Bevel Gearboxes

Product Selection Guide

ISO : 9001 - 2008

ISO 9001 - 2008
KEMA NVT - QC
CERTIFICATE No. 2033535
DUTCH COUNCIL FOR ACCREDITATION

CONTENTS / INTRODUCTION

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Introduction

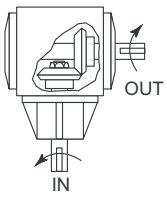
In the field of power transmission, Bevel Gearboxes have a special place because of their ability to change the direction of power transmission, usually to 90°. Bevel gearboxes can also transmit high torque at high speed with low power loss unlike worm gearboxes. Gears & Gear Drives offer straight Bevel gearboxes of different versions and ratings enabling appropriate solutions to all kinds of power transmission problems.

Gears & Gear Drives, with over 30 years of experience, provide products, solutions and services in Power Transmission Technology. Other products of Gears & Gear Drives include Worm Gear screw Jacks, Electro Mechanical Linear Actuators, Bevel Gear Screw Jacks, Electric cylinders, Geared motors, Universal Joints and custom designed Gear Units.

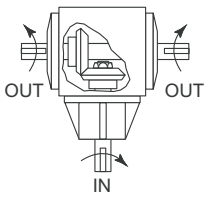
Primary Purpose

The primary purposes of Bevel Gearboxes are many fold. Two or more purposes are combined frequently.

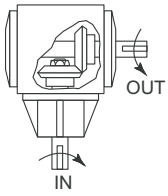
Transmitting Power At 90°



Splitting Power



Decreasing Speed & Increasing Torque

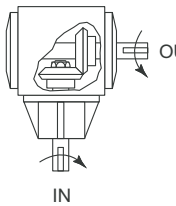


OUT: 125 rpm & 440 Nm

2:1 Reduction

IN: 250 rpm & 220 Nm

Increasing Speed & Decreasing Torque

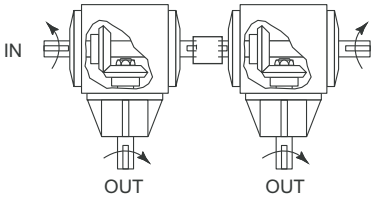


OUT: 500 rpm & 200 Nm

1:2 Speed-Up

IN: 250 rpm & 400Nm

Functioning as a Power Take-off Device with the Cross-shaft as a Common Input



Industrial Application

- Printing machines
- Plastic extruders
- Conveyors
- Packaging machines
- Gate valves
- Lifts / hoists

Mobile Applications

- Commercial movers
- Scissors Lift
- Cranes

Miscellaneous Applications

- Pump drives
- Fan/ blowers
- Mining equipment
- Dryers
- Food processing equipment
- Agricultural
- Lifting systems

