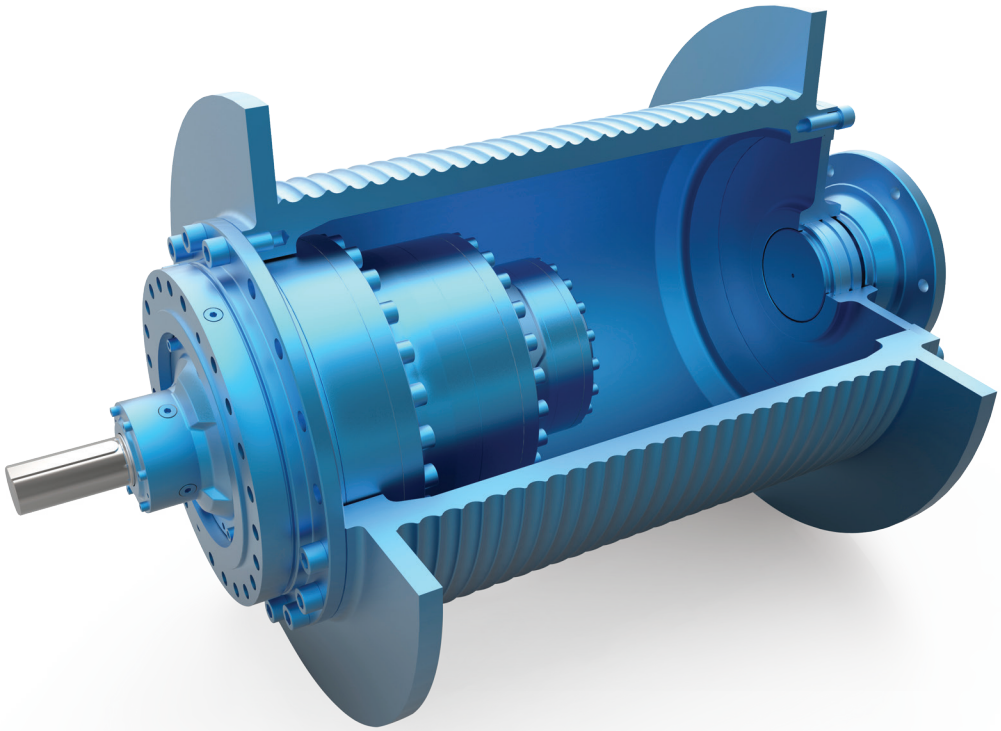
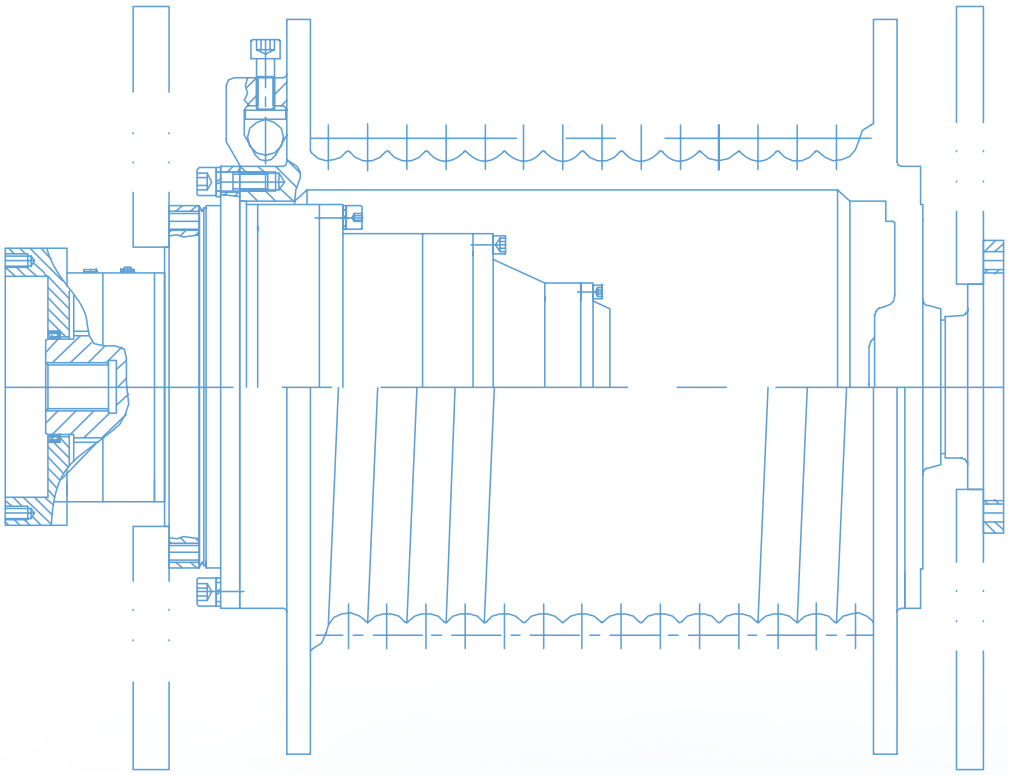
TGE TRANSMISSION



PW Winch Gearbox

Modified date 06/2021



PW Series Winch Gearbox

» PW Winch Gearbox is the perfect driven device for hoisting winches. Compact dimensions is useful to assemble the PW Winch Gearbox in the drum and save the space. Especially in the confined space conditions, it is the economic solutions. TGE PW Winch Gearbox have proved highly successful under extreme bad operating conditions.

» Sun and planet wheels material is excellent alloy steel and processed by carburization and quenching. Internal gear wheel material is excellent alloy steel and processed by hardening. All gears grinding. The connection flange of planet carrier and internal gear wheel are made of ductile graphite iron. Optimal design through the computer and the stress analysis.

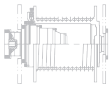
» All bearings are from famous brand. The bearings have high loading support and safety. The input and output are protected with radial shaft seals and V type seals. Viton material improves the seal life.

» High modular design. Volume production is more economic and speeds up the delivery period.

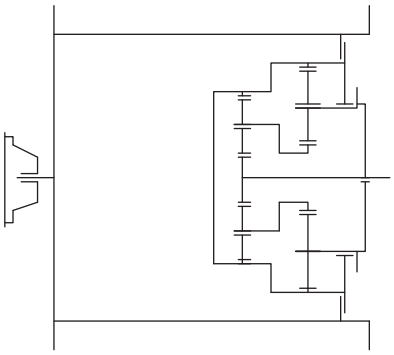
» 2 stage, 3 stage and 4 stage design and wide range of ratio.

» Low noise, high efficiency and long operation life.

» Easy mounting and maintenance.

