Belt Driven Tables

HLE-RB Series Features

HLE-RB Series Belt Driven Linear Modules

Features

- Standard travel up to 7.9 meters*
- Load Capacities up to 600 kg
- ±0.2 mm positional repeatability
- Timing belt and pulley drive mechanism for fast, accurate positioning
- Roller wheel bearings for smooth high speed linear motion
- IP30 strip seal

*Longer travels available with splice kits.

The HLE-RB linear modules are ideal as single axis products or as components for high speed multi-axis gantries. With thousands of units in operation worldwide the HLEs are proven performers offering long life and trouble-free operation.

Construction

The HLE Linear Module consists of a lightweight carriage which can be precisely positioned within an extruded aluminum housing by a timing belt and pulley drive system. The housing, constructed from extruded aluminum with a square cross sectional geometry, demonstrates excellent deflection characteristics.

The protective anolite coating provides durability as well as an attractive silver appearance. It includes T-slots along its entire length for flexible mounting. The drive mechanism is a zero backlash steel reinforced timing belt. The tension station, conveniently located at the end of the unit provides for quick and easy belt adjustment. The drive station is designed to accept planetary gear reducers as well as a wide variety of servo and stepper motors. The bearing system for the RB models is comprised of three rows of roller wheels integral to the carriage which are guided by extruded tracks within the housing.



Proven Technology

Proven in numerous applications, the HLE-RB series offers the following advantages:

- Low running friction
- Low particle generation (clean room suitability to class 100)
- Low wear
- Low maintenance
- Quiet operation
- High efficiency
- Long service life
- High dynamic performance due to low-mass, play-free wheels
- Minimal preventative maintenance required
- T-slots integrated on all sides of the profile for mounting attachments or for use as a cable duct
- Timing belts can be replaced without removing load attachment plate
- Multiple configuration options due to T-slots available on both the profile and load plate



Magnetic strips recessed in the profile ensure that the strip seal is fully sealed with the profile.

Polymer inlays serve as a bearing surface for the strip seal.

The timing belt is attached to the carriage with a serrated clamp mechanism which assures a strong connection and makes belt replacement easy without the need to remove payload.



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As part of advanced, cost-effective construction of machines and handling systems:

- Materials handling: palletizing, depalletizing, feeding, part removal
- Cleanroom technology: wafer transport, wafer coating
- Warehouse technology: parts picking, storage and retrieval
- Machine tool automation: workpiece loading and unloading, tool changing
- Construction: formwork, placing reinforcing steel bars in concrete
- Process engineering: painting, coating, bonding
- Testing technology: guiding ultrasonic sensors, laboratory equipment
- Textile machinery: crosscutting, slitting and stacking, quilting, seam stitching

Optional Features

- Direct mounting for planetary gear reducers
- Adjustable "end of travel" limit switches and "home" position sensor
- Clean room preparation option
- Cable carrier systems
- Performance matched Parker servo systems
- Structural components for vertical and multi-axis mounting
- Toe clamps and hardware for fast and easy mounting
- External bumpers
- Link shafts and support bearings for dual axis units
- Splice plates for extending travels beyond length available in a single profile

See pages 272-276 for available options and accessories.

Housing

Lightweight and self-supporting aluminum profiles are offered in three sizes:

HLE60: 60 x 60 mm HLE100: 100 x 100 mm HLE150: 150 x 150 mm

T-slots are provided for mounting the linear unit itself, applying additional components and accessories, or combining multiple HLEs. T-slots with plastic covers provide a simple cable conduit.

Load Attachment Plate

Load attachment plates are available for every type of carriage. With integral T-slots or tapped with holes in a standard mounting pattern, they allow easy mounting of your load to the carriage of the HLE. Multiple HLEs can easily be mounted together by using standard clamping profiles. Tripping plates are mounted to the side of the load attachment plate to activate home or end of travel switches mounted to the side of the HLE. For special applications, the load plates can be designed to customer specified requirements.

Drive Station

Rigid cast housing with standard flanges for a variety of gearboxes. The drive stations are designed to accept planetary and worm gear reducers or provide different shaft outputs for driving the HLE.

Drive Belt

A zero backlash, steel reinforced timing belt provides high speed, high acceleration and good bidirectional repeatability.

