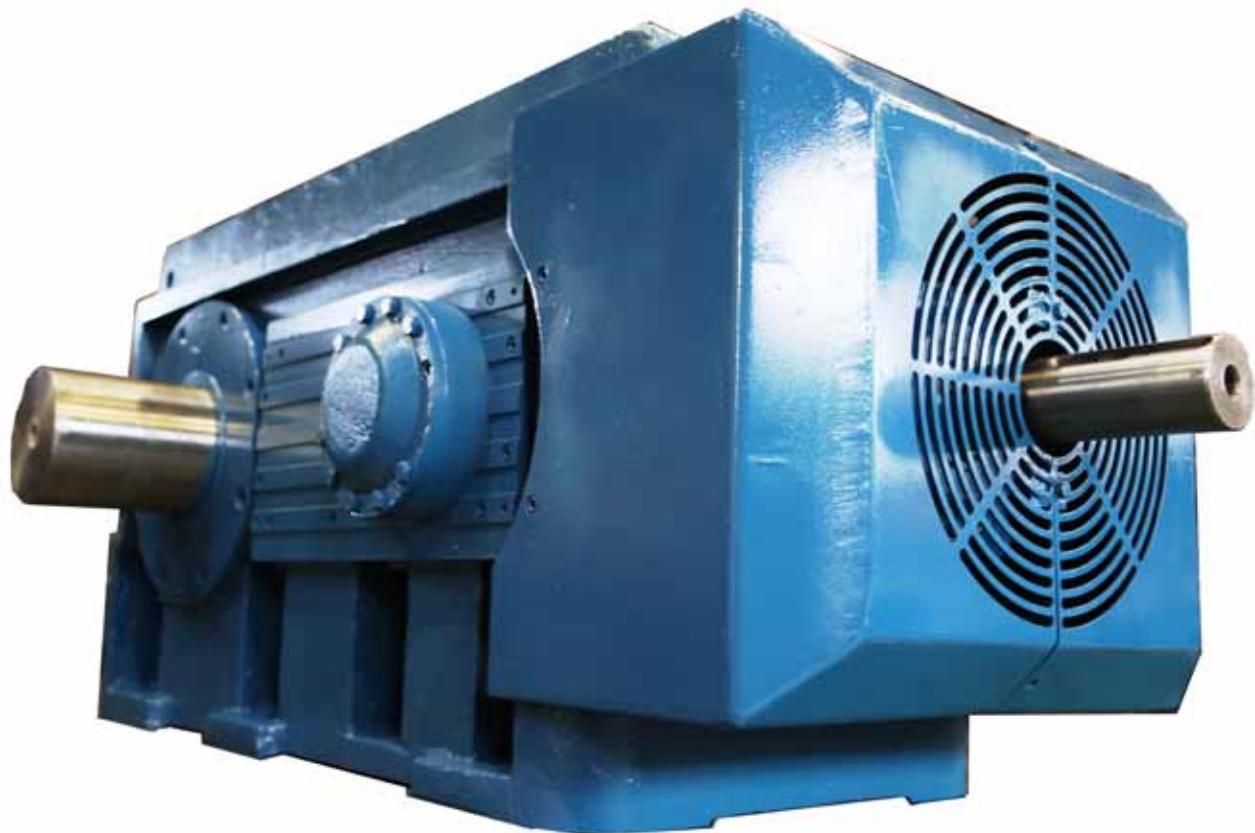


Series L Helical/Bevel Gear Reducers



Technical
20kW to 5000kW

Industrial Gear Units

SERIES L Helical Bevel CONTENTS PAGE

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SERIES L Helical Bevel BACKGROUND

The Series L range of helical and bevel helical gear units are designed to meet the most arduous of power transmission application needs. Reliable and efficient in operation, they provide a cost-effective solution to all our customers' needs. Designed to David Brown Radicon's long established standard of quality these quiet running units provide exceptional levels of performance, versatility and life expectancy to meet the demanding requirements of modern industry.

The Radicon story is above all a constant drive for perfection. It starts more than a century ago and tells of total dedication and commitment to the development of gear technology. Series L is a part of that story.

The David Brown gear organisation was founded in 1860. It produced the first commercial worm gearbox in 1903 and so helped to establish a marketplace it has led ever since.

The organisation rapidly became a master of its craft. Notable credits include the introduction of a patented involute helicoidal worm thread form in 1912, followed later by the development of phosphor bronze materials for wormwheels which have become a standard throughout the industry.

The division got its title in 1933 with the introduction of worm gearbox units with cooling fans and ribbed casings. This brought unprecedented performance in the dissipation of generated heat and it gave rise to the name Radicon; RADiation Induction and CONvection. That name has since become respected in gear circles throughout the world.

The passage of time has seen constant refinements accumulating expertise and scientific progress but the organisation's pioneering spirit remains unchanged as technological barriers are crossed one after another. The development of the Series L helical and bevel helical geared units is another example of David Brown South Africa's superior technical expertise. Series L gear units are available in-line and right-angle versions in single, double, triple and quadruple reduction gear stages having a maximum power capacity exceeding 5,500 kW.

Designed in South Africa for southern hemisphere conditions, the Series L benefits from the "design-for-manufacture" philosophy which ensures optimum product for the applicable and minimum spares requirements. This in turn provides considerable economies of production whilst maintaining the highest standard of component integrity. Featuring carburized, hardened and profile ground helical gears, highly efficient and quiet running characteristics are assured. The gear units are available in a wide range of ratios from 1,22:1 to 1000:1. Units can be offered in horizontal mounting positions or alternatively vertical mounting. Specially designed units are available for cooling tower applications or heavy duty stirrer applications. All units are also available with hollow bores for output shaft mounting. The product is further enhanced by a high power-to-weight ratio and low volume, enabling installation in the most difficult situations.

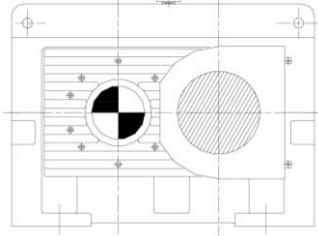
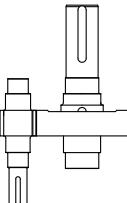
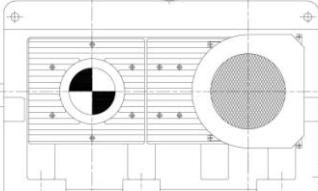
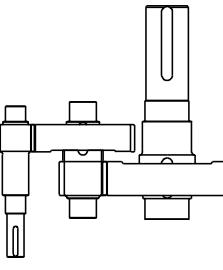
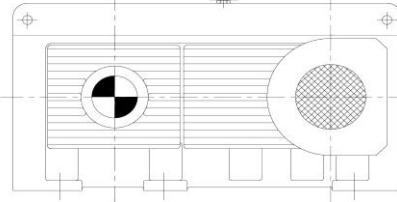
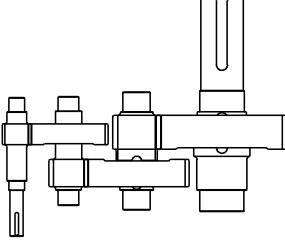
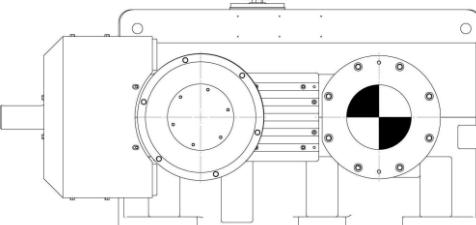
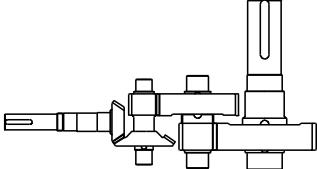
The use of high quality materials also provides assurance of long life and reliability in operation in the most extreme environmental conditions.

SERIES L Helical Bevel GENERAL DESCRIPTION

Series L

Series L gear units are available in both parallel shaft helical gear units and right angled shaft bevel helical units. Series L has a wide range of ratios varying from 1.2:1 to 70.6:1.

For lower gear ratios the Series L range includes Single reduction Parallel Shaft (SPS) gear units. These units are foot mounted. For intermediate ratios the Series L range includes Double reduction Parallel Shaft (DPS) gear units. These units can be either foot or shaft mounted. For higher ratios the Series L range includes Triple reduction Parallel Shaft (TPS) gear units. These units can be either foot or shaft mounted. For right angled units, the Series L range includes the Triple Reduction Angular (TRA) gear units. These gear units can be either foot or shaft mounted.

UNIT	SHAFT LAYOUT
 SPS	
 DPS	
 TPS	
 TRA	

SERIES L Helical Bevel ORDERING

How to order: Information required when ordering standard gear units

The following information is required when selecting and ordering a Series L gear unit.

Prime Mover

1. Type - electric or engine, for example 4 cylinder internal combustion engine or AC motor.
2. Power rating in kW.
3. Is the unit VFD/VSD controlled? If so, all operating conditions must be taken into account.
4. Output speed. If variable, indicate speed range and frequency of variation.
5. Dimensions of prime mover.
6. Are bedplate and/or adaptor required?

Driven Machine

1. Type, for example, kiln, conveyor, etc.
2. Power rating in kW.
3. Speed
4. Service - hours per day, running time in any hour, details of reversals if applicable, type of loading, ambient temperature, etc.

Gear Unit – if unknown see page 7 for gear unit selection

1. Type, for example, DPS.
2. Size, for example, 40.
3. Ratio
4. Shaft handing. Refer to page 12 and quote reference.
5. Direction of rotation. Refer to page 12 and quote reference.

Shaft Connections

1. Couplings. Quote shaft diameters with tolerances or coupling bores.
2. Details of overhung loads, including diameter and type of sleeve, sprocket or pinion and any thrust loads.

Shaft Mounted Units for High Inertia Drives

When used on Traverse Drives with high inertia driven loads, e.g. crane drives (slewing, long travel and cross travel) bogie drives and selected high inertia load roller table drives, it is recommended that shaft mounted units be fitted with shock absorbing Torque Arms. Consult David Brown with specific application details.

SERIES L Helical Bevel UNIT RATINGS-MECHANICAL

Mechanical Ratings and Service Factors Fm and Fs

Mechanical ratings measure capacity in terms of life and/or strength, assuming 10hr/day continuous operation under uniform load conditions.

Catalogue ratings allow 100% overload at start, braking or momentarily during operation up to 10 times per day.

The unit selected must therefore have a catalogue rating at least equal to half the maximum load overload.

The Mechanical Service Factor Fm (Table 1) is used to modify the actual load according to daily operating time, and the type of loading. Required mechanical power rating P(mech)= absorbed power x Fm.

Load characteristics for a wide range of applications are detailed in table 3 on page 5, which are used in deciding the appropriate Service Factor Fm from table 1.

If loading can be calculated, or accurately measured, actual loads should be used instead of modifying using Fm.

For units subjected to torque reversal or frequent stop/start overloads in excess of 10 times per day, the following check should be made

$$\text{Gear unit input power capacity (kW)} \geq \frac{T_m \times F_s \times n}{2 \times 9550}$$

Where T_m = motor starting torque (Nm) or rating of torque limiting device, fluid coupling etc
 n = input speed (rpm)
 F_s = Number of starts factor (see table 2)

For applications where high inertia loads are involved e.g. crane travel drives, slewing motion etc, or when units are to operate in extremely dusty or moist/humid atmospheres, unit selection should be referred to our Application Engineers.

Table 1 Mechanical Service Factor (Fm)

Load Classification- Driven Machine				
Prime Mover	Duration of service- hrs per day	Uniform loading	Moderate Shock Loading	Heavy Shock Loading
Electric Motor, Steam Turbine, or Hydraulic Motor	Under 3	0.08	1.00	1.50
	3 to 10	1.00	1.25	1.75
	Over 10	1.25	1.50	2.00
Multi-Cylinder Internal Combustion Engine	Under 3	1.00	1.25	1.75
	3 to 10	1.25	1.50	2.00
	Over 10	1.50	1.75	2.25
Single Cylinder Internal Combustion Engine	Under 3	1.25	1.50	2.00
	3 to 10	1.50	1.75	2.25
	Over 10	1.75	2.00	2.50

Table 2 Number of Starts Factor (Fs)

Start/ Stops per hour	Up to 1	5	10	40	60	≥ 200
Unidirectional	1.0	1.03	1.06	1.10	1.15	1.20
Reversing	1.4	1.45	1.50	1.55	1.60	1.70

SERIES L Helical Bevel LOAD CLASSIFICATION

Table 3		Driven Machine	Type of Load	Driven Machine	Type of Load	Driven Machine	Type of Load
U = Uniform load						presses	M
M = Moderate shock load		cable reel	M	re-saw merry-go-round conveyor	M	pulp machine reel	M
H = Heavy shock load		conveyors	M	roll cases	H	stock chest	M
† = Refer to David Brown		cutter head drives	H	slab conveyor	H	suction roll	M
* 24 hours/day Service factor only		jig drives	H	small waste conveyor-belt	U	washers and thickeners	M
** Use 1.00 Service Factor		maneuvering winches	M	small waste conveyor-chain	M	winders	M
‡ Use 1.25 Service Factor		pumps	M	sorting table	M	Printing presses	†
## Use 1.50 Service Factor		screen drive	H	tipple hoist conveyor	M	Pullers	
		stackers	M	tipple hoist drive	M	barge haul	H
		utility winches	M	transfer conveyors	M	Pumps	
		Dry dock winches		transfer rolls	M	Centrifugal	U
		main hoist	**	tray drive	M	reciprocating	
		auxiliary hoist	**	trimmer feed	M	single action; 3 or	M
		boom, luffing	**	waste conveyor	M	more cylinders	
		rotating, swing or slew	‡	Machine tools		double acting; 2 or	M
		tracking, drive wheels	##	bending roll	M	more cylinders	
		Elevators		punch press-gear driven	H	single acting; 1 or 2	
		bucket - uniform load	U	notching press-belt		cylinders	
		bucket - heavy load	M	driven	†	double acting; single	
		bucket - continuous	U	plate planers	H	cylinder	
		centrifugal discharge	U	tapping machine	H	rotary gear type	
		escalators	U	other machine tools		lobe, vane	
		freight	M	main drives	M	Rubber and plastics industries	
		gravity discharge	U	auxiliary drives	U	crackers*	H
		man lifts	†	Metal mills		laboratory equipment	M
		passenger	†	draw bench carriage	M	mixed mills*	H
		Fans		and main drive		refiners*	M
		centrifugal	U	pinch, dryer and		rubber calenders*	M
		cooling towers		scrubber rolls-reversing	†	rubber mill - 2 on line*	M
		induced draft	†	slitters	M	rubber mill - 3 on line	U
		forced draft	†	table conveyors		sheeter*	M
		induced draft	M	non-reversing		tire building machines	
		large, mine, etc..	M	group drives	M	tire and tube press	
		large, industrial	M	individual drives	H	openers	†
		light, small diameter	U	reversing	†	tubers and strainers*	M
		Feeders		wire draw and		warming mills*	M
		apron	M	flattening machine	M	Sand muller	M
		belt	M	wire winding machine	M	Sewerage disposal equipment	
		disc	U	Mills-rotary type		bar screens	U
		reciprocating	H	ball*	M	chemical feeders	U
		screw	M	cement kilns*	M	collectors	U
		Food industry		dryers and coolers*	M	dewatering screws	M
		beef slicer	M	kilns other than cement	M	scum breakers	M
		cereal cooker	U	pebble*	M	slow or rapid mixers	M
		dough mixer	M	rod*	M	thickeners	M
		meat grinders	M	plain	M	vacuum filters	M
		Generators-not welding		wedge bar	M	Screens	
		Hammer mills	H	tumbling barrels	H	air washing	U
		Hoists		Mixers		rotary-stone or gravel	M
		heavy duty	H	concrete-continuous	M	travelling water intake	U
		medium duty	M	concrete-intermittent	M	Slab pushers	M
		skip hoist	M	constant density	U	Steering gear	†
		Laundry washers		variable density	M	Stokers	U
		reversing	M	Oil industry		Sugar industry	
		Laundry tumblers		chillers	M	cane knives	M
		Line shafts		oil well pumping	†	crushers	M
		driving processing	M	paraffin filter press	M	mills*	M
		equipment	U	rotary kilns	M	Textile industry	
		light	U	Paper mills		batchers	M
		other line shafts	U	agitators (mixers)	M	calenders	M
		Lumber industry		barker-auxiliaries-hyd.	M	cards	M
		barkers-hydraulic mech.	M	barker-mechanical	H	dry cans	M
		burner conveyor	M	barking drum	H	dryers	M
		chain saw and drag saw	H	beater and pulper	M	dyeing machinery	M
		chain transfer	H	bleacher	U	knitting machines	†
		craneway transfer	H	calenders	M	looms	M
		de-barking drum	H	calenders-super	H	mangles	M
		edger feed	M	converting machine,		nappers	M
		gang feed	M	except cutters, platters	M	pads	M
		green chain	M	conveyors	U	range drives	†
		live rolls	H	couch	M	slashers	M
		log deck	H	cutters-plates	H	soapers	M
		log haul-incline	H	cylinders	M	spinners	M
		log haul-well type	H	dryers	M	tenter frames	M
		log turning device	H	felt stretcher	M	washers	M
		main log conveyor	H	felt whipper	H	winders	M
		off bearing rolls	M	jordans	M	Windlass	†
		planer feed chains	M	log haul	H		
		planer floor chains	M				
		planer tilting hoist	M				

SERIES L Helical Bevel UNIT RATINGS- THERMAL

Thermal Ratings and Service Factors

The thermal ratings are a measure of the gear units ability to dissipate heat. If they are exceeded the lubricant may overheat and breakdown, resulting in gear failure.