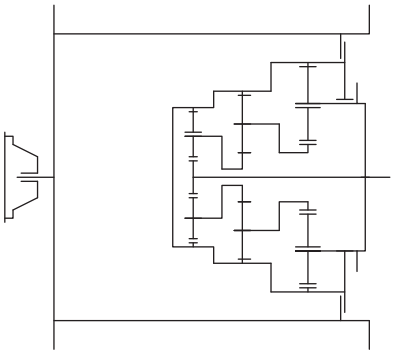


1 Design and Construction



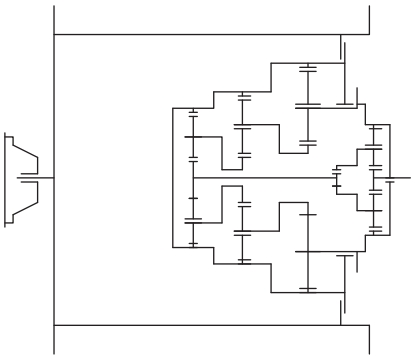
2 stage planetary gearbox

Output torques: 11.6 to 155 KN.m
Rope load: 67 to 408KN
Ratio from i=13 to 28
Gearbox mounted inside winch drum.
Input and output in opposite sense of rotation



3 stage planetary gearbox

Output torques: 25 to 236 KN.m
Rope load: 116 to 566 KN
Ratio from i=45 to 141
Gearbox mounted inside winch drum.
Input and output in opposite sense of rotation



4 stage planetary gearbox

Output torques: 47 to 1500 KN.m
Rope load: 180 to 1950 KN
Ratio from i=167 to 940
Gearbox mounted inside winch drum.
Input and output in opposite sense of rotation

Remark: Mechanical efficiency of every stage is 98%, bearings for rope drum and the seal rings mechanical efficiency is 99%

For example: the total mechanical efficiency for 2 stage winch planetary gearbox $\eta=0.98\times0.98\times0.99=0.95$

2 Type Description

PW 3 27 — 90 — H + UV32 — V1

Series name

Planetary gear transmit stage
2/3/4 Stage

Size

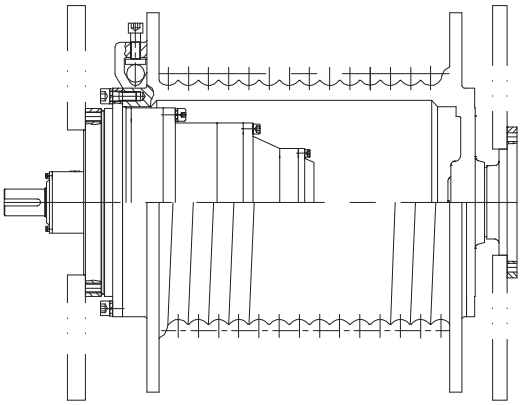
Nominal ratio

Input part
Hydraulic motor input
Shaft (motor) input without mark

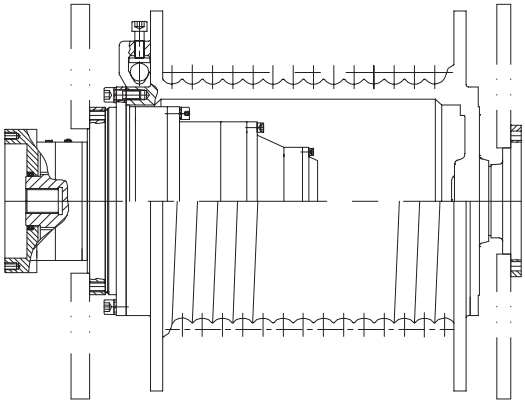
Accessories and special requests

Version Number
Technical update

3 Input modes



Motor input foot mounted



Hydraulic motor input, foot mounted

PW with electric motor input and hydraulic motor input.
When hydraulic motor is input, the input shaft is a DIN 5480 spline shaft, equipped with the hydraulic pressure release and loose-spring multi disc brake parking system. This brake safety device is a self contained piston or brake with a minimum release pressure of 15 bar, the maximum pressure is 300 bar. System residual pressure is less than 0.5 bar.

Remark: PW complete range can be equipped with kinds of motors, such as high speed motor (Single or 2 — 3 drive units), cycloidal motor, low speed with big torque motor etc, can meet customer's different demands. For details, please consult us.

4 Integrated Rope Drum

4.1 Drum categories

1) Drum with normal grooves (figure 1) and with special grooves (figure 2).

2) Rope groove has right hand lead and left hand. The default lead is right hand (figure 1).

3) Drum with special grooves can avoid the difficulties encountered in multi-layer winding on to grooves of the usual kind. As the crossover points of the rope in each layer always lie in the same section of the drum and the spiral angle of the next layer rope is determined. 8 and more layers can be accommodated without difficulty.

PW

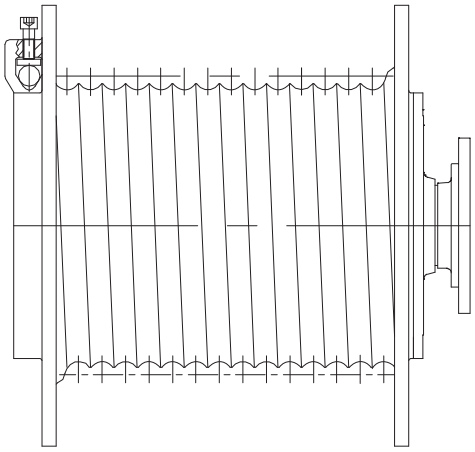


Figure 1

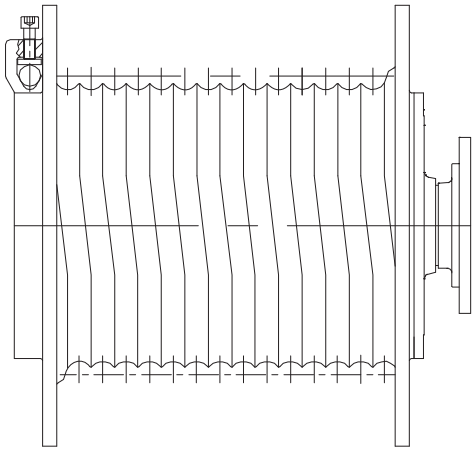


Figure 2

4.2 Rope fixing: on the outside of the drum flange

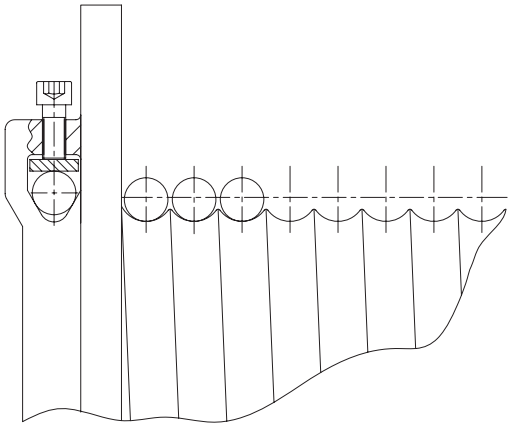


Figure 3

4.3 To achieve acceptable rope winding, the deflection angle α must be kept in the allowable value (figure 4) Attent the following points:

1) Rope lay should be in the opposite sense to drum lead.

2) The deflection angle α must not less than 0,5° in order to prevent the rope from riding up the drum flange and to ensure that it is guided securely on to the next layer.

3) The deflection angle α must not exceed 1,5° in order to prevent the rope in the first layer being pulled against the grooves and, where a number of layers occur, to enable even winding up to the drum flanges.

