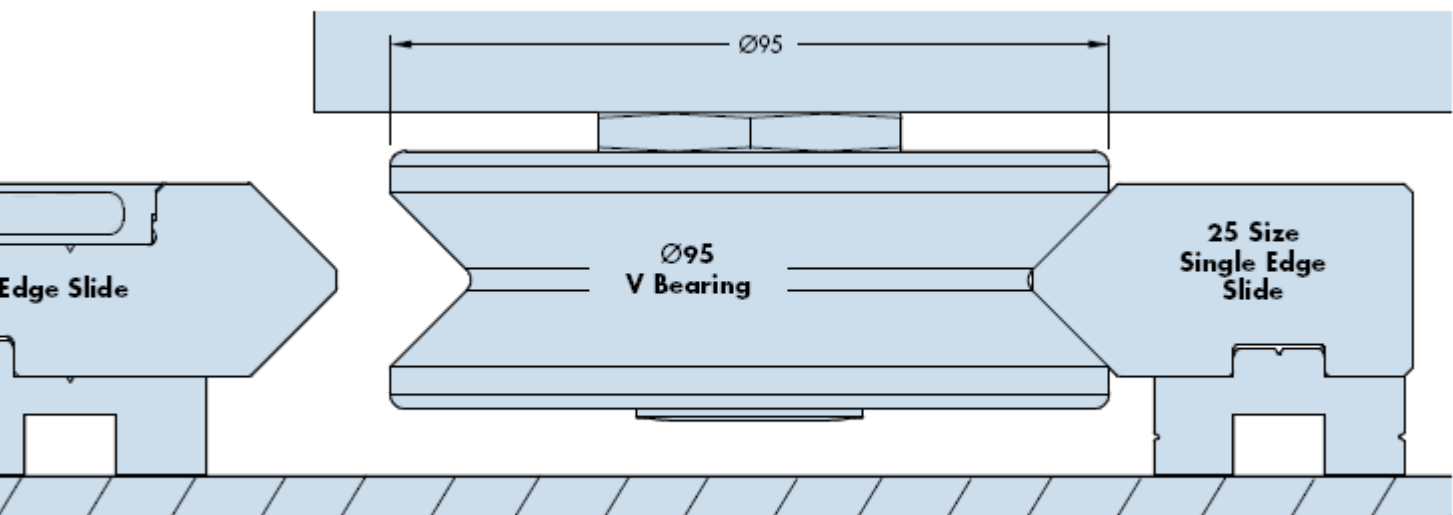
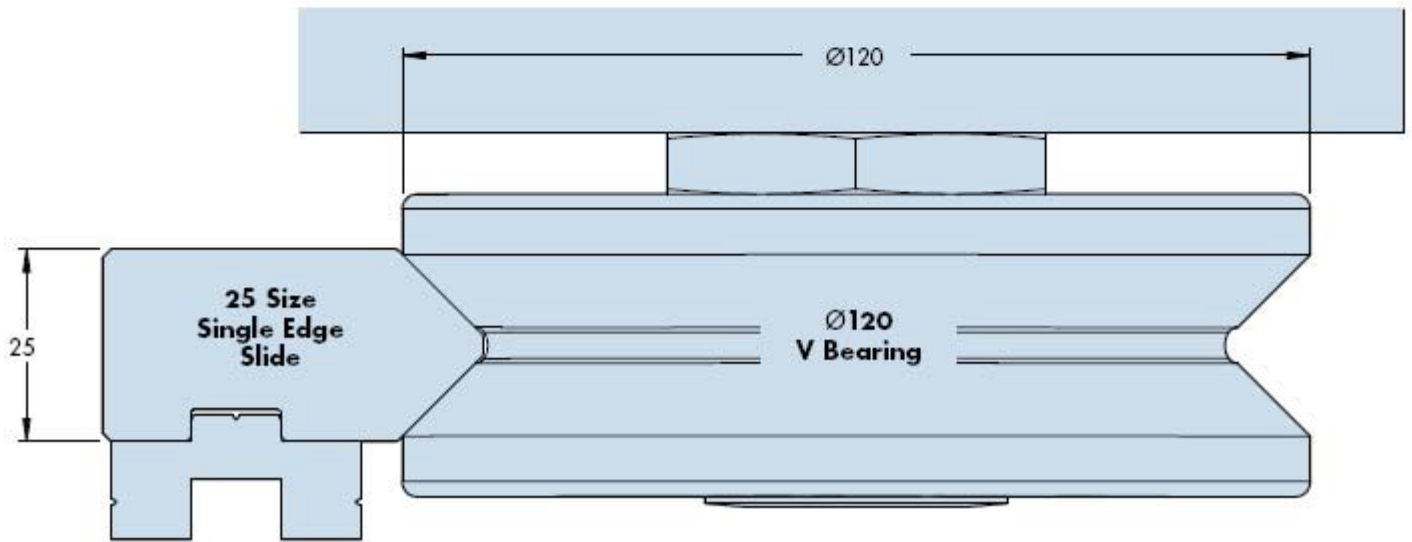
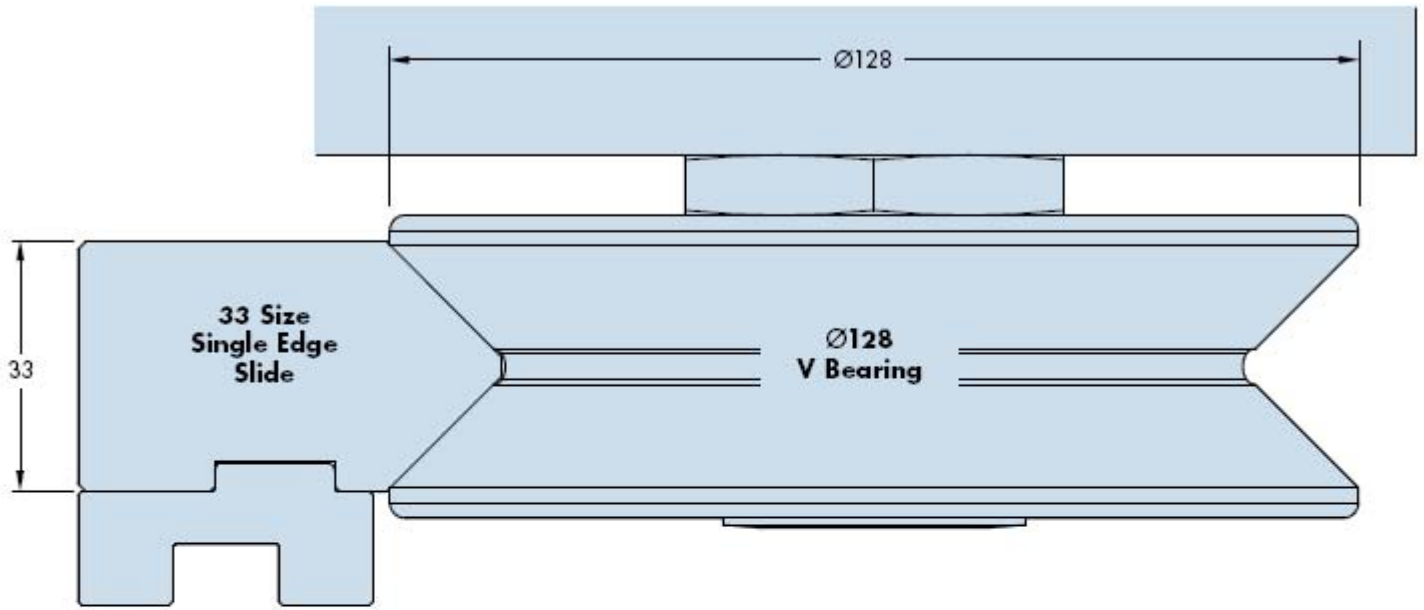
Please note that bearing cap wipers and roller cap wipers are not shown on the illustrations. These will increase the space required very slightly 32.

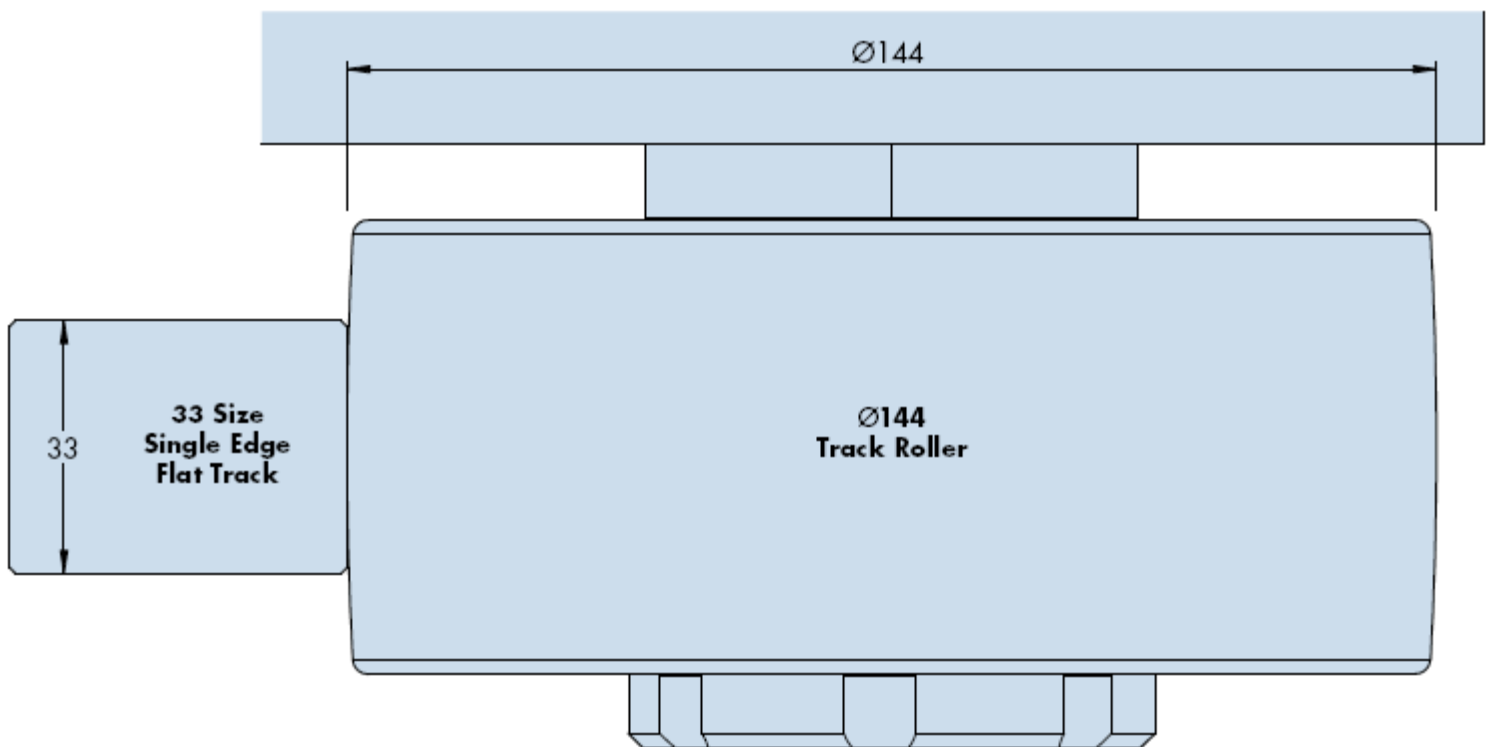
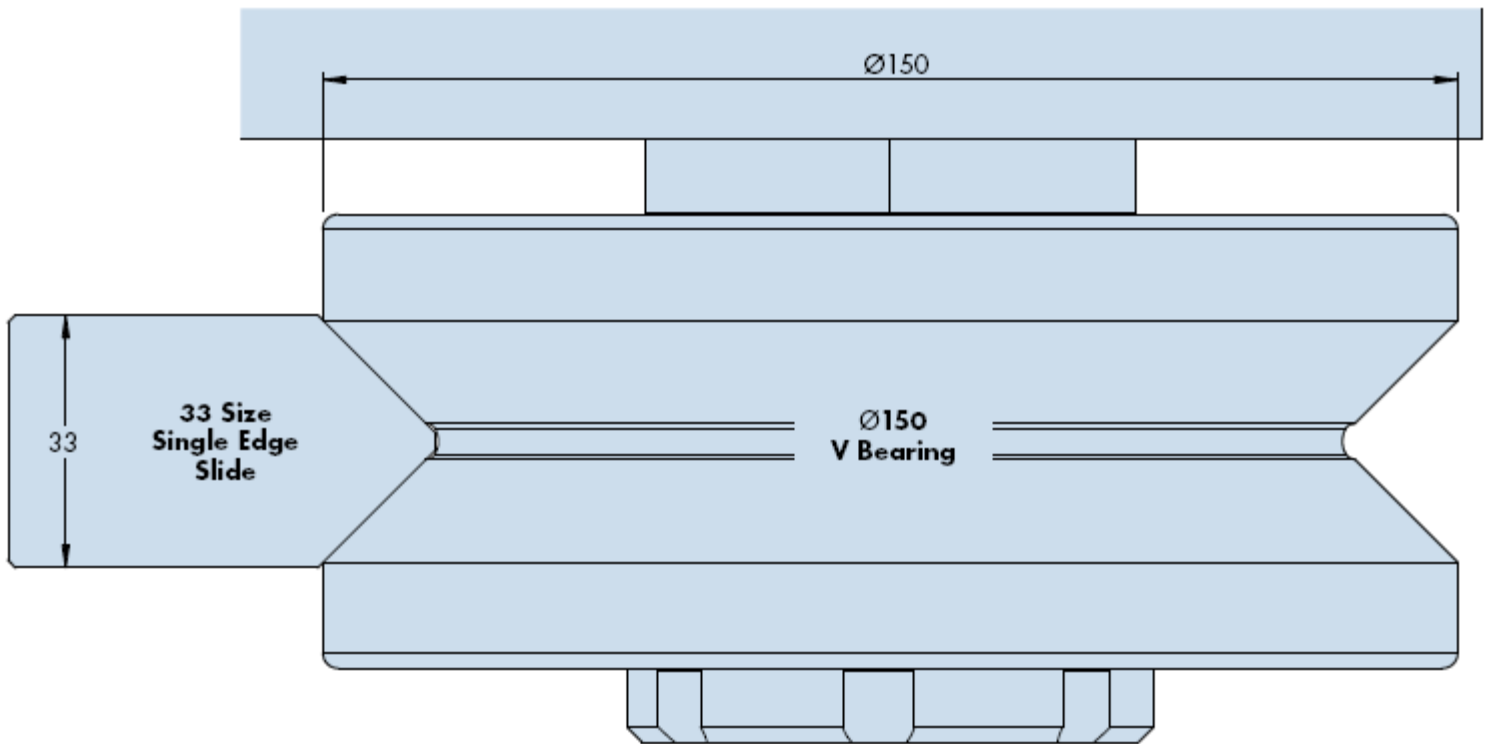
Slide		Bearing		System Load (Lubricated)		
Size & Type	Part No.	Ø	Part No.	L <sub>A</sub>	L <sub>R</sub>	M <sub>R</sub>
25 Single Edge	C/P/SS HSS25	64	B/THJR64	10,000N	16,000N	Variable
25 Single Edge	C/P/SS HSS25	95	B/THJR95	28,000N	40,000N	Variable
25 Single Edge	C/P/SS HSS25	120	B/THJR120	40,000N	60,000N	Variable
25 Double Edge	C/P/SS HSD25	64	B/THJR64	10,000N	16,000N	450Nm
25 Double Edge	C/P/SS HSD25	95	B/THJR95	28,000N	40,000N	1280Nm
25 Double Edge	C/P/SS HSD25	120	B/THJR120	40,000N	60,000N	1820Nm
33 Single Edge	C/P/SS HSS33	128	B/THJR128	40,000N	60,000N	Variable
33 Single Edge	C/P/SS HSS33	150	B/THJR150	68,000N	100,000N	Variable

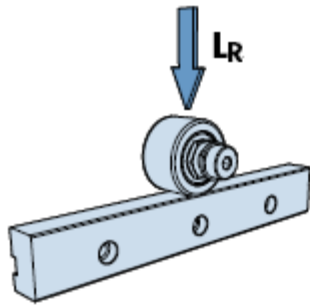
Load capacities apply to steel systems. Stainless steel systems load capacities are 25% lower.



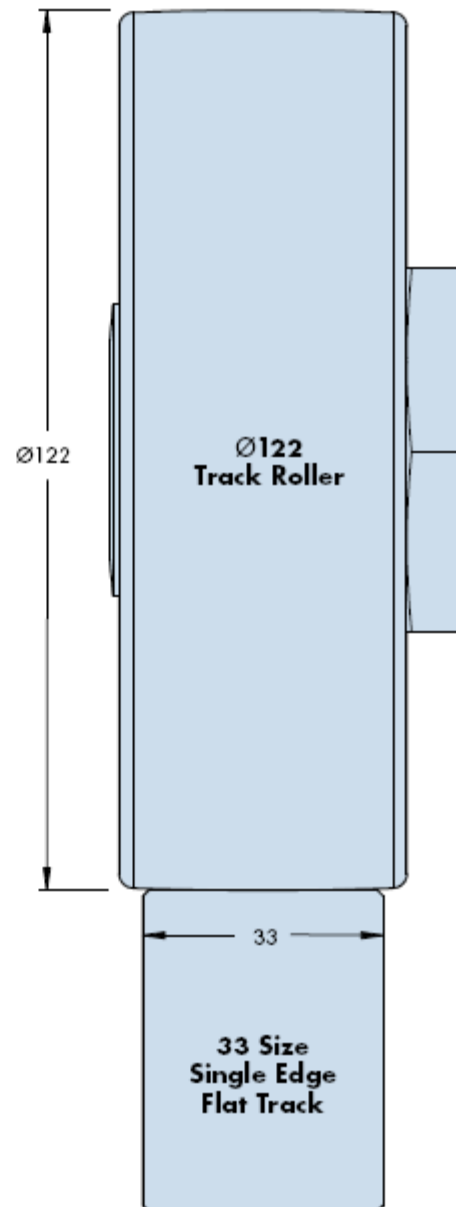
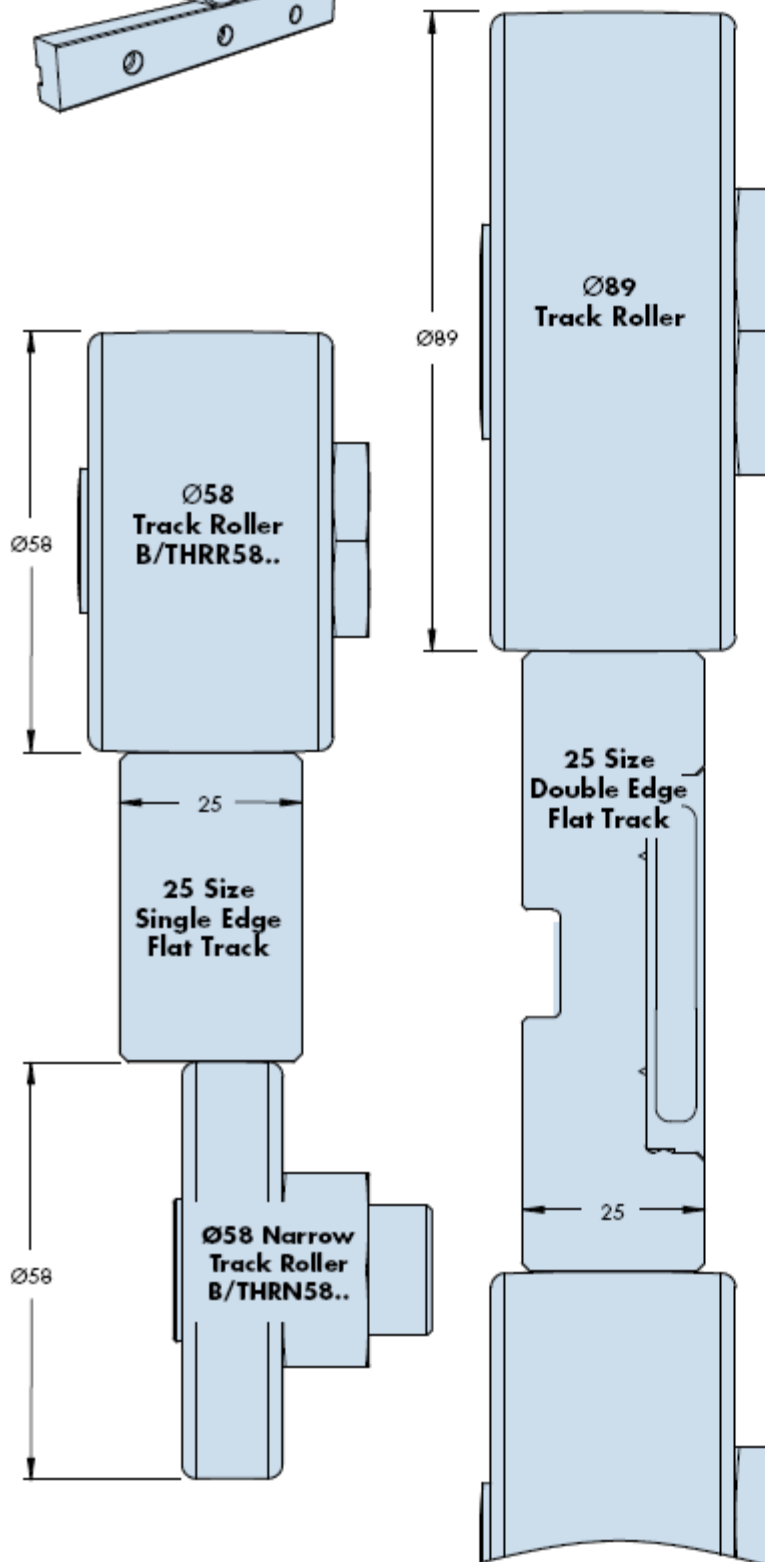
# Full Size Illustrations For Initial Selection



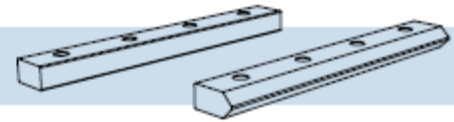




Track Roller		Load Capacity
Ø	Part No.	$L_R$
58	B/THRN58	5,000N
58	B/THRR58	10,000N
89	B/THRR89	20,000N
122	B/THRR122	30,000N
144	B/THRR144	50,000N

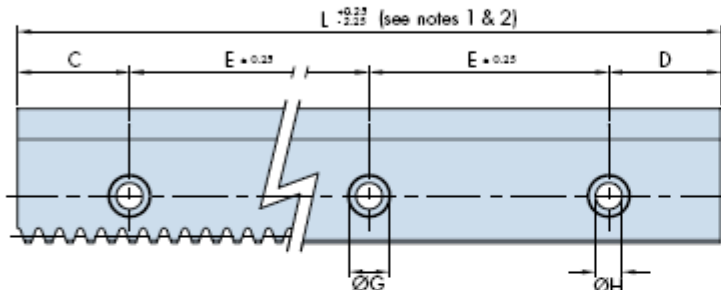


# V Slides & Flat Tracks

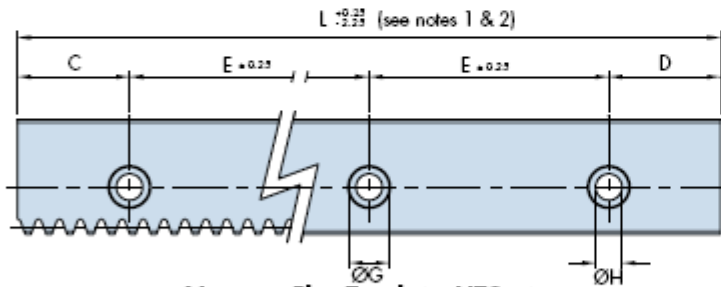


HDS2 V slides and flat tracks are manufactured from high quality bearing steel, hardened on the wearing surfaces. Other areas are left soft for customizing. All sizes are available in precision ground, commercial and stainless steel grades. The precision and stainless steel grades are ground on the wearing surfaces and mounting face to provide accuracy and smooth operation. The commercial grade is etched on the wearing surfaces to aid lubrication retention and is suitable for many applications. Single edge slides and tracks are available with a spur or helical rack cut into the rear face. These are also available with a keyway for use with back plates or dowel pins.

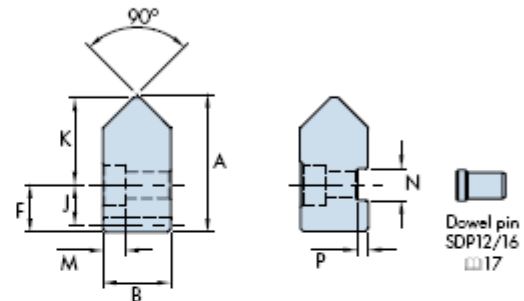
**Popular options available on request:** Non-standard lengths and holes, butt jointed profiles of unlimited length\*2, □45 - Matched and replaceable short butted sets, □45 - Hardened racks\*5



**Single Edge V Slide (...HSS...)**



**Narrow Flat Track (...HTS...)**



**Plain version**

**Keyway version**

Dowel pin SDP12/16 □17

Dowel pin SDP12/16 □17

Part Number	A	B	C	D	E	F	G	H	J				K	L	M	N	P	kg/m ~
									Rack Module									
									2.5	3	4	5						
CHSS 25	51.7	25.4	43	43	90	17.7	15	10	15.1	14.6	-	-	32.7	4046	8.5	12	4.2	8
SS/PHSS 25	51.2	25	43	43	90	17.5	15	10	15.1	14.6	-	-	32.5	4046	8.5	12	4	8
CHSS 33	57.7	33.4	58	58	120	26.2	20	14	-	-	22.1	21.1	30.2	3956	12.7	16	4.2	12.3
SS/PHSS 33	57.2	33	58	58	120	26	20	14	-	-	22.1	21.1	30	3956	12.5	16	4	12.3
CHTS 25	43.1	25.4	43	43	90	17.7	15	10	15.1	14.6	-	-	25.4	4046	8.5	12	4.2	7.7
SS/PHTS 25	42.7	25	43	43	90	17.5	15	10	15.1	14.6	-	-	25.2	4046	8.5	12	4	7.7
CHTS 33	44.7	33.4	58	58	120	26.2	20	14	-	-	22.1	21.1	18.5	3956	12.7	16	4.2	11.7
SS/PHTS 33	44.2	33	58	58	120	26	20	14	-	-	22.1	21.1	18.3	3956	12.5	16	4	11.7

Rack Type & Module Availability					
Module	Rack Type*4	HSS25	HTS25	HSS33	HTS33
2.5	Spur	✓	✓	x	x
2.5	Helical	✓	✓	x	x
3	Spur	✓	✓	x	x
4	Helical	x	x	✓	✓
5	Spur	x	x	✓	✓

✓ = Standard      x = Not available

**Helical racks are not available for SS versions**

Type %	Precision / Stainless steel	Commercial Grade	Type %	Precision / Stainless Steel	Commercial Grade
..HSS...			..HSD...		
..HTS...			..HTD...		

