

 **MAVILOR**

INFRANOR GROUP COMPANY



## Motors

ISSUE 2001

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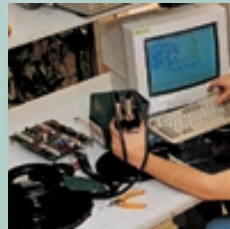
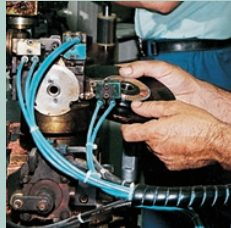
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# MAVILOR

INFRANOR GROUP COMPANY



Since its establishment in 1973, Mavilor Motors S.A. has been associated with creativity, innovation and tenacity.

Only in this way it has been possible to offer our clients the most complete range of servomotors during all these years. Servomotors, which range from plane geometry to extended geometry and brush technology to brushless technology, executed with ac or dc technology. Each one of these offers distinctive elements, which gives them their unique and exclusive characteristics.

Moreover if we associate this with a culture based on flexibility in all aspects, listening to the client, the highest level of professionalism, offering intelligent solutions, all of which allow Mavilor Motors S.A. to respond appropriately to everything that we have been entrusted with, and to satisfy our clients in their need to optimise their industrial automation applications in all types of machines and installations.

Thousands of clients every day using our servomotors confirms their confidence in us.



# DC Servo Motors MSS Series

- Ratings to 6,000 RPM.
- Compact Length.
- Zero Cogging.
- Acceleration Torques to 10 x Rated.

MAVILOR's axial air gap dish armature is specially suited for high response servo drives. High torque to inertia ratio and smooth, non cogging torque low speed velocity control makes MAVILOR the motor of choice for the most exacting applications.

The MAVILOR MSS Series servomotors provide a 20% increase in power to weight and volume ratios and a 20% increase in power rate and acceleration capability over previous designs.

Incorporating an ironless rotor design, these industrial strength motors have an extremely long brush life and high efficiency.

MAVILOR MSS Series motors incorporate options of tachometers and fail-safe holding brakes within the motor structure, and in many cases are half the length of equivalently rated conventional motors.



## Dimensions

	MSS-2	MSS-4	MSS-6	MSS-8	MSS-12	MSS-22	MSS-35	MSS-45
A	131.5	129.5		140	139.5	167.5		193
B	23		30			50		60
C	122.5	120.5		131	127.5	155.5		181
D			9					12
E	4		3.5					4.5
F (DIN 933)	M3x10		M4x16			M8x16		M10x22
G (DIN 6885)	A4x4x14		A5x5x20					A8x7x32
H	3		2					3.5
I	235	233		243.5	237.5	265.5		291
J (j6)	ø80		ø95			ø130		ø180
K (j6)	ø110		ø130		ø180	ø230		ø250
L	ø118	ø140	ø168	ø192	ø212	ø275		ø305
M	4xM6 ø100		4xM6 ø115		4xM8 ø165	4xM10 ø165		4xM12 ø215
N (h11)	ø149 □119	ø200 □154	ø210 □170	ø205 □176	ø250 □206	ø300 □258		ø350 □284
P	4xø9 ø130	4xø11 ø165	4xø11 ø180		4xø14 ø215	4xø14 ø265		4xø18 ø300
Q (h9)	4		5					8
R (g6)	11		14			24		28
S ( $\frac{0}{-0.1}$ )	12.7		16			27		31
T					ø101			
V	8			10		11		14
W	10.5	13	13.5	14		12.5		14
X			35.5					33
Z					77			