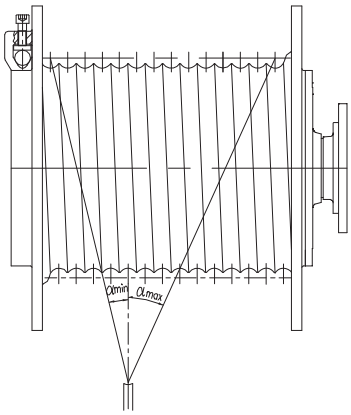


Figure 4

4.4 The related calculations between drum and rope (figure 5):

Rope drum diameter D1= 20 x d or as specified

Drum flange diameter D2= D1 + 2 (Z + 1) d

Length of rope (including 3 safety turns)

$$Ls = \left(\frac{L2}{P}\right) - a\ (D1+0.866\ *d\ (z-1)) \frac{z*\pi}{1000}$$

LS = Length of rope [m]
L2 = Length of drum [mm]
D1 = Diameter of drum [mm]
d = Diameter of rope [mm]
p = Pitch of rope groove [mm]
z = Number of rope layers
a = 1 for normal grooves , a= 0,5 for special grooves

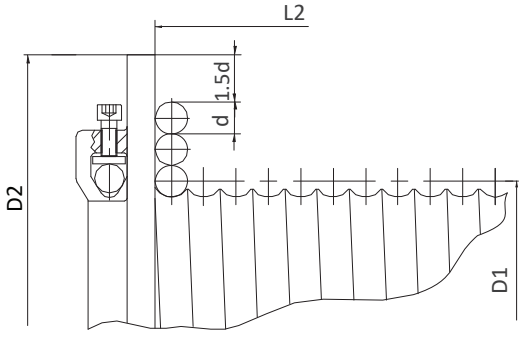


Figure 5

5 Valve explanation

According to different working condition, the drive motor should be equipped with the valve to make sure the hoisting winch running safely.

There are two different valves:
One is the motor integrated valve with open hydraulic system. The valve can control the load while it is descending, lighten the pressure and opening the brake automatically.Another is the tube explosion-proof valve with close hydraulic system. The valve can lock the motor when the tube is exploded and prevent the fail save motor.

PW

5.1 The motor integrated valve with open hydraulic system

The motor integrated valve is the standard valve for the hoisting winch drive, we suggest the customer to use the valve in advance. If customer need only use one of the valve function, it should be customized.

5.1.1 Motor integrated valve

The motor integrated valve can lighten the pressure, control the load and open the integrated motor brake automatically. Valve working principle drawing: the balance valve is on the oil port B side of motor (figure 6), the balance valve is on the oil port A side of motor (figure 7).

When filling the oil on motor A side and pull the rope, should select the valve as figure 6; When filling the oil on motor B side and pull the rope, should select the valve as figure 7.

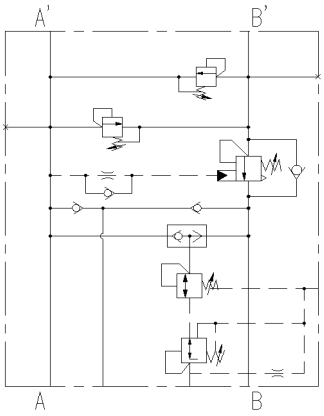


Figure 6 motor integrated valve

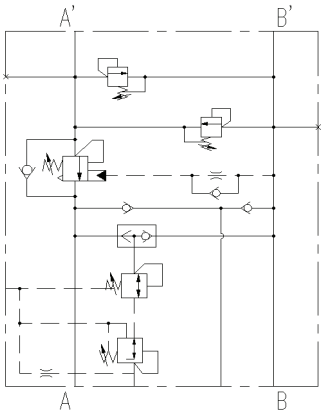


Figure 7 motor integrated valve

Valve function:

1)When the hoisting winch is operating under negative loading, we should mount the balance valve on the motor to prevent the hoisting winch from stalled glide and keep the stable operating.

2)When the rope pulling force is changing and the load is unstable, it will cause the hydraulic pressure wave and there is the higher pressure, we should mount the cushion valve to release the pressure to prevent the hydraulic system damaged.

3)Brake is mounted to prevent the hoisting winch from slipping when the hoisting winch stops running and is locked well. The brake in the motor integrated valve can open automatically when the hoisting winch is operating and will close automatically when the hoisting winch is stopping.

Remark: the balance valve mounting position is very important. How to confirm the mounting position is on the A side or B side of motor, you can refer to the winding direction on the rope drums.

5.2 The motor integrated valve with close hydraulic system

The close hydraulic system can achieve the hydrostatic brake through the hydraulic pump, and motor can absorb the brake torque, usually balance valve is not suggested to keep from the hydraulic oil temperature too high. If customer has this special demand, the technical testing should be done.

5.2.1 The tube explosion-proof valve

To ensure the correct using hoisting winch, we suggest customer to use the tube explosion-proof valve. It can cut off the returned oil port of motor when the hydraulic tube is split. The counter pressure of the returned oil port will make the dynamic brake on the motor to prevent the hoisting winch from slipping.

The tube explosion-proof valve working principle drawing: the tube explosion-proof valve is on the oil port A side of motor (figure 8), the tube explosion-proof valve is on the oil port B side of motor (figure 9).

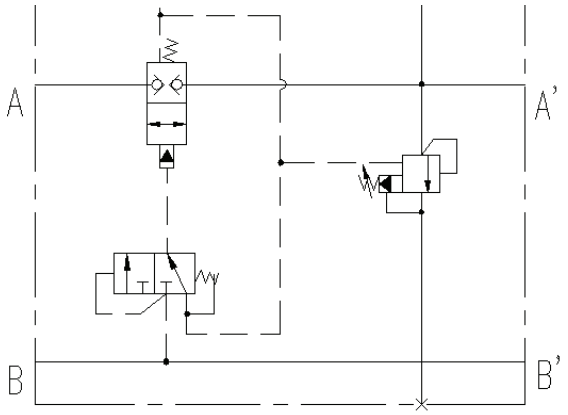


Figure 8 The tube explosion-proof valve

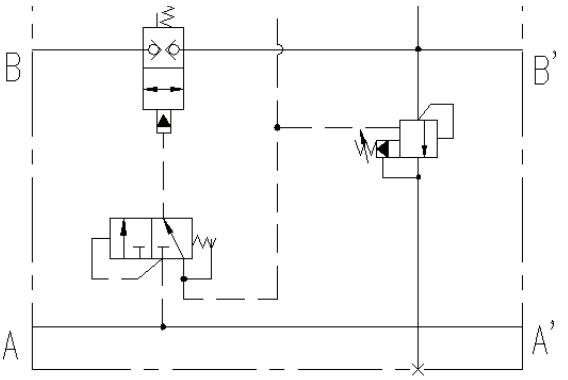
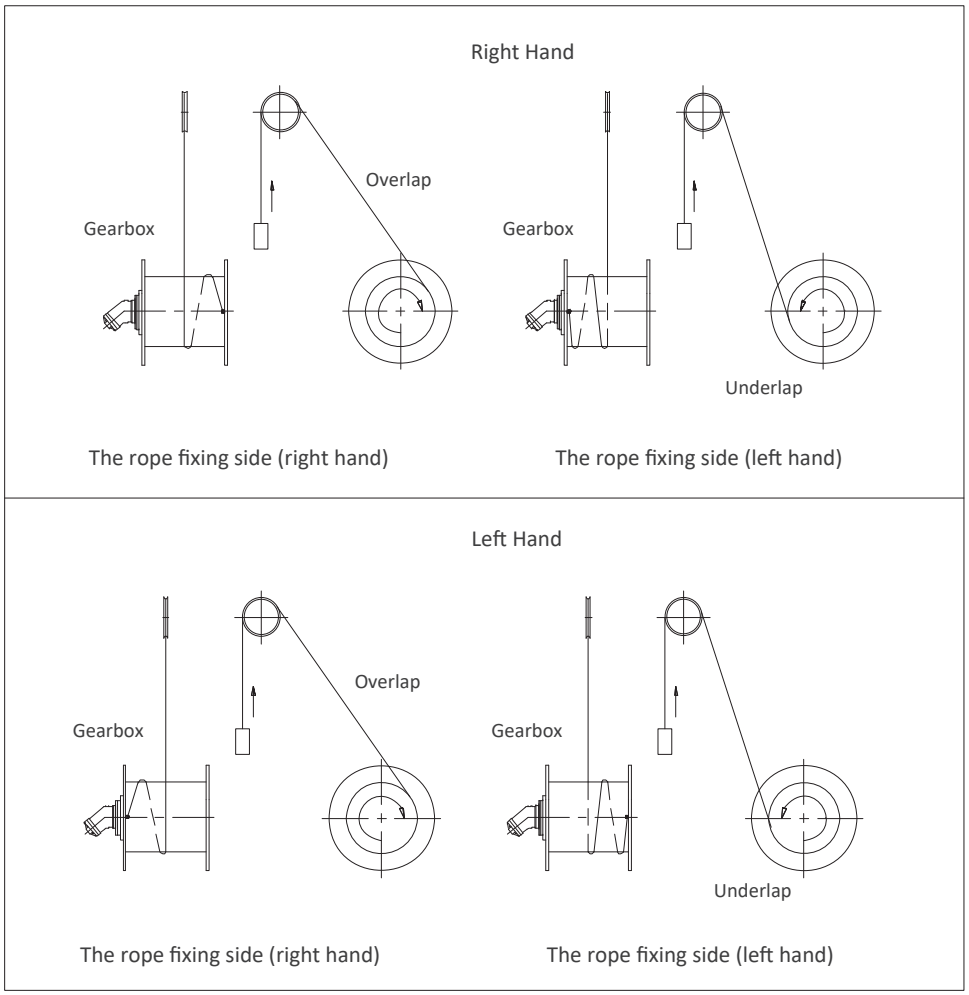


