

PRINCIPIO DI FUNZIONAMENTO DEL VARIATORE

Si tratta di una trasmissione epicicloidale a rapporto variabile. Quando il motore aziona il solare (5-6), i satelliti (8) sono indotti a ruotare sul proprio asse e, contemporaneamente, per effetto del vincolo con la pista esterna fissa (7) e la pista esterna mobile (9), ad un movimento di rivoluzione che trascina in rotazione il portasatelliti (albero uscita).

Variando la posizione assiale della pista esterna mobile (9) tramite la vite di comando, l'anello portasfere (14) e la camma fissa (15), i satelliti sono costretti a variare la loro posizione radiale di rivoluzione. In tal modo i diametri di rotolamento cambiano, così come la velocità angolare dell'albero uscita.

Quando il contatto di rotolamento con le piste esterne (7) (9) si trova verso il centro del satellite (8), la velocità di rivoluzione è più bassa: l'albero uscita ruoterà più lentamente ma avrà disponibile un maggior momento torcente.

ATTENZIONE

La regolazione della velocità si può effettuare SOLO col variatore in funzione, MAI a macchina ferma.

VARIATOR OPERATING PRINCIPLE

The mechanical variator is based on an epicyclic transmission for variable ratios.

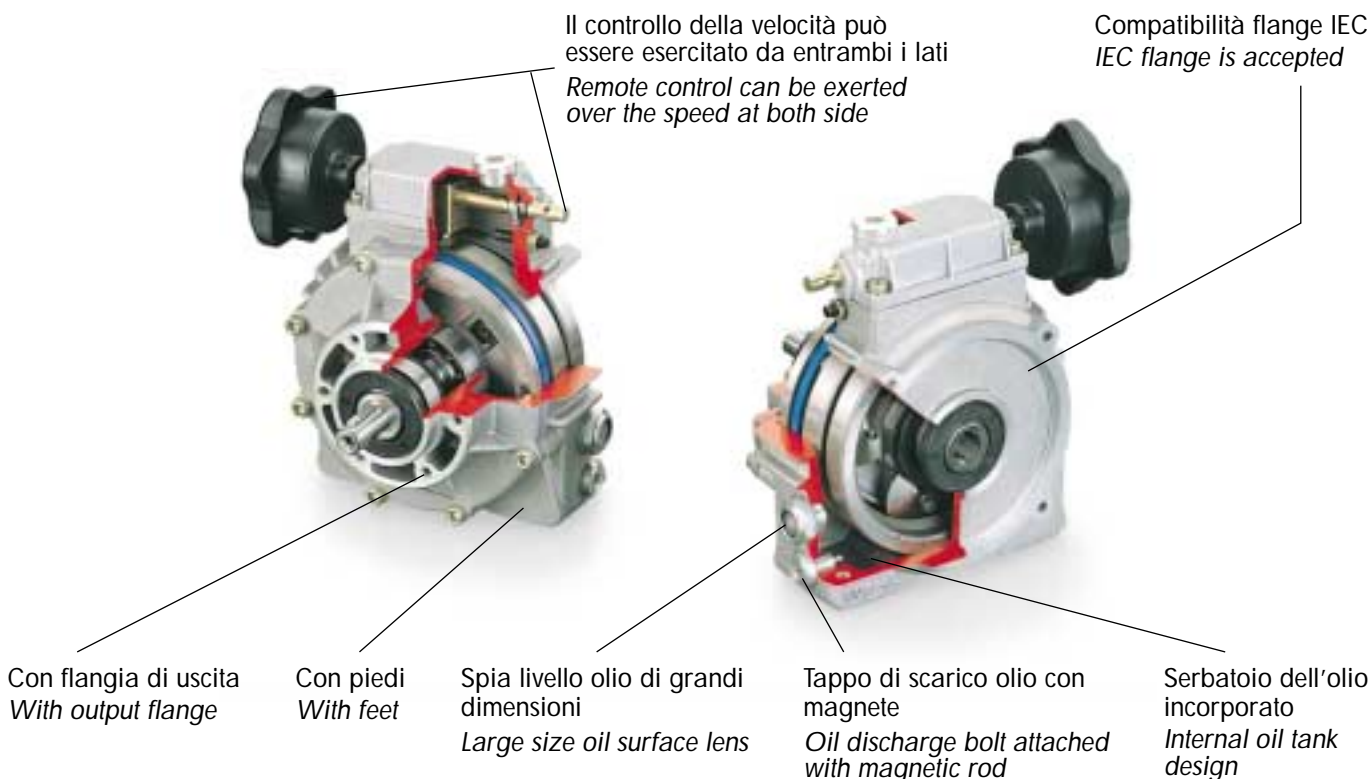
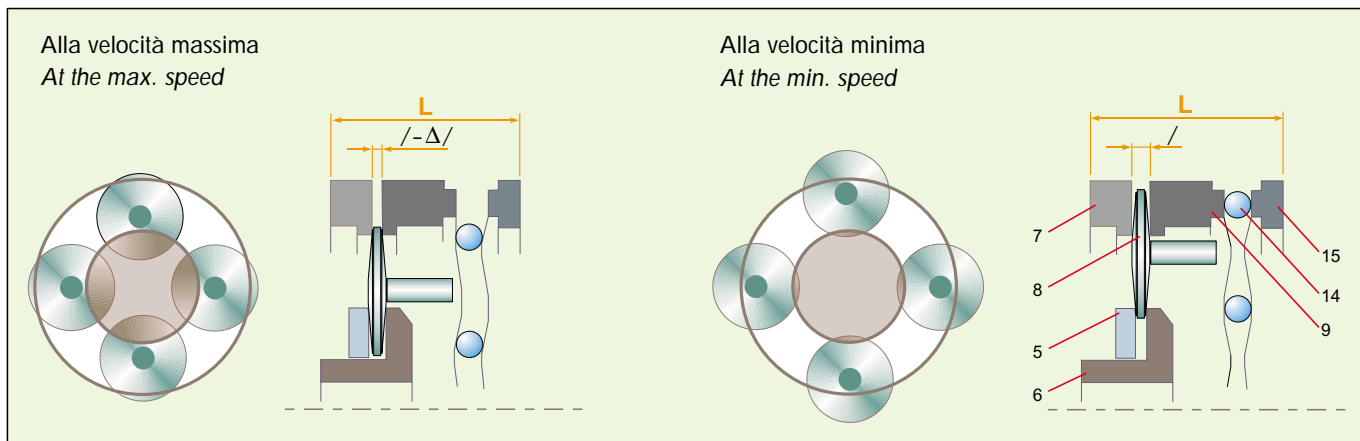
The motor rotates the solar rings (5-6) which rotate the satellites (8). In turn these are in contact with the fixed outer ring (7) and external mobile ring (9).

