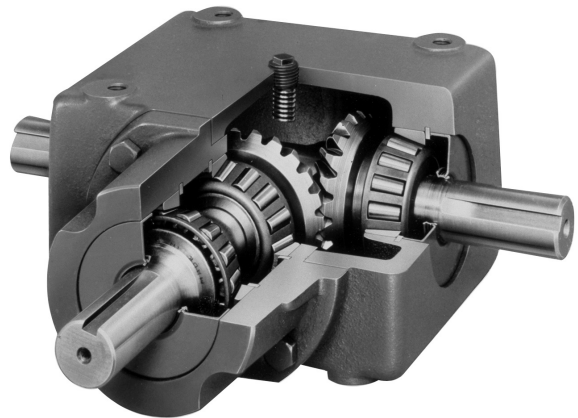




Browning[®]

HB and HSB Bevel and Spiral Bevel

1. Rugged cast iron housings, line bored for precise gear and bearing alignment.
2. Commercially available tapered roller and ball bearings catalog load capacity.
3. Carburized alloy steel straight or spiral gears manufactured to AGMA standard for long life and quiet operation.
4. Double lip contact oil seals ride on hardened plunge ground shafts.



- 6 Sizes
- Spiral bevel and straight bevel gears
- Ratios 1:1 to 3:1 with speed up ratios available
- Torque ratings from 99 to 6,508 in.-lbs.

Selection and Ordering Information

Overload Service Factors

Load and operating characteristics of both driver and driven units must be considered thoroughly when selecting Browning® Bevel Gear Boxes. It is essential that all gear boxes be selected for maximum load conditions to be encountered. Browning Bevel Gear Boxes will safely transmit momentary starting loads as great as 200% of the mechanical input ratings.

First determine the load classification of the driven unit from the table on page B-4. Then from the table below, select an overload service factor for this classification, for duration of service to be involved and for the type of prime mover to be used.

Prime Mover	Duration of Service	Driven Machine Load Classification		
		U Uniform	M Moderate Shock	H Heavy Shock
Electric Motor	Occasional - 1.2 hour per day	0.50	0.80	1.25
	Intermittent - 3 hours per day	0.80	1.00	1.50
	Up to 10 hours per day	1.00	1.25	1.75
	24 hours per day	1.25	1.50	2.00
Multi-Cylinder Internal Combustion Engine	Occasional - 1.2 hour per day	0.80	1.00	1.50
	Intermittent - 3 hours per day	1.00	1.25	1.75
	Up to 10 hours per day	1.25	1.50	2.00
	24 hours per day	1.50	1.75	2.25
Single Cylinder Internal Combustion Engine	Occasional - 1.2 hour per day	1.00	1.25	1.75
	Intermittent - 3 hours per day	1.25	1.50	2.00
	Up to 10 hours per day	1.50	1.75	2.25
	24 hours per day	1.75	2.00	2.50

Overhung Loads

When a gear box is driven by any belt, chain, or gear drive, or when the gear box drives a driven unit through a belt, chain or gear drive, overhung loads must not exceed those shown in the tables on pages B-5 - B-8. Use the following formula to calculate the overhung load.

$$OL = \frac{2TK}{D}$$

Where:

- OL = Overhung Load (pounds)
- T = Actual Shaft Torque (Inch-Pounds)
- D = P.D. of Sprocket, Sheave, Pulley or Gear
- K = 1.0 for Chain Drives
- 1.25 for Gear Drives
- 1.25 for Gearbelt Drives
- 1.50 for V-Belt Drives

No overhung loads are encountered when the gear box is coupling connected to the driver and/or driven machine. However, care should be taken in aligning the shafts to avoid pre-loading bearings by misalignment.

Selection Example

A right angle gear box is needed for a line shaft driving processing machinery which requires 1330 inch-pounds torque and will operate about 10 hours per day. This line shaft will be coupling connected at a right angle to an existing line shaft which is driven by an 1150 rpm electric motor. Existing line shaft is 1 7/16" diameter and the new line shaft is 1 3/16" diameter.

1. Determine the Load Classification of the driven unit.

From page B-4, the load class for a line shaft driving processing machinery is "M".

2. Determine the Overload Service Factor.

From the table on this page, the service factor for a moderate shock (M) load driven by an electric motor 10 hours per day is 1.25.

3. Determine the Normal Torque (or the Normal hp).

Multiply the required torque by the service factor:
1330 x 1.25 = 1662.5 Normal Torque

4. Select the Gear Box.

From page B-6 under the 1150 RPM column, select a gear box which has a mechanical rating of 1663, or slightly greater, which in this case is 1670 and the gear box is 12HSB1-LR10. Check to see that the thermal rating (1670) exceeds the transmitted load (1330).

5. Select the Couplings Required.

Note: If a chain drive or the other drive has been specified for either or both input or output shafts, the overhung loads would have to be checked from the formula above and from the table on page B-6.

