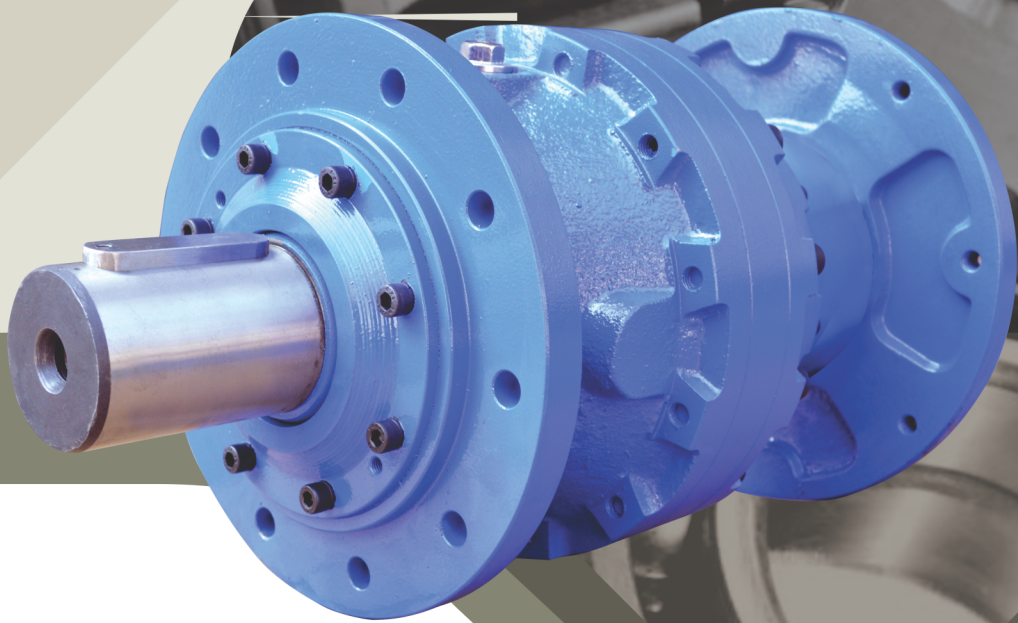


TUV NORD
ISO 9001 : 2015



GPRO® DRIVES
TRANSMITTING VALUES...

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TECHNICAL DESCRIPTION

Reduction Ratio (i) Ratio (i) = $\frac{\text{Input Speed (} n_1 \text{)}}{\text{Output Speed (} n_2 \text{)}}$

Generated Torque/ Gear Motor Delivered Torque T₁ (Nm)

This is net torque delivered to output shaft while prime mover of capacity P (kw/Hp) coupled to gear drive.

- Efficiency is taken into consideration.
- Calculation confirms to 10,000 hrs of service life.

Rated Torque/ Output Torque T₂ (Nm)

This is the torque output which gearbox can transmit safely.

- 10,000 hrs of service life.
- Values are derived from ISO DP6336.

Table No - 1 Rated Torque of All Gear Box

Model	Rated Torque T ₂ (Nm)	O/P. Shaft	Model	Rated Torque T ₂ (Nm)	O/P. Shaft
501	250	Ø20	508	12,000	Ø95
502	525	Ø30	509	17,000	Ø110
503	1,000	Ø40	510	32,500	Ø120
504	1,700	Ø50	511	75,000	Ø150
505	3,500	Ø60	512	1,20,000	Ø160
506	6,000	Ø70	513	1,90,000	Ø180
507	8,100	Ø80	514	2,50,000	Ø200

Required Torque T_{R2} (Nm)

It is a torque demanded/required by the end use application to get the work done. It should always be less than T₂ by service factor value S.

$$T_{R2} = \frac{7123 \times P \times \eta}{n_2} \quad T_{R2} = \frac{9550 \times P \times \eta}{n_2}$$

For 1 Stage $\eta = 96\%$ For 3 Stage $\eta = 88\%$
 For 2 Stage $\eta = 92\%$ For 4 Stage $\eta = 85\%$

where P=Input Power (Hp) where P=Input Power (kW)

Selection Torque T_{S2} (Nm)

It is a final torque value calculated for selection of gearbox taking into consideration application required service factor S.

$$T_{S2} = T_{R2} \times S. < T_2$$

Input Power P₁ (kW / Hp)

It represents the input prime mover's power available for the gear drive. It is the combination of the output speed (n₂) and the relevant output torque (T₂).