The satellites rotate around their axes while simultaneously originate the rotation of the satellite carrier (output shaft).

When the rolling contact point of the outer rings (7) (9) is near the center of satellites (8) the output speed will reduce: the output shaft will rotate more slowly thus increasing the output torque value.

WARNING

Speed adjustment is only possible when variator is running, never adjust speed while variator is stationary. This will result in damage to the variator.



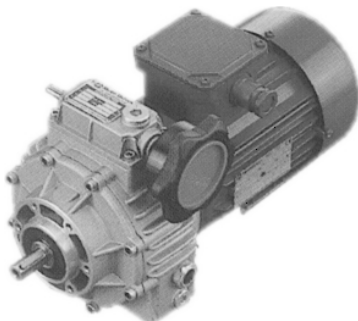
VARIATORI

I variatori meccanici serie N sono in alluminio nelle grandezze 003, 005, 010, 020, 030, 050 per potenze da 0.18 kW a 4 kW.

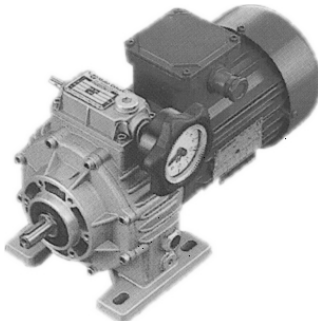
VARIATORS

The series N mechanical variators consist of size 003, 005, 010, 020, 030 and 050 with power ranges of 0.18 kW to 4 kW are constructed from aluminium.

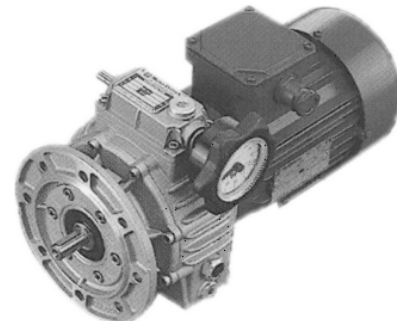
N



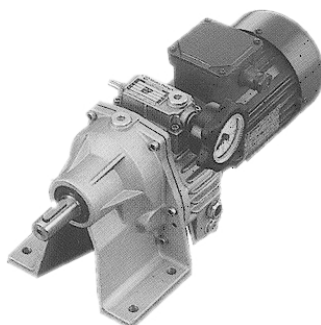
NM



NF



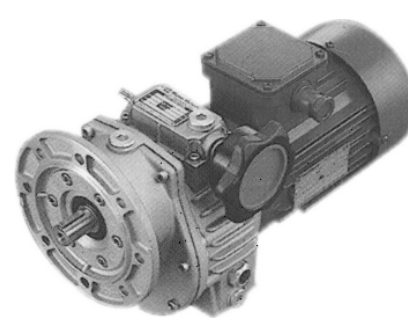
NRT



NRM



NRF



CARATTERISTICHE

- 1 - La carcassa in alluminio, oltre ad una migliore estetica, comporta un minor peso del variatore rendendone più convenienti applicazioni e trasporti.
- 2 - Sul modulo base è possibile montare, in modo semplice e veloce, flangia uscita o piede, a seconda delle necessità. Questo riduce i volumi di stoccaggio ed i tempi di consegna.
- 3 - Il lato di entrata del variatore è chiuso, parte integrale col corpo: questo rende più facile l'installazione ed elimina totalmente la possibilità di perdite d'olio.
- 4 - E' previsto, come standard, il collegamento a motori a dimensioni IEC forma B5.
- 5 - Il tappo di scarico olio è del tipo a magnete: la lubrificazione più pulita consente intervalli di manutenzione più lunghi.
- 6 - Funzionamento in bagno d'olio, silenzioso, con elevato rendimento ed esente da vibrazioni.
- 7 - Il funzionamento è possibile in entrambi i sensi di rotazione con entrata ed uscita concordi.
- 8 - Campo di variazione = 1 - 6.
- 9 - L'albero di comando è bisporgente ed è quindi accessibile, per la manovra, da entrambe le estremità.

FEATURES

- 1 - Aluminium construction of housing benefits weight reduction for more convenient applications and transportation.
- 2 - The simple design allows both foot or flange mounting to standard unit, reducing stocking levels and allowing quick delivery.
- 3 - The closed input flange is an integral part of the variator casing for easy installation and prevents possibility of oil leaks.
- 4 - IEC B5 motor connections available as standard.
- 5 - The magnetic breather plug maintains clean lubricant and extends maintenance intervals.
- 6 - The oil bath operation provides high efficiency for noiseless, vibration free running.
- 7 - The unit can operate in both directions, input and output shafts rotate in same direction.
- 8 - Range of variation = 6 - 1 reduction.
- 9 - Hand wheel can be fitted to both sides of control box for convenient installation.