6. List Components

- 1, 12HSB1-LR10 Spiral Bevel Gear Box

Load Classifications - Typical Applications**

Application	Load Class	Application	Load Class	Application	Load Class
AGITATORS		EXTRUDERS (Plastic)-Continued		PAPER MILLS-Continued	
Pure Liquids	U	Pipe	U	Calendars-Super	H
Liquids and Solids	M	Tubing	U	Converting Machine, Except Cutters, Platers	M
Liquids - Variable Density	M	Blow Molders	M	Conveyors	U
BLOWERS		Pre-plasticizers	M	Couch	M
Centrifugal	U	FANS		Cutters-Platers	H
Lobe	M	Centrifugal	U	Cylinders	M
Vane	U	Cooling Towers-Induced Draft	★	Dryers	M
BREWING AND DISTILLING		Forced Draft	U*	Felt Stretchers	M
Bottling Machinery	U	Induced Draft	U	Felt Whippers	H
Brew Kettles, Continuous Duty	U	Large (Mine, etc.)	M	Jordons	H
Cookers, Continuous Duty	U	Large (Industrial)	M	Log Haul	H
Mash Tubs, Continuous Duty	U	Light (Small Diameter)	U	Presses	U
Scale Hopper, Frequent Starts	M	FEEDERS		Pulp Machine Reel	M
CAN FILLING MACHINES	U	Apron	M	Stock Chests	M
CANE KNIVES	M*	Belt	M	Suction Roll	U
CAR DUMPERS	H	Disc	U	Washers and Thickeners	M
CAR PULLERS	M	Reciprocating	H	Winders	U
CLARIFIERS	U	Screw	M	PRINTING PRESSES	
CLASSIFIERS	M	FOOD INDUSTRY		PULLERS	
CLAY WORKING MACHINERY		Beet Slicers	M	Barge Haul	H
Brick Press	H	Cereal Cookers	U	PUMPS	
Briquette Machine	H	Dough Mixers	M	Centrifugal	U
Clay Working Machinery	M	Meat Grinders	M	Proportioning	M
Pub Mill	M	GENERATORS - (Not Welding)	U	Reciprocating	
COMPRESSORS		HAMMER MILLS	H	Single Acting, 3 or more cylinders	M
Centrifugal	U	HOISTS		Double Acting, 2 or more cylinders	M
Lobe	M	Heavy Duty	H	Single Acting, 1 or 2 cylinders	★
Reciprocating, Multi-Cylinder	M	Medium Duty	M	Double Acting, Single cylinder	★
Reciprocating, Single Cylinder	H	Skip Hoist	M	Rotary-Gear Type	U
CONVEYORS-UNIFORMLY LOADED OR FED		LAUNDRY WASHERS		-Lobe, Vane	U
Apron	U	Reversing	M	RUBBER AND PLASTIC INDUSTRIES	
Assembly	U	LAUNDRY TUMBLERS	M	Crackers	H*
Belt	U	LINE SHAFTS		Laboratory Equipment	M
Bucket	U	Driving Processing Equipment	M	Mixing Mills	H*
Chain	U	Light	U	Refiners	M*
Flight	U	Other Line Shafts	U	Rubber Calenders	M*
Oven	U	LUMBER INDUSTRY	★	Rubber Mill (2 on line)	M*
Screw	U	MACHINE TOOLS		Rubber Mill (3 on line)	U*
CONVEYORS-HEAVY DUTY NOT UNIFORMLY FED		Bending Roll	M	Sheeter	M*
Apron	M	Punch Press-Gear Driven	H	Tire Building Machines	★
Assembly	M	Notching Press-Belt Driven	★	Tire and Tube Press Openers	★
Belt	M	Plate Planers	H	Tubers and Strainers	M*
Bucket	M	Tapping Machine	H	Warming Mills	M*
Chain	M	Other Machine Tools		SAND MULLER	M
Flight	M	Main Drives	M	SEWAGE DISPOSAL EQUIPMENT	
Live Roll	★	Auxiliary Drives	U	Bar Screens	U
Oven	M	METAL MILLS		Chemical Feeders	U
Reciprocating	H	Draw Bench Carriage and Main Drive	M	Collectors	U
Screw	M	Pinch, Dryer and Scrubber Rolls, Reversing	★	Dewatering Screens	M
Shaker	H	Slitters	M	Scum Breakers	M
CRANES		Table Conveyors		Slow or Rapid Mixers	M
Main Hoists	U	Non-Reversing		Thickeners	M
Bridge	★	Group Drives	M	Vacuum Filters	M
Trolley Travel	★	Individual Drives	H	SCREENS	
CRUSHER		Reversing	★	Air Washing	U
Ore	H	Wire Drawing and Flattening Machines	M	Rotary-Stone and Gravel	M
Stone	H	Wire Winding Machines	M	Traveling Water Intake	U
Sugar	M*	MILLS, ROTARY TYPE		SLAB PUSHERS	M
DREDGES		Ball	M*	STEERING GEAR	★
Cable Reels	M	Cement Kilns	M*	STOKERS	U
Conveyors	M	Dryers and Coolers	M*	SUGAR INDUSTRY	
Cutter Head Drives	H	Kilns	M	Cane Knives	M*
Jig Drives	H	Pebble	M*	Crushers	M*
Maneuvering Winches	M	Rod, Plain and Wedge Bar	M*	Mills	H*
Pumps	M	Tumbling Barrels	H	TEXTILE INDUSTRY	
Screen Drive	H	MIXERS		Batchers	M
Stackers	M	Concrete, Continuous	M	Calenders	M
Utility Winches	M	Concrete, Intermittent	M	Cards	M
ELEVATORS		Constant Density	U	Dry Cans	M
Bucket-Uniform Load	U	Variable Density	M	Dryers	M
Bucket-Heavy Load	M	OIL INDUSTRY		Dyeing Machinery	M
Bucket-Continuous	U	Chillers	M	Knitting Machines	★
Centrifugal Discharge	U	Oil Well Pumping	★	Looms	M
Escalators	U	Paraffin Filter Presses	M	Mangles	M
Freight	M	Rotary Kilns	M	Nappers	M
Gravity Discharge	U	PAPER MILLS		Range Drives	★
Man Lifts	★	Agitators (Mixers)	M	Slashers	M
Passenger	★	Barker-Auxiliaries-Hydraulic	M	Soapers	M
EXTRUDERS (Plastic)		Barker-Mechanical	M	Spinners	M
Film	U	Barking Drum	H	Tenter Frames	M
Sheet	U	Beater and Pulper	M	Washers	M
Coating	U	Bleacher	U	Winders	M
Rods	U	Calenders	M	WINDLASS	★

* Select Service Factor for 24 hours service only.

★ Refer to Application Engineering (1 800 626 2093).