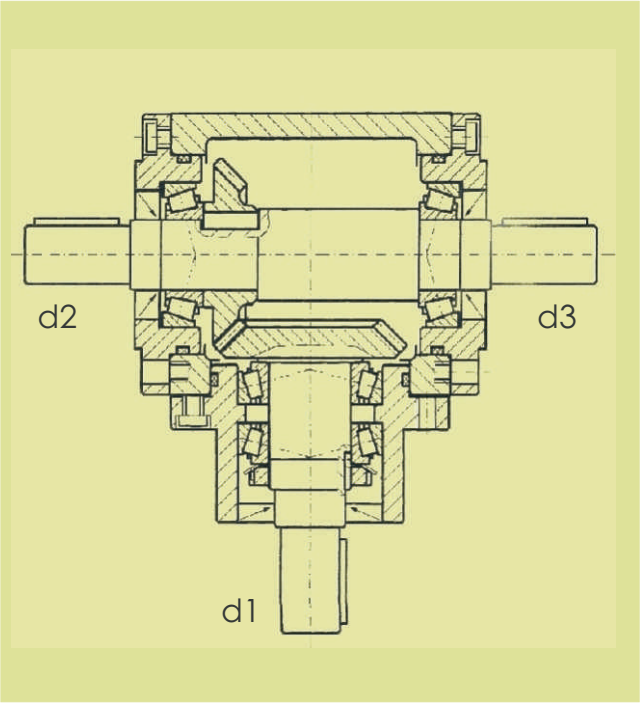
DESIGN PRINCIPLE

Housing

The gearbox housing is of cubical form for dimensional symmetry. The housing and bearing flanges are made from high quality grey cast iron. Tapped mounting holes are provide on two opposite sides. The drive input is usually on shaft d1, but shaft d2 or d3 can

Bearings

Pre loaded metric tapered roller bearings are used for radial and axial loads.



Input, Output Shafts

Input and output shafts are made of medium carbon alloy steel, hardened, tempered and ground on journal and locating diameters.

Bevel Gears

Bevel gears are of case hardened steel with generated profile and ground bores. The gears are matched for optimum blue bearing for smooth running and high load transmission.

Seals

Quality seals rubbing on ground diameters prevent oil / grease leakage.

Lubricant

Lubricating oil with viscosity grade UG is used for gears and bearing to reduce heat loss and

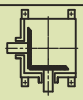
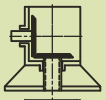
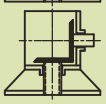
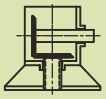
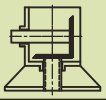
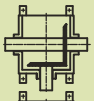
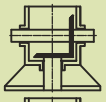
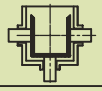
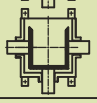
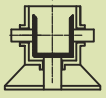
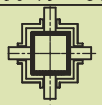
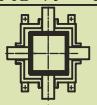
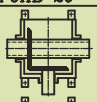
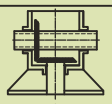
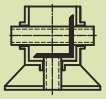
Design Advantages

- Six models in modular design
- Easy to mount electric motor or hydraulic motor
- Solid, hollow shaft designs for universal application
- Can be turned upside down due to symmetry in mounting

Over View of Types

SOLID INPUT/1 SOLID OUTPUT

HOLLOW INPUT / SOLID OUTPUT

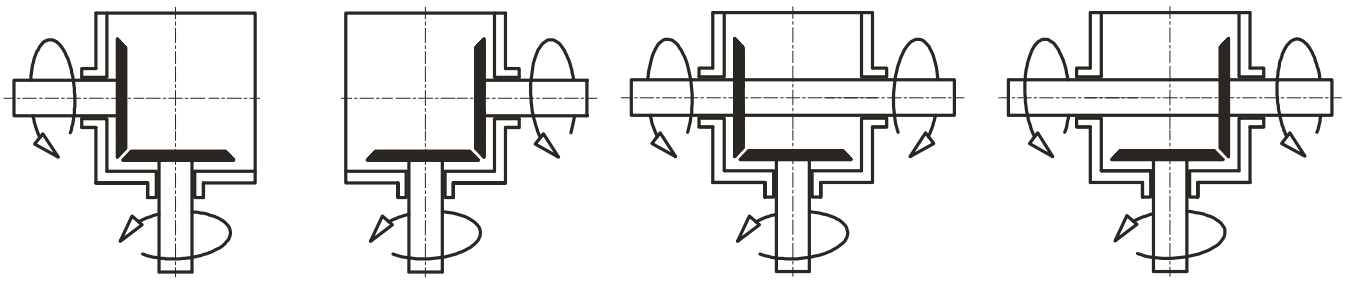
FC 10 – FC 75	FGB 10 – FGB 75	FGF 10 – FGF 75
TYPE A 	TYPE A 	TYPE A 
TYPE D 	TYPE D 	TYPE D 
TYPE B 	TYPE B 	TYPE B 
TYPE C 	TYPE C 	TYPE C 
SOLID INPUT/2 SOLID OUTPUT		HOLLOW INPUT/2 SOLID OUTPUT
FC 10 – FC 75	FGB 10 – FGB 75	FGF 20 – FGF 55
TYPE E 	TYPE E 	TYPE E 
TYPE G 	TYPE G 	TYPE G 
TYPE F 	TYPE F 	TYPE F 
SOLID INPUT/3 SOLID OUTPUT		HOLLOW INPUT/3 SOLID OUTPUT
FC 10 – FC 75	FGB 10 – FGB 75	FGF 10 – FGF 55
TYPE I 	TYPE I 	
TYPE H 	TYPE H 	
TYPE J 	TYPE J 	
SOLID INPUT/2 HOLLOW OUTPUT SOLID INPUT/2 HOLLOW OUTPUT& 1 SOLID OUTPUT		HOLLOW INPUT/HOLLOW OUTPUT
FGH 20 – FGH 75	FGHB 20 – FGHB 75	FGHF 20 – FGHF 75
TYPE K 	TYPE K 	TYPE K 
TYPE M 	TYPE M 	TYPE M 
TYPE L 	TYPE L 	
TYPE N 	TYPE N 	

