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**Servomotori brushless a
magneti permanenti**

***Permanent magnet
brushless servomotors***

Generalità

I servomotori brushless a magneti permanenti derivano dalle esigenze sempre più spinte dell'automazione industriale che necessita di sistemi a sempre più elevate prestazioni e affidabilità con ridotta manutenzione. La MAGNETIC interpretando le esigenze di mercato e affinando con l'esperienza di numerose applicazioni diverse ha consolidato due distinte serie di motori: una per applicazioni generiche che necessitano di una buona rotondità di moto, inerzia non troppo ridotta per agevolarne il controllo e una grande varietà di personalizzazioni, l'altra per applicazioni ad altissima dinamica e dove gli ingombri richiesti sono particolarmente ridotti.

Ambedue le serie utilizzano magneti dell'ultima generazione in neodimio-ferro-boro e soluzioni tecniche che assicurano:

- F.C.E.M. sinusoidale
- intercambiabilità con le ns. serie precedenti e con le esecuzioni più diffuse presenti sul mercato
- ridotto momento d'inerzia con conseguenti elevate accelerazioni e decelerazioni
- elevata capacità di sovraccarico
- bassa pendolazione di coppia
- avvolgimento trifase a stella senza neutro accessibile
- esecuzione non ventilata IC400 (CEI EN 60034-6) con grado di protezione IP 54 (CEI EN 60034-5)
- dimensionamento in classe F (CEI EN 60034-1 - $\Delta T_{max}=105K$) pur utilizzando isolanti in classe H
- forma costruttiva B5 (CEI EN 60034-7), trasformabile in V1 o V3 senza modifiche
- protezione termica realizzata con termoprotettore a contatto normalmente chiuso avente le seguenti caratteristiche:

Temperatura di intervento	135 ± 5°C
Tensione massima	48 Vcc, 230 Vca
Max portata dei contatti	6 Acc, 6 Aca (cosφ =0.6) 1,3 Acc, 1,6 Aca (cosφ =0.6) su BLQ 23-33 e la serie TOP

L'esecuzione meccanica particolarmente robusta assicura un'ottima affidabilità delle parti. I materiali isolanti utilizzati e i controlli eseguiti sia durante le fasi di costruzione degli avvolgimenti e al collaudo finale assicurano un'ottima affidabilità nelle condizioni di alimentazione tipiche: invertitore a PWM con ingresso diretto da rete.

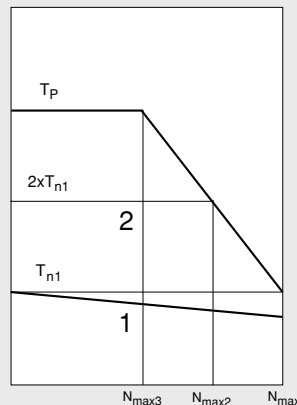
Definizione dei parametri

I valori riportati nelle tabelle corrispondono alle seguenti definizioni:

- **Coppia di stallo T_{n1}** : coppia continuativa erogabile dal motore a velocità prossima a zero con $\Delta T_{max}=105K$ ($T_{amb.max}=40^{\circ}C$)
- **Coppia di stallo T_{n2}** : coppia continuativa erogabile dal motore a velocità prossima a zero con $\Delta T_{max}=65K$ ($T_{amb.max}=40^{\circ}C$)
- **Coppia massima T_p** : coppia massima di accelerazione erogabile dal motore
- **Velocità massima n_{max}** : velocità massima con carico pari alla coppia di stallo T_{n1} e tensione al motore pari alla massima erogabile dal convertitore (Vca)
- **Area 1**: poiché l'aumentare della velocità determina maggiori perdite nel motore, occorre considerare un declassamento della coppia continuativa (S1 CEI EN 60034-1) in funzione della velocità come riportato sui grafici di pag. 10
- **Area 2**: nella scelta del motore necessita considerare la velocità fino a cui viene richiesta l'erogazione della coppia massima richiesta: la limitazione è dovuta alla tensione massima fornibile dal convertitore.

A tal senso le tabelle di pagine 4, 5 e 8 forniscono i valori di velocità massima (n_{max2} e n_{max3}) corrispondenti a 2 volte la coppia di stallo T_{n1} e alla coppia massima T_p .

Affinché il motore possa fornire coppia di sovraccarico alla velocità richiesta, risulta necessario sceglierlo con velocità massima maggiore.



General features

The brushless servomotors with permanent magnets are designed to meet the more and more demanding needs of industrial automation with very high-performances and reliable systems requiring little maintenance.

MAGNETIC, to meet the market requirements and on the ground of its experience of many different applications, has defined two different motor series: one for generic applications that need a good rotation regularity, an inertia not too low to make the control easier and a wide range of customized executions; the other series for high dynamic special applications with overall dimensions particularly reduced. These two series of servomotors use the last generation magnets made of neodymium, iron and boron and advanced technical solutions to obtain:

- sinusoidal B.E.M.F.
- interchangeability with our previous series and with the most common servomotors present on the market
- low moment of inertia resulting in high accelerations and decelerations
- high overload capacity
- low cogging of torque.
- three-phase, 4 pole star winding with no access to neutral
- TENV execution IC400 (IEC 34-6) with degree of protection IP 54 (IEC60034-5)
- dimensioning in F class (IEC34-1; $\Delta T=105K$), even if the insulation used is of H class
- assembly B5 (IEC34-7), with the possibility of transforming it into V1 or V3 without changes
- normally-closed contact foreseen for thermal protection with the following characteristics:

Operating temperature	135±5°C
Ceiling voltage	48 Vdc, 230 Vac
Capacity of the contacts	6 Adc, 6 Aac (cosφ =0.6) 1,3 Adc, 1,6 Aac (cosφ =0.6) for BLQ 23-33 and TOP series

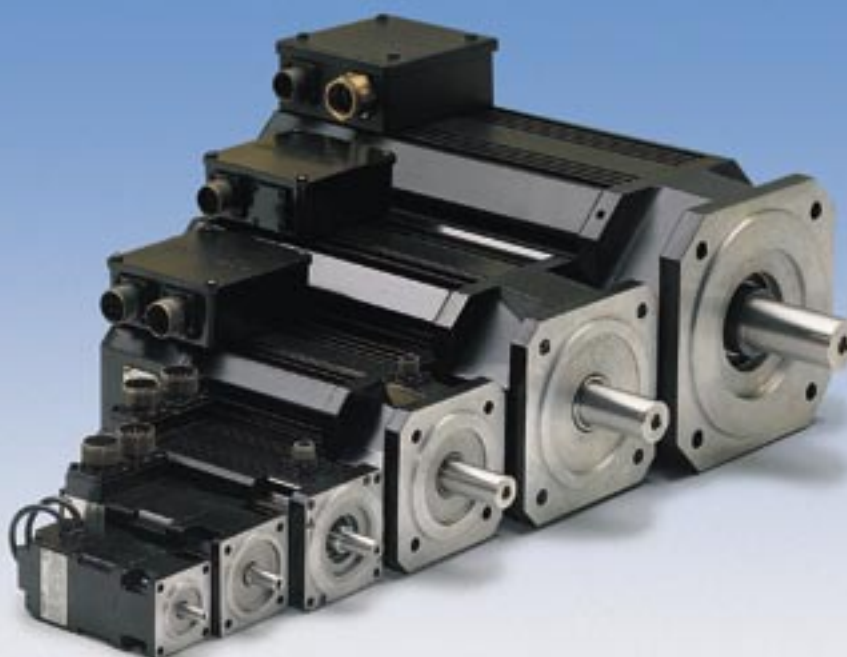
The mechanical execution particularly rugged assures a very high reliability of the components.

The insulation materials used and the tests made during the windings manufacturing phase and the final testing assure the operating in the typical supplying conditions: PWM inverter with input from transformer or direct to the mains.

Parameters

The values indicated on the tables correspond to what follows

- **Stall torque T_{n1}** : continuous torque that may be supplied by the motor while running at a speed near zero with $\Delta T_{max}=105K$ (max room $T=40^{\circ}C$)
- **Stall torque T_{n2}** : continuous torque that may be supplied by the motor while running at a speed near zero with $\Delta T_{max}=65K$ (max room $T=40^{\circ}C$)
- **Max torque T_p** : acceleration torque that may be supplied by the motor
- **Max speed n_{max}** : max speed when the load is equal to the stall torque T_{n1} and the voltage supplied to the motor is equal to the max voltage that may be delivered by the converter (Vac)
- **Area 1**: since an increase in speed results in bigger losses of the motor, it is necessary to derate the continuous torque (S1 IEC 34-1) according to the speed as shown in the graphs of page 10
- **Area 2**: when choosing the motor it is necessary to take into account the speed up to which the max torque has to be supplied; this depends on the max voltage which may be delivered by the converter. To this purpose, the max speed values (n_{max2} and n_{max3}) corresponding to the stall torque T_{n1} multiplied per 2 and to the max torque T_p are given in the tables on pages 4, 5 and 8. It is necessary to choose the motor with a higher max speed in order to obtain the overload torque at the desired speed.



Questa serie si sviluppa su 6 taglie 25-35-40-60-80-100 in esecuzione a 6 poli (tranne le 25 e 35 eseguite a 4 poli) coprendo le richieste che vanno da 0,35Nm a 68Nm di coppia continuativa allo stallo. Particolarmente apprezzate sono le caratteristiche di bassa ondulazione di coppia e adeguato valore d'inerzia che porta ad un miglior controllo dell'asse anche in applicazioni come la macchina utensile.

Sono definiti per una tensione di alimentazione max (Vca) pari a 3x205 V_{RMS} (tensione di rete 3x230V) i tipi BLQ 23, 33, 43, 63, 83 e 103 mentre per tensione Vca pari a 3x345 V_{RMS} (tensione di rete 3x400V) i tipi 44, 64, 84 e 104..

Le dimensioni meccaniche delle due serie sono le stesse.

Per applicazioni che richiedono elevate coppie continue anche ad alte velocità (regolazione a coppia costante), è disponibile l'esecuzione ventilata del BLQ 83, 84, 103 e 104.

The BLQ series includes 6 frames (25-35-40-60-80 and 100), all with 6 poles (except for frames 25 and 35 with 4 poles) covering the requirements from 0,35 Nm to 68 Nm of stall continuous torque.

Low torque ripple and adequate inertia value are characteristics particularly appreciated that allow a better control even in applications as the tool machines.

The max supply voltage (V_{ac}) for the 23, 33, 43, 63, 83 and 103 types is 3x205 V_{RMS} (mains 3x230V), while the 44, 64, 84, 87 and 104 are designed for V_{ac}=3x345 V_{RMS} (mains 3x400V). The mechanical dimensions of these two series are the same.

For applications that require high continuous torques even at high speed (constant torque regulation) the execution with fan is available for BLQ 83, 84, 103 and 104.

Motore tipo <i>Motor type</i>		BLQ 23	BLQ 33	BLQ 43 BLQ 44	BLQ 63 BLQ 64	BLQ 83 BLQ 84	BLQ 103 BLQ 104	
Caratteristiche dei cuscinetti <i>Bearings data</i>								
Cuscinetto lato accoppiamento <i>Shaft end bearing</i>		6200 2RS1	6202 2RS1	6204 2RS1	6205 2RS1	6307 2RS1	6209 2RS1	
Cuscinetto lato opposto <i>Opposite end bearing</i>		61900 2Z	16002 2Z	6003 2Z	6204 2Z	6205 2Z	6307 2Z	
Caratteristiche dell'opzione freno <i>Option brake features</i>								
Tipo <i>Type</i>		04*	06H	06H	07H	11E	11H	14
Coppia frenante <i>Braking torque</i>	[Nm]	1.2	3.2	3.2	11	20	40	40
Corrente assorbita <i>Nominal current</i>	[Adc]	0.33	0.50	0.50	0.64	0.89	1.0	1.46
Momento d'inerzia agg. <i>Additional inertia</i>	[x10 ⁻⁴ kgm ²]	0.14	0.5	0.5	1.37	12.1	12.1	36
Tempo di risposta in ins. <i>Insertion response time</i>	[x10 ⁻³ s]	4	29	29	73	55	73	100
Tempo di risposta in disins. <i>Fall response time</i>	[x10 ⁻³ s]	3	19	19	25	18	25	30
Peso aggiuntivo <i>Additional weight</i>	[kg]	0.3	0.3	0.3	0.6	1.9	1.5	3.5

*:Versione speciale, chiedere ad ufficio commerciale MAGNETIC

*: Special version, please contact Magnetic sales dpt.