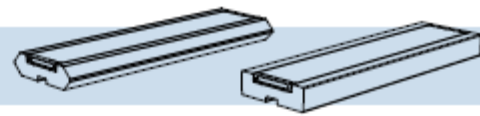
∇ Indicates surfaces which are precision ground

### Notes:

- Any length of slide up to 4046mm long can be supplied in one piece, but for optimum price and delivery, slide lengths should be specified with C and D dimensions as shown in the above table.
- Butt-jointed slides of unlimited length are available. The hole pitch will be maintained across the joint. See installation details □45.
- Tooth pitch positions relative to the hole pitch may vary between components. Customers using rack cut profiles in parallel should ensure that one drive pinion can be adjusted relative to the other in order to compensate. Rack cut profiles to a regulated or matched tooth position are available on request.
- Helical racks have a left handed helix angle of 30 degrees.
- Hardened racks are available on request. ..HSS/HTS25 with mod 3 racks are supplied with hardened rack as standard.
- Commercial V slides and flat tracks are manufactured to  $^{+0.3}_{-0.0}$  tolerance on width and  $^{+0.1}_{-0.0}$  tolerance on thickness. Precision and stainless steel versions are manufactured to  $\pm 0.025$  on both width and thickness. Finish is generally to N5.



# V Slides & Flat Tracks

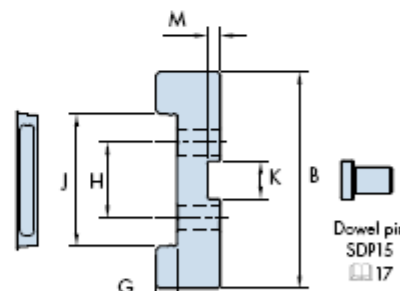
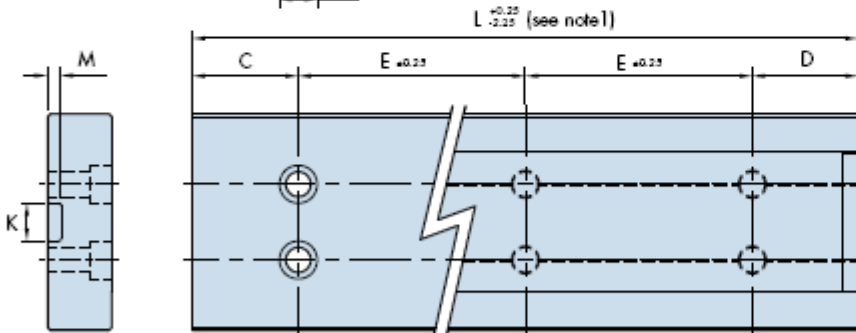
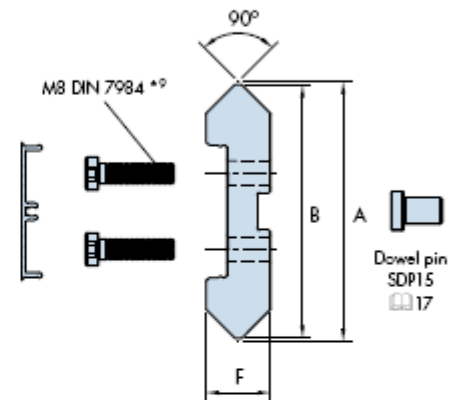
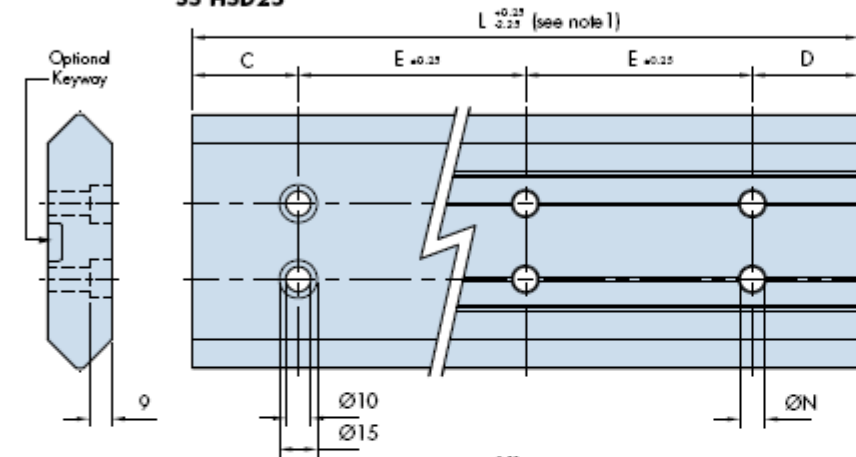


Double edge slides and wide flat tracks have built in parallelism for ease of setting. Both are supplied with flush fitting plastic covers and end caps to prevent entrapment of debris. Double edge slides and wide flat tracks are supplied with a keyway for locating to a key register, dowel pins or back plates. Stainless steel versions are available and have a slightly different design, without the central recess or plastic cover and with mounting holes and counterbores to suit M8 cap head screws to DIN912.

**Stainless Steel  
SS HSD25**

**Double Edge V Slide (...HSD...)**

**Standard  
P/C HSD25**



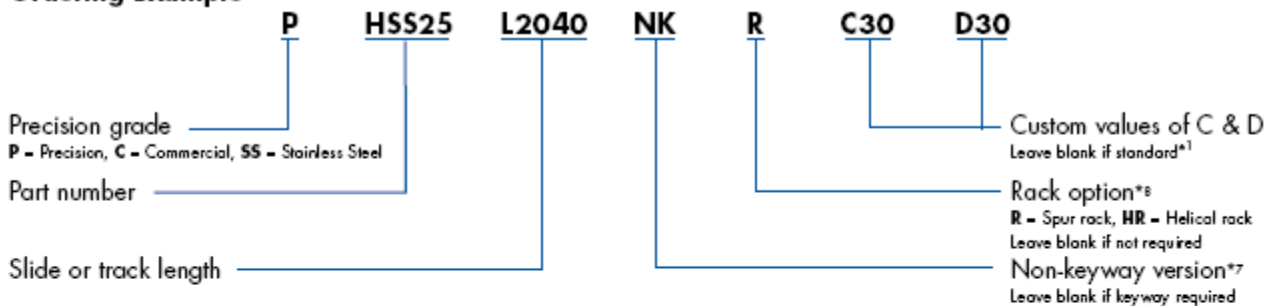
**Stainless Steel  
SS HTD25**

**Wide Flat Track (...HTD...)**

**Standard  
P/C HTD25**

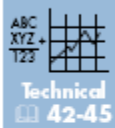
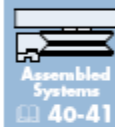
Part Number	A	B	C	D	E	F	G	H	J	K	L	M	N	kg/m ~
CHSD 25	103	100.4	43	43	90	25.4	8.2	30	52.6	15	4046	5.35	10	13.5
SS/PHSD 25	102.4	100	43	43	90	25	8	30	52.6	15	4046	5.15	10	13.5
CHTD 25	-	85.8	43	43	90	25.4	8.2	30	52.6	15	4046	5.35	10	12.5
SS/PHTD 25	-	85.4	43	43	90	25	8	30	52.6	15	4046	5.15	10	12.5

## Ordering Example

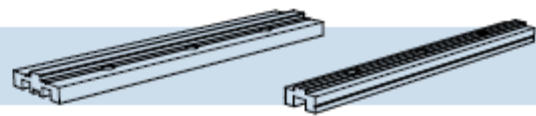


## Notes:

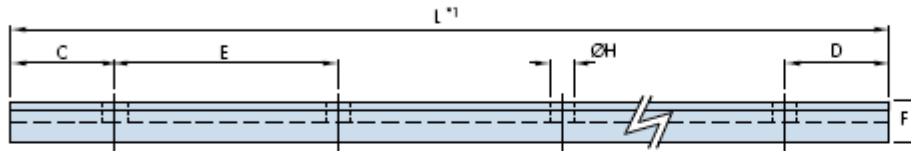
- Single edge slides & flat tracks for corner mounting to beams should be ordered without keyway 'NK' 24. The keyway version is useful for customers' own location requirements and is necessary when using back plates 16 & 25.
- HSS & HTS 25 slide and flat tracks have an option of 2.5 or 3 module spur rack. 2.5 module rack is supplied as standard when 'R' is added to the part number. If 3 module rack is required add 3 after 'R' to confirm size required. Helical racks are not available for stainless steel slides or flat tracks.
- M8 low head cap screws are available in the following lengths: 30mm (part no. FS8-30) for use without back plate, 40mm (part no. FS8-40) for use with low back plates, and 60mm (part no. FS8-60) for use with high back plates. HSS and HTS slides and tracks can use widely available standard M8 and M12 capscrews DIN 912.



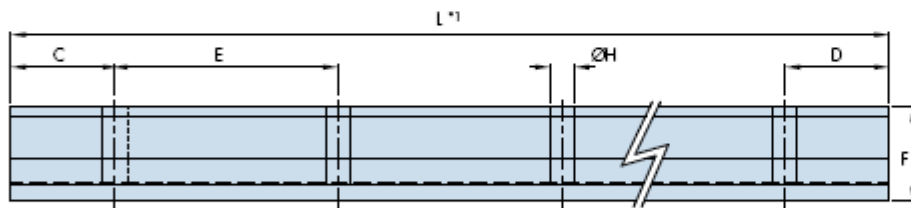
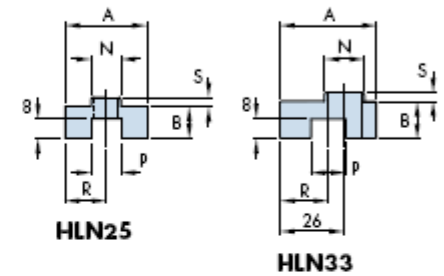
## Back Plates



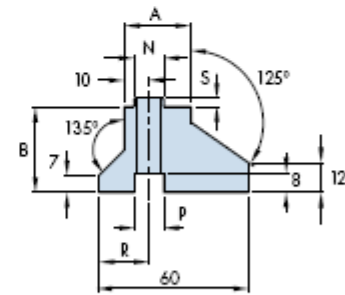
HDS2 back plates are designed to space the V slides and flat tracks off the mounting surface, providing clearance to accommodate the V bearings and track rollers plus their respective lubrication devices [47](#). They may be used either within the customer's own machine design or in conjunction with the construction beams [25](#). The male key section is designed to locate in the optional keyway of the slide and flat tracks while the female keyway section(s) are designed to locate either with the customer's own key section or with dowel pins. The HHN25 and HLN narrow type back plates may be ordered with a jacking screw alignment facility to enable one slide or track to be set exactly parallel to another within a system (see opposite).



**Low Narrow Back Plate**

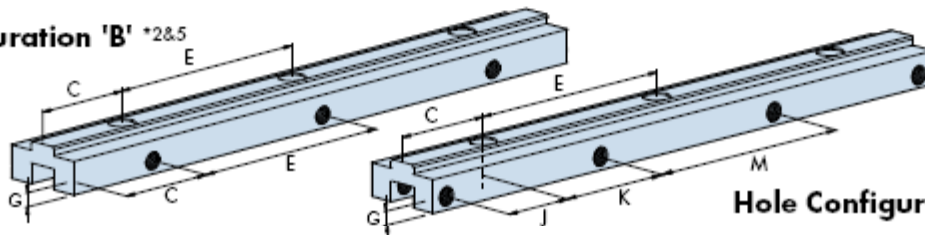


**High Narrow Back Plate**



**HHN25 & 33**

**Hole Configuration 'B' \*2&5**



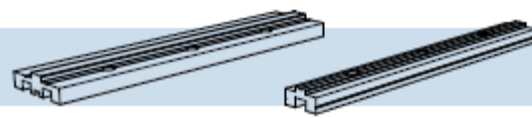
**Hole Configuration 'A' \*2&5**

Part Number	For Use With			A	B	C	D	E	F	G <sup>4</sup>	H	J <sup>4</sup>	K <sup>4</sup>	L	M <sup>4</sup>	N	P	R	S	kg/m
HLN 25	HSS 25	HTS 25		33	13	*1	*1	90	16.6	5	10	35	45	6026	90	12	12	16.5	3.6	1.0
HLN 33	HSS 33	HTS 33		39	15	*1	*1	120	18.6	5	14	50	60	5996	120	16	14	19.5	3.6	1.6
HLW 25	HSD 25	HTD 25		66	13	*1	*1	90	17.7	-	10	-	-	6026	-	15	12	33	4.7	2.25
HHN 25	HSS 25	HTS 25		27	34.5	*1	*1	90	38.1	5	10	35	45	6026	90	12	12	20	3.6	3.8
HHN 33	HSS 33	HTS 33		27	30.8	*1	*1	120	34.4	5	14	50	60	5996	120	16	14	21	3.6	3.7
HHW 25	HSD 25	HTD 25		54	34.5	*1	*1	90	39.2	-	10	-	-	6026	-	15	12	35	4.7	5.3

### Notes

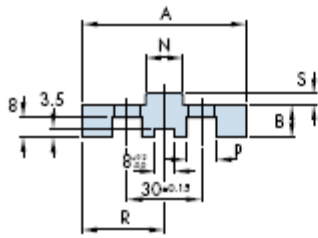
- Overall lengths ('L' dimension) should be ordered to correspond with the length of slide or track ensuring that 'C' & 'D' dimensions also correspond. Back plate lengths up to 6026mm are available in one piece to suit butted matched sets [45](#).
- HLN back plates will be supplied with tapped holes and M8 dog point socket set screws to ISO 4028 for customers requiring the jacking screw alignment facility. Hole configuration 'B' denotes jacking screw positions corresponding with fixing hole positions, necessary when used in conjunction with the construction beams (see figure 1). Hole configuration 'A' denotes jacking screw positions midway between fixing hole positions and is for general use where customers provide their own center key section or use alignment dowel pins SDPA as shown in figure 2.
- Holes for dowel pins should be reamed to a tolerance K6. Dowel pin head  $\varnothing$  tolerance for engagement with keyway is m6.
- Dimensions G, J, K and M only apply for back plates supplied with either type 'A' or type 'B' hole configurations.
- Type 'B' hole configuration is only available for the HLN25 and HHN25 back plates. Type 'A' hole configurations are available for all narrow type back plates.

# Back Plates

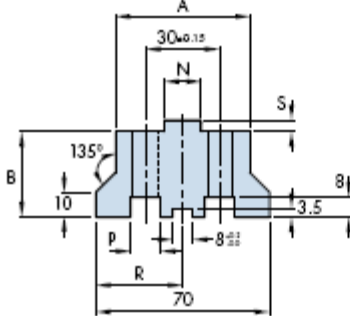


Mounting surfaces and location faces are manufactured to precision extrusion tolerances and are adequate for most applications. Back plates are manufactured from high strength aluminum and are supplied clear anodized. Compatibility of back plates with the various sizes and types of slide, tracks, bearings and lubricators can be found on 46 & 47.

## Low Wide Back Plate



**HLW25**



**HHW25**  
High Wide Back Plate

## Alignment procedure

It is normal to use one adjustable slide/track and back plate element in conjunction with one non-adjustable element. The non-adjustable element should be located onto a key, dowel pins, or otherwise set adequately straight for the application and bolted down tight.

Where the construction beams are used, the non-adjustable element should be located by means of location T-nuts types 'L' and the adjustable element by means of the alignment T-nuts type 'A'. (for T-nut details 38).

For applications not requiring a construction beam, the adjustable element should be located onto a reduced width key section or dowel pins type SDPA midway between hole centers. The hole in the mounting surface for fixing should be spotted and drilled from the back plate to ensure even clearance around the screws.

The adjustable element should be set parallel to the non-adjustable element at the end hole positions, with the jacking screws set for even clearance around the fixing screws, and the end screws tightened down. Working outward from the center of the element and with all but the end screws fully retracted, each jacking screw should be progressively jacked in to influence the elements parallel with the corresponding position on the opposing element, then both jacking screws locked and the corresponding fixing screw tightened down. Depending upon available hole clearances, it is possible to bend an element up to 1mm pro-rata per meter.

## Alignment principle for use with beam Hole configuration 'B' \*2

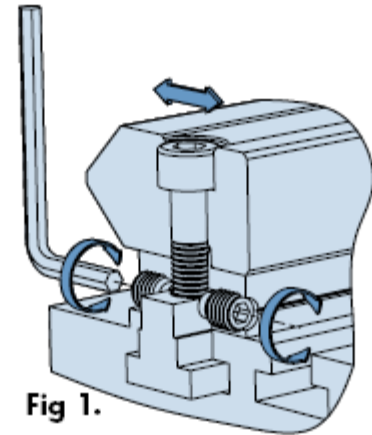


Fig 1.

## General alignment principle Hole configuration 'A' \*2

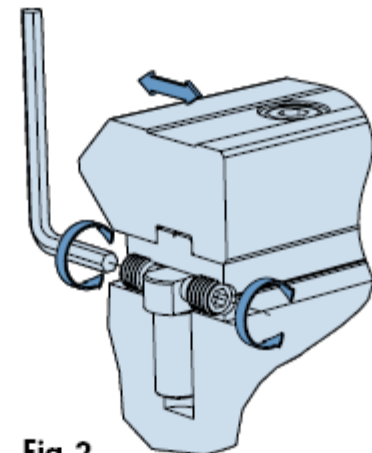
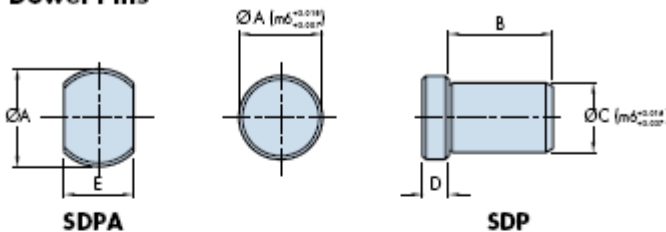


Fig 2.

## Dowel Pins



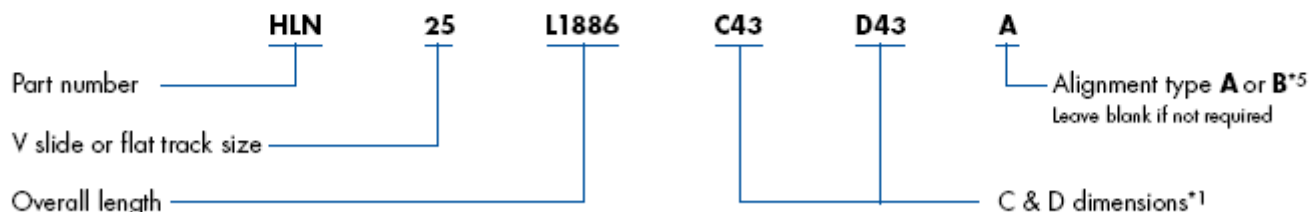
**SDPA**

**SDP**

Stainless steel dowel pins are available, prefix the part number with SS. Example - SS SDP 8

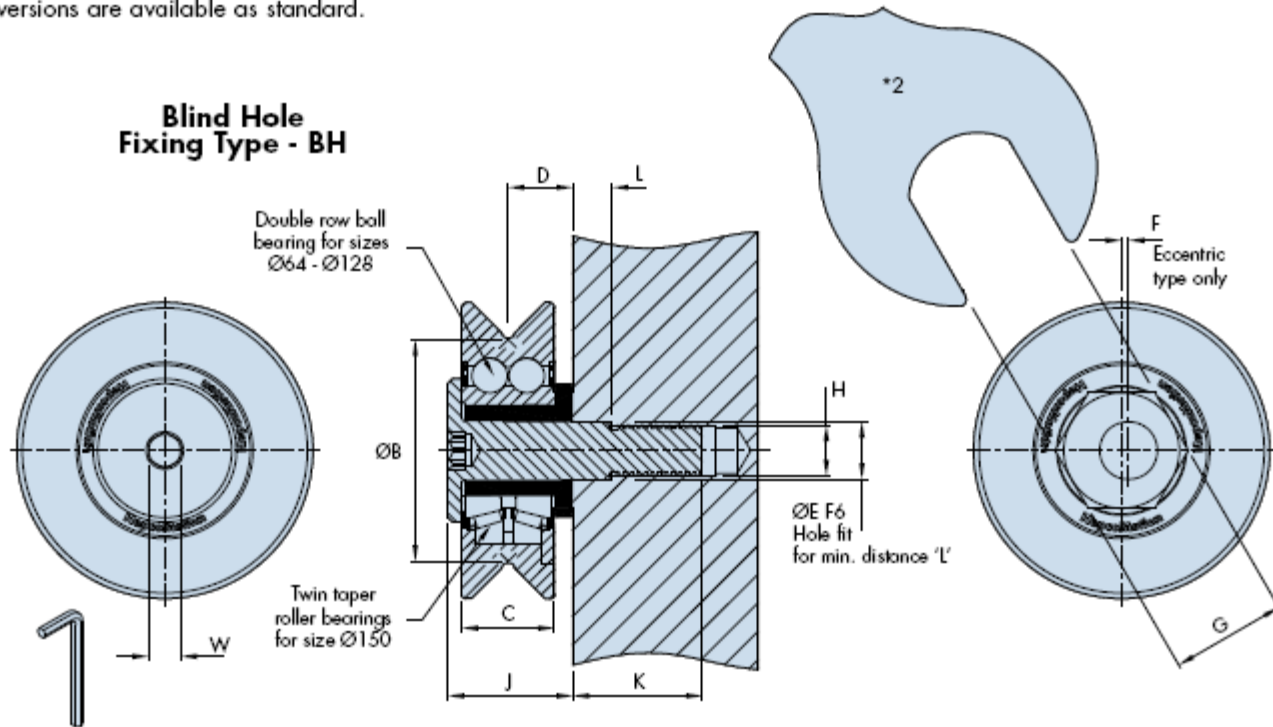
Part Number	ØA*3	B	ØC*3	D	E
SDP8	8	8	6	2.75	-
SDP12	12	15	10	3.75	-
SDP14	14	15	12	3.75	-
SDP15	15	15	10	4.75	-
SDP16	16	15	12	3.75	-
SDPA14	14	20	10	7.5	10
SDPA16	16	20	12	7.5	12




## Ordering Example for Back Plates





HJR bearings use double row ball bearings on sizes 64 to 128 and twin taper roller bearings on size 150. These provide high axial and radial load capacity. The design allows for easy assembly, and bearings can be removed from a system with a single screw. Each bearing has a chemically blackened, high tensile steel journal and bushing and is available in concentric and eccentric (adjustable) forms. Each bearing is available with either a blind or through hole fixing. Stainless steel versions are available as standard.



Part Number		For Use With V Slide		$\text{Ø}B$ $\pm 0.015$	C	D	$\text{Ø}E$ F6	F	G	H	J	K	L
	$\text{Ø}A$												
BHJR..	64	HSS 25	HSD 25	41	34	22	16	1.25	27	M10	44	26	10
THJR..	64	HSS 25	HSD 25	41	34	22	16	1.25	27	M12	-	-	-
BHJR..	95	HSS 25	HSD 25	72	34	22	20	2	40	M16	44	41	11.5
THJR..	95	HSS 25	HSD 25	72	34	22	20	2	40	M16	-	-	-
BHJR..	120	HSS 25	HSD 25	96	40	28	25	3	50	M24	54	56	17
THJR..	120	HSS 25	HSD 25	96	40	28	25	3	50	M24	-	-	-
BHJR..	128	HSS 33	-	96	40	28	25	3	50	M24	54	56	17
THJR..	128	HSS 33	-	96	40	28	25	3	50	M24	-	-	-
BHJR..	150	HSS 33	-	118	60	40	38	2	65	M36	80	70	20
THJR..	150	HSS 33	-	118	60	40	38	2	65	M36	-	-	-

## Mounting Plate Screw Lengths

Part Number	$T^1$	
	min	max
THJR 64 ... 12	6.5	12.5
THJR 64 ... 17	11.5	17.5
THJR 64 ... 22	16.5	22.5
THJR 64 ... 27	21.5	27.5
THJR 95 ... 16	9	16
THJR 95 ... 22	16	22
THJR 95 ... 27	21	27
THJR 95 ... 32	26	32

Part Number	$T^1$	
	min	max
THJR 120 ... 17	6.5	17
THJR 120 ... 27	16.5	27
THJR 120 ... 37	26.5	37
THJR 128 ... 17	6.5	17
THJR 128 ... 27	16.5	27
THJR 128 ... 37	26.5	37
THJR 150 ... 25	6.5	25
THJR 150 ... 40	21.5	40

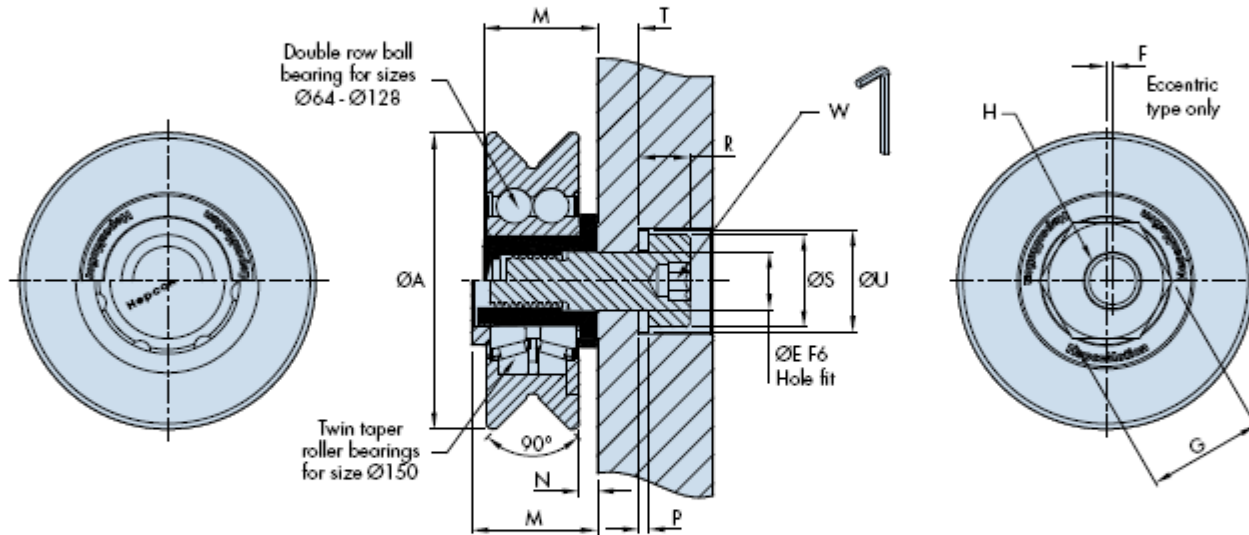
### Notes:

- When using THJR bearings, the part number must be selected to suit the required plate thickness, T. Choose from the tables above.
- Adjustment tools for V bearing and track rollers are available. Please order part number AT54 for HJR64, AT95 for HJR95, AT128 for HJR120/HJR128, and AT150 for HJR150.