Output Power P₂ (kW / Hp)

It is net power available at output shaft considering efficiencies of each stage of gear drive.

Life Index/ Load Cycle n₂ .h

It is the product of output speed of the gear drive and expected life of the gear drive in hours

e.g.: Output speed n₂ = 40 rpm, Life required h = 12,500 hours

$$n_2 \cdot h = 40 \times 12,500 = 5,00,000$$



SERVICE FACTOR S_f

It is a number which is derived by taken into consideration

- Number of start and stops per hour
- Type of Load (Uniform, Moderate, Heavy)
- Number of hours of work per day

It gives general guideline to design engineer to select gear drive properly according to severity of application. Refer table No -2 for operation specific service factor selection table which covers industry specific application to prevent designer from selecting under rated gear drive. It also act as cross checking for analyzing previously calculated Service Factor.

Table No - 2 Service Factor

Load Category	Usage / Day (Hours)	Number of starts / hour						
		2 to 5	6 to 9	10 to 15	16 to 30	31 to 60	61 to 120	120 to 250 & more
Uniform Load	3	0.8	0.9	0.9	1.0	1.1	1.1	1.2
	6	1.0	1.1	1.1	1.3	1.3	1.3	1.3
	12	1.25	1.3	1.3	1.5	1.5	1.5	1.5
	24	1.5	1.5	1.5	1.8	1.8	1.8	1.8
Prime mover : Electric motor, Hydraulic Motor, Steam Turbine								
Load Category	Usage / Day (Hours)	Number of starts / hour						
		2 to 5	6 to 9	10 to 15	16 to 30	31 to 60	61 to 120	120 to 250 & more
Moderate Shock	3	1	1	1	1.3	1.3	1.3	1.3
	6	1.3	1.3	1.3	1.5	1.5	1.5	1.5
	12	1.5	1.5	1.5	1.8	1.8	1.8	1.8
	24	1.8	1.8	1.8	2.2	2.2	2.2	2.3
Prime mover : Multi-Cylinder internal combustion engine								
Load Category	Usage / Day (Hours)	Number of starts / hour						
		2 to 5	6 to 9	10 to 15	16 to 30	31 to 60	61 to 120	120 to 250 & more
Heavy Shock	3	1.3	1.3	1.3	1.5	1.5	1.5	1.5
	6	1.5	1.5	1.5	1.8	1.8	1.8	1.8
	12	1.8	1.8	1.8	2.2	2.2	2.2	2.2
	24	2.2	2.2	2.2	2.5	2.5	2.5	2.5
Prime mover : Single-Cylinder internal combustion engine								

THERMAL RATING P_t (kW)

Thermal Rating is limiting value of maximum mechanical power that can be transmitted by the gear drive without overheating (i.e. sump temperature not getting above 90-95 °C & Overall casing temperature not getting above 80-85 °C), which is necessary for the satisfactory working of gear drive for stipulated time frame. Values are derived based on the following conditions:

- Lubrication system Splash
- Mounting Horizontal
- Input speed 1440 RMP
- Ambient temp. 30°C
- Use Continuous
- Max. oil temp. 90°C
- Oil grade VG220

Thermal rating value should not be taken into consideration in case of continuous duty for max. 1.5 hours followed by sufficient enough gap (1.5-2 hours) to bring gear drive back to an ambient temperature.

RADIAL & AXIAL LOAD Fr & Fa

Radial load Fr

Permissible radial and axial load carrying capacity of the gear drive is based on the nominal bearing life chosen. When a sprocket, gear or pulley is mounted on the input or output side of the shaft, radial load (overhung load) will act on the shaft and consequently on the bearings.

For satisfactory operation of the reducer calculated overhung load on the shaft should not exceed the tabulated value for any specific gear drive.

$$OHL (N) = \frac{9,500,000 \times K \times kW}{(n_1/n_2) \times R}$$

kW Power transmitted by shaft (kW)
K Factor
n ₁ Speed of Input shaft
n ₂ Speed of Input shaft (rpm)
R Pitch radius of the sprocket, etc (mm)

Axial load/Thrust Load Fa

No check or calculation is required if the axial load towards or away from the unit is 50% of the permissible overhung load. If the axial load on the unit exceeds considerably or there is combination of axial and radial load please contact us.