MOTOR	Code	Stall torque ΔT=105K	Stall torque ΔT=65K	Max torque	Inertia	Maximum speed with T _{n1}	Maximum speed with 2xT _{n1}	Maximum speed with T _p	Stall current ΔT=105K	Stall current ΔT=65K	BEMF. T=20°C	Resistance T=20°C	Inductance	N° Poles	Thermal time constant	Weight
		T _{n1} [Nm]	T _{n2} [Nm]	T _p [Nm]	J [kgcm ²]	n _{max} [RPM]	n _{max2} [RPM]	n _{max3} [RPM]	I _{n1} [A _{RMS}]	I _{n2} [A _{RMS}]	E* [V/KRPM]	R* [Ohm]	L* [mH]	τ _{th} [min]	W [kg]	
BLQ 23 M	80	0.33	0.27	1.15	0.21	8000	6720	4550	1.09	0.92	20.4	15.5	33	4	15	1.5
BLQ 23 L	40	0.65	0.54	2.3	0.38	4000	3260	2000	1.07	0.85	39.1	21.3	58	4	18	2
	80					8000	7010	5070	2.0	1.57	21.1	6.4	17.1			
BLQ 33 S	81	0.6	0.5	2.1	0.5	8000	7090	5110	1.9	1.55	20.8	7.4	16.7	4	15	2.4
BLQ 33 M	40	0.9	0.78	3.1	0.75	4000	3900	2560	1.74	1.48	34.5	11.4	30.7	4	18	3.1
	81					8000	7100	5240	2.85	2.4	21.4	4.1	11.8			
BLQ 33 L	40	1.15	0.95	4	1	4000	3240	2120	1.85	1.5	41.6	10.9	33.5	4	20	3.8
	81					8000	7210	5500	3.4	2.63	21.9	2.95	9.3			
BLQ 43 S	30	0.9	0.7	2.7	1	3000	2720	1980	1.2	0.9	47	19	45	6	15	3
	60					6000	5860	4750	2.1	1.7	26	5.2	14			
BLQ 43 M	30	1.8	1.4	5.4	2	3000	2840	2220	2.3	1.8	50	6.9	25	6	22	4
	45					4500	3830	3030	3.2	2.6	38	4.1	14			
BLQ 43 L	30	2.6	2	7.8	3	3000	2500	1950	3.0	2.4	57	5.1	22	6	29	5
	45					4500	3940	3210	4.4	3.5	39	2.3	10.2			
BLQ 43 P	30	3.2	2.5	9.6	4	3000	2940	2400	4.1	3.1	52	2.7	14	6	36	6
	45					4500	3980	3310	5.2	4.0	40	1.64	8.1			
BLQ 43 X	30	3.8	3	11.4	5	3000	2820	2320	4.7	3.5	55	2.3	12.3	6	43	7
	45					4500	4050	3390	6.4	4.8	40	1.2	6.5			
BLQ 63 S	30	5.2	4.3	15.6	7	3000	2090	1490	6.8	5.6	53	1.5	17	6	45	10.5
	50					5000	3370	2450	10.4	8.5	34	0.65	6.9			
BLQ 63 M	21	7.6	6	22.8	10.5	2000	1350	950	6.8	5.4	80	1.87	25	6	50	13
	30					3000	2000	1440	9.6	7.6	56	0.94	12.4			
BLQ 63 L	25	10	7.9	30	14	2500	1650	1190	10.1	8.0	69	0.96	14.1	6	55	16
	30					3000	2040	1480	12.5	9.9	56	0.63	9.5			
BLQ 63 P	20	12	9.5	36	17.5	2000	1360	970	10.1	8.0	83	1.07	17	6	60	18.5
	26					2500	1700	1230	12.5	9.8	70	0.70	11			
BLQ 83 S	25	11.5	8.4	35	26	2500	1900	1330	12.3	9.1	60	0.55	11	6	60	20
	30					3000	2260	1590	15.2	11.2	50	0.38	7.8			
BLQ 83 M	20	16	11.9	48	38	2000	1520	1070	14.9	10.8	74	0.47	11.5	6	67	25
	25					2500	1960	1400	18.1	13.1	60	0.30	7.3			
BLQ 83 L	20	21.5	16	65	50	2000	1510	1080	18.0	12.6	79	0.35	9.2	6	74	30
	30					3000	2310	1670	27.2	19.0	53	0.15	4.1			
BLQ 83 P	15	27	20	81	62	1500	1230	880	18.0	12.6	99	0.41	11	6	81	35
	25					2500	1880	1360	27.3	19.1	66	0.18	4.9			
BLQ 103 S	20	32	23	96	120	2000	1350	950	30.0	21.3	74	0.16	6.7	6	85	52
	25					2500	1650	1160	35.6	25.3	61	0.11	4.6			
BLQ 103 M	16	41	29	123	160	1600	1110	790	28.9	20.6	98	0.19	8.1	6	90	60
	23					2300	1550	1120	40.0	28.5	71	0.10	4.2			
BLQ 103 L	13	50	36	150	200	1300	920	660	28.7	20.1	123	0.22	9.5	6	95	68
	18					1800	1290	940	39.7	27.8	89	0.12	4.9			
BLQ 103 P	11	59	43	177	240	1100	790	580	28.0	19.0	148	0.25	10.9	6	100	76
	15					1500	1110	810	39.0	26.5	107	0.14	5.7			
BLQ 103 X	13	68	49	204	280	1300	950	690	39.8	25.5	124	0.15	6.4	6	105	84
	20					2000	1410	1030	57.0	36.5	86	0.07	3.1			

* Tolleranza ± 8%

* Tolerance ± 8%

MOTOR	Code	Stall torque $\Delta T=105K$	Stall torque $\Delta T=65K$	Max torque	Inertia	Maximum speed with T_{n1}	Maximum speed with $2T_{n1}$	Maximum speed with T_p	Stall current $\Delta T=105K$	Stall current $\Delta T=65K$	BEMF. $T=20^{\circ}C$	Resistance $T=20^{\circ}C$	Inductance	N° Poles	Thermal time constant	Weight
		T_{n1} [Nm]	T_{n2} [Nm]	T_p [Nm]	J [kgcm ²]	n_{max} [RPM]	n_{max2} [RPM]	n_{max3} [RPM]	I_{n1} [A _{RMS}]	I_{n2} [A _{RMS}]	E^* [V/KRPM]	R^* [Ohm]	L^* [mH]		τ_{th} [min]	W [kg]

BLQ 44 S	60	0.9	0.7	2.7	1	6000	5310	4220	1.2	0.9	46	19	45	6	15	3
BLQ 44 M	30	1.8	1.4	5.4	2	3000	2420	1850	1.2	1.0	95	26.4	89	6	22	4
	60					6000	5150	4220	2.3	1.8	51	6.9	25			
BLQ 44 L	30	2.6	2	7.8	3	3000	2750	2210	1.8	1.5	91	12.6	53	6	29	5
	60					6000	5320	4430	3.2	2.6	51	4.1	17			
BLQ 44 P	30	3.2	2.5	9.6	4	3000	2770	2250	2.3	1.7	92	9.0	43	6	36	6
	60					6000	5260	4410	4.1	3.2	52	2.7	13.7			
BLQ 44 X	30	3.8	3	11.4	5	3000	2710	2200	2.8	2.1	95	7.0	37	6	43	7
	60					6000	5560	4700	5.2	4.0	50	1.9	10			

BLQ 64 S	30	5.2	4.3	15.6	7	3000	2320	1620	4.3	3.5	84	3.8	41	6	45	10.5
	51					5000	3590	2530	6.5	5.3	56	1.7	18.2			
BLQ 64 M	30	7.6	6	22.8	10.5	3000	2340	1640	6.4	5.1	84	2.1	28	6	50	13
	40					4000	2860	2020	7.6	6.1	70	1.5	19.5			
	50					5000	3690	2630	9.6	7.6	56	0.94	12			
BLQ 64 L	30	10	7.9	30	14	3000	2140	1510	7.4	5.9	94	1.8	26	6	55	16
	40					4000	3000	2130	10.1	8.0	69	0.96	14			
	50					5000	3660	2610	12.4	9.8	56	0.63	9.5			
BLQ 64 P	26	12	9.5	36	17.5	2500	1850	1310	7.7	6.1	109	1.8	29	6	60	18.5
	30					3000	2170	1530	9.1	7.2	94	1.3	21			
	40					4000	2950	2100	12.1	9.6	70	0.73	11.9			
	50					5000	3850	2750	15.5	12.3	55	0.45	7.2			

BLQ 84 S	25	11.5	8.4	35	26	2500	1810	1280	6.9	5.1	106	1.66	35	6	60	20
	30					3000	2120	1490	8.2	6.1	91	1.22	25.5			
	40					4000	2780	1980	10.4	7.7	70	0.76	15.4			
BLQ 84 M	25	16	11.9	48	38	2500	1900	1350	10.2	7.4	106	0.93	22.3	6	67	25
	30					3000	2220	1580	12.1	8.8	90	0.66	16.5			
	40					4000	2980	2130	16.2	11.7	68	0.38	9.2			
BLQ 84 L	25	21.5	16	65	50	2500	1870	1350	13.2	9.3	110	0.65	17.4	6	74	30
	30					3000	2320	1680	16.0	11.2	90	0.44	11.6			
	40					4000	3010	2180	20.6	14.4	70	0.26	7			
BLQ 84 P	20	27	20	81	62	2000	1500	1080	13.2	9.3	138	0.77	21	6	81	35
	30					3000	2430	1770	20.6	14.4	88	0.31	8.5			
	40					4000	3210	2340	27.2	19.0	67	0.18	4.9			

BLQ 104 S	23	32	23	96	120	2300	1590	1100	19.8	14.1	111	0.37	15.0	6	85	52
	30					3000	2030	1410	25.8	18.3	87	0.22	9.1			
BLQ 104 M	18	41	29	123	160	1800	1290	910	19.2	13.7	148	0.44	18.1	6	90	60
	28					2800	1960	1380	28.9	20.6	98	0.19	8.1			
BLQ 104 L	15	50	36	150	200	1500	1070	770	18.9	13.2	186	0.50	21.3	6	95	68
	23					2300	1640	1170	28.7	20.1	123	0.22	9.4			
	28					2800	2310	1660	39.2	27.4	89	0.12	4.9			
BLQ 104 P	12	59	43	177	240	1200	920	660	18.7	12.7	223	0.57	24.4	6	100	76
	19					1900	1410	1020	28.0	19.0	148	0.25	10.9			
	26					2600	1970	1430	38.7	26.3	107	0.14	5.7			
BLQ 104 X	16	68	49	204	280	1600	1210	880	28.7	18.4	173	0.28	12.2	6	105	84
	20					2000	1690	1220	39.8	25.5	125	0.15	6.4			

* Tolleranza $\pm 8\%$

Le coppie di stallo si riferiscono a regime termico raggiunto (a caldo) con motore montato orizzontale accoppiato su flangia, non raffreddata, di dimensioni analoghe alla flangia motore.

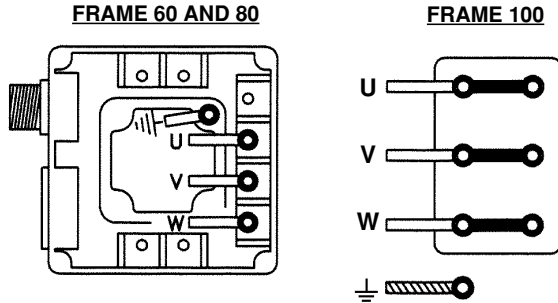
* Tolerance $\pm 8\%$

Stall torque data refer to horizontal motor which are coupled to a noncooled flange having dimensions similar to the motor flange.

Collegamenti

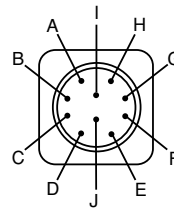
Connections

POWER CONNECTIONS WITH TERMINAL BOX



RESOLVER CONNECTOR

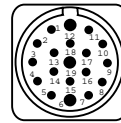
FOR FRAME 30+100



- A V RIF
- B COS
- C SEN
- D
- E V RIF (0V)
- F SCHERMO
- G COS (0V)
- H SEN (0V)
- I
- J } THERMOPROTECTOR

TYPE: MS 3102 A 18-1P WITH MS 3106 A 18-1S

FOR FRAME 20

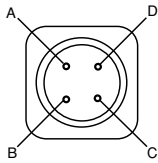


- 1 V RIF
- 2 COS
- 3 SEN
- 4
- 5 V RIF (0V)
- 6 SCHERMO
- 7 COS (0V)
- 8 SEN (0V)
- 9
- 10 } THERMOPROTECTOR

TYPE: HUMMEL 7410017010 WITH 7101617040

POWER CONNECTORS

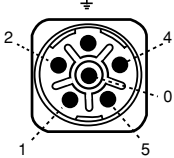
FOR FRAME 30+80



- A U
- B V
- C W
- D GROUND

FRAME 30, 40, 50 E 60: MS 3102 A 18-10P WITH MS 3106 F 18-10S
 FRAME 80: MS 3102 A 22-22P WITH MS 3106 F 22-22S

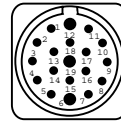
FOR FRAME 20



- 1 U
- 2 V
- 0 GROUND
- 4
- 5
- 6 W

TYPE: HUMMEL 7601006010 WITH 7550506020

ENCODER CONNECTOR



HENGSTLER S21	HEIDENHAIN EQN 1325	ELTRA EF36-EF49
1 A+	A+	A+
2 A-	A-	A-
3 R+ (Z)	+ DATA	Z
4 D- (ref COS)		U
5 C+ (ref COS)	+ CLOCK	V
6 C- (ref COS)		V-
7 0V	0V	0V
8 } THERMOPROTECTOR		
9 } THERMOPROTECTOR		
10 Up +5V (Vdc)	Up +5V (Vdc)	+ Vdc
11 B+	B+	B+
12 B-	B-	B-
13 R- (Z)	- DATA	Z-
14 D+ (ref COS)	- CLOCK	U-
15 0V sensor	0V sensor	W-
16 +5V sensor	+5V sensor	W
17 SHIELD	SHIELD	SHIELD

TYPE: HUMMEL 7410017010 WITH 7101617040

FREE CABLES

POWER CABLE

- RED U
- BLACK V
- WHITE W
- YELLOW-GREEN GROUND

RESOLVER CABLE

- RED-WHITE VRIF
- YELLOW-WHITE VRIF (0)
- RED COS
- BLACK COS (0)
- YELLOW SEN
- BLUE SEN (0)
- SHIELD SHIELD
- WHITE THERM.
- WHITE THERM.

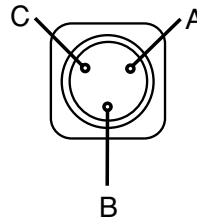
BRAKE CABLE

- RED POSITIVE (+)
- BLUE NEGATIVE (-)

ENCODER EF36/49 CABLE

- RED +Vdc
- BLACK 0 Volt
- GREEN Ch A
- BROWN Ch A-
- YELLOW Ch B
- PINK or ORANGE Ch B-
- BLUE Ch Z
- WHITE Ch Z-
- MARKED "S" SHIELD
- GRAY Ch U
- RED-BLUE Ch U-
- VIOLET Ch V
- WHITE-GREEN Ch V-
- GRAY-PINK Ch W
- BROWN-GREEN Ch W-
- MARKED "T" } THERMOPROTECTOR
- MARKED "T" } THERMOPROTECTOR

BRAKE CONNECTORS



- A NEGATIVE (-)
- B
- C POSITIVE (+)

TYPE: MS 3102 R10 SL-3P WITH MS 3106 F10 SL-3P

Servomotori per applicazioni ad altissima dinamica

Very high dynamic servomotors



Questa serie di servomotori è stata sviluppata specialmente per applicazioni dove è richiesto un elevatissimo rapporto coppia/inerzia, come ad esempio nei settori del packaging e alimentare.