The thermal ratings are given on page 21. The following choices are available:

- i. No additional cooling.
- ii. Unit fitted with cooling fan.

Catalogue thermal limitations are based on the unit operating continuously in an environment with an ambient temperature equal to 30 °C and in a horizontal mounting position. The thermal rating is affected by the ambient temperature, duration of running per hour, altitude and operating area. To account for these varying conditions, the service factors given in tables 4, 5, 6 and 7 should be applied as follows:-

$$P_{therm} = \frac{\text{Absorbed Power}}{Ft \times Fd \times Fh \times Fv}$$

Where P_{therm} = Required Thermal Rating (kW)
 Ft = Service factor for ambient temperatures (see Table 4)
 Fd = Service factor for intermittent duty (see Table 5)
 Fh = Thermal service factor for altitude (see Table 6)
 Fv = Thermal service factor for air velocity correction (operating area) (see Table 7)

Table 4 Ambient Temperature Factor (Ft)

UNIT TYPE	Ambient Temperature							
	-20 °C	-10 °C	0 °C	15 °C	25 °C	30 °C	35 °C	
ALL UNITS	1.77	1.61	1.45	1.23	1.08	1	0.92	0.76

Table 5 Intermittent Duty Factor (Fd)

UNIT OUTPUT SPEED (rpm)	% RUNNING TIME PER HOUR					
	100	80	60	40	20	
0 to 10	1.00	1.18	1.45	1.72	2.38	
> 10 to 25	1.00	1.16	1.39	1.64	2.22	
> 25 to 50	1.00	1.14	1.31	1.54	2.00	
> 50 to 100	1.00	1.08	1.19	1.33	1.64	
> 100 to 150	1.00	1.04	1.08	1.19	1.41	
> 150 to 200	1.00	1.00	1.00	1.06	1.23	
> 200	1.00	1.00	1.00	1.00	1.00	

Table 6 Altitude Adjustment Factor (Fh)

Altitude [m]	Factor (Fh)
Sea Level	1.0
500	0.97
1000	0.93
1500	0.90
2000	0.87
3000	0.81
4000	0.75
5000	0.70

Table 7 Ambient Air Velocity Correction Factor (Fv)

Assumes all units have fans.

Operating Area	If Vv is not known use this value for Fv	Air Velocity Vv [m/sec]	Factor Fv if Vv is known use this formula for Fv
Small confined space	0.86	0-1.4	0.1Vv +0.86
Large indoor space (& fan cooled)	1.0	> 1.4- < 6	0.2Vv + 0.72
Sheltered outdoor space	1.3	> 2- < 6	0.17Vv +0.9
Outdoor space	1.5	> 2	0.17Vv +0.9 (max Fv= 1.92)

SERIES L Helical Bevel SELECTION PROCEDURE

EXAMPLE – APPLICATION DETAILS

Absorbed Power of Driven Machine = 79kW
 Output speed of gearbox of Input speed of machine= 56rpm
 Application= uniformly loaded belt conveyor operating in a sheltered outdoor space.
 Duration of service (hours per day)= 24hrs
 Motor speed = 3 phase electric motor, 4 pole, 1450rpm
 Mounting position= Horizontal, Right Angle Shaft
 Ambient temperature= 35°C
 Running time (%) = 100%
 Altitude = Sea level

1. Determine Ratio of Gear Unit Required

$$\frac{\text{Motor speed}}{\text{Output speed}} = \frac{1450}{56} = 25.89$$

Refer to exact ratios (page 13) for the nearest nominal ratio = 25.6

3. Determine Required Mechanical Capacity of Gear Unit

$$\text{Required Mechanical Rating (Pmech)} = \text{Absorbed Power} \times F_m$$

$$P_{\text{mech}} = 79 \times 1.25 = 98.75 \text{kW}$$

2. Determine Mechanical Service Factor (Fm)

Refer to Load Classification by Application, Table 3.
 Application = uniformly loaded belt conveyor

Conveyors- uniformly loaded or fed

apron	U
assembly	U
belt	U
bucket	U
chain	U

U= uniform load

Refer to mechanical service factor (Fm), table 1.

Duration of service (hours per day) = 24hrs

Load Classification- Driven Machine

Prime Mover	Duration of service- hrs per day	Uniform loading
Electric Motor,	Under 3	0.08
Steam Turbine, or Hydraulic Motor	3 to 10	1.00
	Over 10	1.25

Therefore the mechanical service factor (Fm) = 1.25

4. Determine Size of Gear Unit Required

Unit input power capacity $\geq P_{\text{mech}}$

Refer to rating tables, Input speed= 1450rpm, therefore to page 19.

Mechanical input power capacity must be equal or more than required mechanical input power capacity (Pmech). Required Pmech = 98.75kW. At a ratio of 25.6:1 a TRA45 has a mechanical input power capacity of 102kW. Therefore the unit is acceptable.

If the unit is subjected to torque reversal or frequent stop/starts the input power capacity must be checked in accordance with the formula on page 4.

5. Determine Exact Ratio of Gear Unit

Refer to exact ratios table, page 13.

$$\text{Exact ratio} = 26.161$$

Go to Point 6 page 8

SERIES L Helical Bevel

6. Determine Thermal Service Factor (Ft)

Refer to table 4, page 6
Ambient temperature = 35°C

UNIT TYPE	Ambient Temperature	
	30 °C	35 °C
ALL UNITS	1	0.92

$$Ft = 0.92$$

7. Determine Thermal Service Factor (Fd)

Refer to table 5, page 6

Unit running time per hour = 100%
Nominal Output speed (rpm) = 56rpm

UNIT OUTPUT SPEED (rpm)	% RUNNING TIME PER HOUR	
	100	80
0 to 10	1.00	1.18
> 10 to 25	1.00	1.16
> 25 to 50	1.00	1.14
> 50 to 100	1.00	1.08

$$Fd = 1.00$$

9. Determine Ambient Air Velocity Factor (Fv)

Refer to table 7, page 6

Operating Area	If Vv is not known use this value for Fv
Small confined space	0.86
Large indoor space (& fan cooled)	1.0
Sheltered outdoor space	1.3

$$Fv = 1.3$$

8. Determine Altitude Adjustment Thermal Service Factor (Fh)

Refer to table 6, page 6

Altitude [m]	Factor (Fh)
Sea Level	1.0
500	0.97

$$Fh = 1.0$$

10. Calculate Required Thermal Rating (Ptherm)

(Ptherm)

Ptherm = Absorbed Power (kW)

Ft x Fd x Fh x Fv

$$Ptherm = \frac{79}{0.92 \times 1.00 \times 1.0 \times 1.3}$$

$$Ptherm = 66.05\text{kW}$$

11. Check Thermal Capacity

Refer to page 21

Thermal Rating ≥ Ptherm

	UNIT SIZE	
	40	45
No additional cooling	73	84
Cooling	1750	154
Fan	1450	140

$$Ptherm = 66.05\text{kW}$$

Thermal rating without additional cooling= 84kW

Therefore thermal capacity is acceptable and no additional cooling is required.

SERIES L Helical Bevel UNIT SELECTION SHEET

The Following Sheet has been provided to allow for easy selection of a Series L Gear Unit. This sheet can be forwarded to David Brown for easy ordering of a Series L gear unit.

Absorbed Power of Driven Machine [kW] =

Output speed of gearbox or Input speed of driven machine [rpm] =

Application=

Duration of service (hours per day)=

Motor speed =

Mounting position=

Ambient temperature= °C

Running time (%) = %

Altitude =

$$\text{Gear Unit ratio} = \frac{\text{Motor Speed}}{\text{Output Speed}} = \frac{\boxed{}}{\boxed{}} = \boxed{}$$

From page 13, the nominal ratio is .

From table 3, the load classification factor is

From table 1, the mechanical service factor, Fm, is

$$\begin{aligned} \text{Required Mechanical Power, Pmech [kW]} &= \text{Absorbed Power} \times Fm = \boxed{} \times \boxed{} \\ &= \boxed{} \end{aligned}$$

Acceptable unit is with an exact ratio of

From table 4, the thermal service factor, Ft, is

From table 5, the thermal service factor, Fd, is

From table 6, the Altitude Adjustment Factor, Fh, is

From table 7, the Ambient Air Velocity Factor, Fv, is

$$\begin{aligned} \text{Required Thermal Rating, Ptherm [kW]} &= \frac{\text{Absorbed Power}}{Ft \times Fd \times Fh \times Fv} = \frac{\boxed{}}{\boxed{} \times \boxed{} \times \boxed{} \times \boxed{}} \\ &= \boxed{} \end{aligned}$$

Acceptable unit is with a thermal rating of kW.

SERIES L Helical Bevel LUBRICATION

All Series L gear units are dispatched without oil (a warning label is attached), and therefore filled by the client. The recommended oils are listed in table 11 on page 11 of this catalogue. The oil change period can be found in the installation and maintenance manual of all Series L gear units.

The approximate quantity of oil required is give in table 8, but the unit should always be filled to the level marked on the dipstick or any other level indicator fitted (sight glass etc). Warning: Do not overfill the unit as this may cause leakage and overheating.

Where possible run the unit without load for a short time to circulate the lubrication thoroughly, then stop the unit and recheck the oil level after allowing the unit to stand for 10 minutes and if necessary top up to the correct mark on the dipstick or any other level indicator fitted (sight glass etc).

In addition where bearings are greased packed, the greases approved are NLGI grade 2 and recommended greases are listed in the Approved Lubrication Scheme booklet available from David Brown.

Table 8 Lubricant Quantity (Litres)

UNIT TYPE	UNIT SIZE								
	40	45	50	56	63	69	76	83	91
SPS	17	30	42	56	100	90	105	110	145
DPS	25	38	58	80	74	160	-----	-----	-----
TPS	-----	-----	-----	-----	84	105	191	205	240
TRA	18	23	35	46	90	94	146	195	232

* Oil quantities are approximately as individual unit capacities vary with ratio. The final oil level should conform to the markings on the oil level sight glass.

Table 9 Oil Grades

EP Mineral Oil (type E)

LUBRICANT	AMBIENT TEMPERATURE RANGE		
	-5°C to 25°C	0°C to 40°C	10°C to 50°C
Oil Grade	5E (VG 220)	6E (VG 320)	7E (VG 460)

Table 10 Oil Grades

Polyalphaolefin based Synthetic (type H)

LUBRICANT	AMBIENT TEMPERATURE RANGE		
	-5°C to 25°C	0°C to 40°C	10°C to 50°C
Oil Grade	5H (VG 220)	5H (VG 220)	6H (VG 320)

SERIES L Helical Bevel

Correct lubricant is most important and it should be noted that EP oils are essential in all instances. The nameplate of each gear unit is stamped with the David Brown oil grade number which corresponds to the particular duty of the unit. The table 11 gives details of suppliers and lubricants appropriate to the grade reference numbers from which a suitable lubricant can be selected.

Lubricants listed are suitable for normal ambient temperatures and operating duties. All gear units in this range are designed to operate under full load at a maximum temperature of 100°C. Higher temperatures up to a maximum of 120°C are acceptable on the basis of peak periods of short duration only. In certain applications these maximum temperatures may be exceeded by the use of special lubricants. Such cases or others where extreme conditions are to be met, e.g. low temperature operation or unusual loading conditions, should be referred, with full details to David Brown for recommendations.

The approved oils listed in table 11 are mineral lubricants. Mineral lubricants are not compatible with synthetic lubricants.

Table 11 Approved Lubrication- Mineral Oils with EP Additives DB Grade 6E (ISO 320)

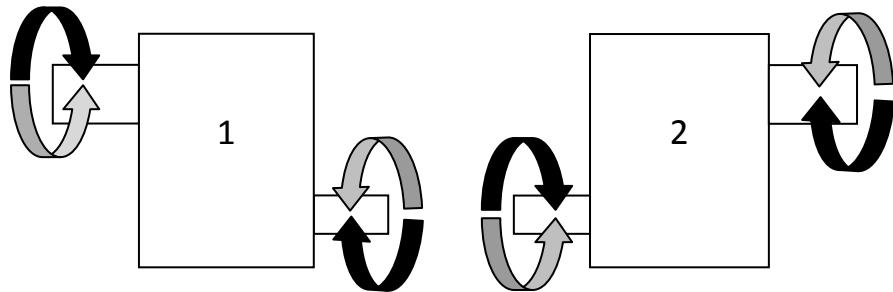
SUPPLIER	LUBRICANT NAME/DESIGNATION
Ampol limited	Gearlube SP 320
Batoyle Limited	Remus 320
Boxer Serivec Limited	Indus 320
B.P. Oil Limited	Energol GR-XP 320
Caltex (U.K.) Limited	EP Plus Gear Lubricant 320
Caltex (U.K.) Limited	RPM Borate EP Lubricant 320
Carl Bechem GmbH	Star Oil G 320
Carl Bechem GmbH	Berugear GSBM 320
Castrol	Alpha SP 320
Chemico (Pty) Limited	Lubro Gear Oil GEP 320
Engen	Gengear 320
Exxon Company International	Spartan EP 320
Fina	Giran 320
Fuchs Mineraloelwerke (U.K.) Plc	Renogear WE 320
Fuchs Mineraloelwerke GmbH	Renolin CLPF Super
Gulf Oil (G.B.) Limited	EP Lubricant HD
Klüber Lubrication	Klüberoil GEM1 320
Kuwait Petroleum International	Q8 Govo 320
Lubrication Engineers Inc.	Almasol Vari-Purpose Gearlube 605
Mobil Oil Co. Limited	Mobilgear 600 Series 632
Omega Manufacturing Division	Omega 690 85W/140
Optimol Olwerke	Optigear 320
Optimol Olwerke	Optigear BM 320
Petromin Lubricating Oil Company	Gearlube 320 EP
Sasol Oil	Cobalt 320
Sasol Oil	Hemat 320
Shell Oils	Omala 320
Texaco Limited	Meropa Lubricant 320
Total	Carter EP
Tribol GmbH	Molub-Alloy Gear Oil 690
Tribol GmbH	Tribol 1100-320

SERIES L Helical Bevel UNIT HANDINGS & SHAFT ROTATION

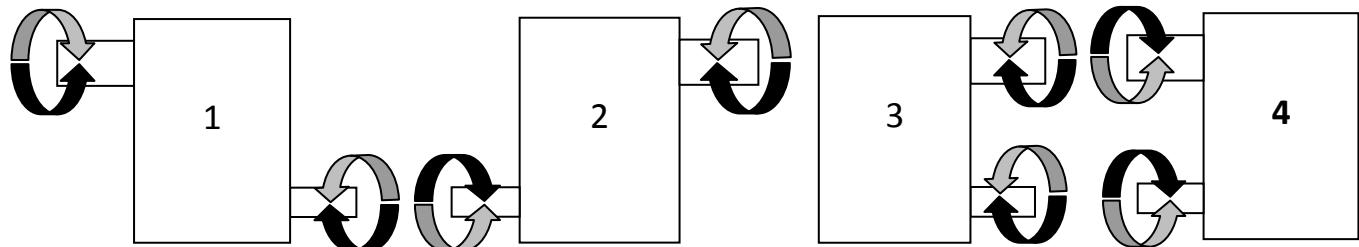
The black arrows in the diagrams below represent a clockwise input rotation, while the grey arrows represent a counter-clockwise input rotation. Unit Handing is determined, by facing the unit with the input shaft closest, while Shaft Rotation is determined facing the output shaft.