DESIGNAZIONE

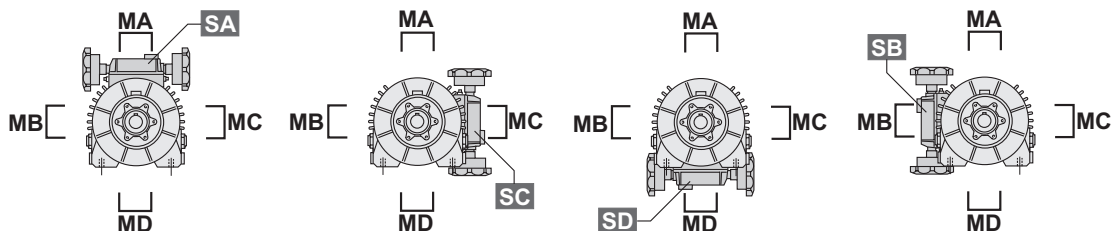
DESIGNATION

Tipo Type	Grandezza Size	Albero uscita diam. mm. Output shaft diam. mm.	Flangia uscita diam. mm. Output flange diam. mm.	Attacco motore IEC IEC motor adaptor	Posizione di montaggio Mounting position	Posizione scatola di comando Speed control box position	Potenza motore Motor power	N° poli Poles number	Forma costruttiva motore Motor version	Tensione Voltage	Frequenza Frequency	Posizione morsetti Terminal box position
NF	030	AU28	F250	100B5	B5	SA	2.2 kW	4	B5	230/400	50Hz	MA
N	003	Vedi tabelle	Vedi tabelle	Vedi tabelle	B3	SA	Vedi tabelle	2	B5			MA
NM	005				B6	SB		4				MB
NF	010	See tables	See tables	See tables	B7	SC		6				MC
	020				B8	SD	See tables					MD
NK	030				V5							
NMK	050				V6							
NFK					B5							
					V1							
					V3							

Tipo Type	Grandezza Size	Rapporto di riduzione (i) Reduction ratio (i)	Albero uscita diam. mm. Output shaft diam. mm.	Flangia uscita diam. mm. Output flange diam. mm.	Attacco motore IEC IEC motor adaptor	Posizione di montaggio Mounting position	Posizione scatola di comando Speed control box position	Potenza motore Motor power	N° poli Poles number	Forma costruttiva motore Motor version	Tensione Voltage	Frequenza Frequency	Posizione morsetti Terminal box position
NRF	003/1	5	AU19	F160	63B5	B5	SA	0.25 kW	4	B5	230/400	50Hz	MA
NRT	003/1	2.5	Vedi tabelle	Vedi tabelle	Vedi tabelle	B3	SA	Vedi tabelle	2	B5			MA
NRM	005/1	5				B6	SB		4				MB
NRF	010/1		See tables	See tables	See tables	B7	SC		6				MC
	020/1					B8	SD	See tables					MD
NRTK	030/1					V5							
NRMK	050/1					V6							
NRFK						B5							
						V1							
						V3							

POSIZIONE MORSETTIERA E SCATOLA DI COMANDO

TERMINAL BOX AND SPEED CONTROL BOX POSITION



MA, MB, MC, MD
Posizione morsetti
Terminal box position

SA, SB, SC, SD
Posizione scatola di comando
Speed control box position

DATI TECNICI

TECHNICAL DATA

Tipo Type	P_1 kW	poli poles	Attacco motore IEC IEC motor adaptor	n_2 max min^{-1}	n_2 min min^{-1}	i	T_2 min Nm	T_2 max Nm
N003	0.25	4	63 B5	950	190	—	1.9	3.8
	0.37	2	63 B5	1900	380	—	1.5	3
NR 003/1	0.25	4	63 B5	380	76	2.5	4.7	9.3
				190	38	5	9.3	18.6
N005	0.37	4	71 B5	1000	167	—	3	6
	0.75	2	71 B5	2000	333	—	3	6
NR 005/1	0.37	4	71 B5	400	67	2.5	7.3	14.7
				200	33	5	14.7	29.4
N010	0.75	4	80 B5	1000	167	—	6	12
	1.5	2	80 B5	2000	333	—	6	12
NR 010/1	0.75	4	80 B5	400	67	2.5	14.7	29.4
				200	33	5	29.4	58.8
N020	1.5	4	90 B5	1000	167	—	12	24
	2.2	2	90 B5	2000	333	—	9	18
NR 020/1	1.5	4	90 B5	400	67	2.5	29.4	58.8
				200	33	5	58.8	118
N030	2.2	6	100 B5	660	125	—	27	54
	2.2	4	100 B5	1000	167	—	18	36
NR 030/1	2.2	4	100 B5	400	67	2.5	44.1	88.2
				200	33	5	88.2	176
N050	3.6	4	112 B5	1000	167	—	32	64
NR 050/1	3.6	4	112 B5	400	67	2.5	78.4	157
				200	33	5	157	314

Simbologia:

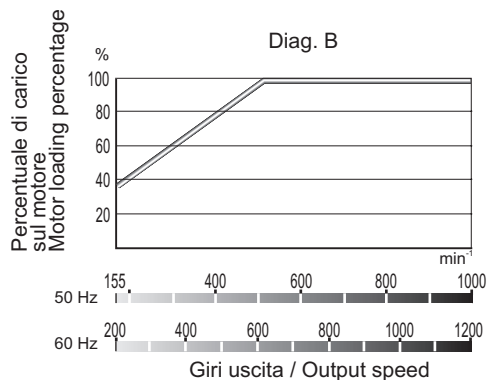
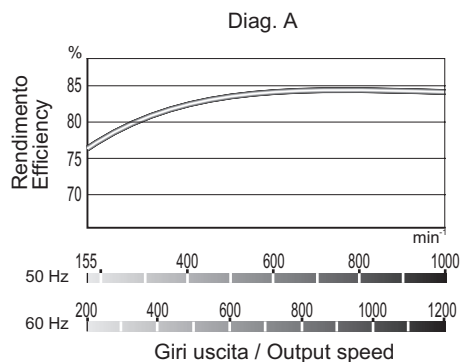
P_1 [kW] Potenza motore
 poli N° poli motore
 n_2 max [min^{-1}] Velocità massima in uscita
 n_2 min [min^{-1}] Velocità minima in uscita
 T_2 min [Nm] Coppia alla velocità massima
 T_2 max [Nm] Coppia alla velocità minima
 i Rapporto di riduzione