** Determine Load Class from the table above. Determine Service Factor from the table on page B-3.

Speed, Horsepower, Torque and Overhung Loads

Part No.	Ratio	Gearing	Rating	Revolutions per Minute — Input Shaft**						
				1750	1150	850	690	400	300	100
3HSB1-LR10 3HSB1-SN10 3HSB1-SF10	1:1	Spiral	Output Speed (RPM)	1750	1150	850	690	400	300	100
			Mechanical Horsepower	2.19	1.47	1.10	0.90	0.53	0.40	0.14
			Thermal Horsepower	2.19	1.47	1.10	0.90	0.53	0.40	0.14
			Mechanical Output Torque (In.-Lbs.)	78.70	80.30	81.30	81.90	83.30	84.70	85.80
			Thermal Output Torque (In.-Lbs.)	78.70	80.30	81.30	81.90	83.30	84.70	85.80
			Maximum Input Overhung Load (Lbs.)	60	90	100	110	125	150	160
Maximum Output Overhung Load (Lbs.)	150	175	210	230	300	400	400			
3HB1-LR10 3HB1-SN10 3HB1-SF10	1:1	Straight	Output Speed (RPM)	1750	1150	850	690	400	300	100
			Mechanical Horsepower	2.25	1.50	1.13	0.93	.55	.42	.14
			Thermal Horsepower	2.25	1.50	1.13	0.93	.55	.42	.14
			Mechanical Output Torque (In.-Lbs.)	81	83	84	85	87	88	90
			Thermal Output Torque (In.-Lbs.)	81	83	84	85	87	88	90
			Maximum Input Overhung Load (Lbs.)	88	110	131	137	169	189	190
Maximum Output Overhung Load (Lbs.)	177	205	240	267	330	378	400			
3HB1-LR15 3HB1-SN15 3HB1-SF15	1.5:1	Straight	Output Speed (RPM)	1166	766	566	460	266	200	66
			Mechanical Horsepower	1.57	1.03	.80	.65	.39	.30	.12
			Thermal Horsepower	1.57	1.03	.80	.65	.39	.30	.12
			Mechanical Output Torque (In.-Lbs.)	84	85	88	89	92	95	113
			Thermal Output Torque (In.-Lbs.)	84	85	88	89	92	95	113
			Maximum Input Overhung Load (Lbs.)	98	118	137	144	175	190	190
Maximum Output Overhung Load (Lbs.)	245	290	320	350	400	400	400			
3HB1-LR20 3HB1-SN20 3HB1-SF20	2:1	Straight	Output Speed (RPM)	875	575	425	345	200	150	50
			Mechanical Horsepower	1.04	.70	.53	.43	.26	.20	.08
			Thermal Horsepower	1.04	.70	.53	.43	.26	.20	.08
			Mechanical Output Torque (In.-Lbs.)	75	77	78	80	82	83	100
			Thermal Output Torque (In.-Lbs.)	75	77	78	80	82	83	100
			Maximum Input Overhung Load (Lbs.)	102	121	142	148	180	190	190
Maximum Output Overhung Load (Lbs.)	300	350	382	400	400	400	400			
6HSB1-LR10 6HSB1-SN10 6HSB1-SF10	1:1	Spiral	Output Speed (RPM)	1750	1150	850	690	400	300	100
			Mechanical Horsepower	20.30	13.7	10.4	8.52	5.08	3.85	1.33
			Thermal Horsepower	20.30	13.7	10.4	8.52	5.08	3.85	1.33
			Mechanical Output Torque (In.-Lbs.)	731	750	771	778	800	808	838
			Thermal Output Torque (In.-Lbs.)	731	750	771	778	800	808	838
			Maximum Input Overhung Load (Lbs.)	152	152	235	308	516	580	580
Maximum Output Overhung Load (Lbs.)	500	508	508	508	508	508	508			
6HB1-LR10 6HB1-SN10 6HB1-SF10	1:1	Straight	Output Speed (RPM)	1750	1150	850	690	400	300	100
			Mechanical Horsepower	21.8	14.3	10.6	8.58	4.98	3.73	1.24
			Thermal Horsepower	21.8	14.3	10.6	8.58	4.98	3.73	1.24
			Mechanical Output Torque (In.-Lbs.)	784	784	784	784	784	784	784
			Thermal Output Torque (In.-Lbs.)	784	784	784	784	784	784	784
			Maximum Input Overhung Load (Lbs.)	549	559	559	559	559	559	559
Maximum Output Overhung Load (Lbs.)	536	536	536	536	536	536	536			
6HB1-LR15 6HB1-SN15 6HB1-SF15	1.4615:1	Straight	Output Speed (RPM)	1197	786	581	472	273	205	68
			Mechanical Horsepower	9.37	6.16	4.55	3.70	2.14	1.61	.54
			Thermal Horsepower	9.37	6.16	4.55	3.70	2.14	1.61	.54
			Mechanical Output Torque (In.-Lbs.)	492	492	492	492	492	492	492
			Thermal Output Torque (In.-Lbs.)	492	492	492	492	492	492	492
			Maximum Input Overhung Load (Lbs.)	559	559	559	559	559	559	559
Maximum Output Overhung Load (Lbs.)	536	536	536	536	536	536	536			
6HB1-LR18 6HB1-SN18 6HB1-SF18	1.8:1	Straight	Output Speed (RPM)	972	638	472	383	222	166	55
			Mechanical Horsepower	6.38	4.91	3.10	2.52	1.46	1.09	.36
			Thermal Horsepower	6.38	4.91	3.10	2.52	1.46	1.09	.36
			Mechanical Output Torque (In.-Lbs.)	412	412	412	412	412	412	412
			Thermal Output Torque (In.-Lbs.)	412	412	412	412	412	412	412
			Maximum Input Overhung Load (Lbs.)	559	559	559	559	559	559	559
Maximum Output Overhung Load (Lbs.)	536	536	536	536	536	536	536			
9HSB1-LR10 9HSB1-SN10 9HSB1-SF10	1:1	Spiral	Output Speed (RPM)	1750	1150	850	690	400	300	100
			Mechanical Horsepower	16	11	8.30	6.80	4.10	3.10	1.10
			Thermal Horsepower	16	11	8.30	6.80	4.10	3.10	1.10
			Mechanical Output Torque (In.-Lbs.)	580	600	615	620	645	650	693
			Thermal Output Torque (In.-Lbs.)	580	600	615	620	645	650	693
			Maximum Input Overhung Load (Lbs.)	114	182	211	243	319	384	600
Maximum Output Overhung Load (Lbs.)	265	310	355	395	475	550	800			
9HB1-LR10 9HB1-SN10 9HB1-SF10	1:1	Straight	Output Speed (RPM)	—	1150	850	690	400	300	100
			Mechanical Horsepower	—	17.00	13	10.60	6.30	5	1.65
			Thermal Horsepower	—	17.00	13	10.60	6.30	5	1.65
			Mechanical Output Torque (In.-Lbs.)	—	930	960	970	1000	1010	1040
			Thermal Output Torque (In.-Lbs.)	—	930	960	970	1000	1010	1040
			Maximum Input Overhung Load (Lbs.)	—	79	121	156	374	450	600
Maximum Output Overhung Load (Lbs.)	—	260	305	345	425	500	775			

