

 ***dinamic oil***

PRESENTATION

Dinamic Oil's expertise in designing a complete range of planetary gearboxes and hoisting winches has developed thanks to constant technical research throughout the company's 30 years history. While maintaining its growth trend, the Company has always remained customer focused. Dinamic Oil's corporate philosophy and success are based on ease of communication, highly skilled personnel and flexible solutions.

This catalogue is the result of proven experience in designing hoisting winches, whose reliability and technical quality is known worldwide, combined with the competence acquired in designing gearboxes which are all characterized by compact dimensions that do not limit their high performances.

Dinamic Oil offers its expertise to customers who want or need to build a hoisting winch by themselves, with its complete range of rotating case gearboxes that are specifically designed for this type of application and whose main characteristic is simplicity of installation, use and maintenance.

The modular transmission system, the rotating drum, hydraulic operation and control system make the product particularly functional, with customers appreciating its advantages from the very first use.

The applications this catalogue is intended for are those where hoisting is the core feature, like drilling machines, marine cranes and shipyard cranes.

WD Series

This series consists of gearboxes with three reduction stages and FEM torque values from 18.000 Nm to 118.000 Nm, characterized by the strength of the cinematic chain components, in particular the splined shafts, which guarantee high safety factors and increased torque stiffness.

The design is particularly compact in order to meet all possible winch requirements and make maintenance easy: lubrication oil can be checked and replaced from the motor side without having to unwind the rope or carry out further actions.

The gearboxes are equipped with a full range of brakes with torques that are proportional to the gearbox's torque, according to the main certification bodies. The following types of brakes are available:

- *With low opening pressures, suitable for systems using an auxiliary pump to control the brake*
 - *With special lubrication, in order to achieve high input speeds without overheating*
 - *With an optional sprag clutch, in order to ensure safety against load fall during hoisting*
- All the gearboxes in this range can be certified with design approval by the main certification bodies.*

WDD Series

Based on the WD range gearboxes, these motor drums have been designed for line pulls from 7.500kg to 30.000 kg. This type of gearbox is complemented by the drum and the support on the side opposite to the gearbox, so that the customer only has to design and build the winch frame.

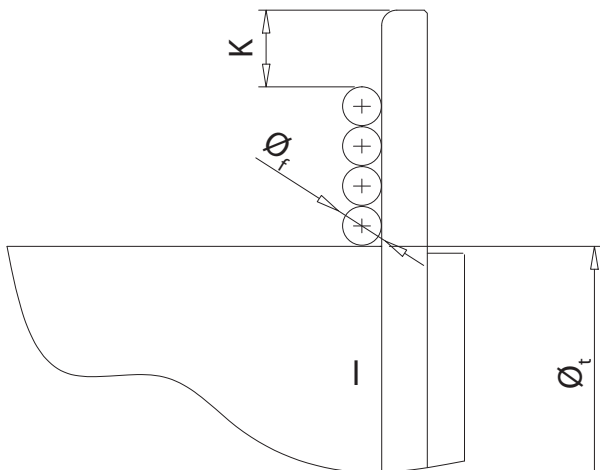
The drums' length and diameter can be customized, as long as they comply with the minimum dimensions listed in the catalogue. They are available with smooth, with standard grooving, and with Lebus style grooving.

Custom Versions

In case the customer needs to operate winches that require higher torque performances, Dinamic Oil can customize the standard range, designing custom-made models with rotating case, which entirely satisfy even the most demanding applications.

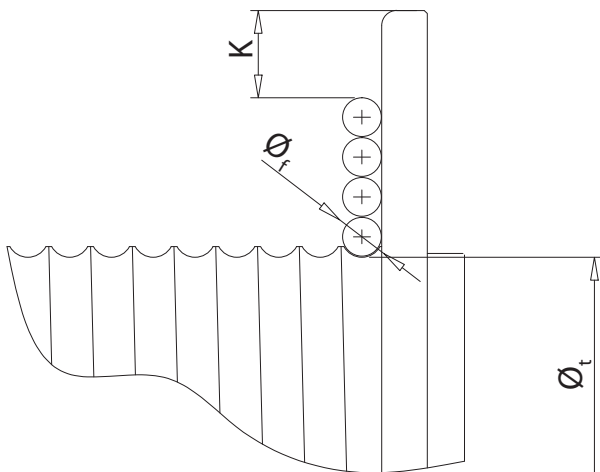
This range, which is not present in the catalogue as it would be limiting to list only few of all the possible versions, is available for torques up to 3.000.000 Nm, both in the right angle and in line version, with single and multiple motor input flange configurations.