Figure 9 The tube explosion-proof valve

When filling the oil on motor B side and pull the rope, should select the valve as figure 8;
When filling the oil on motor A side and pull the rope, should select the valve as figure 9.

Remark: the tube explosion-proof valve mounting position is very important. How to confirm the mounting position is on the A side or B side of motor, you can refer to the winding direction on the rope drums.

5.3 Winding directions on the rope drums



Rope direction	Rope groove lead	Rope pull mode	Gearbox output	Gearbox input	Motor rotation	Motor inlet oil port	Balance valve/ explosion-proof valve mounting position
Draw rope	Right hand	overshot	CW	CCW	CW	A (B)	A (B)
	Right hand	undershot	CCW	CW	CCW	B (A)	B (A)
	Left hand	undershot	CW	CCW	CW	A (B)	A (B)
	Left hand	undershot	CCW	CW	CCW	B (A)	B (A)
Release rope	Right hand	overshot	CCW	CW	CCW	B (A)	A (B)
	Right hand	undershot	CW	CCW	CW	A (B)	B (A)
	Left hand	overshot	CCW	CW	CCW	B (A)	A (B)
	Left hand	undershot	CW	CW	CW	A (B)	B (A)

Remark: 1) Gearbox output and input direction in above table: when facing the gearbox input shaft.
2) The motor rotation in above table: when facing the motor output shaft.
3) The drum rotation: When facing the gearbox input shaft, the gearbox output shaft rotation is the drum rotation.

6 Type selection

6.1 Operation instruction

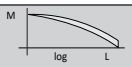
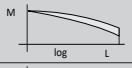
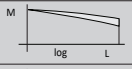
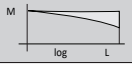
PW rated dynamic output torques $T_{dyn\ max}$ are based on FEM Standards section 1, 3rd edition (FEM - Federation Europeenne de la Manutention). Drive unit group M5, load conditions L2 (P=constant, =15rpm), running time classification T5. Ambient temperature +20°C. If the hoisting winch is classified as other working grades, the output torque must be multiplied by the factor K.

T_2: output torque (Nm)
Fnom: single rope pull (N)
Dw: rope strands diameter (m)

$$T_2 = \frac{Fnom^* Dw}{2}$$

T_{2k}: output torque with multiplied factor (Nm)
K: application factor (the relative factor for drive unit group and load conditions)
$T_{2k} = T_2 * K$
Note: $T_{2k} \leq T_{dyn\ max}$(design torque or sample torque)

6.2 Application factor K (running time classification and load conditions)

Running time classification	Symbol	T2	T3	T4	T5	T6	T7	T8
	Mean running time per day in hours, related to one year	0.25 to 0.5	0.5 to 1	1 to 2	2 to 4	4 to 8	8 to 16	over 16
	Life in hours 8 years,200 days/year	400 to 800	800 to 1600	1600 to 3200	3200 to 6300	6300 to 12500	12500 to 25000	25000 to 50000
Load conditions	Collective coefficient Km	Drive unit class Application Factor K						
L1	 to 0.125	M1 0.90	M2 0.90	M3 0.90	M4 0.92	M5 0.92	M6 1.1	M7 1.36
L2	 0.125 to 0.250	M2 0.90	M3 0.92	M4 0.96	M5 1	M6 1.07	M7 1.3	M8 1.6
L3	 0.250 to 0.500	M3 1.05	M4 1.09	M5 1.17	M6 1.23	M7 1.28	M8 1.53	M8 1.89
L4	 0.500 to 1.000	M4 1.32	M5 1.36	M6 1.46	M7 1.53	M8 1.58	M8 1.8	M8 2.22