LUBRICATION

For the best performance of the enclosed industrial gear drives proper selection of the lubricating agent is indispensable. Unless otherwise specified **gear drive are supplied without oil fill.** Lubricant serves following purposes:

- Reduces friction: Reduces/ prevents wear . Carries away heat generated due to friction
- Protects against corrosion

There are three kinds of lubricants: Liquids (mineral/vegetable oils) Semi-solids (grease) Solids (graphite, molybdenum disulfide)

Lubricant should satisfy following constraints of the gear drive at different working conditions:

- Speed - Lesser the output speed more viscous the lubricant required. Higher speed necessitates use of synthetic based oils.
- Temperature - Higher the output speed higher the temperature lesser the viscosity grade of the lubricant required.
- Pressure - High pressure usually requires Synthetic base EP additives

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TABLE NO - 3 RANGE OF RATIO AND FRAME SIZE SUITABLE FOR DIFFERENT MODELS

MODEL	RATIO RANGE	INPUT (FS)	MODEL	RATIO RANGE	INPUT (FS)
1501	3.55,3.95,4.5,5.31,6.6	63,71,80	1506	3.43,4.09,4.58,5.25,6.23,7.8	112,132,160
2501	12.6-43.5	63,71,80	2506	11.8-60.8	100,112,132
3501	44.7-287.5	63,71,80	3506	40.4-474.6	100,112,132
4501	158.8-1897	63,71,80	4506	146.5-3796	100,112
1502	3.68,4.11,4.69,5.54,6.9	80,90	1507	3.43,4.09,4.58,5.25,6.23,7.8	112,132,160
2502	13.54-47.6	63,71,80,90	2507	11.8-60.8	112,132,160
3502	48-314	63,71,80	3507	40.4-474.6	100,112,132
4502	170.7-2073	63,71,80	4507	138.4-3701	100,112,132
1503	3.63,4.4,5.5,2,6.25,8	90,100,112	1508	3.43,4.09,4.58,5.25,6.23,7.8	132,160,180
2503	13-55	80,90,100,112	2508	11.8-60.8	112,132,160
3503	47.4-364.3	63,71,80	3508	40.4-474.6	100,112,132
4503	174.5-2514	63,71,80	4508	138.4-3701	100,112,132
1504	3.43,4.09,4.58,5.25,6.23,7.8	100,112	1509	3.43,4.09,4.58,5.25,6.23,7.8	132,160,180
2504	12.5-62.4	100,112	2509	11.8-60.8	112,132,160
3504	45.8-430.6	80,90	3509	40.4-474.6	100,112,132
4504	162.7-2841.7	63,71,80	4509	138.4-3701	100,112,132
1505	3.43,4.09,4.58,5.25,6.23,7.8	100,112,132	1510	3.43,4.09,4.58,5.25,6.23,7.8	132,160,180
2505	11.8-60.8	100,112,132	2510	11.8-60.8	112,132,160
3505	60.7-486.7	100,112	3510	40.4-474.6	100,112,132
4505	223.5-3358	80,90	4510	138.4-3701	100,112,132

TABLE NO - 4 HOLLOW INPUT DIMENSIONAL DETAILS

SR. NO.	HP	FS	Ød1	Ød2	Ød3	Ød4	e	f	ff
1	0.16/0.25	63	Ø11	Ø95	PCØ115 (M8 n ⁴)	Ø140	32	4	12.9
2	0.35/0.5	71	Ø14	Ø110	PCØ130 (M8 n ⁴)	Ø160	37	5	16.3
3	0.75/1	80	Ø19	Ø130	PCØ165 (M10 n ⁴)	Ø200	56	6	21.8
4	1.5/2	90	Ø24	Ø130	PCØ165 (M10 n ⁴)	Ø200	60	8	27.3
5	3/4	100	Ø28	Ø180	PCØ215 (M12 n ⁴)	Ø250	82	8	31.3
6	5	112	Ø28	Ø180	PCØ215 (M12 n ⁴)	Ø250	82	8	31.3
7	7.5/10	132	Ø38	Ø230	PCØ265 (M12 n ⁴)	Ø300	93	10	41.3
8	12.5/15/20	160	Ø42	Ø250	PCØ300 (M16 n ⁴)	Ø350	115	12	45.3
9	25/30	180	Ø48	Ø250	PCØ300 (M16 n ⁴)	Ø350	115	14	51.8
10	40	200	Ø55	Ø300	PCØ350 (M16 n ⁴)	Ø400	126.5	16	59.3
11	50	225	Ø60	Ø350	PCØ400 (M16 n ⁸)	Ø450	146	18	64.4