All bearings are greased for life and incorporate nitrile seals to inhibit ingress of liquids and contaminants. Customers are strongly recommended to provide lubrication to the interface between the bearings and the slide by specifying cap wipers or lubricators which contact the V of the slide or the bearing. This lubrication greatly increases the load capacity and life.

## Through Hole Fixing Type - TH



M	N	P	R	ØS	ØU	W	kg~	Max Working Load Capacity <sup>3</sup>		Bearing Static (Co) & Dynamic (C) Radial Load Capacities <sup>4</sup>	
								Axial (N)	Radial (N)	Co (N)	C (N)
-	5	-	-	-	-	10	0.65	2,500	8,000	12,899	21,373
40	5	2.5	13.5	24	28	8	0.65	2,500	8,000	12,899	21,373
-	5	-	-	-	-	12	1.45	7,000	20,000	29,340	41,823
40	5	3	17	30	34	10	1.45	7,000	20,000	29,340	41,823
-	8	-	-	-	-	14	3.0	10,000	30,000	43,200	63,830
50	8	4	22	40	44	14	3.0	10,000	30,000	43,200	63,830
-	8	-	-	-	-	14	3.0	10,000	30,000	43,200	63,830
50	8	4	22	40	44	14	3.0	10,000	30,000	43,200	63,830
-	10	-	-	-	-	19	7.5	17,000	50,000	218,000	150,018
80	10	5	33	60	66	22	7.5	17,000	50,000	218,000	150,018

Slides  
14-15

Back Plates  
16-17

Assembled Systems  
40-41

Assembled Carriages  
26-27

Rack Driven Carriages  
28-29

Lubrication  
32-34

ABC XYZ T23  
Technical  
42-45

Mix & Match  
46

### Ordering Example

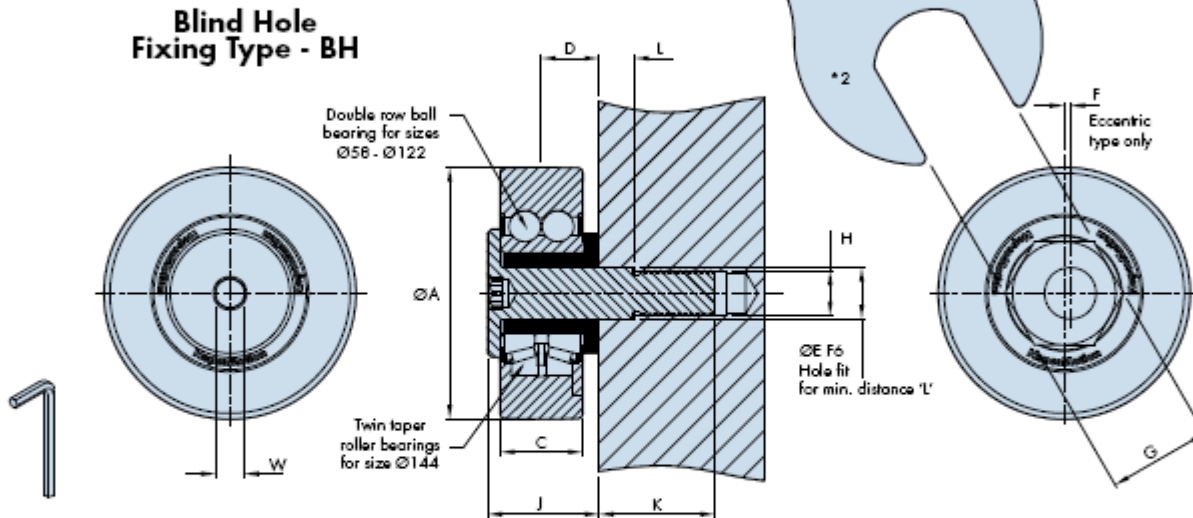
**SS** = Stainless steel option, Leave blank if not required,<sup>3&5</sup>  
**THJR** = Through hole  
**BHJR** = Blind hole  
**95** = Bearing diameter  
**C** = Journal type: **E** = Eccentric, **C** = Concentric  
**NS** = Nitrile seals  
**16** = Plate thickness<sup>1</sup> and tables left. Leave blank for BHJR

### Notes:

- Load capacities stated assume lubrication at the bearing/slide interface. Stainless steel versions have a 25% lower capacity.
- The quoted static and dynamic load capacities are based on industry standard calculations. These do not accurately reflect performance, and are only provided for comparison with other systems. Please use Max Working Load figures and the Load/Life calculations on 42-44 to determine system performance.
- SS versions of the size 150 bearing contains a steel twin taper roller bearing protected by nitrile seals.



HRR track rollers use double row ball bearings on sizes 58 to 122 and twin roller bearings on size 144. These provide high radial load capacity. The design allows for easy assembly, and track rollers can be removed from a system with a single screw. Each track roller has a chemically blackened, high tensile steel journal and bushing and is available in concentric and eccentric (adjustable) forms. Each track roller is available with either a blind or through hole fixing. Stainless steel versions are available as standard.



Part Number		For Use With Flat Track		C	D	ØE F6	F	G	H	J	K
	ØA										
BHRR..	58	HTS 25	HTD 25	34	22	16	1.25	27	M10	44	26
THRR..	58	HTS 25	HTD 25	34	22	16	1.25	27	M12	-	-
BHRR..	89	HTS 25	HTD 25	34	22	20	2	40	M16	44	41
THRR..	89	HTS 25	HTD 25	34	22	20	2	40	M16	-	-
BHRR..	122	HTS 33	-	40	28	28	3	50	M24	54	56
THRR..	122	HTS 33	-	40	28	28	3	50	M24	-	-
BHRR..	144	HTS 33	-	60	40	38	2	65	M36	80	70
THRR..	144	HTS 33	-	60	40	38	2	65	M36	-	-

## Mounting Plate Screw Lengths

Part Number	T <sup>1</sup>	
	min	max
THRR 58 ... 12	6.5	12.5
THRR 58 ... 17	11.5	17.5
THRR 58 ... 22	16.5	22.5
THRR 58 ... 27	21.5	27.5
THRR 89 ... 16	9	16
THRR 89 ... 22	16	22
THRR 89 ... 27	21	27
THRR 89 ... 32	26	32

Part Number	T <sup>1</sup>	
	min	max
THRR 122 ... 17	6.5	17
THRR 122 ... 27	16.5	27
THRR 122 ... 37	26.5	37
THRR 144 ... 25	6.5	25
THRR 144 ... 40	21.5	40

### Notes:

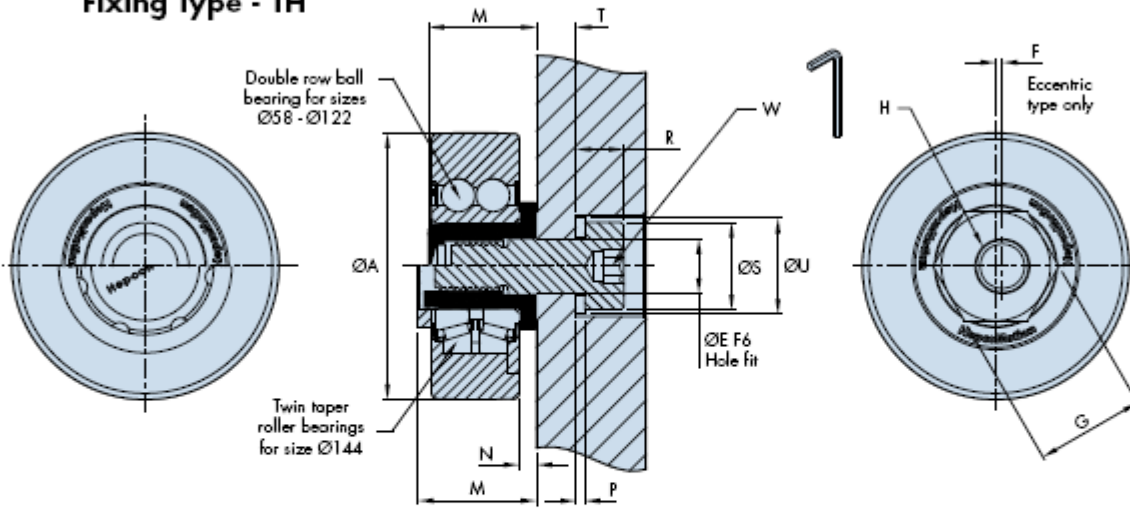
- When using THRR track rollers, the part number must be selected to suit the required plate thickness, T. Choose from the tables above.
- Adjustment tools for V bearing and track rollers are available. Please order part number AT54 for HRR58, AT95 for HRR89, AT128 for HRR122, and AT150 for HRR144.
- Load capacities stated are for steel bearings. Stainless steel versions have a 25% lower capacity.
- With THRN58 a washer is supplied. Fixing screw lengths depend on application and are not included. Use M10 screws in material condition 8.8 or stronger.
- The quoted static and dynamic load capacities are based on industry standard calculations. These do not accurately reflect performance, and are only provided for comparison with other systems. Please use Max Working Load figures and the Load/Life calculations on 42-44 to determine system performance.
- The narrow track roller is designed to bear on the back face of single edge slides or flat tracks as illustrated opposite. It is specifically intended for use with 25 size V slides and flat tracks in conjunction with either 64 or 95 size bearings and their track roller equivalents. Most other combinations can also be accommodated by using a spacer under the mounting face of either the narrow or standard wide track roller.
- SS versions of the size 144 track roller contain a steel twin taper roller bearing protected by nitrile seals.

# Track Rollers

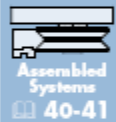


All track rollers are greased for life and incorporate nitrile seals to inhibit ingress of liquids and contaminants. Customers are strongly recommended to provide lubrication to the interface between the track roller and the flat track by specifying roller cap wipers or lubricators which contact the surface of the flat track or the track roller.

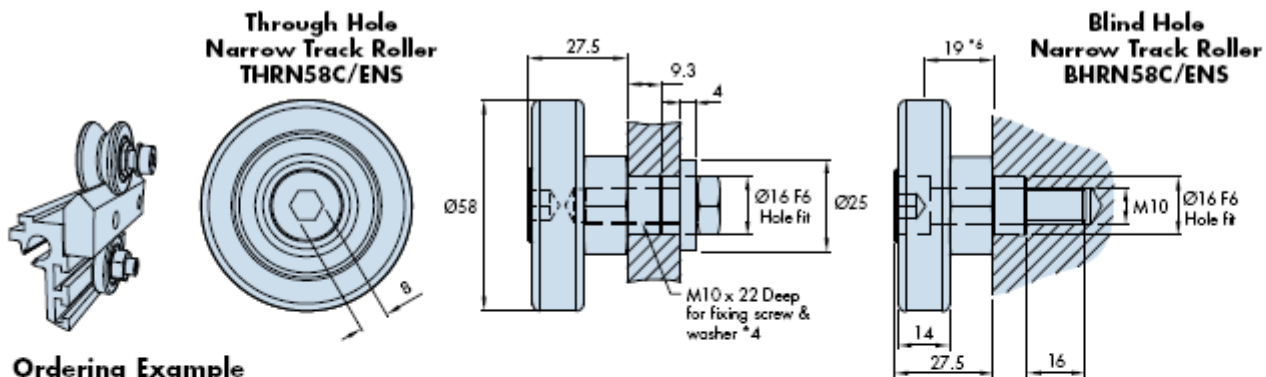
## Through Hole Fixing Type - TH



L	M	N	P	R	ØS	ØU	W	kg~	Max Working Radial Load Capacity*3 (N)	Static (Co) & Dynamic (C) Radial Load Capacities*5	
										Co (N)	C (N)
10	-	5	-	-	-	-	10	0.63	10,000	13,271	21,989
-	40	5	2.5	13.5	24	28	8	0.63	10,000	13,271	21,989
11.5	-	5	-	-	-	-	12	1.4	20,000	30,185	43,025
-	40	5	3	17	30	34	10	1.4	20,000	30,185	43,025
17	-	8	-	-	-	-	14	2.9	30,000	48,535	65,970
-	50	8	4	22	40	44	14	2.9	30,000	48,535	65,970
20	-	10	-	-	-	-	19	7.3	80,000	218,000	150,018
-	80	10	5	29	60	66	22	7.3	80,000	218,000	150,018



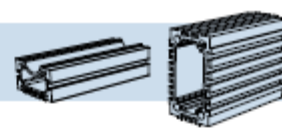
Narrow track rollers incorporate a single row ball bearing, and have a different mounting design. Maximum working load capacity is 5kN. They are ideally suited to captivate a system by running on the rear face of a single edge slide or track. See example below.



### Ordering Example

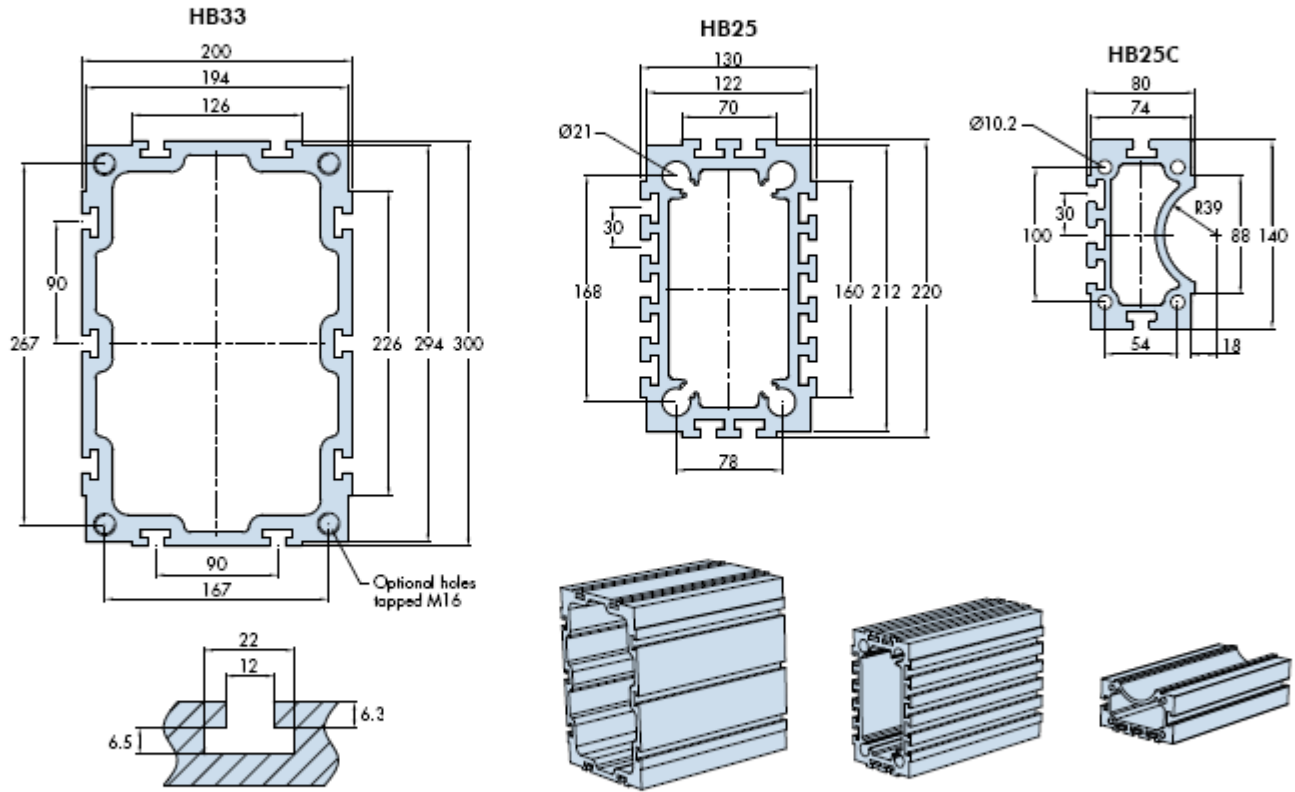
**SS** = Stainless steel option, Leave blank if not required,<sup>3&7</sup>  
**THRR** = Through hole  
**BHRR** = Blind hole  
**89** = Bearing diameter  
**C** = Journal type: E = Eccentric, C = Concentric  
**NS** = Nitrile seals  
**16** = Plate thickness<sup>1</sup> and tables left. Leave blank for BHRR

# Construction Beams



The design of construction beams enables slides and flat tracks to be factory assembled directly to the corner faces of the beam or to be mounted at the many T-slot positions in conjunction with back plates and T-nuts  $\square$ 24&25. Very high stiffness allows the beams to be used as self supporting construction elements.

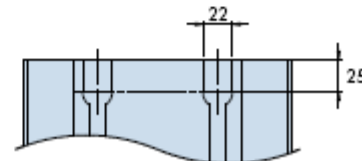
The recess in the HB25C beam has been designed to accommodate a screw drive. Beams are manufactured from high strength aluminum alloy to precision extrusion tolerances and are supplied clear anodized. Beam deflection can be calculated using simple beam theory requiring second moment of inertia figures which are given in the table below. For further details of calculations please visit [www.bwc.com/products/hds.html](http://www.bwc.com/products/hds.html).



General T-slot details

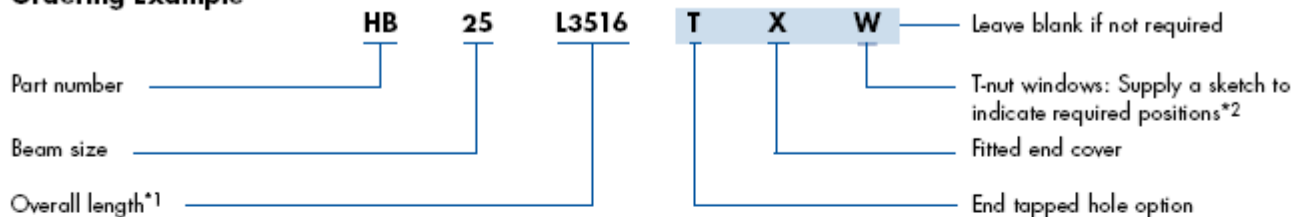
Beam	Second Moment Of Inertia		kg/m
	Vertical X-X	Horizontal Y-Y	
HB 25C	$2.8 \times 10^7$	$10.2 \times 10^7$	11.3kg/m
HB 25	$4.7 \times 10^7$	$1.8 \times 10^7$	24kg/m
HB 33	$16.9 \times 10^7$	$8.4 \times 10^7$	37.5kg/m

Beam second moment of inertia figures are stated in mm<sup>4</sup>.



General T-slot Window Details\*2

## Ordering Example

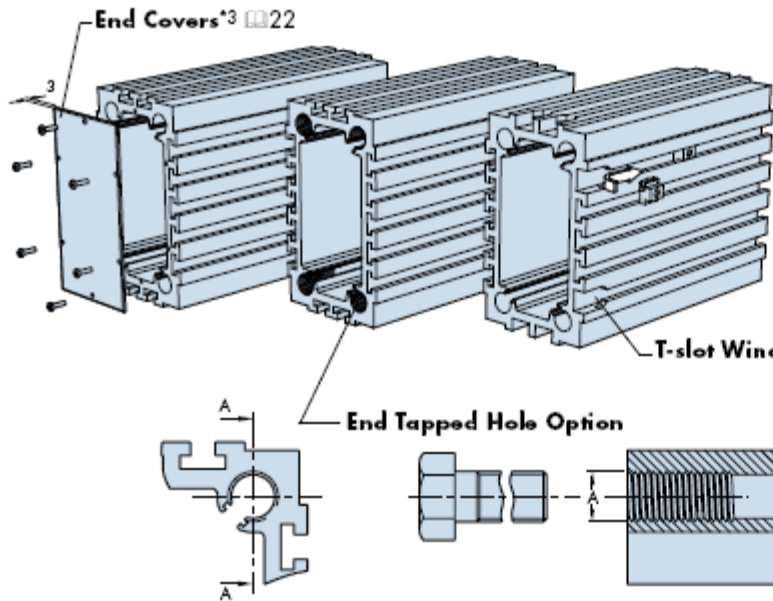
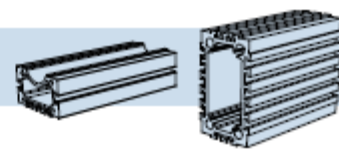


## Notes:

- Beams are cut to customer's length requirements with machine finished ends. They may be requested matched in length and should be ordered minimum 5mm longer than the corresponding slides or tracks. Beams are available in one piece up to 6m long. Special high strength joining systems can be readily supplied to achieve beams of unlimited length. Customers attaching carriage plates or other components directly to the ends of the beam which require a higher than normal squareness are requested to specify this requirement when ordering.
- Where access to beam end will be blocked, customers using high strength T-nuts  $\square$ 38 can specify T-nut windows at either end of any T-slot to enable nuts to be inserted. Supply a sketch to indicate required positions.
- Fitted aluminum end covers are supplied clear anodized and are secured via pan head screw DIN7985. Covers are not compatible with end tapped hole option.
- Plastic T-slot cover compatible with all construction beams is available. Please specify the number required and length. Example; 14 x TC12 L3000.

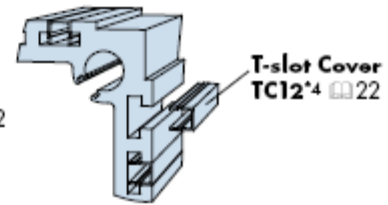


# Construction Beam Options



Construction beam options apply to all sizes of beam.

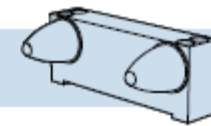
End tapped holes can be used to secure beams directly to carriages 8, or to fit cross members and other items to the end of the beam\*1.



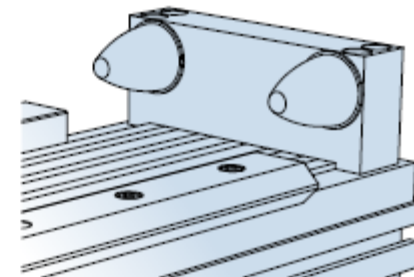
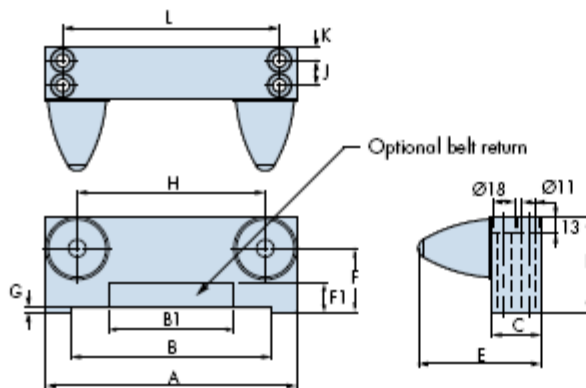
Beam	A
HB25C	M12 x 24 Deep
HB25	M24 x 50 Deep
HB33	M16 x 40 Deep



## Bumper Units



Bumper units are available for the three sizes of construction beam. Made from high strength aluminum and clear anodized, the bumper unit is fitted with rubber end stops in line with the assembled carriage 26-29. Alternative design bumper units can be supplied with access for a belt return as supplied on HDLS driven systems 7.



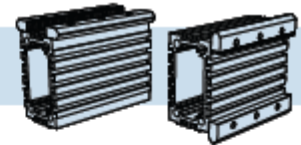
Part Number	For Use With	A	B	B1	C	D	E	F	F1	G	H	J	K	L	kg~
BU 25C	HB 25C	140	88	55	40	76	98	51	32	4	90	20	10	115	0.52
BU 25N	HB 25N	156	70	55	40	76	98	51	40	4	106	20	10	83	0.57
BU 25W	HB 25W	200	160	80	40	76	98	51	40	4	150	20	10	173	0.69
BU 33N	HB 33N	195	126	80	40	82	98	57	40	4	146	20	10	170	0.73
BU 33W	HB 33W	294	226	110	40	82	98	57	40	4	244	20	10	270	1.03

### Ordering Example



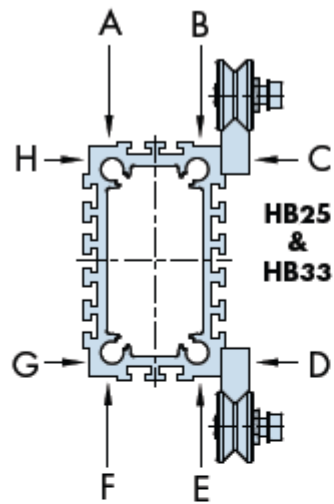
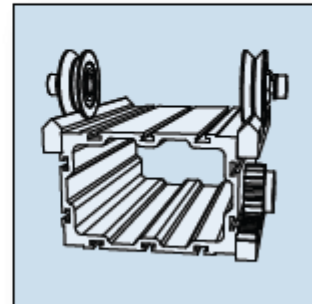
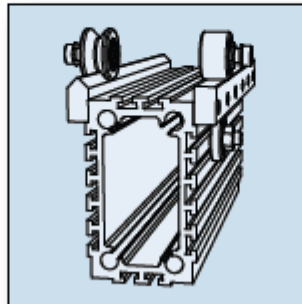
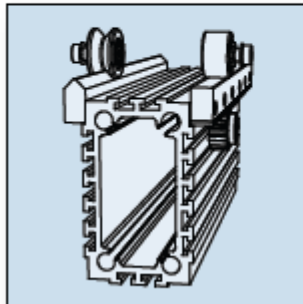
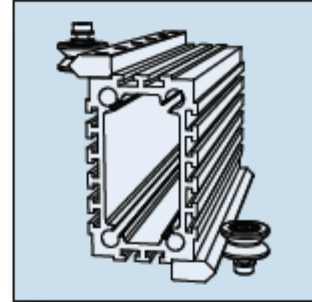
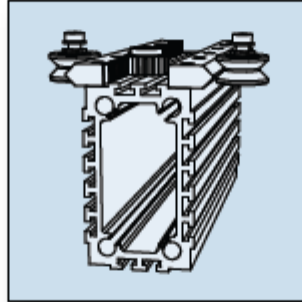
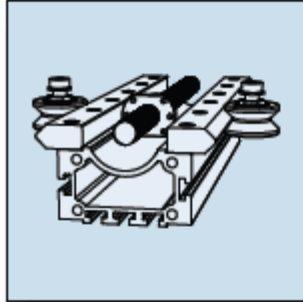
### Notes:

- Bumper units are designed to fit directly to construction beams. Holes should be drilled and tapped into the beam. Positions are given by dimensions L & J. Holes should be drilled and tapped M10.
- Dimensions B1 & F1 refer to access for a belt return, available with optional BU...BR



## Corner Mounted Slides & Tracks

Below are shown a selection of varied ways single edge V slides and narrow flat tracks can be used when mounted to the corner faces of the construction beams. Slides and tracks should be specified without a keyway. Corner face mounting has the advantage of being lower in cost compared to T-slot mounting due to the back plate and T-nuts not being required. A range of assembled carriages [26-29](#) are available to suit all corner mounted slide options. These will be factory adjusted to the beam unit if specified in the ordering details below. Bumper units for end of stroke protection are available [23](#).