Available CSA-US certified



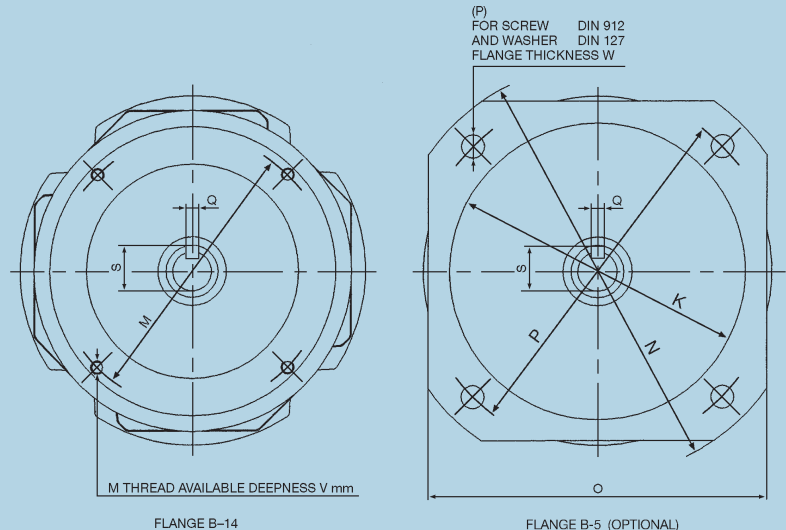
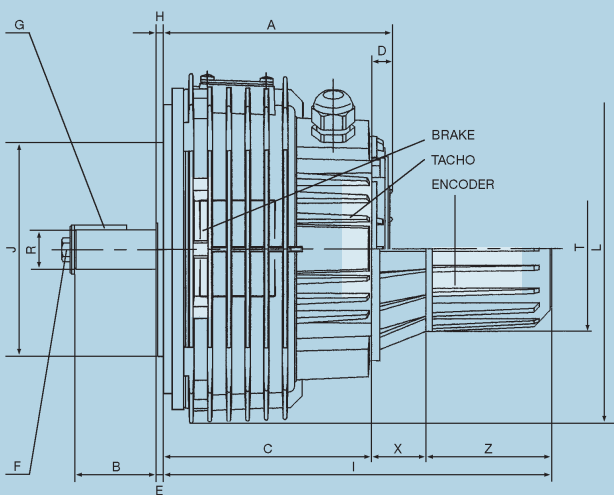
# Technical Specifications

ALL CHARACTERISTICS MEASURED AT 40°C AMBIENT TEMPERATURE EXCEPT TERMINAL RESISTANCE (25°C)				MSS-2	MSS-4	MSS-6	MSS-8	MSS-12	MSS-22	MSS-35	MSS-45
	SYMBOLS	UNITS									
RATED SPEED	n	rpm		3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
RATED VOLTAGE ±5%	U	V		39.4	67	67.8	89.7	106.7	181	200	224
RATED CURRENT	I	A		6.5	7.8	10.7	10.7	14	16	19.5	21
RATED OUTPUT POWER (1)	P	W		190.3	397	575	805	1,240	2,573	3,525	4,274
EFFICIENCY	$\eta$	%		74	76	80	84	83	89	90	91
RATED TORQUE	T	Nm		0.6	1.26	1.83	2.56	3.95	8.19	11.23	13.6
MAXIMUM TORQUE (2)	T <sub>max</sub>	Nm		3.6	7.58	11	15.38	23.7	49.14	67.38	81.6
MAXIMUM SPEED (3)	n max	rpm		7,000	6,000	6,000	5,000	4,500	4,000	4,000	4,000
EMF CONSTANT ±5%	K <sub>E</sub>	V/1000 rpm		10.4	18	19	26.3	30.85	55.6	62.53	70
TORQUE CONSTANT ±5%	K <sub>T</sub>	Nm/A		0.099	0.172	0.181	0.251	0.295	0.53	0.597	0.668
FRICTION TORQUE	T <sub>F</sub>	Nm		0.03	0.05	0.05	0.06	0.09	0.09	0.11	0.11
DAMPING CONSTANT	K <sub>D</sub>	Nm/1000 rpm		0.003	0.009	0.018	0.021	0.02	0.05	0.1	0.11
TERMINAL RESISTANCE (25°C)	R	$\Omega$		1	1.25	0.75	0.82	0.75	0.67	0.51	0.51
ARMATURE INDUCTANCE	L	$\mu$ H		<102	<130	<120	<150	<200	<250	<300	<300
INERTIA	J	kg m <sup>2</sup> 10 <sup>-3</sup>		0.15	0.37	0.40	0.82	1.7	5.1	8.5	8.5
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms		14.38	15	9	10.17	14	11.6	11.6	9.3
TRANSITORY POWER	P <sub>S</sub>	kW/s		89	155	300	288	330	473	534	783
THERMAL TIME CONSTANT ROTOR TO HOUSING	T <sub>AC</sub>	s		170	180	190	200	300	360	650	650
THERMAL TIME CONSTANT (1) HOUSING TO AMBIENT	T <sub>CA</sub>	s		1,700	1,750	1,800	2,000	2,700	3,000	4,000	4,000
THERMAL RESISTANCE ROTOR TO HOUSING	R <sub>AC</sub>	°C/W		0.8	0.5	0.5	0.5	0.3	0.2	0.13	0.15
THERMAL RESISTANCE (1) HOUSING TO AMBIENT	R <sub>CA</sub>	°C/W		0.5	0.3	0.4	0.4	0.3	0.2	0.14	0.15
RADIAL LOAD (at mid-length of shaft)	F <sub>R</sub>	N		200	200	300	300	500	600	700	700
AXIAL LOAD	F <sub>A</sub>	N		150	200	200	200	250	400	400	400
MASS (Only motor. No options)	M	kg		3.3	4.5	5.8	8	10	16	22	24
				300x300x10		400x400x10			500x500x10		
				3	3.5	4	7	10			
				9,000		6,000				4,500	