Carriage

Roller bearing wheels are installed on three sides of the carriage to provide smooth linear motion and support. The wheels are positioned to evenly distribute the load across the length of the carriage. Eccentric bearing wheel bushings are adjusted to eliminate play on all sides of the carriage. Due to a low coefficient of friction, the carriage design provides a high mechanical efficiency and long service life. The carriages are available in standard and extended lengths. Special carriage lengths and linear units with multiple carriages are available for custom applications.

Roller Bearing

60

Each wheel consists of a lubricated and sealed radial ball bearing to reduce friction and maintenance. The bearing is enclosed within a tough polyamide tread to reduce noise and provide long service life.

IP30 Strip Seal

Magnetically attached stainless steel seal strip (not shown) provides environmental protection to interior components.

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Tensioning Station

tensioning bolts allow

external adjustment of

"Easy access"

belt tension.

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HLE-RB Series Specifications

Characteristic	Units	HLE	60-RB	HLE1	00-RB	HLE1	50-RB
Unit Weight (basic unit without stroke) Standard Carriage, NL Extended Carriage, VL	kg (lb.) kg (lb.)	2.28 3.98	(5.03) (8.77)	12.70 15.80	(28.00) (34.84)	31.20 38.50	(68.80) (84.89)
Carriage Weight Standard Carriage, NL Extended Carriage, VL Weight per meter of additional length	kg. (lb) kg. (lb) kg/m (lb/ft)	0.8 1.3 3.62	(1.76) (2.87) (2.43)	2.80 4.40 10.00	(6.17) (9.70) (6.72)	7.30 11.50 21.10	(16.10) (25.36) (14.18)
Moment of Inertia (related to the drive shaft) Standard Carriage, NL Extended Carriage, VL	kg-cm² (lb-in²) kg-cm² (lb-in²)	3.07 4.81	(1.05) (1.64)	24.60 36.40	(8.41) (12.45)	123.30 183.60	(42.17) (62.79)
Travel and Speed Maximum Speed ⁽¹⁾ Maximum Acceleration ⁽¹⁾ Maximum Travel ⁽²⁾ —standard carriage, NL Maximum Travel ⁽²⁾ —extended carriage, VL	m/s (in/s) m/s² (in/s²) m (in) m (in)	5 10 4.0 3.8	(120) (393) (160) (149)	5 10 6.2 6.0	(200) (393) (244) (238)	5 10 7.9 7.7	(200) (393) (311) (305)
Geometric Data Cross Section, Square Moment of Inertia Ix Moment of Inertia Iy Moment of Elasticity	mm (in) cm ⁴ (in ⁴) cm ⁴ (in ⁴) N/mm ² (lb/in ²)	57.1 55.8 56.2 0.72 x 10⁵	(2.25) (1.34) (1.35) (0.1044 x 10 ⁸)	100.0 383.0 431.0 0.72 x 10 ⁵	(3.94) (9.20) (10.35) (0.1044 x 10 ⁸)	150.0 1940.0 2147.0 0.72 x 10 ⁵	(5.91) (46.61) (51.58) (01044 x 10 ⁸)
Pulley Data, Torques, Forces Travel Distance per Revolution Pulley Diameter Maximum Drive Torque ⁽³⁾ Maximum Belt Traction ⁽³⁾ (effective load) Repeatability ⁽⁴⁾	mm/rev (in/rev) mm (in) Nm (lb-in) N (lb) mm (in)	125 39.8 8.87 ±0.2	(4.92) (1.57) (78.5) (±0.008)	170 54.1 40.0 ±0.2	(6.69) (2.13) (354.0) (±0.008)	240 76.4 108.0 ±0.2	(9.45) (3.01) (955.9) (±0.008)

For the following deviations from the above standards, please contact Parker engineering: (1) Greater speeds and accelerations may be achieved.

(2) Splicing possible for longer travel distances. This may cause reductions in effective load, drive torque, speed, acceleration, and repeatability. Consult factory for strip seal availability on spliced units.

(3) Increased timing belt tension required.

(4) Nominal value - component dependent. For improved repeatability consult factory.