SELECTION CRITERIA

Directions of Rotation

With reference to direction of rotation of input shaft, direction of rotation of output shaft is given below depending upon position of

The direction of rotation is given considering view towards the shaft under consideration.



Torque and Power Calculation

Maximum input power required is calculated from

$$P = P1 \times C1 \times C2$$

Where,

P = maximum input power to bevel gearbox kW
P1 = Power to be transmitted
C1 = Shock load factor (Table)
C2 = Ambient temperature factor (Table)

From calculated input power P, calculate output torque M2

$$M2 = \frac{9550XPX0.95}{n2}$$

Where,

M2 = Output torque, Nm
P = Input power, kW
0.95= Efficiency of gearbox
n2 = Output speed, rpm

In the performance Table maximum input power P(kW) to gearbox, input speed n1(rpm)

Shock load factor C1			
No. of working hrs/day	Uniform Speed	Medium Shocks	Heavy Shocks
8	1.08	1.3	1.6
12	1.2	1.45	1.7
24	1.3	1.6	1.82

Ambient temperature factor C2	
Ambient temperature	C2
0 to 20°C	1
20 to 30°C	1.1
30 to 40°C	1.2
40 to 60°C	1.4

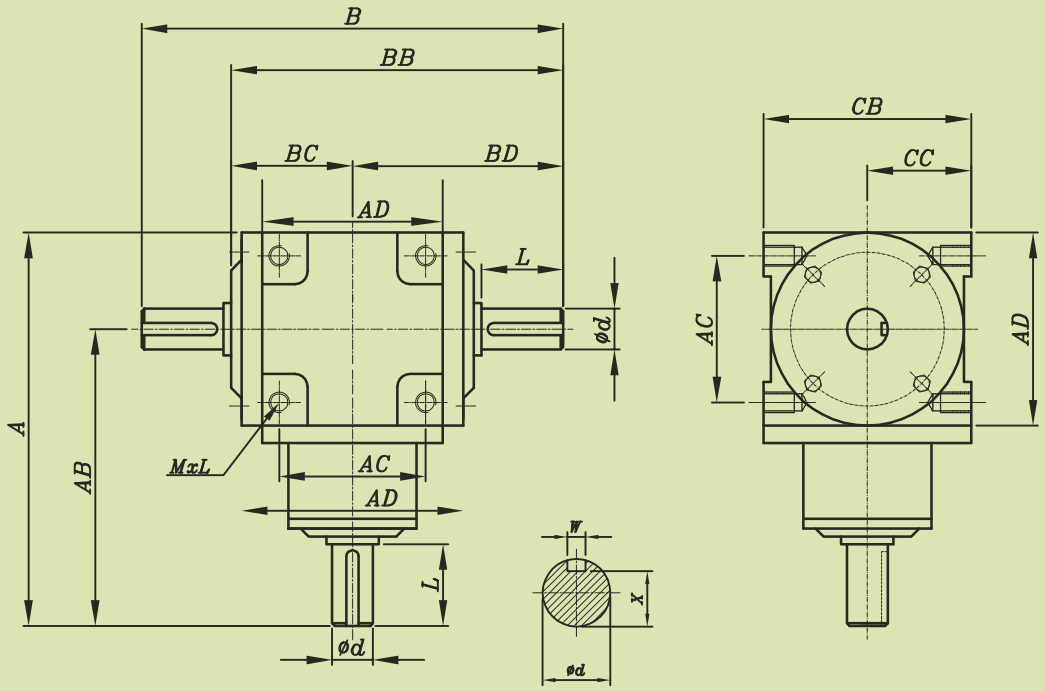
Output speed n2 (rpm) and output torque M2 (Nm) are given for easy selection of gearbox.