(1) With an aluminium heat sink plate

(2) For an S3 cycle

(3) Maximum speed in continuous service. During a very short time (r.p.m.)



## Options

MODEL	Tachometer Type	Brake Type
<b>MSS-2</b>	D40	04
<b>MSS-4</b>	D40	06
<b>MSS-6</b>	D40	06
<b>MSS-8</b>	D40	06
<b>MSS-12</b>	D40	07
<b>MSS-22</b>	D26	09
<b>MSS-35</b>	D26	11
<b>MSS-45</b>	D26	11

## Tachometer Specifications

	UNITS	TYPE	
		D40	D26
Voltage Constant	V/krpm	10 ± 5%*	10 ± 5%*
Ripple @ 1000 rpm (pp)	%	<1.5	<1.2
Linearity @ 6000 rpm	%	≤0.1	≤0.1
Reversing Error	%	≤0.12	≤0.12
Temperature Coefficient	%/°C	0.03	0.02
Rotor Inertia	kg m <sup>2</sup> 10 <sup>-3</sup>	0.004	0.024
Resistance	Ω	86	90
Inductance	mH	13	25
Current	mA	2	4
Maximum Current	mA	8	17
Maximum Speed	rpm	9,000	8,000
Mass	kg	0.105	0.295

\*other voltages available

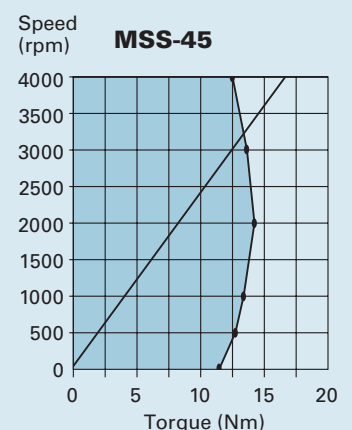
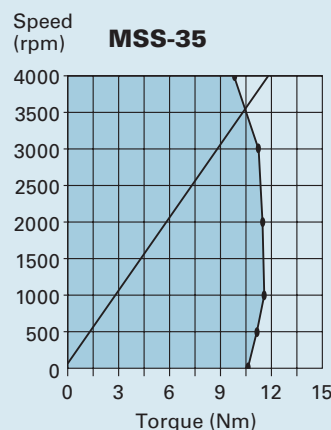
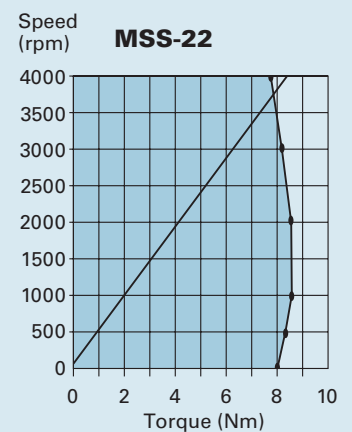