**The input shaft is the shaft at a right angle to the cross shaft.



Reducer Selection Chart



Speed, Horsepower, Torque and Overhung Loads

Part No.	Ratio	Gearing	Rating	Revolutions per Minute — Input Shaft**						
				1750	1150	850	690	400	300	100
9HB1-LR15 9HB1-SN15 9HB1-SF15	1.5:1	Straight	Output Speed (RPM)	1166	766	566	460	266	200	66
			Mechanical Horsepower	9.20	6.20	4.70	3.90	2.30	1.80	.65
			Thermal Horsepower	9.20	6.20	4.70	3.90	2.30	1.80	.65
			Mechanical Output Torque (In.-Lbs.) Thermal	500	510	520	530	550	560	615
			Output Torque (In.-Lbs.)	500	510	520	530	550	560	615
			Maximum Input Overhung Load (Lbs.)	366	426	473	508	600	600	600
			Maximum Output Overhung Load (Lbs.)	320	380	425	470	610	655	800
9HB1-LR20 9HB1-SN20 9HB1-SF20	2:1	Straight	Output Speed (RPM)	875	575	425	345	200	150	50
			Mechanical Horsepower	6.25	4.25	3.25	2.70	1.60	1.25	.50
			Thermal Horsepower	6.25	4.25	3.25	2.70	1.60	1.25	.50
			Mechanical Output Torque (In.-Lbs.) Thermal	442	465	481	494	504	525	630
			Output Torque (In.-Lbs.)	442	465	481	494	504	525	630
			Maximum Input Overhung Load (Lbs.)	372	434	481	517	600	600	600
			Maximum Output Overhung Load (Lbs.)	455	525	555	575	780	800	800
12HSB1-LR 10 12HSB1-SN10 12HSB1-SF10	1:1	Spiral	Output Speed (RPM)	1750	1150	850	690	—	300	100
			Mechanical Horsepower	46	30.50	24	20.0	—	10	3.70
			Thermal Horsepower	46	30.50	24	20.0	—	10	3.70
			Mechanical Output Torque (In.-Lbs.) Thermal	1650	1670	1790	1830	—	2100	2330
			Output Torque (In.-Lbs.)	1650	1670	1790	1830	—	2100	2330
			Maximum Input Overhung Load (Lbs.)	62	109	143	178	—	312	493
			Maximum Output Overhung Load (Lbs.)	100	160	210	250	—	420	685
12HB1-LR10 12HB1-SN10 12HB1-SF10	1:1	Straight	Output Speed (RPM)	1750	1150	850	690	—	300	100
			Mechanical Horsepower Thermal Horsepower	52.6	24.20	19	16.30	—	8.14	2.86
			Mechanical Output Torque (In.-Lbs.) Thermal	32.2*	24.20	19	16.30	—	8.14	2.86
			Output Torque (In.-Lbs.)	1891	1320	1410	1780	—	1700	1800
			Maximum Input Overhung Load (Lbs.) Maxi-	1160*	1320	1410	1780	—	1700	1800
			mum Output Overhung Load (Lbs.)	721	126	158	213	—	418	625
				748	190	230	265	—	425	695
12HB1-LR15 12HB1-SN15 12HB1-SF15	1.5:1	Straight	Output Speed (RPM)	1166	766	566	460	—	200	66
			Mechanical Horsepower Thermal Horsepower	15	10.60	8.20	7.10	—	3.50	1.40
			Mechanical Output Torque (In.-Lbs.) Thermal	15	10.60	8.20	7.10	—	3.50	1.40
			Output Torque (In.-Lbs.)	810	870	910	970	—	1100	1320
			Maximum Input Overhung Load (Lbs.) Maxi-	810	870	910	970	—	1100	1320
			mum Output Overhung Load (Lbs.)	351	446	524	558	—	744	900
				300	340	400	445	—	645	965
12HB1-LR20 12HB1-SN20 12HB1-SF20	2:1	Straight	Output Speed (RPM)	875	575	425	345	—	150	50
			Mechanical Horsepower Thermal Horsepower	7.30	5.40	4.50	3.90	—	1.80	0.70
			Mechanical Output Torque (In.-Lbs.) Thermal	7.30	5.40	4.50	3.90	—	1.80	0.70
			Output Torque (In.-Lbs.)	525	591	667	712	—	756	882
			Maximum Input Overhung Load (Lbs.) Maxi-	525	591	667	712	—	756	882
			mum Output Overhung Load (Lbs.)	459	521	567	603	—	806	900
				330	380	440	465	—	715	1080
12HB1-LR15-A 12HB1-SN15-A 12HB1-SF15-A	1:1.5 Speed- Up	Straight	Output Speed (RPM)	—	—	1275	1035	—	450	150
			Mechanical Horsepower Thermal Horsepower	—	—	11.80	9.80	—	4.90	1.80
			Mechanical Output Torque (In.-Lbs.) Thermal	—	—	11.80	9.80	—	4.90	1.80
			Output Torque (In.-Lbs.)	—	—	580	600	—	685	775
			Maximum Input Overhung Load (Lbs.) Maxi-	—	—	580	600	—	685	775
			mum Output Overhung Load (Lbs.)	—	—	513	559	—	750	900
				—	—	520	679	—	770	900
15HSB1-LR10 15HSB1-SN10 15HSB1-SF10	1:1	Spiral	Output Speed (RPM)	1750	1150	850	690	400	300	100
			Mechanical Horsepower	90	63	48	36.50	23.50	18	6.50
			Thermal Horsepower	90	63	48	36.50	23.50	18	6.50
			Mechanical Output Torque (In.-Lbs.) Thermal	3240	3450	3558	3607	3702	3780	4095
			Output Torque (In.-Lbs.)	3240	3450	3558	3607	3702	3780	4095
			Maximum Input Overhung Load (Lbs.)	35	202	243	308	429	486	843
			Maximum Output Overhung Load (Lbs.)	320	370	410	475	590	655	1100
15HB1-LR10 15HB1-SN10 15HB1-SF10	1:1	Straight	Output Speed (RPM)	—	—	850	690	400	300	100
			Mechanical Horsepower Thermal Horsepower	—	—	44	36.50	21.50	16.40	5.80
			Mechanical Output Torque (In.-Lbs.) Thermal	—	—	44	36.50	21.50	16.40	5.80
			Output Torque (In.-Lbs.)	—	—	3260	3330	3390	3440	3650
			Maximum Input Overhung Load (Lbs.) Maxi-	—	—	3260	3330	3390	3440	3650
			mum Output Overhung Load (Lbs.)	—	—	103	234	514	600	1050
				—	—	385	450	565	630	1075
15HSB1-LR15 15HSB1-SN15 15HSB1-SF15	1.5:1	Spiral	Output Speed (RPM)	1166	766	566	460	266	200	66
			Mechanical Horsepower	69	47	35.70	29.50	17.60	13.50	4.80
			Thermal Horsepower	69	47	35.70	29.50	17.60	13.50	4.80
			Mechanical Output Torque (In.-Lbs.) Thermal	3720	3860	3970	4040	4160	4250	4440
			Output Torque (In.-Lbs.)	3720	3860	3970	4040	4160	4250	4440
			Maximum Input Overhung Load (Lbs.)	97	216	234	329	546	631	1120
			Maximum Output Overhung Load (Lbs.)	457	600	625	710	930	1020	1500