Symbols:

P_1 [kW] Motor power
 poles Number of poles
 n_2 max [min^{-1}] Max output speed
 n_2 min [min^{-1}] Min output speed
 T_2 min [Nm] Output torque at the high speed
 T_2 max [Nm] Output torque at the low speed
 i Reduction ratio

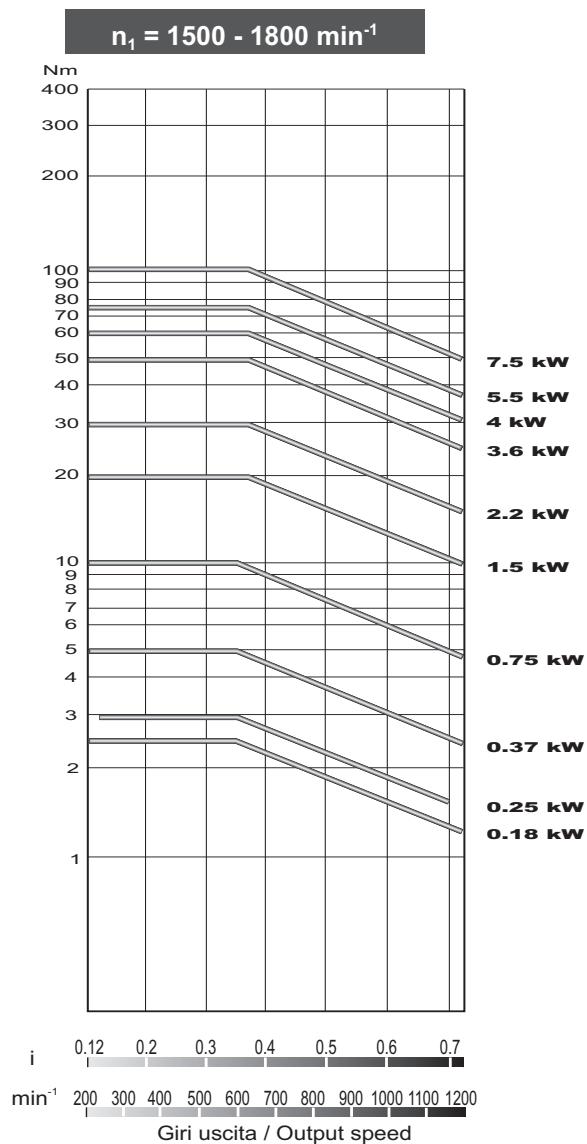
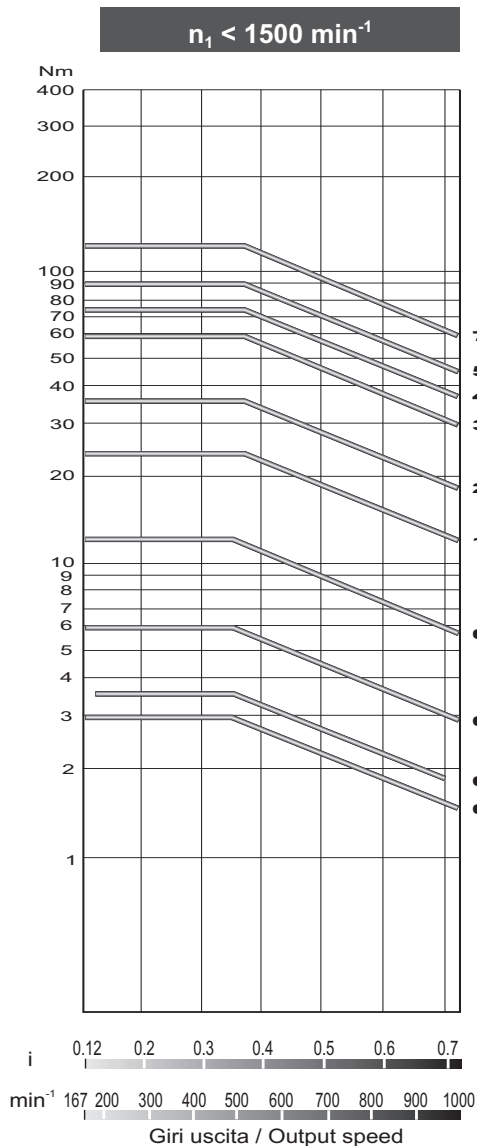
Il diagramma A riporta i valori indicativi del rendimento del variatore alle varie velocità in uscita n_2 espresse in min^{-1} e il diagramma B indica la percentuale di carico sul motore.

Diagram A shows the indicative value of efficiency in relation to output speed n_2 expressed in min^{-1} . Diagram B shows the percentage of motor output power utilized.



I diagrammi seguenti riportano le curve di coppia riferite alle varie potenze applicate e al numero di giri in entrata al variatore n_1 (min^{-1}).

The following diagrams show the performance for output torque in relation to input power and input speed n_1 (min^{-1}).



LUBRIFICAZIONE

I variatori vengono forniti completi di lubrificante. Dopo il piazzamento del variatore assicurarsi che il livello del lubrificante sia visibile dall'apposita spia di livello effettuando eventuali rabbocchi se necessario, con un analogo lubrificante scelto fra quelli raccomandati in tabella.