Calcolo capacita' fune *Rope Capacity*



Liscio *Smooth Drum*

$$L = [l / \varnothing_f - 1] [(\varnothing_t + \varnothing_f) + \varnothing_f (z - 1)] \cdot \pi \cdot z / 1000$$



Filettato standard *Standard Grooved Drum*

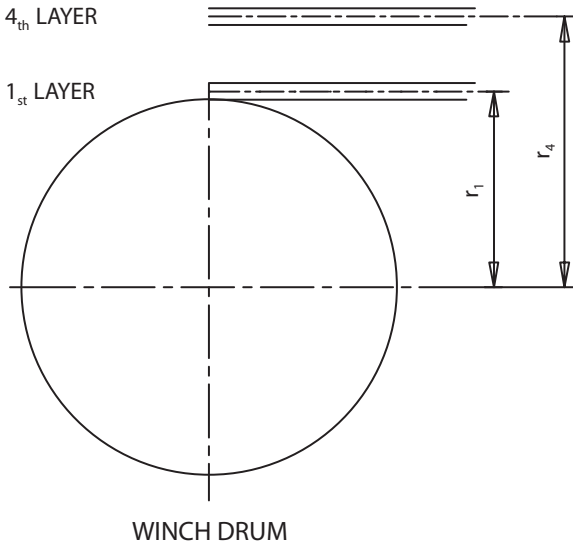
$$L = [l / p - 1] [(\varnothing_t + \varnothing_f) + \varnothing_f (z - 1)] \cdot \pi \cdot z / 1000$$

Filettato speciale *Special Grooved Drum*

$$L = [l / p - 0.5] [(\varnothing_t + \varnothing_f) + \varnothing_f (z - 1)] \cdot \pi \cdot z / 1000$$

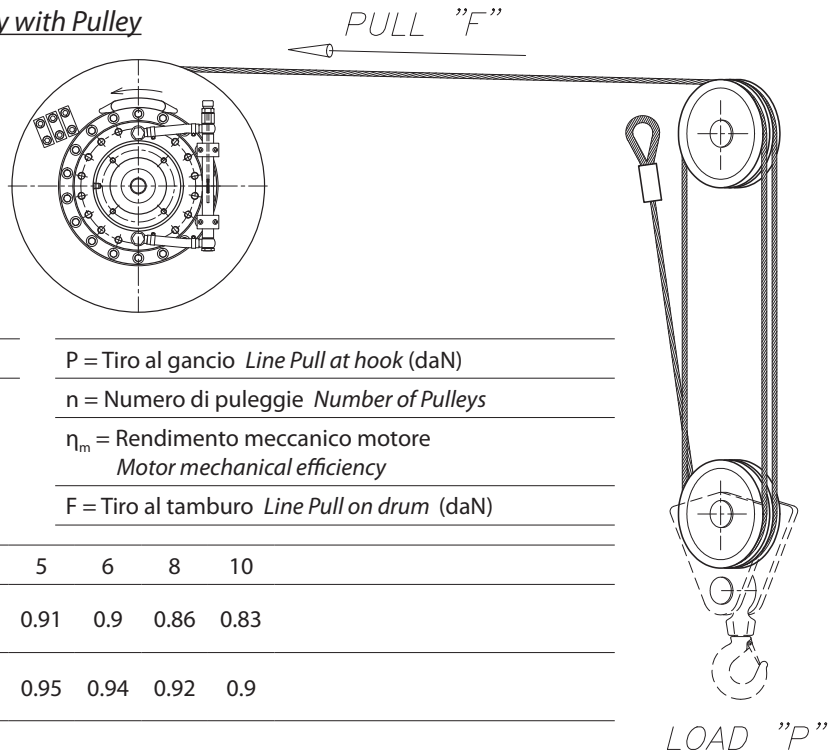
\varnothing_f = Diametro fune	<i>Cable diameter</i>	(mm)	z = Numero strati	<i>Number of Layers</i>	
\varnothing_t = Diametro tamburo	<i>Drum diameter</i>	(mm)	p = Passo filettatura	<i>Groove Pitch</i>	(mm)
l = Lunghezza tamburo	<i>Drum Length</i>	(mm)	L = Lunghezza fune	<i>Rope Length</i>	(m)
$K = 1.5 \cdot \varnothing_f$					
$K = 2.5 \cdot \varnothing_f$ (ABS, API specification 2C)					
$K = 2 \cdot \varnothing_f$ (DNV)					
$K = 1/2"$ (ANSI B30)					

Coppia al tamburo Drum Torque



$M_1 = F \times r_1 / 1000$
$M_4 = F \times r_4 / 1000$
$M_m = M_1 / (i_e \times \eta_{mg}) = M_4 / (i_e \times \eta_{mg})$
$p = (M_m \times 628) / (V_m \times \eta_m)$
$P_{el} = (M_m \times n) / 955 \times \eta_{el}$
p = Pressione di sollevamento <i>Hoisting pressure</i> (bar)
M_m = Coppia del motore <i>Motor torque</i> (daNm)
V_m = Cilindrata del motore <i>Motor displacement</i> (cm ³)
η_m = Rendimento meccanico del motore <i>Motor mechanical efficiency</i>
η_{mg} = Rendimento meccanico ingranaggi e tamburo <i>Gear and drum mechanical efficiency</i>
M_1 = Coppia al primo strato <i>Torque on first layer</i> (daNm)
M_4 = Coppia all'ultimo strato <i>Torque on last layer</i> (daNm)
F = Tiro al tamburo <i>Line Pull on Drum</i> (daN)
i_e = Rapporto di riduzione effettiva <i>Actual Reduction Ratio</i>
η_{el} = Rendimento motore elettrico <i>Electric Motor Efficiency</i>
n = Numero giri motore elettrico <i>Electric Motor rpm</i>
P_i = Potenza motore elettrico <i>Electric Motor Power</i>