**The input shaft is the shaft at a right angle to the cross shaft.

Speed, Horsepower, Torque and Overhung Loads

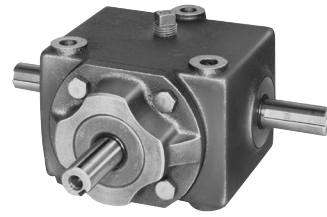
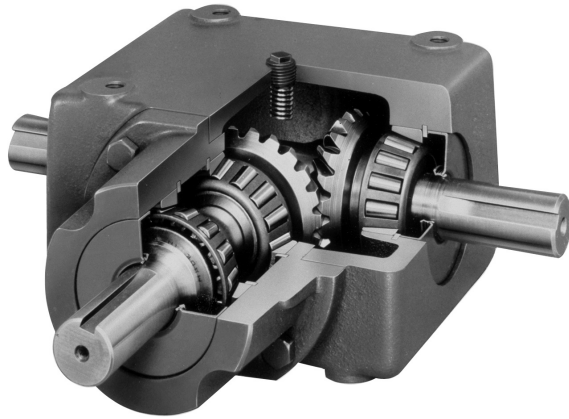
Part No.	Ratio	Gearing	Rating	Revolutions per Minute — Input Shaft**						
				1750	1150	850	690	400	300	100
15HB1-LR15 15HB1-SN15 15HB1-SF15	1.5:1	Straight	Output Speed (RPM)	—	766	566	460	266	200	66
			Mechanical Horsepower	—	39	29	24	14.30	10.90	3.80
			Thermal Horsepower	—	39	29	24	14.30	10.90	3.80
			Mechanical Output Torque (In.-Lbs.)	—	3200	3220	3290	3380	3435	3590
			Thermal Output Torque (In.-Lbs.)	—	3200	3220	3290	3380	3435	3590
			Maximum Input Overhung Load (Lbs.)	—	99	309	309	565	794	1400
			Maximum Output Overhung Load (Lbs.)	—	570	600	600	910	995	1475
15HB1-LR20 15HB1-SN20 15HB1-SF20	2:1	Straight	Output Speed (RPM)	—	575	425	345	200	150	50
			Mechanical Horsepower	—	22	16.50	13.80	8.50	6.50	2.30
			Thermal Horsepower	—	22	16.50	13.80	8.50	6.50	2.30
			Mechanical Output Torque (In.-Lbs.)	—	2410	2446	2520	2680	2730	2898
			Thermal Output Torque (In.-Lbs.)	—	2410	2446	2520	2680	2730	2898
			Maximum Input Overhung Load (Lbs.)	—	330	506	602	925	1038	1400
			Maximum Output Overhung Load (Lbs.)	—	700	850	950	1170	1250	1500
15HB1-LR30 15HB1-SN30 15HB1-SF30	3:1	Straight	Output Speed (RPM)	583	383	283	230	133	100	33
			Mechanical Horsepower	15	9.90	7.50	6.50	3.80	2.90	1.00
			Thermal Horsepower	15	9.90	7.50	6.50	3.80	2.90	1.00
			Mechanical Output Torque (In.-Lbs.)	1621	1629	1669	1780	1800	1827	1891
			Thermal Output Torque (In.-Lbs.)	1621	1629	1669	1780	1800	1827	1891
			Maximum Input Overhung Load (Lbs.)	600	709	793	843	1035	1147	1400
			Maximum Output Overhung Load (Lbs.)	760	820	900	1200	1400	1475	1500
15HSB1-LR15- A 15HSB1-SN15- A 15HSB1-SF15- A	1:1.5 Speed-Up	Spiral	Output Speed (RPM)	—	1725	1275	1035	600	450	150
			Mechanical Horsepower Thermal	—	68	51	42	26	20	7.10
			Horsepower	—	68	51	42	26	20	7.10
			Mechanical Output Torque (In.-Lbs.)	—	2480	2520	2585	2730	2790	2980
			Thermal Output Torque (In.-Lbs.)	—	2480	2520	2585	2730	2790	2980
			Maximum Input Overhung Load (Lbs.)	—	152	176	247	396	396	608
			Maximum Output Overhung Load (Lbs.)	—	219	252	356	498	498	829
15HB1-LR15-A 15HB1-SN15-A 15HB1-SF15-A	1:1.5 Speed-Up	Straight	Output Speed (RPM)	—	—	—	1035	600	450	150
			Mechanical Horsepower	—	—	—	25	18	15	5.60
			Thermal Horsepower	—	—	—	25	18	15	5.60
			Mechanical Output Torque (In.-Lbs.)	—	—	—	1520	1890	2020	2350
			Thermal Output Torque (In.-Lbs.)	—	—	—	1520	1890	2020	2350
			Maximum Input Overhung Load (Lbs.)	—	—	—	290	612	700	1235
			Maximum Output Overhung Load (Lbs.)	—	—	—	710	831	889	1400
15HB1-LR20-A 15HB1-SN20-A 15HB1-SF20-A	1:2 Speed-Up	Straight	Output Speed (RPM)	—	—	—	1380	800	600	200
			Mechanical Horsepower	—	—	—	26	15.40	11.75	4.25
			Thermal Horsepower	—	—	—	26	15.40	11.75	4.25
			Mechanical Output Torque (In.-Lbs.)	—	—	—	1188	1210	1235	1340
			Thermal Output Torque (In.-Lbs.)	—	—	—	1188	1210	1235	1340
			Maximum Input Overhung Load (Lbs.)	—	—	—	383	792	996	1400
			Maximum Output Overhung Load (Lbs.)	—	—	—	603	819	987	1400
18HSB1-LR10 18HSB1-SN10 18HSB1-SF10	1:1	Spiral	Output Speed (RPM)	1750	1150	850	690	400	300	100
			Mechanical Horsepower Thermal	132	90	67	56	33	25	9.00
			Horsepower	132	90	67	56	33	25	9.00
			Mechanical Output Torque (In.-Lbs.)	4750	4930	4970	5115	5200	5250	5670
			Thermal Output Torque (In.-Lbs.)	4750	4930	4970	5115	5200	5250	5670
			Maximum Input Overhung Load (Lbs.)	140	308	478	566	934	1155	1750
			Maximum Output Overhung Load (Lbs.)	690	708	870	940	1160	1340	1080
18HB1-LR10 18HB1-SN10 18HB1-SF10	1:1	Straight	Output Speed (RPM)	—	—	—	690	400	300	100
			Mechanical Horsepower	—	—	—	56.20	33.80	25.80	9.00
			Thermal Horsepower	—	—	—	56.20	33.80	25.80	9.00
			Mechanical Output Torque (In.-Lbs.)	—	—	—	5130	5320	5420	5660
			Thermal Output Torque (In.-Lbs.)	—	—	—	5130	5320	5420	5660
			Maximum Input Overhung Load (Lbs.)	—	—	—	1040	1309	1474	1750
			Maximum Output Overhung Load (Lbs.)	—	—	—	940	1160	1340	2080
18HB1-LR12 18HB1-SN12 18HB1-SF12	1.2105:1	Straight	Output Speed (RPM)	—	—	702	570	330	248	83
			Mechanical Horsepower	—	—	48	40	24	19	6.70
			Thermal Horsepower	—	—	48	40	24	19	6.70
			Mechanical Output Torque (In.-Lbs.)	—	—	4271	4383	4527	4788	5067
			Thermal Output Torque (In.-Lbs.)	—	—	4271	4383	4527	4788	5067
			Maximum Input Overhung Load (Lbs.)	—	—	1062	1149	1425	1572	1750
			Maximum Output Overhung Load (Lbs.)	—	—	1125	1185	1515	1740	2200

