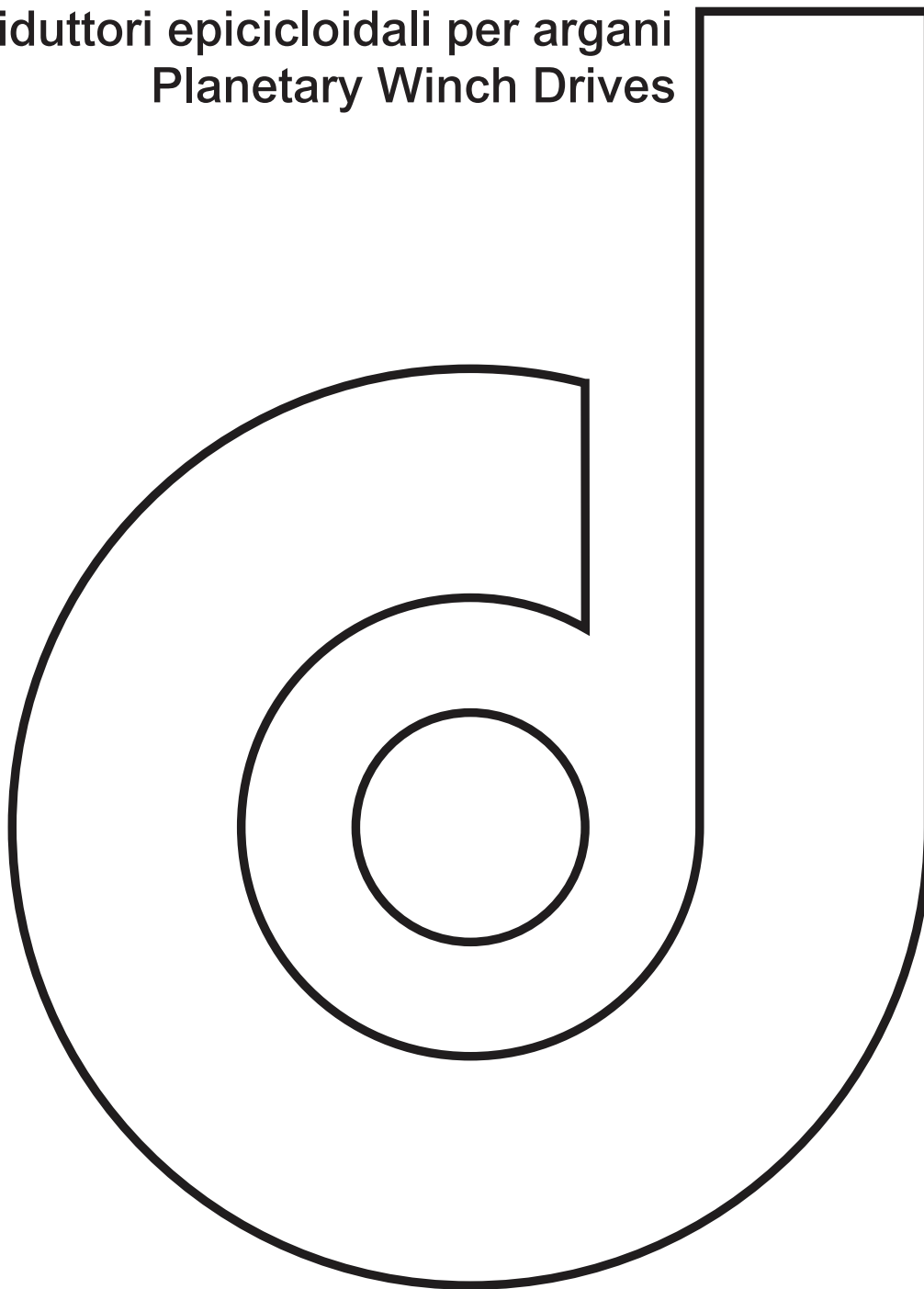# Riduttori epicicloidali per argani
Planetary Winch Drives

dinamic oil

Dinamic Oil garantisce un'esperienza di oltre 30 anni, costantemente arricchita dalla ricerca tecnologica, nella progettazione di una gamma completa di riduttori epicicloidali ed argani di sollevamento. L'Azienda, pur confermando il suo trend di crescita, rimane sempre in grado di mantenersi a misura d'uomo, esaltando la centralità del cliente e delle sue esigenze. La facilità di comunicazione, l'elevata competenza del personale e la flessibilità delle soluzioni sono infatti gli ingredienti alla base della filosofia Dinamic Oil e del suo successo.

Il presente catalogo è frutto della comprovata esperienza derivante dalla progettazione della gamma di argani di sollevamento, rinomata in tutto il mondo per affidabilità e livello tecnico, combinata con la competenza maturata nello sviluppo della gamma dei riduttori caratterizzata dalle dimensioni compatte che non ne precludono le elevate prestazioni.

Dinamic Oil mette il proprio know-how a disposizione di quei costruttori che desiderano, o necessitano, realizzare autonomamente un argano di sollevamento, proponendo una gamma completa di riduttori a carcassa rotante concepita esclusivamente per questo tipo di applicazione ed ispirata al concetto di semplicità: semplicità di installazione, semplicità di impiego, semplicità di manutenzione.

La progettazione a blocchi indipendenti di trasmissione del moto, tamburo di avvolgimento, azionamento e controllo idraulico rende estremamente fruibile un prodotto, i cui vantaggi sono immediatamente apprezzati dagli utilizzatori.

Le applicazioni ai quali questo catalogo è destinato sono tutti quelli in cui la funzione del sollevamento costituisce il cuore dell'applicazione come le macchine di perforazione, i sollevamenti navali e offshore, le gru da piazzale.

Gamma WD

E' costituita da riduttori a tre stadi planetari di riduzione, con valori di coppia in classe fem comprese tra i 18.000 Nm ed i 210.000 Nm, caratterizzati dalla robustezza dei componenti della catena cinematica, con particolare riferimento all'albero passante ed agli scanalati di accoppiamento, in modo da garantire fattori di sicurezza particolarmente elevati ed incrementare la rigidità torsionale.
Il riduttore è dotato di un solo cuscinetto di supporto, in modo da garantire una configurazione isostatica con il supporto del tamburo dal lato opposto a quello del riduttore.
Il disegno è particolarmente compatto per poter adattarsi al meglio alle svariate esigenze del progetto dell'argano e studiato con lo scopo di facilitare la manutenzione: l'olio lubrificante è infatti controllabile e sostituibile dal lato motore senza necessità di svolgere la fune o di compiere ulteriori operazioni.
I riduttori sono completati da una gamma completa di freni che hanno coppie proporzionate a quella trasmissibile dal riduttore in accordo con i parametri dei principali Enti di certificazione.
Sono disponibili svariate versioni:
- con pressione di apertura ridotta, adatti agli impianti che utilizzano per il comando del freno la pompa di sovralimentazione
- con lubrificazione speciale, per consentire alte velocità di ingresso senza problemi di surriscaldamento
- con ruota libera, per garantire la sicurezza contro la caduta del carico in fase di sollevamento.
La gamma è in corso di validazione da parte di DNV per ricevere il type approval. Per tutti i modelli è possibile richiedere il product certificate da parte dei principali Enti certificatori.