*(ABOVE DATA APPLICABLE FOR 4POLE, 1440RPM, B5 FLANGE MOUNTED MOTOR ONLY)

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**DIMENSIONAL DETAIL FOR FLANGE MOUNTED GEAR DRIVE
MODEL 501 - 510**

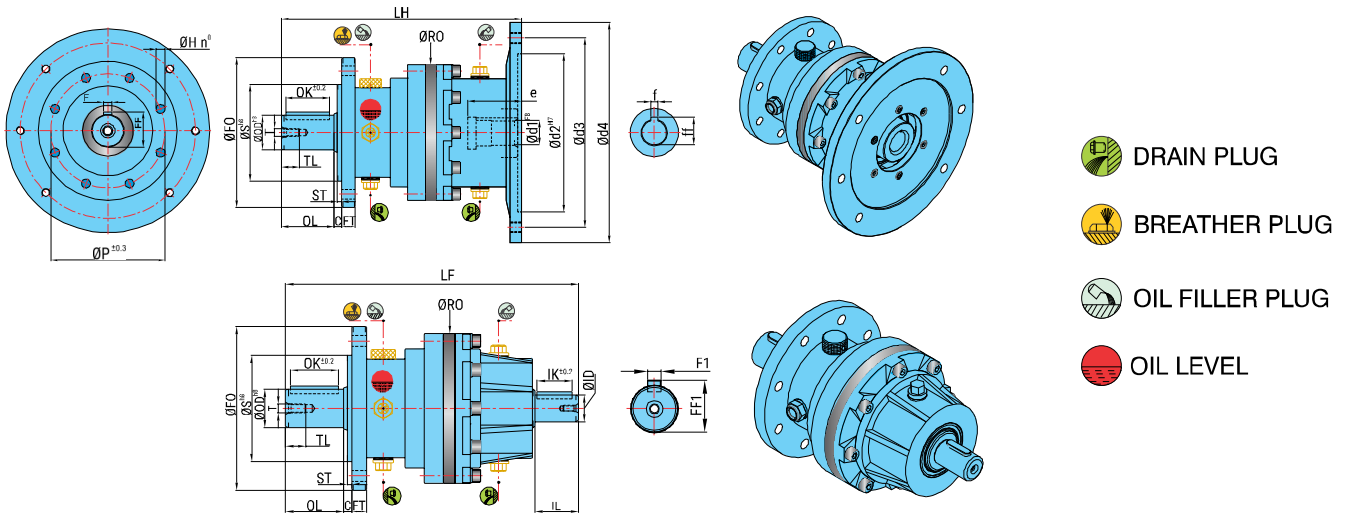


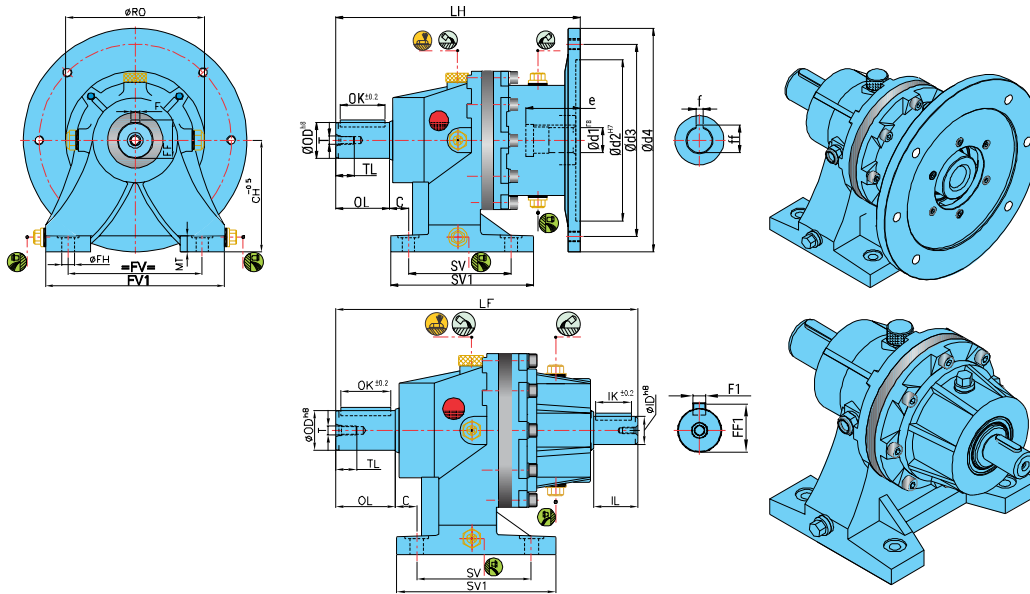
TABLE NO - 5 DIMENSIONAL DETAILS FOR FLANGE MOUNTED GEAR DRIVE

MODEL	INPUT SIDE					OUTPUT SIDE															Total Length			
	ØID	IL	IK	F1	FF1	ØOD	OL	OK	F	FF	C	ØS	ØP	ØFO	FT	ST	ØH	n°	T	TL	ØRO	LH	LF	
1501																							173	185
2501																							206	219
3501	15	25	18	5	17	20	30	20	6	22.5	5	80	100	120	10	3	9	4	M5	14	100	240	252	
4501																							273	286
1502																							240	254
2502																							282	296
3502	20	30	20	6	22.5	30	50	40	8	33	6	95	115	140	13	3	11	4	M8	20	124	294	307	
4502																							328	340
1503																							274	304
2503																							325	355
3503	28	45	30	8	31	40	60	50	12	43	9	110	140	170	15	5	11	8	M12	28	155	367	381	
4503																							408	422
1504																							335	349
2504																							390	404
3504	40	60	50	12	43	50	75	63	14	53.5	10	130	165	200	15	6	13	8	M12	28	195	406	437	
4504																							457	488
1505																							378	414