Trattasi quindi di servomotori brushless con valori di inerzia e dimensioni molto inferiori rispetto alle esecuzioni più diffuse presenti sul mercato. Questo è possibile con un'esecuzione a 8 poli e la particolare soluzione elettromagnetica adottata. Sono definiti per una tensione di alimentazione max (V_{ca}) pari a $3 \times 205 V_{RMS}$ (tensione di rete $3 \times 230V$) i tipi TOP 20-40-50 e BLQ 86-89 mentre per tensione V_{ca} pari a $3 \times 345 V_{RMS}$ (tensione di rete $3 \times 400V$) i tipi TOP 41-51 e BLQ 87-90.

Le dimensioni meccaniche delle due serie sono le stesse.

Per applicazioni che richiedono elevate coppie continuative anche ad alte velocità (regolazione a coppia costante), è disponibile l'esecuzione ventilata del BLQ 86, 87, 89 e 90.

These servomotors series has been developed especially for applications where a very high torque/inertia ratio is required, for example in food and packaging machines. The inertia values and the dimensions of these servomotors are in fact considerably lower than those of the most diffused executions present on the market. This is possible through an execution at 8 poles and the particular electromagnetic solution adopted.

The max supply voltage (V_{ac}) for the TOP 20-40-50 and BLQ 86-89 types is $3 \times 205 V_{RMS}$ (mains $3 \times 230V$), while the TOP 41-51 and BLQ 87-90 are designed for $V_{ac} = 3 \times 345 V_{RMS}$ (mains $3 \times 400V$). The mechanical dimensions of these two series are the same.

For applications that require high continuous torques even at high speed (constant torque regulation) the execution with fan is available for BLQ 86, 87, 89 and 90.

Motore tipo <i>Motor type</i>		TOP 20	TOP 40 TOP 41	TOP 50 TOP 51	BLQ 86 BLQ 87	BLQ 89 BLQ 90		
Caratteristiche dei cuscinetti <i>Bearings data</i>								
Cuscinetto lato accoppiamento <i>Shaft end bearing</i>		6200 2RS1	6204 2RS1	6205 2RS1	6307 2RS1	6307 2RS1		
Cuscinetto lato opposto <i>Opposite end bearing</i>		61900 2Z	6003 2Z	6203 2Z	6205 2Z	6205 2Z		
Caratteristiche dell'opzione freno <i>Option brake features</i>								
Tipo <i>Type</i>		04*	06H	07H	11E	11H	11E	11H
Coppia frenante <i>Braking torque</i>	[Nm]	1.2	3.2	11	20	40	20	40
Corrente assorbita <i>Nominal current</i>	[Adc]	0.33	0.50	0.64	0.89	1.0	0.89	1.0
Momento d'inerzia agg. <i>Additional inertia</i>	[$\times 10^{-4} \text{kgm}^2$]	0.14	0.50	1.37	12.1	12.1	12.1	12.1
Tempo di risposta in ins. <i>Insertion response time</i>	[$\times 10^{-3} \text{s}$]	4	29	73	55	73	55	73
Tempo di risposta in dis. <i>Fall response time</i>	[$\times 10^{-3} \text{s}$]	3	19	25	18	25	18	25
Peso aggiuntivo <i>Additional weight</i>	[kg]	0.3	0.3	0.6	1.9	1.5	1.9	1.5

* Versione speciale, chiedere ad ufficio commerciale MAGNETIC

*: Special version, please contact Magnetic sales dept.

3x205 Vrms

MOTOR	Code	Stall torque $\Delta T=105K$	Stall torque $\Delta T=65K$	Max torque	Inertia	Maximum speed with T_{n1}	Maximum speed with $2xT_{n1}$	Maximum speed with T_p	Stall current $\Delta T=105K$	Stall current $\Delta T=65K$	BEMF. $T=20^{\circ}C$	Resistance $T=20^{\circ}C$	Inductance	N° Poles	Thermal time constant	Weight
		T_{n1} [Nm]	T_{n2} [Nm]	T_p [Nm]	J [kgcm ²]	n_{max} [RPM]	n_{max2} [RPM]	n_{max3} [RPM]	I_{n1} [A _{RMS}]	I_{n2} [A _{RMS}]	E^* [V/KRPM]	R^* [Ohm]	L^* [mH]	τ_{th} [min]	W [kg]	
TOP 20 M	80	0.50	0.41	1.5	0.21	8000	7370	6450	1.54	1.24	22.9	6.6	14.5	4	15	1.5
TOP 20 L	40	1.00	0.82	3.0	0.38	4000	3720	3120	1.68	1.36	42.2	8.8	24.6	4	18	2.0
	80					8000	7580	6730	3.23	2.61	22.9	2.4	7.2			
TOP 40 M	40	2.5	2.0	7.5	0.77	4000	2870	1980	3.88	3.05	41.1	2.7	16.7	8	20	3.5
TOP 40 L	40	3.5	2.8	10.5	1.05	4000	3160	2230	5.55	4.37	40.3	1.5	10.4	8	24	4.7
TOP 50 M	40	5.5	4.4	16.5	2.2	4000	3440	2430	9.98	7.86	37.0	0.5	5.5	8	25.0	5.7
TOP 50 L	40	7.8	6.6	23.4	3	4000	3450	2430	14.25	1.88	36.5	0.3	4.0	8	28.0	7.3
BLQ 86 S	20	9	7.3	27	11	2000	1510	1050	9.7	7.7	68	0.84	17.6	6	57	18
	30					3000	2180	1520	13.8	11.0	48	0.42	8.8			
	40					4000	2960	2070	18.5	14.7	36	0.23	4.9			
BLQ 86 M	20	13	10.5	39	16	2000	1390	980	12.1	9.6	79	0.57	15	6	63	22
	30					3000	2330	1650	19.6	15.5	49	0.22	5.7			
	40					4000	3150	2240	26.1	20.7	36	0.12	3.2			
BLQ 86 L	25	17	13.5	51	21	2500	1750	1240	19.3	15.0	65	0.25	7.6	6	68	26
	33					3300	2360	1680	25.6	19.9	49	0.14	4.3			
	40					4000	2850	2030	30.7	23.9	41	0.094	3			
BLQ 86 P	20	21	17	63	26	2000	1380	980	18.8	14.9	82	0.31	9.7	6	74	30
	30					3000	2260	1610	30.2	24.0	51	0.12	3.8			
	40					4000	2870	2050	37.7	29.9	41	0.075	2.4			
BLQ 86 X	17	25	20	75	31	1700	1160	830	18.7	14.7	98	0.35	11.4	6	80	34
	27					2700	1940	1390	29.8	23.4	61	0.13	4.4			
	33					3300	2440	1760	37.3	29.2	49	0.084	2.8			
BLQ 89 S	20	22.5	19	67	18	2000	1810	1480	16.29	13.55	90.7	0.35	4.4	8	55	23.5
	30					3000	2790	2310	24.33	20.24	60.5	0.16	2.0			
BLQ 89 M	20	34.0	28	102	24	2000	1830	1500	24.62	19.97	90.9	0.20	2.9	8	60	30
	30					3000	2710	2240	36.03	29.22	62.5	0.092	1.4			

3x345 Vrms

MOTOR	Code	Stall torque $\Delta T=105K$	Stall torque $\Delta T=65K$	Max torque	Inertia	Maximum speed with T_{n1}	Maximum speed with $2xT_{n1}$	Maximum speed with T_p	Stall current $\Delta T=105K$	Stall current $\Delta T=65K$	BEMF. $T=20^{\circ}C$	Resistance $T=20^{\circ}C$	Inductance	N° Poles	Thermal time constant	Weight
		T_{n1} [Nm]	T_{n2} [Nm]	T_p [Nm]	J [kgcm ²]	n_{max} [RPM]	n_{max2} [RPM]	n_{max3} [RPM]	I_{n1} [A _{RMS}]	I_{n2} [A _{RMS}]	E^* [V/KRPM]	R^* [Ohm]	L^* [mH]	τ_{th} [min]	W [kg]	
TOP 41 M	40	2.5	2.0	7.5	0.77	4000	3210	2210	2.57	2.02	62.4	6.1	38.6	8	20	3.5
TOP 41 L	40	3.5	2.8	10.5	1.05	4000	3540	2510	3.69	2.91	60.8	3.3	23.7	8	24	4.7
TOP 51 M	40	5.5	4.4	16.5	2.2	4000	2900	2040	5.07	4.00	73.0	2.0	21.5	8	25	5.7
TOP 51 L	40	7.8	6.6	23.4	3	4000	2970	2090	7.17	5.98	71.4	1.14	15.2	8	28	7.3
BLQ 87 S	20	9	7.3	27	11	2000	1300	890	5.1	4.1	131	3.10	66	6	57	18
	30					3000	2030	1410	7.6	6.0	88	1.37	29			
	40					4000	2660	1860	9.7	7.7	68	0.84	17.6			
BLQ 87 M	15	13	10.5	39	16	1500	1120	780	5.8	4.6	165	2.48	65	6	63	22
	30					3000	1970	1390	9.7	7.7	97	0.87	23			
	40					4000	3050	2180	14.4	11.4	65	0.41	10			
BLQ 87 L	20	17	13.5	51	21	2000	1490	1060	9.6	7.5	129	1.01	30	6	68	26
	30					3000	2200	1550	14.6	11.4	86	0.44	14			
	40					4000	3030	2170	19.3	15.0	65	0.25	7.6			
BLQ 87 P	15	21	17	63	26	1500	1160	820	9.6	7.6	164	1.22	38	6	74	30
	25					2500	1790	1280	14.3	11.3	109	0.54	17			
	35					3500	2410	1720	18.8	14.9	82	1.31	9.7			
BLQ 87 X	15	25	20	75	31	1500	990	700	9.3	7.3	196	0.36	45	6	80	34
	20					2000	1530	1090	14	11.0	130	0.61	20			
	30					3000	2060	1490	18.3	14.3	98	0.35	11.4			
BLQ 90 S	20	22.5	19	67	18	2000	1830	1500	9.8	8.1	151	1.00	12	8	55	23.5
	30					3000	2990	2620	16.3	13.6	90.7	0.35	4.4			
BLQ 90 M	20	34.0	28	102	24	2000	1970	1610	16.2	13.1	142	0.46	7.2	8	60	30
	30					3000	2990	2620	24.6	20.0	90.9	0.20	2.9			

* Tolleranza $\pm 8\%$

Le coppie di stallo si riferiscono a regime termico raggiunto (a caldo) con motore montato orizzontale accoppiato su flangia, non raffreddata, di dimensioni analoghe alla flangia motore.

* Tolleranza $\pm 8\%$

Stall torque data refer to horizontal motor which are coupled to a noncooled flange having dimensions similar to the motor flange.

Opzioni

- **Trasduttore di posizione:** il motore è fornito completo di resolver o encoder alloggiato nello scudo per protezione contro gli urti accidentali. Sono disponibili i seguenti tipi:

Motore tipo	Resolver size 15 Sine-Cosine wave; 2 poles; trasformation ratio 0.5	Resolver size 21 Sine-Cosine wave; 2 poles; trasformation ratio 0.5	Encoder ELTRA type EF36 Incremental signals A, A and B, B 1024 ppr; commutation signals; zero pulse; 5VDC; Line driver	Encoder ELTRA type EF49 Incremental signals A, A and B, B 2048 ppr; commutation signals; zero pulse; 5VDC; Line driver	Encoder Hengstler type S21 Sinusoidal 2048 ppr 1Vpp signals; Sine/Cosine 1 period absolute waves/rev.; zero pulse; 5VDC	Encoder Heidenhain type EQN 1325 Absolute multiturn (4096 rev.) position on 13 bits; sinusoidal 2048 ppr 1Vpp signals; EnDat01; 5VDC
BLQ 23	✓		✓			
BLQ 33	✓		✓			
BLQ 43-44		✓		✓	✓	✓
BLQ 63-64		✓		✓	✓	✓
BLQ 83-84		✓		✓	✓	✓
BLQ 103-104		✓		✓	✓	✓
TOP 20	✓		✓			
TOP 40-41		✓		✓	✓	✓
TOP 50-51		✓		✓	✓	✓
BLQ 86-87		✓		✓	✓	✓
BLQ 89-90		✓		✓	✓	✓

- **Freno:** di stazionamento e/o di emergenza a magneti permanenti incorporato nel motore lato accoppiamento; chiude per caduta di tensione. Alimentazione a 24 Vcc. Sono disponibili per le taglie 60 ed 80 freni potenziati come riportato nelle tabelle. A causa della potenza dissipata dal freno si consideri un declassamento del 5% della coppia di stallo del motore.

- **Predisposizione encoder:** fornibile a richiesta può essere completa di giunto e lanterna di accoppiamento previsti per gli encoder di maggior diffusione.

- **Angus:** il motore può essere fornito su richiesta dell'anello paraolio. Va montato solo se è previsto un accoppiamento in bagno d'olio.

- **Collegamenti:** per il BLQ 23 ed il TOP 20 l'esecuzione standard prevede cavi liberi con lunghezza 0.4 m, mentre per i motori BLQ 33-43-44 e TOP40-41-50-51 è previsto il collegamento con connettori di tipo MS sia per la potenza che per il resolver; sulle restanti taglie è prevista la scatola morsettiera con basetta per la potenza e connettore per il resolver.

A richiesta è possibile prevedere:

- per BLQ 23 e TOP 20 connettori all'estremità dell'uscita cavi standard
- per BLQ 63-64-83-84-86-87-89-90 i connettori direttamente sul corpo del motore quindi senza scatola morsettiera.
- per BLQ 63-64-83-84-86-87-89-90 la scatola può essere dotata di pressacavo (PG11 o 3/4" GAS) o di connettore per la potenza. I connettori sono sempre forniti completi di parte fissa e volante.