6.3 Typical load spectrum for crane (figure 10)

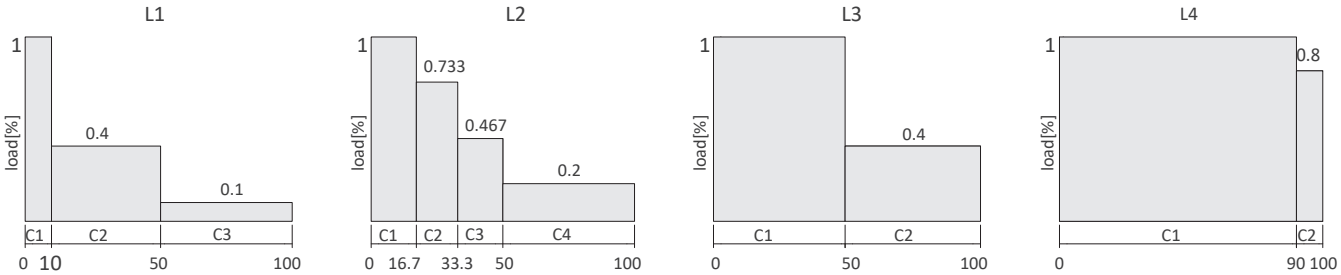


Figure 10 Crane load spectrum

6.1 Classification Guidance According FEM section 1, 3rd edition, table T.2.1.3.5

Type of Crane (name)	Working accessories	Type of mechanism				
		Hoisting	Slewing	Luffing	Traverse	Travel
Erection cranes		M2-M3	M2-M3	M1-M2	M1-M2	M2-M3
Bridge crane	Hook duty	M5-M6	M4	-	M4-M5	M5-M6
Bridge crane	Grab or magnet	M7-M8	M6	-	M6-M7	M7-M8
Workshop cranes	Grab or magnet	M6	M4	-	M4	M5
Crane, Ram crane, Scrap mill crane	Hook or magnet	M8	M6	-	M6-M7	M7-M8
Unloading bridge, Container gantry crane	Hook	M6-M7	M5-M6	M3-M4	M6-M7	M4-M5
Other gantry crane(with crab and/or slewing jib crane)	Grab or magnet	M4-M5	M4-M5	-	M4-M5	M4-M5
Unloading bridge, Container gantry crane (with crab and/or slewing jib crane)	Hook	M8	M5-M6	M3-M4	M7-M8	M4-M5
Shipyard crane, Dock crane, Disassembly crane		M5-M6	M4-M5	M4-M5	M4-M5	M5-M6
Dockside cranes (slewing, on gantry, etc.), floating cranes and pontoon derricks	Hook	M6-M7	M5-M6	M5-M6	-	M3-M4
Dockside cranes (slewing, on gantry, etc.), floating cranes and pontoon derricks	Grab or magnet	M7-M8	M6-M7	M6-M7	-	M4-M5
Floating cranes and pontoon derricks for very heavy loads (usually greater than 100 t)		M3-M4	M3-M4	M3-M4	-	-
Deck cranes	Hook	M4	M3-M4	M3-M4	M2	M3
Deck cranes	Grab or magnet	M5-M6	M3-M4	M3-M4	M4-M5	M3-M4
Tower cranes for building		M4	M5	M4	M3	M3
Derricks		M2-M3	M1-M2	M1-M2	-	-
Railway cranes allowed to run in train		M3-M4	M2-M3	M2-M3	-	-
Mobile cranes	Hook	M3-M4	M3-M4	M2-M3	-	-

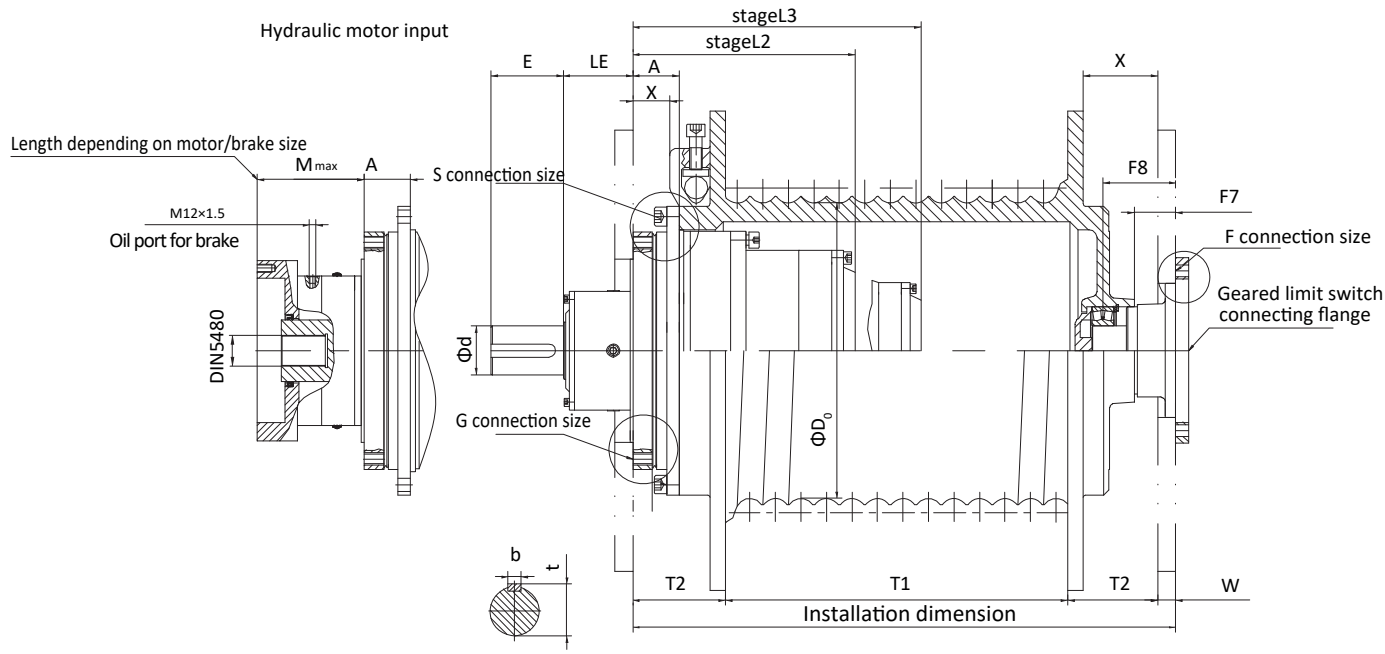
Note: Above are only some typical applications for hoisting winch.

7 Transmission capacity

Nominal ratio	Exact ratio	type PW	20	22	24	25	26	27	29	31	32	33	34	36	38	40
i_N	i_{ex}	dynamic kNm	11.6	19.4	25.5	36	48	63	105	155	236	311	406	644	1100	1500
		static kNm	18.5	31	41	57.5	77	101	168	248	377.5	497.5	649.5	1030.5	1760	2400
13	13.11	2 stage	*	*	*	*	*	*	*	*	*					
15	15.14		*	*	*	*	*	*	*	*	*					
18	18.22		*	*	*	*	*	*	*	*	*					
20	20.45		*	*	*	*	*	*	*	*	*					
23	23.47		*	*	*	*	*	*	*	*	*					
28	27.79		*	*	*	*	*	*	*	*	*					
45	44.97	3 stage	*	*	*	*	*	*	*	*	*					
52	51.56		*	*	*	*	*	*	*	*	*					
59	59.10		*	*	*	*	*	*	*	*	*					
71	70.57		*	*	*	*	*	*	*	*	*					
79	78.88		*	*	*	*	*	*	*	*	*					
84	84.23		*	*	*	*	*	*	*	*	*					
90	90.13		*	*	*	*	*	*	*	*	*					
105	105.18		*	*	*	*	*	*	*	*	*					
120	120.13		*	*	*	*	*	*	*	*	*					
141	141.49		*	*	*	*	*	*	*	*	*					
167	167.48	4 stage	*	*	*	*	*	*	*							
192	192.03		*	*	*	*	*	*	*	*	*	*	*	*		
220	220.1		*	*	*	*	*	*	*	*	*	*	*	*	*	*
262	262.1		*	*	*	*	*	*	*	*	*	*	*	*	*	*
273	273.16		*	*	*	*	*	*	*	*	*	*	*	*	*	*
293	292.54		*	*	*	*	*	*	*	*	*	*	*	*	*	*
313	312.95		*	*	*	*	*	*	*	*	*	*	*	*	*	*
334	333.74		*	*	*	*	*	*	*	*	*	*	*	*	*	*
349	349.31		*	*	*	*	*	*	*	*	*	*	*	*	*	*
374	373.52		*	*	*	*	*	*	*	*	*	*	*	*	*	*
393	392.59		*	*	*	*	*	*	*	*	*	*	*	*	*	*
417	416.91		*	*	*	*	*	*	*	*	*	*	*	*	*	*
445	445.46		*	*	*	*	*	*	*	*	*	*	*	*	*	*
476	475.62		*	*	*	*	*	*	*	*	*	*	*	*	*	*
509	508.98		*	*	*	*	*	*	*	*	*	*	*	*	*	*
532	531.54		*	*	*	*	*	*	*	*	*	*	*	*	*	*
559	559.49		*	*	*	*	*	*	*	*	*	*	*	*	*	*
594	593.94		*	*	*	*	*	*	*	*	*	*	*	*	*	*
625	625.27		*	*	*	*	*	*	*	*	*	*	*	*	*	*
678	678.38		*	*	*	*	*	*	*	*	*	*	*	*	*	*
699	698.68		*	*	*	*	*	*	*	*	*	*	*	*	*	*
798	798		*	*	*	*	*	*	*	*	*	*	*	*	*	*
841	841.37		*	*	*	*	*	*	*	*	*	*	*	*	*	*
940	939.89		*	*	*	*	*	*	*	*	*	*	*	*	*	*

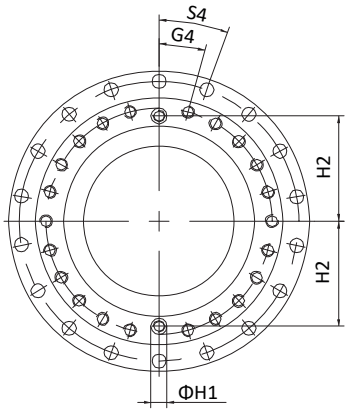
Note: For ratios not listed, please contact!