Gamma WDD

Basata sui riduttori della serie WD, è nata la gamma dei mototamburi per tiri da 7.500 kg a 30.000 kg. Il riduttore è in questa gamma completato dal tamburo e dal supporto del lato opposto a quello del riduttore; in questo modo al cliente non resta che progettare e realizzare il tela dell'argano. I tamburi sono personalizzabili per quanto riguarda lunghezza e diametro, nel rispetto però delle dimensioni minime fornite a catalogo. Sono disponibili in versione senza filettatura,

con filettatura standard e con filettatura tipo Lebus.
I mototamburi possono essere forniti completi di tutti gli accessori disponibili per la gamma degli argani (a questo proposito occorre far riferimento al catalogo argani).

Gamma RW

I riduttori della serie RW completano la proposta Dinamic Oil andando a rispondere alle esigenze che tecnicamente non è possibile soddisfare con i modelli della gamma WD: in particolare taglie per coppie da 5.000 Nm a 18.000 Nm e versioni per coppie fino a 30.000 Nm con due stadi di riduzione, in modo da offrire rapporti di trasmissione idonei alle applicazioni con azionamento elettrico.
Anche i riduttori della serie RW sono completati da una gamma completa di freni che li rendono idonei per le più svariate applicazioni.
L'intera gamma RW ha un type approval del DNV; per gli altri Enti certificatori è possibile richiedere il product certificate.

Versioni speciali

Per azionamenti di argani che richiedono prestazioni superiori in termini di coppia, Dinamic Oil è in grado di personalizzare la gamma standard, realizzando prodotti su misura in versione a carcassa rotante, per soddisfare completamente le applicazioni più esigenti.
Questa gamma, non illustrabile a catalogo perché sarebbe troppo limitativo ridurre a pochi esempi tutte le varianti possibili, è disponibile per coppie fino a 3.000.000 Nm, con versioni angolari ed in linea, predisposizioni attacco motore singole e multiple.

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 companies 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 210.000 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.

RW Series

The RW gearboxes complement Dinamic Oil's series in that they meet the requirements which are technically not possible to meet with the WD type gearboxes, mainly torques from 5.000Nm to 18.000 Nm and versions for torques up to 30.000 Nm with two reduction stages, in order to be able to offer transmission ratios that are suitable for electrical applications.

The RW gearboxes are also complemented by a complete range of brakes which make them suitable for the most varied applications. The entire RW range has a DNV type approval and various RW models have obtained the design approval by the main certification bodies.

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.

Symbols

All rating values provided in this catalog are calculated in accordance with the ISO 6336 and ISO 281 standards, but may not meet other requirements required by internal regulations of the certifying organizations. When selecting equipment that complies with these regulations, please contact the Dinamic Oil Sales Department.

C_0 – Static Bearing Load **[N]**
This is the static load of the supporting bearing of the rotating flange.

C_d – Dynamic Bearing Load **[N]**
This is the dynamic load of the supporting bearing of the rotating flange.

c – Transformation Coefficient
This is the coefficient that provides the gearbox torque value calculated in FEM class L2 – T5 – M5 to the required class.

$T_{2\,fem}$ – FEM Torque **[Nm]**
This is the transmissible torque value from the gearbox in FEM class M5 – L2 – T5 at 25 RPM, to be compared with the value $T_{///}$, which is the normal torque of the application including accelerations and transmission output. At this torque value, reduced by the coefficient of the FEM spectrum L2 and applied continuously at a velocity of 25 RPM, the gearbox has the theoretical life required by FEM class T5.

T_{d-max} – Maximum Dynamic Torque **[Nm]**
The max transmissible torque for the gearbox at peak or for brief durations, to be compared with the value $T_{///}$ which is the peak torque of the application.

T_{s-max} – Maximum Static Torque **[Nm]**
The maximum allowable static torque, to be compared with the value of the emergency torque of the application.

T_b – Braking Torque **[Nm]**
This is the value of the braking torque statically transmissible from the negative brake.

i_e – Actual Reduction Ratio
This is the actual reduction ratio, which is the ratio between the input speed and the gearbox output speed.

p_b Brake Opening Pressure **[bar]**
This is the pressure needed to fully open the brake.

n_{1-max} – Maximum Input Speed **[RPM]**
This is the maximum input speed the gearbox allows. The values indicated in the charts can be limited by some accessories, such a brakes.

The RW and WD series consist of planetary gearboxes designed to operate as winch drives. These gearboxes are built with a fixed flange to be attached to the winch frame, and a rotating flange, attached to the drum. As the rotating flange is supported by a single bearing, the drum must also be supported on the opposite side by an outrigger bearing.

In the standard catalog version, these gearboxes are complete with a negative static disc brakes and set up for a hydraulic motor, however, they are also available without brakes, set up for an electric motor or with high speed input shafts.

Choosing a gearbox

Selection

Select a gearbox based on the FEM class and the speed of the application.

First and foremost, if the speed of the application is not equivalent to 25 RPM, identify the FEM class duration at 25 RPM equivalent to what is required: this is the class with a duration equal to or superior to the value obtained by multiplying the class duration required by the speed of the application, divided by 25 RPM.

At this point, use the table provided in the catalog to identify the coefficient c corresponding to the class of an equivalent duration and the spectrum required by the application.

For example, class L3 – T4 at 12 RPM is equivalent to class L3 – T3 at 25 RPM and therefore the catalogue ratings will be multiplied by 0.90.

The ideal gearbox for the application is the one with the reduction ratio close to the one required and with FEM torque multiplied by the coefficient c higher than that of the application.

Verification

Bearing duration.

Check that the journal bearing of the rotating flange is not loaded beyond the static load value and has a lifespan equal to or greater than what is required by the FEM class.

Since gearboxes have only a single journal bearing, the winch structure is isostatic, and therefore it is not necessary to consider the distance of the load from the bearing.

Calculate the lifespan using the following formula:

$$Lh10 = (C_d / F)^{\wedge}3.33 \times 10^6 / n_2 \times 60$$

Where Lh10 is the theoretic lifespan expressed in hours, F is the radial load in N and n_2 the output velocity in RPM. The radial load can also be verified based on the FEM class.

Output torque.

Dynamic and static torque must never surpass the maximum dynamic and static torque of the gearbox, respectively.

Input speed

The maximum input speed accepted is the one shown in the chart for every gearbox, but for speeds over 1500 RPM special high speed versions brakes are recommended.

Negative hydraulic brakes

Dinamic Oil gearboxes can be fitted with a negative static brake with multiple discs and hydraulic command. The brakes of model F5 are set up with a full ST input for mounting the flange and connection joints for a wide range of motors currently on the market.