2505																							442	478
3505	40	60	50	12	43	60	90	70	18	64	10	160	215	250	17	6	13	8	M16	35	230	498	513	
4505																							553	568
1506																							460	489
2506																							540	569
3506	55	75	63	16	59	70	100	80	20	74.5	30	180	220	260	20	8	14	10	M16	35	260	576	612	
4506																							640	676
1507																							500	540
2507																							592	632
3507	60	80	63	20	64.5	80	120	90	22	85	31	240	265	300	20	8	18	8	M16	40	280	621	657	
4507																							685	721
1508																							569	625
2508																							676	732
3508	70	100	80	20	74.5	95	135	110	25	100	32	250	290	340	25	8	18	12	M20	50	320	734	763	
4508																							814	843
1509																							703	743
2509																							837	877
3509	80	110	80	22	85	110	180	160	28	116	42	260	315	370	32	10	18	12	M20	40	360	885	925	
4509																							977	1017
1510																							806	897
2510																							971	1063
3510	80	120	100	22	85	120	190	160	32	127	46	280	330	380	34	12	21	12	M24	50	410	1066	1088	
4510																							1173	1195

**DIMENSIONAL DETAIL FOR FOOT MOUNTED GEAR DRIVE
MODEL 501 - 510**



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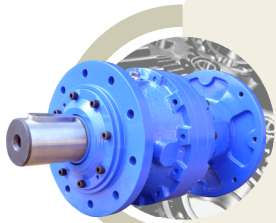