Parallel Shaft Units

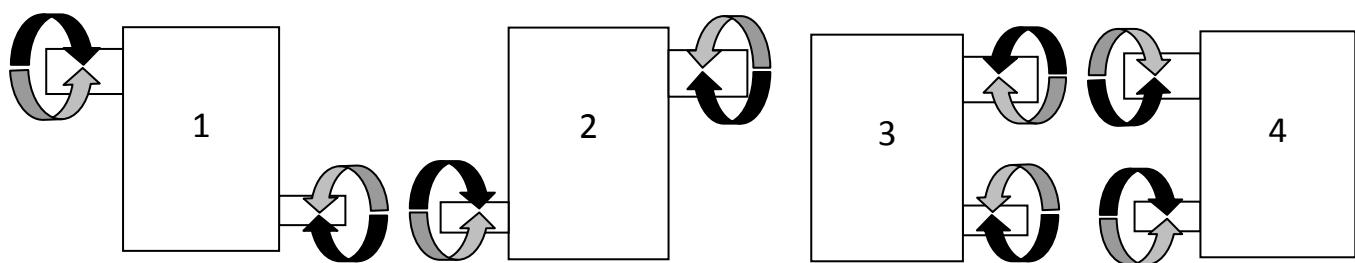
Single Reduction Units



Double Reduction Units

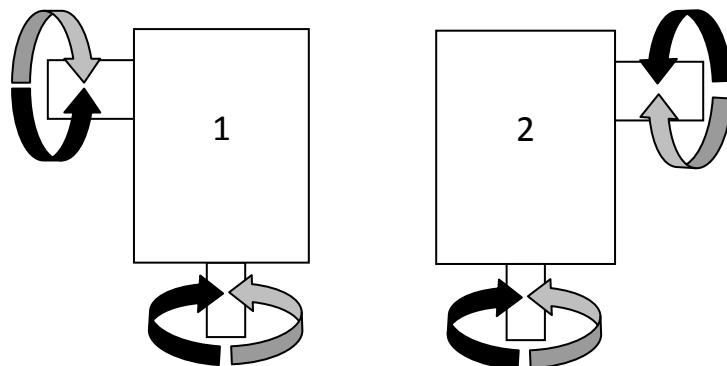


Triple Reduction Units



Right Angle Shaft Units

Triple Reduction Units



SERIES L Helical Bevel EXACT RATIOS

EXACT RATIOS- ALL SERIES L UNITS

Single Reduction-Parallel Shaft

Nominal Ratios	UNIT SIZE							
	40	45	50	56	63	69	76	83
1.25	1.241	1.212	1.216	1.194	1.259	1.233	1.242	1.233
1.40	1.364	1.355	1.343	1.345	1.346	1.310	1.387	1.345
1.50	1.50	1.517	1.485	1.519	1.480	1.481	1.467	1.481
1.70	1.60	1.704	1.645	1.654	1.652	1.680	1.643	1.680
1.80	1826	1.808	1.828	1.833	1.773	1.792	1.846	1.833
2.00	2.048	2.042	2.037	2.091	2.050	2.045	2.083	2.045
2.30	2.250	2.259	2.240	2.238	2.261	2.190	2.217	2.240
2.50	2.50	2.520	2.478	2.450	2.50	2.474	2.524	2.522
2.80	2.762	2.739	2.750	2.750	2.80	2.652	2.70	2.682
3.10	3.053	3.00	3.050	3.00	3.053	2.941	3.111	3.050
3.40	3.389	3.40	3.444	3.333	3.471	3.368	3.353	3.263
3.70	3.647	3.833	3.667	3.737	3.750	3.667	3.650	3.810
4.10	4.158	4.118	4.158	4.056	4.133	4.091	4.167	4.050
4.60	4.444	4.50	4.706	4.625	4.611	4.550	4.636	4.611
5.10	5.063	5.056	5.063	5.056	5.10	4.895	4.960	5.136

Double Reduction- Parallel Shaft

Nominal Ratios	UNIT SIZE							
	40	45	50	56	63	69	76	83
5.6	5.451	5.760	5.576	5.423	5.704	5.536	5.543	5.425
6.2	6.105	6.30	6.196	6.125	6.272	6.061	6.104	6.016
6.8	6.868	6.857	6.845	6.778	6.939	6.803	6.750	6.588
7.6	7.632	7.50	7.565	7.560	7.70	7.421	7.560	7.545
8.4	8.431	8.217	8.399	8.217	8.540	8.246	8.242	8.213
9.3	9.479	9.176	9.317	9.00	9.644	9.244	9.371	9.033
10.3	10.345	10.20	10.336	10.20	10.514	9.804	10.125	9.833
11.4	11.638	11.50	11.124	11.50	11.193	10.991	11.160	10.971
12.6	12.668	12.353	12.682	12.353	12.725	11.928	12.859	11.965
14.0	14.064	14.0	14.322	13.725	13.750	13.702	13.859	13.349
15.4	15.135	15.784	15.246	15.387	15.592	14.870	15.087	14.850
17.1	17.255	16.955	17.288	16.699	----	16.591	17.222	16.568
								16.736

SERIES L Helical Bevel

Triple Reduction- Parallel Shaft

Nominal Ratios	UNIT SIZE								
	40	45	50	56	63	69	76	83	91
14.0	13.741	13.760	13.910	13.422	14.00	13.456	13.750	12.999	13.365
15.4	15.268	15.288	15.285	14.70	15.489	15.306	15.40	14.415	15.243
17.1	16.867	16.890	16.983	16.660	17.188	16.697	16.789	16.509	16.3165
18.9	18.741	18.990	18.762	18.743	19.063	18.553	19.088	17.971	17.861
20.9	20.705	20.605	20.737	20.825	21.350	20.798	20.790	20.051	20.048
23.2	23.016	22.895	23.021	23.007	24.111	22.572	22.666	22.387	21.870
25.6	25.538	25.293	24.775	25.867	26.069	25.149	25.769	24.370	24.30
28.4	28.770	28.438	28.245	28.229	29.441	27.943	27.844	27.189	27.242
31.4	31.784	31.053	31.771	31.758	31.340	31.326	30.690	29.992	29.565
34.7	35.735	33.889	35.099	34.570	34.168	33.998	34.359	33.462	34.067
38.4	38.999	38.125	38.794	38.975	38.746	37.246	37.125	37.560	36.715
42.5	43.874	43.991	43.067	42.330	40.821	40.423	40.920	40.886	39.968
47.1	47.758	48.009	46.348	47.725	46.290	45.698	47.151	45.617	45.625
52.1	52.785	54.010	52.840	51.265	52.628	49.596	53.467	49.749	51.463
57.7	58.60	58.792	59.673	56.961	60.00	56.80	57.624	55.505	54.537
63.8	63.064	66.285	63.523	63.830	64.830	61.829	62.729	61.745	62.256
70.6	71.897	71.201	72.034	69.302	71.457	68.983	71.608	68.889	69.129

Triple Reduction- Right Angled Shaft

Nominal Ratios	UNIT SIZE								
	40	45	50	56	63	69	76	83	91
10.3	10.480	10.523	10.434	10.425	10.313	10.204	9.984	10.018	10.315
11.4	11.645	11.738	11.543	11.412	11.550	10.940	10.929	11.077	11.059
12.6	12.865	12.759	12.809	12.809	12.810	12.134	12.267	12.406	11.831
14.0	14.219	14.086	13.966	13.966	13.737	13.895	14.135	13.526	13.642
15.4	15.518	15.837	15.504	15.263	15.40	15.411	15.420	15.378	15.026
17.1	17.457	17.855	16.685	16.944	17.931	17.404	17.134	16.616	16.357
18.9	19.003	19.486	19.022	18.235	19.088	18.526	19.208	18.711	18.078
20.9	21.235	21.922	20.812	20.443	21.074	20.167	20.701	20.217	20.391
23.2	23.889	23.863	23.002	23.306	24.538	22.868	22.466	22.284	22.751
25.6	26.004	26.161	25.536	25.294	26.121	25.352	25.655	25.056	25.435
28.4	28.753	29.998	27.482	29.304	29.620	27.596	27.844	27.618	28.378
31.4	31.298	32.654	31.331	30.035	32.874	31.294	30.895	30.232	30.780
34.7	34.838	36.107	35.383	33.670	34.995	33.965	34.328	33.323	33.375
38.4	38.676	39.951	38.951	38.386	39.683	36.972	38.483	37.585	37.236
42.5	42.878	43.748	41.071	41.660	42.878	41.925	41.658	41.427	41.491
47.1	46.776	49.465	46.824	47.722	46.986	46.826	46.701	45.651	46.292
52.1	51.339	53.844	52.880	51.792	53.281	49.641	50.684	50.272	50.351
57.7	55.884	58.738	56.291	57.369	57.571	56.291	55.174	56.608	56.177
63.8	63.712	63.095	63.834	63.683	63.456	62.805	62.984	62.395	62.378

SERIES L Helical Bevel
PARALLEL SHAFT UNIT MECHANICAL KW RATINGS AT 1750RPM

Nominal Ratio	Nominal Output speed [rpm]	UNIT SIZE														
		40	45	50	56	63	69	76	83	91						
1.2	1458	1289	1868	2444	3481	5378	6257	9179	11239	----	SINGLE REDUCTION					
1.4	1250	1215	1765	2364	3235	5122	6061	8620	10891	----						
1.5	1166	1149	1652	2312	2996	4963	5553	8378	10171	----						
1.7	1029	1113	1544	2241	2931	4549	5224	7936	9398	----						
1.8	972	1024	1479	2149	2689	4307	4922	7281	9067	----						
2.0	875	920	1375	2074	2464	3975	4582	6752	8332	----						
2.3	760	885	1294	1934	2367	3639	4316	6473	7916	----						
2.5	700	808	1184	1748	2261	3424	3879	5861	7202	----						
2.8	625	772	1067	1655	2045	3135	3818	5574	6894	----						
3.1	564	702	1006	1520	1912	2949	3527	5032	6278	----						
3.4	514	668	920	1291	1779	2642	3165	4755	5972	----						
3.7	472	601	820	1109	1600	2479	3015	4397	4996	----						
4.1	426	495	732	964	1519	2262	2422	3766	4650	----						
4.6	380	458	648	811	1203	1646	2021	2601	3953	----						
5.1	343	361	487	704	995	1268	1939	2045	2702	----						
5.6	312	417	563	793	1137	1507	2054	----	----	----	DOUBLE REDUCTION					
6.2	282	383	516	715	1044	1404	1922	----	----	----						
6.8	257	355	480	648	973	1309	1773	----	----	----						
7.6	230	322	439	587	895	1209	1664	----	----	----						
8.4	208	291	401	529	848	1118	1509	----	----	----						
9.3	188	259	360	508	785	1002	1355	----	----	----						
10.3	169	238	324	458	704	954	1348	----	----	----						
11.4	153	212	288	425	632	898	1213	----	----	----						
12.6	168	194	268	374	596	801	1078	----	----	----						
14.0	125	175	163	236	210	316	301	466	434	737	576	955	730	1435	1864	2486
15.4	113	147	149	202	192	272	301	397	432	651	583	881	698	1283	1683	2183
17.1	102	121	142	180	183	236	279	376	374	-----	577	614	698	1177	1471	2040
18.9	92	135		164	269	337	566	698		1128	1525	2018	TRIPLE REDUCTION			
20.9	83	124		147	247	308	512	652		1036	1388	1799				
23.2	75	113		133	223	283	462	615		951	1266	1650				
25.6	68	103		128	207	255	432	520		837	1176	1486				
28.4	61	93.1		116	182	240	387	519		775	1059	1326				
31.4	55	84.3		107	162	222	366	464		703	960	1222				
34.7	50	75		98.1	146	198	341	440		628	861	1061				
38.4	45	68.8		87.2	132	183	301	410		582	768	985				
42.5	41	61.1		81.1	119	168	286	378		528	705	905				
47.1	37	56		74.3	111	154	252	334		424	632	793				
52.1	33	48.9		65	97.2	146	202	308		374	518	688				
57.7	30	41.3		56.4	79	129	180	247		337	465	570				
63.8	27	35.4		48.9	72	104	157	217		295	360	500				
70.6	24	29.2		42.2	60	92	134	183		225	323	423				

SERIES L Helical Bevel
PARALLEL SHAFT UNIT MECHANICAL KW RATINGS AT 1450RPM

Nominal Ratio	Nominal Output speed [rpm]	UNIT SIZE															
		40	45	50	56	63	69	76	83	91							
1.2	1208	1130	1638	2142	3051	4715	5486	8047	9852	----	SINGLE REDUCTION						
1.4	1035	1065	1547	2072	2836	4490	5313	7557	9547	----							
1.5	966	1007	1448	2027	2627	4351	4868	7345	8917	----							
1.7	852	975	1354	1965	2570	3988	4580	6869	8238	----							
1.8	805	898	1296	1884	2357	3776	4315	6383	7948	----							
2.0	725	806	1205	1818	2160	3485	4017	5919	7304	----							
2.3	630	776	1134	1658	2075	3190	3784	5674	6940	----							
2.5	580	708	1038	1458	1982	3002	3401	5138	6214	----							
2.8	517	677	889	1319	1793	2748	3347	4887	6044	----							
3.1	467	616	882	1265	1676	2585	3092	4412	5504	----							
3.4	426	585	794	1074	1560	2316	2775	4168	5236	----							
3.7	391	499	682	923	1332	2173	2643	3666	4168	----							
4.1	353	412	608	802	1264	1881	2020	3137	3877	----							
4.6	315	381	539	675	1000	1370	1684	2169	3293	----							
5.1	284	300	405	585	828	1056	1614	1707	2253	----							
5.6	258	366	468	659	996	1321	1801	----	----	----	DOUBLE REDUCTION						
6.2	233	333	428	594	915	1230	1685	----	----	----							
6.8	213	296	398	538	853	1146	1542	----	----	----							
7.6	190	267	365	487	776	1041	1426	----	----	----							
8.4	172	242	333	439	726	950	1282	----	----	----							
9.3	155	215	299	421	667	852	1153	----	----	----							
10.3	140	197	269	380	598	811	1146	----	----	----							
11.4	127	175	239	353	538	763	1031	----	----	----							
12.6	115	161	222	310	503	681	917	----	----	----							
14.0	103	145	138	196	178	262	264	387	381	611	505	793	640	1191	1547	2064	TRIPLE REDUCTION
15.4	94	122	127	168	163	226	257	329	376	540	511	731	612	1064	1397	1811	
17.1	84	101	120	150	155	196	232	312	328	-----	506	509	612	977	1221	1693	
18.9	76	118	142	234	302	493	627	968	1327	1731							
20.9	69	108	128	212	276	445	584	889	1207	1544							
23.2	62	98	117	191	254	401	548	816	1102	1416							
25.6	56	89	112	177	228	376	467	718	1013	1275							
28.4	51	80	101	156	198	337	453	665	908	1138							
31.4	46	72.3	93	138	198	318	404	603	824	1048							
34.7	41	64.3	81.3	125	178	293	365	539	739	910							
38.4	37	59	79	113	160	258	344	499	658	845							
42.5	34	52.4	74	102	149	245	317	453	605	776							
47.1	30	48	63.7	95	138	216	281	364	542	680							
52.1	27	41.9	55.7	83	123	173	259	321	445	590							
57.7	25	35.4	44	67.7	110	152	212	283	398	489							
63.8	22	29.7	41.9	61.7	89.6	132	186	253	309	429							
70.6	20	26.4	36.2	51.5	78.9	112	157	189	277	363							