Linear Actuator Size Comparison











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Load-Bearing Capacity of Carriage and Timing Belt

Forces and Moment Loads

The forces and moments that the carriage is capable of transferring are speed-dependent. The curves shown in the graphs apply to a standard carriage (S). With the extended carriage (E), all the values apart from Fx (load-bearing capacity of timing belt) can be doubled if the load is applied equally to both halves of the carriage or distributed uniformly along its entire length.

The curves show the maximum load-bearing capacity of a carriage in one direction of force or torque. If several loads are applied in different directions, the values given by the curves must be derated, i.e. the load or speed should be reduced if necessary.



"DimAxes" software is available for determination of precise carriage loading.

Visit www.parkermotion.com to request a Gantry Robot CD.

Load-Bearing Capacity Timing Belt (Fx)

HLE60-RB

	Transferrable Thrust Force (n)								
	Nominal Belt Tension	Maximum Belt Tension							
Drive Option	(81,000 km life)	(46,000 km life)							
Supported Pulley (SP19 - SP30)	500	-							

HLE100-RB

	Transferrable Thrust Force (n)								
	Nominal Belt Tension	Maximum Belt Tension							
Drive Option	(81,000 km life)	(46,000 km life)							
GTN115	925	1115							
GTN090, PEN115	675	900							
PEN090	500	665							

HLE150-RB

	Transferrable Thrust Force (
	Nominal Belt Tension	Maximum Belt Tension							
Drive Option	(85,000 km life)	(37,000 km life)							
GTN142	1700	2235							
GTN115	1515	2015							
PEN115	675	900							







HLE-RB Series – Force and Moment Loads







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HLE-RB Deflection Characteristics

The HLE deflection curves can be used for determining the deflection based on the profile length and the application load weight. Applications requiring high acceleration forces can place a severe strain on the system stability. In these cases, a solid substructure may be required with the HLE product being supported at frequent intervals.

These deflection curves illustrate the deflection δ , based on the HLE profile being simply supported at both ends. The graphs take into consideration the self deflection due to the weight of the profile, along with the load to be transported. The maximum deflection cannot be exceeded. If the maximum deflection is exceeded based on your application parameters, then additional supports are required. Alternatively, the next larger profile size may be considered. For deflection formulas and calculations, please refer to the Technical Information Library found on our web site www.parkermotion.com



F = Force N

- L = Unsupported length mm
- δ = Deflection mm



Belt Driv Tables

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Dual Unit Axis Considerations

When two parallel linear modules are required to form a single axis, the span or distance between each unit determines which type of shaft connection is required. In some cases, a link shaft support bearing might also be required.

The link shaft bearing is used to support the linking shaft of an HLE dual axis when there is a large center to center distance. This bearing must be used if the critical speed is exceeded with the dual-axis link shaft.

Figure A

	"A" Spa	n (mm)
Series	(min.)	(max.)
HLE100	105	225
HLE150	155	260

Figure B



Figure C

			
		"A" Spa	ın (mm)
T T	Series	(min.)	(max.)
	HLE60	300	1500
	HLE100	501	_
	HLE150	501	_
A Contraction of the second se			



n

0

1000

Shaft rpm

750

v

1250

1500

1750

2000

*HLE60 Critical speed is above charted 2000 RPM.

500

2

1

0

0

250



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Belt Driven Tables





HLE60-RB Drive with Motor Block



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HLE60-RB Dimensions



HLE60-RB Idler

Dimensions (mm)









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H 85 -150 -

HLE100-RB Drive

Dimensions (mm)



HLE100-RB Idler



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HLE-RB Series Dimensions



HLE150-RB Drive

Dimensions (mm)