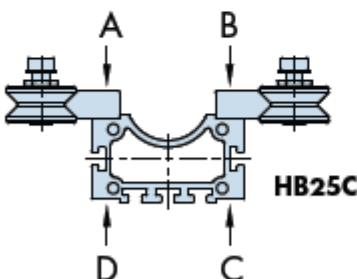
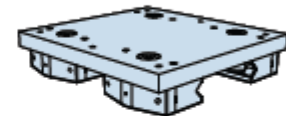
### Ordering Example\*1&3

List the components required and bracket those to be factory assembled, specifying the mounting positions on the construction beam as relevant. See drawing for construction beam mounting positions. Where slides or tracks are ordered shorter than the length of the beam, it will be assumed that the required position is equal distance from both ends of the beam unless otherwise stated.

#### Example

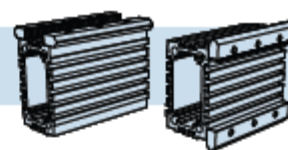
- 1 x HB25 L4051
- 1 x CHSS25NK L4046 - Assembled position C
- 1 x CHSS25NK L4046 - Assembled position D

Mounted Carriage (optional)  
1 x AU6425WCW [26-27](#)



The table below identifies the available options for corner mounted slides and tracks when fitted to construction beams, also [46](#).

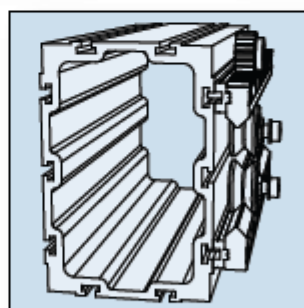
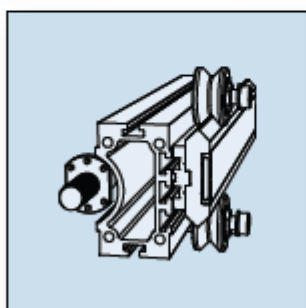
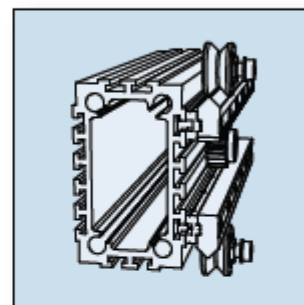
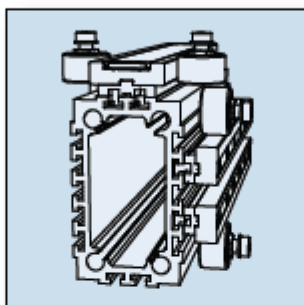
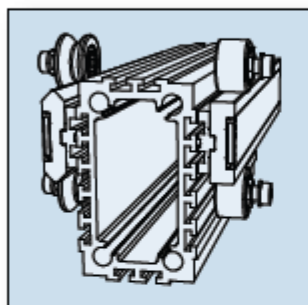
Beam	Single Edge Slide And Flat Track			
	HSS25	HTS25	HSS33	HTS33
HB 25C	✓	✓	✗	✗
HB 25	✓	✓	✗	✗
HB 33	✓ <sup>4</sup>	✓	✓	✓
✓ = Standard ✗ = Not compatible				



## T-Slot Mounted Slides & Tracks

Below is shown a selection of the varied ways slides and flat tracks can be used when mounted to the T-slot positions of the construction beams. Single edge slides and narrow flat tracks should be specified with a keyway. T-slot mounting has the advantage that one element can be set parallel to another by means of the alignment facility whether they are mounted on the same beam or on separate beams in parallel [17](#).

The T-slot mounting method can also accommodate the double edge slides and wide flat tracks (except on HB33 beam). For compatibility of slides and tracks with particular back plates, see [47](#).



**Slides**  
[14-15](#)

**Back Plates**  
[16-17](#)

**Bearings**  
[18-21](#)

**Beams**  
[22-23](#)

**Assembled Systems**  
[40-41](#)

**Assembled Carriages**  
[26-27](#)

**Rock Driven Carriages**  
[28-29](#)

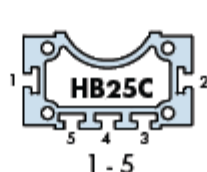
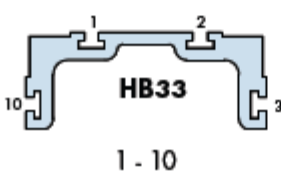
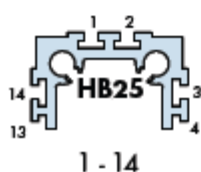
**Lubrication**  
[32-34](#)

**T-Nuts**  
[38](#)

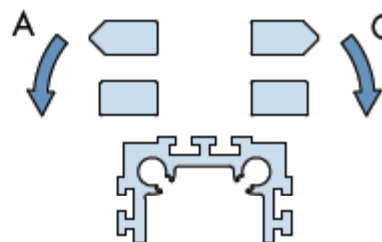
**Technical**  
[42-45](#)

**Mix & Match**  
[46](#)

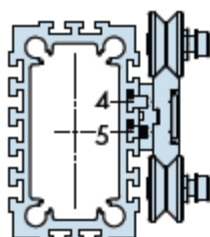
### T-slot Designation



### Orientation Designation\*2



### Ordering Example



1 x HB25 L3961

1 x CHSD25 L3956

1 x HLW25 L3956

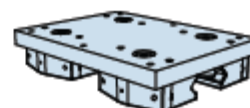
44 x HTN25L

44 x HTN25



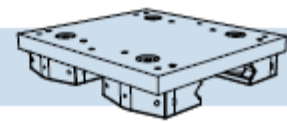
Assembled position 4/5

Optional mounted carriage (T-slot mounted double edge slide only) [26 & 27](#)  
1 x AU9525DCW



### Notes: (See also notes page 22)

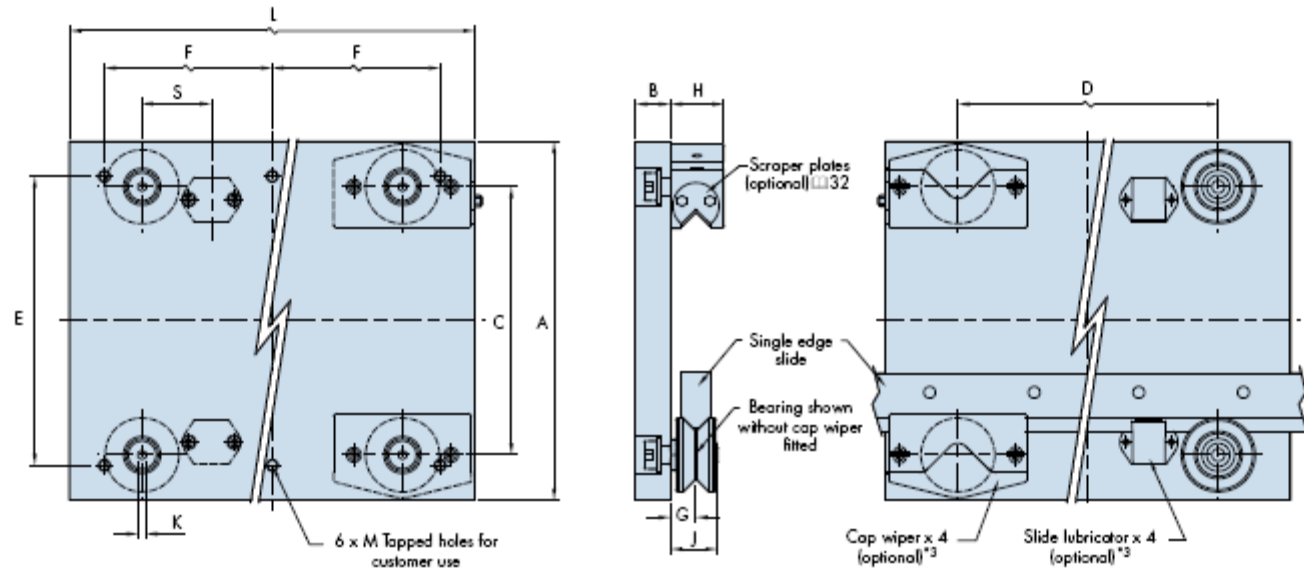
- Beams with corner mounted slides and tracks should be ordered factory assembled which ensures best parallelism between linear elements.
- Where single edge slides and narrow flat tracks are to be T-slot mounted, please state orientation required ('C' clockwise or 'A' counter-clockwise see drawing above) after T-slot position. Example: 1 x CHSS25 L4051 position 4 A.
- Butt-jointed slides and tracks will be fitted for requirements in excess of 4046mm long (hole pitches at the joint may vary [45](#)). Unless specified by the customer, Bishop-Wisecarver will determine the individual lengths to make up a matched butted set with the minimum number of joints. Joints will be offset to one another where slides or tracks are mounted in parallel on the same beam. This will ensure best running condition across the joints.
- Cap wipers are not compatible with this option.



Assembled carriages for all sizes of bearing are available to fit all sizes of beam incorporating corner mounted slides. Carriages are also available to fit double edge slides. Carriages are supplied with through hole fixing bearings to facilitate direct removal from the slide. Cap wipers [32](#) and lubricators [34](#) are available as options.

Carriage plates are fully machined from high strength aluminum alloy supplied clear anodized with tapped holes provided in convenient positions to enable other components to be attached.

Assembled carriages can be factory adjusted to suit the corresponding beam assembly [24](#). Special carriages can be readily supplied and material can be removed in unwanted areas to reduce weight.



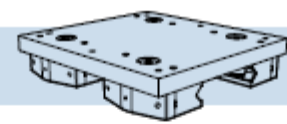
### For Assembled Carriage Load Capacities [42](#)

Part Number	For Use With Slides		For Use With Beam			Slide Position <sup>1</sup>	Bearing	A	B	C	D
AU 64 25 D...		HSD 25				-	Ø64	230	30	143.7	205
AU 64 25 C...	HSS 25		HB 25 C			AB or CD	Ø64	310	30	231.9	225
AU 64 25 N...	HSS 25			HB 25		AB or EF	Ø64	300	30	213.9	205
AU 64 25 W...	HSS 25			HB 25		CD or GH	Ø64	390	30	303.9	265
AU 95 25 D...		HSD 25				-	Ø95	290	30	174.7	230
AU 95 25 C...	HSS 25		HB 25 C			AB or CD	Ø95	375	30	262.9	270
AU 95 25 N...	HSS 25			HB 25		AB or EF	Ø95	360	30	244.9	230
AU 95 25 W...	HSS 25			HB 25		CD or GH	Ø95	450	30	334.9	290
AU 120 25 D...		HSD 25				-	Ø120	340	30	198.7	235
AU 120 25 C...	HSS 25		HB 25 C			AB or CD	Ø120	430	30	286.9	285
AU 120 25 N...	HSS 25			HB 25		AB or EF	Ø120	410	30	268.9	290
AU 120 25 W...	HSS 25			HB 25		CD or GH	Ø120	500	30	358.9	290
AU 128 33 N...	HSS 33			HB 33		AB or EF	Ø128	480	30	335.9	350
AU 128 33 W...	HSS 33			HB 33		CD or GH	Ø128	580	30	435.9	440
AU 150 33 N...	HSS 33			HB 33		AB or EF	Ø150	530	50	357.9	385
AU 150 33 W...	HSS 33			HB 33		CD or GH	Ø150	630	50	457.9	435

### Notes:

- For slide position information please refer to [24](#).
- The AU12025D carriage requires high type back plate HHW25 [16-17](#).
- Access to cap wiper and lubricator fixing screws is from the top of the carriage for ease of adjustment and removal. For cap wiper and lubricator mounting hole positions please refer to [32](#) & [34](#) respectively.
- The ordering details opposite relate to assembled carriages only. For ordering details concerning beams assembled with slides and to specify the assembled carriage to be ready adjusted and mounted, please refer to [24-25](#).
- For the stainless versions, bearing assemblies and all fixing screws are in stainless steel. Carriage plates are aluminum with clear anodized finish. A special USDA approved surface treatment for greatly enhanced corrosion resistance is available on request.
- This table states dimensions for precision grade slides. For assembled dimensions based on commercial grade slides add 0.2mm to dimensions N & O. Other dimensions will not be affected.

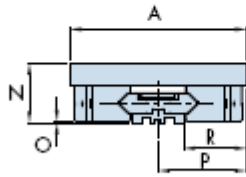
# Carriages



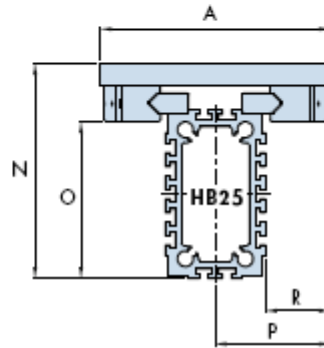
The drawings below show HDS2 carriages assembled together with beams with slides in the basic combinations possible. Cap wipers are illustrated for worst case dimensions. Bearings only or lubricators will be slightly more compact (18,19 & 34).



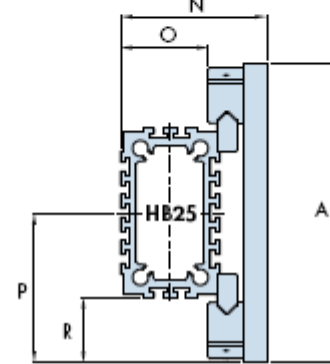
**AU..D - Double edge<sup>\*2</sup>**



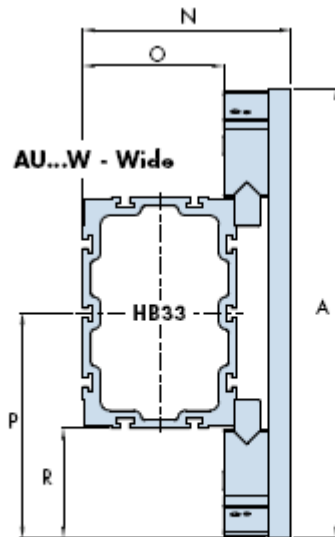
**AU..N - Narrow**



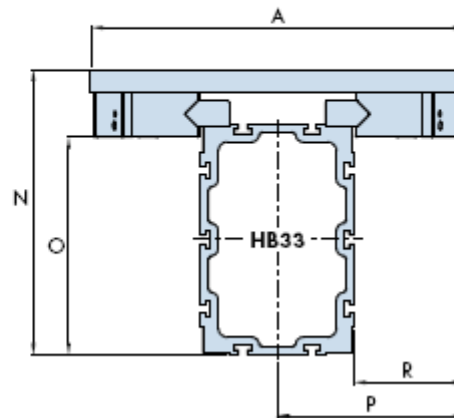
**AU..W - Wide**



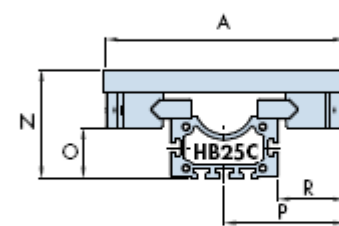
**AU...W - Wide**



**AU...N - Narrow**

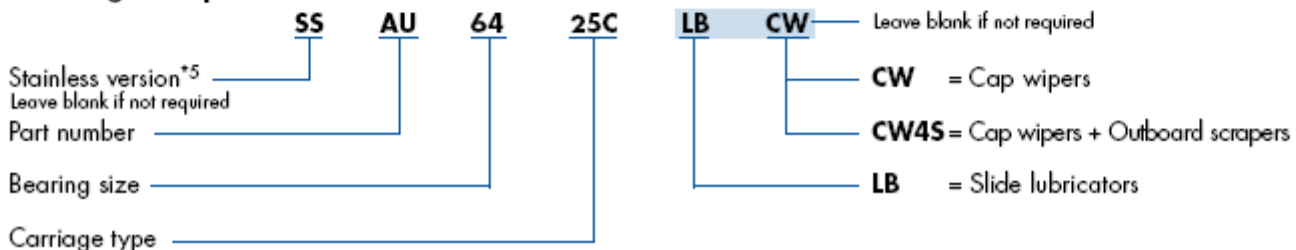


**AU..C - Compact**

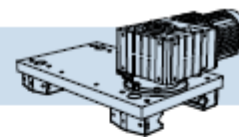


	E	F	G	H	J	K	L	M Thread size x depth	N <sup>*6</sup>	O <sup>*6</sup>	P	R	S	kg
	190	135	22	46	40.5	8	330	M10x20	77.5	1.5	115	82	60	9.0
	250	145	22	46	40.5	8	350	M10x20	141.5	65.5	155	85	60	11.6
	240	135	22	46	40.5	8	330	M10x20	280.5	204.5	150	85	60	10.1
	330	165	22	46	40.5	8	390	M10x20	190.5	114.5	195	85	60	14.0
	250	165	22	46	40.5	10	390	M10x20	77.5	1.5	145	112	70	14.7
	315	185	22	46	40.5	10	430	M10x20	141.5	65.5	187.5	117.5	70	18.2
	300	165	22	46	40.5	10	390	M10x20	280.5	204.5	180	115	70	16.7
	390	195	22	46	40.5	10	450	M10x20	190.5	114.5	225	115	70	22.7
	280	205	28	58	50	14	470	M12x20	105	17	170	135	84	28.5
	370	230	28	58	50	14	520	M12x20	147.5	59.5	215	145	85	33.6
	350	235	28	58	50	14	530	M12x20	286.5	198.5	205	140	85	33.1
	440	235	28	58	50	14	530	M12x20	196.5	108.5	250	140	85	37.0
	420	265	28	58	50	14	590	M12x20	370.5	286.5	240	140	100	39.1
	520	310	28	58	50	14	680	M12x20	270.5	186.5	290	140	100	48.2
	470	300	40	85	80	22	660	M16x30	402.5	267.5	265	165	110	79.8
	570	325	40	85	80	22	710	M16x30	302.5	167.5	315	165	110	93.0

## Ordering Example<sup>\*4</sup>



# Rack Driven Carriages



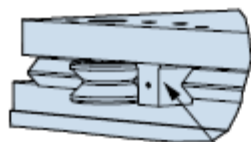
HDS2 rack driven carriages are available to suit the corner mounted options for construction beam assemblies or for other mounting arrangements with slides spaced the same distance apart [□27](#). They are designed to engage with single edge V slides with integrated racks in precision, stainless steel and commercial grade versions. They have all the benefits of the assembled carriages [□26-27](#) with the addition of a high performance rack and pinion drive facility.

Rack driven carriages can be supplied with an automatic lubrication device which will apply a controlled amount of grease directly to the teeth [□36](#).

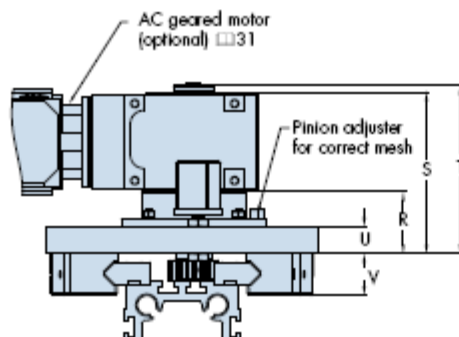
Part Number	For Use With			Rack Options*1					A	B	C	D	E		
	Beam	Slide	Bearing	2.5	3	4	5	mod						S=Spur	H=Helical
AURD 64 25 C..	HB 25C		HSS 25	Ø64	✓	✓	×	×	×		310	250	231.9	385	62.5
AURD 64 25 C..3	HB 25C		HSS 25	Ø64	×	×	✓	×	×		310	250	231.9	385	62.5
AURD 64 25 N..	HB 25		HSS 25	Ø64	✓	✓	×	×	×		300	240	213.9	365	62.5
AURD 64 25 W..	HB 25		HSS 25	Ø64	✓	✓	×	×	×		390	330	303.9	425	62.5
AURD 95 25 C..	HB 25C		HSS 25	Ø95	×	✓	✓	×	×		375	315	262.9	430	80
AURD 95 25 N..	HB 25		HSS 25	Ø95	×	✓	✓	×	×		360	300	244.9	390	80
AURD 95 25 W..	HB 25		HSS 25	Ø95	×	✓	✓	×	×		450	390	334.9	450	80
AURD 120 25 C..	HB 25C		HSS 25	Ø120	×	✓	✓	×	×		430	370	286.9	465	117.5
AURD 120 25 N..	HB 25		HSS 25	Ø120	×	✓	✓	×	×		410	350	268.9	415	117.5
AURD 120 25 W..	HB 25		HSS 25	Ø120	×	✓	✓	×	×		500	440	358.9	415	117.5
AURD 128 33 N..		HB 33	HSS 33	Ø128	×	×	×	✓	✓		480	420	335.9	525	122.5
AURD 128 33 W..		HB 33	HSS 33	Ø128	×	×	×	✓	✓		580	520	435.9	555	122.5
AURD 150 33 N..		HB 33	HSS 33	Ø150	×	×	×	✓	✓		530	470	357.9	575	137.5
AURD 150 33 W..		HB 33	HSS 33	Ø150	×	×	×	✓	✓		630	570	457.9	675	137.5

## Rack Driven Carriage Load Capacities [□42](#)

### Dimensions and specification of the drive flange assembly and AC geared motor [□30-31](#)

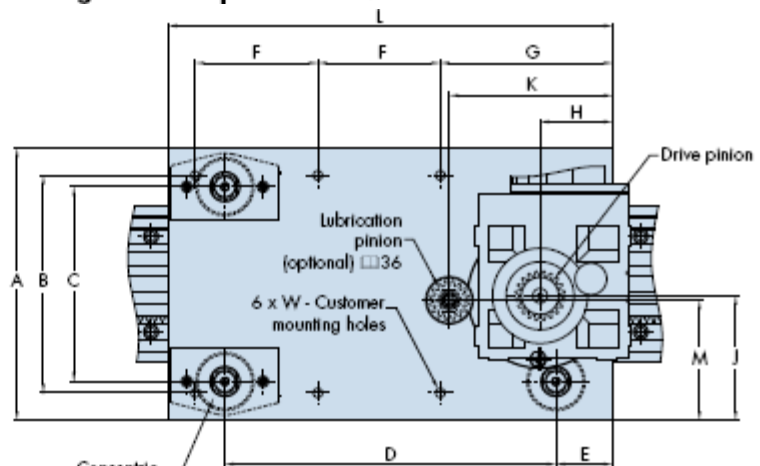


Slide lubricators x 4 (optional)\*5 [□34](#)

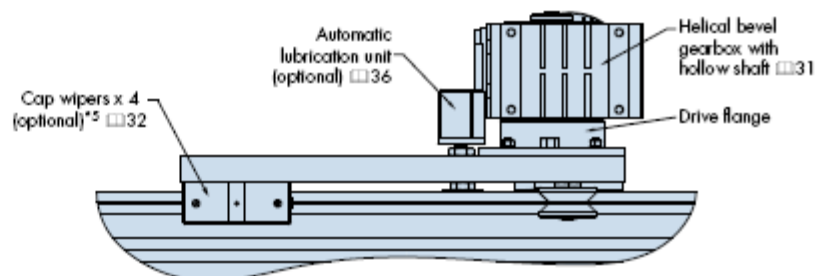


AC geared motor (optional) [□31](#)

Pinion adjuster for correct mesh



Concentric bearings fitted this side



Cap wipers x 4 (optional)\*5 [□32](#)

Automatic lubrication unit (optional) [□36](#)

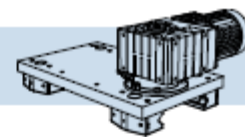
Helical bevel gearbox with hollow shaft [□31](#)

Drive flange

### Notes:

- Module 2.5 and 4 helical racks have a left handed helix angle of 30° on HSS25HR and HSS33HR slides respectively.
- Assembled carriage weights do not include motor & gearbox, [□31](#) for details.
- Motor mounting position 3,4,5 & 8 are not compatible with the standard mounting position of the automatic lubrication unit. Alternative positions of the lubrication unit are available.
- SS versions have all stainless steel components except carriage and drive flange body which are aluminum clear anodized (enhanced anti-corrosion finish available on application). Cap wipers are plastic. Geared motor is standard.
- For cap wiper mounting hole positions, see [□32](#). For lubricator mounting hole positions, see [□26 & 34](#).

# Rack Driven Carriages



Rack driven carriages incorporate a strong drive flange assembly with micro adjustment facility to achieve correct mesh between pinion and rack [□30](#). The standard design is for connection with supplied AC geared motors [□31](#), this being the most economical means of achieving point-to-point linear motion. Speed and acceleration can also be controlled via an AC speed controller which Bishop-Wisecarver also supplies.

Modified or special drive flanges can be readily supplied to suit customer's own motor gearbox, including servo and stepper types.

F	G	H		J		K	L	M		R		S		T		U	V	W Thread size x depth	kg <sup>2</sup>
		Spur	Helical	Spur	Helical			Spur	Helical	Spur	Helical	Spur	Helical	Spur	Helical				
145	190	80	133.5	137.4	180	510	128.5	131.6	68	179	187	30	46	M10x20	18.0				
145	190	90	138	-	200	510	132	-	69.5	205	214	30	46	M10x20	18.3				
135	190	80	137.5	141.4	180	490	132.5	135.6	68	179	187	30	46	M10x20	17.2				
165	190	80	137.5	141.4	180	550	132.5	135.6	68	179	187	30	46	M10x20	22.6				
185	200	90	170.5	169.9	200	590	164.5	164.1	69.5	68	205	179	214	187	30	46	M10x20	26.9	
165	200	90	172	171.4	200	550	166	165.6	69.5	68	205	179	214	187	30	46	M10x20	25.0	
195	200	90	172	171.4	200	610	166	165.6	69.5	68	205	179	214	187	30	46	M10x20	31.2	
220	230	90	198	197.4	220	700	192	191.6	69.5	68	205	179	214	187	30	58	M10x20	42.6	
195	230	90	197	196.4	220	650	191	190.6	69.5	68	205	179	214	187	30	58	M10x20	39.8	
195	230	90	197	196.4	220	650	191	190.6	69.5	68	205	179	214	187	30	58	M10x20	44.6	
245	250	110	232.5	228.9	240	770	212.5	210.5	68	221	236	30	58	M12x20	52.3				
260	250	110	232.5	228.9	240	800	212.5	210.5	68	221	236	30	58	M12x20	60.0				
295	240	110	257.5	253.9	240	850	237.5	235.5	88	241	256	50	85	M16x30	101.2				
345	240	110	257.5	253.9	240	950	237.5	235.5	88	241	256	50	85	M16x30	124.7				

**Slides**  
[□ 14-15](#)

**Bearings**  
[□ 18-21](#)

**Beams**  
[□ 22-23](#)

**Assembled Beams**  
[□ 24-25](#)

**Assembled Carriages**  
[□ 26-27](#)

**Drive Flange Assembly**  
[□ 30](#)

**Pinions**  
[□ 35](#)

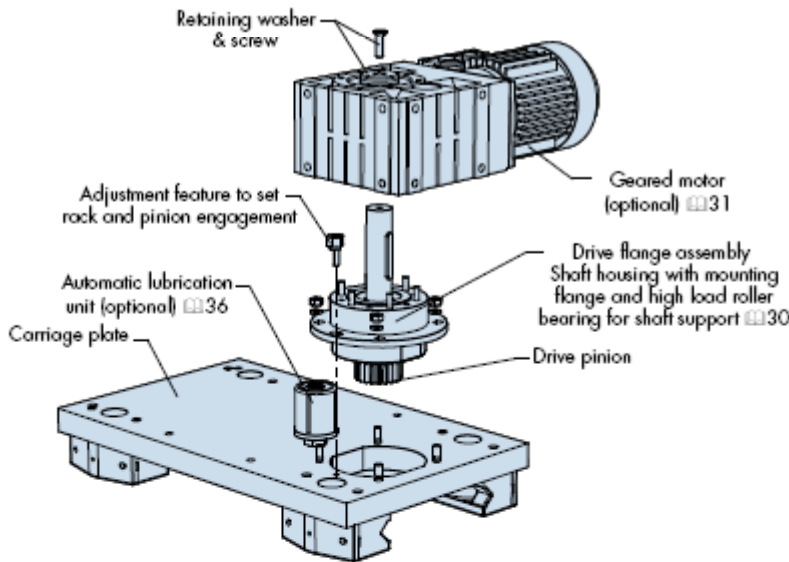
**Automatic Lubrication**  
[□ 36](#)

**Lubrication**  
[□ 32-34](#)

**AC Geared Motor**  
[□ 31](#)

**Technical**  
[□ 42-45](#)

Special shape and size carriages, and carriages to suit different slide spacing, can be readily supplied.