Model FG/FGB/FGF/FGH/FGHB/FGHF 10-75

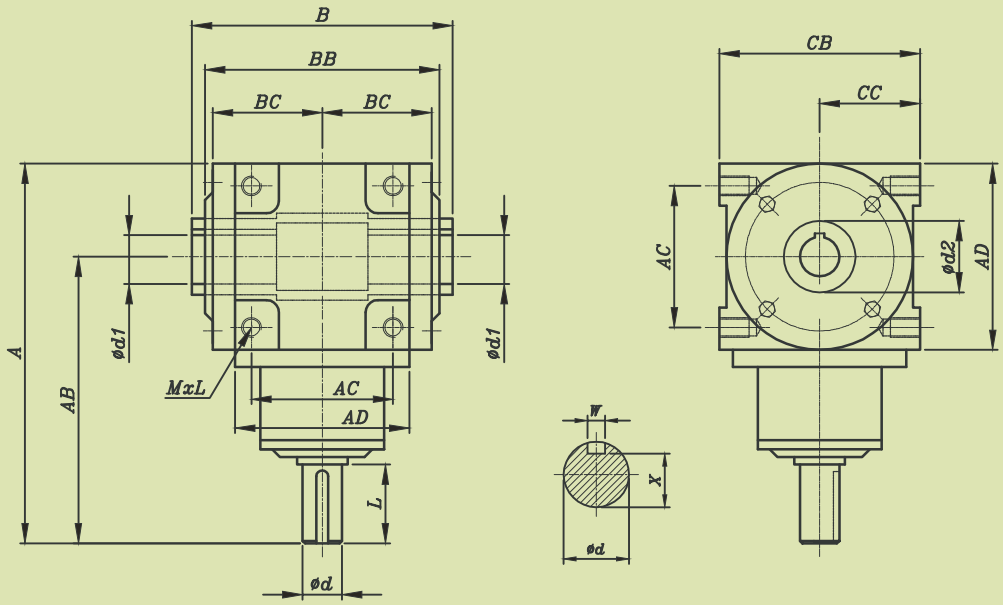
Input / output rpm	Size 10		Size 20		Size 25		Size 35		Size 45		Size 55		Size 60		Size 75	
	P kW	M2 Nm	P kW	M2 Nm	P kW	M2 Nm	P kW	M2 Nm	P kW	M2 Nm	P kW	M2 Nm	P kW	M2 Nm	P kW	M2 Nm
Ratio 1:1																
50/50	0.1	17.6	0.27	50	0.63	115	1.07	195	2.42	440	5.3	960	9.0	1710	18.6	3550
250/250	0.48	17.6	1.38	50	3.18	115	5.37	195	12.1	440	26.4	960	39.3	1500	81.2	3100
500/500	0.97	17.6	2.64	48	5.78	105	9.9	180	22	400	44	800	68.1	1300	136.1	2600
750/750	1.4	17	3.8	46	8.26	100	14	170	28.9	350	57.8	700	94.2	1200	188.5	2400
1000/1000	1.76	16	4.63	42	9.9	90	16.5	150	34.7	315	66	600	115.2	1100	230.4	2200
1200/1200	2	15	5.3	40	11.2	85	19.2	145	39.6	300	72.7	550	130.1	1035	257.6	2050
1500/1500	2.4	14.5	6.28	38	13.5	82	22.3	135	44.6	270	82.6	500	155.5	990	306.3	1950
Ratio 1.5:1																
50/33	0.06	17.6	0.18	50	0.42	115	0.71	195	1.6	440	3.5	960	5.2	1500	11.9	3400
250/167	0.32	17.6	0.92	50	2.1	115	3.6	195	8.1	440	17.7	960	24.4	1400	52.4	3000
500/333	0.64	17.6	1.76	48	3.85	105	6.6	180	14.7	400	29.3	800	42.9	1230	89.0	2550
750/500	0.94	17	2.5	46	5.5	100	9.4	170	19.3	350	38.5	700	60.2	1150	120.4	2300
1000/667	1.17	16	3.1	42	6.6	90	11	150	23	315	44	600	75.4	1080	150.1	2150
1200/800	1.32	15	3.5	40	7.5	85	12.8	145	26.4	300	48.5	550	85.4	1020	169.6	2025
1500/1000	1.6	14.5	4.2	38	9	82	14.9	135	29.7	270	55.1	500	102.6	980	203.1	1940
Ratio 2:1																
50/25	0.05	17.6	0.14	50	0.32	115	0.54	195	1.21	440	2.64	960	4.5	1700	8.9	3390
250/125	0.24	17.6	0.69	50	1.58	115	2.68	195	6	440	13.2	960	20.3	1550	39.9	3050
500/250	0.48	17.6	1.32	48	2.9	105	4.96	180	11	400	22	800	36.6	1400	70.7	2700
750/375	0.7	17	1.9	46	4.1	100	7	170	14.5	350	28.9	700	51.0	1300	98.2	2500
1000/500	0.9	16	2.3	42	4.95	90	8.3	150	17.3	315	33	600	64.4	1230	123.0	2350
1200/600	1	15	2.6	40	5.6	85	9.6	145	19.8	300	36.3	550	72.3	1150	140.1	2230
1500/750	1.2	14.5	3.1	38	6.8	82	11.1	135	22.3	270	41.3	500	88.0	1120	168.8	2150