**The Input Shaft is the Shaft at a Right Angle to the Cross Shaft.

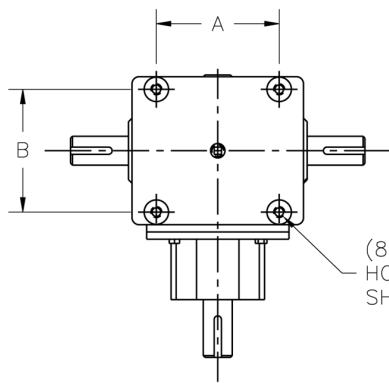
Speed, Horsepower, Torque and Overhung Loads

Part No.	Ratio	Gearing	Rating	Revolutions per Minute — InputShaft**						
				1750	1150	850	690	400	300	100
18HB1-LR13 18HB1-SN13 18HB1-SF13	1.3333:1	Straight	Output Speed (RPM)	—	—	637	517	300	225	75
			Mechanical Horsepower	—	—	45	37	22.10	16.60	6.10
			Thermal Horsepower	—	—	45	37	22.10	16.60	6.10
			Mechanical Output Torque (In.-Lbs.)	—	—	4350	4400	4630	4720	5000
			Thermal Output Torque (In.-Lbs.)	—	—	4350	4400	4630	4720	5000
			Maximum Input Overhung Load (Lbs.)	—	—	1098	1192	1471	1647	1750
			Maximum Output Overhung Load (Lbs.)	—	—	1175	1235	1640	1790	2200
18HSB1-LR15 18HSB1-SN15 18HSB1-SF15	1.5:1	Spiral	Output Speed (RPM)	1166	766	566	460	266	200	66
			Mechanical Horsepower	69	47	35.7	29.5	17.6	13.5	4.80
			Thermal Horsepower	69	47	35.7	29.5	17.6	13.5	4.80
			Mechanical Output Torque (In.-Lbs.)	3720	3830	3970	4040	4160	4250	4440
			Thermal Output Torque (In.-Lbs.)	3720	3830	3970	4040	4160	4250	4440
			Maximum Input Overhung Load (Lbs.)	75	300	475	625	975	1200	1750
			Maximum Output Overhung Load (Lbs.)	500	1100	1550	1750	2200	2200	2200
18HB1-LR15 18HB1-SN15 18HB1-SF15	1.5:1	Straight	Output Speed (RPM)	—	766	566	460	266	200	66
			Mechanical Horsepower	—	44	34	28	17	13	4.60
			Thermal Horsepower	—	44	34	28	17	13	4.60
			Mechanical Output Torque (In.-Lbs.)	—	3620	3780	3840	4010	4100	4350
			Thermal Output Torque (In.-Lbs.)	—	3620	3780	3840	4010	4100	4350
			Maximum Input Overhung Load (Lbs.)	—	1036	1162	1257	1530	1699	1750
			Maximum Output Overhung Load (Lbs.)	—	1280	1425	1525	1970	2125	2200
18HB1-LR17 18HB1-SN17 18HB1-SF17	1.7143:1	Straight	Output Speed (RPM)	—	671	496	402	233	175	58
			Mechanical Horsepower	—	33	26	21.6	13	10	3.4
			Thermal Horsepower	—	33	26	21.6	13	10	3.4
			Mechanical Output Torque (In.-Lbs.)	—	3100	3820	3327	3485	3580	3642
			Thermal Output Torque (In.-Lbs.)	—	3100	3820	3327	3485	3580	3642
			Maximum Input Overhung Load (Lbs.)	—	1076	1189	1280	1558	1750	1750
			Maximum Output Overhung Load (Lbs.)	—	1330	1475	1580	1915	2195	2200
18HB1-LR12-A 18HB1-SN12-A 18HB1-SF12-A	1:1.2105 Speed-Up	Straight	Output Speed (RPM)	—	—	—	835	484	363	121
			Mechanical Horsepower	—	—	—	46	28	22	8
			Thermal Horsepower	—	—	—	46	28	22	8
			Mechanical Output Torque (In.-Lbs.)	—	—	—	3500	3780	3860	4200
			Thermal Output Torque (In.-Lbs.)	—	—	—	3500	3780	3860	4200
			Maximum Input Overhung Load (Lbs.)	—	—	—	1023	1284	1430	1750
			Maximum Output Overhung Load (Lbs.)	—	—	—	1076	1400	1572	1750
18HB1-LR13-A 18HB1-SN13-A 18HB1-SF13-A	1:1.3333 Speed-Up	Straight	Output Speed (RPM)	—	—	—	920	533	400	133
			Mechanical Horsepower	—	—	—	48	22	22	7.8
			Thermal Horsepower	—	—	—	48	22	22	7.8
			Mechanical Output Torque (In.-Lbs.)	—	—	—	3290	3410	3460	3690
			Thermal Output Torque (In.-Lbs.)	—	—	—	3290	3410	3460	3690
			Maximum Input Overhung Load (Lbs.)	—	—	—	1020	1292	1456	1750
			Maximum Output Overhung Load (Lbs.)	—	—	—	1101	1445	1646	1750
18HSB1-LR15-A 18HSB1-SN15-A 18HSB1-SF15-A	1:1.5 Speed-Up	Spiral	Output Speed (RPM)	—	—	—	1035	600	450	150
			Mechanical Horsepower	—	—	—	42	20	20	6.90
			Thermal Horsepower	—	—	—	42	20	20	6.90
			Mechanical Output Torque (In.-Lbs.)	—	—	—	2560	2710	2800	2900
			Thermal Output Torque (In.-Lbs.)	—	—	—	2560	2710	2800	2900
			Maximum Input Overhung Load (Lbs.)	—	—	—	1069	1338	1484	1750
			Maximum Output Overhung Load (Lbs.)	—	—	—	1066	1387	1552	1750
18HB1-LR15-A 18HB1-SN15-A 18HB1-SF15-A	1:1.5 Speed-Up	Straight	Output Speed (RPM)	—	—	—	1035	600	450	150
			Mechanical Horsepower	—	—	—	42	20	20	6.90
			Thermal Horsepower	—	—	—	42	20	20	6.90
			Mechanical Output Torque (In.-Lbs.)	—	—	—	2560	2710	2800	2900
			Thermal Output Torque (In.-Lbs.)	—	—	—	2560	2710	2800	2900
			Maximum Input Overhung Load (Lbs.)	—	—	—	1069	1338	1484	1750
			Maximum Output Overhung Load (Lbs.)	—	—	—	1066	1387	1552	1750
18HB1-LR17-A 18HB1-SN17-A 18HB1-SF17-A	1:1.7143 Speed-Up	Straight	Output Speed (RPM)	—	—	—	1183	685	514	171
			Mechanical Horsepower	—	—	—	29.10	18.30	14	5.10
			Thermal Horsepower	—	—	—	29.10	18.30	14	5.10
			Mechanical Output Torque (In.-Lbs.)	—	—	—	1550	1680	1720	1880
			Thermal Output Torque (In.-Lbs.)	—	—	—	1550	1680	1720	1880
			Maximum Input Overhung Load (Lbs.)	—	—	—	1174	1446	1613	1750
			Maximum Output Overhung Load (Lbs.)	—	—	—	1268	1540	1750	1750