Customers ordering rack driven carriages fitted with geared motors should specify the orientation required (1-8)\*3, and the terminal box position (A-D) by indicating these requirements in the ordering details for the geared motor [□31](#).



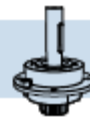
### Ordering Example

**SS** **AURD** **64** **25C** **3S** **LB** **CW** **L** — Leave blank if not required  
 Stainless version\*4  
 Leave blank if not required  
 Part number  
 Bearing size  
 Carriage type  
[□26 & 27 for range available](#)  
 Rack type  
 2.5S = Module 2.5 Spur, 2.5H = Module 2.5 Helical  
 3S = Module 3 Spur, 4H = Module 4 Helical, 5S = Module 5 Spur

Lubrication pinion assembly  
**CW** = Cap wipers  
**CW4S** = Cap wipers + Outboard scrapers  
**LB** = Slide lubricators

Geared motor should be ordered as a separate item [□31](#).

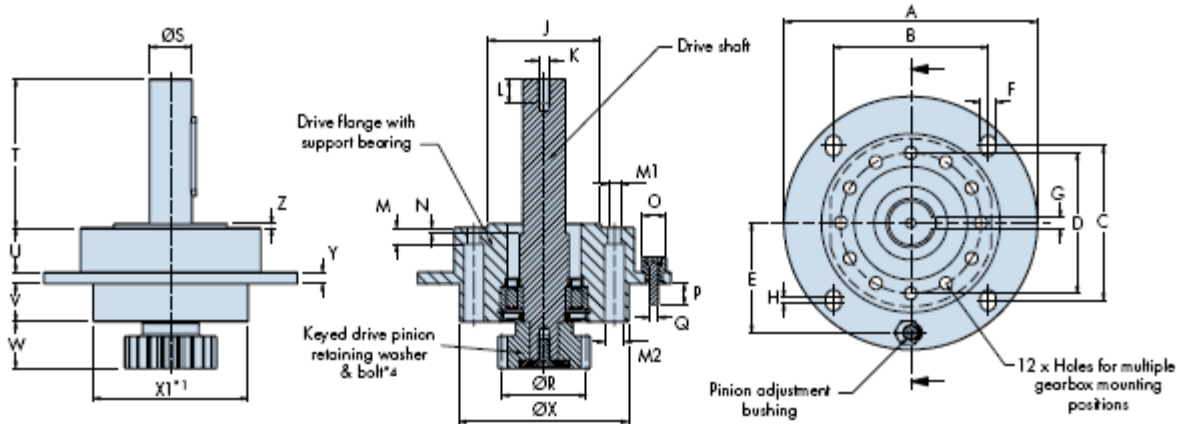
# Drive Flange Assembly



Drive flange assemblies are available to suit all five rack sizes\*6. They are designed to mount on the top face of the rack driven carriage and connect the drive from the geared motor to the pinion. A high capacity roller bearing is fitted to provide rigid support to both geared motor and carriage, and to withstand high radial loads\*3. Axial forces, which are generated when helical rack and pinion are used, are supported by the gearbox bearings. The drive flange assembly features a unique micro adjustment facility for achieving correct mesh between pinion and rack.

The drive flange body for both stainless (SS) and standard versions is aluminum clear anodized. An enhanced anti-corrosion finish is available on application. The stainless version is supplied with stainless steel shaft, pinion and fixings, and steel roller bearing protected by nitrile seals. Pinions mod. 2.5 and 3 are keyed to the shaft and retained by screw and washer. The larger pinions mod. 4 and 5 incorporate a keyless locking bushing for secure fixing under higher loading conditions □35. Stainless pinions are supplied keyed to the shaft and retained by screw and washer. Other sizes of pinions can be readily supplied to special order\*5.

The standard drive flange assembly as shown is designed to be coupled with geared motors, but modified or special drive flanges can be readily supplied to suit customer's own motor gearbox, including servo and stepper types.



Part Number	For Use With					Rack Module *2	No. of teeth	A	B	C	D	E	F	G	H	J	K
	Slide	Track	Bearing	Track Roller	Geared Motor												
HDF 25S						2.5S	20	160	98	98	90	70	9	8	4	75	M8
HDF 25H	.HSS25.	.HTS25.	.HJR64	.HRR58	HB 04	2.5H											
HDF 30S			.HJR95	.HRR89	HB 05	3S											
HDF 25HX	.HSS25.	.HTS25.	.HJR120	.HRR122	HB 04	2.5H	20	160	98	98	90	70	9	8	4	75	M8
HDF 30SX					HB 05	3S											
HDF 40H	.HSS33.	.HTS33.	.HJR128	.HRR122	HB 06	4H	24	220	130	130	120	92	13	12	8	100	M12
HDF 50S					HB 06	5S											
HDF 40HX	.HSS33.	.HTS33.	.HJR150	.HRR144	HB 06	4H	24	220	130	130	120	92	13	12	8	100	M12
HDF 50SX					HB 06	5S											

Part Number	L	M	M1	M2	N	O	P	Q	R	S	T	U	V	W	X	X1	Y	Z	kg~
HDF 25S	16	9	7	11	2.5	17	10	M6	50	30	107.5	30	26	33.5	110	105	8	2	2.5
HDF 25H									57.74										
HDF 30S	16	10.5	9	14	4	17	10	M6	60	30	106	31.5	26	33.5	128	120	8	3	3.0
HDF 25HX	16	9	7	11	2.5	17	10	M6	57.74	30	107.5	30	26	39.5	110	105	8	2	2.5
HDF 30SX	16	10.5	9	14	4	17	10	M6	60	30	106	31.5	26	39.5	128	120	8	3	3.0
HDF 40H	24	8	11	17	5	25	19	M8	110.85	40	145	30	10	60	150	142	8	3	7.2
HDF 50S									120										8.6
HDF 40HX	24	28	11	17	5	25	19	M8	110.85	40	145	30	42	60	150	142	8	3	8.0
HDF 50SX									120										9.4

## Ordering Example

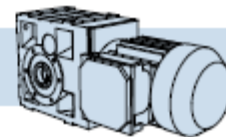
Stainless version\*6 SS      HDF      30S      20      \_\_\_\_\_ Number of teeth of pinion  
 Leave blank if not required  
 Part number \_\_\_\_\_ Rack and pinion module/type

## Notes:

- X1 denotes the dimension between the parallel faces of the flange body which engages with the slot on the carriage for adjustment purposes.
- Rack and pinion module: S = spur, H = helical.
- Drive flange assemblies have a dynamic radial bearing capacity (C<sub>R</sub>) of 38,000N for HDF25&30, and 60,500N for HDF40&50.
- Drive flange assembly shown in the drawing is for module 2.5, 3 & SS versions, module 4 & 5 use a keyless locking bushing □35.
- Customers requiring alternative pinion sizes should note that the mounting position of the drive flange assembly on the rack driven carriage □28-29 will need to be altered to compensate. Please discuss this requirement with Bishop-Wisecarver.
- Stainless version (SS): drive flange assemblies are available to suit spur racks only.



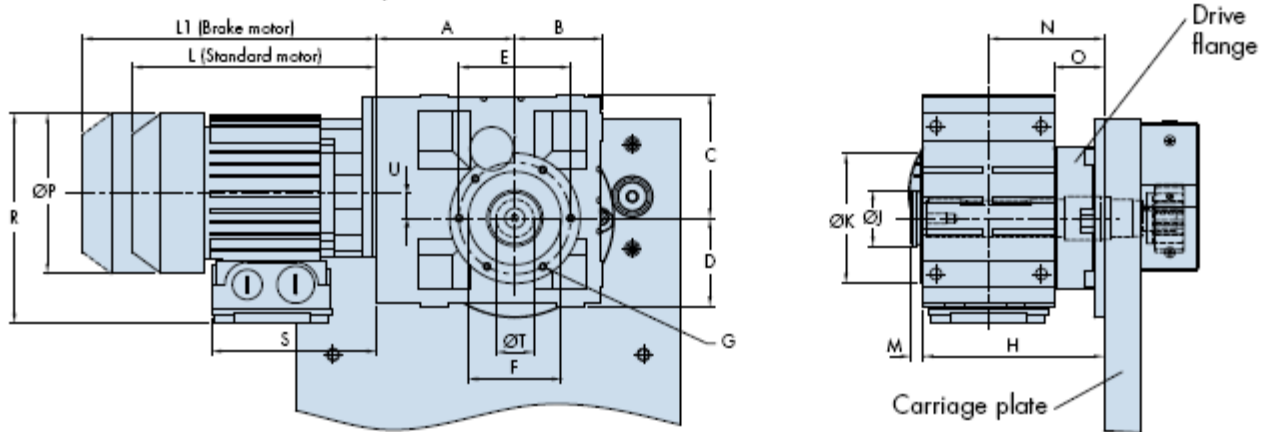
# AC geared motors



Rack driven carriages can be supplied with an AC geared motor which provides a simple and low cost means of achieving point-to-point linear motion. Helical bevel gearboxes with hollow output shafts are supplied as standard. The compact design complements the rack driven carriage, and the hollow shaft allows direct connection of the drive flange assembly with maximum rigidity.

3-phase motors are available with 2 or 4 poles running at approximately 2800 & 1400rpm, respectively, and comply with IEC34-VDE530, DIN57530 and 42677. Motors are protected to IP55 and are finished in silver grey paint. Motors with alternative single and three phase windings, special finishes and an enhanced IP protection rating are available on request. The large range of motor sizes and gearbox ratios available enable ideal solutions to be specified for most applications. For requirements outside AC motor capabilities, servo motors can be directly fitted to the helical gearbox via a standard or tailored input flange.

In all cases, customers are requested to discuss their requirements with Bishop-Wisecarver for assistance in specifying the correct choice of motor and gearbox. Dimensions stated below could vary depending on the choice of motor and gearbox, and are shown for initial selection only.



Part Number	A	B	C	D	E	F	G Thread size x depth	H	J	K	M	N	O	T <sup>1</sup>	U	kg~ Gearbox only
HB 04	132	71	100	71	90	75	M6x12	149	45	105	10.5	90.5	38	30	20	15
HB 05	152	80	125	80	100	80	M8x15	170.5	45	118	13	103	39.5	30	23	25
HB 06	191	100	150	100	120	100	M10x16	187	60	140	19	111	38	40	28	39

Motor Frame Size	L	L1	P	R	S	kg~ Motor only		Power				
						'S' Type	'L' Type	2 Pole 'S'	2 Pole 'L'	4 Pole 'S'	4 Pole 'L'	4 Pole 'XL'
63	188	228	123	176.5	117	4.6	4.6	180 W	250 W	130 W	180 W	250 W
71	207	259	138	193	117	6.3	6.3	370 W	550 W	-	370 W	550 W
80	225	298	156	219	138	11.0	11.0	750 W	1100 W	-	750 W	1100 W
90	276	346	176	234	141	12.5	15.2	1500 W	2200 W	-	1500 W	-
100	309	388	196	254	148	22.0	22.0	3000 W	-	2200 W	3000 W	-

## Ordering Example

Part number **HB 05 R9.412 M80 L 4 B 1 A**

Gearbox size **R9.412**  
 Gearbox ratio **M80**  
 Motor frame size **L 4 B 1 A**  
 Discuss this requirement with Bishop-Wisecarver

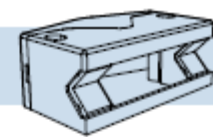
**A** = Terminal box position  
**1** = Geared motor orientation  
 Leave blank if not assembled to carriage  
**B** = Brake motor  
**U** = Un-braked motor  
 Motor poles  
**2** = 2 poles **4** = 4 poles  
 AC motor field length  
 Choose **L** (long), **S** (short) or **XL** (X long)

## Notes:

- 'T' dimension refers to hollow shaft diameter for the gearbox. This can be cross referenced to 'S' dimension on 30 to aid selection of the drive flange assembly.

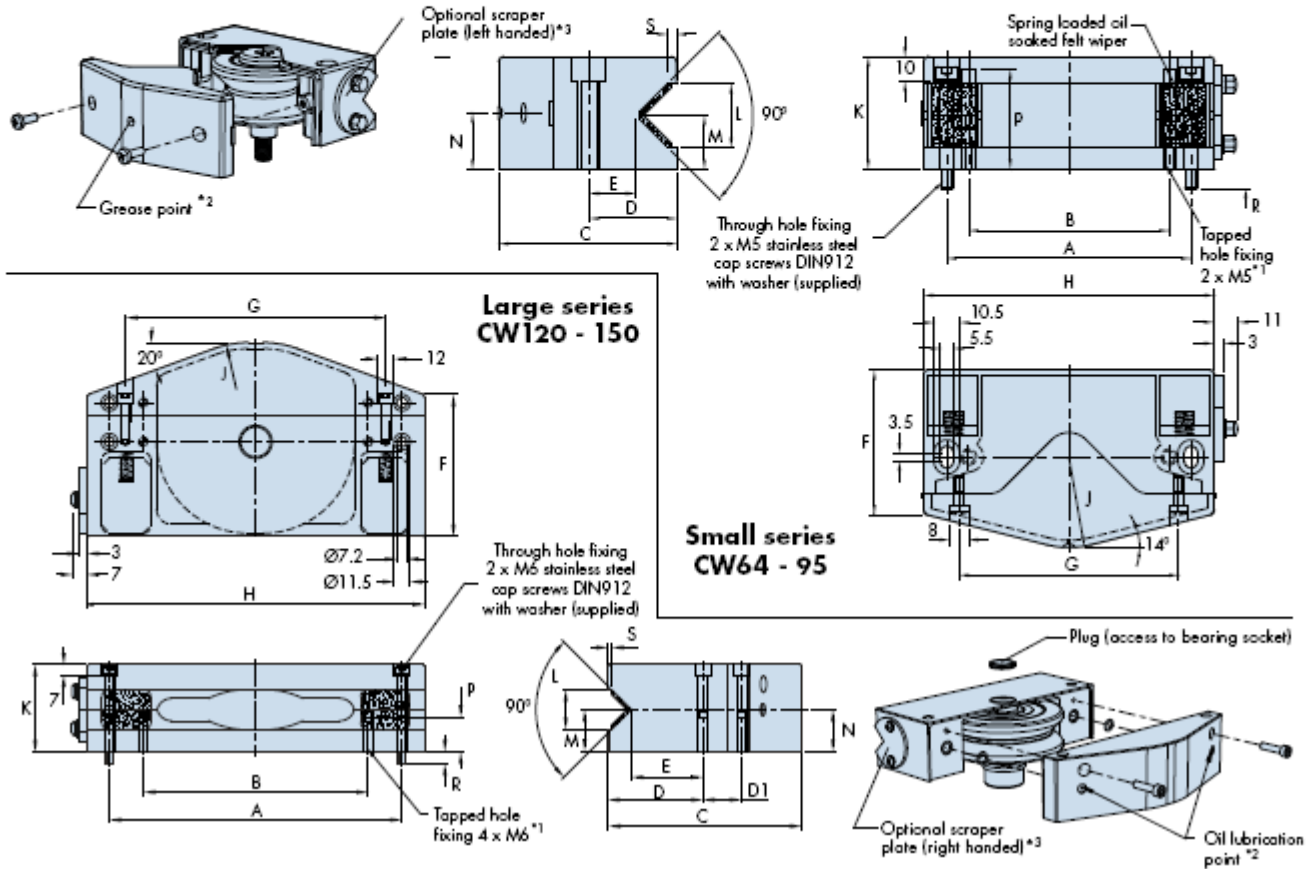


# Bearing Cap Wipers



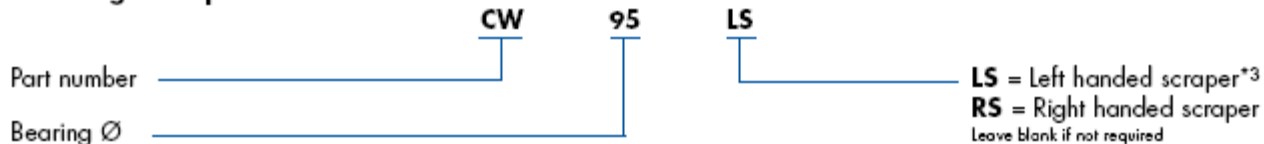
Cap wipers encapsulate the bearing when engaged with the slide and provide constant lubrication to the contact faces, thereby greatly increasing load capacity and life. They prevent ingress of debris and improve safety and appearance. Lubrication is by means of spring loaded oil impregnated felt wipers. The small series has a central cavity filled with grease which partially liquefies under operation and recharges the wipers.

The large series incorporates high lubricant capacity felt wipers which can be recharged with oil as required. Cap wipers are made from impact resistant plastic and have a removable section to allow access to adjust the bearing. Two methods of attachment are provided, either from above or from below. Fixing positions should be calculated from the V apex of the slide using dimensions E and D1 as relevant. Alternatively see 41.



Part Number 	For Use With Bearing 	Dimensions (mm)																kg	
		A	B	C	D	D1	E	F	G	H	J	K	L	M	N	P	R		S
CW 64	HJR64	100	84	73	36	-	19	58.5	90	119	37	46	26	22	23	44.5	8	4	0.17
CW 95	HJR95	132	114	105	52	-	35	87	121	151	53	46	26	22	23	44.5	8	4	0.22
CW 120	HJR120	195	160	131	63	26	47.5	95.5	173.5	225	68	58	26.5	28	28	17	9	2	0.88
CW 128	HJR128	200	165	137.5	66.5	28	47.5	100	182.5	235	67	58	34	28	28	17	9	2	0.91
CW 150	HJR150	235	190	162	78	31.5	58	120	213.5	265	82	85	35	40	40	17	12	2.5	1.75

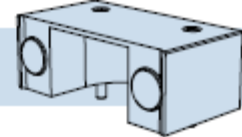
## Ordering Example



## Notes:

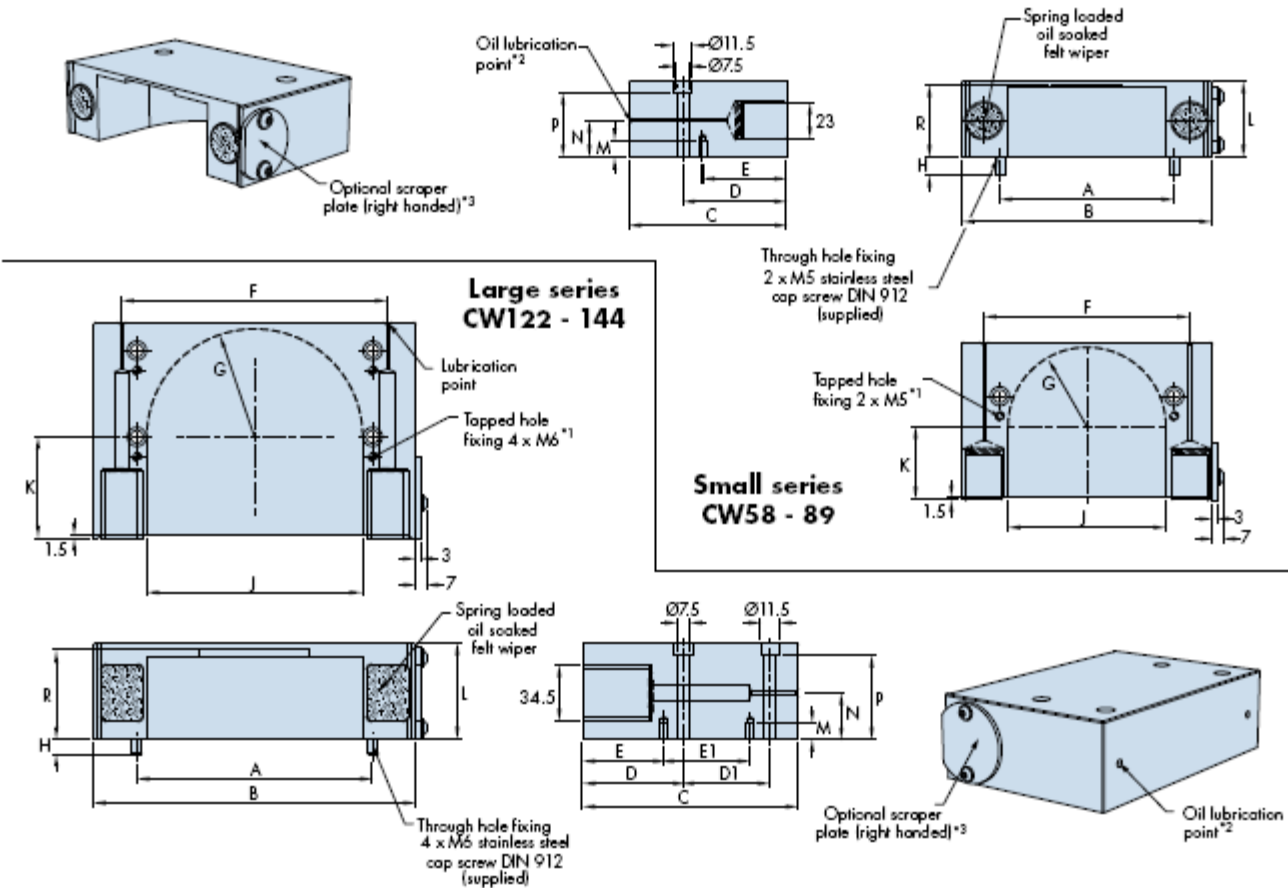
- Tapped hole fixing for small series:** Inserts provide M5 x 9mm thread. A deep cavity behind accommodates long screws (ref. P dimension). Mounting plates should be drilled Ø7mm for adjustment purposes. **Tapped hole fixing for large series:** Tapped holes M6 x 17 deep are provided. Mounting plate should be drilled Ø7mm for adjustment purposes.
- Lubrication intervals depend on stroke, duty and environmental factors 49. Threaded inserts can be incorporated in a number of positions to enable cap wipers to be linked to a central lubrication point or lubrication canister 37.
- Optional scrapers in hardened stainless steel are adjustable for maximum exclusion of debris in harsh environments. It is normal to specify scrapers only for the outermost ends of the cap wipers within a system.

# Roller Cap Wipers



Roller cap wipers encapsulate the track roller when engaged with the flat track and provide constant lubrication to the contact faces, thereby increasing the life of the system. They inhibit ingress of debris and improve safety and appearance. Lubricant is applied to the surface of the track by means of spring loaded oil impregnated felt wipers. Roller cap wipers are made from impact resistant plastic and are easily removed from the system to give access for adjustment of the track rollers. Two methods of attachment are provided, either from above or from below.

Fixing positions should be calculated from the contact face of the flat track using dimensions E/E1 and D/D1 as relevant. Alternatively see 41.



Part Number	For Use With Track Roller	Dimensions (mm)																	kg
		A	B	C	D	D1	E	E1	F	G	H	J	K	L	M	N	P	R	
CW 58	.HRR58.	74	120	64	47	-	37	-	93	32	11	64	29	46	15	22	39	44	0.23
CW 89	.HRR89.	105	151	95	62.5	-	50.5	-	124	47.5	11	95	44	46	15	22	39	44	0.35
CW 122	.HRR122.	142	194	130	61	52	49	52	160	65	9	130	61	58	17	28	51	54	1.04
CW 144	.HRR144.	165	216	152	72	52	60	52	184	76	13	152	72	84	17	40	77	80	1.78

## Ordering Example

Part number        CW 89 LS  
 Roller Ø       

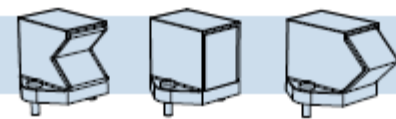
**LS** = Left handed scraper\*  
**RS** = Right handed scraper  
 Leave blank if not required

## Notes:

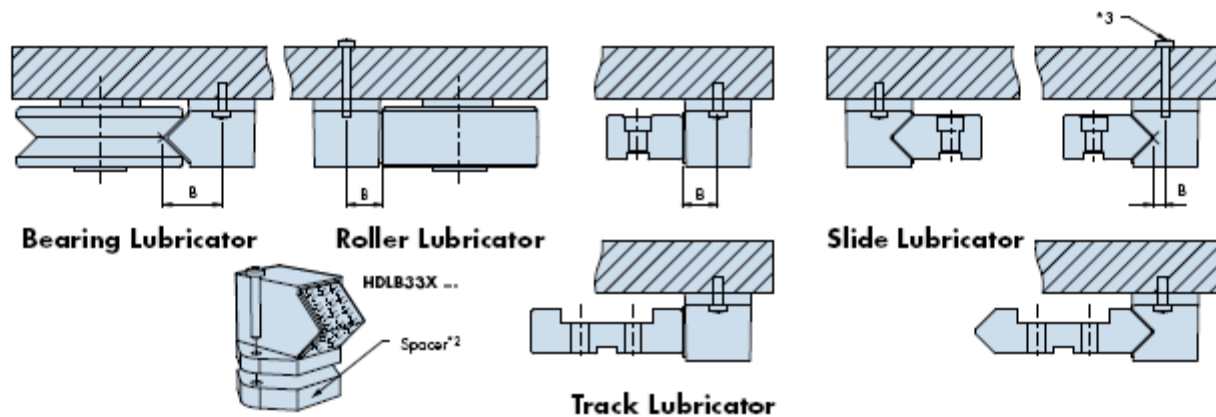
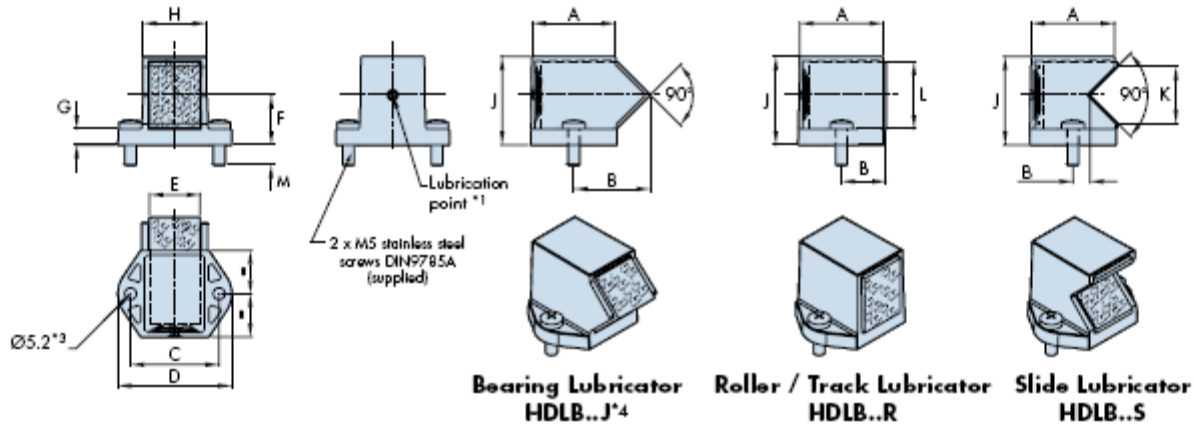
- For adjustment purposes, the holes in the mounting plate for the tapped hole fixing method should be drilled Ø7mm for the small series roller cap wiper and Ø8mm for the large series.
- Lubrication intervals depend on stroke, duty and environment 49. Threaded inserts can be incorporated at a number of positions to enable roller cap wipers to be linked to a central lubrication point or lubrication canister 37.
- Optional scrapers in hardened stainless steel are adjustable for maximum exclusion of debris in harsh environments. It is normal to specify scrapers only for the outermost ends of the roller cap wipers within a system.