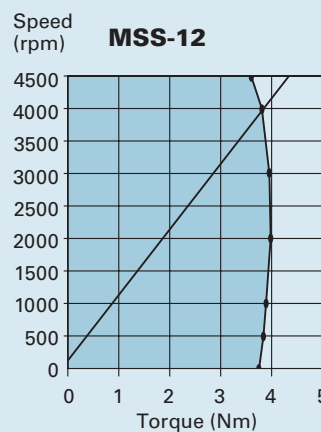
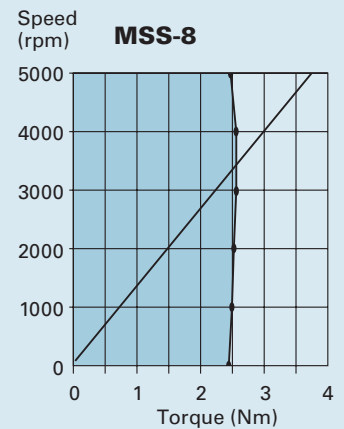
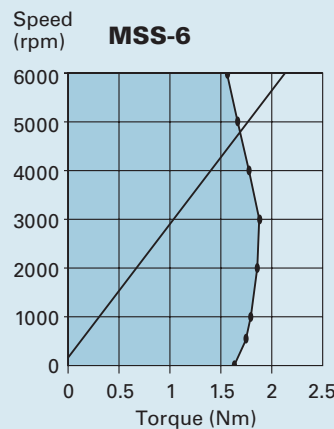
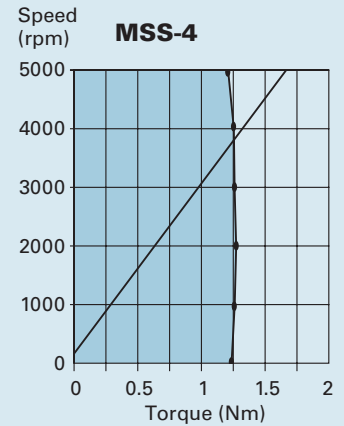
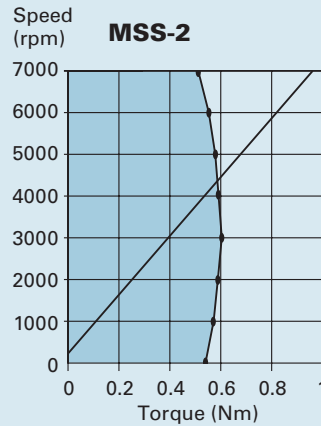
## Brake Specifications

	UNITS	TYPE				
		04	06	07	09	11
Holding Torque	Nm	1.2	2.5	5	12	20
DC Voltage	V	24	24	24	24	24
Input Power	W	8	12	16	18	22
Inertia	kg cm <sup>2</sup>	0.05	0.23	0.65	2.14	5.7
Response Time						
Disengagement	ms	4	7	15	30	55
Engagement	ms	3	5	7	13	18
Mass	kg	0.19	0.3	0.6	1.1	1.9

Performance curves shown right indicate the continuous operating zone or torque-speed envelope for 40°C ambient conditions. For MAVILOR motors, the torque that the motor can produce continuously at rated speed (3000 rpm for most MSS Series motors) exceeds the stall torque rating of the motor. The continuous torque rating (T) is the value used for sizing motors once the RMS torque requirement has been determined.