LUBRICATION

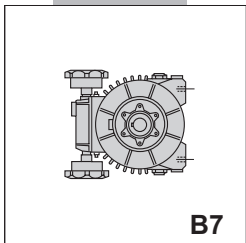
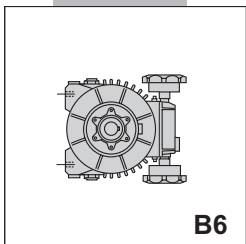
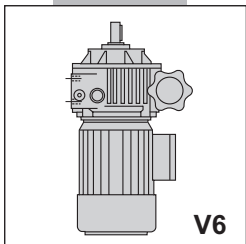
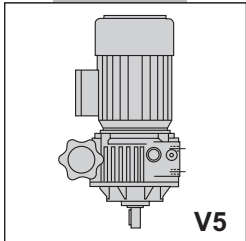
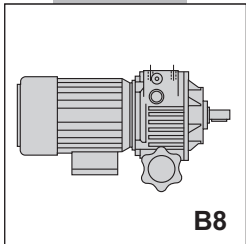
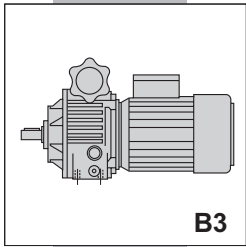
The variators are supplied complete with lubricant. It is important to have the correct level of lubrication for the final mounting position chosen. Ensure the oil can be seen through the oil level plug this to allow the filling up if necessary.

TIPI DI LUBRIFICANTI RACCOMANDATI - RECOMMENDED LUBRICANTS			
Dexron fluid II	IP		
A.T.F. Dexron fluid DIII	SHELL		
A.T.F. 200 RED	MOBIL		
A.T.F. Dexron	FINA		
BP Autran DX	BP		
A.T.F. Dexron	ESSO		
A.T.F. Dexron	CHEVRON		
A.T.F. Dexron	AGIP		
Atina grease 0		IP	
Tivela Compound A		SHELL	

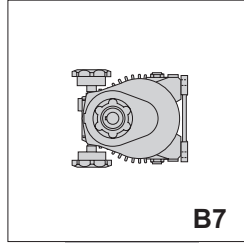
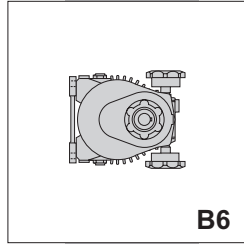
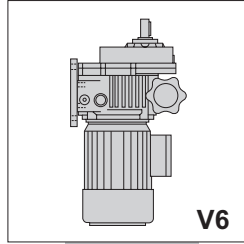
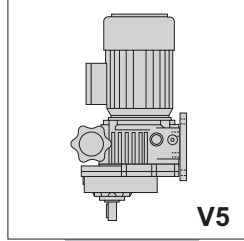
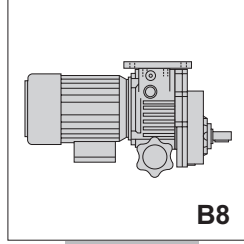
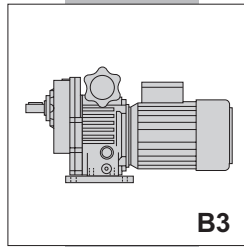
POSIZIONI DI MONTAGGIO

MOUNTING POSITIONS

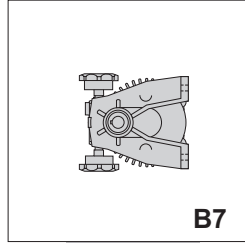
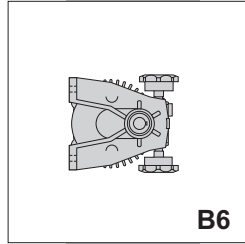
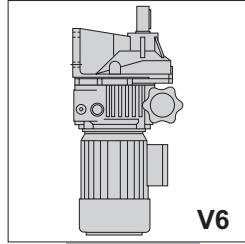
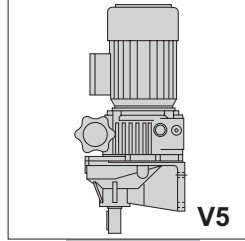
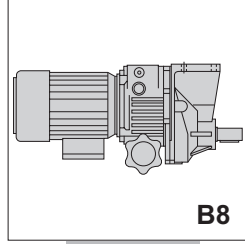
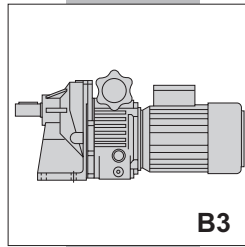
N-NM



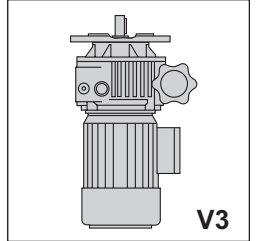
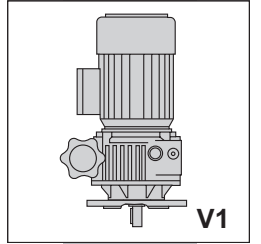
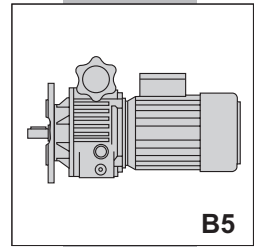
NRM