# Lubricators



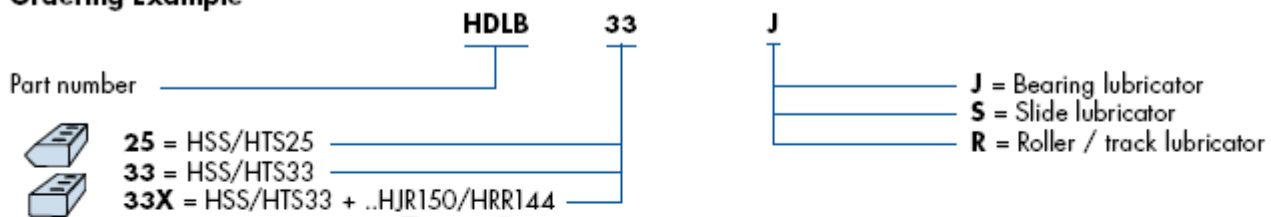
Lubricators provide a simple and versatile means of applying lubricant to a system, thereby increasing load capacity and extending life. Lubricators consist of an impact resistant plastic housing incorporating a spring loaded oil impregnated felt wiper. There are three types available for applying lubricant directly to either slide, flat track and track roller or V bearing. They can be sited in any convenient position to give best access for re-lubrication and can be mounted from above or below as shown.



Part Number	A	B	C	D	E	F	G	H	J	K	L	M	kg~
HDLB 25 J	38	34	39	50	23	22	7	27	39	-	30	5	0.10
HDLB 25 S	38	8.5	39	50	23	22	7	27	39	24	30	5	0.08
HDLB 25 R	38	21	39	50	23	22	7	27	39	-	30	5	0.09
HDLB 33 J	50	44	50	65	30	28	9	35	50	-	38	11	0.20
HDLB 33 S	50	9.9	50	65	30	28	9	35	50	33	38	11	0.15
HDLB 33 R	50	25	50	65	30	28	9	35	50	-	38	11	0.18
HDLB 33X J	50	44	50	65	30	40	21	35	62	-	38	14	0.28
HDLB 33X S	50	9.9	50	65	30	40	21	35	62	33	38	14	0.23
HDLB 33X R	50	25	50	65	30	40	21	35	62	-	38	14	0.26

Compatibility with mating components [46-47](#)

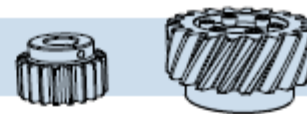
## Ordering Example



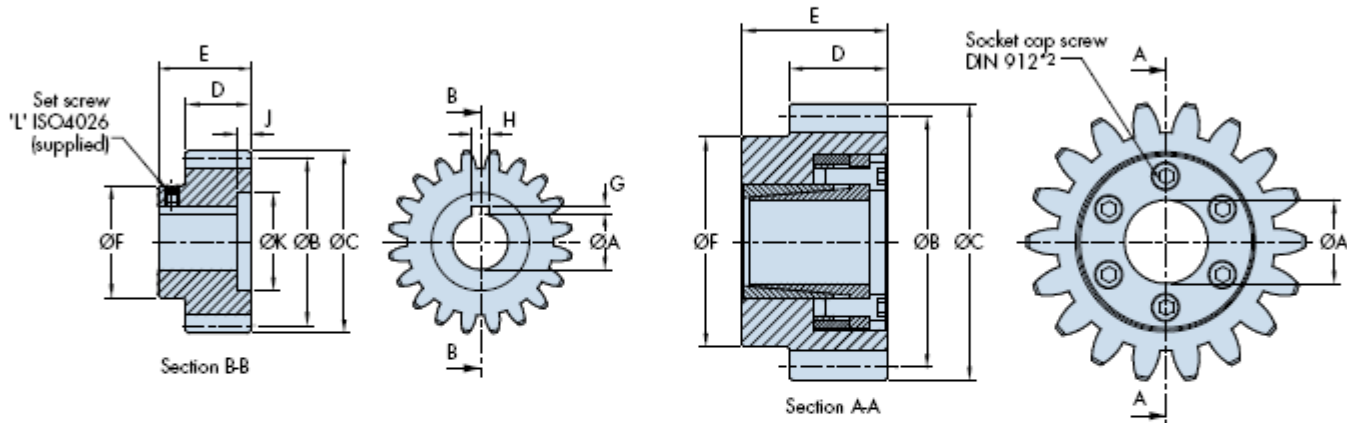
## Notes

- The lubrication interval depends on stroke, duty and environment [49](#). Threaded insert can be incorporated at the lubrication position to enable lubricators to be linked to a central point or lubrication canister [37](#).
- HDLB33X lubricators will be supplied with a spacer to match the height of the Ø150 bearing and Ø144 track roller.
- For through hole fixing, the Ø5.2 holes in the lubricator should be tapped M6.
- The use of bearing lubricators allows easy carriage disengagement with the slide, as only the bearing will need to be removed.

# Pinions



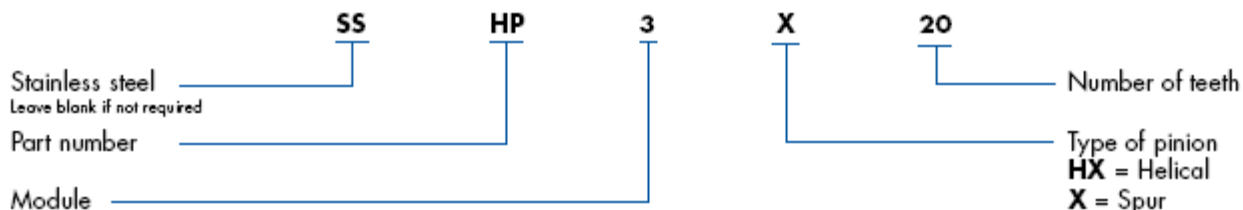
Pinions are made from high grade case hardened steel. The teeth are precision ground to ISO 1328 grade 6 for maximum wear resistance. Two types of pinions are available to suit the spur and helical rack cut into the back face of the single edge V slide and flat track. The smaller module pinions are supplied with a keyway location to mate with the drive shaft. The large module 4 and 5 pinions incorporate a locking bushing which, when tightened, locks onto the shaft and makes a rigid connection. Stainless steel spur pinions are available as standard and are supplied with a keyway location only.



Part Number (Steel pinion <sup>1&amp;2</sup> )	Pinion Type	Helix Angle	Mod	No of Teeth	A	B	C	D	E	F	G	H	J	K	L	kg
HP 25 X 20	Spur	-	2.5	20	20	50	55	23	33	40	2.8	6	6	36	M5	0.35
HP 25 HX 20	Helical	30	2.5	20	20	57.74	62.74	23	33	40	2.8	6	6	36	M5	0.46
HP 3 X 20	Spur	-	3	20	20	60	66	23	33	40	2.8	6	6	36	M5	0.5
HP 4 HX 20	Helical	30	4	20	30	92.38	100.38	35	52	75	-	-	-	-	-	1.9
HP 4 HX 24	Helical	30	4	24	40	110.85	118.85	35	59	90	-	-	-	-	-	2.9
HP 5 X 18	Spur	-	5	18	30	90	100	35	52	75	-	-	-	-	-	1.8
HP 5 X 24	Spur	-	5	24	40	120	130	35	59	100	-	-	-	-	-	3.6

Part Number (Stainless steel pinion <sup>1&amp;2</sup> )	Pinion Type	Mod	No of Teeth	A	B	C	D	E	F	G	H	J	K	L	kg
SS HP 25 X 20	Spur	2.5	20	20	50	55	23	33	40	2.8	6	5	35	M5	0.35
SS HP 3 X 20	Spur	3	20	20	60	66	23	33	40	2.8	6	5	35	M5	0.5
SS HP 5 X 18	Spur	5	18	30	90	100	35	52	75	3.3	10	8.5	60	M8	1.8
SS HP 5 X 24	Spur	5	24	40	120	130	35	59	100	3.3	12	8.5	60	M8	3.6

## Ordering Example



## Notes

- Module 2.5 & 3, and all stainless steel pinions are supplied with location keyway and both retaining washer and a countersunk screw. All other steel versions are supplied complete with a locking bushing.
- Locking bushing retaining bolts should be tightened to a torque of 17Nm.
- All steel pinions are supplied case hardened with ground teeth as standard. Stainless steel versions are manufactured from 420 stainless steel and are hardened and ground.

Slides  
14-15

Bearings  
18-21

Assembled Beams  
24-25

Assembled Carriages  
26-27

Rack Driven Carriages  
28-29

Mix & Match  
46

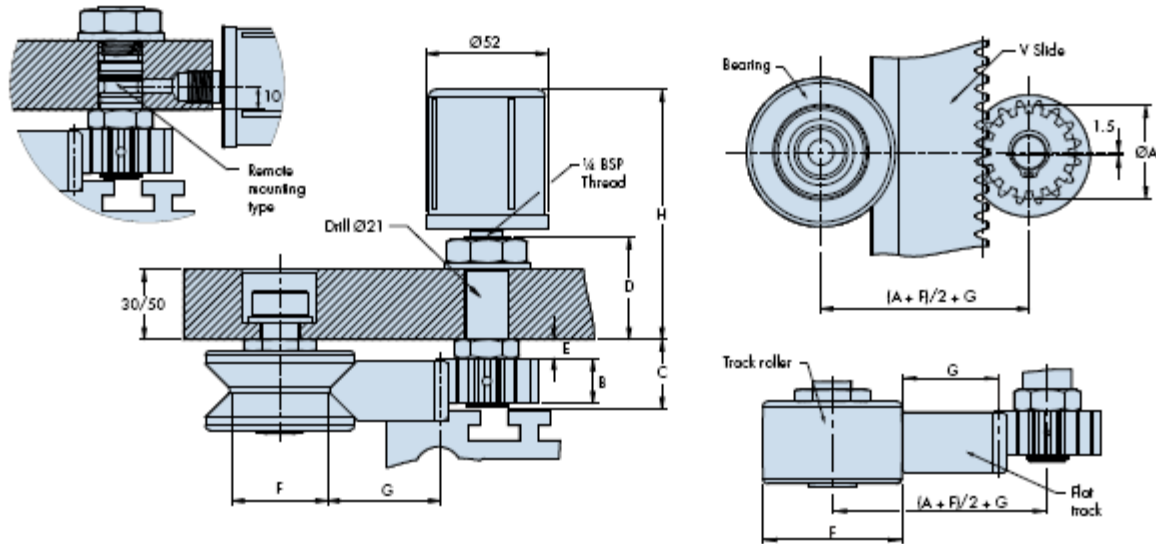
# Automatic Rack Lubrication



Automatic rack lubrication systems provide constant lubrication to the rack and pinion interface. Two types are available, integral canister mounting and remote canister mounting, which require lubricant passageways in the carriage plate to be drilled as required. The lubrication systems are available to suit all sizes of rack driven carriage 28-29 and are generally suitable for customers' own manufactured carriages of the required thickness.

They are compatible with most combinations of rack elements and bearings, either V slides with V bearings or flat tracks with rollers. These combinations are given in the table below. Lubrication is carried out by means of grease filled pressure canister which delivers lubricant at a controlled rate directly to the teeth of the rack via cross drilled plastic pinion. The eccentric mounting journal allows correct engagement of the lubrication pinion with the rack.

Rack lubrication units to suit other thickness of carriage plates can be readily supplied to special order.



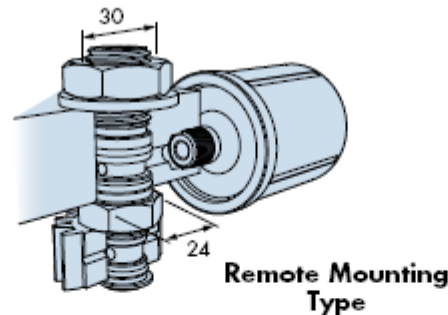
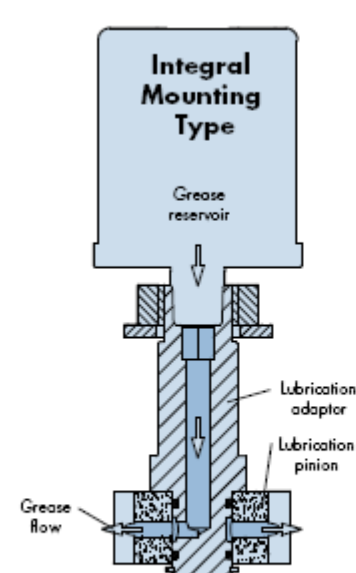
Part Number	Mod	Pinion Type	For Use With		No of Teeth	A	B	C	D	E	H
HLP A 25 S	2.5	Spur	..HJR64	..HRR58	16	40	18	30	47	9	150
HLP A 25 H	2.5	Helical	..HJR95	..HRR89	16	46.2	18	30	47	9	150
HLP A 30 S	3	Spur	..HJR120	..HRR122	16	48	18	30	47	9	150
HLP A 25 SX	2.5	Spur	..HJR120	..HRR122	16	40	18	36	47	15	150
HLP A 25 HX	2.5	Helical	..HJR120	..HRR122	16	46.2	18	36	47	15	150
HLP A 30 SX	3	Spur	..HJR120	..HRR122	16	48	18	36	47	15	150
HLP A 40 H	4	Helical	..HJR128	..HRR122	16	73.9	24	40	47	13.5	150
HLP A 50 S	5	Spur	..HJR128	..HRR122	16	80	24	40	47	13.5	150
HLP A 40 HX	4	Helical	..HJR150	..HJR144	16	73.9	24	52	67	25.5	170
HLP A 50 SX	5	Spur	..HJR150	..HJR144	16	80	24	52	67	25.5	170

Mod	G			
2.5	49.1	48.8	40.5	40.3
3	48.6	48.3	40.0	39.8

Mod	G			
4	53.6	53.3	40.6	40.3
5	52.6	52.3	39.6	39.3

	F
..HJR64	41
..HJR95	72
..HJR120	96
..HJR128	96
..HJR150	118

	F
..HRR58	58
..HRR89	89
..HRR122	122
..HRR144	144



### Ordering Example

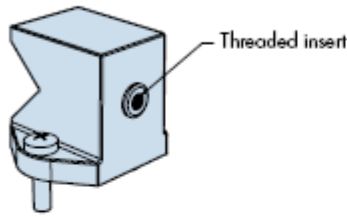
Automatic rack lubrication unit **HLP A 25 S I**  
 Rack module / type **25 S**  
 Rack lubrication canisters should be ordered separately: Part Number **LAGD125**

**I** = Integral mounted canister  
**R** = Remote mounted canister



Bishop-Wisecarver can provide modifications to the standard cap wipers and lubricators so that they can be easily connected to a centralized lubrication system. Adding threaded inserts to locations on the lubricator and cap wiper body allows threaded connectors to be fitted so that oil lubrication can be fed directly to the felt wipers. Inserts with M4, M5 and M6 threads are available as standard. Other sizes are available on request.

## Lubricator Options



All types and sizes of lubricators as detailed on 34 can be fitted with threaded inserts at the lubrication point. Please refer to that page for positions. Standard fitted inserts may be ordered by adding a suffix, as shown below, to the lubricator part number 34.

### Ordering Example

State lubricator part number 34 followed by:

**C4** for M4 insert.

**C5** for M5 insert.

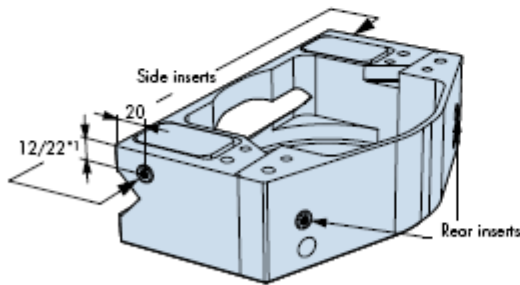
**C6** for M6 insert.

## Cap Wiper Options

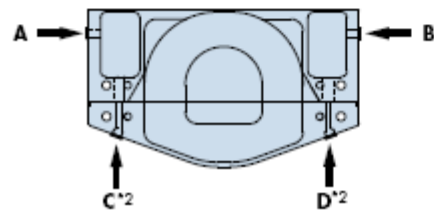
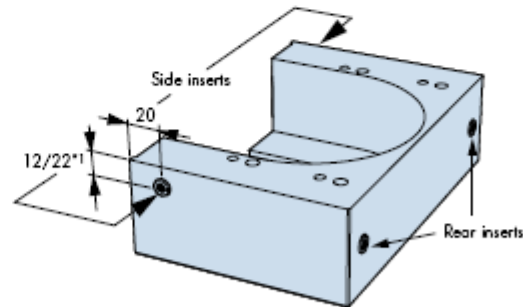
All types and sizes of bearing cap wipers and roller cap wipers as detailed on 32 & 33 can be fitted with threaded inserts. Inserts may be fitted on either one or both ends of the wiper body or, at one or both oil lubrication positions in the back face 32 & 33. The small series cap wipers are available only with inserts fitted at the ends\*2.

Oil lubrication into the felt wiper of one end of the wiper body is generally sufficient to ensure carry over of lubricant to the felt insert on the other side of the body (see automatic lubrication example at the bottom of the page). This allows an outboard scraper to be fitted at the opposite end to the insert if required.

### Bearing Cap Wiper Insert Positions



### Roller Cap Wiper Insert Positions



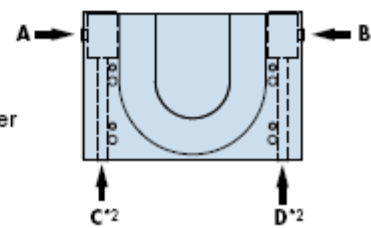
### Ordering Example

State bearing cap wiper / roller cap wiper part number 32 & 33 followed by:

**C4 A** — Choose insert position A - D

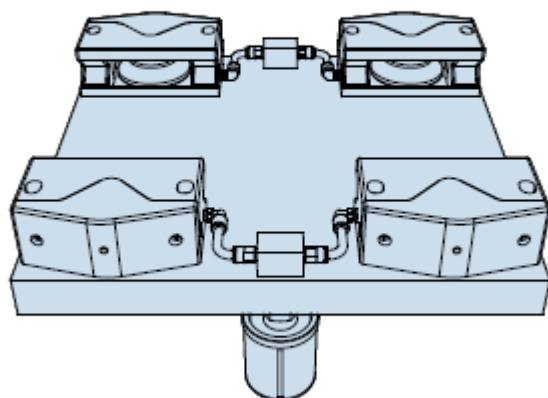
**C4** for M4 insert. **C5** for M5 insert.

**C6** for M6 insert



### Notes:

1. Roller cap wipers CW144 and bearing cap wipers CW150 have insert dimension 22mm from the wiper mounting base. All others have a dimension of 12mm.
2. Insert positions C & D are not available for small series bearing cap wipers CW64 & CW95.

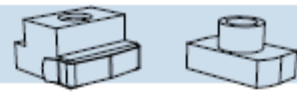


### Automatic Lubrication For Cap Wipers

Threaded inserts for cap wipers and lubricators enable them to be linked to a central lubrication point or pressure feed canister.

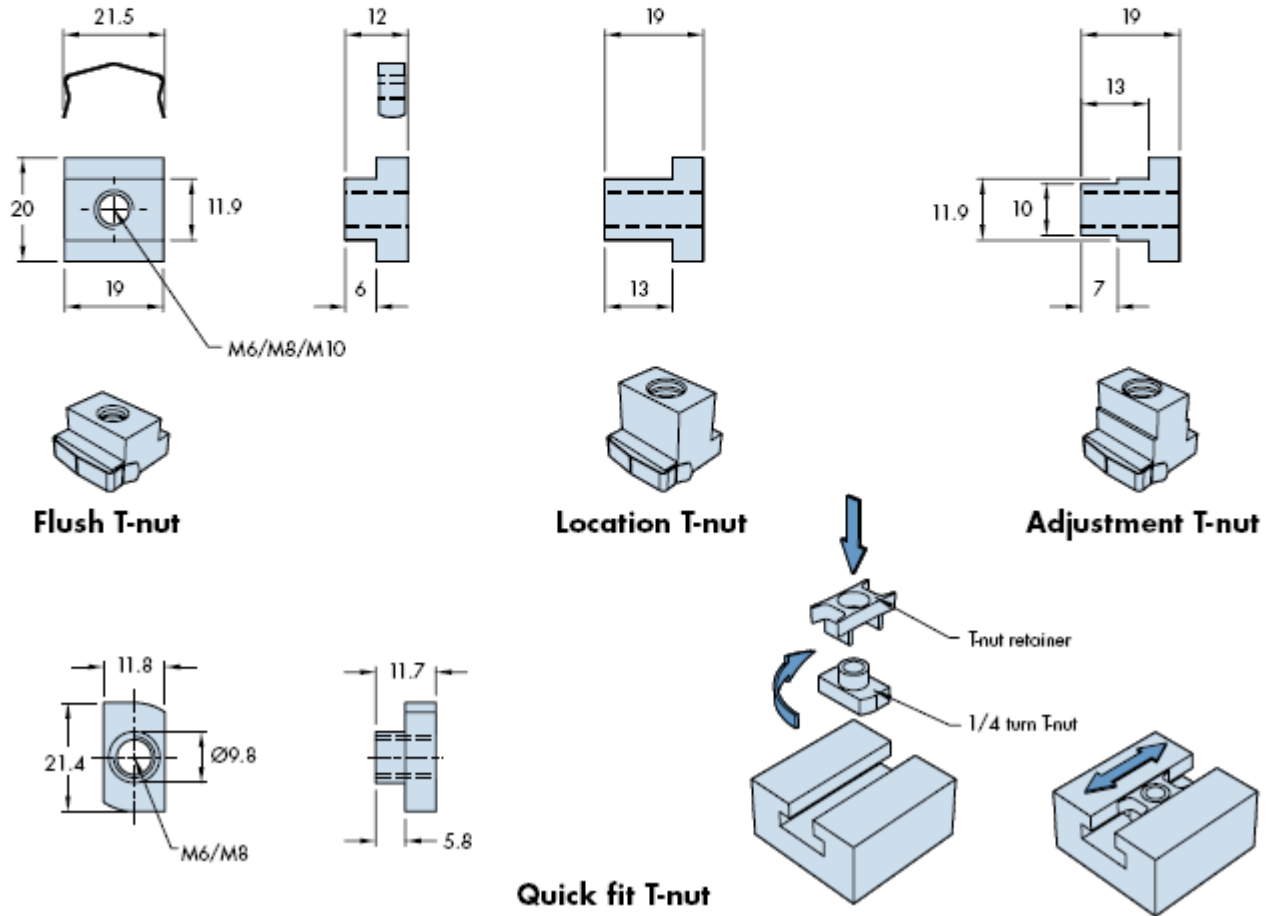
Bishop-Wisecarver is able to supply carriages with linked lubrication devices according to the customer's preferred layout. The illustration shows one of the many possibilities.





T-nuts are manufactured in high grade steel supplied chemically blackened and are designed to fit the T-slots of the construction beams. Three types of high strength T-nuts are available: the flush type HTNM for attachment of the customer's own components, the location type HTNM8L which locates into the keyways of the back plates 16-17, and the adjustment type HTNM8A required for system alignment facility 17. All high strength T-nuts are supplied with a retaining spring clip to prevent loss of position when the T-nut is fitted into the T-slot in the construction beams.

Also available is a range of quick fit T-nuts. These can be inserted directly into the T-slot of the construction beams and rotated through 90° to engage. Available with threads of M6 and M8, the quick fit T-nut is supplied with a plastic retainer to prevent the T-nut from turning when the fixing bolt is loosened. It also holds the T-nut in place and allows repositioning if required.



Part Number	Type	Thread	Retainer
HTN M6	Flush	M6	Spring
HTN M8	Flush	M8	Spring
HTN M10	Flush	M10	Spring
HTN M8L	Location	M8	Spring
HTN M8A	Adjustment	M8	Spring
HRTN M6	Quick fit	M6	Plastic
HRTN M8	Quick fit	M8	Plastic

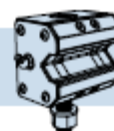
## Ordering Example




State the quantity and the part number of the type of T-nut required.