Calcolo tiro con puleggie Lifting Capacity with Pulley



$$F = P / n \times \eta_m$$

P = Tiro al gancio *Line Pull at hook* (daN)

n = Numero di puleggie *Number of Pulleys*

η_m = Rendimento meccanico motore *Motor mechanical efficiency*

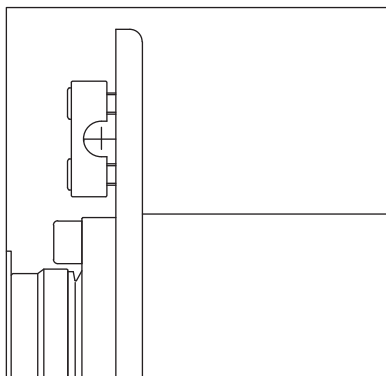
F = Tiro al tamburo *Line Pull on drum* (daN)

n	2	3	4	5	6	8	10
η_m							
BOCCOLE PLAIN BEARINGS	0.97	0.95	0.93	0.91	0.9	0.86	0.83
CUSCINETTI ANTIFRICTION BEARINGS	0.98	0.97	0.96	0.95	0.94	0.92	0.9

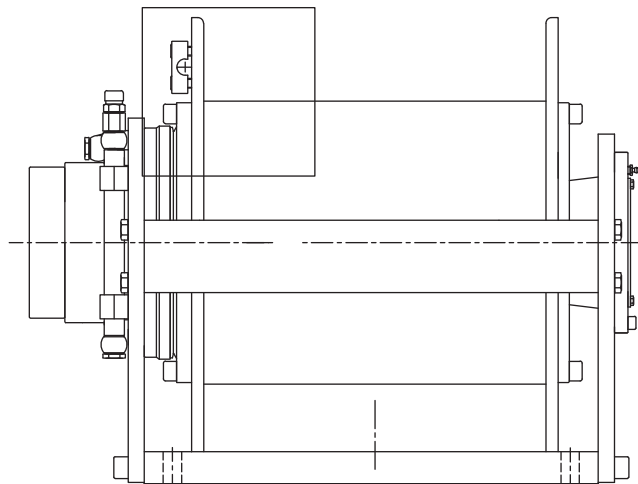
Esempio Example

$P = 10000$ (daN) | $n = 4$ | PULEGGIE CON BOCCOLA
PULLEYS WITH PLAIN BEARINGS | $F = 10000 / (4 \times 0.93) = 2690$ (daN)

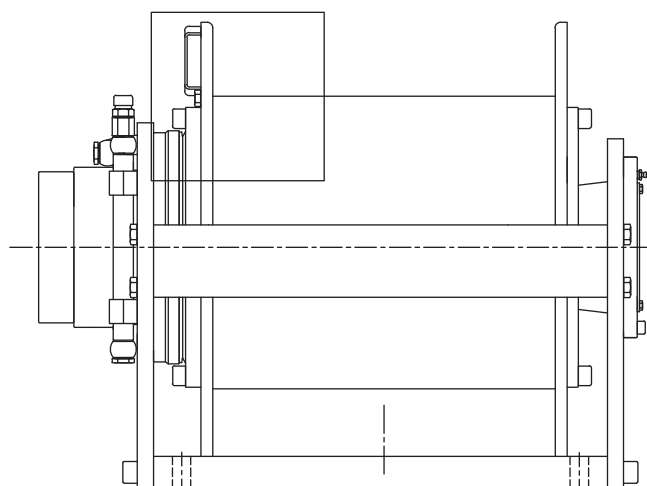
Blocco fune *Rope Fixing*



MORSETTO
CLAMPS

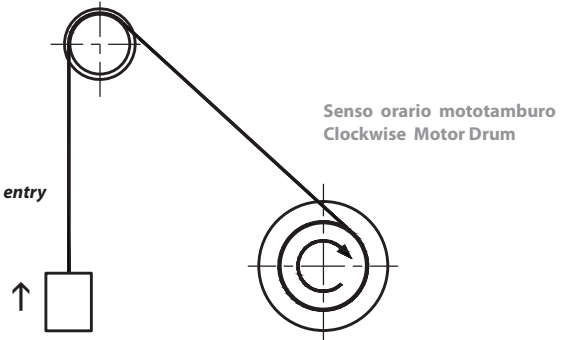
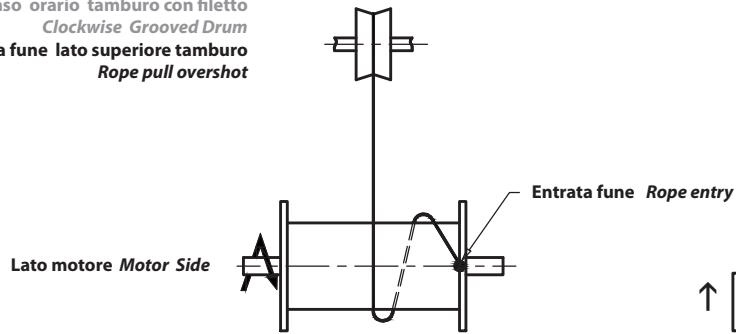