Models F9 and FW have brakes that reach a braking torque of 1500 Nm and 1600 Nm, respectively, and may provide the option of mounting a free wheel mechanism up to a torque of 730 Nm(F9) and 1160 Nm(FW). They are set up with "SAE B", "SAE C", "SAE D" or full ST inputs.

Through the latter, flange and connection joints may be mounted for a wide range of motors currently on the market.

The brakes of model FY reach braking torques of up to 3600 Nm and may provide the option of mounting a free wheel mechanism up to a torque of 3070 Nm. They are set up with "SAE B", "SAE C", "SAE D" inputs or a full MU. Through the latter, flanges and connection joints may be mounted for a wide range of motors currently on the market.

These are service brakes, which operate by creating a static braking torque when the control hydraulic pressure is at zero. Their operation ceases when the hydraulic pressure reaches the minimum value for release. For brakes that have a lubrication chamber (the standard version of F5), the lubrication chamber must be filled (about 0.1 L) with mineral oil that has an ISO VG 32 viscosity. Some F5 brake models and F9 brakes are available in special versions that allow higher values of maximum velocity.

Installation and storage instructions

Refer to the use and maintenance manual.

Lubrication

Type of lubrication

The gearbox is lubrificated with an oil splash beth: before activating the gearbox, fill it with oil: look through the level plug (RW) or dip stick (WD) to visually check that the correct level is reached. This operation requires particular attention and you must check again, after a few minutes of operation, to ensure the proper level was reached.

Oil selection

Any type of oil for mechanical transmissions with EP additives, which satisfies the viscosity class from ISO VG220 to ISO VG320 under ISO 3448, may be used. In special cases, oils of different viscosities may be used: in this case, contact the Dinamic Oil technical department. Oil viscosity must be chosen based on the room temperature and the real operational temperature of the gearbox. The use of synthetic-base oils is recommended for gearboxes that must operate at very high room temperatures or in areas with a wide temperature range.

Oil changes

The oil must be changed after the first 150 hours of operation, and then after 2000 or 4000 hours of operation, depending on how the gearbox is used and, in any case, at least once per year. Different brands of oil, or oils of different viscosities, should not be mixed: in particular, synthetic oils and mineral oils should not be mixed together. After activation, periodically check the level of the lubricant and top it off when necessary.

Temperature

The recommended room temperature for using standard gearboxes is between -20°C and +40°C.

<u>Calcolo capacita' fune</u>   *Rope Capacity*
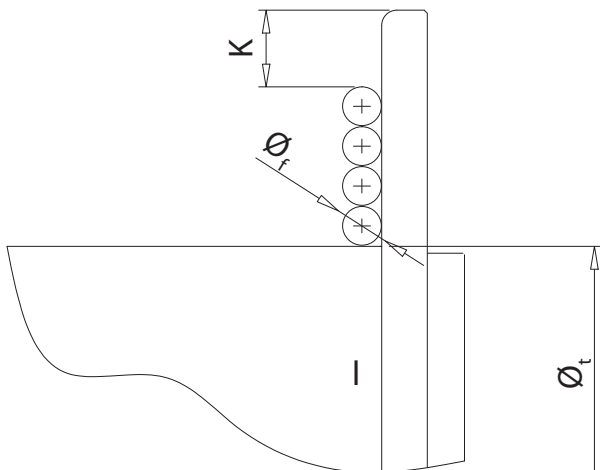
Liscio *Smooth Drum*

$$L = [\, l/Ø_f - 1 \,] \, [(Ø_t + Ø_f) + Ø_f (z - 1)] \cdot \pi \cdot z/1000$$
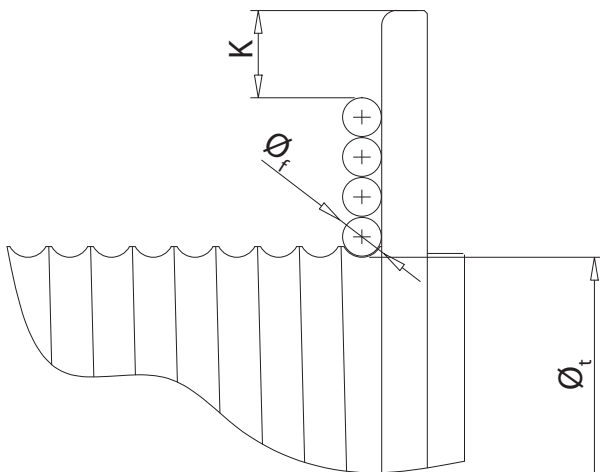
Filettato standard *Standard Grooved Drum*

$$L = [\, l/p - 1 \,] \, [(Ø_t + Ø_f) + Ø_f (z - 1)] \cdot \pi \cdot z/1000$$

Filettato speciale *Special Grooved Drum*

$$L = [\, l/p - 0.5 \,] \, [(Ø_t + Ø_f) + Ø_f (z - 1)] \cdot \pi \cdot z/1000$$

$Ø_f$ = Diametro fune	*Cable diameter*	(mm)	z = Numero strati	*Number of Layers*	
$Ø_t$ = Diametro tamburo	*Drum diameter*	(mm)	p = Passo filettatura	*Groove Pitch*	(mm)
l = Lunghezza tamburo	*Drum Length*	(mm)	L = Lunghezza fune	*Rope Length*	(m)
K = 1.5 · $Ø_f$					
K = 2.5 · $Ø_f$ (ABS, API specification 2C)					
K = 2 · $Ø_f$ (DNV)					
K = 1/2" (ANSI B30)					

Coppia al tamburo   *Drum Torque*

4$_{th}$ LAYER

1$_{st}$ LAYER

r$_1$

r$_4$

WINCH DRUM
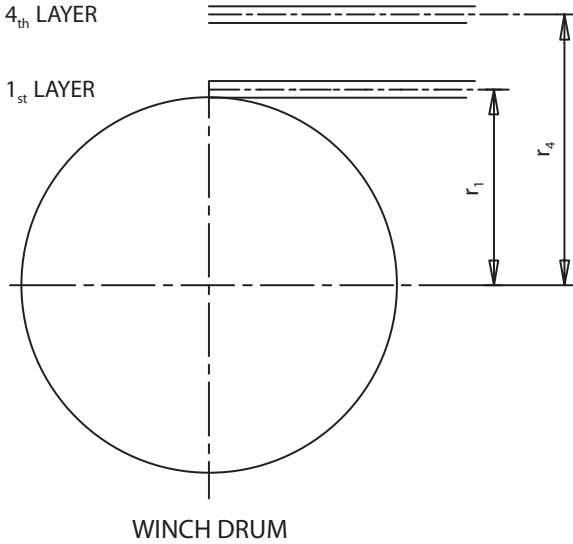
$$M_1 = F \times r_1 / 1000$$

$$M_4 = F \times r_4 / 1000$$

$$M_m = M_1 / (i_e \times \eta_{mg}) = M_4 / (i_e \times \eta_{mg})$$

$$p = (M_m \times 628) / (V_m \times \eta_m)$$

$$P_{el} = (M_m \times n) / 955 \times \eta_{el}$$

p = Pressione di sollevamente *Hoisting pressure* (bar)