DIMENSION SHEET

FG 10 to FG 75



FGH 20 to FGH 75



Type FG Solid Input/Solid Output

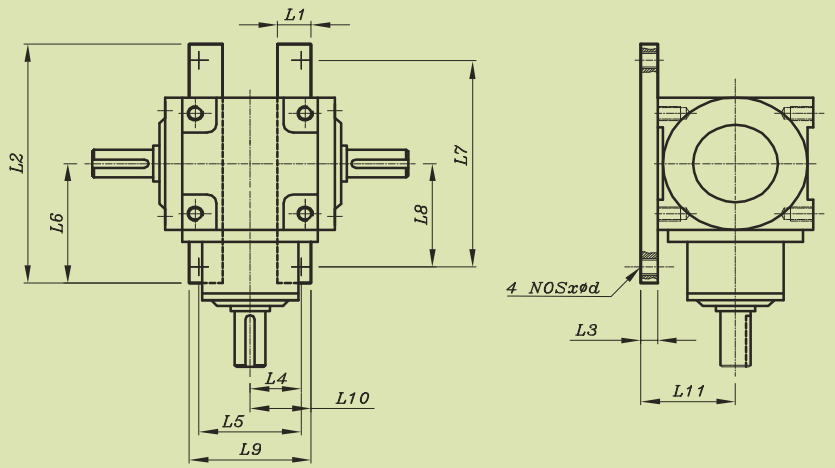
TYPE	A	AB	AC	AD	B	BB	BC	BD	CB	CC	L	Ød	W(N9)	X	MxL
FG 10	132	100	45	65	144	116	44	72	65	32.5	26	12	4	9.5	M4x8
FG 20	195	145	76	100	216	176	68	108	92	46	35	20	6	16.5	M8x12
FG 25	247	181	108	132	268	219	85	134	108	54	48	25	8	21	M10x20
FG 35	326	250	114	152	330	265	100	165	156	78	60	32	10	27	M12x24
FG 45	395	300	152	190	416	336	128	208	190	95	75	38	10	33	M12x24
FG 55	445	335	184	220	480	377	137	240	220	110	100	55	16	49	M16x32
FG 60	500	360	220	280	534	422	155	267	295	140	110	60	18	53	M16x24
FG 75	625	445	280	360	650	527	202	325	382	180	120	75	20	67.5	M20x30