FISSAGGIO CON RADANCIA (*opzionale)
WEDGE LOCK (*optional)

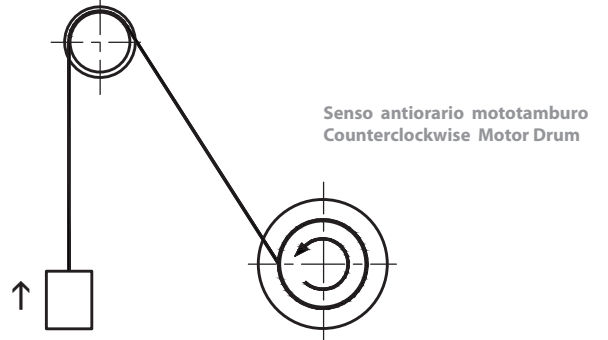
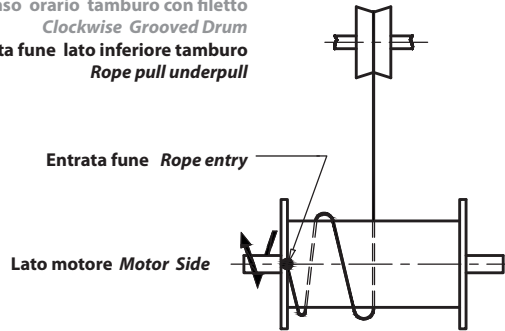


Senso di rotazione *Hoisting Direction*

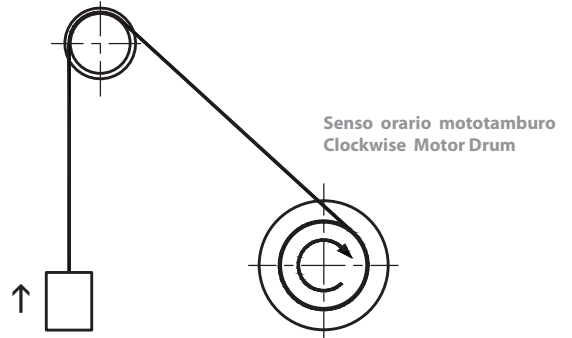
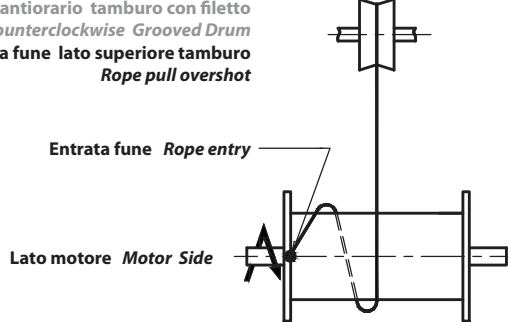
Senso orario tamburo con filetto
Clockwise Grooved Drum
 Entrata fune lato superiore tamburo
Rope pull overshoot



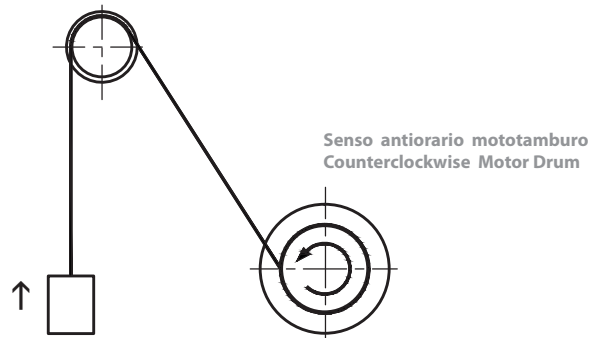
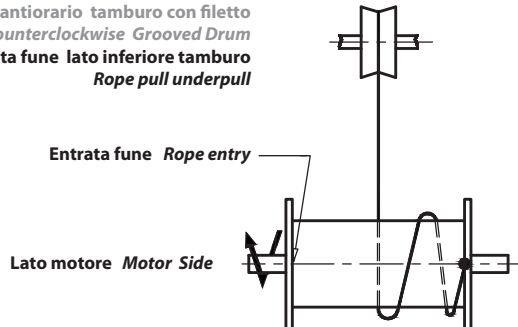
Senso orario tamburo con filetto
Clockwise Grooved Drum
 Entrata fune lato inferiore tamburo
Rope pull underpull