M_m = Coppia del motore *Motor torque* (daNm)

V_m = Cilindrata del motore *Motor displacement* (cm^3)

η_m = Rendimento meccanico del motore *Motor mechanical efficiency*

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

M_1 = Coppia al primo strato *Torque on first layer* (daNm)

M_4 = Coppia all'ultimo strato *Torque on last layer* (daNm)

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

i_e = Rapporto di riduzione effettiva *Actual Reduction Ratio*

η_{el} = Rendimento motore elettrico *Electric Motor Efficiency*

n = Numero giri motore elettrico *Electric Motor rpm*

P_l = Potenza motore elettrico *Electric Motor Power*

Calcolo tiro con puleggie   *Lifting Capacity with Pulley*

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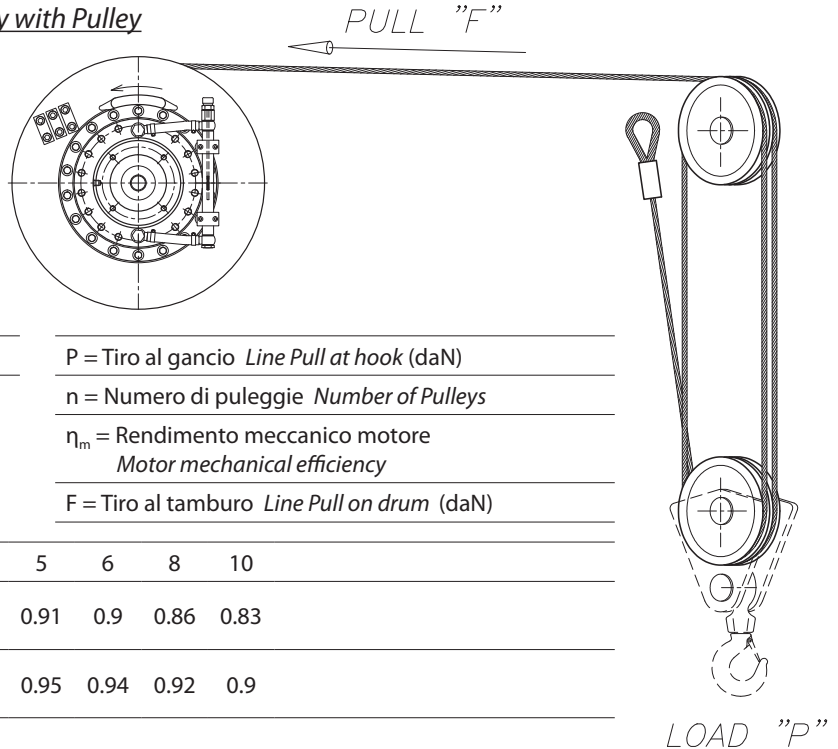
$$F = P / n \times \eta_m$$

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)

LOAD "P"

	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 x 0.93) = 2690 (daN) |

Blocco fune   *Rope Fixing*
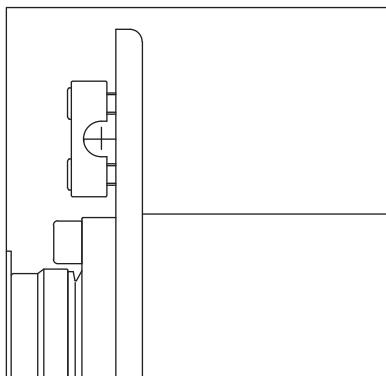
MORSETTO
CLAMPS
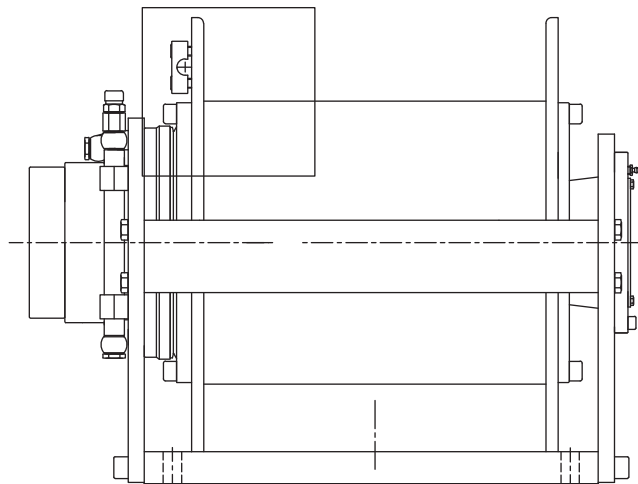
FISSAGGIO CON RADANCIA (**opzionale)
*WEDGE LOCK (*optional)*

* La scelta di questa opzione può portare alla variazione delle dimensioni riportate alla pagina 24

* Choosing this option can lead to changes in the dimensions shown on page 24
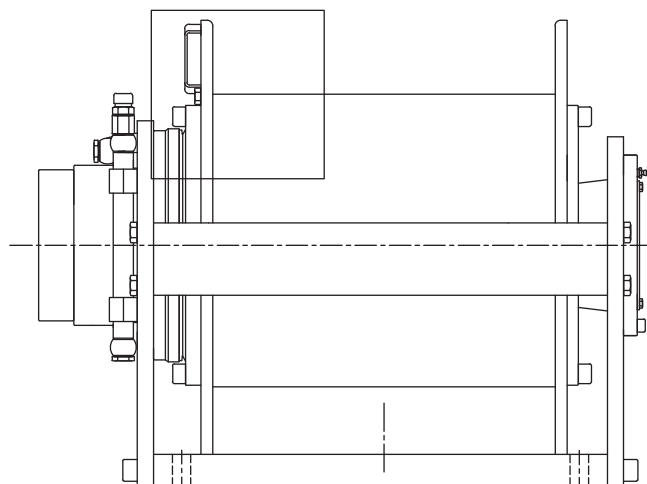
Senso di rotazione   *Hoisting Direction*