**Example:** 10 x HTN M10 10 ea. Flush type T-nut with M10 thread and spring retainer.



# Bearing Blocks

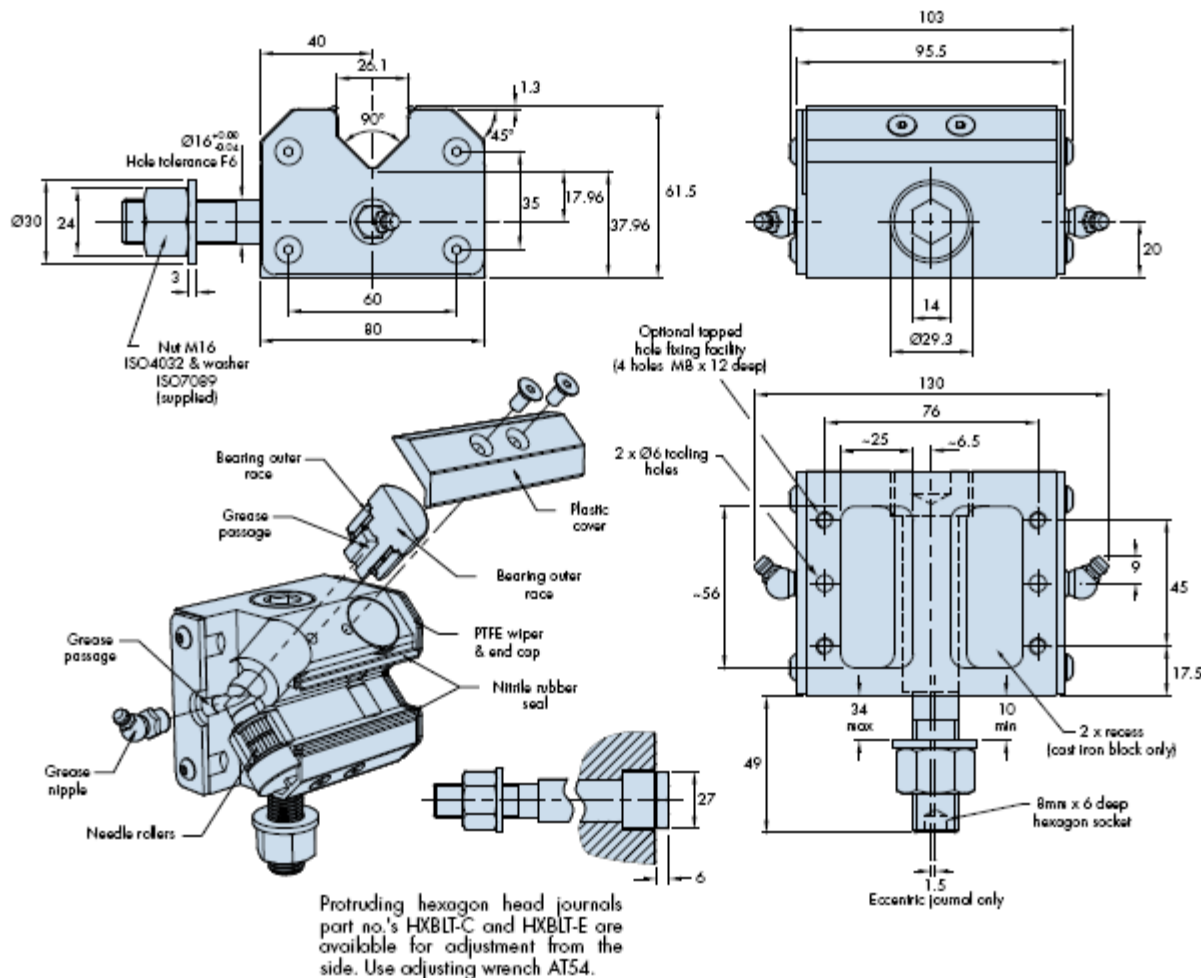


HDS2 bearing blocks can be used in place of V bearings in cases where limited width is available and where high rigidity is required. They are designed for use in conjunction with the .HSS25 V slides only. They may be used with the HB25C and HB25 construction beams with slides corner mounted in any position  24, They may also be used in conjunction with high style back plates HHN25 and HHW25  16&17, either mounted to a base or T-slot mounted to the beams  25.

Bearing blocks feature high capacity full complement needle roller races within a precision machined rigid casting. A lubrication facility channels lubricant direct to the needle races, then onto the roller/slide contact faces. Side and adjustable end seals retain the lubricant and prevent ingress of debris. Bearing blocks can be mounted via high tensile steel concentric and eccentric (adjustable) journals or by using the optional tapped hole facility in the back face. Blocks are available in high quality nodular cast iron, high strength aluminum, and stainless steel with a slightly different design.

**For load capacity, technical specification and further details including stainless steel version**, please visit our web site [www.bwc.com/products/hds.html](http://www.bwc.com/products/hds.html).

**IMPORTANT:** Lubrication channels are not interconnected. Both ends must be charged with grease\*1.



## Ordering Example

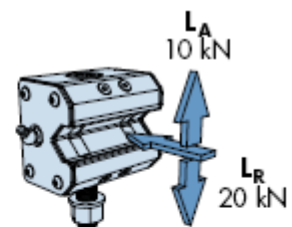
Block version **P** **HC25** **A** **C** **H**


**P** = To suit precision slides,  
**C** = To suit commercial slides

Block material **A** = Aluminum, **S** = Cast iron, **SS** = Stainless steel\*2

Tapped hole fixing facility (no journal supplied)

Journal type **E** = Eccentric, **C** = Concentric



 Cast iron block = 3 kg, aluminum block = 1.2 kg, and journal = 0.4 kg.

## Notes:

- On installation, blocks should be charged with NLGI No 2 lithium soap based grease. Lubrication intervals will vary between applications, but once per 200km would be typical.
- Stainless steel blocks are only available in 'P' grade to suit precision slides.

Slides  
14-15

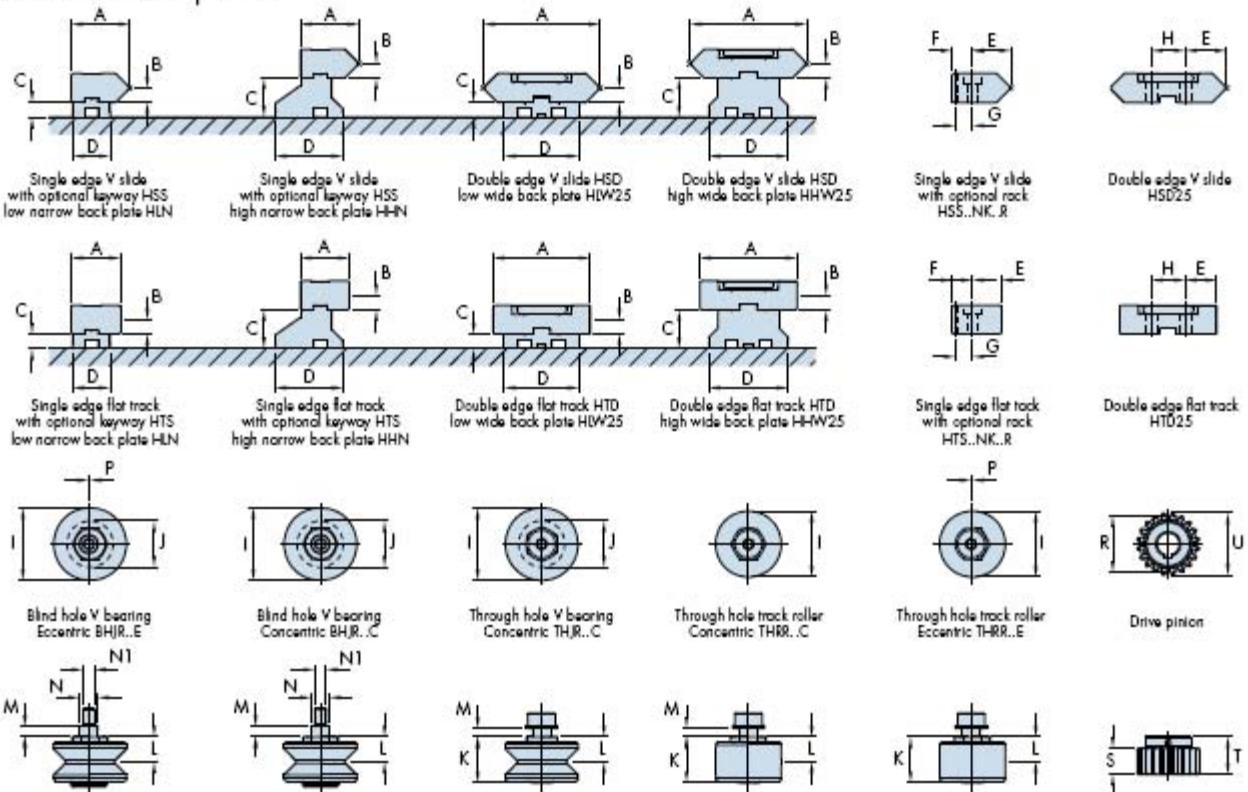
Back Plates  
16-17

Beams  
22-23

Assembled Beams  
24-25

# Data and Dimensions for Assembled Systems

Use this section to calculate the overall dimensions of a system without having to refer to dimensions on individual component pages. Use it also for calculating drilling positions and for important reference dimensions of mating components. These tables include all basic dimensions for most standard components. For more detailed dimensional information refer to the catalog pages for the individual components.

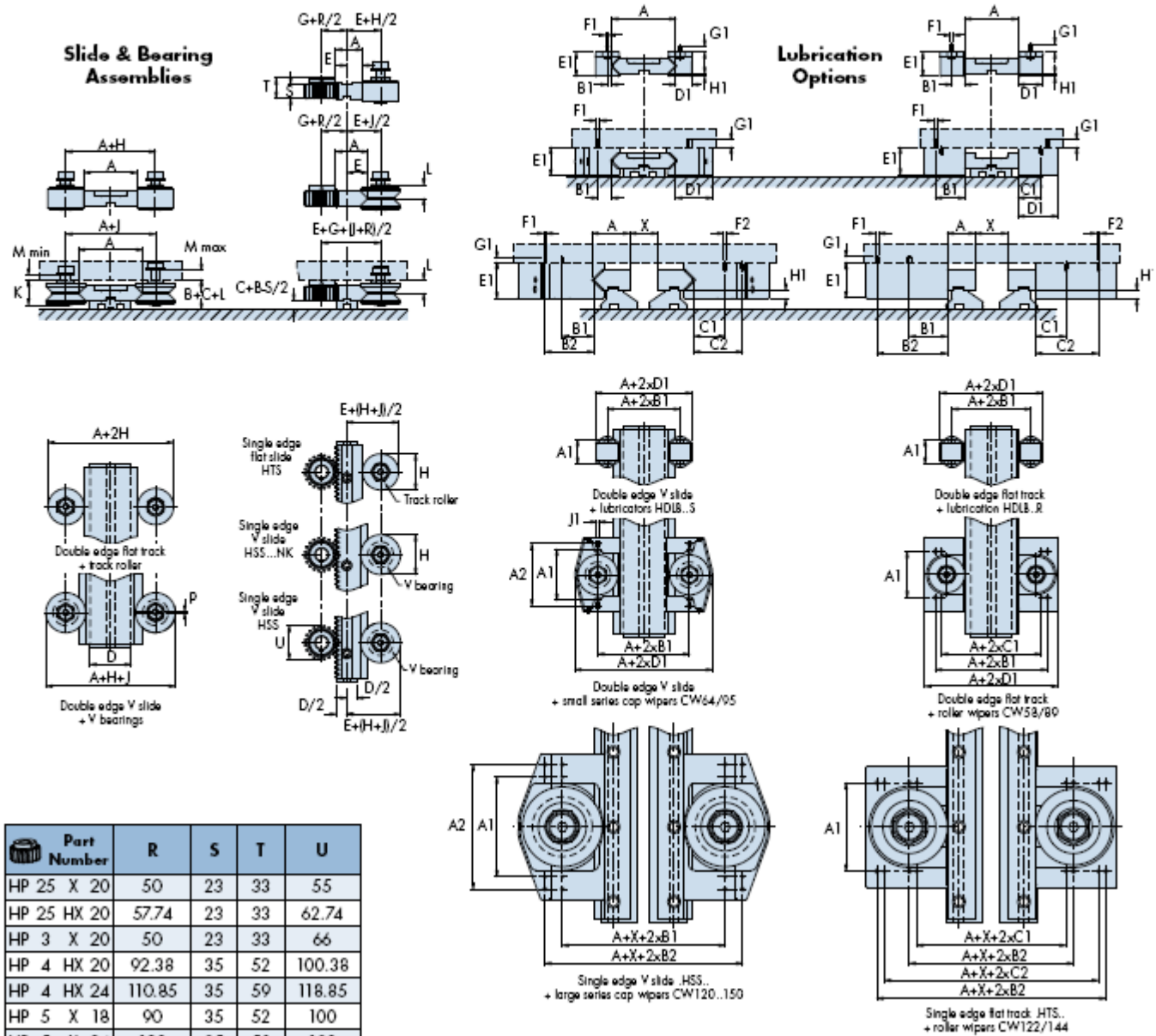


Part Number	Rack Module	A		B		C	D	E		F		G	H
		P Grade	C Grade	P Grade	C Grade			P Grade	C Grade	P Grade	C Grade		
HSS 25	2.5	51.2	51.7	12.5	12.7	13	33	33.7	34	17.5	17.7	15.1	-
HSS 25	3	51.2	51.7	12.5	12.7	13	33	33.7	34	17.5	17.7	14.6	-
HSS 33	4	57.2	57.7	16.5	16.7	15	39	31.2	31.5	26	26.2	22.1	-
HSS 33	5	57.2	57.7	16.5	16.7	15	39	31.2	31.5	26	26.2	21.1	-
HSD 25	-	102.4	103	12.5	12.7	13	66	36.2	36.5	-	-	-	30
HTD 25	-	85.42	85.8	12.5	12.7	13	66	27.7	27.9	-	-	-	30
HTS 25	2.5	42.7	43.1	12.5	12.7	13	33	25.2	25.4	17.5	17.7	15.1	-
HTS 25	3	42.7	43.1	12.5	12.7	13	33	25.2	25.4	17.5	17.7	14.6	-
HTS 33	4	44.2	44.7	16.5	16.7	15	39	18.3	18.5	26	26.2	22.1	-
HTS 33	5	44.2	44.7	16.5	16.7	15	39	18.3	18.5	26	26.2	21.1	-

	Part Number																	
	THJR 64	THJR 95	THJR 120	THJR 128	THJR 150	BHJR 64	BHJR 95	BHJR 120	BHJR 128	BHJR 150	THRR 58	THRR 89	THRR 122	THRR 144	BHRR 58	BHRR 89	BHRR 122	BHRR 144
I	64	95	120	128	150	64	95	120	128	150	58	89	122	144	58	89	122	144
J	41	72	96	96	118	41	72	96	96	118	-	-	-	-	-	-	-	-
K	40	40	50	50	80	44	44	54	54	80	40	40	50	80	44	44	54	80
L	22	22	28	28	40	22	22	28	28	40	22	22	28	40	22	22	28	40
M min	6.5	9	6.5	6.5	6.5	10	11.5	17	17	20	6.5	9	6.5	6.5	10	11.5	17	20
M max	27.5	32	37	37	40	-	-	-	-	-	27.5	32	37	40	-	-	-	-
N <sup>•2</sup>	16	20	25	25	38	16	20	25	25	38	16	20	25	38	16	20	25	38
N1	-	-	-	-	-	M10	M16	M24	M24	M36	-	-	-	-	M10	M16	M24	M36
P <sup>•3</sup>	1.25	2	3	3	3	1.25	2	3	3	3	1.25	2	3	3	1.25	2	3	3

# Data and Dimensions for Assembled Systems

For systems using HDS2 carriages, please refer to [□26](#) and for systems incorporating beams, please refer to [□27](#). Dimensions not stated can be found on the relevant component pages.



Part Number	R	S	T	U
HP 25 X 20	50	23	33	55
HP 25 HX 20	57.74	23	33	62.74
HP 3 X 20	50	23	33	66
HP 4 HX 20	92.38	35	52	100.38
HP 4 HX 24	110.85	35	59	118.85
HP 5 X 18	90	35	52	100
HP 5 X 24	120	35	59	130

X is the variable spacing between slides / tracks. See end view above.

Part Number	A1	B1	D1	E1	F1	G1	H1
HDLB 25 J	39	34	53	39	M5	5	4.5
HDLB 25 S	39	8.5	10.5	39	M5	5	4.5
HDLB 25 R	39	21	38	39	M5	5	4.5
HDLB 33 J	50	42	67	50	M5	7	5.5
HDLB 33 S	50	9.9	34.9	50	M5	7	5.5
HDLB 33 R	50	25	50	50	M5	7	5.5
HDLB 33 JX	50	42	67	62	M5	9	5.5
HDLB 33 SX	50	9.9	34.9	62	M5	9	5.5
HDLB 33 RX	50	25	50	62	M5	9	5.5

Part Number	A1	A2	B1	B2	C1	C2	D1	E1	F1	F2	G1	H1
CW 64	84	100	19	-	19	-	56	46	M5	-	8	1.7
CW 95	114	132	35	-	35	-	89	46	M5	-	8	1.7
CW 120	160	195	47.5	73.5	47.5	73.5	115.5	58	M6	M6	9	17.3
CW 128	165	200	47.5	75.5	47.5	75.5	118.5	58	M6	M6	9	13.3
CW 150	190	235	58	89.5	58	89.5	142	85	M6	M6	12	28.3
CW 58	74	-	47	-	37	-	64	45	M5	-	15	2.7
CW 89	105	-	62.5	-	50.5	-	95	45	M5	-	15	2.7
CW 122	142	-	61	113	49	101	130	58	M5	M5	9	13.3
CW 144	165	-	72	124	60	112	152	84	M5	M5	13	27.3

## Notes:

1. The calculated position of the pinion relative to the rack gives an approximate location only. Customers should make provision for the pinion to be adjusted relative to the rack to ensure the best running condition. The drive flange assembly [□30](#) includes a facility for this type of adjustment.
2. Mounting holes for bearings (ref. N dimension) should be drilled and reamed tolerance F6.
3. P dimension refers to eccentric V bearings and track rollers only.

## Load Life Calculations

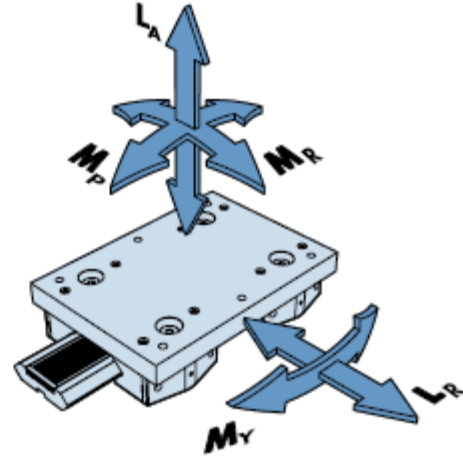
The load capacity and life expectancy of HDS2 will be determined by several factors. The key factors are the size and type of bearings and slide, the presence or absence of lubrication, and the magnitude and direction of loads. Other factors including operational speed, length of stroke and environmental conditions may also have an effect.

When calculating the system load and life, one of two approaches should be taken: if the system uses a conventional four bearing carriage (such as any of the HDS2 carriages), then this may be treated as a single item, and the load and life be determined as in the **Systems with Carriages** section below; alternatively, each bearing can be treated separately according to the method shown in the **Individual Bearing Calculations** section.

### Systems with Carriages

When calculating the loading and life of a V slide system using a four bearing carriage, the loading on the system should be resolved into the direct load components,  $L_A$  and  $L_R$ , and the moment loading components  $M_P$ ,  $M_Y$  and  $M_R$  (see diagram on the right).

The maximum direct and moment load capacities for HDS2 carriages are given in the tables below. Capacities are included for both 'dry' and 'lubricated' conditions - this refers to the 'V' contact, since all bearings are greased internally for life. Values are based on shock free duty.

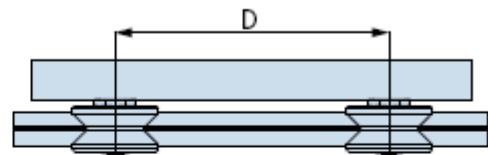


Carriage Part Number	Dry System					Lubricated System				
	$L_A(max)$	$L_R(max)$	$M_R(max)$	$M_Y(max)$	$M_P(max)$	$L_A(max)$	$L_R(max)$	$M_R(max)$	$M_Y(max)$	$M_P(max)$
	N	N	Nm	Nm	Nm	N	N	Nm	Nm	Nm
AU6425D..	10,000	16,000	450	8 x D	5 x D	10,000	16,000	450	8 x D	5 x D
AU..6425C..	10,000	16,000	900	8 x D	5 x D	10,000	16,000	900	8 x D	5 x D
AU..6425N..	10,000	16,000	810	8 x D	5 x D	10,000	16,000	810	8 x D	5 x D
AU..6425W..	10,000	16,000	1,260	8 x D	5 x D	10,000	16,000	1,260	8 x D	5 x D
AU9525D..	28,000	40,000	1,280	20 x D	14 x D	28,000	40,000	1,280	20 x D	14 x D
AU..9525C..	28,000	40,000	2,510	20 x D	14 x D	28,000	40,000	2,510	20 x D	14 x D
AU..9525N..	28,000	40,000	2,260	20 x D	14 x D	28,000	40,000	2,260	20 x D	14 x D
AU..9525W..	28,000	40,000	3,520	20 x D	14 x D	28,000	40,000	3,520	20 x D	14 x D
AU12025D..	-	-	-	-	-	40,000	60,000	1,830	30 x D	20 x D
AU..12025C..	-	-	-	-	-	40,000	60,000	3,590	30 x D	20 x D
AU..12025N..	-	-	-	-	-	40,000	60,000	3,230	30 x D	20 x D
AU..12025W..	-	-	-	-	-	40,000	60,000	5,030	30 x D	20 x D
AU..12833N..	40,000	60,000	4,530	30 x D	20 x D	40,000	60,000	4,530	30 x D	20 x D
AU..12833W..	40,000	60,000	6,530	30 x D	20 x D	40,000	60,000	6,530	30 x D	20 x D
AU..15033N..	-	-	-	-	-	68,000	100,000	7,710	50 x D	34 x D
AU..15033W..	-	-	-	-	-	68,000	100,000	11,110	50 x D	34 x D

**Load capacities apply to steel systems. For stainless steel systems, load capacities are 25% lower.**

### Calculating the System Load Factor

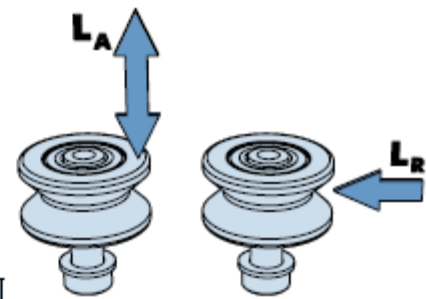
To calculate the system life, the load factor  $L_F$  should first be calculated using the equation below. Where  $M_Y$  and  $M_P$  loads are concerned, the  $M_{Y(max)}$  and  $M_{P(max)}$  for the relevant carriage will need to be determined. This is established by multiplying the figure shown in the table by the spacing of the bearing,  $D$ , in millimeters.  $L_F$  should not exceed 1 for any combination of loads. Once  $L_F$  has been determined for the application, the life is calculated as shown on 43.



$$\text{Load Factor } L_F = \frac{L_A}{L_{A(max)}} + \frac{L_R}{L_{R(max)}} + \frac{M_R}{M_{R(max)}} + \frac{M_Y}{M_{Y(max)}} + \frac{M_P}{M_{P(max)}}$$

## Individual 'V' Bearing Calculations

Many systems do not use standard carriages. In such cases it is necessary to use conventional statics calculations to determine the loading on each bearing in the system, by resolving into axial  $L_A$  and radial  $L_R$  components. Maximum capacities for all types of HDS2 'V' bearings are given in the table below, and are included for both 'dry' and 'lubricated' conditions - this refers to the 'V' contact, since all bearings are greased internally for life. Values are based on shock-free duty.



Bearing Part Number	Dry			Lubricated		
	$L_A$ (max) N	$L_R$ (max) N	Basic Life (km)	$L_A$ (max) N	$L_R$ (max) N	Basic Life (km)
..HJ64	2,500	8,000	300	2,500	8,000	500
..HJ95	7,000	20,000	400	7,000	20,000	400
..HJ120	-	-	-	10,000	30,000	700
..HJ128	10,000	30,000	500	10,000	30,000	700
..HJ150	-	-	-	17,000	50,000	2,000

The above figures assume that bearings are used with slides equal or larger than the preferred slide selection for that bearing size. For details of the preferred sizes, see 18-19. For loading of bearings with smaller slides, please contact Bishop-Wisecarver.

### Calculating the System Load Factor

To calculate the system life, the load factor  $L_f$  should first be calculated using the equation below.

$$\text{Load Factor } L_f = \frac{L_A}{L_{A(\max)}} + \frac{L_R}{L_{R(\max)}}$$

$L_f$  should not exceed 1 for any combination of loads.

Once  $L_f$  has been determined for each bearing, the life can be calculated as follows:

### Calculating System Life

With the  $L_f$  determined for either a four bearing carriage or for an individual bearing, the life in km can be calculated using one of the three equations below. In these equations, the Basic Life is taken from the table (above) in respect of the bearing and lubrication condition applicable.

#### Dry System

$$\text{Life (km)} = \frac{\text{Basic Life}}{(0.04 + 0.96L_f)^2}$$

#### Lubricated System

$$\text{Life (km)} = \frac{\text{Basic Life}}{(0.04 + 0.96L_f)^3}$$

$$\text{Life (km)} = \frac{\text{Basic Life}}{(0.04 + 0.96L_f)^{3.3}}$$

(Use this calculation for all bearings other than ..HJR150.)

(Use this calculation for ..HJR150 bearings only.)

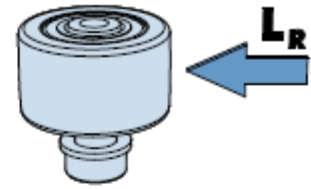
For further information regarding calculations using the methods above visit [www.bwc.com/product/hds.html](http://www.bwc.com/product/hds.html).

#### Notes:

- The maximum values of  $L_A$ ,  $L_R$ ,  $M_R$ ,  $M_P$ ,  $M_V$  and the magnitude of the system basic life for each bearing type relate to the performance of complete systems. Tests have shown these figures to be more reliable than working from theoretical static and dynamic load capacities ( $C$  and  $C_0$ ) of the bearings.
- The calculations within this section assume that the linear stroke involves a number of complete bearing revolutions. If the stroke of any application is less than five times the bearing outside diameter, calculate the distance travelled as if it moves five bearing diameters per stroke. Systems operating at speeds in excess of 8m/s may require additional calculations. Please contact Bishop-Wisecarver for assistance.
- For the purpose of the Load/Life calculations on this page, the axial load  $L_A$  is that load in the axial direction which the bearing can accept from a 'V' slide engaged in its outer ring. Since the line of force is some distance removed from the axis of the bearing, this value is much less than the theoretical axial load capacity of the bearing.
- In the above calculations, the term "lubricated" refers to the contact between the slide and bearing 'V's. This lubrication may best be achieved using lubricators and cap wipers. However other methods which ensure the presence of a suitable grease or oil in the critical area are acceptable.
- When a system consists of more than four bearings per carriage (e.g. see application example on 9), it cannot always be guaranteed that the load will share equally between all bearings. In such cases, it is recommended that the system be derated to allow for the life of the most heavily laden bearing. Please contact Bishop-Wisecarver for assistance.

## Track Roller Calculations

Systems incorporating track rollers running on flat tracks or flat faces of the single edge 'V' slides will require a different calculation to determine the load and life. Track rollers only have a radial load capacity stated as they are not usually loaded axially. Their pure rolling contact with the track means that they do not need to be derated for use in unlubricated applications (although it is recommended that the tracks and rollers be lightly oiled for best performance).