Drive Shaft Option

WRO Shaft on Right WLO Shaft on Left WBO Shaft on Both Sides



HLE150-RB Idler





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		0	2	3	4	5	6	0	8	9	10	11	12	13
	Order Example:	HLE060	RB	NL	Е	1000	DA0000	MBL	SP5	G1205	H1	K24	ZA	LH0
1	Series HLE060					(B Drive S SP19	Station Drive	Interfac Housing	ce For PV60)-FN			
2	Bearing Type RB						SP20 SP21 SP22	Idler U No M Motor	Jnit otor Bloo Block N	ck JEMA 23 v	with 0.	375" B	ore Co	ouplina
3	CarriageTypeNLStandard CarriageVLExtended Carriage						SP23 SP24 SP25	Motor Motor Motor	Block N Block N Block N	JEMA 34 JEMA 34 JEMA 34	with 0. with 0. with 0.	25" Bo 375" B 50" Bo	re Cou ore Co re Cou	ipling pupling ipling
4	Unit Type M Idler D Dual Axis Unit E Single Axis Unit						SP28 SP29 SP30	Motor Motor Motor	⁻ Block N ⁻ Block N ⁻ Block N	JEMA 23 JEMA 34 v Jeo 70 wit	withou withou h 11.(ut Coup t Coup) mm B	oling ling ore Cc	oupling
5	Travel Length nnnn nnnn=mm (3000 m 2900 mm max for V	nm max for NI VL carriage)	_carria	ge;		(Gearbo G0 G1 G1203	No Ge Custc PV60	on* earbox (f mer Sup Gearhea	Requires N oplied Gea ad 3:1 Rat	ИBR, I arhead io	MBL, N *	IRW, M	1LVV)
6	Drive Shaft Option - Cent DA0000 No Drive Shaft - Sii DAnnnn (nnn=mm) Dual A: (200 mm min; 1500 DCnnnn (nnn=mm) Dual A: to Center (200 mm	ter to Centen ngle Axis or lo xis Center to 0 mm max) kis with Cover min; 1500 mn	er dler Un Center red Lin n max	iit - k Shaft)	: Cen	ter	G1205 G1210 G1215 G1225 *Contact	PV60 PV60 PV60 PV60 factory fo	Gearhea Gearhea Gearhea Gearhea or approv	ad 5:1 Rat ad 10:1 Ra ad 15:1 Ra ad 25:1 Ra val of any al	tio atio atio atio ternativ	ve gearb	ox infor	mation.
0	Shaft Configuration OpticWOONo Shaft, Idler UnitAROGearhead RightALOGearhead LeftARWGearhead Right ShALWGearhead Left Sha	ons haft Left ft Right		,		Ċ	Mount H1 H2 H3 H4	i ng Orie Carria Carria Carria Carria	ge Up ge Dow ge on S ge on S	n ide, Drive ide, Drive	Statio Statio	n Up n Dowr	1	
	ALWGearhead Left Shaft RightWLOShaft LeftWROShaft RightWBODouble ShaftMBLMotor Block LeftMBRMotor Block RightMLWMotor Block Left, Shaft RightMRWMotor Block Right, Shaft LeftDALDouble Axis Gearhead, Drive LeftDARDouble Axis, Motor Block LeftDMLDouble Axis, Motor Block LeftDMRDouble Axis, Motor Block Left						 Motor K00 K21 K22 K23 K24 K25 K26 K27 K28 	Kit Opt No M Motor Motor Motor Motor Motor Motor	ion Kit LV23 Kit BE2 Kit SM2 Kit SM2 Kit LV3 Kit BE3 Kit RS3 Kit NO7	3, HV23, (3X to PV6 23, SE23 t 34, HV34 4, NO34X, 34, ES34 t 70, JO70 t 360 to PV	DS23, 50 : o PV6 . JO34 o PV6 : o PV6	ES23, 50 X, TS31 0 50	VS23 t	to PV60 2 to PV60
	WRO WLO WBO ARO ALO A		R MBL			(Strip S ZA ZB Limit/F LH0 	eal Opt Unit w Unit w Iome S No Lir	tion vith Strip vithout S witch (mit Switc	Seal (IP3) Strip Seal Option Ch Assemi	O) Dly			
	DAR DAL						LH1 LH2 LH3 LH4	Three Per S Two N Per S Three Three	Mechar witch) Mechanic witch) NPN Pr PNP Pr	nical Switch cal Switch ox Switch ox Switch	hes (1 es (1 N es, 10 es, 10	NO & 1 NO & 1 -30 VD -30 VD	1 NC C NC Cc C	Contact

Belt Driven Tables

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Belt Driven Tables

HLE100-RB Series Ordering Information

Fill in an order code from each of the numbered fields to create a complete model order code.