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

Entrata fune *Rope entry*

Lato motore *Motor Side*

Senso orario mototamburo
Clockwise Motor Drum

↑

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

Entrata fune *Rope entry*

Lato motore *Motor Side*

Senso antiorario mototamburo
Counterclockwise Motor Drum

↑

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

Entrata fune *Rope entry*

Lato motore *Motor Side*

Senso orario mototamburo
Clockwise Motor Drum

↑

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

Entrata fune *Rope entry*

Lato motore *Motor Side*

Senso antiorario mototamburo
Counterclockwise Motor Drum

↑
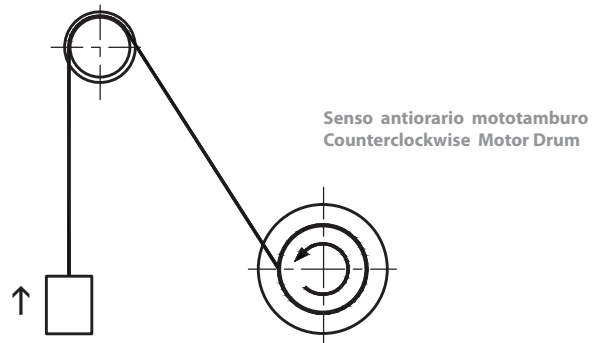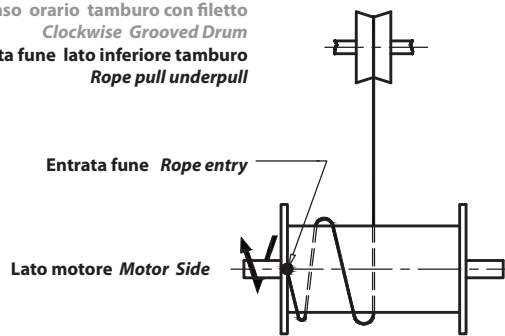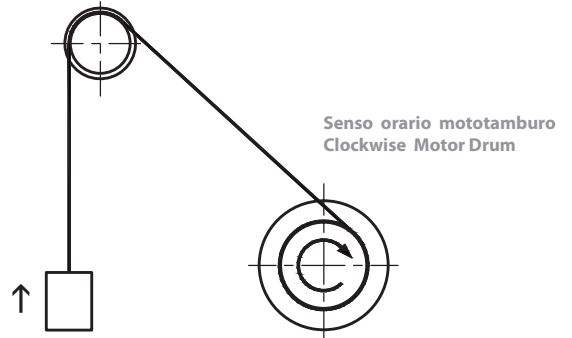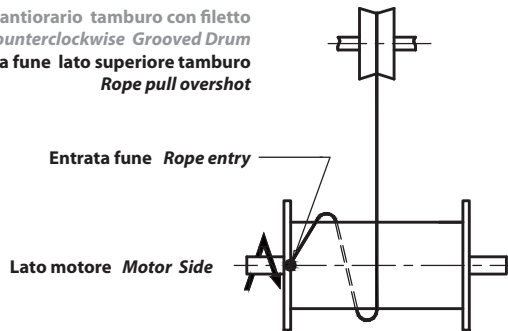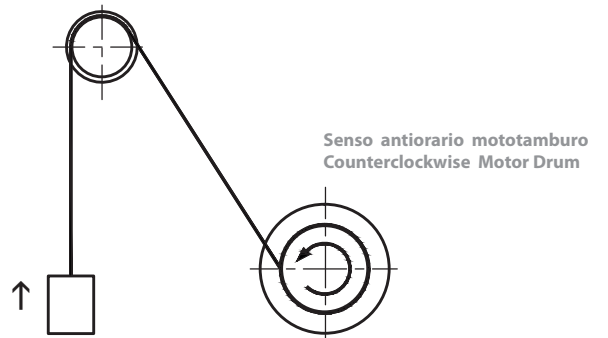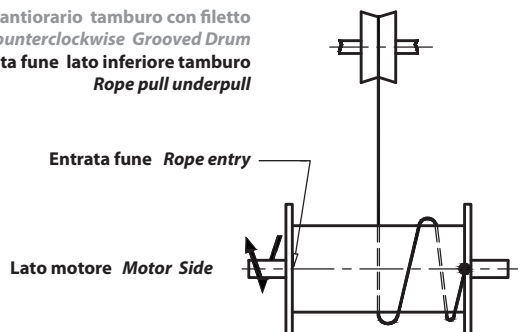
Calcolo potenze   *Power Calculation*

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*
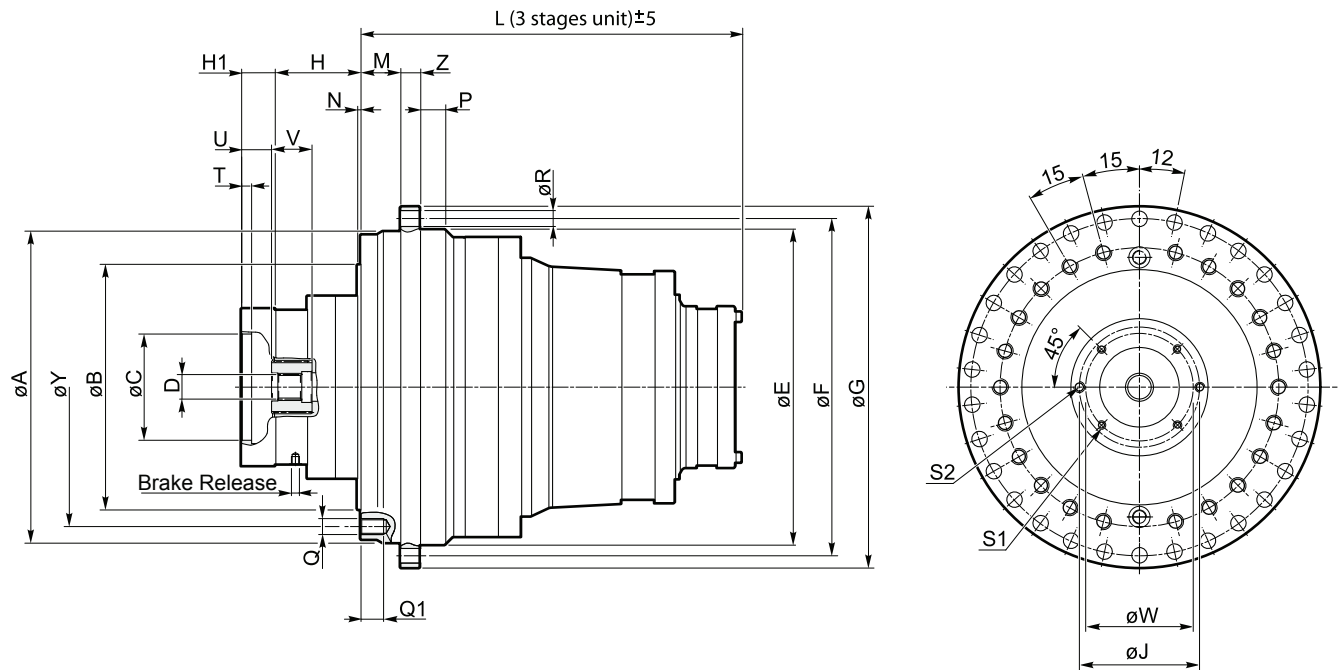
Dimensioni generali - *General Dimensions*