Acceleration torques to 10X rated torque can be obtained. The S3 curves for each motor should be consulted to ascertain time duration vs duty cycle for peak torques.

## Performance Curves





# DC Servo Motors MSS Series



## MSK

Available as "kit" motor (shaftless version) for direct mounting on the shaft of a machine.

Characteristics and curves correspond to Kit Option.

## Technical Specifications

	SYMBOLS	UNITS	MSK-8
RATED SPEED	n	rpm	6,000
RATED VOLTAGE $\pm 5\%$	U	V	40
RATED CURRENT	I	A	5.2
RATED OUTPUT POWER <sup>(1)</sup>	P	W	149
EFFICIENCY	$\eta$	%	71.6
RATED TORQUE	T	Nm	0.24
MAXIMUM TORQUE <sup>(2)</sup>	T <sub>max</sub>	Nm	1.2
MAXIMUM SPEED <sup>(3)</sup>	n max	rpm	10,000
EMF CONSTANT $\pm 5\%$	K <sub>E</sub>	V/1000 rpm	5.5
TORQUE CONSTANT $\pm 5\%$	K <sub>T</sub>	Nm/A	0.053
FRICTION TORQUE	T <sub>F</sub>	Nm	0.01
DAMPING CONSTANT	K <sub>D</sub>	Nm/1000 rpm	0.004
TERMINAL RESISTANCE (25°C)	R	$\Omega$	1.04
ARMATURE INDUCTANCE	L	$\mu\text{H}$	>60
INERTIA	J	$\text{kg m}^2 \cdot 10^{-3}$	0.031
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms	11.2
TRANSITORY POWER	P <sub>S</sub>	kW/s	46
THERMAL TIME CONSTANT ROTOR TO HOUSING	T <sub>AC</sub>	s	110
THERMAL TIME CONSTANT <sup>(1)</sup> HOUSING TO AMBIENT	T <sub>CA</sub>	s	1,000
THERMAL RESISTANCE ROTOR TO HOUSING	R <sub>AC</sub>	°C/W	0.66
THERMAL RESISTANCE <sup>(1)</sup> HOUSING TO AMBIENT	R <sub>CA</sub>	°C/W	1
RADIAL LOAD (at mid-length of shaft)	F <sub>R</sub>	N	220
AXIAL LOAD	F <sub>A</sub>	N	150
MASS (Only motor. No options)	M	kg	1.178

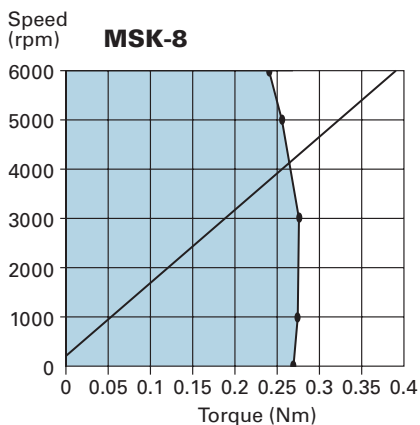
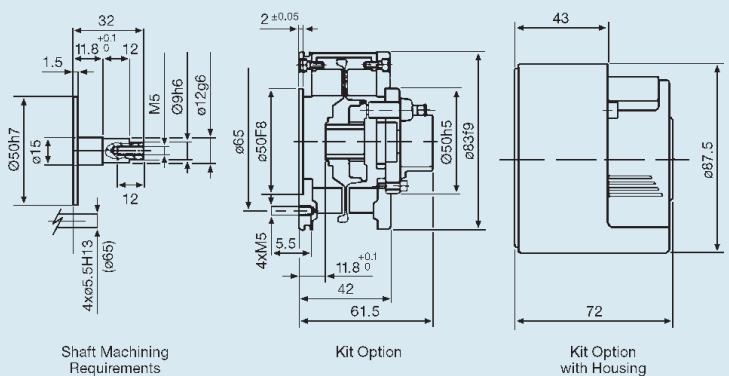
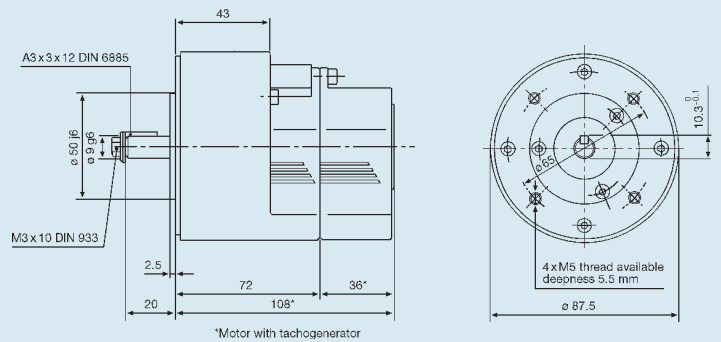
(1) With a 300x300x10 aluminium heat sink plate