		0	2	3	4	5	6	0	8	0	10	1	12	13
	Order Example:	HLE100	RB	NL	Е	1000	DA0000	ARO	SP7	G2-05	H2	ZB	K6	LH0
0	Series HLE100					(8 Drive S SP0 SP1	Station Idler o	Interfa or Shaft (ce Option	GTR-(190		
2	<mark>Bearing Type</mark> RB						SP2 SP3 SP4	Drive Motor Motor	Housing Block - Block -	for GTN / NEMA 34 NEMA 34	GTR with (/ PEN / 0.500 ii 0.375 ii	/ PER- n. coup n. coup	115 bling bling
3	Carriage TypeNLStandard CarriageVLExtended Carriage						SP5 SP6 SP7 SP8	Motor Motor Motor Motor	Block - Block - Block - Block -	NEMA 34 with coup NEMA 42 NEMA 42	witho ling fo with (witho	ut cou or JO92 0.625 ii out cou	oling 3 direct n. coup oling	t drive bling
4	Unit TypeMIdlerDDual Axis UnitETiming Belt Drive, N	ominal Thrus	st, Max	kimum	Life	(SP9 Gearbo G0-00 G2-nn	Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive Drive	Housing on earbox 090**	for PEN /	PER-	090		
5	Travel Length nnnn Specified travel in m	nm (nnnn = n	nm)				G3-nn G4-nn G5-nn	PER-0 PEN-1 PER-1)90** 115** 115** 115**					
6	Drive Shaft Option - Cent DA0000 No Drive Shaft - Sin DAnnnn (nnnn=mm)	er to Cente gle Axis or Ic	e r dler Un	iit			G5-nn G7-nn G8-nn G9-nn *Single s	GTN-0 GTR-0 GTN- ⁻ GTR- ⁻ tage ratio	090 090* 115* 115* s: 3. 5. 8	. 10: Dual s	tage ra	tios: 12	. 15. 16	. 20. 25
0	Shaft Configuration OptionWOONo Shaft, Idler UnitWLOShaft LeftWROShaft RightWBODouble ShaftALOReducer LeftAROReducer RightALWReducer Left, ShaftALWReducer Left, ShaftALWReducer Right, ShaftALWDouble Axis, Drive DDALDouble Axis, Drive D	Right ft Left .eft				(**Single s Mounti H1 H2 H3 H4 Strip S ZA ZB	stage ration ing Orie Carria Carria Carria Carria Carria Carria Unit w Unit w	os: 3, 4, 9 entation ge Up ge Dow ge on S ge on S tion <i>i</i> th Strip <i>i</i> thout S	5, 8; Dual st n ide, Drive s ide, Drive s seal (IP3(strip Seal	age rat Statior Statior))	ios: 9, ⁻ ו Up ו Dowr	12, 15, 1	16, 20, 25
	DAR Double Axis, Drive F MBL Motor Block Left MBR Motor Block Right WOO WLO WRO WBO	Image: HLE100 RB NL R Readard Carriage ended Carriage ended Carriage ended Carriage ended Carriage I Axis Unit ng Belt Drive, Nominal Thrust, Waximum Lift fright bie Shaft - Single Axis or Idler Unit n=mm) Dytion - Center to Center Dytion Shaft - Single Axis or Idler Unit fright bie Shaft ucer Left theight bie Shaft ucer Right, Shaft Left bie Axis, Drive Left bie Axis, Drive Right or Block Left or Block Right Image: MBL AR MBL MBL MBL MBR Image: MBL MBL Image: MBL	W III	(Motor K0 K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 K35 K37 K20 	Kit Opt No ma J034* J070* M105 ES3*, to GT- J034* J090* M105 ES3*, RS42, S106- M145 MPP0 MPP1	ion btor kit , N034*, , N090* * to GT- OEM83 090, PE , N034* , N090* * OEM83 , RE42, 178, S1 92 00 15	BE34*, TS to GT-090 090, PE-09 -*, ZETA8(-090 , BE34*, T -*, ZETA8(S106-205 06-250	;31, TS), PE-C 90 3-*, S8 S3 3-*, S8	632 to ()90)90 33-*, R 33-*, R	GT-090 53* 53*	, PE-090		
		•				(K39 *Single s Limit/F LH0	MPP1 tage ratio Iome S No Lir	15 s: 3, 5, 8 witch (nit Swite	, 10; Dual s Option ch Assemb	tage ra ply	tios: 12	, 15, 16	, 20, 25

- LH1 Three Mechanical Switches, 1 NO and 1 NC contact per switch
- LH2 Two Mechanical Switches, 1 NPN Prox Switch
- **LH3** Three NPN Prox Switches, 10-30 VDC
- LH4 Three PNP Prox Switches, 10-30 VDC

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Fill in an order code from each of the numbered fields to create a complete model order code.