8 Dimension Drawing

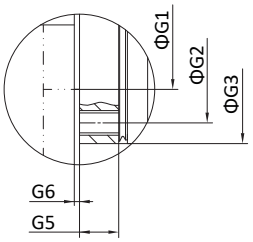


PW	Nominal Gearbox ratings Output torque (KN.m)			G Flange connection 10.9 Gearbox to frame bolts class10.9						S Flange connection 8.8 Gearbox to drum Bolts class 8.8						F Flange connection 8.8 Drum flange to frame bolts class 8.8							
	Tdyn max	Tstatic max	Fnom KN	G1 Location	G2 Pitch diameter	G3 outer diameter	G4 fixing	G5	G6	S1 Location	S2 Pitch diameter	S3 outer diameter	S4 fixing	S5	S6	F1 Location	F2 Pitch diameter	F3 outer diameter	F4 fixing	F5	F6	F7	F8
20	11.6	18.5	69	200h7	255 ±0.2	285	20° 16xM16	25	5	295h7	320 ±0.2	340	15° 34xϕ14	12	9	175h7	200 ±0.2	225	60° 6xϕ11	15	10	30	64
22	19.4	31	98	230h7	280 ±0.2	315	15° 22xM16	25	5	330h7	360 ±0.2	390	20° 18xϕ18	16	9	200h7	230 ±0.2	260	60° 6xϕ14	18	12	35	71
24	25.5	41	119	270h7	320 ±0.2	355	15° 22xM16	25	5	370h7	400 ±0.2	430	15° 24xϕ18	16	9	200h7	230 ±0.2	260	60° 6xϕ14	18	12	35	71
25	36	57.5	147	300h7	350 ±0.2	385	15° 22xM20	30	5	400h7	440 ±0.2	480	20° 18xϕ22	20	9	230h7	260 ±0.2	290	60° 6xϕ22	18	15	40	78
26	48	77	184	330h7	390 ±0.2	425	15° 22xM20	30	5	440h7	480 ±0.2	520	15° 24xϕ22	20	9	260h7	310 ±0.2	360	60° 6xϕ22	25	15	50	92
27	63	101	220	355h7	420 ±0.2	460	15° 22xM24	38	5	470h7	520 ±0.2	560	20° 18xϕ26	24	9	260h7	310 ±0.2	360	60° 6xϕ22	25	15	50	92
29	105	168	313	430h7	480 ±0.2	530	15° 22xM24	38	5	550h7	590 ±0.2	630	15° 24xϕ26	24	9	300h7	350 ±0.2	400	60° 6xϕ22	30	15	50	104
31	155	248	408	515h7	565 ±0.2	615	15° 24xM30	47	5	640h7	690 ±0.2	750	15° 24xϕ33	30	9	325h7	375 ±0.2	425	60° 6xϕ26	35	15	70	134
32	236	377.5	566	580h7	630 ±0.2	680	15° 24xM30	47	5	700h7	755 ±0.2	815	15° 24xϕ33	30	9	325h7	375 ±0.2	425	60° 6xϕ26	35	15	70	134
33	311	497.5	660	670h7	720 ±0.2	770	12° 30xM30	47	5	790h7	840 ±0.2	890	12° 30xϕ33	30	9	375h7	435 ±0.2	500	60° 6xϕ33	40	15	80	144
34	406	649.5	787	720h7	770 ±0.2	820	10° 36xM24	47	5	850h7	900 ±0.2	950	10° 36xϕ33	30	9	375h7	435 ±0.2	500	60° 6xϕ33	40	15	80	144
36	644	1030.5	1073	840h7	900 ±0.2	960	10° 36xM36	56	5	1000h7	1055 ±0.2	1120	10° 36xϕ39	36	9	430h7	490 ±0.2	550	60° 6xϕ33	40	15	90	180
38	1100	1760	1520	1060h7	1140 ±0.2	1210	10° 36xM30	78	26	1240h7	1320 ±0.2	1390	10° 36xϕ33	45	13	600h7	680 ±0.2	750	30° 12xϕ33	50	20	80	180
40	1500	2400	1950	1160h7	1240 ±0.2	1310	10° 36xM30	78	26	1340h7	1420 ±0.2	1490	10° 36xϕ33	45	13	600h7	680 ±0.2	750	30° 12xϕ33	50	20	80	180

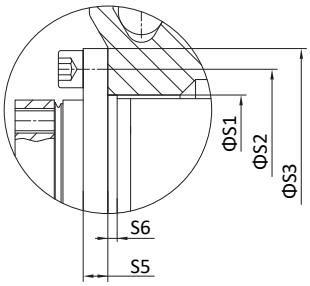
Note: For dimensions not listed, please contact!