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 (16)	24	Ø17 (18)	255	20
WD 1523	328	230 f7	335 f7	368	398	68	414	37	5	34	M16 (22)	24	Ø17 (24)	280	23
WD 2003	355	270 f7	366 f7	394	424	57,5	424.5	37	5	45	M16 (22)	24	Ø17 (24)	320	23
WD 2523	394	300 f7	402 f7	424	450	81	462	50	5	53	M20 (22)	30	Ø14.5 (36)	350	25
WD 3003	432	330 f7	436 f7	465	495	87,5	477	50	5	60	M20 (22)	30	Ø19 (30)	390	25
WD 4803	470	355 f7	476 f7	508	545	128	575	60	5	38	M24 (22)	34	Ø24 (24)	420	30
WD 8003	530	430 f7	544 f7	578	618	129,5	688	55	5	45	M24 (22)	36	Ø24 (30)	480	35
WD 16004*	615	515 h7	640 h7	690	750	129	966	110	5	9	M30 (24)	52	Ø33 (24)	565	30

* Motor adapter on demand

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*
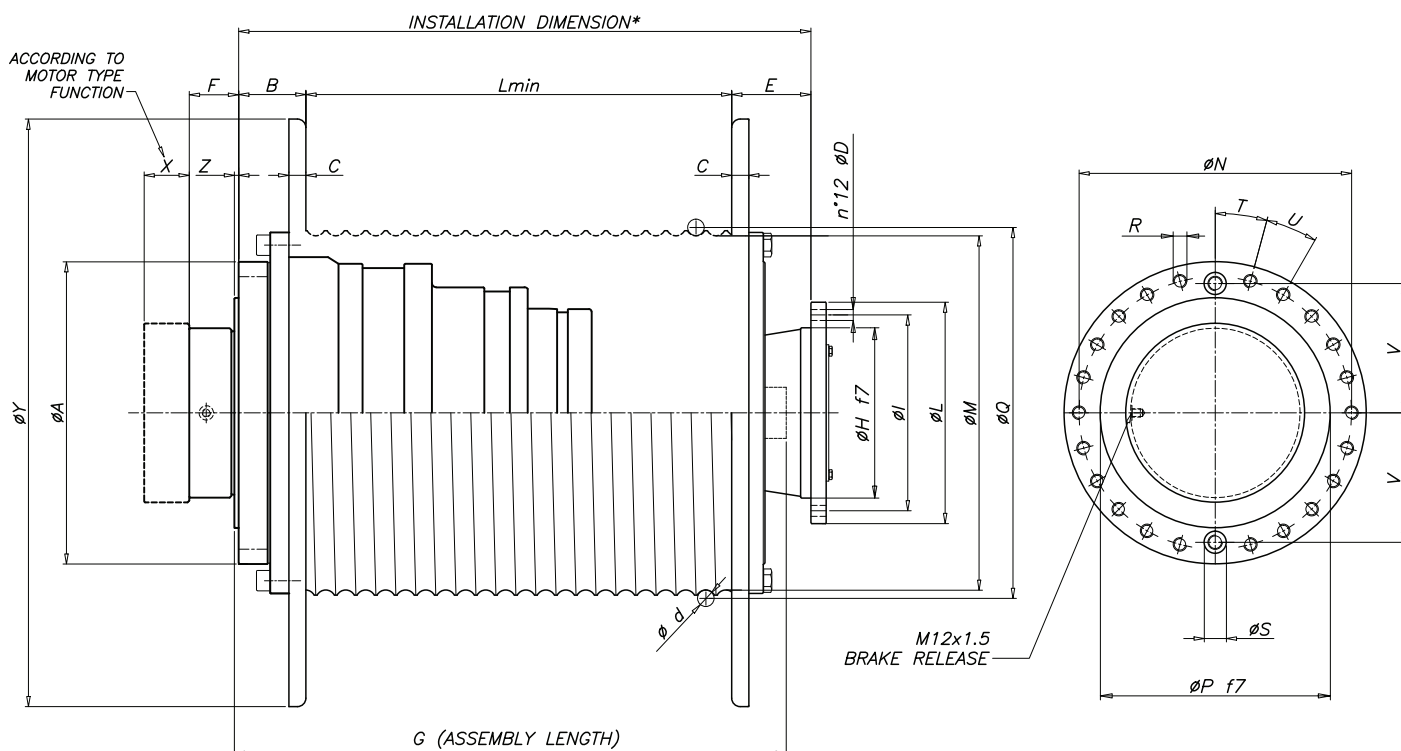
Secondo le norme FEM, classe M5 - L2 - T5   *According to FEM rules, class M5 - L2 - T5*

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	980	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	32

RIDUTTORI EPICICLOIDALI WD PER ARGANO   WD *PLANETARY WINCH DRIVES*

Prestazioni WD   *WD Performances*

Size	i_e	$T_{2\,fem}$ [Nm]	T_{d-max} [Nm]	T_{s-max} [Nm]	n_{1-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

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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	$T_{2\ fem}$ [Nm]	T_{d-max} [Nm]	T_{s-max} [Nm]	n_{1-max} [RPM]
WD 3003	49.75	48200	94700	136500	3100
	58.19	48250	94700	136500	3100
	68.02	47620	94700	133700	3100
	71.66	48200	94700	136500	3100
	81.97	48200	94700	136500	3100
	83.74	48250	94700	133700	3100
	95.75	47900	94700	133700	3100
	96.70	48400	94700	136500	3100
	103.04	46800	90600	121200	3100
	112.94	47600	94700	133700	3100
	117.79	46800	90600	121200	3100
	138.88	46800	90600	121200	3100
WD 4803	51.99	69850	123300	160000	3100
	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	125250	197200	312000	3100
	65.45	125400	197200	312000	3100
	73.1	122000	197200	312000	3100
	85.4	122700	197200	312000	3100
	92.17	125500	197200	298100	3100
	105.08	123000	197200	312000	3100
	108.71	125000	184300	304500	3100
	120.12	122900	197200	312000	3100
	126.50	96500	174500	221600	3100
	141.63	122300	197200	312000	3100
	170.43	96800	174500	221600	3100
WD 16004	200	227000	317000	353000	3100
	233,38	223800	317000	353000	3100
	274,31	233300	317000	353000	3100
	320	232500	317000	353000	3100
	370,13	219000	317000	353000	3100
	393,12	233300	317000	353000	3100
	431,73	219000	317000	353000	3100
	528,91	233500	317000	353000	3100
	605,67	219200	317000	353000	3100
	713,35	219200	317000	353000	3100