			0	2	3	4	5	6	0	8	9	10	1	12	13
	Order	Example:	HLE150	RB	NL	Ε	1000	DA0000	ARO	SP1	G2-05	H2	ZA	K 7	LH2
1	<mark>Series</mark> HLE150						(B Drive SP0	Station Idler c	Interfa or Shaft	ce Option	15			
2	Bearing Ty RB	уре						SP2 SP9	Drive Drive	Housing Housing	for GTN1 for PEN1	42 15			
3	CarriageNLSVLE	Type tandard Carriag xtended Carriag	le Ie				(Gearbo G0-00 G2-nn G3-nn	ox Opti No Ge PEN- ⁻ PER- ⁻	on earbox 115** 115**					
4	Unit Type M lc E T F T	ller iming Belt Drive iming Belt Drive	e, Nominal Thrue e, Maximum Thr	st, Max ust, No	kimum ominal	Life Life		G4-nn G5-nn G6-nn G7-nn *Single s	GTN- GTR- GTN- GTR- tage ratio	115* 115* 142* 142* s: 3, 5, 8	3, 10; Dual s	stage ra	tios: 12	2, 15, 16	6, 20, 25
5	Travel Ler	ngth						**Single	stage ratio	os: 3, 4,	5, 8; Dual s	tage rat	tios: 9,	12, 15,	16, 20, 28
6	Drive Sha DA0000 N DAnnnn (r	pecified travel in ft Option - Ce lo Drive Shaft - 3 innn=mm)	n mm (nnnn = r enter to Cente Single Axis or lo	nm) er dler Un	iit		(Mount H1 H2 H3 H4 	Mounting OrientationH1Carriage UpH2Carriage DownH3Carriage on Side, Drive Station UpH4Carriage on Side, Drive Station Down						
0	Shaft ConWOONWLOSWROS	figuration Op lo Shaft, Idler Un haft Left haft Right	tions nit				(D Strip S ZA ZB	Seal Opt Unit w Unit w	t ion /ith Strip /ithout S	o Seal (IP3) Strip Seal	0)			
	WBODALORARORALWRARWRDALDDARD	ouble Shaft educer Left educer Right educer Left, Sh educer Right, S ouble Axis, Driv ouble Axis, Driv	aft Right Shaft Left re Left re Right				(Motor K0 K6 K7 K8 K9	Kit Opt No ma J034* 115 J090* M105 ES3*,	ion otor kit , N034* , N090* * to GT- OEM83	, BE34*, T to GT-118 115, PE-1 8-*, ZETA8	5, PE-1 5, PE-1 15 3-*, S8	⁻ S32 to 115 33-*, R	5 GT-1 ⁻ S3* to	15, PE- GT-115,
W		WRO WBO			ARW ∢⊞ ■			K10 K11 K12 K13 *Single s	PE-11 RS42 S106- M145 M145 tage ratio	5 , RE42, -178, S1 to GT-1 to GT-1 s: 3, 5, 8	S106-205 106-250 tc 115, PE-11 42, PE-14 3, 10; Dual s	5 to GT 5 GT-1 15 12 stage ra	-115, F 15, PE tios: 12	PE-115 -115 2, 15, 16	5 5, 20, 25
							(3 Limit/H LH0 LH1 LH2	Home S No Lir Three conta Two N	witch (mit Swite Mechar ct per sv lechanie	Option ch Asseml nical Switc witch cal Switch	bly hes, 1 es. 1 N	NO ar NPN Pr	nd 1 No rox Swi	C
		Щ₽₩₽=₹₽	¶⊫≢¶∐∐					LH3	Three	NPN P	rox Switch	es, 10	-30 VE	DC DC	-

LH4 Three PNP Prox Switches, 10-30 VDC

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Belt Driven Tables