- **Accoppiamento:** le dimensioni della flangia d'accoppiamento di ogni motore sono in conformità alla normativa UNEL 13501-69 e sono riportate a pag. 12,13,14 e 15. Per i motori BLQ 23-33 e TOP20 la tolleranza di concentricità e perpendicolarità tra albero e flangia si diversifica dalla normativa ed è rispettivamente di 0.08 mm e 0.13 mm.

A richiesta è disponibile quale esecuzione speciale:

- per BLQ 23-33 E TOP 20 flangia con tolleranza di concentricità e perpendicolarità tra albero e flangia in conformità alla normativa UNEL 13501-96
- per BLQ 43-44: flangia F75 (N=60; M=75) UNEL13501-69 tutte le altre dimensioni, con o senza freno, sono uguali a quelle riportate nell'esecuzione con freno
- per BLQ 43-44-63-64: flangia F115 (N=95; M=115) UNEL 13501-69 tutte le altre dimensioni rimangono inalterate.

- **Protezioni:** l'esecuzione standard prevede le protezioni in IP54 mentre a richiesta sono possibili in IP55.

- **Verniciatura:** i motori vengono verniciati con fondo epossidico (colore nero opaco o in alternativa, a richiesta, di colore grigio RAL7031) atto a ricevere qualsiasi tipo di smalto di finitura. A richiesta è possibile prevedere cicli di verniciatura speciali.

Optionals

- **Position transducer:** the motor is equipped with resolver or encoder located inside rear shield to protect it from accidental impacts. Following types are available:

- **Brake:** an emergency brake with permanent magnets can be built in the driving end side of the motor; it brakes when the voltage drops. Power supply: 24Vdc. For frames 60 and 80, increased torque special types are available. Because of the power losses generated by the brake, the stall torque value must be derated of 5%.

- **Encoder preparation:** it may be supplied on request together with a coupling and a flange suitable for most encoders.

- **Angus:** the oil seal may be supplied with the motor on request. It is assembled only when the coupling is oil-bath lubricated.

- **Connections:** the standard execution of BLQ 23 and TOP20 servomotors foresee free cables 0.4 m long while the BLQ 33,43-44 and TOP40,41,50,51 foresee MS connectors both for the power and for the resolver. For the other sizes it is foreseen as standard a terminal box with a terminal block for the power and a connector for the resolver.

On request, it is possible to supply:

- for BLQ 23 and TOP 20 connectors at the end of standard cables output
- for BLQ 63-64-83-84-86-87-89-90 the connectors directly on the motor body, therefore without terminal box
- for BLQ 63-64-83-84-86-87-89-90, the terminal box may include also a gland (PG11 or 3/4" GAS) or a connector for the power. The connectors are always supplied complete of male and mating.

- **Coupling:** the dimensions of the coupling flange of each motor are indicated at page 12,13,14 and 15 according to UNEL 13501-69 norms. For BLQ 23-33 and TOP 20 the tolerance of concentricity and perpendicularity between shaft and flange is different from the norm and is respectively 0.08 mm and 0.13 mm.

On request it is available as special execution:

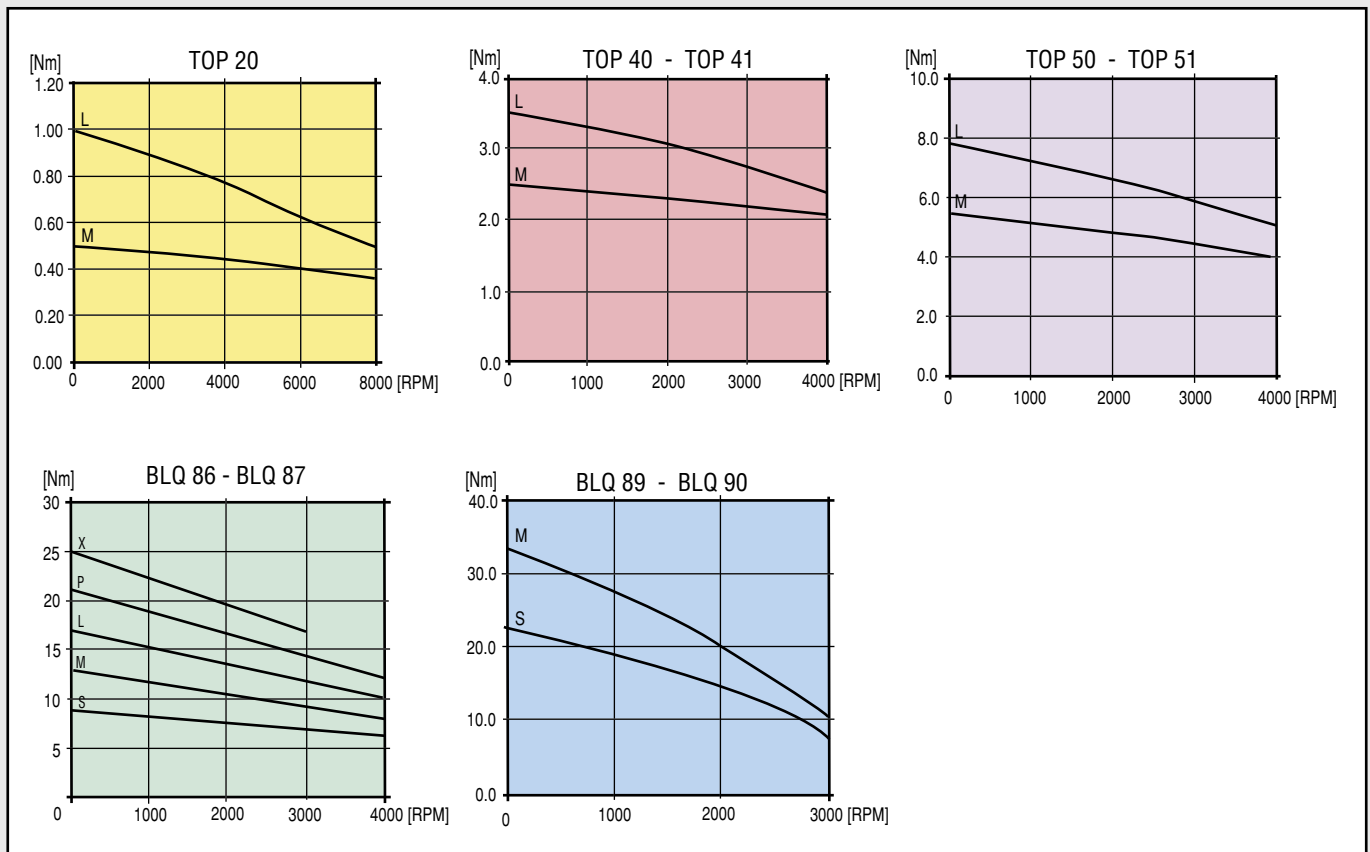
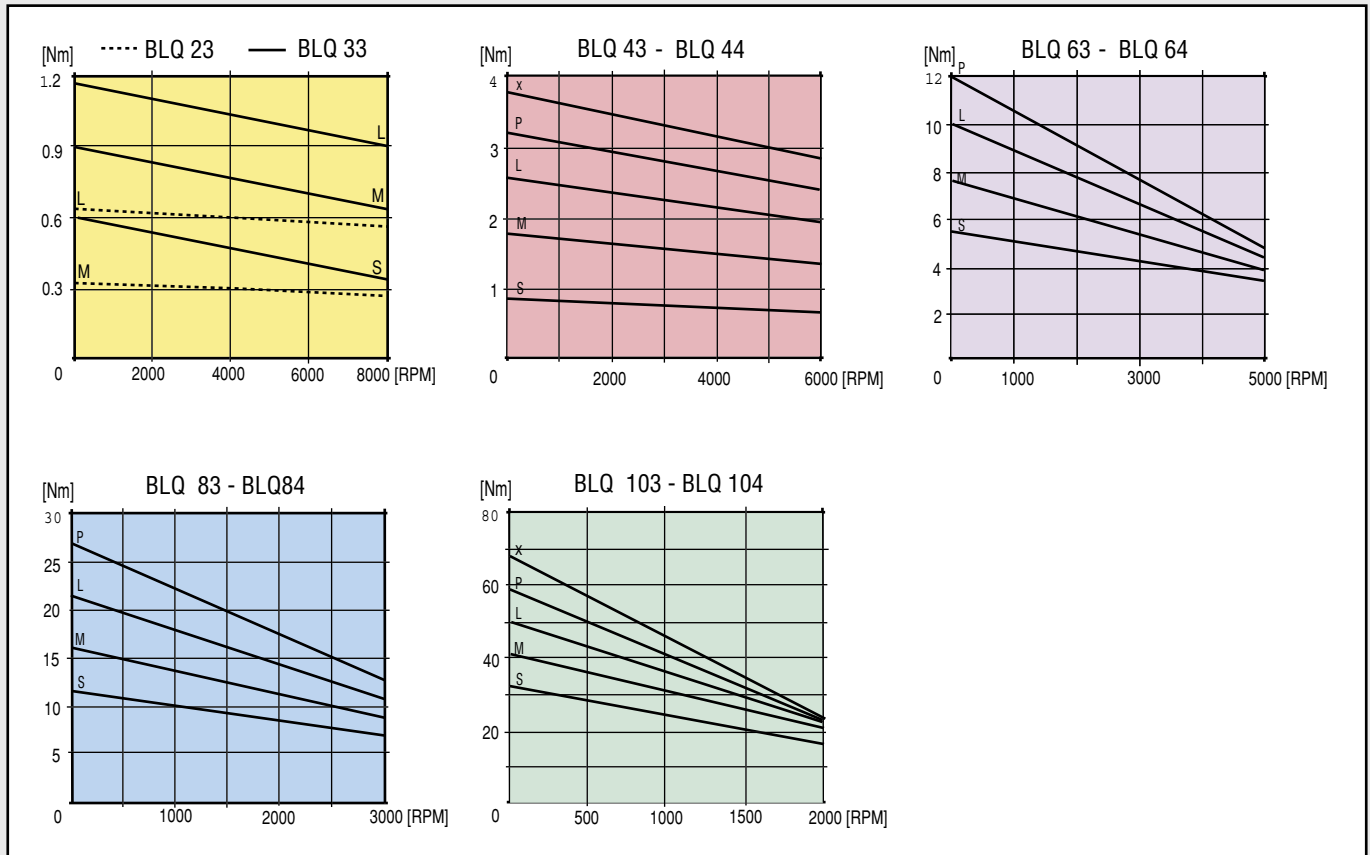
- for BLQ 23-33 and TOP20 the tolerance of concentricity and perpendicularity between shaft and lange in according to UNEL13501-69 norm
- for BLQ 43-44: flange F75 (N=60; M=75) UNEL 13501-69 all dimensions, with brake or without brake, are the same as standard brake version on tablet
- for BLQ 43-44-63-64: flange F115 (N=95; M=115) UNEL 13501-69 with the same dimensions.

- **Protections:** Normally in IP54, it is available on request in IP55.

- **Painting:** Pretreatments for external surface of motor and preliminary painting with epoxy bicomponent primer (lustreless black as standard; grey RAL7031 on request) are foreseen, suitable for any different finishing enamel. On request, it's available special cycles of painting.

**Coppia continuativa ($\Delta T=105K$)
in funzione della velocità**

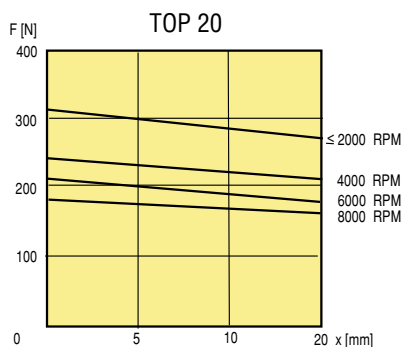
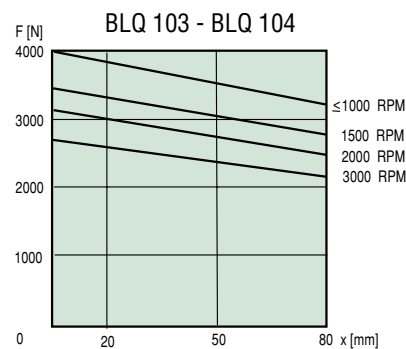
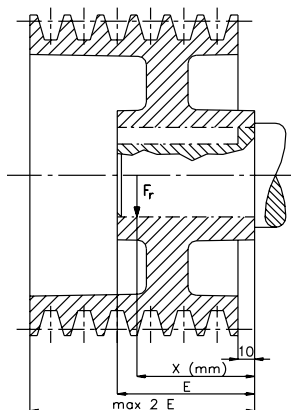
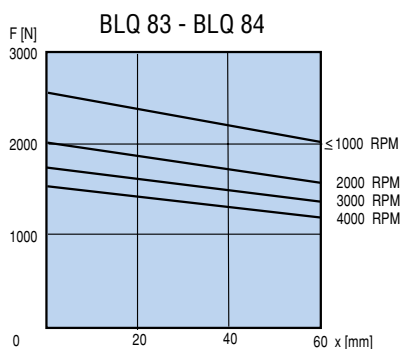
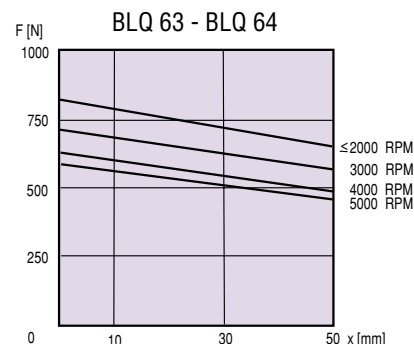
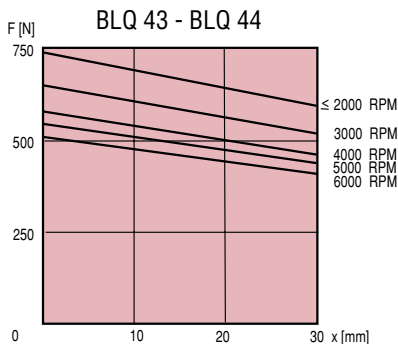
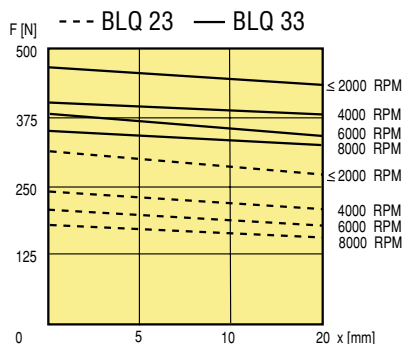
**Continuous torque ($\Delta T=105K$)
versus speed**