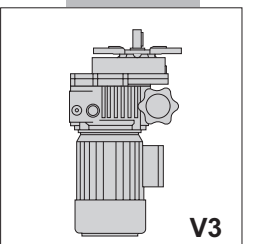
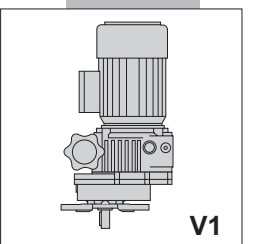
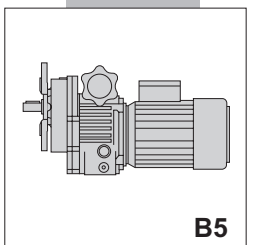
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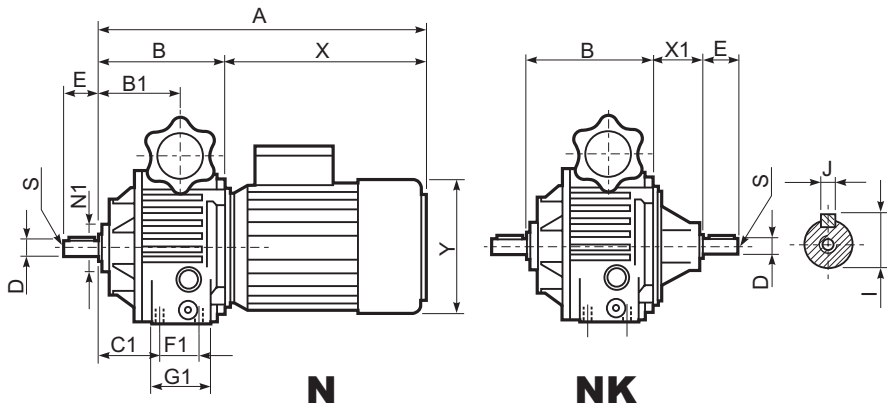
NF



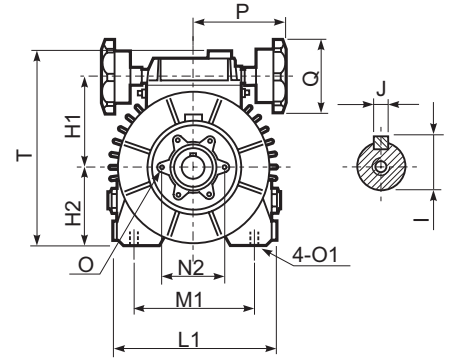
NRF



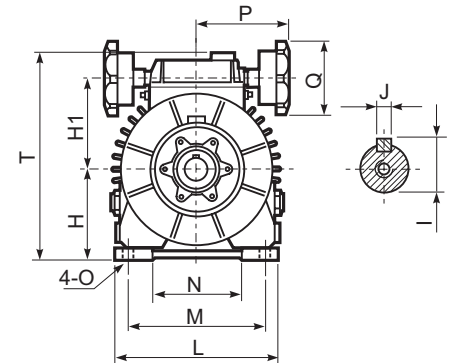
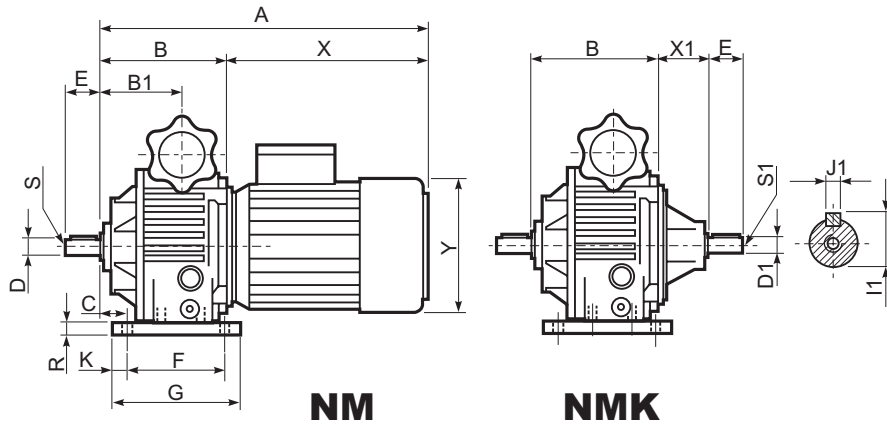
DIMENSIONI



DIMENSIONS



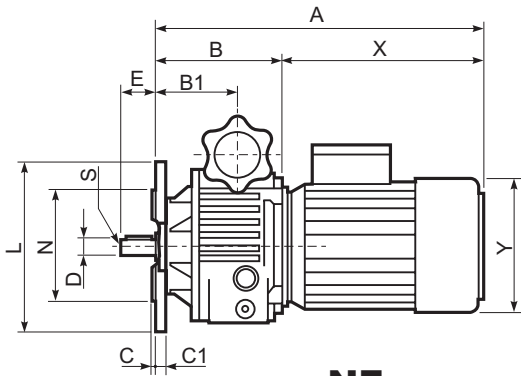
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N003	302	110	66	44	11	23	36	55	79	58	12.5	4	128	100	42	56	M6	M8	97	89	M5	160	192	42	122	5
N005	336	118	78	61	14	30	36	55	88	73	16	5	153	120	56	75	M6	M8	97	89	M6	185	218	50	137	7
N010	383	145	95	75	19	40	45	82	107	91	21.5	6	187	140	56	75	M6	M10	107	89	M6	222	239	65	158	13
N020	450	172	105	82	24	50	58	82	126	108	27	8	220	190	75	100	M8	M10	107	89	M8	264	278	70	177	20



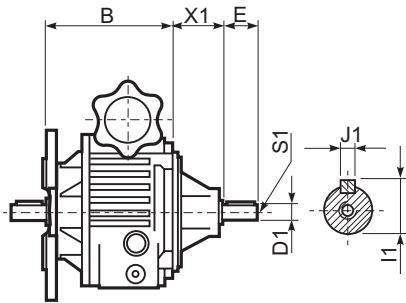
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NM003	302	110	66	25	11 (14)	11	23 (30)	105	130	71	76	12.5 (16)	12.5	4 (5)	4	12.5	140	110	80	9	97	89	11	M5 (M6)	M5	173	192	42	122	6
NM005	336	118	78	30	14 (19)	14	30 (40)	105	130	90	88	16 (21.5)	16	5 (6)	5	12.5	155	120	83	10	97	89	13	M6	M6	202	218	50	137	8
NM010	382	143	95	35	19 (24)	19	40 (50)	125	150	106	107	21.5 (27)	21.5	6 (8)	6	12.5	190	160	120	12	107	89	13.5	M6 (M8)	M6	242	239	65	158	14
NM020	441	171	104	50	24 (28)	24	50 (60)	140	165	125	126	27 (31)	27	8	8	12.5	230	180	130	12	107	89	16	M8 (M10)	M8	277	270	70	177	21
NM030/050	546	206	122	25	28 (38)	28	60 (80)	230	270	150	158	31 (41)	31	8 (10)	8	20	300	245	190	14	155	120	20	M10 (M12)	M10	337	340	95	197	51