SERIES L Helical Bevel
PARALLEL SHAFT UNIT MECHANICAL KW RATINGS AT 960RPM

Nominal Ratio	Nominal Output speed [rpm]	UNIT SIZE															
		40	45	50	56	63	69	76	83	91							
1.2	800	846	1227	1605	2286	3533	4110	6029	7382	----	SINGLE REDUCTION						
1.4	685	798	1159	1552	2125	3364	3981	5662	7153	----							
1.5	640	755	1085	1519	1968	3260	3647	5503	6681	----							
1.7	564	731	1014	1440	1925	2988	3432	5147	6173	----							
1.8	533	673	971	1329	1766	2829	3233	4783	5955	----							
2.0	480	604	903	1242	1619	2611	3010	4435	5473	----							
2.3	417	581	772	1111	1555	2390	2835	4252	5200	----							
2.5	384	527	703	975	1485	2249	2548	3850	4731	----							
2.8	342	507	594	998	1206	2059	2508	3661	4529	----							
3.1	309	439	599	845	1256	1937	2317	3305	4124	----							
3.4	282	396	529	716	1042	1689	2050	3123	3923	----							
3.7	259	333	454	616	888	1473	1943	2452	2791	----							
4.1	234	274	405	535	842	1253	1351	2094	2593	----							
4.6	208	254	359	449	666	914	1125	1451	2199	----							
5.1	188	200	269	389	552	705	1077	1144	1508	----							
5.6	171	248	311	438	729	954	1293	----	----	----	DOUBLE REDUCTION						
6.2	154	221	285	395	656	875	1193	----	----	----							
6.8	141	197	265	358	601	802	1080	----	----	----							
7.6	126	177	242	324	543	728	998	----	----	----							
8.4	114	160	221	292	457	665	897	----	----	----							
9.3	103	143	198	280	457	595	807	----	----	----							
10.3	93	131	178	252	404	567	801	----	----	----							
11.4	84	116	158	234	358	534	721	----	----	----							
12.6	76	161	222	310	503	681	917	----	----	----							
14.0	68	96.2	96.9	130	125	174	187	257	269	406	378	526	479	790	1027	1370	TRIPLE REDUCTION
15.4	62	80.8	88.7	111	114	150	171	218	248	358	383	485	458	706	927	1202	
17.1	56	66.7	81.2	99.2	108	130	154	207	222	----	361	338	458	648	810	1123	
18.9	50	81.7	100	156	206	347	457	570	744	1026							
20.9	45	74	90.2	141	191	314	411	523	667	915							
23.2	41	66.6	81.7	127	179	283	366	480	598	839							
25.6	37	60	78.4	118	165	266	337	423	549	755							
28.4	33	53.3	68.5	104	154	235	318	391	493	674							
31.4	30	48.2	62.8	92.4	140	214	277	355	447	621							
34.7	27	43	53.9	83.6	121	195	244	317	400	539							
38.4	25	39.3	47.9	75.7	110	172	230	294	357	500							
42.5	22	35	46.4	68.2	99.6	163	212	266	328	460							
47.1	20	32.1	42.5	63.4	88.3	144	187	230	294	403							
52.1	18	27.9	37.2	55.6	82.2	115	173	203	267	313							
57.7	16	23.6	32.3	45.2	73.7	101	141	185	239	289							
63.8	15	19.8	28	41.2	59.7	88.1	117	145	173	253							
70.6	13	17.6	24	34.3	52.6	74.8	105	124	155	192							

SERIES L Helical Bevel
PARALLEL SHAFT UNIT MECHANICAL KW RATINGS AT 725RPM

Nominal Ratio	Nominal Output speed [rpm]	UNIT SIZE															
		40	45	50	56	63	69	76	83	91							
1.2	604	689	1008	1319	1878	2902	3377	4953	6065	----	SINGLE REDUCTION						
1.4	517	650	952	1262	1746	2764	3271	4652	5877	----							
1.5	483	615	891	1179	1617	2678	2997	4521	5489	----							
1.7	426	595	822	1096	1582	2455	2819	4228	5071	----							
1.8	402	548	786	1011	1451	2324	2656	3929	4893	----							
2.0	362	492	725	944	1330	2145	2473	3644	4496	----							
2.3	315	454	586	843	1277	1843	2329	3493	4272	----							
2.5	290	400	534	740	1220	1848	2093	3163	3886	----							
2.8	258	392	451	756	916	1608	2055	3002	3705	----							
3.1	233	333	455	640	1029	1519	1903	2601	3255	----							
3.4	213	300	401	542	791	1280	1555	2375	3027	----							
3.7	195	252	344	467	673	1116	1473	1861	2119	----							
4.1	176	208	307	405	638	949	1025	1588	1968	----							
4.6	157	192	271	340	504	693	853	1101	1668	----							
5.1	142	151	204	295	418	535	817	869	1145	----							
5.6	129	187	236	332	572	748	1014	----	----	----	DOUBLE REDUCTION						
6.2	116	167	216	299	507	686	935	----	----	----							
6.8	106	149	200	271	459	629	846	----	----	----							
7.6	95	134	183	245	411	571	784	----	----	----							
8.4	86	121	167	221	379	522	705	----	----	----							
9.3	77	108	150	211	346	468	632	----	----	----							
10.3	70	108	150	211	346	468	632	----	----	----							
11.4	63	88	120	177	271	418	565	----	----	----							
12.6	57	80.8	111	155	252	352	503	----	----	----							
14.0	51	72.7	75.3	98.2	98	131	132	194	211	307	306	398	390	597	777	1036	TRIPLE REDUCTION
15.4	47	61.1	67.8	84.1	89.7	113	129	165	195	270	299	367	373	534	701	909	
17.1	42	50.4	61.4	74.9	81.6	98.2	116	156	179	----	273	256	372	490	612	849	
18.9	38	58.4	72.6	105	164	246	335	431	563	776							
20.9	34	52.9	66.9	95.1	153	214	299	396	504	691							
23.2	31	47.6	60.2	85.7	138	189	275	363	452	634							
25.6	28	42.9	54.5	79.6	127	175	247	319	415	571							
28.4	25	38.1	48.5	69.9	117	155	222	296	372	509							
31.4	23	34.5	44.4	62.1	105	146	198	268	338	469							
34.7	20	30.6	40.7	56.2	91.2	137	183	240	303	407							
38.4	18	28.1	36.2	50.9	83.4	121	170	222	270	378							
42.5	17	25	31.3	45.8	73.7	115	157	201	248	347							
47.1	15	22	28.7	42.6	65.9	101	139	174	222	304							
52.1	13	19.4	25.5	37.4	62	85.3	130	153	201	237							
57.7	12	17.8	22	31.6	46.8	75.4	93.4	141	181	218							
63.8	11	15	20.1	27.3	39.8	66.4	88.4	110	131	191							
70.6	10	12.1	18.2	23.6	37.7	56.4	61.7	93.9	117	145							

SERIES L Helical Bevel

RIGHT ANGLED SHAFT UNIT MECHANICAL KW RATINGS AT 1750RPM

Nominal Ratio	Nominal Output speed [rpm]	UNIT SIZE								
		40	45	50	56	63	69	76	83	
10.3	169	189	189	405	405	828	835	1008	1012	1825
11.4	153	189	189	395	405	828	835	1008	1012	1825
12.6	138	189	189	371	405	793	858	1008	1012	1825
14.0	125	181	189	345	410	741	768	990	1012	1825
15.4	113	166	189	317	410	694	693	990	1012	1825
17.1	102	147	181	297	387	623	616	978	1012	1685
18.9	92	135	166	265	364	554	579	894	1012	1546
20.9	83	121	148	218	325	505	547	838	1012	1499
23.2	75	108	136	218	286	431	523	739	1012	1370
25.6	68	99	119	201	253	405	426	695	752	1244
28.4	61	88	108	187	218	358	402	647	739	1142
31.4	55	82	99	164	218	322	354	562	745	1070
34.7	50	74	88	133	198	303	319	554	630	931
38.4	45	63	82	132	174	267	301	488	633	834
42.5	41	54	74	124	153	233	266	433	570	749
47.1	37	49	54	110	140	226	240	408	493	672
52.1	33	42	54	89	123	199	196	376	433	618
57.7	30	39	49	81	116	173	196	335	393	554
63.8	27	35	48	68	102	139	141	251	356	469

TRIPLE REDUCTION

RIGHT ANGLED SHAFT UNIT MECHANICAL KW RATINGS AT 1450RPM

Nominal Ratio	Nominal Output speed [rpm]	UNIT SIZE								
		40	45	50	56	63	69	76	83	
10.3	140	162	162	364	364	743	759	904	908	1638
11.4	127	162	162	346	364	743	759	904	908	1638
12.6	115	162	162	325	364	712	780	904	908	1638
14.0	103	155	162	303	368	649	698	889	908	1638
15.4	94	142	162	277	368	608	630	889	908	1638
17.1	84	126	155	260	338	506	560	856	908	1510
18.9	76	116	142	231	312	475	526	782	908	1388
20.9	69	103	127	187	279	433	497	733	908	1311
23.2	62	93	116	187	245	370	475	647	908	1199
25.6	56	85	102	172	216	348	387	608	675	1066
28.4	51	75	93	160	187	307	365	566	664	1000
31.4	46	71	85	140	187	276	322	490	663	936
34.7	41	63	75	114	170	260	290	470	568	798
38.4	37	54	71	113	149	229	274	424	568	716
42.5	34	47	64	107	131	199	242	371	490	642
47.1	30	42	47	94	120	184	218	350	422	576
52.1	27	37	47	76	106	171	178	322	371	530
57.7	25	34	42	70	100	149	178	287	337	475
63.8	22	30	41	58	88	126	128	215	306	402

TRIPLE REDUCTION

SERIES L Helical Bevel

RIGHT ANGLED SHAFT UNIT MECHANICAL KW RATINGS AT 960RPM

Nominal Ratio	Nominal Output speed [rpm]	UNIT SIZE								
		40	45	50	56	63	69	76	83	
10.3	93	108	108	263	263	558	569	681	684	1234
11.4	84	108	108	244	263	557	569	681	684	1234
12.6	76	108	108	225	263	508	585	681	684	1234
14.0	68	108	108	210	263	457	524	669	684	1234
15.4	62	95	108	189	262	428	473	663	684	1216
17.1	56	85	108	176	238	338	420	603	684	1125
18.9	50	78	95	154	209	317	395	561	684	985
20.9	45	69	85	125	186	289	373	517	684	924
23.2	41	62	78	125	163	247	356	455	661	844
25.6	37	57	68	115	144	232	290	424	508	711
28.4	33	50	62	107	125	205	274	391	500	704
31.4	30	47	57	94	125	184	242	327	442	649
34.7	27	42	50	76	113	173	218	317	428	533
38.4	25	36	47	76	99	153	206	283	327	478
42.5	22	31	42	71	88	133	182	247	327	429
47.1	20	28	31	63	80	123	164	233	282	384
52.1	18	24	31	51	70	114	134	215	247	353
57.7	16	22	28	47	67	99	134	192	225	317
63.8	15	20	27	38	59	84	96	144	204	268

TRIPLE REDUCTION

RIGHT ANGLED SHAFT UNIT MECHANICAL KW RATINGS AT 725RPM

Nominal Ratio	Nominal Output speed [rpm]	UNIT SIZE								
		40	45	50	56	63	69	76	83	
10.3	70	81	81	197	197	426	433	557	559	1003
11.4	63	81	81	190	197	426	433	557	559	1003
12.6	57	81	81	169	197	397	445	557	559	1003
14.0	51	78	81	157	197	356	398	547	559	996
15.4	47	72	81	142	197	326	359	517	559	948
17.1	42	63	78	132	185	253	319	470	559	871
18.9	38	58	71	116	157	238	300	424	559	739
20.9	34	52	63	93	140	217	283	394	547	719
23.2	31	46	58	93	123	185	271	363	496	659
25.6	28	43	51	86	108	174	221	318	416	533
28.4	25	38	46	80	93	154	208	293	400	533
31.4	23	35	43	70	93	138	184	245	331	487
34.7	20	32	38	57	85	130	165	238	331	400
38.4	18	27	35	57	75	115	156	212	245	358
42.5	17	23	32	53	66	100	138	186	245	322
47.1	15	21	23	47	60	92	124	175	211	288
52.1	13	18	23	38	53	85	101	161	186	265
57.7	12	17	21	35	50	74	101	144	169	238
63.8	11	15	20	29	44	63	73	108	153	201

TRIPLE REDUCTION

SERIES L Helical Bevel THERMAL RATINGS

Thermal ratings kW

These thermal ratings assume the gear units is in constant use working in an ambient temperature of 30°C installed in a large indoor space at sea level. These ratings must be adjusted in accordance with the operating and environmental conditions refer to page 4 of this catalogue.

Parallel Shaft Units- Single Reduction

		UNIT SIZE						
		40	45	50	56	63	69	76
No additional cooling		184	220	292	338	463	516	647
Cooling Fan	1750	325	397	541	635	884	992	1255
	1450	296	361	492	577	804	902	1141
	960	258	314	429	503	701	786	992
	725	236	288	393	461	643	721	912
								931

Parallel Shaft Units- Double Reduction

		UNIT SIZE					
		40	45	50	56	63	69
No additional cooling		128	150	196	271	303	404
Cooling Fan	1750	182	218	292	412	464	625
	1450	166	199	266	375	422	569
	960	144	173	231	326	367	495
	725	133	159	213	300	337	455

Parallel Shaft Units-Triple Reduction

		UNIT SIZE						
		40	45	50	56	63	69	76
No additional cooling		84	98	131	156	207	238	310
Cooling fan	1750	150	179	247	299	403	465	614
	1450	137	163	225	272	367	423	559
	960	123	146	202	244	330	380	503
	725	109	130	180	217	293	338	447
								495

Right Angled Shaft Units- Triple Reduction

		UNIT SIZE							
		40	45	50	56	63	69	76	83
No additional cooling		73	84	115	132	180	203	284	338
Cooling Fan	1750	154	174	249	286	449	504	575	671
	1450	140	159	227	260	409	459	522	610
	960	127	144	203	234	367	411	469	548
	725	112	126	180	206	325	366	418	487
									638

SERIES L Helical Bevel

PARALLEL SHAFT UNIT MOMENTS OF INERTIA

The Moments of Inertia (kg.cm^2) below are referred to the input shaft.