Carico radiale ammissibile per una durata teorica del cuscinetto lato accoppiamento di 20.000 ore

Admitted radial load for 20.000 hours theoretical life of the shaft end bearing

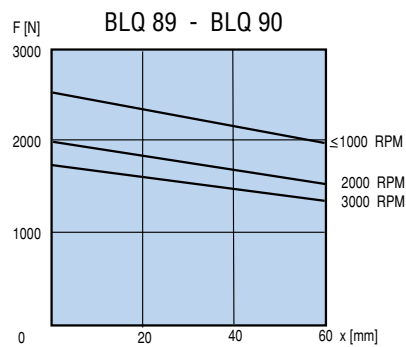
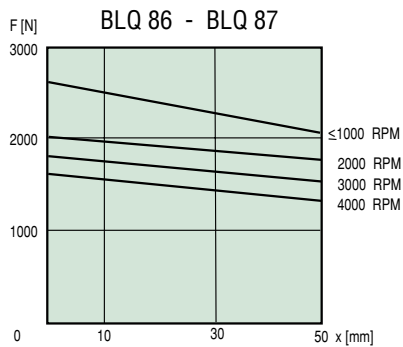
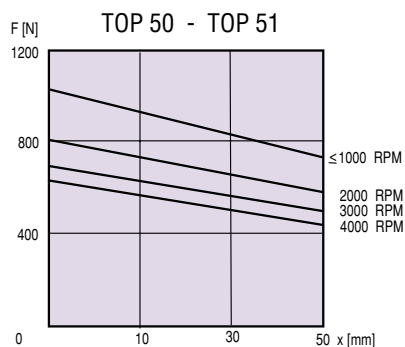
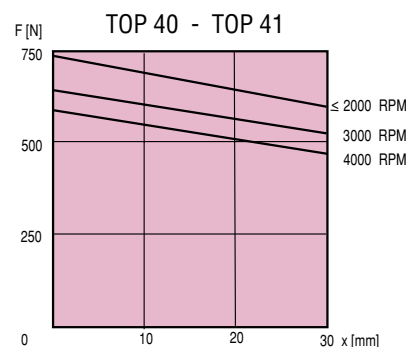
100235/A



$$FR = 2040 \times \frac{C}{D} \times k$$

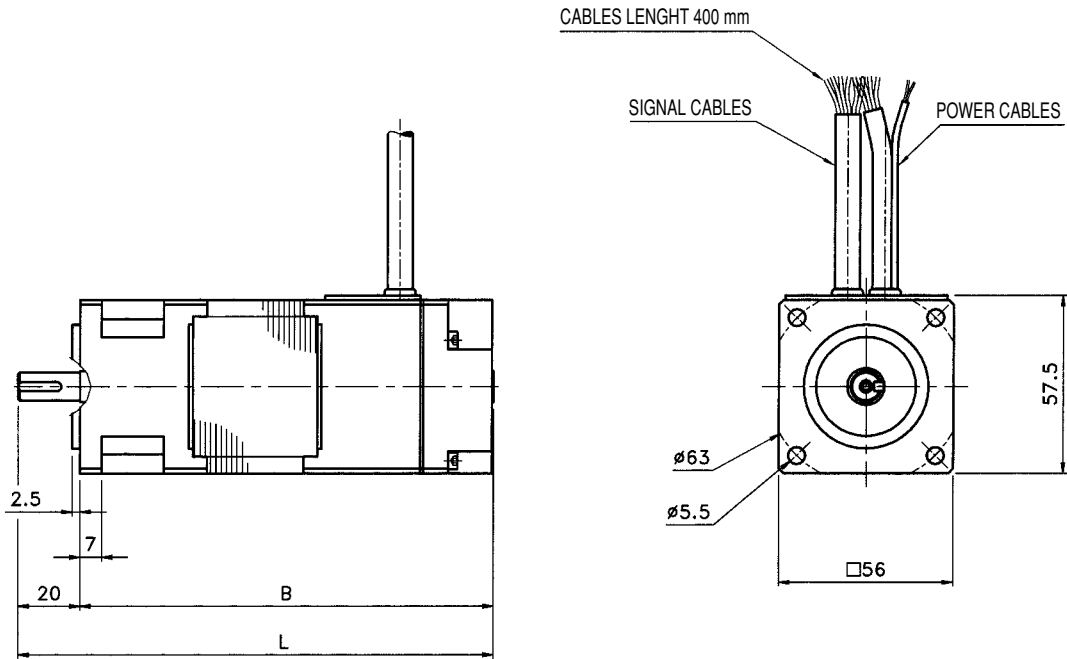
- dove:
- Fr carico radiale in (N)
 - C copia del motore in (Nm)
 - D diametro della puleggia in (mm)
 - k fattore di tensione fornito dal costruttore della puleggia e valutabile mediamente in
 - k=1 per cinghie dementelate
 - k=2.3 per cinghie trapezoidali
 - k=3.8 per cinghie piane

- where:
- Fr radial load in (N)
 - C motor torque in (Nm)
 - D pulley diameter in (mm)
 - k tensile factor specified by pulley manufacturer and corresponding about to:
 - k=1 for toothed belts
 - k=2.3 for trapezoidal belts
 - k=3.8 for flat belts

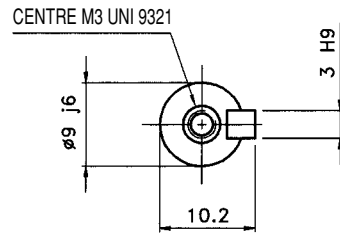


BLQ 23

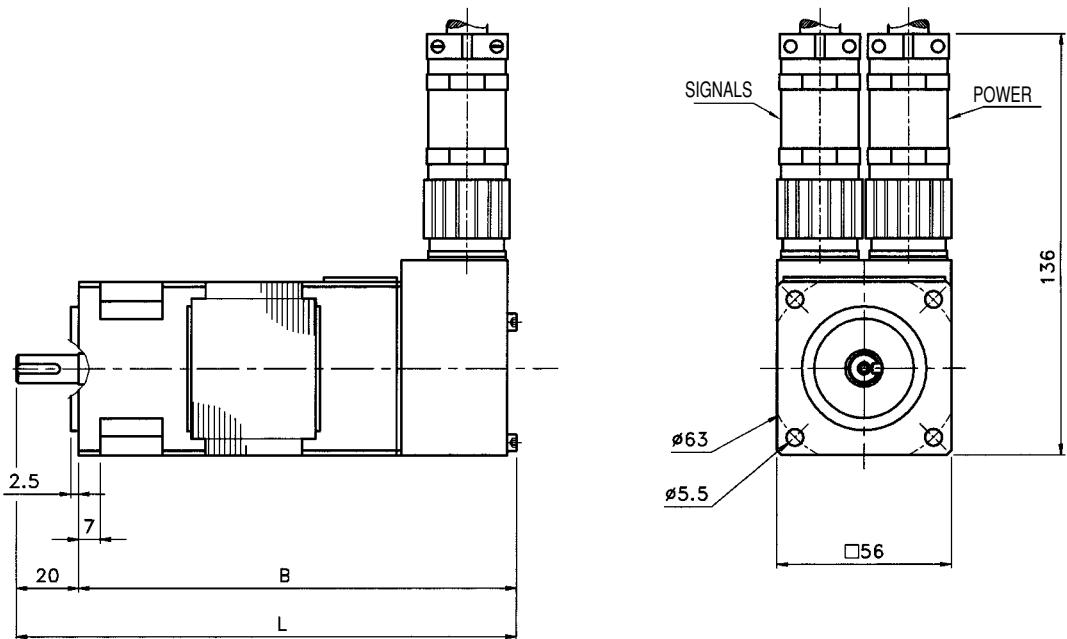
VERSION E: STANDARD EXECUTION (RESOLVER / ENCODER EF36)



		QUOTAS			
		FREE CABLES		CONNECTORS	
		B	L	B	L
LENGHT	M	133	153	141	161
	L	173	193	181	201



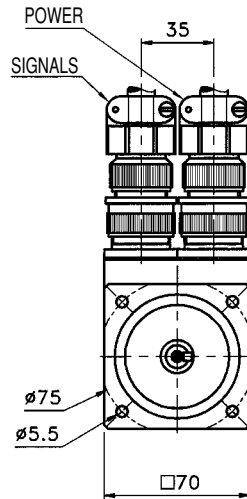
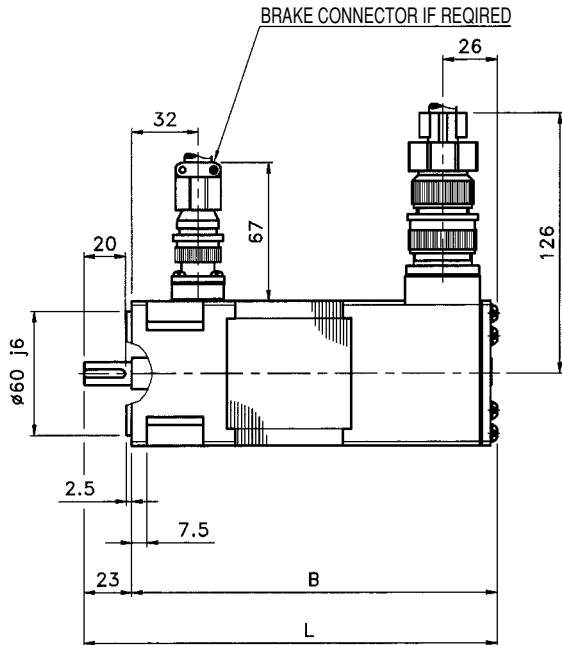
VERSION B: MOTOR WITH RADIAL MOUNTED CONNECTORS



2526/0

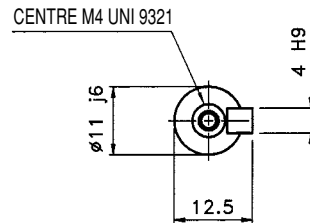
BLQ 33

VERSION B: STANDARD EXECUTION (RESOLVER / ENCODER EF36)

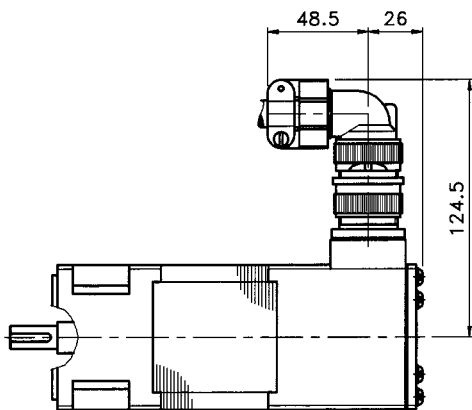


		QUOTAS	
		B	L
LENGHT	S	157	180
	M	177	200
	L	197	220

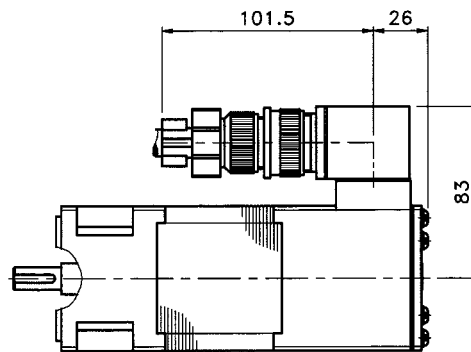
QUOTAS B-L INCREASES
28 MM IN BRAKE VERSION



VERSION C: MOTOR WITH ROTATABLE RIGHT ANGLE LINE CONNECTORS



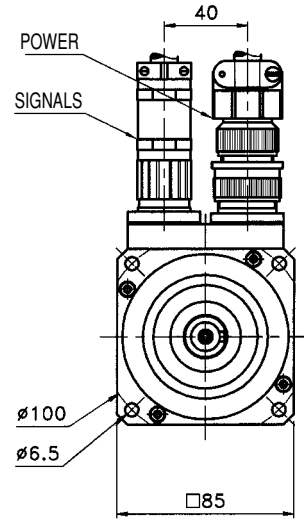
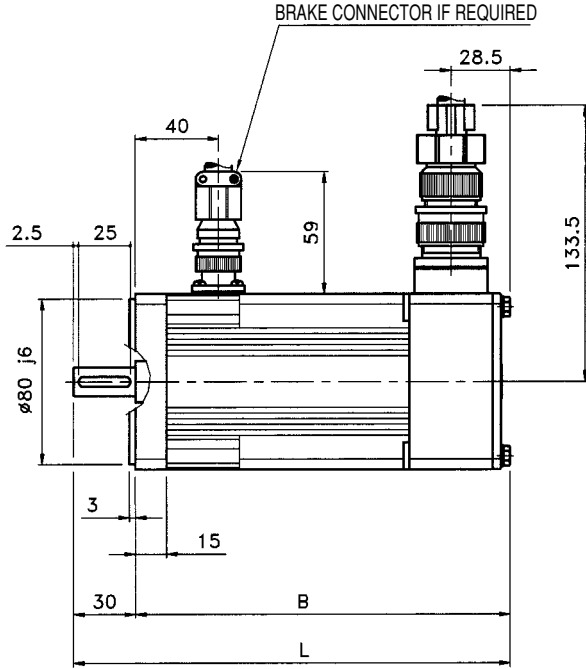
VERSION D: MOTOR WITH RIGHT ANGLE MOUNTED PANEL CONNECTORS (180° ADJUSTABLE)