(2) For an S3 cycle

(3) Maximum speed in continuous service. During a very short time 12,000 rpm

REMARK: Characteristics could be altered by any additional assembling

## Dimensions



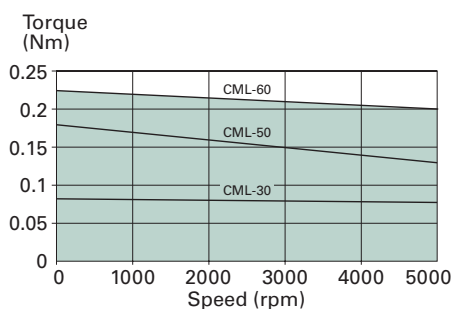
Available Kit Option with housing + Tachogenerator

# DC Servo Motors CML Series

- Small dimensions.
- Radial magnetic flux.
- High performances.
- Square format.



## Performance Curves



## Encoder Specifications

Waveform	Square Wave
Line Counts	1000 ppr
Channels	A, B, Z, $\bar{A}$ , $\bar{B}$ , $\bar{Z}$ / U, V, W, $\bar{U}$ , $\bar{V}$ , $\bar{W}$ Line drives (RS422)
Supply Voltage	5VDC $\pm$ 10%
Frequency Response	200 kHz
Operating Temperature	-40 °C ~ +120 °C