Nominal Ratio	Nominal Output speed [rpm]	UNIT SIZE															
		40	45	50	56	63	69	76	83	91							
1.2	604	1960	3491	6133	11067	20680	32773	56400	86458	-----	SINGLE REDUCTION						
1.4	517	1761	3085	5508	9708	19219	30661	49842	82428	-----							
1.5	483	1582	2725	4945	8510	18303	26822	46845	70546	-----							
1.7	426	1471	2402	4434	8156	15387	23412	41330	61463	-----							
1.8	402	1269	2252	3966	6947	14267	21841	36357	58725	-----							
2.0	362	1062	1973	3535	6028	12185	18924	31832	49554	-----							
2.3	315	1006	1793	3069	5598	10357	17565	29714	45976	-----							
2.5	290	855.6	1589	2645	5329	10136	14607	25729	40302	-----							
2.8	258	831.5	1341	2365	4351	8546	14369	23851	37609	-----							
3.1	233	68037	1036	2199	4045	8101	12665	20302	32488	-----							
3.4	213	655.6	1132	1851	3632	6693	10528	18626	30053	-----							
3.7	195	601.0	947.2	1843	3070	6119	9931	17177	24872	-----							
4.1	176	484.4	871.2	1601	2786	5698	8735	14702	23134	-----							
4.6	157	444.3	813.8	1353	2283	4751	7485	12955	19818	-----							
5.1	142	362.9	680.1	1248	2111	4305	7062	12007	17548	-----							
5.6	129	562.3	791.7	1420	3189	4674	8222	-----	-----	-----							
6.2	116	484.9	725.3	1199	2710	4030	7567	-----	-----	-----							
6.8	106	416.6	738.5	1119	2399	3453	6189	-----	-----	-----							
7.6	95	352.8	680.8	923	2079	3037	5637	-----	-----	-----							
8.4	86	331.8	580.1	859	1758	2755	4978	-----	-----	-----							
9.3	77	277.3	507.2	875	1697	2316	4201	-----	-----	-----							
10.3	70	256.9	466.5	820	1434	2285	4798	-----	-----	-----							
11.4	63	205.9	389.6	748	1181	2228	4058	-----	-----	-----							
12.6	57	186.2	356.3	623	1078	2143	3777	-----	-----	-----							
14.0	51	184.7	541	334.7	1030	603	1898	1053	3125	2108	5857	3859	8568	22971	34443	50675	DOUBLE REDUCTION
15.4	47	181.6	476	323.9	891	602	1675	1020	2790	1853	5109	3608	7390	20254	30373	39784	
17.1	42	175.9	431	319.5	795	589	1444	1010	2391	-----	4517	3534	6631	18764	26246	35273	
18.9	38	439	695	1295	1930	4059	5869	16838	24366	30509							
20.9	34	401	529	1147	1590	3785	5196	12140	22303	24811							
23.2	31	334	467	1045	1374	3395	4832	11322	15516	21812							
25.6	28	297	424	979	1135	2734	3429	10266	14494	18793							
28.4	25	263	379	885	1007	2472	3093	9781	13372	16116							
31.4	23	247	344	552	852	2375	2796	9296	11067	14702							
34.7	20	230	323	509	771	2339	2635	7404	10327	13136							
38.4	18	221	299	467	702	2170	2671	7132	8466	12489							
42.5	17	210	265	438	706	1885	2529	6859	8103	11889							
47.1	15	204	254	419	650	1767	2112	6701	7705	11134							
52.1	13	199	240	392	625	1705	2018	6055	7773	10907							
57.7	12	198	232	380	610	1481	1942	5997	7439	11160							
63.8	11	196	226	380	591	1462	1920	5947	7471	10575							
70.6	10	193	224	372	584	1448	1877	5861	7197	10446							
											TRIPLE REDUCTION						

SERIES L Helical Bevel

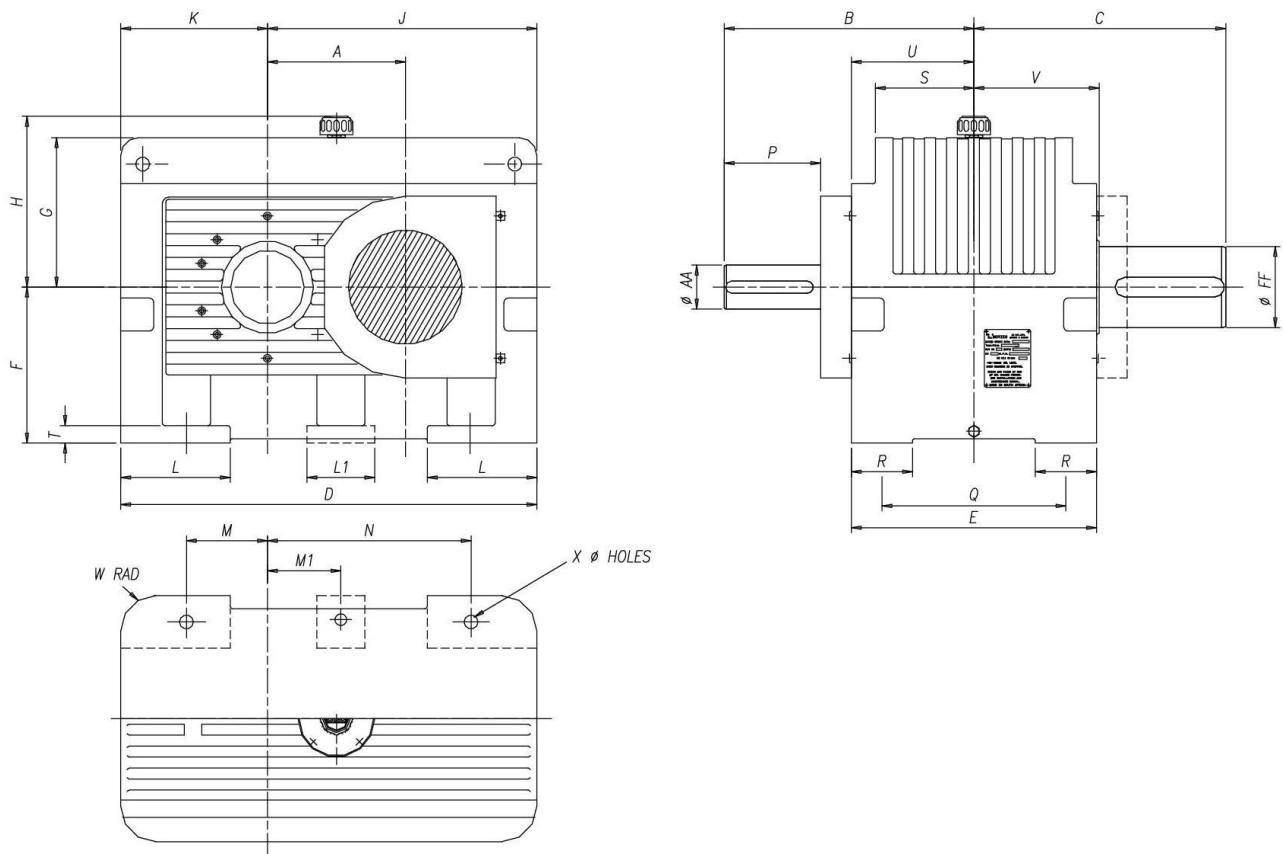
RIGHT ANGLED SHAFT UNIT MOMENTS OF INERTIA

The Moments of Inertia (kg.cm^2) below are referred to the input shaft.

Nominal Ratio	Nominal Output speed [rpm]	UNIT SIZE									TRIPLE REDUCTION
		40	45	50	56	63	69	76	83	91	
10.3	169	2653	3003	8921	9707	36045	42409	94009	132251	209871	
11.4	153	2494	2834	8487	9384	33868	43843	90210	128632	206277	
12.6	138	2177	2664	8053	9060	32579	41573	82703	118751	205297	
14.0	125	2047	2517	7819	8683	30337	41657	80920	115192	193880	
15.4	113	1957	2228	7580	8482	30175	39601	77492	105507	178904	
17.1	102	1741	2143	7263	8117	29811	36555	73426	101147	174728	
18.9	92	1656	2038	6712	7727	29681	36016	68253	103875	173885	
20.9	83	1170	1804	3452	7537	23211	36460	67529	99637	164728	
23.2	75	1054	1710	3151	6922	22946	33877	65425	96449	170923	
25.6	68	1009	1691	3062	6876	22851	27480	48076	79910	122344	
28.4	61	849	1088	2946	3261	21548	27804	52328	77338	121781	
31.4	55	818	1076	2742	3117	17563	25917	43313	68462	115657	
34.7	50	751	1028	2709	3047	17492	20947	41175	66331	119800	
38.4	45	749	864	1628	2820	16520	21189	38439	56128	113882	
42.5	41	435	831	1560	2803	16411	19780	34942	54414	83141	
47.1	37	377	761	1469	1677	13195	17872	32688	49740	79082	
52.1	33	387	459	1455	1666	12471	15949	31755	45495	81828	
57.7	30	374	441	1454	1504	12390	14900	31623	45575	77905	
63.8	27	370	383	1444	1496	12484	14698	31025	44286	78282	

SERIES L Helical Bevel DIMENSIONS PARALLEL SHAFT SINGLE REDUCTION

Single Reduction Parallel Shaft-Foot Mounted Units



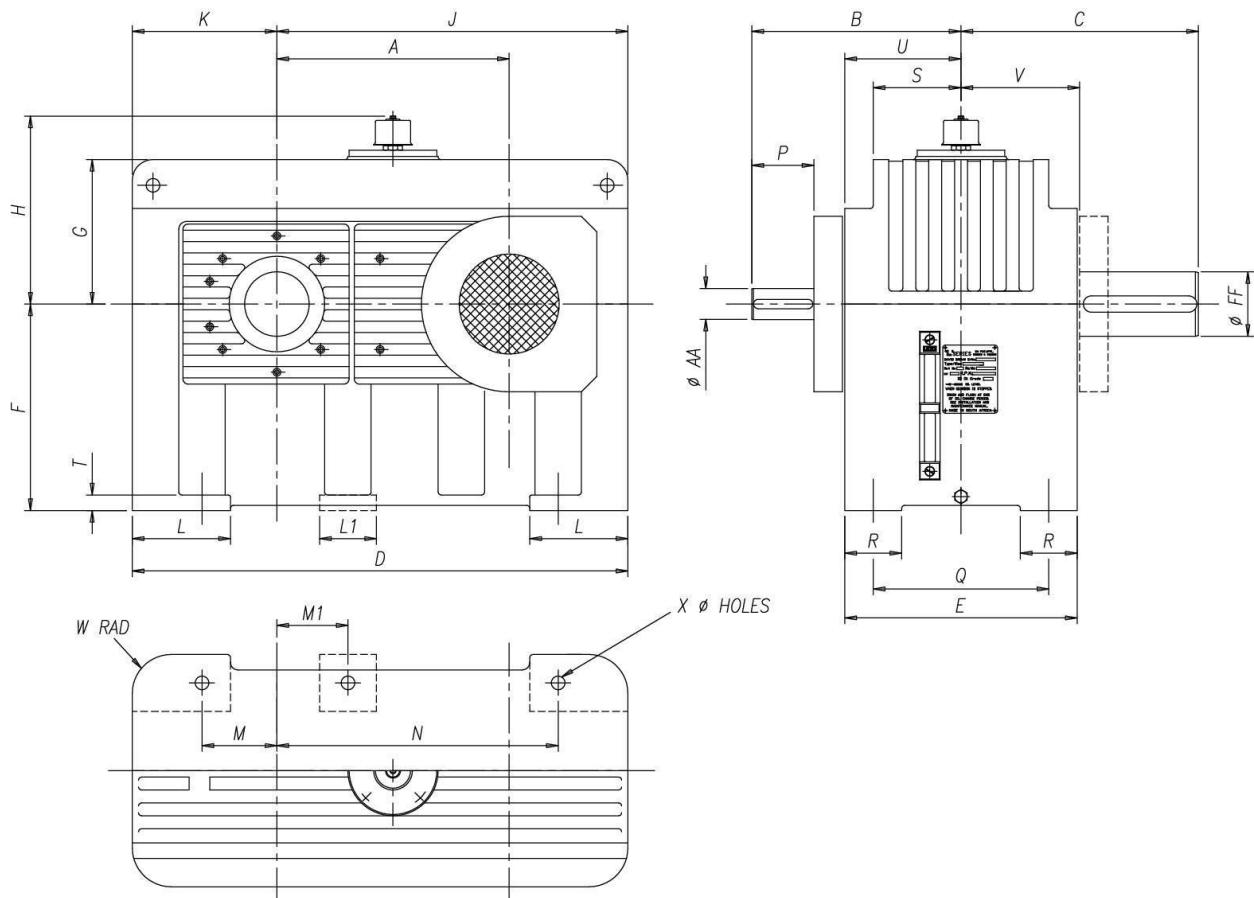
UNIT SIZE	A	B	C	D	E	F	G	H	J	K	L	L1	M	M1	N	P
40	200	375	380	620	370	225	228	276	400	220	160	-----	110	-----	290	140
45	225	400	405	685	370	250	250	298	435	250	160	-----	140	-----	325	155
50	250	450	460	780	450	280	280	328	505	275	190	-----	140	-----	370	165
56	280	460	490	840	450	315	310	358	540	300	190	-----	165	-----	405	170
63	315	570	575	950	560	355	340	388	615	335	250	-----	185	-----	465	220
69	345	590	600	1010	560	400	360	408	655	355	250	-----	185	-----	465	220
76	380	640	700	1150	630	460	400	448	730	420	275	200	237	200	547	255
83	415	690	750	1290	650	480	430	478	815	475	300	200	275	220	615	280

UNIT SIZE	Q	R	S	T	U	V	W	X	AA	FF
40	280	100	135	25	185	191	60	23	60	105
45	280	100	135	25	185	193	60	23	70	115
50	340	110	170	30	225	231	75	27	80	125
56	340	125	170	30	225	231	75	27	90	145
63	440	140	225	40	280	286	80	33	100	165
69	440	150	225	40	280	286	80	33	115	185
76	480	180	255	55	315	321	100	39	125	215
83	500	200	262	60	325	331	110	45	140	230

SPS

SERIES L Helical Bevel DIMENSIONS PARALLEL SHAFT DOUBLE REDUCTION

Double Reduction Parallel Shaft-Foot Mounted Units



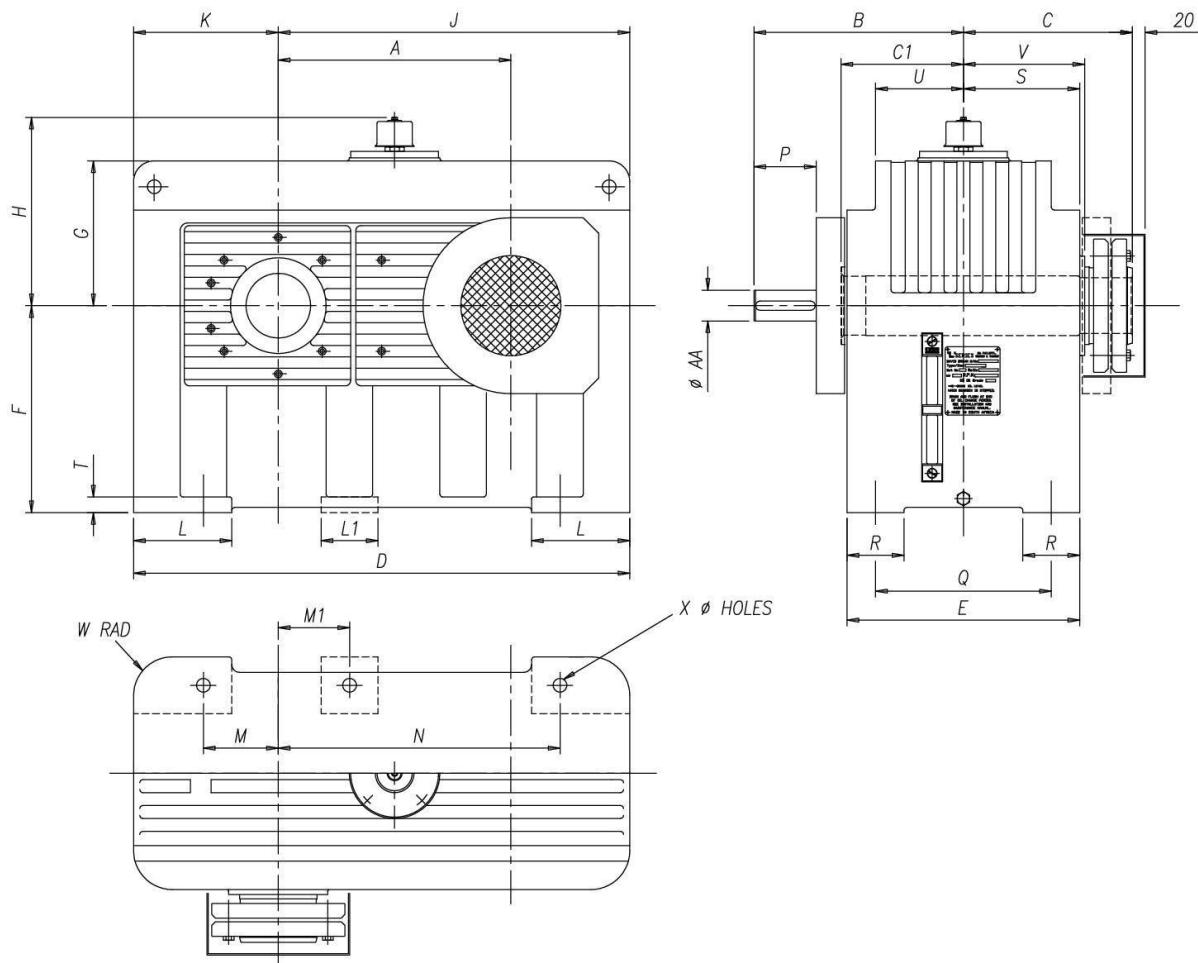
UNIT SIZE	A	B	C	D	E	F	G	H	J	K	L	L1	M	M1	N	P
40	360	335	380	765	370	225	228	276	545	220	160	-----	110	-----	435	100
45	405	355	405	850	390	250	250	298	600	250	160	-----	140	-----	490	110
50	450	405	460	960	450	280	280	328	680	280	190	-----	145	-----	545	120
56	505	435	500	1055	470	315	310	358	745	310	190	120	175	160	610	140
63	565	525	575	1180	560	355	340	388	845	335	250	150	185	182	695	170
69	625	570	610	1265	590	400	360	408	910	355	250	150	205	198	760	195