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RIDUTTORI EPICICLOIDALI WD PER ARGANO   WD *PLANETARY WINCH DRIVES*

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
WD 16004	1100	30

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 Coeffecient K_m	T0 200h	T1 400h	T2 800h	T3 1600h	T4 3200h	T5 6300h	T6 12500h	T7 25000h	T8 50000h	T9 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*
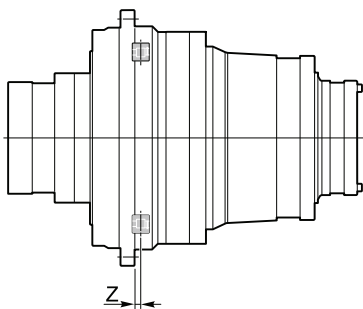
Tipo - *Type*	C_0 [N]	C_d [N]	Z [mm]
WD 1020	330000	183000	17.5
WD 1520	435000	224000	19.7
WD 2000	435000	224000	25.2
WD 2520	620000	315000	21
WD 3000	620000	315000	20.75
WD 4800	800000	390000	13.25
WD 8000	840000	405000	14.5
WD 16000	147000	700000	13.5

RIDUTTORI EPICICLOIDALI RW PER ARGANO   RW *PLANETARY WINCH DRIVES*
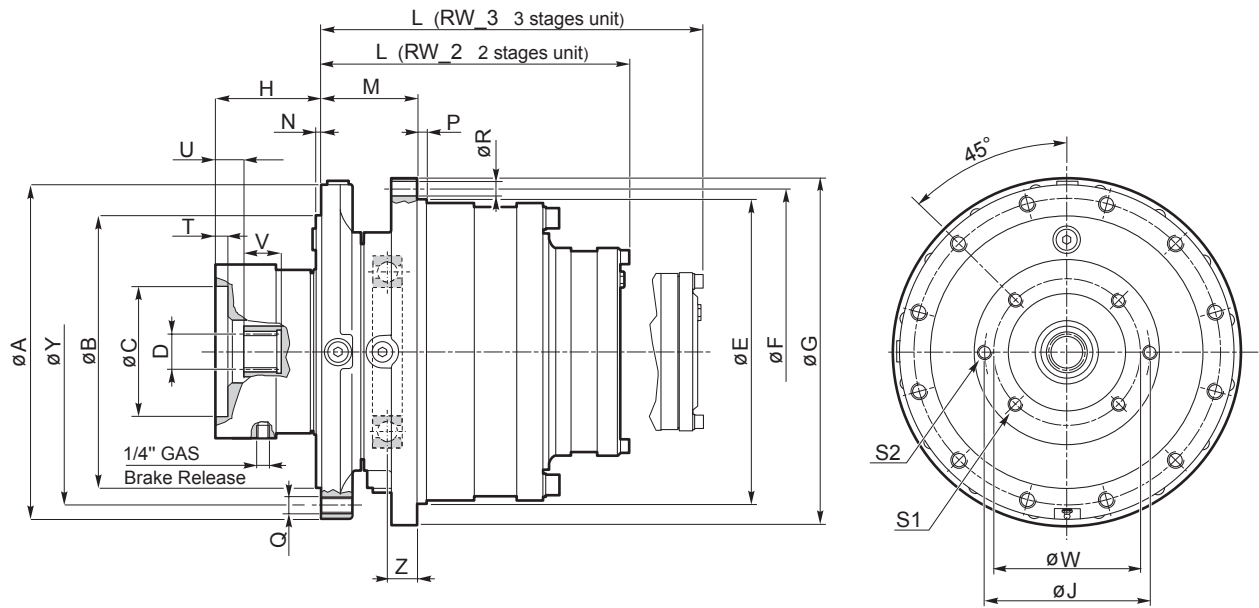
Dimensioni generali - *General Dimensions*

Tipo / *Type*	A	B	E	F	G	L	M	N	P	Q	R	Y	Z
RW 512	262	215 f7	246 f7	271	291	246.5	75	11	10	n° 12 M12	n° 12 Ø13	240	20
RW 513	262	215 f7	246 f7	271	291	289.5	75	11	10	n° 12 M12	n° 12 Ø13	240	20
RW 612	262	215 f7	246 f7	271	291	251	75	11	10	n° 12 M12	n° 12 Ø13	240	20
RW 613	262	215 f7	246 f7	271	291	293	75	11	10	n° 12 M12	n° 12 Ø13	240	20
RW 812	330	270 f7	297 f7	327	352	305	100	6	12	n° 12 M16	n° 12 Ø17	300	26.5
RW 813	330	270 f7	297 f7	327	352	348.5	100	6	12	n° 12 M16	n° 12 Ø17	300	26.5
RW 1022	330	270 f7	297 f7	327	352	340	100	6	12	n° 12 M16	n° 12 Ø17	300	26.5
RW 1023	330	270 f7	297 f7	327	352	395.5	100	6	12	n° 12 M16	n° 12 Ø17	300	26.5
RW 1532	393	320 f7	352 f7	383	408	363	113	6	11	n° 12-M20	n° 16 Ø17	360	34.5
RW 2522	393	320 f7	415 f7	448	473	413	115	6	24	n° 16 M20	n° 24 Ø17	360	29.5

Dimensioni ingressi - *Input Dimensions*

	C	D	H	T	U	V	W	S1	J	S2
Input SAE B	101.6 H8	DP16/32 Z13	138	10	8	30	127	n° 4 M12	146	n° 2 M14
Input SAE C	127 F8	DP12/24 Z14	114	15	16	48	162	n° 4 M12	181	n° 2 M16
Input SAE D	152.5 F8	DP8/16 Z13	128	15	33	47	229	n° 4 M20	/	/

RIDUTTORI EPICICLOIDALI RW PER ARGANO   RW *PLANETARY WINCH DRIVES*

Prestazioni RW_2 (2 stadi) **- RW_3** (3 stadi)
Performances RW_2 (2 stages) - *RW_3* (3 stages)