The maximum radial load capacity  $L_R$  for the HDS2 track roller is stated in the table below.

Load Capacities for Track Rollers		Basic Life (km)
Roller Part Number	$L_R$ (max)	
		N
..HRN58	5,000	500
..HRR58	10,000	300
..HRR89	20,000	400
..HRR122	30,000	700
..HRR144	80,000	500

### Calculating the System Load Factor

To calculate the roller life, the load factor  $L_F$  should first be calculated using the equation below.

$$\text{Load Factor } L_F = \frac{L_R}{L_{R(\max)}} \quad L_F \text{ should not exceed } 1.$$

### Calculating Track Roller Life

With  $L_F$  determined for each roller, the life in km can be calculated using the equation below. The basic life is taken from the table (above) for the respective track roller.

$$\text{Life (km)} = \frac{\text{Basic Life}}{L_F^3}$$

(Use this calculation for all track rollers other than ..HRR144.)

$$\text{Life (km)} = \frac{\text{Basic Life}}{L_F^{3.3}}$$

(Use this calculation for ..HRR144 track roller only.)

## Rack and Pinion Force Calculations

The driving force which can be transmitted through a rack and pinion will depend on the choice of rack (e.g. MOD 2.5 spur or MOD4 x 30° helical), the size of pinion selected, the length of stroke and the desired life (total travel in km). The table below details the driving force in N for all combinations of parts and for a useful range of stroke lengths and design lives. All figures assume ideal lubrication and pinion contact conditions, and that all movement is for the full stroke indicated. It is recommended that a safety factor be applied when selecting rack and pinion components. This table is suitable for initial selection of parts, but please contact Bishop-Wisecarver if you require a specific calculation tailored for your application.

Rack and Pinion Combination	Stroke Length = 1m			Stroke Length = 4m			Stroke Length = 16m		
	Expected Life Of Rack & Pinion			Expected Life Of Rack & Pinion			Expected Life Of Rack & Pinion		
	1,000km	5,000km	25,000km	1,000km	5,000km	25,000km	1,000km	5,000km	25,000km
Mod2.5 & 20 tooth pinion	2,200	1,700	1,200	3,700	2,500	1,800	3,700	3,600	2,500
Mod2.5 helical & 20 tooth pinion	3,300	3,000	2,500	4,300	3,500	3,100	4,300	4,100	3,500
Mod3 & 20 tooth pinion	3,400	3,100	2,500	4,400	3,600	3,200	4,400	4,300	3,600
Mod4 helical & 20 tooth pinion	6,700	5,200	3,700	11,800	8,000	5,800	11,900	11,000	8,200
Mod4 helical & 24 tooth pinion	7,500	5,800	5,300	12,600	9,200	6,600	12,700	12,700	8,300
Mod5 & 18 tooth pinion	4,700	3,900	2,700	8,500	5,700	4,100	8,500	8,500	5,800
Mod5 & 24 tooth pinion	5,800	4,700	3,300	10,900	7,400	5,300	11,000	11,000	7,500

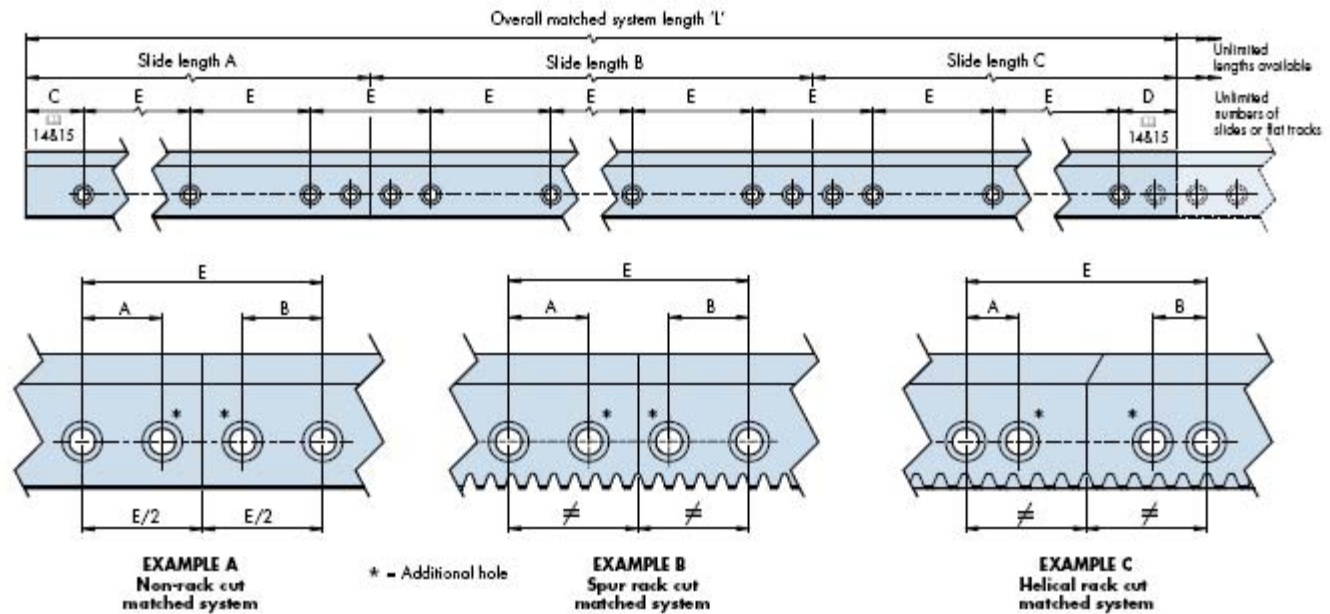
## Matched Systems

Slides or flat tracks can be ordered as matched sets to achieve any length. This is useful not only for achieving very long lengths but also for multiple short lengths to enable replacement of a damaged section.

**For standard matched system requirements,** Bishop-Wisecarver will supply a number of slides or flat track lengths to achieve the overall length required with the minimum number of joints. A continuous hole pitch will be maintained along the entire length of the matched system, and an additional hole will be provided either side of the joint for security and alignment. For plain, non-rack cut matched systems, the joints will be central between mounting holes (see example A). For rack cut systems, the joint position between teeth may not coincide with the center position between holes, and therefore could be up to one tooth pitch offset either side (see examples B & C).

**Where specific rack cut lengths or multiple identical rack cut lengths are required,** these must be ordered to a factor of the tooth pitch. Special hole positions may be required.

In all matched systems the details are recorded to enable the replacement of any individual slide or track.



	V Slides			Flat Tracks														
	Non-Rack	Spur Rack	Helical Rack	.HSS25.		.HSS33.		.HSD25.		.HTS25.		.HTS33.		.HTD25.				
	Non-Rack	Spur Rack	Helical Rack	Non-Rack	Spur Rack	Helical Rack	Non-Rack	Spur Rack	Helical Rack	Non-Rack	Spur Rack	Helical Rack	Non-Rack	Spur Rack	Helical Rack			
A	30	20	40	30	30	30	30	20	40	30	30	30	30	30	30			
B	30	20	40	30	30	30	30	20	40	30	30	30	30	30	30			
E	90			120			90			90			120			90		

For best running quality when using single edge slides or flat tracks in parallel, it is advisable to offset the joints so they do not coincide. It is also important to ensure that slides and tracks overlap any joints in the back plates or beams where these have been supplied in joined condition for long length requirements. Such applications should be discussed with Bishop-Wisecarver.

For further information on matched systems and installation details, please refer to [www.bwc.com/products/hds.html](http://www.bwc.com/products/hds.html).

**IMPORTANT:** All matched system requirements should be referred to Bishop-Wisecarver's technical department.

### Ordering Details

#### Standard matched systems (longer than 4046mm):

State 'L' to the required overall length according to the slide and flat track ordering details 15.

#### Specific or identical length matched systems:

State the overall length of the matched slide or track required and the individual quantity and lengths of which it is comprised, according to ordering details 15.

Example 1: 1 x **matched** P HSS25 L7826 NK R C43 D43 comprising 4 x P HSS25 L1956.5 NK R

**Note:** For rack cut slides and tracks, Bishop-Wisecarver will determine the C&D dimensions to suit the rack pitch across the joints.

Example 2: 1 x **matched** P HSS25 L5576 C43 D43 comprising;  
1 x P HSS25 L3688 C43 D45 + 1 x P HSS25 L1888 C45 D43

# Mix & Match Component Compatibility

		✓ = Preferred Choice      ✓ = Compatible      ✗ = Not Compatible										
		Part Number	..HSS25NK...	..HSS33NK...	..HSS25...	..HSS33...	..HTS25NK...	..HTS33NK...	..HTS25...	..HTS33...	..HSD25...	..HTD25...
V Bearings		.HJR64...	✓	✓	✓	✓	✗	✗	✗	✗	✓	✗
		.HJR95...	✓	✓	✓	✓	✗	✗	✗	✗	✓	✗
		.HJR120...	✓	✓	✓	✓	✗	✗	✗	✗	✓	✗
		.HJR128...	✗	✓	✓	✓	✗	✗	✗	✗	✗	✗
		.HJR150...	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗
Track Rollers		.HRN58...	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>1</sup>	✓	✓	✓	✓	✗	✓
		.HRR58...	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>1</sup>	✓	✓	✓	✓	✗	✓
		.HRR89...	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>1</sup>	✓	✓	✓	✓	✗	✓
		.HRR122...	✗	✓ <sup>1</sup>	✗	✓ <sup>1</sup>	✓	✓	✓	✓	✗	✓
		.HRR144...	✗	✓ <sup>1</sup>	✗	✓ <sup>1</sup>	✓	✓	✓	✓	✗	✓
Back Plate	   	HLN25..	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗
		HLN33..	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗
		HHN25..	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗
		HHN33..	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗
		HLW25..	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
Construction Beam		HB25C..	✓	✗	✓	✗	✓	✗	✓	✗	✓ <sup>2</sup>	✓ <sup>2</sup>
		HB25..	✓	✗	✓	✗	✓	✗	✓	✗	✓ <sup>2</sup>	✓ <sup>2</sup>
		HB33..	✓	✓	✓	✓	✓	✓	✓	✓	✓ <sup>2</sup>	✓ <sup>2</sup>
Lubricator		HDLB25R	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>1</sup>	✓	✓	✓	✓	✗	✓
		HDLB33R	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>1</sup>	✓ <sup>1</sup>	✓	✓	✓	✓	✗	✓
		HDLB33RX	✗	✓ <sup>1</sup>	✗	✓ <sup>1</sup>	✗	✓	✗	✓	✓	✗
		HDLB25S	✓	✗	✓	✗	✗	✗	✗	✗	✓	✗
		HDLB33S	✓	✓	✓	✓	✗	✗	✗	✗	✓	✗
		HDLB33SX	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗

		V Bearings					Track Rollers				
		Part Number	.HJR64...	.HJR95...	.HJR120...	.HJR128...	.HJR150...	.HRR58...	.HRR89...	.HRR122...	.HRR144...
Lubricator		HDLB25J	✓	✓	✓ <sup>3</sup>	✓ <sup>3</sup>	✓ <sup>3</sup>	✗	✗	✗	✗
		HDLB33J	✓ <sup>3</sup>	✓ <sup>3</sup>	✓	✓	✓ <sup>3</sup>	✗	✗	✗	✗
		HDLB33JX	✗	✗	✗	✗	✓	✗	✗	✗	✗
		HDLB25R	✗	✗	✗	✗	✗	✓	✓	✓ <sup>3</sup>	✓ <sup>3</sup>
		HDLB33R	✗	✗	✗	✗	✗	✓ <sup>3</sup>	✓ <sup>3</sup>	✓	✓ <sup>3</sup>
		HDLB33RX	✗	✗	✗	✗	✗	✗	✗	✗	✓
		HDLB25S	✓	✓	✓ <sup>3</sup>	✓ <sup>3</sup>	✓ <sup>3</sup>	✗	✗	✗	✗
		HDLB33S	✓ <sup>3</sup>	✓ <sup>3</sup>	✓	✓	✓ <sup>3</sup>	✗	✗	✗	✗
		HDLB33SX	✗	✗	✗	✗	✓	✗	✗	✗	✗


### Notes:

- Track rollers, roller cap wipers and roller lubricators are compatible with single edge V slides when used on the back face of the slide.
- Double edge V slides & flat tracks can only be fitted to the construction beams by using the HLW25 or HHW25 back plate and T-nuts 25.
- Allowances for differences in mounting heights will be required. Please refer to the relevant component pages for details.




# Mix & Match Component Compatibility


**Lubrication Devices Mix & Match**




CW 64/95  
CW 120/128/150



HDLB25/33S  
HDLB33SX




CW 58/89  
CW 122/144




HDLB25/33R  
HDLB33RX






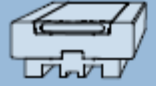
**V Bearings**



**Track Rollers**





x = Not Compatible



		Part Number	.HJR64...	.HJR95...	.HJR120...	.HJR128...	.HJR150...	.HRR58..	.HRR89..	.HRR122..	.HRR144..	
<b>V Slides &amp; Back Plates</b>		.HSS25.. + .HLN25..	HDLB25S or CW64	HDLB25S or CW95	HDLB33S	x	x	HDLB25R or CW58	HDLB25R or CW89	HDLB33R	x	
		.HSS33.. + .HLN33..	HDLB25S	HDLB25S	HDLB33S	HDLB33S	HDLB33SX	HDLB25R or CW58	HDLB25R or CW89	HDLB33R	HDLB33RX	
		.HSS25.. + .HHN25..	HDLB25S or CW64	HDLB25S or CW95	HDLB33S or CW120	x	x	HDLB25R	HDLB25R	x	x	
		.HSS33.. + .HHN33..	HDLB25S	HDLB25S	HDLB33S	HDLB33S or CW128	HDLB33SX or CW150	HDLB25R or CW58	HDLB25R or CW89	HDLB33R	HDLB33RX	
		.HSD25.. + .HLW25..	HDLB25S or CW64	HDLB25S or CW95	HDLB33S	x	x	x	x	x	x	
		.HSD25.. + .HHW25..	HDLB25S or CW64	HDLB25S or CW95	HDLB33S or CW120	x	x	x	x	x	x	
	<b>Flat Tracks &amp; Back Plates</b>		.HTS25.. + .HLN25..						HDLB25R or CW58	HDLB25R or CW89	HDLB33R	x
			.HTS33.. + .HLN33..						HDLB25R or CW58	HDLB25R or CW89	HDLB33R	HDLB33RX
		.HTS25.. + .HHN25..						HDLB25R or CW58	HDLB25R or CW89	HDLB33R or CW122 <sup>2</sup>	x	
		.HTS33.. + .HHN33..						HDLB25R or CW58	HDLB25R or CW89	HDLB33R or CW122 <sup>2</sup>	HDLB33RX or CW144 <sup>3</sup>	
		.HTD25.. + .HLW25..						HDLB25R or CW58	HDLB25R or CW89	HDLB33R	x	
		.HTD25.. + .HHW25..						HDLB25R or CW58	HDLB25R or CW89	HDLB33R or CW122	x	

**Notes:**



- Track rollers, roller cap wipers and roller lubricators are only compatible with single edge V slides when used on the back face of the slide.
- Roller cap wiper CW122 is only compatible with HTS25 + HHN25 and HTS33 + HHN33 when running on the front face of the flat track.
- Roller cap wiper CW144 is only compatible with HTS33 + HHN33 when running on the front face of the flat track.

Indicates back face of HSS25/33 slide






Indicates front face of HTS25 flat track

Indicates front face of HTS33 flat track

## Installation

This page covers general installation of V bearings  and track roller systems .

### V Slides and Flat Tracks (Without Back Plates)

For optimum performance and accuracy, slides and tracks should be mounted on a flat surface. Single edge V slides and single edge flat tracks should be set parallel in a system, either by clamping the back faces against parallel registers or by locating the keyways onto dowel pins or purpose made key sections. Double edge V slides and wide flat tracks may be located in a similar manner utilizing the keyway if precise straightness or positional location is required.

### V Slides and Flat Tracks (With Back Plates)

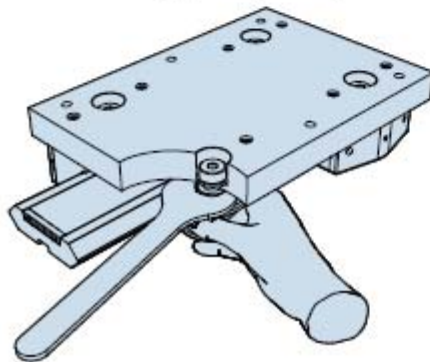
Installation of slides or tracks mounted on back plates is similar to the above procedure. Either the edge of the back plate itself or the keyway can be utilized to provide a datum reference. If the edge of the back plate is used, it is important to ensure that the depth of register affords running clearance for the V bearings, cap wipers and bearing blocks. It is advisable to set the assembled elements against the loaded side of the keys/dowels in order to overcome any slight clearances.

Customers mounting single edge V slides or single edge flat tracks in parallel are recommended to specify the jacking screw alignment facility available for use both with and without the construction beam (□ 17 for installation details). Customers may also specify the location T-nut HTN25-L for locating assembled elements to construction beams. Location T-nuts should be used in only one of the two large keyways in the wide plate HLW25.

### Drilling (V slides and Flat Tracks)

Holes in the mounting surface should be drilled using the slide or track as a template unless an accurate means of pre-drilling is available.

### V Bearings/Cap Wipers and Track Rollers (See figure below left)



The mounting surfaces for the V bearings should be flat and in the same plane. The bearing elements should be assembled to the mounting surface or carriage with the concentric bearings on the side taking the greatest load. In the case of more than two bearing assemblies engaged on the datum (concentric) side of the slide or track, all bearing assemblies between the two outermost concentric assemblies should be eccentric to allow precise engagement and sharing of the load. All bearings on the opposite side should be eccentric.

The concentric bearings should be fully tightened and the eccentrics semi-tightened, then adjusted to their outermost position. The complete carriage assembly, minus any additional components, should be counterbalanced through its center of gravity by means of a length of rope. It is recommended that a lifting eye in the appropriate position be provided for this purpose.

With the carriage in its counterbalanced condition, the eccentric bearings opposite the concentrics should be rotated using the adjusting wrench until engaged with the slide or track such that there is no detectable play and minimal preload. The bearings should be checked for preload by rotating between forefinger and thumb such that the bearing skids against the slide or track without application of undue force. The adjusted bearings should then be fully tightened and checked again for preload. The process as described should be repeated for any pairs of eccentric bearings fitted between the outermost ones. The carriage assembly may then be checked for free running by pushing back and forth along the slide.

The carriage should be withdrawn from the slide to enable bearing cap wipers to be fitted if required. (Roller cap wipers can be fitted without the necessity to withdraw the carriage). The carriage should be returned to the slide with cap wipers adjusted to achieve maximum compression of the felt wipers without the slide contacting the plastic body. The carriage assembly should then be checked for running quality in the non-counterbalanced condition.

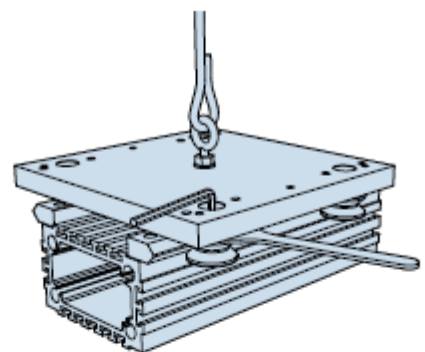
On completion of adjustment, the chamber of the small series bearing cap wipers only should be charged with grease □ 49.

**Important:** Additional preload imposed on the system by incorrect adjustment or misalignment will reduce the load capacity and life of the system. Customers are advised to make allowances for this.

### Bearing Adjustment and Carriage Removal

Bearing adjustment can take place with cap wipers in place and without the need to remove the carriage from the slide or track. Remove the front cover from the cap wiper body to expose the eccentric bearings. This will allow access for the adjustment wrench. Adjustment for the bearings themselves is as described above. Again, adjustment should take place with the carriage in its counterbalanced state.

Carriage removal can take place without the need to slide the carriage to the end of the slide or track. Remove the front covers from the cap wipers covering the concentric bearings. This will allow access for the adjustment wrench. With the wrench in place, unscrew the bearing stud from the bearing. The bearing can then be removed from the carriage. Remove the cap wiper body and the carriage can now be lifted clear from the slide. Replacement is the reversal of this procedure. The advantage of this method is that the eccentric bearings are not affected, and adjustment should not be required.



### 'V' Slides & Flat Tracks

Material and finish: High carbon bearing steel, hardened on running faces. Those areas which are ground have N5 surface finish. Other areas have a chemically blackened finish.

#### Stainless steel version

Material and finish: Special martensitic stainless steel conforming generally to AISI 420 series, ground on all main surfaces to N5. Hardened on running faces.

### Bearings & Track Rollers

Bearings rings, balls & rollers: Carbon-chromium bearing steel AISI 52100, hardened and tempered  
Seals: Nitrile rubber  
Cage: Plastic, metal for ..HJR150.. & ..HRR144..  
Studs: High tensile steel, chemically blackened finish  
Temperature range: -20°C to +120°C

#### Stainless steel version

Bearings rings, balls & rollers: Stainless steel AISI 440C, hardened and tempered  
SS.HJR150.. & SS.HRR144.. contain a steel twin taper roller bearing  
Seals: Nitrile rubber  
Cage: Plastic  
Studs: Stainless steel AISI 303  
Temperature range: -20°C to +120°C

### Carriage Plates & Back Plates

Material: High strength aluminum alloy  
Finish: Clear anodized to 15µm thickness

### Cap Wipers & Lubricators

Material: Body: Impact resistant plastic  
Wipers: Felt  
Fixings: Stainless steel grades AISI 304 or 316  
Temperature range: -20°C to +60°C

Lubricants: Small series bearing cap wipers: } Grease NLGI consistency No. 2  
Large series bearing cap wipers, all roller } Oil 68 cSt or similar. Food  
cap wipers and all lubricators: } compatible lubricants may also  
be used.

### Frictional Resistance for 'V' Slide Systems

Coefficient of friction (without cap wiper or lubricators) = 0.02.  
Cap seals and lubricators add friction as follows:

4 cap wipers per carriage: CW64 or CW95 = 5N  
CW120, CW128 or CW150 = 10N

4 lubricators per carriage: HDLB25 = 2.5N  
HDLB33 = 5N

### Maximum Linear Speeds

HDS2 V slide and flat track system can operate at very high speeds, up to 10m/s in some instances. Speeds are dependent on stroke, duty and environmental conditions. Please contact Bishop-Wisecarver to discuss application requirements. Stated speeds do not apply to rack driven systems.

### Tightening Torques

Please visit our web site [www.bwc.com/products/hds.html](http://www.bwc.com/products/hds.html).

**Bishop-Wisecarver Corporation:** Manufacturer of the original DualVee® guide wheel and industry leader in guided motion technology, and exclusive North and Central American partner and distributor for HepcoMotion products since 1984.

## **BISHOPWISECARVER**®

### **Bishop-Wisecarver**

DualVee® Guide Wheels  
LoPro® Linear Motion System  
MadeWell® Crown Rollers  
MinVee® Linear Slide System  
UtiliTrak® Linear Motion Guide



### **HepcoMotion**®

DAPDU2 Double Acting Profile Driven Unit  
DLS Driven Linear System  
DTS Driven Track System  
GV3 Linear Guidance and Transmission System  
HDCB Heavy Duty Compact Beam  
HDCS Heavy Duty Compact Screw  
HDLS Heavy Duty Driven Linear System  
HDRT Heavy Duty Ring Slides and Track System  
HDS Heavy Duty Slide System  
MHD Heavy Duty Track Roller Guidance System  
MCS Machine Construction System  
PDU2 Profile Driven Unit  
PRT Precision Ring and Track System  
PSD120 Profile Screw Driven Unit  
SBD Sealed Belt Drive  
Simple-Select®  
SL2 Stainless Steel Based Slide System

### **3D CAD DRAWINGS**

Download 3D CAD files for our complete product line at [www.bwc.com/3dcad.php](http://www.bwc.com/3dcad.php).

### **GOT A TOUGH APPLICATION CHALLENGE?**

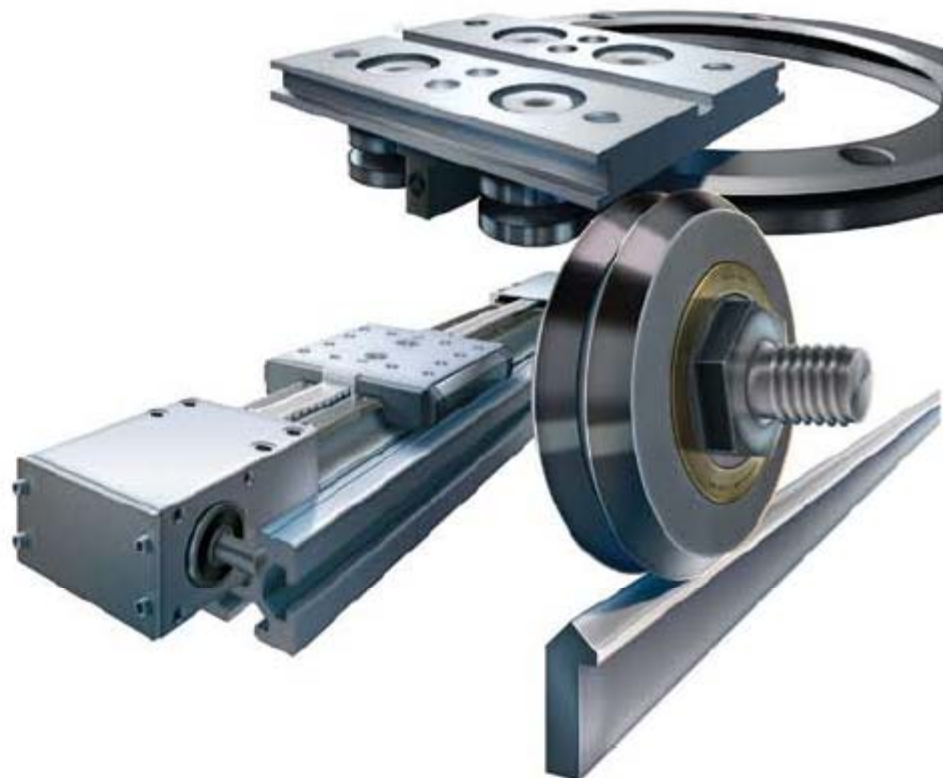
Ask Bud at [www.bwc.com/blog/?cat=11](http://www.bwc.com/blog/?cat=11).

### **PRODUCT ORDERS**

Please call Bishop-Wisecarver with your specific application requirements. Our technical staff is available to assist with your custom solution.

Bishop-Wisecarver provides a written three year limited warranty on our Swiss bearings and a written one year limited warranty on all other products, assuring the customer that its products conform to published specifications and are free from defects in material or workmanship.

Complete terms and conditions and warranty information is available at [www.bwc.com/about\\_conditions.vp.html](http://www.bwc.com/about_conditions.vp.html).



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