UNIT SIZE	Q	R	S	T	U	V	W	X	AA	FF
40	280	100	135	25	185	191	60	23	50	105
45	300	100	145	25	195	201	60	23	55	115
50	340	110	170	30	225	231	75	27	60	125
56	360	115	180	30	235	241	75	27	70	145
63	440	140	225	40	280	286	80	33	85	168
69	460	140	235	50	290	305	80	33	90	185

DPS

SERIES L Helical Bevel DIMENSIONS PARALLEL SHAFT DOUBLE REDUCTION

Double Reduction Parallel Shaft-Shaft Mounted Units



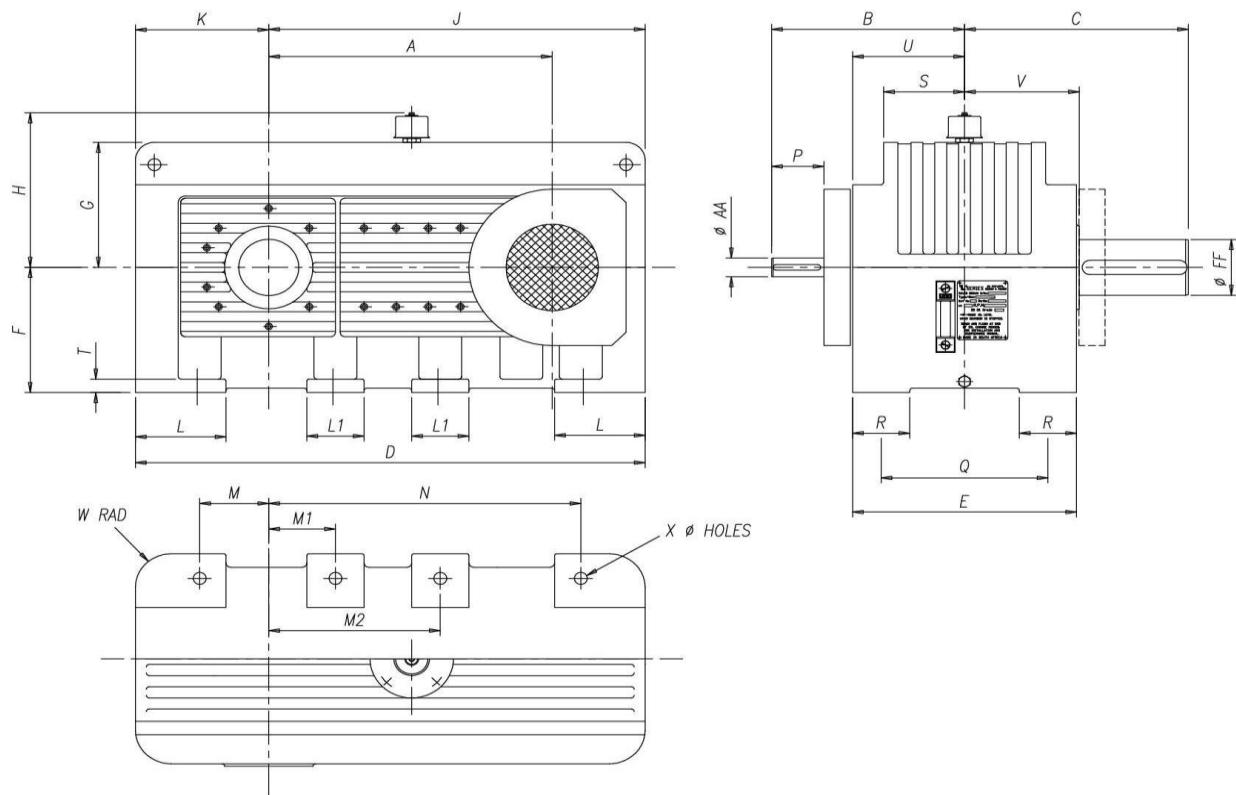
UNIT SIZE	A	B	C	D	E	F	G	H	J	K	L	L1	M	M1	N	P
40	360	335	270	765	370	225	228	276	545	220	160	-----	110	-----	435	100
45	405	355	295	850	390	250	250	298	600	250	160	-----	140	-----	490	110
50	450	405	325	960	450	280	280	328	680	280	190	-----	145	-----	545	120
56	505	435	355	1055	470	315	310	358	745	310	190	120	175	160	610	140
63	565	525	400	1180	560	355	340	388	845	335	250	150	185	180	695	170
69	625	570	430	1265	590	400	360	408	910	355	250	150	205	198	760	195

UNIT SIZE	Q	R	S	T	U	V	W	X	AA
40	280	100	135	25	185	191	60	23	50
45	300	100	145	25	195	201	60	23	55
50	340	110	170	30	225	231	75	27	60
56	360	115	180	30	235	241	75	27	70
63	440	140	225	40	280	286	80	33	85
69	460	140	235	50	290	305	80	33	90

DPS

SERIES L Helical Bevel DIMENSIONS PARALLEL SHAFT TRIPLE REDUCTION

Triple Reduction Parallel Shaft-Foot Mounted Units



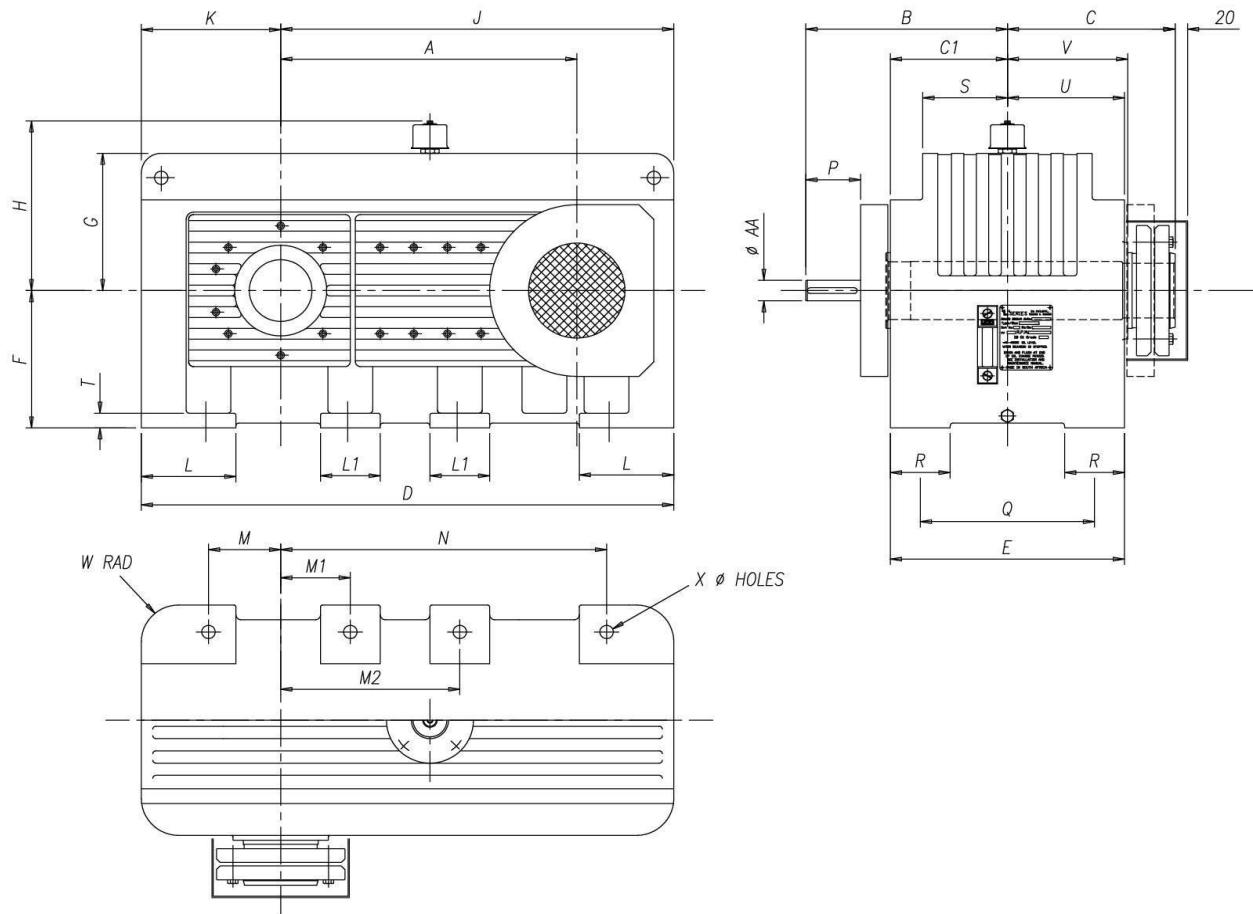
UNIT SIZE	A	B	C	D	E	F	G	H	J	K	L	L1	M	M1	M2	N
40	480	315	380	860	370	225	228	276	640	220	160	-----	-----	110	-----	530
45	505	325	415	920	390	250	250	298	670	250	160	-----	-----	140	-----	560
50	595	405	470	1070	470	280	280	328	790	280	190	120	-----	145	140	655
56	665	415	510	1175	490	315	310	358	865	310	190	120	-----	175	165	730
63	765	495	595	1350	600	355	340	388	1010	340	250	150	-----	185	181	855
69	825	505	625	1445	620	400	360	408	1070	375	250	150	-----	220	187	915
76	945	640	760	1650	760	460	400	448	1230	420	275	180	237	205	552	1047
83	1010	670	815	1760	800	480	440	488	1310	450	275	180	265	230	600	1125

UNIT SIZE	P	Q	R	S	T	U	V	W	X	AA	FF
40	80	280	95	135	25	185	193	60	23	38	105
45	80	300	100	145	25	195	201	60	23	38	115
50	110	360	120	170	30	225	231	75	27	42	125
56	110	380	120	190	35	235	241	75	27	45	145
63	120	480	150	245	40	300	306	80	33	55	165
69	120	480	160	255	50	310	316	80	33	60	185
76	180	600	200	310	55	380	386	100	39	80	215
83	190	616	200	325	55	400	406	100	39	85	230

TPS

SERIES L Helical Bevel DIMENSIONS PARALLEL SHAFT TRIPLE REDUCTION

Triple Reduction Parallel Shaft-Shaft Mounted Units



UNIT SIZE	A	B	C	D	E	F	G	H	J	K	L	L1	M	M1	M2	N
40	480	315	270	860	370	225	228	276	640	220	160	----	----	110	----	530
45	505	325	295	920	390	250	250	298	670	250	160	----	----	140	----	560
50	595	405	335	1070	470	280	280	328	790	280	190	120	----	145	140	655
56	665	415	365	1175	490	315	310	358	865	310	190	120	----	175	162	730
63	765	495	420	1350	600	355	340	388	1010	340	250	150	----	185	181	855
69	825	505	450	1445	620	400	360	408	1070	375	250	150	----	220	187	915
76	945	640	----	1650	760	460	400	448	1230	420	275	180	237	205	552	1047
83	1010	670	----	1760	800	480	440	488	1310	450	275	180	265	230	600	1125

UNIT SIZE	P	Q	R	S	T	U	V	W	X	AA
40	80	280	95	135	25	185	193	60	23	38
45	80	300	100	145	25	195	201	60	23	38
50	110	360	120	170	30	225	231	75	27	42
56	110	380	120	190	35	235	241	75	27	45
63	120	480	150	245	40	300	306	80	33	55
69	120	480	160	255	50	310	316	80	33	60
76	180	600	200	310	55	380	386	100	39	80
83	190	616	200	325	55	400	406	100	39	85

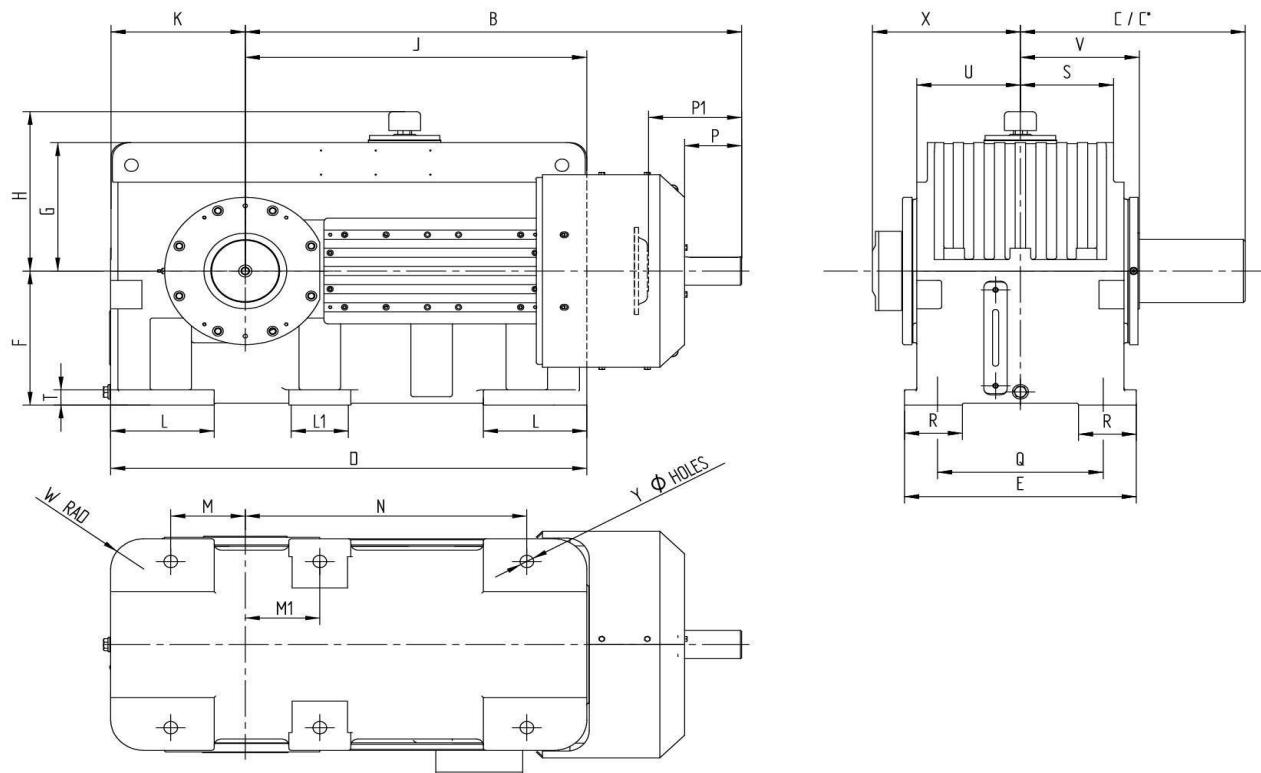
TPS

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SERIES L Helical Bevel

DIMENSIONS RIGHT ANGLE SHAFT TRIPLE REDUCTION

Triple Reduction Right Angle Shaft-Foot Mounted Units



UNIT SIZE	B	C	C*	D	E	F	G	H	J	K	L	L1	M	M1	N	P
40	800	380	330	750	370	225	228	276	530	220	160	-----	115	-----	425	100
45	825	405	330	800	370	250	250	298	555	245	160	-----	140	-----	450	100
50	970	460	390	925	450	280	280	328	655	270	190	-----	145	-----	530	120
56	1000	490	390	985	450	315	310	358	685	300	190	-----	175	-----	560	120
63	1200	575	475	1150	560	355	340	388	825	325	250	150	180	180	680	150
69	1230	600	500	1205	560	400	360	408	855	350	250	150	205	205	710	150
76	1410	725	565	1375	700	460	400	448	975	400	275	180	217	218	792	180
83	1480	790	-----	1520	760	480	430	478	1045	475	300	200	290	230	860	180
91	1650	900	650	1675	840	500	475	523	1165	510	300	200	325	260	980	208