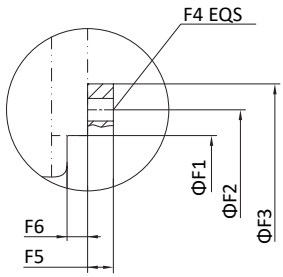
G Flange connection



S Flange connection



F Flange connection



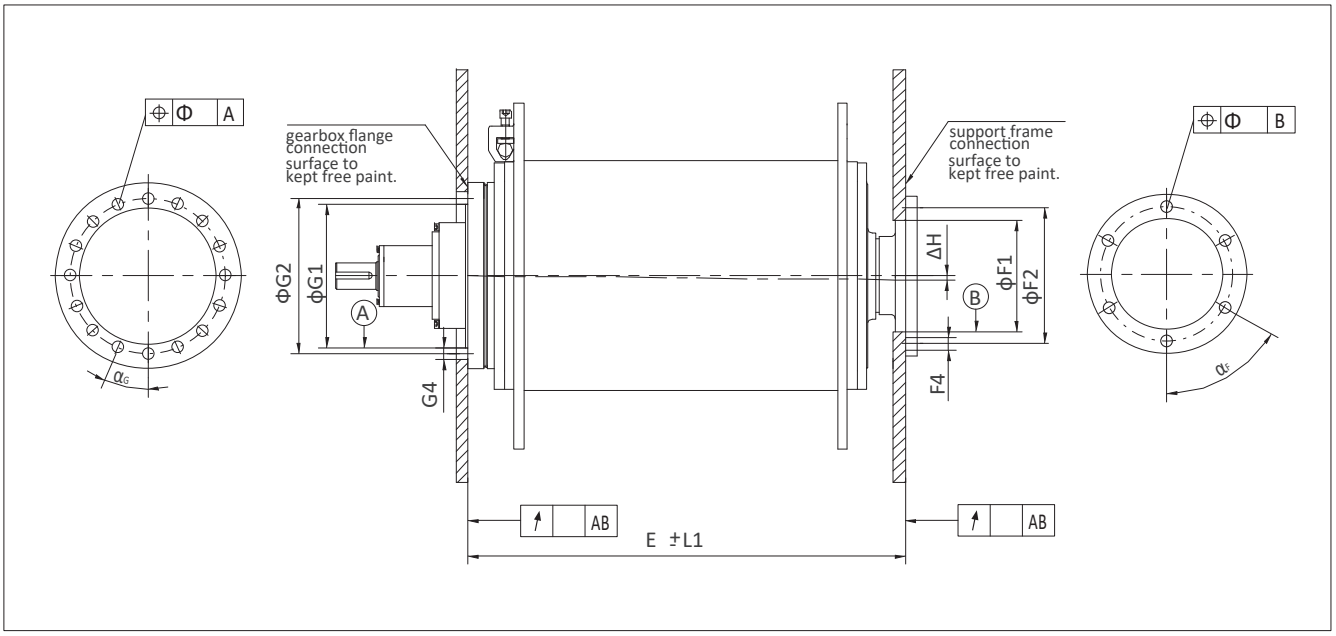
shaft (motor) input									installation dimension															Type
2 stage			3 stage			4 stage			hydraulic motor input	A	L		T1min		D_0	X	T2	W	oil pump connection		weight (kg)			
d	E	LE	d	E	LE	d	E	LE	Mmax		2 stage L2	3 stage L3	2 stage	3 stage	Approx min	min		suggestion	H1	H2	2 stage	3 stage	4 stage	PW
55m6	110	98.5	——	——	——	——	——	——	183	60	300	——	240	——	340	15	95	15	26	117	120	——	——	20
55m6	110	85	——	——	——	——	——	——	171	60	315	——	255	——	390	15	100	15	26	132	140	——	——	22
75m6	140	135.5	65m6	140	117.5	——	——	——	207	60	350	489	290	430	440	20	100	20	26	152	210	245	——	24
75m6	140	118	65m6	140	100	——	——	——	189	75	366	506	295	435	480	20	120	20	30	168	245	275	——	25
95m6	170	139.5	65m6	140	104.5	65m6	140	238	**209**	75	426	555	355	480	520	20	120	20	30	184	365	385	415	26
95m6	170	135	65m6	140	100	65m6	140	233.5	**204**	90	431	560	345	475	570	20	140	20	30	195.5	400	415	445	27
110m6	210	165	95m6	170	165	75m6	140	281	**209**	90	507	685	420	595	670	25	145	25	30	233	630	720	730	29
110m6	210	142	95m6	170	142	75m6	140	258	**186**	110	530	708	425	600	770	30	180	30	38	235	805	890	920	31
——	——	——	110m6	210	130	75m6	140	251	**321**	110	——	800	——	695	830	30	180	30	38	268	——	1320	1360	32
——	——	——	——	——	——	110m6	210	381	462	110	——	928	——	820	930	40	180	40	38	298	——	——	1970	33
——	——	——	——	——	——	110m6	210	377.5	458	120	——	932	——	815	1030	40	200	40	38	335	——	——	2195	34
——	——	——	——	——	——	110m6	210	264	345	120	——	1045	——	970	1200	50	240	50	38	385	——	——	2920	36
——	——	——	——	——	——	160m6	300	421	457	130	——	1415	——	1320	1360	50	240	50	45	497	——	——	6650	38
——	——	——	——	——	——	160m6	300	392	307	130	——	1444	——		1530	50	240	60	45	545	——	——	7660	40

Note: For dimensions not listed, please contact!

9 Assemble method

To ensure correct operation of the winch, the winch gearbox must be in the same line with the frame fixing hole centers and the flange pieces square to the base plate. The relative location between frame mounting central hole and flange mounting surface shouldn't be changed more when they are operating in different environment and outer force. The working tolerance and allowed max. deflections for the support frame are given in the accompanying table.

PW



Type PW	gearbox flange connection			support frame connection			L1	Maximum permitted deviation ΔH from the central line in relation to L1							Type PW
	AB	Φ A	α_G	AB	Φ B	α_F		250	500	750	1000	1500	2000	2500	
20	0.1	0.4	20°	0.2	0.3	60°	2	0.1	0.2	0.2	0.3	0.4			20
22	0.1	0.4	15°	0.2	0.3	60°	2		0.2	0.2	0.3	0.4			22
24	0.1	0.4	15°	0.2	0.3	60°	2			0.2	0.3	0.4	0.5		24
25	0.1	0.5	15°	0.4	0.5	60°	2			0.2	0.3	0.4	0.5		25
26	0.1	0.5	15°	0.4	0.5	60°	3			0.2	0.3	0.4	0.5		26
27	0.1	0.5	15°	0.4	0.5	60°	3				0.3	0.4	0.5		27
29	0.1	0.5	15°	0.4	0.5	60°	3				0.3	0.4	0.5		29
31	0.2	0.5	15°	0.6	0.5	60°	3				0.3	0.4	0.5		31
32	0.2	0.5	15°	0.6	0.5	60°	3				0.3	0.4	0.5	0.7	32
33	0.2	0.5	12°	0.6	0.5	60°	3				0.3	0.4	0.5	0.7	33
34	0.2	0.5	10°	0.6	0.5	60°	3				0.3	0.4	0.5	0.7	34
36	0.3	0.5	10°	0.8	0.5	60°	3				0.3	0.4	0.5	0.7	36
38	0.3	0.5	10°	0.8	0.5	30°	3					0.4	0.5	0.7	38
40	0.3	0.5	10°	0.8	0.5	30°	3					0.4	0.5	0.7	40

10 Lubrication

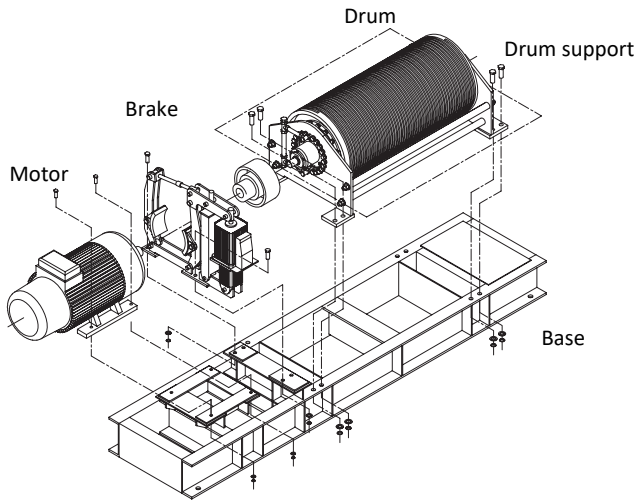
Lubrication viscosity (heavy industrial gear oil) [VG20 (Code: UV32); VG460 (Code: UV46)]

Ambient temperature °C	-20°C – +40°C	+30°C – +50°C
Viscosity	VG320	VG460

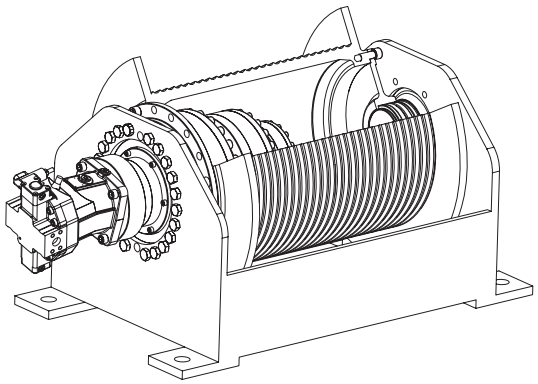
Note:
1. The bearing on the support frame is lubricated by grease.
2. Above table viscosity is only for the temperature under 40°C.
3. Ambient temperature is -10°C must use synthetic oil.
4. To make sure the long using life, we suggest to use synthetic oil.
5. If the ambient temperature is not in the range of table, please consult TGE.