Senso antiorario tamburo con filetto
Counterclockwise Grooved Drum
 Entrata fune lato superiore tamburo
Rope pull overshoot



Senso antiorario tamburo con filetto
Counterclockwise Grooved Drum
 Entrata fune lato inferiore tamburo
Rope pull underpull



Calcolo potenze Power Calculation

P_m [kW] = potenza meccanica alla fune – *mechanical power at cable*

P_t [kW] = potenza teorica in ingresso – *theoretical input power*

P_{id} [kW] = potenza idraulica in ingresso – *hydraulic input power*

P_{el} [kW] = potenza elettrica in ingresso – *electric input power*

Q [l/min] = portata olio (solo per motori idraulici) - *flow rate (only for hydraulic motor)*

p [bar] = pressione (solo per motori idraulici) - *pressure (only for hydraulic motor)*

v_f [m/min] = velocità fune – *cable speed*

F [daN] = Tiro alla fune – *Line Pull*

η_{mg} = Rendimento meccanico ingranaggi e tamburo - *Gear and drum mechanical efficiency*

η_m = Rendimento meccanico motore - *Motor mechanical efficiency*

η_v = Rendimento volumetrico motore (solo per motori idraulici) - *Motor volumetric efficiency (for hydraulic motor only)*

$$P_m = (v_f \times F) / 6000$$

$$P_t = P_m / (\eta_{mg} \times \eta_m \times \eta_v)$$

For hydraulic motor