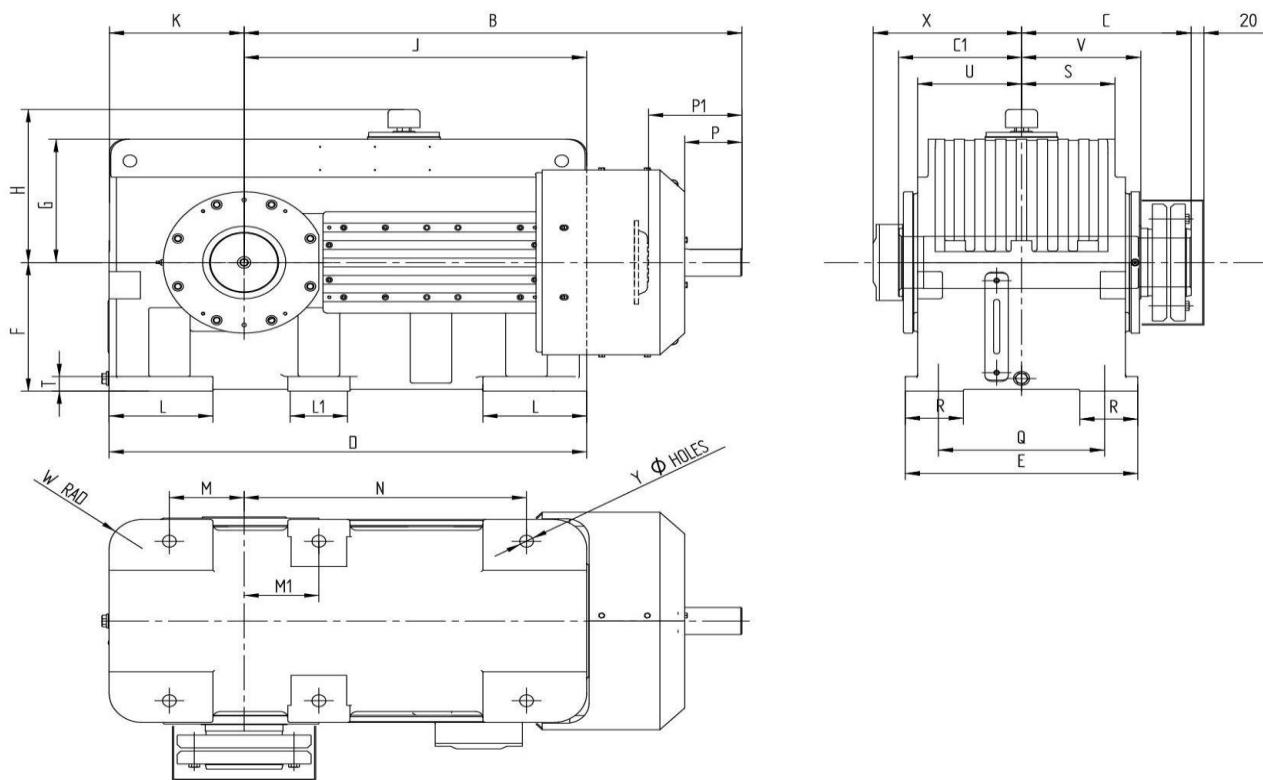
UNIT SIZE	P1	Q	R	S	T	U	V	W	X	Y
40	142	280	100	132	25	190	193	65	236	23
45	142	280	100	132	25	190	193	65	236	23
50	172	330	115	170	30	230	231	75	285	27
56	172	330	115	170	30	230	231	75	285	27
63	226	440	140	225	40	285	291	80	371	33
69	226	440	140	225	50	285	291	80	371	33
76	257	580	180	275	55	350	350	100	435	39
83	257	620	200	305	60	380	380	110	-----	45
91	286	700	200	335	55	420	426	100	-----	45

* For Rigid Flange coupled units

TRA

SERIES L Helical Bevel DIMENSIONS RIGHT ANGLE SHAFT TRIPLE REDUCTION

Triple Reduction Right Angle Shaft -Shaft Mounted Units

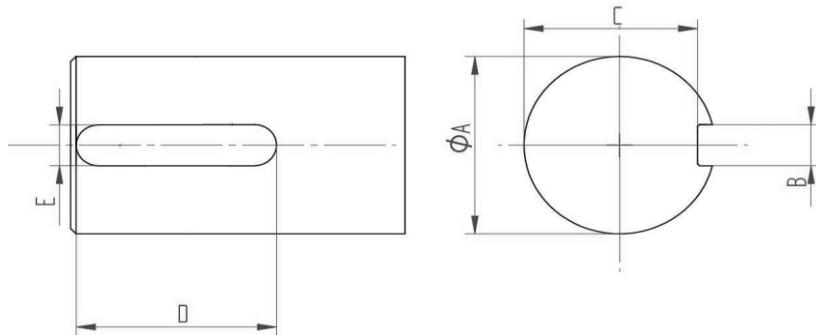


UNIT SIZE	B	C	C1	D	E	F	G	H	J	K	L	L1	M	M1	N	P
40	800	270	200	750	370	225	228	276	530	220	160	----	115	----	425	100
45	825	285	205	800	370	250	250	298	555	245	160	----	140	----	450	100
50	970	325	240	925	450	280	280	328	655	270	190	----	145	----	530	120
56	1000	345	240	985	450	315	310	358	685	300	190	----	175	----	560	120
63	1200	400	295	1150	560	355	340	388	825	325	250	150	180	180	680	150
69	1230	420	295	1205	560	400	360	408	855	350	250	150	205	205	710	150
76	1410	----	----	1375	700	460	400	448	975	400	275	180	217	217	792	180
83	1480	----	----	1520	760	480	430	478	1045	475	300	200	290	230	860	180
91	1650	----	----	1675	840	500	475	523	1165	510	300	200	325	260	980	208

UNIT SIZE	P1	Q	R	S	T	U	V	W	X	Y
40	142	280	100	132	25	190	193	65	236	23
45	142	280	100	132	25	190	193	65	236	23
50	172	330	115	170	30	230	231	75	285	27
56	172	330	115	170	30	230	231	75	285	27
63	226	440	140	225	40	285	291	80	371	33
69	226	440	140	225	50	285	291	80	371	33
76	257	580	180	275	55	350	350	100	435	39
83	257	620	200	305	60	380	380	110	----	45
91	286	700	200	335	55	420	426	100	----	45

TRA

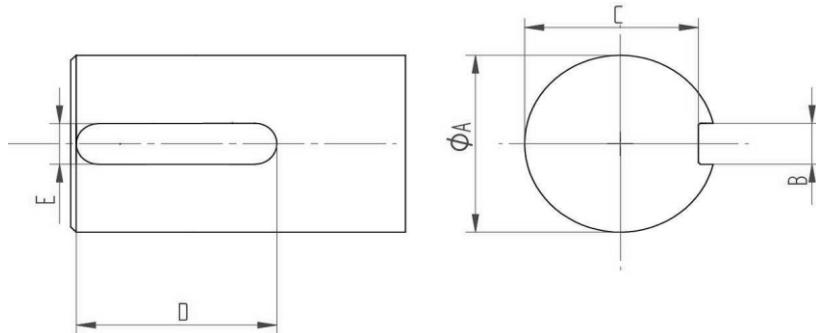
SERIES L Helical Bevel INPUT SHAFT OPTIONS



Parallel Shaft Units

SIZE OF UNIT	TYPE OF UNIT	NO OF REDUCTIONS	DIMENSIONS IN MM				
			A	B	C	D	E
40	SPS	1	60,030 60,011	17,982 17,939	53,0 52,8	100	M20X42
	DPS	2	50,025 50,009	13,982 13,939	44,5 44,3	91	M16X36
	TPS	3	38,018 38,002	9,985 9,949	33,0 32,8	70	M12X28
45	SPS	1	70,030 70,011	19,978 19,926	62,5 62,3	130	M20X42
	DPS	2	55,030 55,011	15,982 15,939	49,0 48,8	100	M16X36
	TPS	3	38,018 38,002	9,985 9,949	33,0 32,8	70	M12X28
50	SPS	1	80,030 80,011	21,978 21,926	71,0 70,8	145	M20X42
	DPS	2	60,030 60,011	17,982 17,939	53,0 52,8	115	M16X36
	TPS	3	42,018 42,002	11,982 11,939	37,0 36,8	100	M16X36
56	SPS	1	90,035 90,013	24,978 24,926	81,0 80,8	150	M20X42
	DPS	2	70,030 70,011	19,978 19,926	62,5 62,3	130	M20X42
	TPS	3	45,018 45,002	13,982 13,939	39,5 39,3	100	M16X36
63	SPS	1	100,035 100,013	27,978 27,926	90,0 89,8	200	M20X42
	DPS	2	85,035 85,013	21,978 21,926	76,0 75,8	160	M20X42
	TPS	3	55,030 55,011	15,982 15,939	49,0 48,8	110	M20X42
69	SPS	1	115,035 115,013	31,974 31,912	104,0 103,8	220	M20X42
	DPS	2	90,035 90,013	24,978 24,926	81,0 80,8	190	M20X42
	TPS	3	60,030 60,011	17,982 17,939	53,0 52,8	110	M20X42
76	SPS	1	125,040 125,015	31,974 31,912	114,0 113,8	230	M20X42
	DPS	2	-----	-----	-----	-----	-----
	TPS	3	80,030 80,011	21,978 21,926	71,0 70,8	170	M20X42
83	SPS	1	140,040 140,015	35,974 35,912	128,0 127,7	265	M20X42
	DPS	2	-----	-----	-----	-----	-----
	TPS	3	85,035 85,013	21,978 21,926	76,0 75,8	180	M20X42

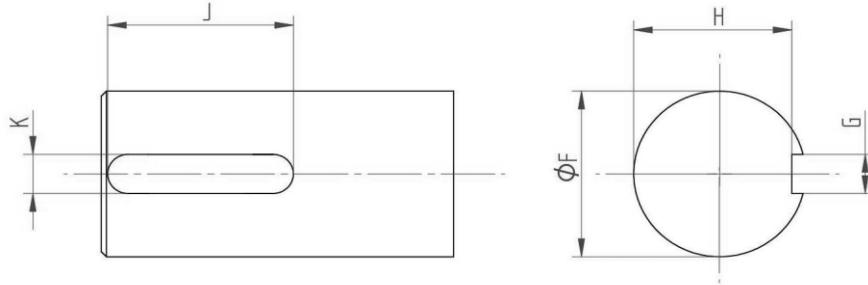
SERIES L Helical Bevel



Right Angle Shaft Units

SIZE OF UNIT	TYPE OF UNIT	NO OF REDUCTIONS	RATIOS	DIMENSIONS IN MM				
				A	B	C	D	E
40	TRA	3	≤ 38.4:1	50,025 50,009	13,982 13,939	44,5 44,3	80	M16 x 36
			≥ 42.5:1	40,025 40,009	11,982 11,939	35,0 34,8	80	M16 x 36
		3	≤ 42.5:1	50,025 50,009	13,982 13,939	44,5 44,3	80	M16 x 36
			≥ 47.0:1	40,025 40,009	11,982 11,939	35,0 34,8	80	M16 x 36
50	TRA	3	≤ 38.4:1	60,030 60,011	17,982 17,939	53,0 52,8	100	M20 x 42
			≥ 42.5:1	55,030 55,011	15,982 15,939	49,0 48,8	100	M20 x 42
		3	≤ 52.0:1	60,030 60,011	17,982 17,939	53,0 52,8	130	M20 x 42
			≥ 57.7:1	55,030 55,011	15,982 15,939	49,0 48,8	100	M20 x 42
63	TRA	3	≤ 38.4:1	75,030 75,011	19,982 19,939	67,5 67,3	130	M20 x 42
			≥ 42.5:1	70,030 70,011	19,978 19,926	62,5 62,3	130	M20 x 42
		3	≤ 42.5:1	75,030 75,011	19,982 19,939	67,5 67,3	130	M20 x 42
			≥ 47.0:1	70,030 70,011	19,978 19,926	62,5 62,3	130	M20 x 42
76	TRA	3	ALL	90,035 90,013	24,978 24,926	81,0 80,8	160	M20 x 42
83	TRA	3	ALL	90,035 90,013	24,978 24,926	81,0 80,8	160	M20 x 42
91	TRA	3	ALL	100,035 100,013	27,978 27,926	90,0 89,8	190	M20 x 42

SERIES L Helical Bevel OUTPUT SHAFT OPTIONS



Parallel Shaft Units

SIZE OF UNIT	TYPE OF UNIT	NO OF REDUCTIONS	DIMENSIONS IN MM				
			A	B	C	D	E
40	ALL	1, 2, 3	105,035	27,978	95,0	182	M20 x 42
			105,013	27,926	94,8		
45	ALL	1, 2, 3	115,035	31,974	104,0	205	M20 x 42
			115,013	31,912	103,8		
50	ALL	1, 2, 3	125,040	31,974	114,0	220	M20 x 42
			125,015	31,912	113,8		
56	ALL	1, 2, 3	145,040	35,974	133,0	250	M20 x 42
			145,015	35,912	132,7		
63	ALL	1, 2, 3	165,040	39,974	152,0	280	M20 x 42
			165,015	39,912	151,7		
69	ALL	1, 2, 3	185,046	44,974	170,0	290	M20 x 42
			185,017	44,912	169,7		
76	ALL	1, 3	215,046	49,974	198,0	345	M20 x 42
			215,017	49,912	197,7		
83	ALL	1, 3	230,046	49,974	213,0	380	M20 x 42
			230,017	49,912	212,7		

Right Angle Shaft Units

SIZE OF UNIT	TYPE OF UNIT	NO OF REDUCTIONS	RATIOS	DIMENSIONS IN MM				
				A	B	C	D	E
40	TRA	3	ALL	105,035	27,978	95,0	182	M20 x 42
				105,013	27,926	94,8		
45	TRA	3	ALL	115,035	31,974	104,0	205	M20 x 42
				115,013	31,912	103,8		
50	TRA	3	ALL	125,040	31,974	114,0	220	M20 x 42
				125,015	31,912	113,8		
56	TRA	3	ALL	145,040 (140,040*)	35,974	133,0	250	M20 x 42
				145,015 (140,015*)	35,912	132,8		
63	TRA	3	ALL	165,040	39,974	152,0	280	M20 x 42
				165,015	39,912	151,7		
69	TRA	3	ALL	185,046	44,974	170,0	290	M20 x 42
				185,017	44,912	169,7		
76	TRA	3	ALL	215,046 (210,046*)	49,974	198,0	345	M20 x 42
				215,017 (210,017*)	49,912	197,7		
83	TRA	3	ALL	230,046	49,974	213,0	380	M20 x 42
				230,017	49,912	212,7		
91	TRA	3	ALL	255,052 (250,052*)	55,968	235,0	456	M20 x 42
				255,020 (250,020*)	55,894	234,7		

* For Rigid Flange coupled units.