Type FGH Solid Input/Hollow Output

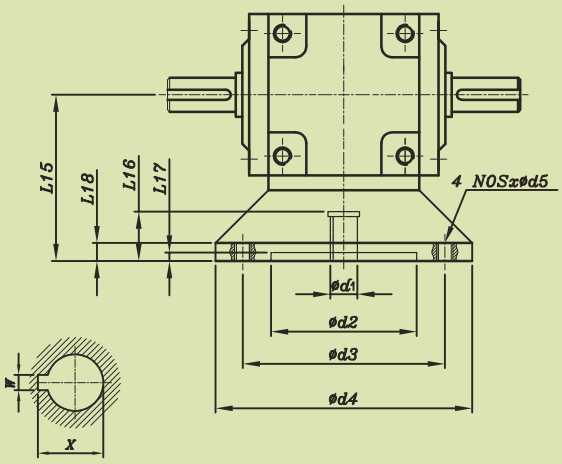
TYPE	A	AB	AC	AD	B	BB	BC	CB	CC	L	Ød	Ød1	W(N9)	X	Ød2	MxL
FGH 20	195	145	76	100	142	136	68	92	46	35	20	18	6	16.5	30	M8x12
FGH 25	247	181	108	132	176	170	85	108	54	48	25	25	8	21	40	M8x16
FGH 35	326	250	114	152	210	200	100	156	78	60	32	32	10	27	45	M12x24
FGH 45	395	300	152	190	266	256	128	190	95	75	38	35	10	33	50	M12x24
FGH 55	445	335	184	220	284	274	137	220	110	100	55	42	16	49	80	M16x32
FGH 60	500	360	220	280	314	310	115	295	140	110	60	60	18	53	85	M16x24
FG 75	625	445	280	360	410	404	202	382	180	120	75	75	20	67.5	100	M20x30