11 Accessories (on request)

- Drum (without grooves, with normal grooves, with special grooves)
- Drum support
- Base plate
- Motor
- Hydraulic motor
- Brake
- Valve
- Encoder



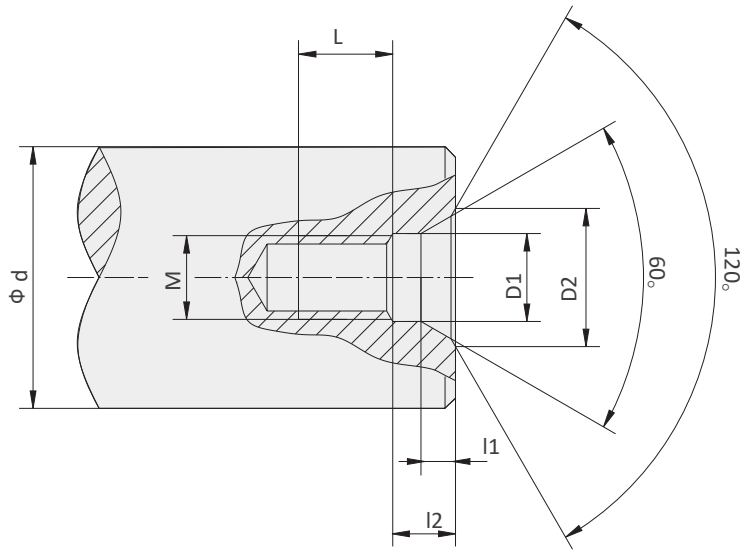
Integrated motor drive



Integrated hydraulic motor drive

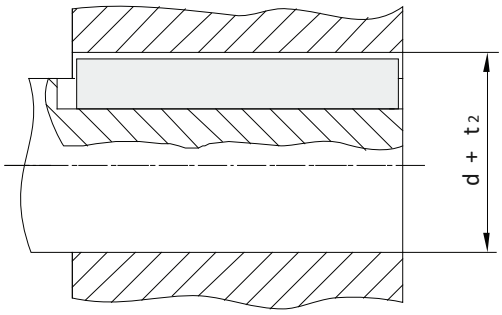
12 Shaft end central hole

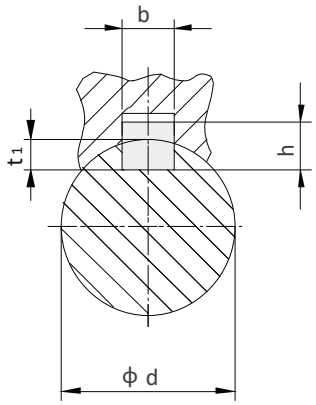
C type screw central hole



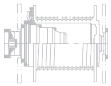
d	M	L	l2	l1	D1	D2
7 < d ≤ 10	M3	10	2.6	1.8	3.2	5.8
10 < d ≤ 13	M4	10	3.2	2.1	4.3	7.4
13 < d ≤ 16	M5	10	4	2.4	5.3	8.8
16 < d ≤ 21	M6	12	5	2.8	6.4	10.5
21 < d ≤ 24	M8	12	6	3.3	8.4	13.2
24 < d ≤ 30	M10	15	7.5	3.8	10.5	16.3
30 < d ≤ 38	M12	20	9.5	4.4	13	19.8
38 < d ≤ 50	M16	25	12	5.2	17	25.3
50 < d ≤ 85	M20	30	15	6.4	21	31.3
85 < d ≤ 130	M24	35	18	8	25	38
130 < d ≤ 225	M30	45	18	11	31	48

13 Key and Keyway dimension





d	b	h	t_1	$d+t_2$
8 < d ≤ 10	3	3	1.8	d + 1.4
10 < d ≤ 12	4	4	2.5	d + 1.8
12 < d ≤ 17	5	5	3	d + 2.3
17 < d ≤ 22	6	6	3.5	d + 2.8
22 < d ≤ 30	8	7	4	d + 3.3
30 < d ≤ 38	10	8	5	d + 3.3
38 < d ≤ 44	12	8	5	d + 3.3
44 < d ≤ 50	14	9	5.5	d + 3.8
50 < d ≤ 58	16	10	6	d + 4.3
58 < d ≤ 65	18	11	7	d + 4.4
65 < d ≤ 75	20	12	7.5	d + 4.9
75 < d ≤ 85	22	14	9	d + 5.4
85 < d ≤ 95	25	14	9	d + 5.4
95 < d ≤ 110	28	16	10	d + 6.4
110 < d ≤ 130	32	18	11	d + 7.4
130 < d ≤ 150	36	20	12	d + 8.4
150 < d ≤ 170	40	22	13	d + 9.4
170 < d ≤ 200	45	25	15	d + 10.4
200 < d ≤ 230	50	28	17	d + 11.4
230 < d ≤ 260	56	32	20	d + 12.4

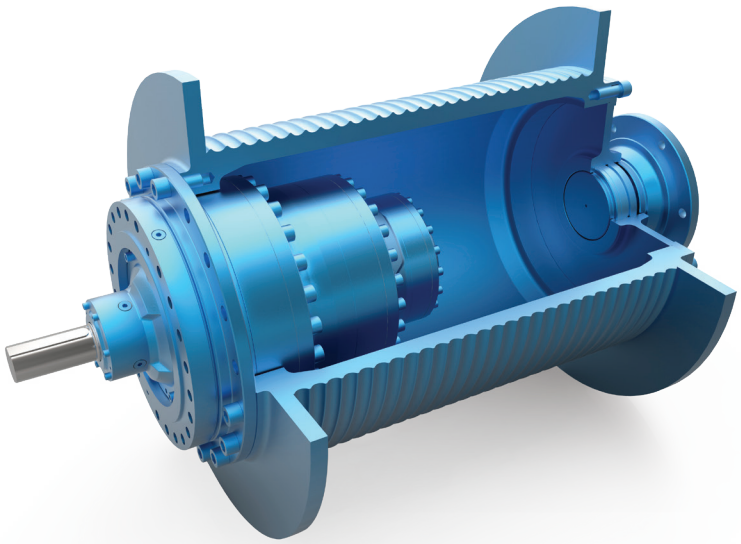


Note:

- The structure scheme,appearance diagram and other attached diagrams in sample are examples,there is no strict proportion requirement.(The unmarked dimension units are mm).
- The marked weight is average value,it has no constraint force.

⚠You must conform to the following instructions:

- To prevent accidents,all the rotation parts are added with protective covers according to the safety regulations of the nation and region.
- Before debugging,you should carefully read instruction book.
- Gearbox is on running-permission status when delivered,you should add lubrication oil before putting it into running.
- The marked oil quantity in sample is only reference value,actual oil filling quantity should be the same with the mark on oil immersion lens.
- Lubrication oil viscosity should be selected according to working situation and application environment temperature of gearmotor.
- You can only apply lubrication oil of internationlly famous brand.



TGE Transmission s.r.o.
9. května 209,
268 01 Hořovice

Technical office Plzeň
Teslova 7b
301 00 Plzeň
info@tge.cz | www.tge.cz

Local dealer