DIMENSIONI

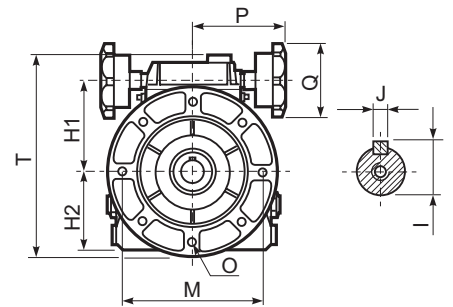
DIMENSIONS



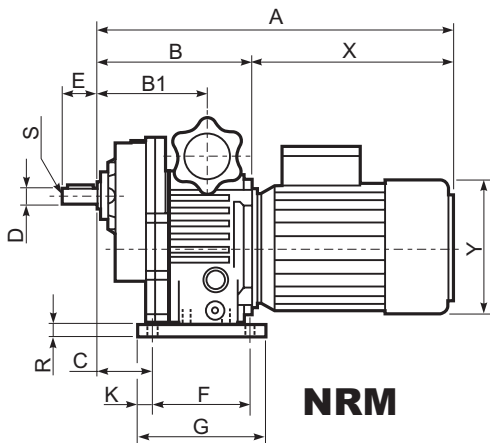
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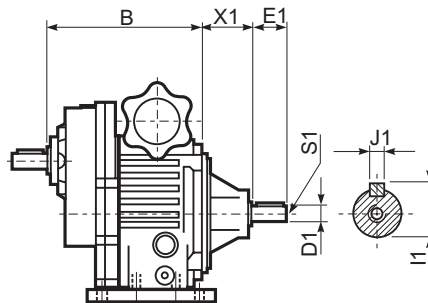
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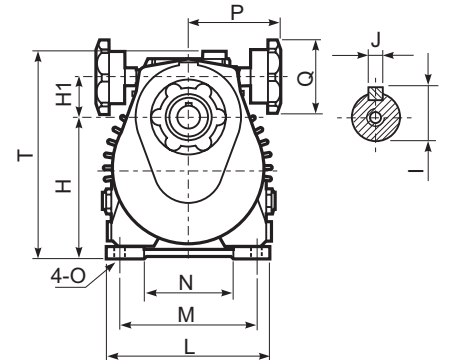
Tipo-Type	A	B	B1	C	C1	D	D1	E	H1	H2	I	I1	J	J1	L	M	N	O	P	Q	S	S1	T	X	X1	Y	Kg
NF003	302	110	66	3.5	8	11 (14)	11	23 (28)	76	58	12.5 (16)	12.5	4 (5)	4	140 (160)	115 (130)	95 (110)	9 (9)	97	89	M5	M5	165 (175)	192	42	122	6
NF005	338	120	80	3.5	10.5	14 (19)	14	28 (38)	88	73	16 (21.5)	16	5 (6)	5	160 (200)	130 (165)	110 (130)	9 (11)	97	89	M6	M6	188 (208)	218	50	137	8
NF010	384	145	97	3.5	13.5	19 (24)	19	38 (48)	107	91	21.5 (27)	21.5	6 (8)	6	200	165	130	11	107	89	M6 (M8)	M6	237	239	65	158	14
NF020	443	173	106	4	14	24 (28)	24	48 (58)	126	108	27 (31)	27	8	8	200 (250)	165 (215)	130 (180)	11 (14)	107	89	M8 (M10)	M8	260 (277)	270	70	177	21
NF030/050	548	208	124	4 (5)	16	28 (38)	28	58 (78)	158	134	31 (41)	31	8 (10)	8	250 (300)	215 (265)	180 (230)	14	155	120	M10 (M12)	M10	336	340	95	197	51