DIMENSION SHEET

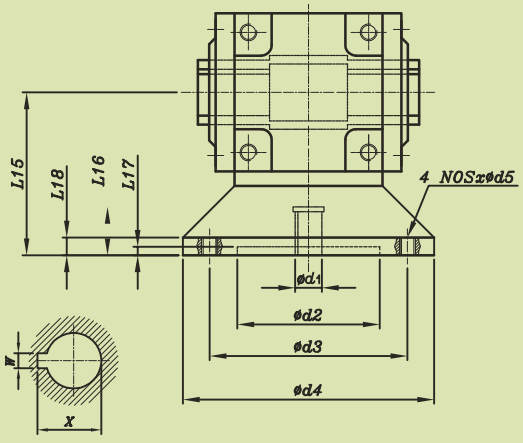
FGB 10 to FGB 75 & FGHB 20 to FGHB 75



FGF 10 to FGF 75



FGHF 20 to FGHF 75



DIMENSION SHEET

FGB 10 to FGB 75 & FGHB 20 to FGHB 75

TYPE	Ød	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
FGB 10	7	23	120	10	30	60	60	100	50	75	37.5	42.5
FGB/FGHB20	9	25	160	10	35	70	80	130	65	90	45	56
FGB/FGHB25	11	30	210	15	50	100	105	180	90	120	60	69
FGB/FGHB35	11	35	230	15	55	110	115	200	100	136	68	93
FGB/FGHB45	14	45	280	15	65	152	140	250	125	197	78	110
FGB/FGHB55	18	50	350	30	90	180	175	300	150	230	115	140
FGB/FGHB60	18	60	385	25	110	220	192.5	335	167.5	280	140	165
FGB/FGHB75	22	80	480	30	140	280	240	430	215	360	180	210

FGF 10 to FGF 55 & FGHF 20 to FGHF 55

TYPE		Ød1	Ød2	Ød3	Ød4	Ød5	L15	L16	L17	L18	W	X
FGF 10	----------	11	70	85	105	M4	90	26	4	10	4	12.8
			80	100	120	M4						
			95	115	145	M4						
FGF 20	FGHF 20	14	70	85	105	M6	115	35	4	12	5	16.3
			80	100	120	M6						
			95	115	140	M8						
			110	130	160	M8						
FGF 25	FGHF 25	24	80	100	120	M6	145	55	4	12	8	27.3
			95	115	140	M8						
			110	130	160	M8						
			130	165	200	M10						
FGF 35	FGHF 35	28	95	115	140	M8	175	65	5	15	8	31.3
			110	130	160	M8						
			130	165	200	M10						
			180	215	250	M12						
FGF 45	FGHF 45	38	110	130	160	M8	190	85	5	15	10	41.3
			130	165	200	M10						
			180	215	250	M12						
			230	265	300	M12						
FGF 55	FGHF 55	55	180	215	250	M12	250	115	5	25	16	54.3
			230	265	300	M12						
			250	300	350	M16						
			300	350	400	M16						

Bevel Gearbox	Model	Size	Type	Ratio

Model	Size
FG	10,20,25,35,45,55,60,75
FGH	20,25,35,45,55,60,75
FGB	10,20,25,35,45,55,60,75
FGHB	20,25,35,45,55,60,75
FGF	10,20,25,35,45,55
FGHF	10,20,25,35,45,55

A B
C D
E F
G H
I J
K L
M N

1:1
1.5:1
2:1

HITORK®

Worm Reducer

Worm Gear Screw Jacks CLASSIC

Worm Gear Screw Jacks CUBICAL

Ball Screw Jack

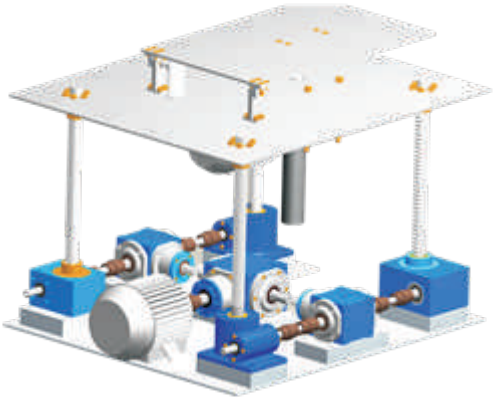
Electric Cylinder

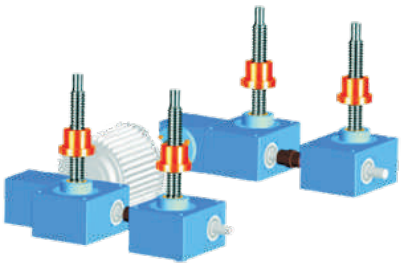
Bevel Gear Screw Jacks

Bevel Gear Box, FG

Bevel Gear Box, L Drive

UV Joints





Lifting Systems

Gears and Gear Drives (India) Pvt. Ltd.

(ISO 9001 : 2008 Certified)

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