- DRAIN PLUG
- BREATHER PLUG
- OIL FILLER PLUG
- OIL LEVEL

TABLE NO - 6 DIMENTIONAL DETAILS FOR FOOT MOUNTED GEAR DRIVE

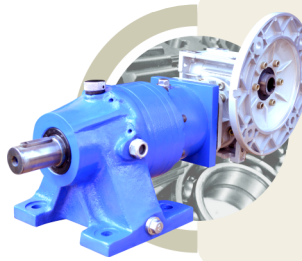
MODEL	INPUT SIDE					OUTPUT SIDE															Total Length		
	ϕID	IL	IK	F1	FF1	ϕOD	OL	OK	F	FF	C	FV	FV1	SV	SV1	CH	MT	ϕFH	T	TL	ϕRO	LH	LF
1501																						173	185
2501																						206	219
3501	15	25	18	5	17	20	30	20	6	22.5	25	80	110	55	85	85	8	9	M5	14	100	240	252
4501																						273	286
1502																						240	254
2502	20	30	20	6	22.5	30	50	40	8	33	20	125	170	100	135	100	12	13	M8	20	124	282	296
3502																						294	307
4502																						328	340
1503																						274	304
2503	28	45	30	8	31	40	60	50	12	43	21.3	150	200	120	160	125	18	14	M12	28	155	325	355
3503																						367	381
4503																						408	422
1504																						335	349
2504	40	60	50	12	43	50	75	63	14	53.5	25.7	190	240	120	165	130	18	14	M12	28	195	390	404
3504																						406	437
4504																						457	488
1505																						378	414
2505	40	60	50	12	43	60	90	70	18	64	24	230	280	145	200	150	20	16	M16	35	230	442	478
3505																						498	513
4505																						553	568
1506																						460	489
2506	55	75	63	16	59	70	100	80	20	74.5	34.3	230	300	170	230	160	20	18	M16	35	260	540	569
3506																						576	612
4506																						640	676
1507																						500	540
2507	60	80	63	20	64.5	80	120	90	22	85	24.3	260	330	200	238	170	25	18	M16	40	280	592	632
3507																						621	657
4507																						685	721
1508																						569	625
2508	70	100	80	20	74.5	95	135	110	25	100	48	320	400	180	255	200	25	22	M20	50	320	676	732
3508																						734	763
4508																						814	843
1509																						703	743
2509	80	110	80	22	85	110	180	160	28	116	115	330	410	230	314	250	30	26	M20	40	360	837	877
3509																						885	925
4509																						977	1017
1510																						806	897
2510	80	120	100	22	85	120	190	160	32	127	155	405	500	325	425	250	30	26	M24	50	410	971	1063
3510																						1067	1088
4510																						1173	1195

BETTER TRANSMISSION... GREATER RESULTS....



Planetary Gearbox

- Model- 501-515
- Ratio- 1:3.63 to 1:1,00,000
- Rated Torque- 12Kg.m to 60,000 Kg.m
- Input Power- 0.12kW to 315kW
- Mounting- Foot / Flange / Agitator
- Input- Hollow to suite 63Fs to 355Fs & Male Free Shaft



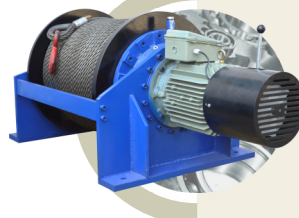
Worm Planetary

- Model- W25P1501-W150P4511
- Ratio- 1:26.6 to 1:10,000
- Rated Torque- 12Kg.m to 8,000 Kg.m
- Input Power- 0.12kW to 37kW
- Mounting- Foot / Flange
- Input- Hollow to suite 63Fs to 355Fs & Male Free Shaft



Bevel-Planetary

- Model- B70P1501-B240P4515
- Ratio- 1:3.63 to 1:1,00,000
- Rated Torque- 12Kg.m to 60,000 Kg.m
- Input Power- 0.12kW to 315kW
- Mounting- Foot / Flange
- Input- Hollow to suite 63Fs to 355Fs & Male Free Shaft



Electric Winch

- Model- 0.5TEW - 20TEW
- Capacity- 500 Kg to 20,000 Kg
- Speed- 3 m/min - 25 m/min
- Wire Rope- Ø6 to Ø38 & L10m - 1000m
- Drum- Single / Double



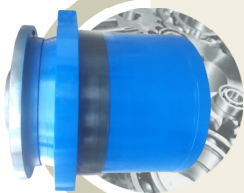
Hydraulic Winch

- Model- 0.5THW - 20THW
- Capacity- 500 Kg to 20,000 Kg
- Speed- 15 m/min - 40 m/min
- Pressure- 50-200 Bar, Flow- 25-100 Lpm
- Wire Rope- Ø6 to Ø38 & L10m - 1000m
- Drum- Single / Double
- Supplied with Negative Parking Break



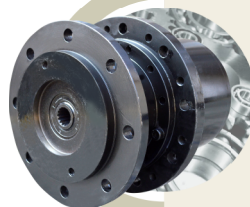
Screw Jack

- Model- SJ25 - SJ190
- Capacity- 0.5 Ton to 100 Ton
- Stroke- 30mm to 4000mm
- Rotating and Translating Screw
- Trapezoidal and ACME thread



Winch Drive

- Model-WD1502 to WD4512
- Ratio- 1:40 to 1:1,000
- Rated Torque- 12Kg.m to 6,000 Kg.m
- Input Power- 0.12kW to 315kW
- Mounting- Body
- Input- Hollow to suite 63Fs to 355Fs & Male Free Shaft



Track Drive

- Model- TD160 - TD 415
- Ratio- 1:5.25 to 1:39.5
- Rated Torque- 100Kg.m to 4,000 Kg.m
- Face Seal for Longer Life
- Rigid Design
- Hydraulic Releasing Parking Break on Request

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