NRM



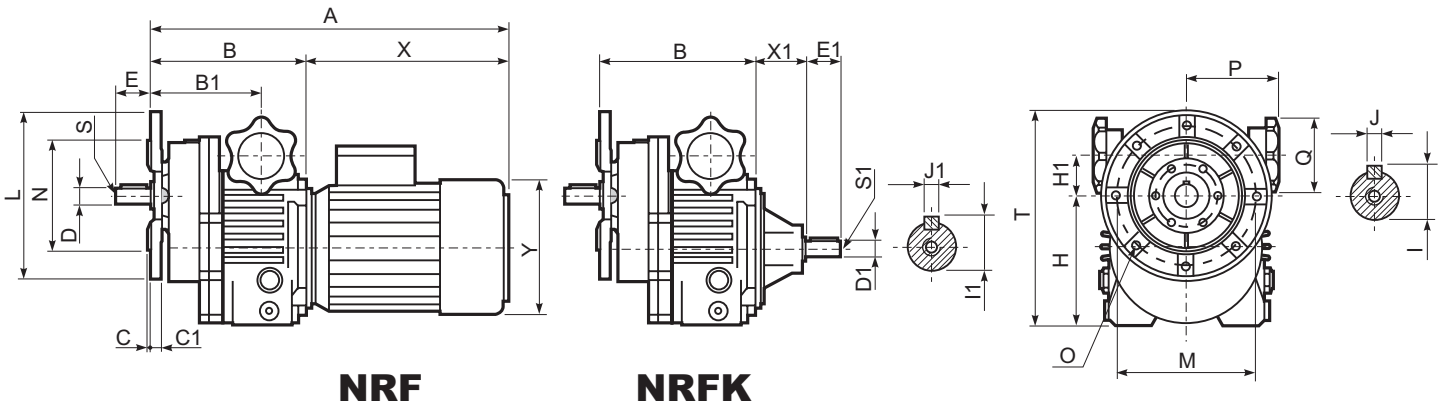
NRMK



Tipo Type	A	B	B1	C	D	D1	E	E1	F	G	H	H1	I	I1	J	J1	K	L	M	N	O	P	Q	R	S	S1	T	X	X1	Y	Kg
NRM003	331	139	108	57	19 (20)	11	30	23	105	130	111 (116)	36	21.5 (22.5)	12.5	6	4	12.5	140	110	80	9	97	89	11	M6	M5	173	192	42	122	7
NRM005	363	145	105	54	19 (20)	14	30	30	105	130	140 (135)	38	21.5 (22.5)	16	6	5	12.5	155	120	83	10	97	89	13	M6	M6	202	218	50	137	11
NRM010	418	179	131	69	24 (25)	19	35	40	125	150	169 (160)	44	27 (28)	21.5	8	6	12.5	190	160	120	12	107	89	13.5	M8	M6	242	239	65	158	9
NRM020	471	201	135	78	28 (30)	24	45	50	140	165	188 (190)	63	31 (33)	27	8	8	12.5	230	180	130	12	107	89	16	M10	M8	277	270	70	177	33
NRM030 NRM050	586	246	165	63	38 (40)	28	60	60	230	270	230 (224)	78	41 (43)	31	10 (12)	8	20	300	245	190	14	155	120	20	M12	M8	337	340	95	197	75

DIMENSIONI

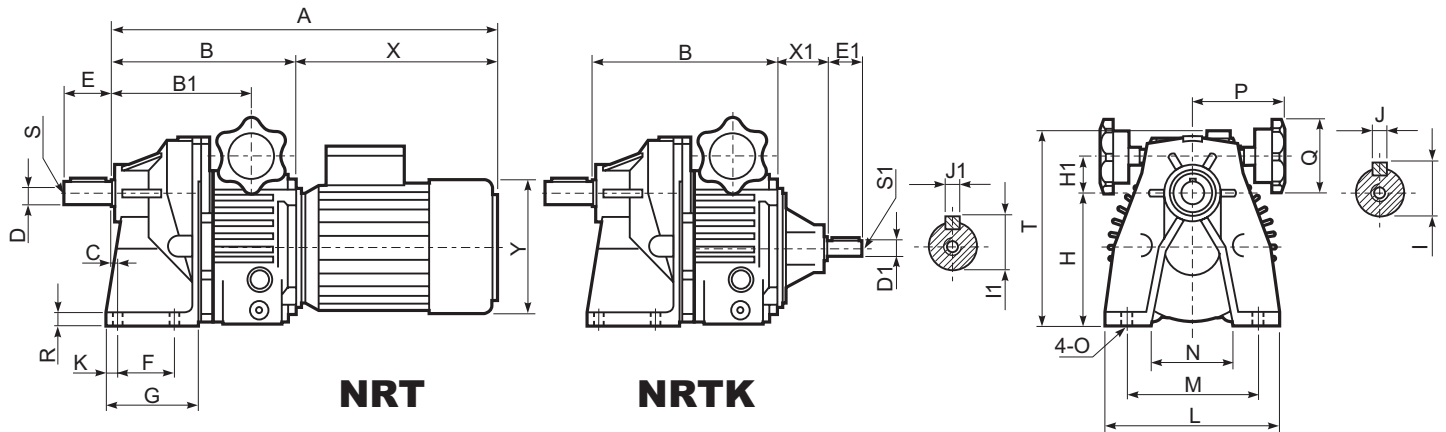
DIMENSIONS



NRF

NRFK

Tipo-Type	A	B	B1	C	C1	D	D1	E	E1	H	H1	I	I1	J	J1	L	M	N	O	P	Q	S	S1	T	X	X1	Y	Kg
NRF003	333	141	112	3.5	8	19	11	28	23	98	36	21.5	12.5	6	4	160	130	110	9	97	89	M6	M5	178	192	42	122	7
NRF005	372	154	114	3.5	10.5	19	14	28	30	123	38	21.5	16	6	5	160	130	110	9	97	89	M6	M6	203	218	50	137	11
NRF010	419	180	130	3.5	13.5	24	19	33	40	154	44	27	21.5	8	6	200	165	130	11	107	89	M8	M6	254	239	65	158	19
NRF020	473	203	137	4	14	28	24	43	50	171	63	31	27	8	8	250	215	180	14	107	89	M10	M8	296	270	70	177	33
NRF030/050	588	248	167	4	16	38	28	58	60	214	78	41	31	10	8	300	265	230	14	155	120	M12	M8	364	340	95	197	75



NRT

NRTK

Tipo/Type	A	B	B1	C	D	D1	E	E1	F	G	H	H1	I	I1	J	J1	K	L	M	N	O	P	Q	R	S	S1	T	X	X1	Y	Kg
NRT003	376	184	140	20	19	11	40	23	45	80	110	36	21.5	12.5	6	4	14	130	105	70	9	97	89	10	M6	M5	167	192	42	122	9
NRT005	412	194	154	6	24	14	50	30	70	110	130	38	27	16	8	5	15	180	150	90	11	97	89	12	M8	M6	192	218	50	137	13
NRT010	456	218	171	7.5	28	19	60	40	70	115	163	44	31	21.5	8	6	14	215	165	100	11	107	89	15	M8	M6	231	239	65	158	21
NRT020	551	281	215	25	38	24	70	50	85	142	195	46	41	27	10	8	23	250	185	130	14	107	120	16	M10	M8	266	270	70	177	33
NRT030/050	686	346	261	19	48	28	100	60	130	178	250	59	51.5	31	14	8	17	310	240	160	17	155	120	18	M10	M8	337	340	95	197	75