2521/0

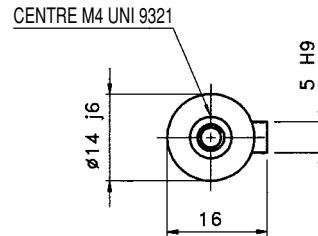
BLQ 43/44

VERSION B: STANDARD EXECUTION (RESOLVER / ENCODER S21 - EF49 - EQN1325)

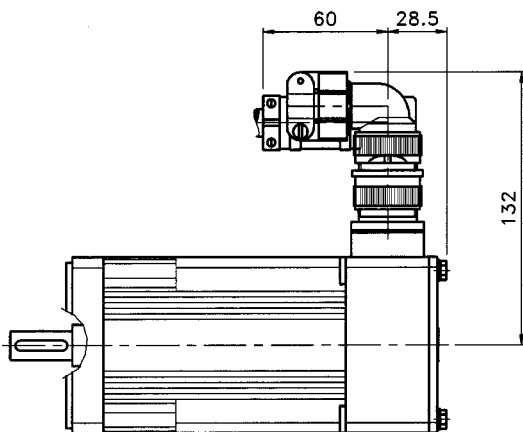


		QUOTAS	
		B	L
LENGHT	S	180	210
	M	207	237
	L	235	265
	P	262	292
	X	289	319

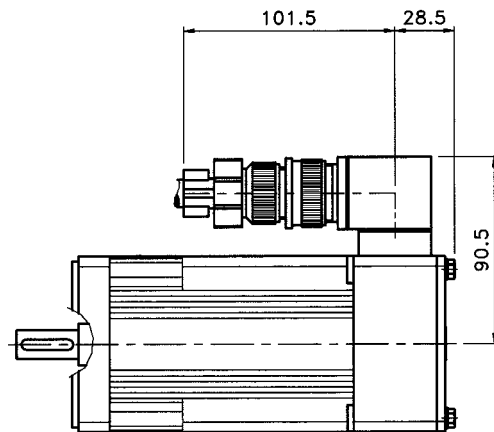
QUOTAS B-L INCREASES
27.5 MM IN BRAKE VERSION



VERSION C: MOTOR WITH ROTATABLE RIGHT ANGLE LINE CONNECTORS



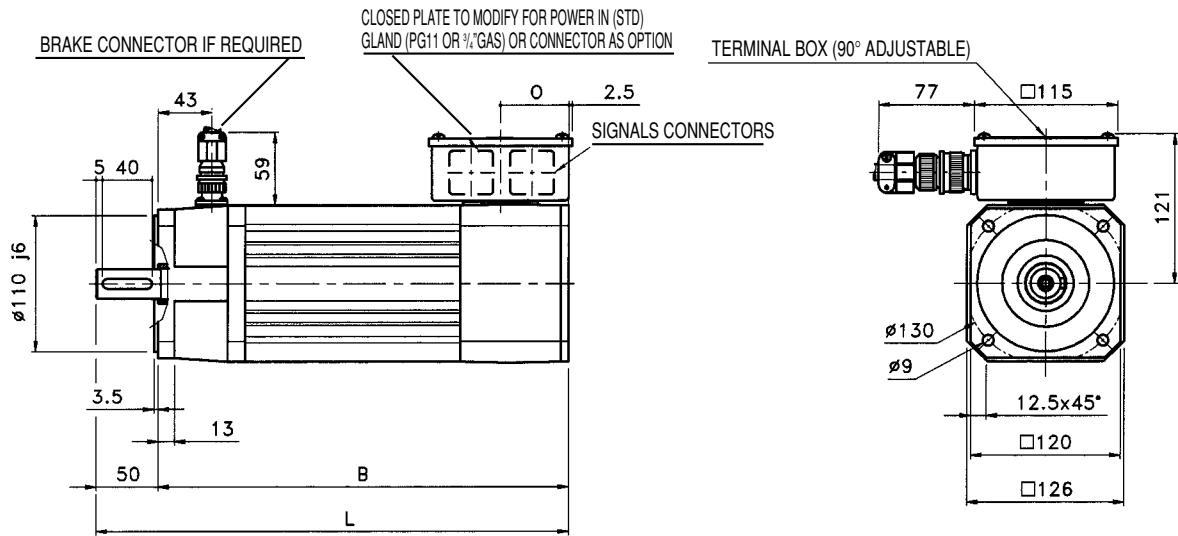
VERSION D: MOTOR WITH RIGHT ANGLE MOUNTED PANEL CONNECTORS (180° ADJUSTABLE)



2517/0

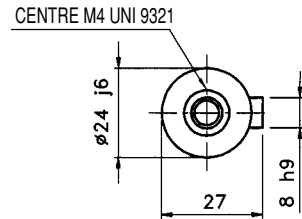
BLQ 63/64

VERSION A: STANDARD EXECUTION (RESOLVER / ENCODER S21 - EF49 - EQN1325)

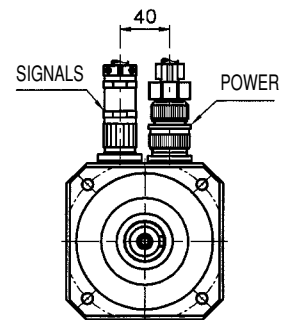
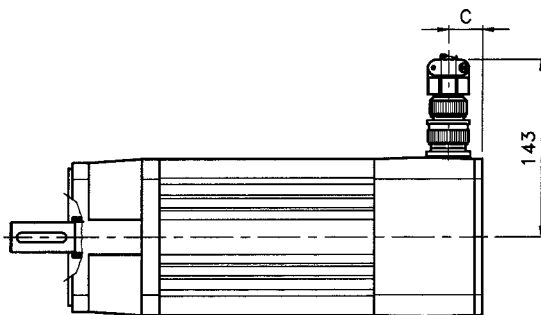


		QUOTAS							
		ENCODER EF49 / RESOLVER				ENCODER S21 / EQN1325			
LENGHT	S	263	313	55	27.5	275	325	67	39.5
	M	298	348			309	359		
	L	330	380			342	392		
	P	364	414			376	426		

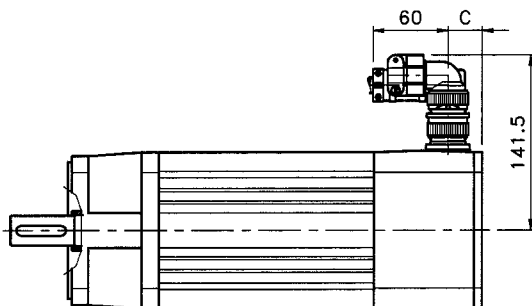
IN THE VERSION WITH BRAKE THE DIMENSIONS ARE THE SAME



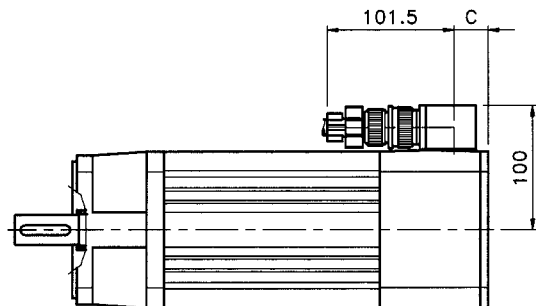
VERSION B: MOTOR WITH RADIAL MOUNTED CONNECTORS



VERSION C: MOTOR WITH ROTATABLE RIGHT ANGLE LINE CONNECTORS



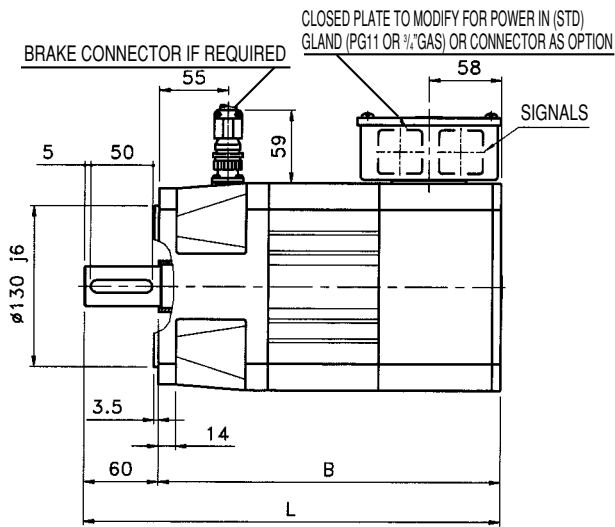
VERSION D: MOTOR WITH RIGHT ANGLE MOUNTED PANEL CONNECTORS (180° ADJUSTABLE)



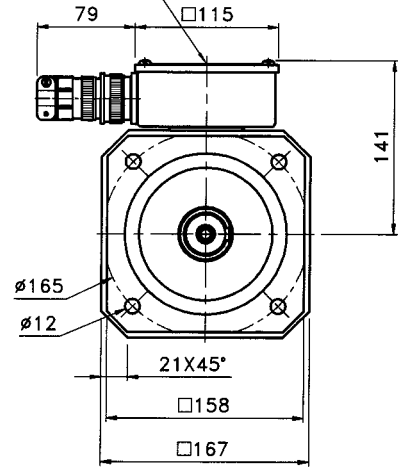
2518/0

BLQ 83/84

VERSION A: STANDARD EXECUTION (RESOLVER / ENCODER S21 - EF49 - EQN 1325)



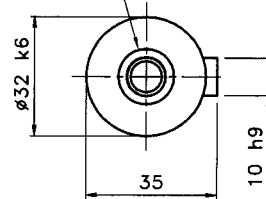
TERMINAL BOX (90° ADJUSTABLE)



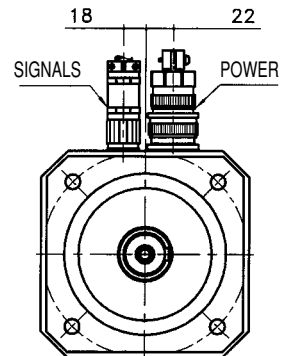
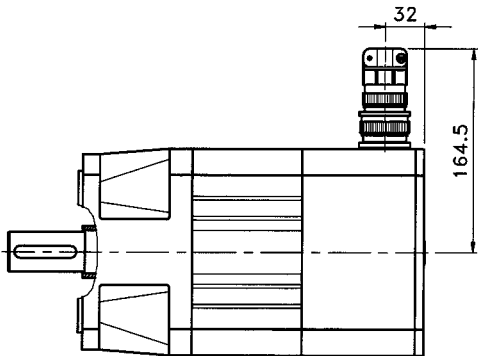
		QUOTAS	
		B	L
LENGHT	S	275	335
	M	314	374
	L	353	413
	P	391	451

QUOTAS B-L INCREASES 45 MM IN BRAKE VERSION

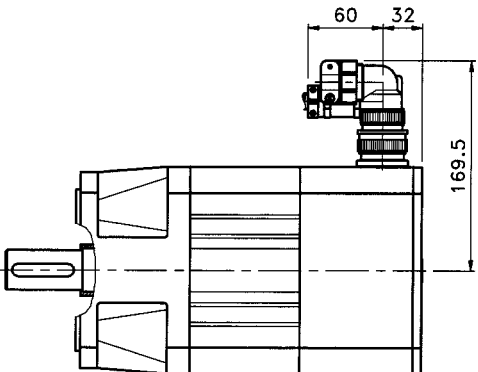
CENTRE M4 UNI 9321



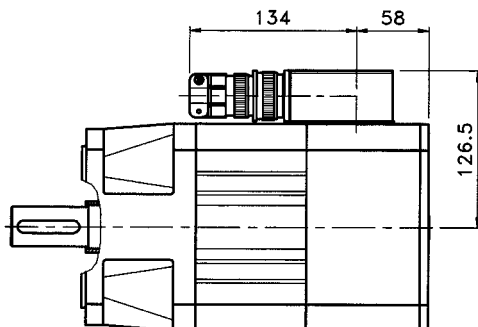
VERSION B: MOTOR WITH RADIAL MOUNTED CONNECTORS



VERSION C: MOTOR WITH ROTATABLE RIGHT ANGLE LINE CONNECTORS



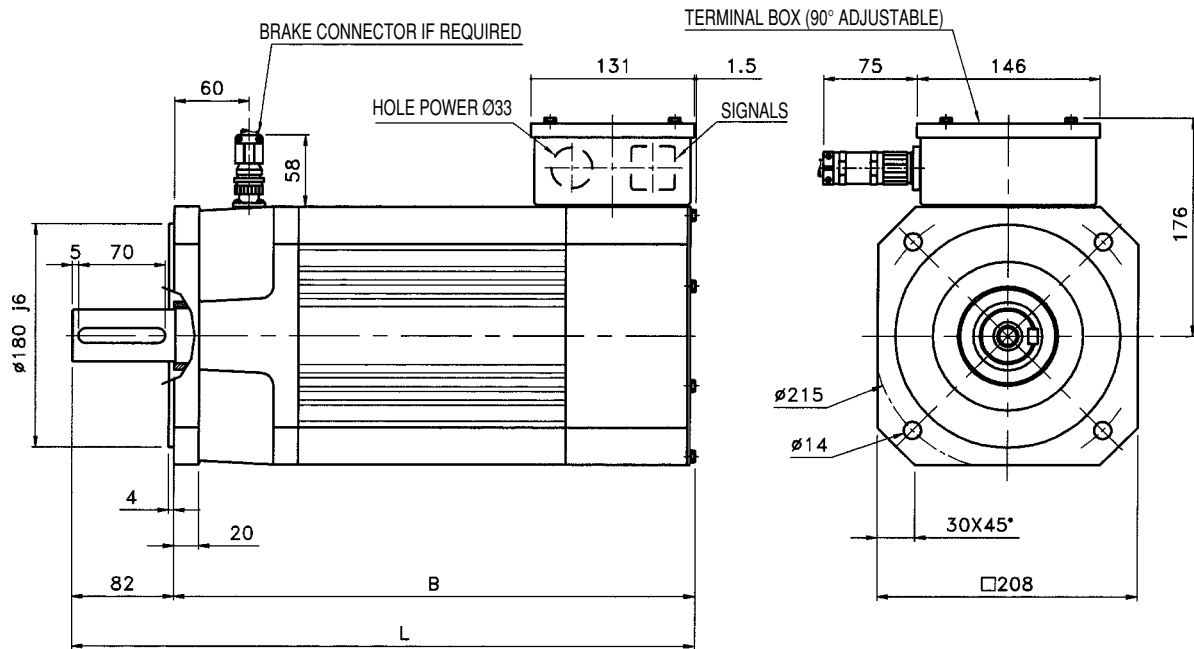
VERSION D: MOTOR WITH RIGHT ANGLE MOUNTED PANEL CONNECTORS (180° ADJUSTABLE)