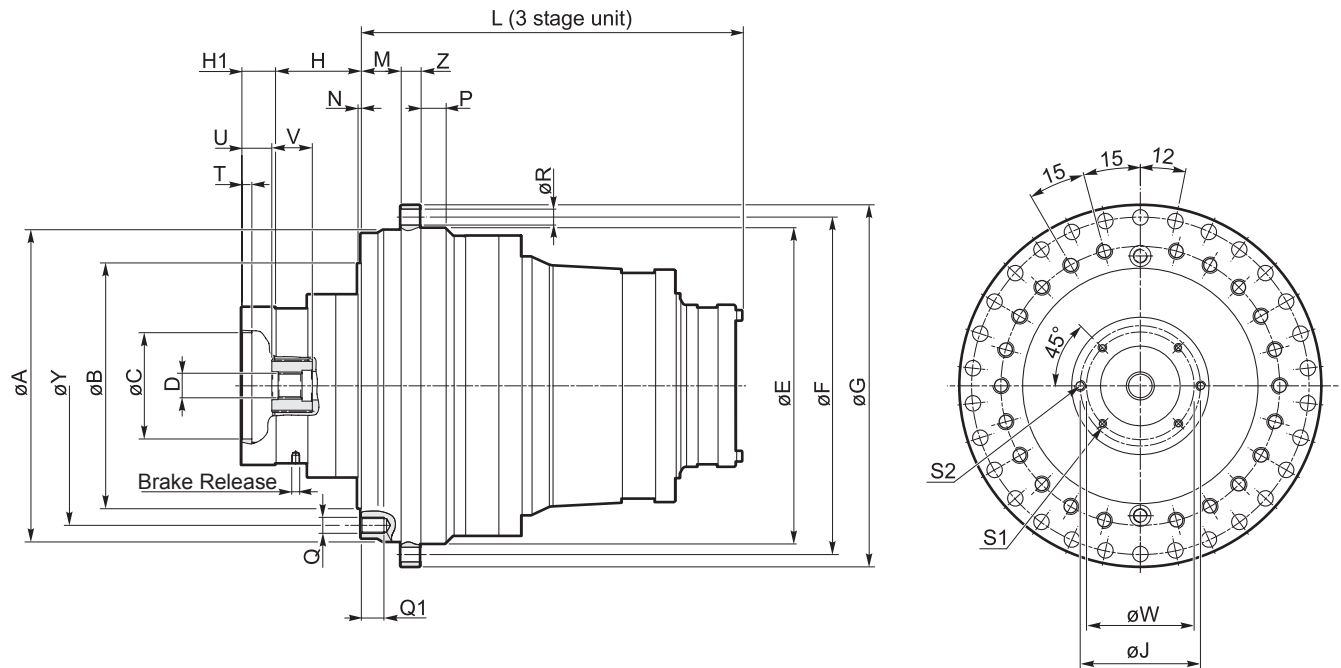
$$P_{id} = (Q \times p) / 600$$

$$P_t < P_{id}$$

For electric motor

$$P_t < P_{el}$$

RIDUTTORI EPICICLOIDALI WD PER ARGANO WD PLANETARY WINCH DRIVES



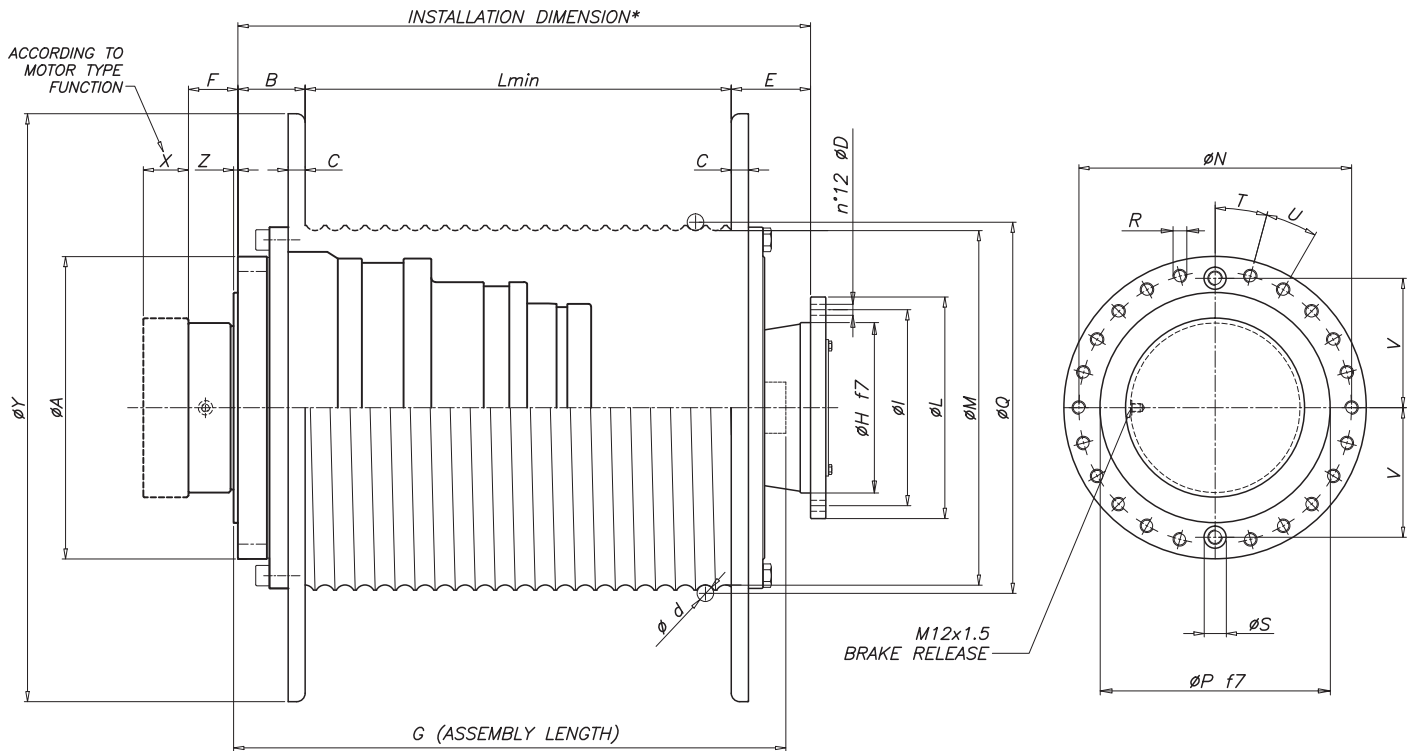
Dimensioni generali - General Dimensions

Tipo / Type	A	B	E	F	G	H	L	M	N	P	Q	Q1	R	Y	Z
WD 1023	290	200 f7	295 f7	320	348	99	383	40	5	41	M16 (6)	24	$\varnothing 17$ (18)	255	20
WD 1523	328	230 f7	335 f7	368	398	68	414	37	5	58	M16 (22)	24	$\varnothing 17$ (24)	280	23
WD 2003	355	270 f7	366 f7	394	424	57,5	424.5	37	5	45	M16 (22)	24	$\varnothing 17$ (24)	320	23
WD 2523	394	300 f7	402 f7	424	450	81	626	50	5	53	M20 (22)	30	$\varnothing 14.5$ (36)	350	25
WD 3003	432	330 f7	436 f7	465	495	87,5	477	50	5	60	M20 (22)	30	$\varnothing 19$ (30)	390	25
WD 4803	470	355 f7	476 f7	508	545	128	575	60	5	38	M24 (22)	34	$\varnothing 24$ (24)	420	30
WD 8003	530	430 f7	544 f7	578	618	129,5	688	55	5	45	M24 (22)	36	$\varnothing 24$ (30)	480	35

Dimensioni ingressi - Input Dimensions

	C	D	H1	T	U	V	W	S1	J	S2
Input SAE B	101.6 H8	DP16/32 Z13	20	10	7	37	127	n°4 M12	146	n°2 M14
Input SAE C	127 F8	DP12/24 Z14	30	15	16	56	162	n°4 M12	181	n°2 M16
Input SAE D	152.4 F8	DP8/16 Z13	40	15	28	75	229	n°4 M20	/	/