SERIES L Helical Bevel

OUTPUT BORE OPTIONS



Parallel Shaft Units

SIZE OF UNIT	TYPE OF UNIT	NO OF REDUCTIONS	DIMENSIONS IN MM			
			F	G	H	J
40	ALL	2 , 3	90,035 90,000	95,047 95,012	85	40
45	ALL	2 , 3	110,035 110,000	115,047 115,012	95	45
50	ALL	2 , 3	120,035 120,000	125,054 125,014	100	60
56	ALL	2 , 3	140,040 140,000	145,054 145,014	120	70
63	ALL	2 , 3	160,040 160,000	165,045 165,014	120	80
69	ALL	2 , 3	170,040 170,000	175,054 175,014	135	90

Right Angle Shaft Units

SIZE OF UNIT	TYPE OF UNIT	NO OF REDUCTIONS	RATIOS	DIMENSIONS IN MM			
				F	G	H	J
40	TRA	3	ALL	90,035 90,000	95,047 95,012	85	40
45	TRA	3	ALL	110,035 110,000	115,047 115,012	95	45
50	TRA	3	ALL	120,035 120,000	125,054 125,014	100	60
56	TRA	3	ALL	140,040 140,000	145,054 145,014	120	70
63	TRA	3	ALL	160,040 160,000	165,045 165,014	120	80
69	TRA	3	ALL	170,040 170,000	175,054 175,014	135	90

SERIES L Helical Bevel HOLLOW SHAFT WITH SHRINK DISC

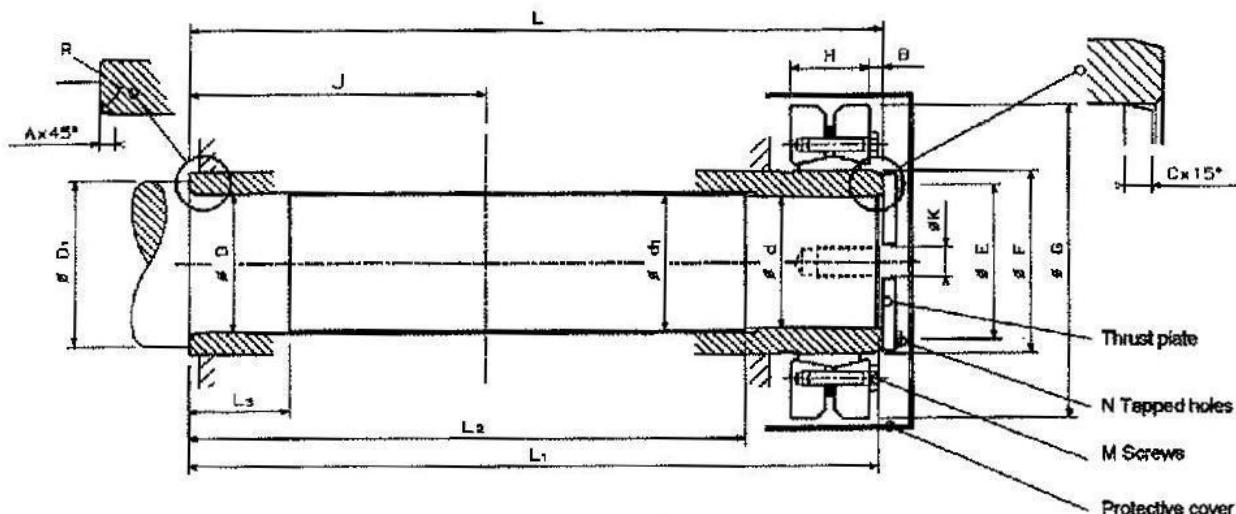
Each shaft mounted gear unit is fitted with a 'shrink disc' device located on the hollow output shaft to provide a positive outer locking connection between the gear unit the driven shaft. The 'shrink disc' is a friction device, without keys, which exerts an external clamping force on the hollow output shaft, thus establishing a mechanical shrink fit between the gear unit hollow shaft and the driven shaft. 'Shrink disc' capacities have ample external loading imposed on gear units.

Working Principle

The 'shrink disc' consists of two locking collars, a double tapered inner ring, locking screws and a sealing ring. By tightening the locking screws, the locking collars are pulled together, exerting radial forces on the inner ring, thus creating a positive friction connection between the hollow output shaft and the driven shaft.

As the tapered surfaces of the locking collars and the inner ring are lubricated with Molycote 321R or similar and the taper angle is not self locking, locking collars will not seize on the inner ring and can be released easily when removal is necessary.

When the 'shrink disc' is clamped in position the high contact pressures between the tapered surfaces and the screw heads and their seatings ensure hermetic sealing and eliminate the possibility of fretting corrosion.



UNIT SIZE	CUSTOMERS SHAFT								SHRINK DISC					
	d	d1	D	L1	L2	L3	C	R	K	F	G	H	M	Ma
40	90	92	95	467	372	105	3	3,5	M24X50	125	215	53	M10	58
45	110	112	115	487	382	118	3	3,5	M24X50	150	263	62	M12	100
50	120	122	125	572	452	130	4	4,0	M30X60	160	290	68	M16	240
56	140	142	145	582	452	155	4	4,0	M30X60	180	330	85	M16	240
63	160	162	165	692	568	160	4	4,0	M36X70	200	350	85	M16	240
69	170	172	175	713	567	180	4	4,0	M36X70	220	370	104	M16	240

UNIT SIZE	HOLLOW SLEEVE					
	J	L	A	B	N	E
40	200	470	4,5	10	M6X12	112
45	205	490	4,5	10	M6X12	135
50	240	565	5,0	10	M8X18	145
56	240	585	5,0	12	M8X18	160
63	295	695	5,0	12	M8X20	185
69	295	715	5,0	14	M10X26	197

SERIES L Helical Bevel COUPLING OPTIONS

Cone Ring

Accommodate all types of shaft misalignment met during normal operation. Being a development of the old pin and bush design which it resembles in simplicity and ease of assembly and dismantling. Flexible cone ring couplings; types 611, 612, 613 and 614 are available in bore sizes up to and including 355 mm and has simplified torque rating up to 188,700Nm.

For the L series application the preferred coupling is the type 611, this is the heavy duty range with a parallel bore and can be used as an input coupling between the L series gear unit and the prime mover or as an output coupling between the gear unit and the application. It is a zero maintenance coupling, there are no re-greasing intervals or initial greasing requirements.

These couplings are manufactured locally at David Brown Gears Ind.

Grid Flex

A general purpose, lubricated design coupling that combines economy and high torque capacity of a gear coupling with the flexibility of a cone ring coupling. The grid Flex couplings require non-periodic maintenance when lubricated with our long term grease at installation. The Grid Flex coupling range has a basic torque rating of 932,000Nm and accommodates shaft diameters up to and including 508mm.

For the L series application the preferred coupling is the Type T10, the coupling can be used as an input coupling between the L series gear unit and the prime mover or as an output coupling between the gear unit and the application.

Couplings are supplied by David Brown, and can be sized for application by David Brown Application Engineers.

Gear type

A torsionally rigid coupling, lubricated design that offers high torque transmitting capacity. The gear couplings are designed to AGMA size standards and feature triple-crowned teeth. 28 size gear couplings are available and can transmit over 8MNm with a bore range up to and including 1025mm. The single engagement coupling can accommodate angular shaft misalignment and a double engagement coupling can accommodate both angular and parallel shaft misalignment.

For the L series application the gear coupling is used on the output between the gear unit and the application, either a G20 (double engagement) or G52 (single engagement) can be used, depending on the system requirements.

Hydrodynamic coupling

A coupling based on Foettinger's Principle, where either mineral oil or water is typically used as the operating fluid within the coupling. The Hydrodynamic or fluid coupling allows for "soft-starting", smooth acceleration and torque limitations from the prime mover to the gear unit, the coupling can transmit in excess of 15.280Nm with a bore range of up to and including 180mm.

For the L series range the hydrodynamic coupling is used as an input coupling between the prime mover and gear unit. Most often a coupling with a delay fill chamber is used, however the coupling design will vary depending on the applications parameters and requirements. When two or more drives are driving an application the hydrodynamic coupling will allow for effective load sharing between the two drives.

SERIES L Helical Bevel

Rigid flange coupling

A coupling designed to replace conventional couplings which are normally keyed or heat shrunk onto the shafts. Shaft alignment between the gear unit and application is eliminated as the two coupling halves are merely bolted together to create the rigid coupling. The coupling is maintenance free and requires no initial greasing or lubrication. The rigid coupling can transmit 517,000 Nm with a bore range of up to and including 290mm. If a rigid coupling is used either the resilient bush type or swivel type torque mounting must be used in conjunction to accommodate for reaction forces as the drive "hangs" from the application shaft.

For the L series the rigid coupling is used on the output shaft between the gear unit and the application. There is no need for a foundation to positively secure the drive to, only a reaction arm point is required for the torque mounting. If one drive needs to be replaced by another drive it can be done simplistically and quickly.

Roller buffer coupling

A flexible coupling that incorporates rubber buffers to transmit the required torque. The rubber buffers shear when the application is overloaded, thus protecting the system from damage. The roller buffer coupling can accommodate both parallel and angular misalignment experienced during normal operation. The roller buffer coupling can accommodate up to 366,800 Nm with a bore of up to and including 390mm.

For the L series gear unit the roller buffer coupling can be used as an input coupling between the prime mover and the L series gear unit. Due to the torque rating and bore size range this coupling can also be used as an output coupling between the gear unit and application.

*The above mentioned couplings are not the only couplings David Brown Gears recommends and supplies, they are however the more common and popular couplings for L series range.

Resilient bush torque mount

A compact design torque mount with a resilient rubber bush and a steel stud. This design is compact and allow for both compressive and tensile loading conditions that would be experienced in normal operation.

**To be used in conjunction with a rigid flange coupling

Swivel type torque mount

A versatile torque mount that is easy to install and allows for quite sever misalignment during operation. The overall length can be varied from 350mm to well over 1500mm (load dependant). David Brown Engineers will determine the maximum loads and lengths that the torque mount can accommodate.

**To be used in conjunction with a rigid flange coupling

SERIES L Helical Bevel SHIPPING SPECIFICATIONS

The masses given below are approximations. The actual mass of the gear units may vary in accordance with the size and ratio of the unit.

Gear Unit Net Weights-kg

UNIT TYPE	UNIT SIZES								
	40	45	50	56	63	69	76	83	91
SPS	418	492	809	932	1350	1730	2733	4315	-----
DPS	470	610	950	1092	1582	2027	-----	-----	-----
TPS	590	765	1191	1370	1985	2342	3700	5841	-----
TRA	470	534	884	954	1594	1804	2924	3513	4884

David Brown Gear units are commonly shipped as part of a full drive system, the overall mass is system dependent, and cannot be estimated.

All Series L gear units are packed as per David Brown standard on a wooden shipping pallet only. Upon request by the customer other forms of packaging can be provided.

SERIES L Helical Bevel NOTES

SERIES L Helical Bevel

IMPORTANT

Product Safety Information

General – The following information is important in ensuring safety. It must be brought to the attention of personnel involved in the selection of David Brown Radicon (Pty) Limited power transmission equipment, those responsible for the design of the machinery in which it is to be incorporated and those involved in its installation, use and maintenance.

David Brown power transmission equipment will operate safely provided it is selected, installed, used and maintained properly. As with any power transmission equipment **proper precautions** must be taken as indicated in the following paragraphs, to ensure safety.

1. Fire/Explosion
 - a. Oil mists and vapour are generated within gear units. It is therefore dangerous to use naked light in the proximity of gearbox openings, due to the risk of fire or explosion.
 - b. In the event of fire or serious overheating (over 300°C), certain materials (rubber, plastics, etc) may decompose and produce fumes. Care should be taken to avoid exposure to the fumes, and the remains of burned or overheated plastic/ rubber materials should be handled with rubber gloves.
2. Guards- Rotating shafts and couplings must be guarded to eliminate the possibility of physical contact of entanglement of clothing. It should be of rigid construction and firmly secured.
3. Noise- High speed gearboxes and gearbox driven machinery may produce noise levels which are damaging to the hearing with prolonged exposure. Ear defenses should be provided in these circumstances.
4. Lifting- Where provided, only the lifting points or eyebolts should be used for lifting operations (see Maintenance and Installation manuals or general arrangement drawings for lifting positions). Failure to use the lifting points provided may result in personal injury and/ or damage to the product or surrounding equipment. **Keep clear of the raised equipment.**
5. Lubricants and Lubrication
 - a. Prolonged contact with lubricants can be detrimental to the skin. The manufacturer's instruction must be followed when handling lubricants.
 - b. The lubrication status of the equipment must be checked before commissioning. Read and carry out all instruction on the lubricant plate and in the installation and maintenance literature. Heed all warning tags. Failure to do so could result in mechanical damage and in extreme cases risk of injury.
6. Electrical Equipment- Observe hazard warnings on electrical equipment and isolate power before working on the gearbox or associated equipment, in order to prevent the machinery being started.
7. Installation, Maintenance and Storage
 - a. In the event that the equipment is to be held in storage, for a period exceeding six (6) months, prior to installation or commuting, David Brown Radicon (Pty) Limited must be consulted regarding special preservative requirements. Unless otherwise agreed, equipment must be stored in a building protected for extremes of temperature and humidity to prevent deterioration.
 - b. External gearbox components may be supplied with preservative materials applied, in the form of a "waxed" tape overwrap or wax film preservative. Gloves should be worn when removing these materials. The former can be removed manually, the latter using white spirit as a solvent.
 - c. Installation must be performed in accordance with the manufacturer's instructions and be undertaken by suitably qualified personnel.
 - d. Before working on a gearbox or associated equipment, ensure that the load has been removed from the system to eliminate the possibility of any movement of the machinery and isolate power supply. Where necessary, provide mechanical means to ensure the machinery cannot move or rotate. Ensure removal of such devices after work is complete.
 - e. Ensure the proper maintenance of gearboxes in operation. Use only the correct tools and David Brown Radicon (Pty) Limited approves spares for repair and maintenance. Consult the Maintenance manual before dismantling or performing maintenance work.
8. Hot Surfaces and Lubricants
 - a. During operation, gear units may become sufficiently hot to cause skin burns. Care must be taken to avoid accidental contact.
 - b. After extended running the lubricant in gear units and lubrication system may reach temperatures sufficient to cause burns. Allow equipment to cool before servicing or performing adjustments.
9. Selection and Design
 - a. Where gear units provide holdback facility, ensure that back-up systems are provided if failure of the holdback device would endanger personnel or result in damage.
 - b. The driving and driven equipment must be correctly selected to ensure that the complete machinery installation will perform satisfactorily, avoiding system critical speeds, system torsional vibration, etc.
 - c. The equipment must not be operated in an environment or at speeds, powers, torques or with any external loads beyond those for which it was designed.
 - d. As improvements in design are being made continually the contents of this catalogue are not to be regarded as binding in detail, and drawings and capacities are subject to alterations without notice.

The above guidance is based on the current state of knowledge and our best assessment of the potential hazards in the operation of the gear units.

Any further information or clarification required may be obtained by telephoning or writing to:

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