2519/0

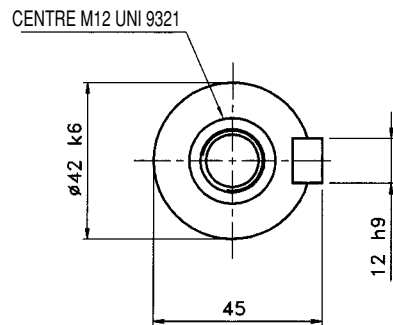
BLQ 103/104

VERSION A: STANDARD EXECUTION (RESOLVER / ENCODER S21 - EF49 - EQN 1325)



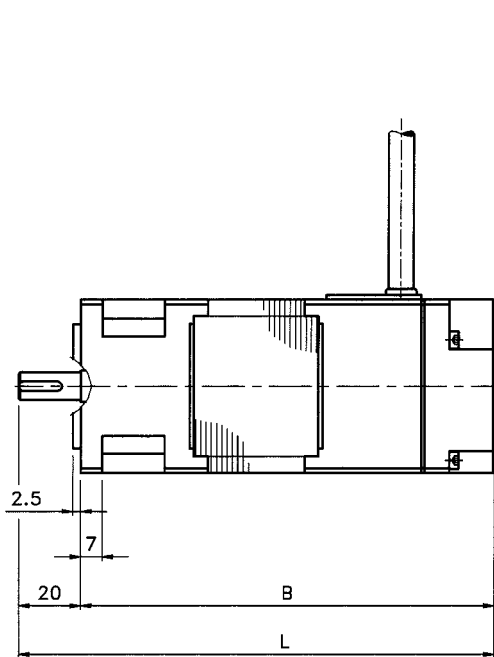
		QUOTAS	
		B	L
LENGHT	S	374	456
	M	419	501
	L	464	546
	P	509	591
	X	554	636

QUOTAS B-L INCREASES
45 MM IN BRAKE VERSION

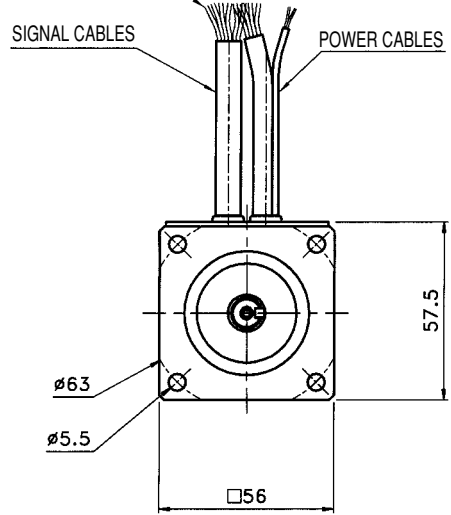


TOP 20

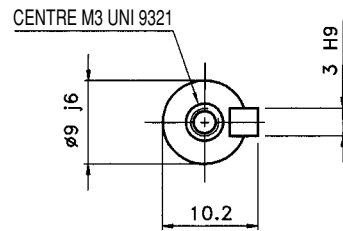
VERSION E: STANDARD EXECUTION (RESOLVER / ENCODER EF36)



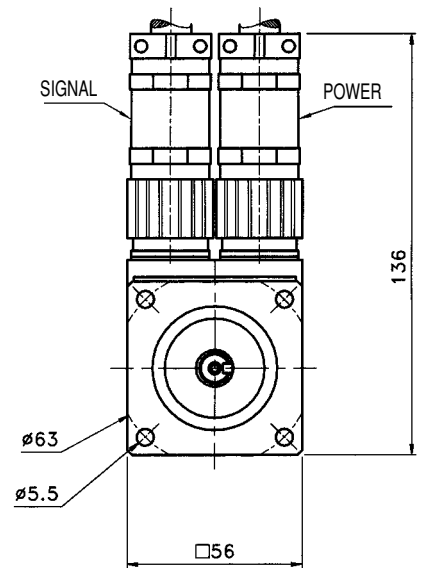
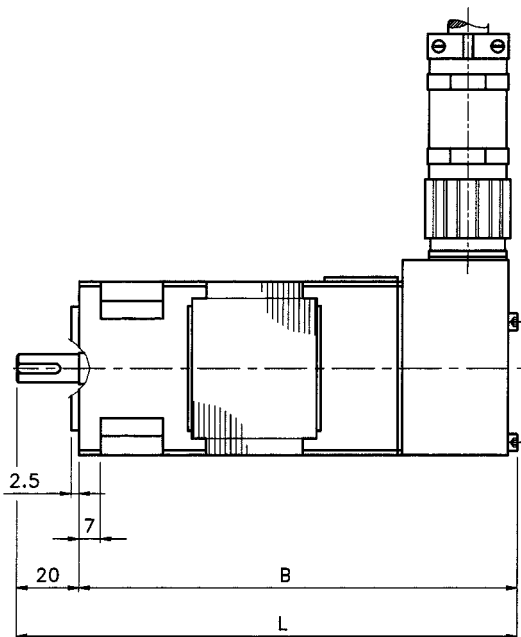
CABLES LENGHT 400 mm



		QUOTAS			
		FREE CABLES		CONNECTORS	
		B	L	B	L
LENGHT	M	133	153	141	161
	L	173	193	181	201



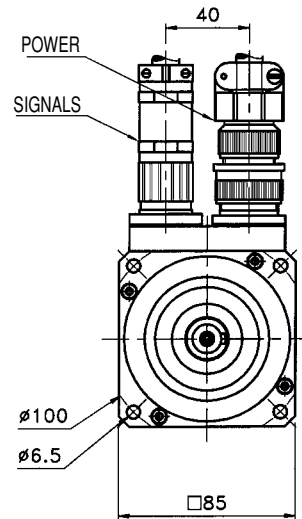
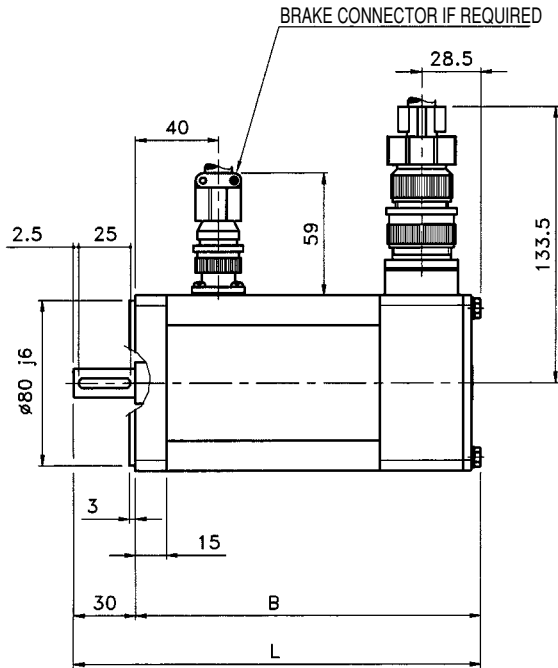
VERSION B: MOTOR WITH RADIAL MOUNTED CONNECTORS



2521/0

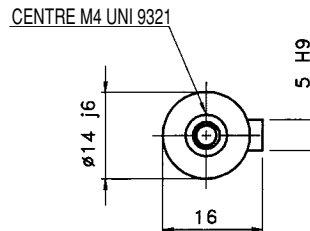
TOP 40/41

VERSION B: STANDARD EXECUTION (RESOLVER / ENCODER S21 - EF49 - EQN 1325)

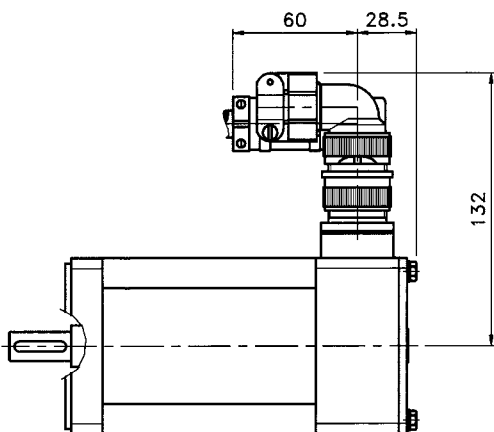


		QUOTAS	
		B	L
LENGHT	M	166	196
	L	186	216

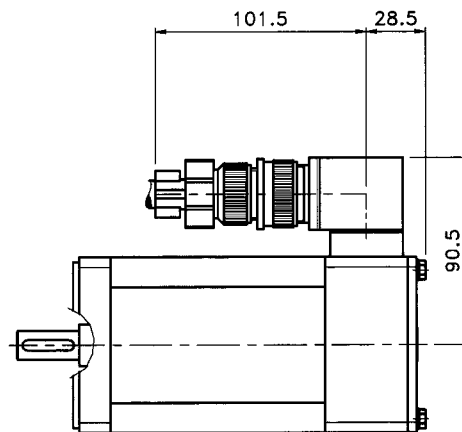
QUOTAS B-L INCREASES
44 MM IN BRAKE VERSION



VERSION C: MOTOR WITH ROTATABLE RIGHT ANGLE LINE CONNECTORS



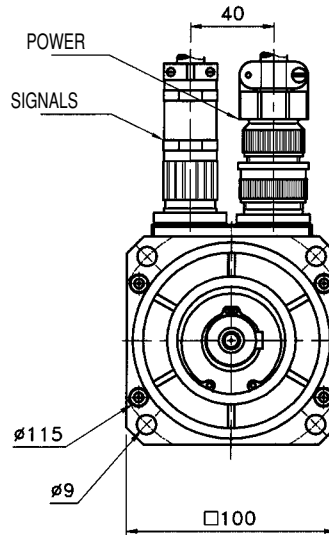
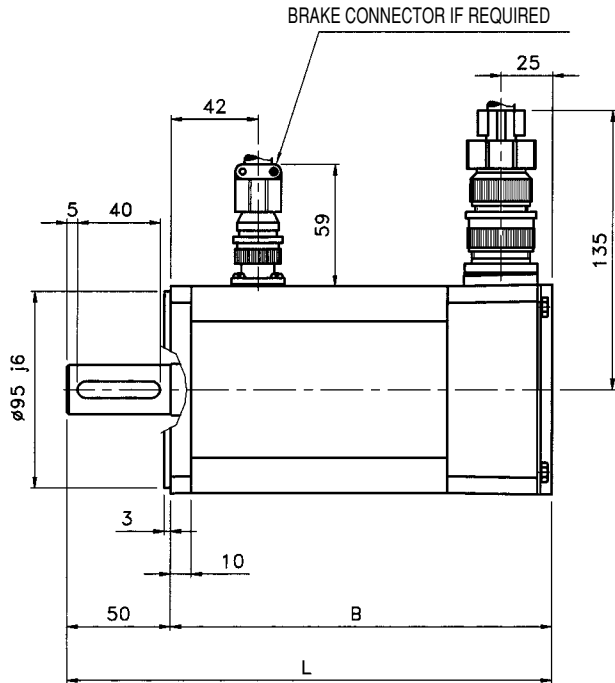
VERSION D: MOTOR WITH RIGHT ANGLE MOUNTED PANEL CONNECTORS (180° ADJUSTABLE)



2523/0

TOP 50/51

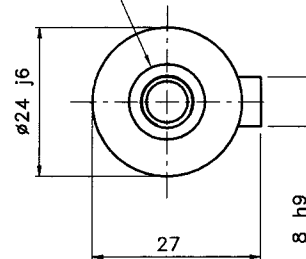
VERSION B: STANDARD EXECUTION (RESOLVER / ENCODER S21 - EF49 - EQN 1325)



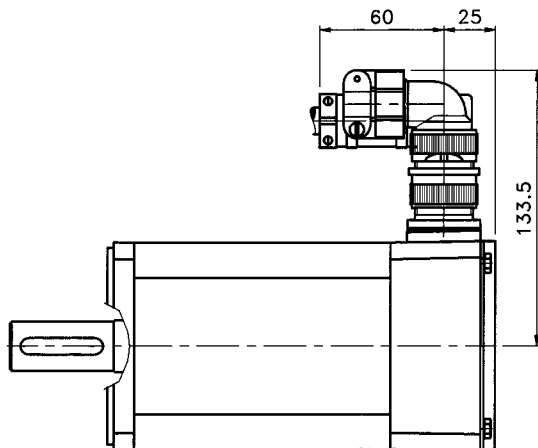
		QUOTAS	
		B	L
LENGHT	M	184	234
	L	214	264