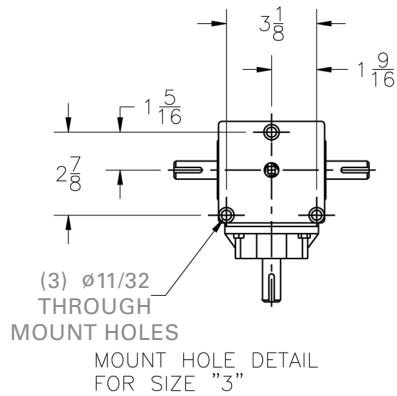
**The Input Shaft is the Shaft at a Right Angle to the Cross Shaft.



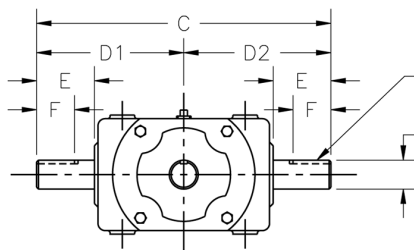
Cast Iron Housing Hardened Gears



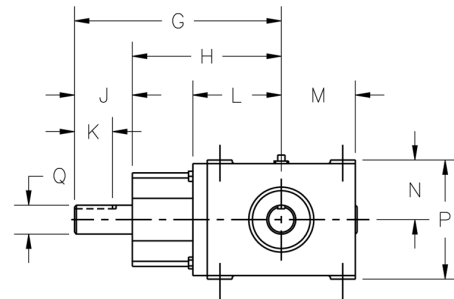
(8) "R" TAPPED MOUNT HOLES LOCATED AS SHOWN, TOP AND BOTTOM



(3) $\varnothing 11/32$ THROUGH MOUNT HOLES
MOUNT HOLE DETAIL FOR SIZE "3"



(3) "S" KEYWAY TYP 3 SHAFT EXT.



Specifications

Size No.	Wt. Lbs.	Dimensions							
		A	B	C	D ₁	D ₂	E	F	G
3	10	▲	▲	7.500	3.750	3.750	1.500	1.156	4.563
6	23	4.375	2.750	9.094	4.547	4.547	1.625	0.875	6.125
9	28	4.250	4.250	10.188	5.094	5.094	2.000	1.156	7.156
12	48	4.500	4.500	12.250	6.125	6.125	2.500	1.906	8.438
15	105	6.500	6.500	15.813	7.906	7.906	3.000	2.313	10.875
18	125	6.500	6.500	16.094	8.047	8.047	3.094	2.250	11.500

Size No.	Dimensions								Tap Size	Tap Depth	Keyway S
	H	J	K	L	M	N	P	Q*	R		
3	3.063	1.500	1.156	2.281	-	1.594	3.188	0.625	-	-	3/16" x 3/32"
6	4.375	1.750	1.000	2.938	2.063	2.125	4.250	1.000	3/8- 16NC	0.560	1/4 x 1/8
9	5.125	2.031	1.531	2.875	2.536	2.063	4.125	1.000	3/8- 16NC	0.560	1/4 x 1/8
12	3.175	5.263	1.906	3.438	2.813	2.813	5.625	1.250	1/2- 13NC	0.813	1/4 x 1/8
15	7.813	3.063	2.313	4.594	3.844	4.094	8.188	1.375	1/2- 13NC	1.000	5/16 x 5/32
18	8.438	3.063	2.250	4.563	4.156	4.094	8.750	1.500	1/2- 13NC	0.750	3/8 x 3/16

▲ See Mount Hole Detail Drawing for 3HSB1.

Select Part No. from the table and Figures 1-6 on page B-10.

* Shaft Tolerances are: +.000 to -.001".

Note — If gear box is to be mounted with either shaft vertical, provision must be made to lubricate the top bearings. Contact Application Engineering (1 800 626 2093).

Note — Catalog ratings are not applicable when reducer shafts are subjected to combined overhung and thrust loads. If your application has combined loads or loads beyond the catalog ratings, contact Application Engineering (1-800-626-2093) and provide complete application information for review.