RIDUTTORI EPICICLOIDALI WD PER ARGANO WD PLANETARY WINCH DRIVES



Secondo le norme FEM, classe M5 - T2 - T5 According to FEM rules, class M5 - T2 - T5

Dimensioni generali WDD - WDD General Dimensions

Tipo / Type	A	B	C	D	E	F	G	H	I	L	M	N	P	Q	R	S	T	U	V	Lmin	Y	Z
WDD A75	285	74	15	10.5	85	99	451	175	200	225	341	255	200	359	N°16-M16	32	20°	20°	117	320	560	5
WDD B100	315	79	20	12.5	93	68	494	200	230	260	392	280	230	412	N°22-M16	32	15°	15°	132	350	630	5
WDD C130	355	79	20	13	93	58	514	200	230	260	416	320	270	438	N°22-M16	32	15°	15°	152	370	690	5
WDD D155	385	94	20	17	110	81	554	230	260	290	443	350	300	467	N°22-M20	35	15°	15°	168	385	720	5
WDD E190	425	99	25	21	135	87.5	592.5	260	310	360	490	390	330	516	N°22-M20	35	15°	15°	184	390	790	5
WDD F230	460	118.5	30	21	139.5	60	678	260	310	360	540	420	355	568	N°22-M24	35	15°	15°	195.5	465	865	5
WDD G300	530	118.5	30	21	147	61	780.5	300	350	400	610	480	430	640	N°22-M24	35	15°	15°	233	560	960	5

* Installation dimension = B + Lmin. + E

Prestazioni WDD - WDD Performances

Tipo / Type	Typical line pull on first layer [daN]	ø d (suggested cable) [mm]
WDD A75	7500	18
WDD B100	10000	20
WDD C130	13000	22
WDD D155	15500	24
WDD E190	19000	26
WDD F230	23000	28
WDD G300	30000	30

RIDUTTORI EPICICLOIDALI WD PER ARGANO WD PLANETARY WINCH DRIVES

Prestazioni WD WD Performances

Coppie nominali secondo FEM 1.001 sezione 1 - 3ª edizione-1998
Nominal torques according to FEM 1.001 part 1 - 3rd edition-1998

Size	i_e	$T_{2\text{ fem}}$ [Nm]	$T_{d\text{-max}}$ [Nm]	$T_{s\text{-max}}$ [Nm]	$n_{1\text{-max}}$ [RPM]
WD 1023	52.83	18100	26900	33400	3100
	62.55	18100	26900	33400	3100
	74.03	18100	26900	33400	3100
	78.70	18100	26900	33400	3100
	93.09	18100	26900	33400	3100
	108.45	18100	26900	33400	3100
	111.15	18100	26900	33400	3100
	117.00	18100	26900	33400	3100
	131.40	18100	26900	33400	3100
	136.27	18100	26900	33400	3100
	165.05	18100	26900	33400	3100
WD 1523	51.46	26100	43200	60000	3100
	60.16	26200	43200	60000	3100
	71.21	26300	43200	60000	3100
	74.11	26300	43200	60000	3100
	76.71	26300	43200	60000	3100
	87.67	26300	43200	60000	3100
	89.61	26350	43200	60000	3100
	104.33	26350	43200	60000	3100
	108.29	24900	43200	60000	3100
	110.27	26400	43200	60000	3100
	126.42	26400	43200	60000	3100
128.35	26400	43200	60000	3100	
155.48	26500	43200	60000	3100	
WD 2003	48.16	33800	57900	80000	3100
	56.31	33500	57900	80000	3100
	57.03	34000	57900	80000	3100
	66.66	33800	57900	80000	3100
	69.38	33000	57900	80000	3100
	71.82	34100	57900	80000	3100
	82.09	33000	57900	80000	3100
	83.90	33650	57900	80000	3100
	97.70	33650	57900	80000	3100
	103.26	33000	57900	80000	3100
	120.21	33000	57900	80000	3100
145.62	33000	57900	80000	3100	
WD 2523	50.29	44050	72800	105000	3100
	58.82	44200	72800	105000	3100
	59.55	44200	72800	105000	3100
	69.62	44300	72800	105000	3100
	72.44	44300	72800	105000	3100
	75.0	44350	72800	105000	3100
	85.70	44350	72800	105000	3100
	87.34	44450	72800	105000	3100
	97.99	42450	72800	105000	3100
	102.02	44500	72800	105000	3100
	105.86	44500	72800	105000	3100
	107.79	44500	72800	105000	3100
	123.62	44500	72800	105000	3100
	125.48	44600	72800	105000	3100
152.00	44600	72800	105000	3100	

RIDUTTORI EPICICLOIDALI WD PER ARGANO WD PLANETARY WINCH DRIVES

Prestazioni WD WD Performances

Coppie nominali secondo FEM 1.001 sezione 1 - 3ª edizione-1998
Nominal torques according to FEM 1.001 part 1 - 3rd edition-1998