QUOTAS B-L INCREASES
47 MM IN BRAKE VERSION

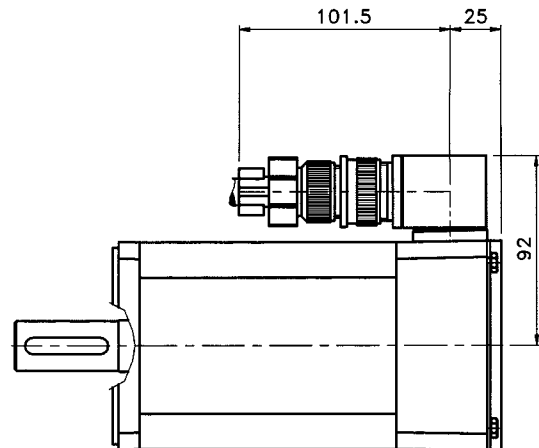
CENTRE M4 UNI 9321



VERSION C: MOTOR WITH ROTATABLE RIGHT ANGLE LINE CONNECTORS



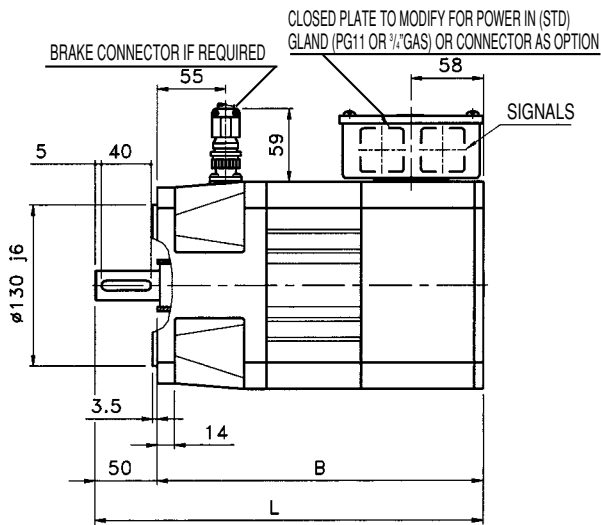
VERSION D: MOTOR WITH RIGHT ANGLE MOUNTED PANEL CONNECTORS (180° ADJUSTABLE)



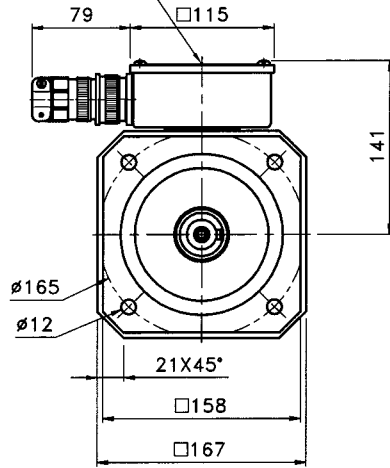
2524/0

BLQ 86/87

VERSION A: STANDARD EXECUTION (RESOLVER / ENCODER S21 - EF49 - EQN 1325)



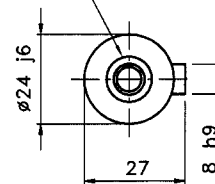
TERMINAL BOX (90° ADJUSTABLE)



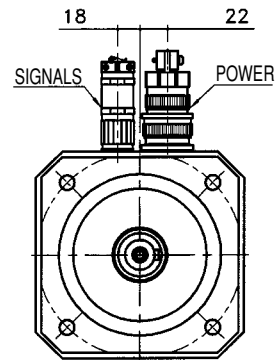
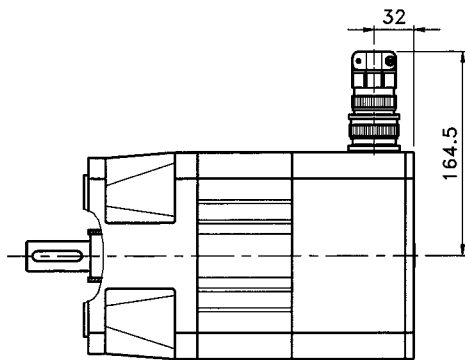
		QUOTAS	
		B	L
LENGHT	S	262	312
	M	292	342
	L	322	372
	P	352	402
	X	382	432

QUOTAS B-L INCREASES 45 MM IN BRAKE VERSION

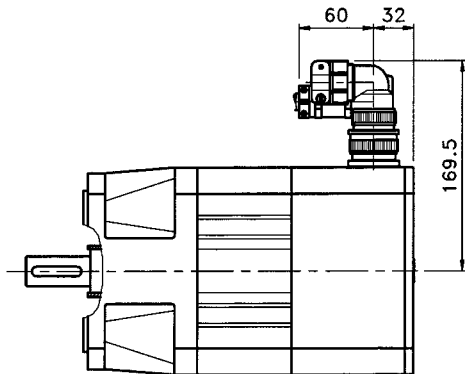
CENTRE M8 UNI 9321



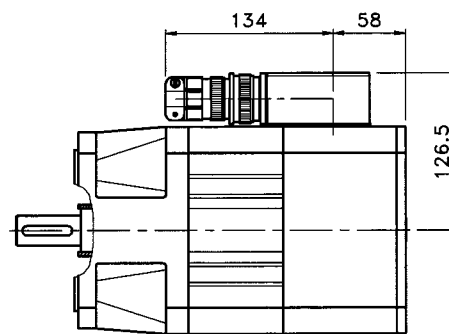
VERSION B: MOTOR WITH RADIAL MOUNTED CONNECTORS



VERSION C: MOTOR WITH ROTATABLE RIGHT ANGLE LINE CONNECTORS



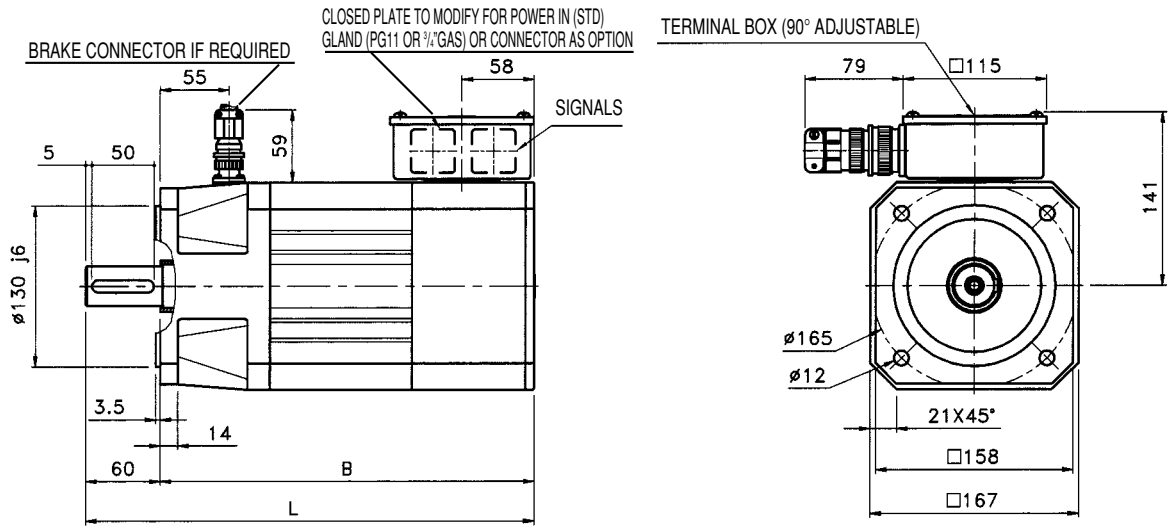
VERSION D: MOTOR WITH RIGHT ANGLE MOUNTED PANEL CONNECTORS (180° ADJUSTABLE)



2528/0

BLQ 89/90

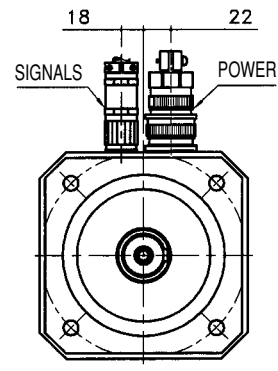
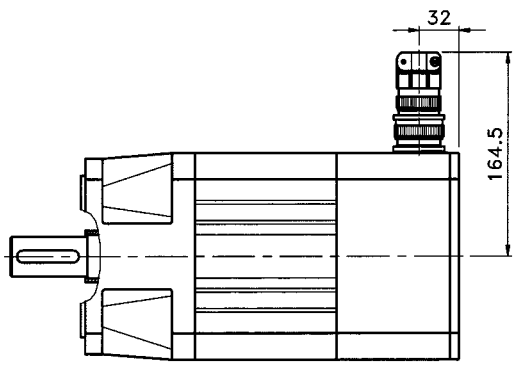
VERSION A: STANDARD EXECUTION (RESOLVER / ENCODER S21 - EF49 - EQN 1325)



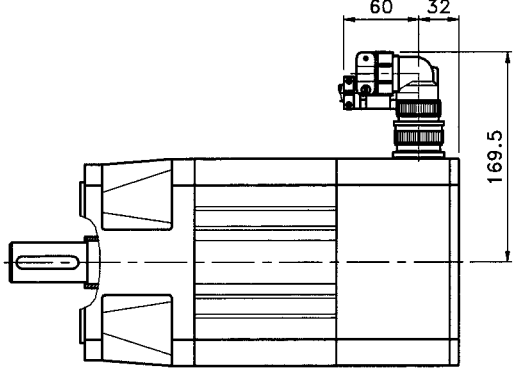
		QUOTAS	
		B	L
LENGHT	S	300	360
	M	350	410

QUOTAS B-L INCREASES
45 MM IN BRAKE VERSION

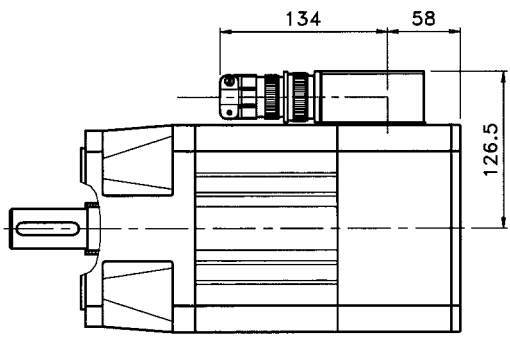
VERSION B: MOTOR WITH RADIAL MOUNTED CONNECTORS



VERSION C: MOTOR WITH ROTATABLE RIGHT ANGLE LINE CONNECTORS

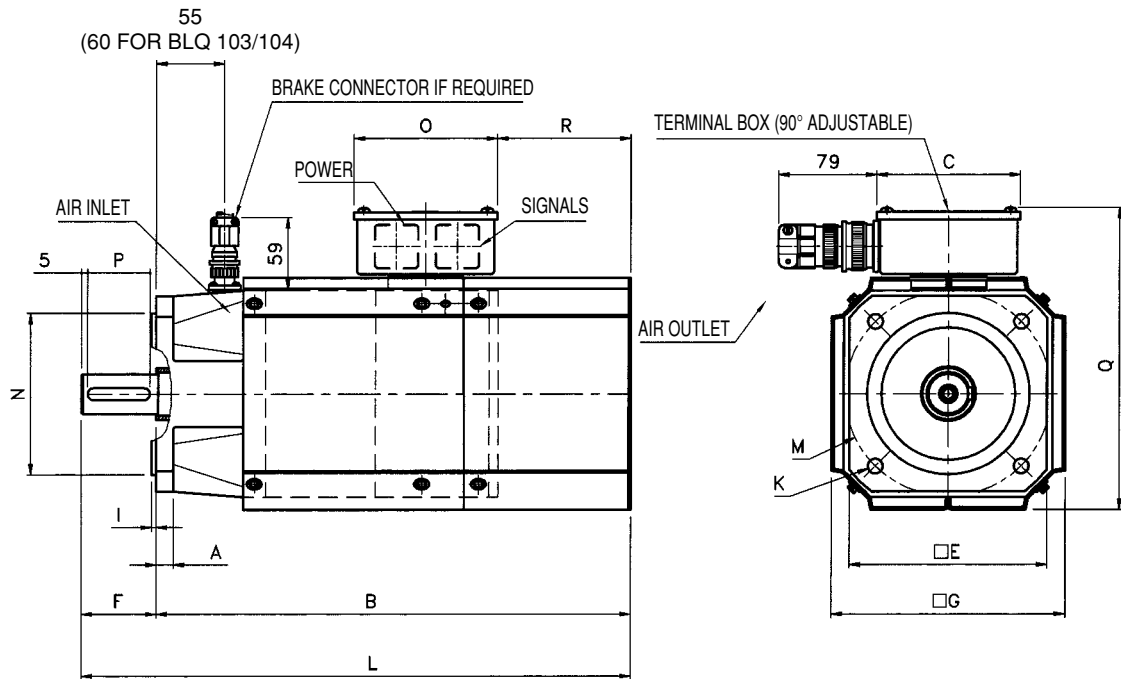


VERSION D: MOTOR WITH RIGHT ANGLE MOUNTED PANEL CONNECTORS (180° ADJUSTABLE)

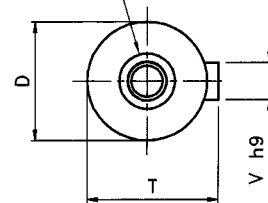


BLQ 83/84 - 86/87 - 89/90 - 103/104

VERSION A: STANDARD EXECUTION (RESOLVER / ENCODER S21 - EF49 - EQN 1325)



CENTRE M8 UNI 9321



QUOTAS

		N	M	K	I	A	F	D	V	T	d	P	B	L	O	C	R	E	G	Q	
BLQ 83/84	S												381	441							
	M	130	165	12	3.5	14	60	32 ^{h6}	10	35	M10	50	420	480	115	115	107	158	187	244	
	L												459	519							
	P												497	557							
BLQ 86/87	S												368	418							
	M	130	165	12	3.5	14	50	24 ^{h6}	8	27	M8	40	398	448	115	115	107	158	187	244	
	L												428	478							
	P												458	508							
X													488	538							
BLQ 89/90	S												406	466	115	115	107	158	187	244	
	M	130	165	12	3.5	14	60	32 ^{h6}	10	35	M10	50	456	516							
BLQ 103/104	S												468	550							
	M	180	215	14	4	20	82	42 ^{h6}	12	45	M12	70	513	595	131	146	99	208	236	312	
	L												558	640							
	P												603	685							
X													648	730							

QUOTAS B-L INCREASES 45 MM IN BRAKE VERSION

2530/0



PRODUCTION PROGRAM

DC Motors

DC Servomotors

Brushless Servomotors

Tachogenerators and centrifugal relays

DC servomotor convertors

Brushless servomotor convertors

Asynchronous vectorial motors

PROGRAMMA DI PRODUZIONE

Motori in corrente continua

Servomotori in corrente continua

Servomotori Brushless

Dinamo tachimetriche e Relè centrifughi

Convertitori per servomotori in C.C.

Convertitori per servomotori Brushless

Motori asincroni vettoriali



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