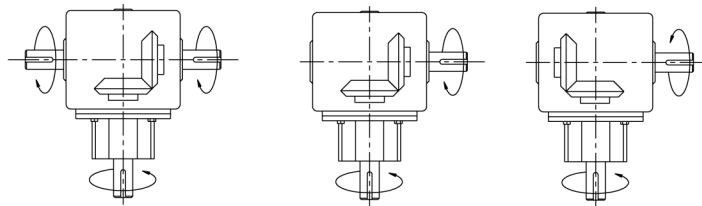


FIG. 1-TYPE LR

FIG. 3-TYPE SN

FIG. 5-TYPE SF

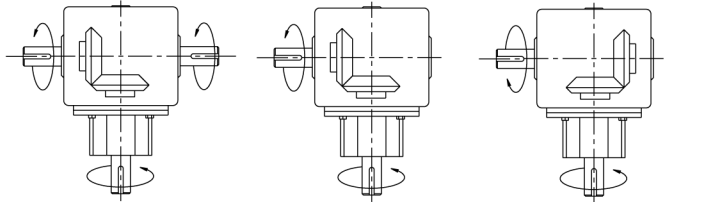


FIG. 2-TYPE LR

FIG. 4-TYPE SN

FIG. 6-TYPE SF

Ratios, Types and Part Numbers

Ratio	Fig.	Type	Part No.	Ratio	Fig.	Type	Part No.	Ratio	Fig.	Type	Part No.
Size No.3				Size No.12				Size No.18			
1:1 Spiral	1 and 2 3 and 4 5 and 6	LR SN SF	3HSB1-LR 10 3HSB1-SN10 3HSB1-SF10	1:1 Spiral	1 and 2 3 and 4 5 and 6	LR SN SF	12HSB1-LR 10 12HSB1-SN10 12HSB1-SF10	1:1 Spiral	1 and 2 3 and 4 5 and 6	LR SN SF	18HSB1-LR 10 18HSB1-SN10 18HSB1-SF10
1:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	3HB1-LR 10 3HB1-SN10 3HB1-SF10	1:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	12HB1-LR 10 12HB1-SN10 12HB1-SF10	1:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	18HB1-LR 10 18HB1-SN10 18HB1-SF10
1.5:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	3HB1-LR 15 3HB1-SN15 3HB1-SF15	1.5:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	12HB1-LR 15 12HB1-SN15 12HB1-SF15	1.2105:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	18HB1-LR 12 18HB1-SN12 18HB1-SF12
2:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	3HB1-LR 20 3HB1-SN20 3HB1-SF20	2:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	12HB1-LR 20 12HB1-SN20 12HB1-SF20	1.3333:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	18HB1-LR 13 18HB1-SN13 18HB1-SF13
Size No.6				Size No.15				Size No.15			
1:1 Spiral	1 and 2 3 and 4 5 and 6	LR SN SF	6HSB1-LR 10 6HSB1-SN10 6HSB1-SF10	1:1.5 Straight (Speed-Up)	1 and 2 3 and 4 5 and 6	LR SN SF	12HB1-LR 15-A 12HB1-SN15-A 12HB1-SF15-A	1.5:1 Spiral	1 and 2 3 and 4 5 and 6	LR SN SF	18HSB1-LR 15 18HSB1-SN15 18HSB1-SF15
1:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	6HB1-LR 10 6HB1-SN10 6HB1-SF10	1:1 Spiral	1 and 2 3 and 4 5 and 6	LR SN SF	15HSB1-LR 10 15HSB1-SN10 15HSB1-SF10	1.5:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	18HB1-LR 15 18HB1-SN15 18HB1-SF15
1.4615:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	6HB1-LR 15 6HB1-SN15 6HB1-SF15	1:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	15HB1-LR 10 15HB1-SN10 15HB1-SF10	1.7131:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	18HB1-LR 17 18HB1-SN17 18HB1-SF17
1.8:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	6HB1-LR 18 6HB1-SN18 6HB1-SF18	1.5:1 Spiral	1 and 2 3 and 4 5 and 6	LR SN SF	15HSB1-LR 15 15HSB1-SN15 15HSB1-SF15	1:1.2105 Straight (Speed-Up)	1 and 2 3 and 4 5 and 6	LR SN SF	18HB1-LR 12-A 18HB1-SN12-A 18HB1-SF12-A
Size No.9				Size No.15				Size No.15			
1:1 Spiral	1 and 2 3 and 4 5 and 6	LR SN SF	9HSB1-LR 10 9HSB1-SN10 9HSB1-SF10	1.5:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	15HB1-LR 15 15HB1-SN15 15HB1-SF15	1:1.3333 Straight (Speed-Up)	1 and 2 3 and 4 5 and 6	LR SN SF	18HB1-LR 13-A 18HB1-SN13-A 18HB1-SF13-A
1:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	9HB1-LR 10 9HB1-SN10 9HB1-SF10	2:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	15HB1-LR 20 15HB1-SN20 15HB1-SF20	1:1.5 Spiral (Speed-Up)	1 and 2 3 and 4 5 and 6	LR SN SF	18HSB1-LR 15-A 18HSB1-SN15-A 18HSB1-SF15-A
1.5:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	9HB1-LR 15 9HB1-SN15 9HB1-SF15	3:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	15HB1-LR 30 15HB1-SN30 15HB1-SF30	1:1.5 Straight (Speed-Up)	1 and 2 3 and 4 5 and 6	LR SN SF	18HB1-LR 15-A 18HB1-SN15-A 18HB1-SF15-A
2:1 Straight	1 and 2 3 and 4 5 and 6	LR SN SF	9HB1-LR 20 9HB1-SN20 9HB1-SF20	1:1.5 Spiral (Speed-Up)	1 and 2 3 and 4 5 and 6	LR SN SF	15HSB1-LR 15-A 15HSB1-SN15-A 15HSB1-SF15-A	1:1.7143 Straight (Speed-Up)	1 and 2 3 and 4 5 and 6	LR SN SF	18HB1-LR 17-A 18HB1-SN17-A 18HB1-SF17-A
				1:1.5 Straight (Speed-Up)	1 and 2 3 and 4 5 and 6	LR SN SF	15HB1-LR 15-A 15HB1-SN15-A 15HB1-SF15-A				
				1:2 Straight (Speed-Up)	1 and 2 3 and 4 5 and 6	LR SN SF	15HB1-LR 20-A 15HB1-SN20-A 15HB1-SF20-A				

Determine the size reducer and ratio needed from Engineering Data on pages B-5 to B-8. Then from the sketches above determine the Type needed for the desired shaft extension and rotation. Then from the table above, determine the Reducer Part Number. Example: For a Size 12, 2:1 Ratio Reducer with single output left and output to rotate CCW when input rotates CW (looking at the shaft ends) note from Fig. 4 that a Type SN is needed and from the table the Part Number is 12HB1-SN20.