Size	i_e	$T_{2\text{fem}}$ [Nm]	$T_{d\text{-max}}$ [Nm]	$T_{s\text{-max}}$ [Nm]	$n_{1\text{-max}}$ [RPM]
WD 3003	49.75	48200	94700	136500	2500
	58.19	48250	94700	136500	2500
	68.02	47620	94700	133700	2500
	71.66	48200	94700	136500	2500
	81.97	48200	94700	136500	2500
	83.74	48250	94700	133700	2500
	95.75	47900	94700	133700	2500
	96.70	48400	94700	136500	2500
	103.04	46800	90600	121200	2500
	112.94	47600	94700	133700	2500
	117.79	46800	90600	121200	2500
	138.88	46800	90600	121200	2500
	WD 4803	51.99	69850	123300	160000
61.55		69350	123300	160000	3100
71.58		83750	123300	168500	3100
77.49		67500	123300	160000	3100
84.68		84000	123300	168500	3100
90.26		66650	123300	160000	3100
106.51		84100	123300	168500	3100
109.39		52000	103200	160000	3100
123.99		84000	123300	168500	3100
150.20		70000	123300	168500	3100
WD 8003	56.0	96800	197200	312000	2500
	65.45	96000	197200	312000	2500
	73.1	118000	197200	312000	2500
	80.60	94450	197200	312000	2500
	85.4	115800	197200	312000	2500
	92.17	93100	197200	298100	2500
	105.08	113500	197200	312000	2500
	108.71	91300	184300	304500	2500
	120.12	112200	197200	312000	2500
	126.50	96500	174500	221600	2500
	141.63	110300	197200	312000	2500
170.43	96700	174500	221600	2500	

Peso e olio - Weight and Oil Quantity

	Weight [kg]	Oil Quantity [litri - liters]
WD 1023	150	3.5
WD 1523	200	4.5
WD 2003	225	5
WD 2523	275	6
WD 3003	350	8
WD 4803	455	10
WD 8003	660	15

RIDUTTORI EPICICLOIDALI WD PER ARGANO WD PLANETARY WINCH DRIVES

Valori di coefficiente di amplificazione γ_m - Values of Amplifying Coefficient γ_m

Mechanism group	M1	M2	M3	M4	M5	M6	M7	M8
γ_m	1.00	1.04	1.08	1.12	1.16	1.20	1.25	1.30

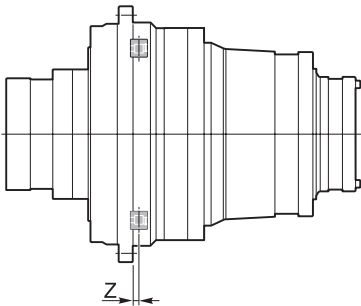
Classe del meccanismo - Mechanism Class

Class of load spectrum	Spectrum Coefficient K_m	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
		200h	400h	800h	1600h	3200h	6300h	12500h	25000h	50000h	100000h
L1	0.5	M1 1.89	M1 1.71	M1 1.57	M2 1.44	M3 1.34	M4 1.26	M5 1.16	M6 1.02	M7 0.87	M8 0.72
L2	0.63	M1 1.5	M1 1.36	M2 1.24	M3 1.14	M4 1.06	M5 1	M6 0.92	M7 0.81	M8 0.69	M8 0.57
L3	0.79	M1 1.18	M2 1.07	M3 0.98	M4 0.9	M5 0.84	M6 0.79	M7 0.72	M8 0.64	M8 0.55	M8 0.45
L4	1	M2 0.95	M3 0.86	M4 0.78	M5 0.72	M6 0.67	M7 0.63	M8 0.58	M8 0.51	M8 0.44	M8 0.36

Esempio - Example: $C_{L3-T1} = C_{L2-T5} \cdot 1.07$

Queste coppie non devono mai superare il valore della coppia massima dinamica a tabella
These torques must never be higher than the max dynamic torque in the rating table

Capacità di carico cuscinetto - Bearing Load Capacity



Tipo - Type	C_0 [N]	C_d [N]	Z [mm]
WD 1020	330000	183000	17.5
WD 1520	435000	224000	19.7
WD 2000	435000	224000	25.2
WD 2520	620000	315000	21
WD 3000	620000	315000	20.75
WD 4800	800000	390000	13.25
WD 8000	840000	405000	14.5

Prestazioni freni FW - FW Brake Performances

	FW02	FW03	FW05	FW08	FW11	FW13	FW16	
T_b [Nm]	230	340	550	800	1100	1300	1600	
p_b [bar]	15	15	17.5	17.5	17.5	17.5	17.5	± 5%
p_{max} [bar]	300	300	300	300	300	300	300	
n_{1-max} [RPM]	3500	3500	3500	3500	3500	3500	3500	

Prestazioni freni FY - FY Brake Performances

	FY22	FY27	FY36	
T_b [Nm]	2200	2700	3600	
p_b [bar]	17.5	17.5	17.5	± 5%
p_{max} [bar]	300	300	300	
n_{1-max} [RPM]	3500	3500	3500	

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