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	$T_{2\,fem}$ [Nm]	$T_{d\text{-}max}$ [Nm]	$T_{s\text{-}max}$ [Nm]	$n_{1\text{-}max}$ [RPM]
RW 512	13.79	7300	7900	8800	5200
	17.11	7380	9700	10800	5200
	21.71	6000	10500	13500	5200
	23.52	6600	12500	14500	5200
	29.75	6100	10500	14800	5200
	34.77	5100	8900	11800	5200
	37.38	5850	10500	14800	5200
	43.64	5150	8900	11800	5200
RW 513	42.60	7680	11900	13200	5200
	52.41	7720	11900	13200	5200
	62.05	7680	12900	15500	5200
	64.42	7750	11900	13200	5200
	71.27	7760	11900	13200	5200
	76.24	7700	12900	15500	5200
	84.32	7720	12900	15500	5200
	89.20	6580	11900	13200	5200
	95.92	6250	10500	14800	5200
	105.81	7710	12900	15500	5200
	109.50	7800	11900	13200	5200
	123.47	5240	8900	11800	5200
	129.45	7750	12900	15500	5200
	154.35	5240	8900	11800	5200
	162.69	6250	10500	14800	5200
	189.30	5250	8900	11800	5200
RW 612	13.4	9550	10500	11800	3100
	16	9700	12500	13900	3100
	18.34	8600	13400	15800	3100
	20.33	9800	15600	17400	3100
	23.8	9050	16200	18100	3100
	27.21	8750	13400	20500	3100
	29	7100	13600	18100	3100
	33.13	8000	13400	20500	3100
RW 613	49.11	10000	16200	18100	5200
	55.94	8900	13400	20500	5200
	60.39	10000	16200	18100	5200
	68.75	8950	13400	20500	5200
	73.24	10150	16200	18100	5200
	83.35	9000	13400	20500	5200
	93.41	9000	13400	20500	5200
	97.09	10150	16200	18100	5200
	102.33	9000	13400	20500	5200
	110.45	9000	13400	20500	5200
	122.09	10070	16200	18100	5200
	142.10	9250	16200	18100	5200
	152.59	10300	16200	18100	5200
	161.59	9050	13400	20500	5200
	173.52	9050	13400	20500	5200
	201.89	9050	13400	20500	5200
RW 812	14.14	11750	11100	12400	3100
	18	9600	13900	15500	3100
	21.13	10750	16200	18100	3100
	24.73	9400	18000	21000	3100
	30.62	9100	15700	21000	3100
	35.10	7700	13400	18600	3100
	37.25	9000	15700	21000	3100
	42.74	7900	13400	18600	3100
RW 813	43.60	12400	20800	24300	5200
	53.63	12400	20800	24300	5200
	63.50	12350	20800	24500	5200
	76.09	11150	18600	23000	5200
	86.30	11100	20800	24500	5200
	93.44	11150	18600	23000	5200
	100.87	11150	18600	23000	5200
	108.55	10000	18300	24500	5200
	114.88	9300	15700	21000	5200
	126.82	11200	18600	23000	5200
	135.70	9800	18300	24500	5200
	147.61	9700	18000	23000	5200
	158.50	11200	18600	23000	5200
	184.43	9700	18000	23000	5200
	207.31	7900	13400	18600	5200

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RIDUTTORI EPICICLOIDALI RW PER ARGANO   RW *PLANETARY WINCH DRIVES*

Prestazioni RW_2 (2 stadi) **- RW_3** (3 stadi)
Performances RW_2 (2 stages) - RW_3 (3 stages)

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	$T_{2\,fem}$ [Nm]	$T_{d\text{-}max}$ [Nm]	$T_{s\text{-}max}$ [Nm]	$n_{1\text{-}max}$ [RPM]
RW 1022	14.14	13770	13770	15352	3100
	16.64	15400	16060	17900	3100
	18.00	16500	17280	19260	3100
	21.08	16600	20000	22400	3100
	24.73	15700	23400	26100	3100
	30.13	15150	26880	31600	3100
	37.25	13200	22650	30300	3100
	42.74	11200	19300	26950	3100
RW 1023	43.60	17880	30000	35400	5200
	53.63	17950	30000	35400	5200
	65.07	18010	30000	35400	5200
	72.95	18040	30000	35400	5200
	79.94	18060	30000	35400	5200
	93.09	17150	30000	35400	5200
	100.87	16200	26900	33400	5200
	108.55	17200	30000	35400	5200
	126.82	16200	26900	33400	5200
	135.70	18150	30000	35400	5200
	147.61	16250	26900	33400	5200
	158.50	17150	26900	33400	5200
	167.22	9800	16600	21400	5200
	184.43	16250	26900	33400	5200
	207.31	11450	19300	27000	5200
	226.66	13500	22600	30300	5200
RW 1532	17.9	19100	32200	35900	3100
	20.81	22650	37200	41400	3100
	24.36	19100	36500	48200	3100
	27.00	19450	33800	53200	3100
	29.68	14950	28700	50300	3100
	31.55	19550	33800	54600	3100
	38.38	19100	33800	54600	3100
	45.73	15550	26900	46300	3100
RW 2522	17.51	31400	33400	37200	2500
	19.40	32530	36800	41000	2500
	21.25	24600	40100	44700	2500
	25.52	32000	47800	53200	2500
	29.26	32100	52900	60800	2500
	30.88	25000	43700	61700	2500
	34.62	31150	53000	61700	2500
	41.81	25150	43700	61700	2500

Peso e quantità olio - *Weight and Oil Quantity*

	Weight [kg]	*Oil Quantity* [litri - *liters*]
RW 512	75	2
RW 513	85	2.3
RW 612	90	2.3
RW 613	100	2.5
RW 812	130	3
RW 813	140	3.5
RW 1022	145	4
RW 1023	155	4.2
RW 1532	195	5
RW 2522	275	7

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RIDUTTORI EPICICLOIDALI RW PER ARGANO   RW *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*

		T0	T1	T2	T3	T4	T5	T6	T7	T8	T9
Class of load spectrum	Spectrum Coefficent K$_m$	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*

Tipo - *Type*	C$_0$ [N]	C$_d$ [N]	Z [mm]
RW 512 - RW 513	65500	72800	20
RW 612 - RW 613	65500	72800	20
RW 812 - RW 813	100000	106000	26.5
RW 1022 - RW 1023	100000	106000	26.5
RW 1532	125000	125000	34.5
RW 2522	143000	390000	29.5

Prestazioni freni F5 - *F5 Brake Performances*

		F 501	F 502	F 503	F 504	F505	F 506	F508	
T$_b$ *[Nm]*		110	215	325	405	500	630	818	
p$_b$ *[bar]*		10	20	30	38	28	35	33	
p$_{max}$ *[bar]*		300	300	300	300	300	300	300	± 5%
n$_{1-max}$ *[RPM]*	standard	1500	1500	1500	1500	1500	1500	1500	
	special	3500	3500	3500	3500	3500	3500	3500	

Prestazioni freni F9 - *F9 Brake Performances*

		F 902	F 903	F 904	F 905	F906	F 908	F910	F 912	F915	
T$_b$ *[Nm]*		244	317	439	488	683	854	976	1120	1465	
p$_b$ *[bar]*		16	21	20	16	23	23	26	32	39	
p$_{max}$ *[bar]*		300	300	300	300	300	300	300	300	300	± 5%
n$_{1-max}$ *[RPM]*	*standard*	1500	1500	1500	1500	1500	1500	1500	1500	1500	
	special	3500	3500	3500	3500	3500	3500	3500	3500	3500	

Su richiesta, i freni fino alla taglia F912 possono essere dotati di ruota libera.
Upon request, brakes up to size F912 can be equipped with freewheeling clutch.

NOTE LEGALI

Tutti i contenuti riportati nel presente catalogo sono stati controllati; in caso di eventuali errori viene comunque declinata ogni responsabilità.

Dinamic Oil si riserva la facoltà di modificare senza preavviso i dati tecnici riportati.

Per ulteriori informazioni contattare il servizio tecnico commerciale Dinamic Oil S.p.A.

LEGAL NOTES

All information in this catalogue has been checked; in case of possible mistakes, we decline all responsibility.

Dinamic Oil reserves the right to amend the technical data of this catalogue without prior notice.

For all further information please contact Dinamic Oil S.p.A. Commercial Department.

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