## Tachometer Specifications

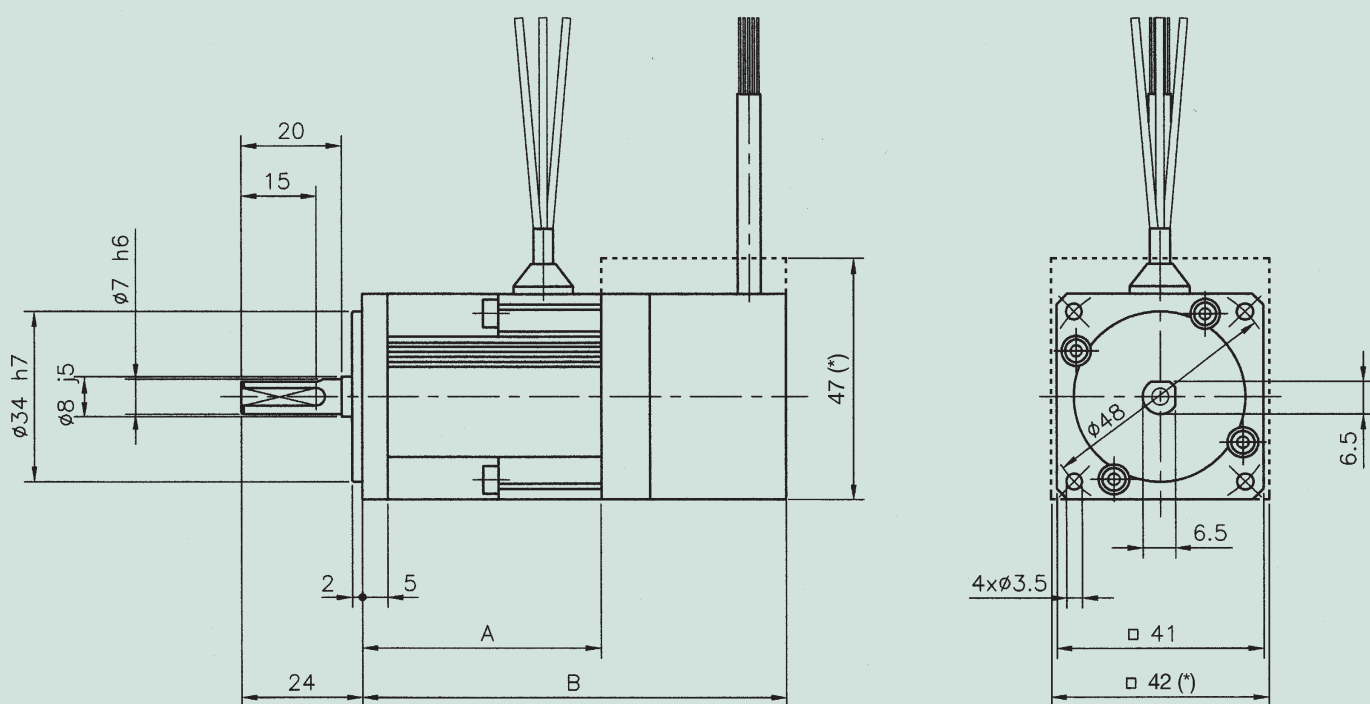
	UNITS	TYPE
Voltage Constant	V/krpm	D40
Ripple @ 1000 rpm (pp)	%	10 $\pm$ 5%*
Linearity @ 6000 rpm	%	<1.5
Reversing Error	%	$\leq$ 0.1
Temperature Coefficient	%/°C	$\leq$ 0.12
Rotor Inertia	kg m <sup>2</sup> 10 <sup>-3</sup>	0.03
Resistance	$\Omega$	0.004
Inductance	mH	86
Current	mA	13
Maximum Current	mA	2
Maximum Speed	rpm	8
Mass	kg	9,000
		0.105

\*other voltages available



# Technical Specifications

ALL CHARACTERISTICS MEASURED AT 25°C AMBIENT TEMPERATURE	SYMBOLS	UNITS	CML-30	CML-50	CML-60
RATED SPEED	n	rpm	3000	3000	3000
RATED VOLTAGE ±5%	U	V	24	24	34
RATED CURRENT	I	A	2.1	3.9	2.7
RATED OUTPUT POWER (1)	P	W	25	47	63
RATED TORQUE	T	Nm	0.08	0.15	0.2
MAX TORQUE	T <sub>max</sub>	Nm	0.32	0.6	0.8
MAX SPEED WITHOUT LOAD	n <sub>max</sub>	rpm	4750	5000	3550
EMF CONSTANT ±5%	K <sub>E</sub>	V/1000 rpm	4.80	4.71	9.00
TORQUE CONSTANT ±5%	K <sub>T</sub>	Nm/A	0.0458	0.0450	0.0859
FRICTION TORQUE	T <sub>F</sub>	Nm	0.01	0.011	0.02
DAMPING CONSTANT	K <sub>D</sub>	Nm/1000 rpm	0.002	0.005	0.004
TERMINAL RESISTANCE	R	Ω	3.1	1.45	2.45
ARMATURE INDUCTANCE	L	mH	1.1	0.4	0.95
ROTOR INERTIA	J	kg m <sup>2</sup> 10 <sup>-3</sup>	0.0039	0.0065	0.0094
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms	5.75	4.66	3.12
ELECTRICAL TIME CONSTANT	T <sub>E</sub>	ms	0.35	0.28	0.39
THERMAL TIME CONSTANT	T <sub>TH</sub>	s	900	1260	1380
THERMAL RESISTANCE	R <sub>TH</sub>	°C/W	3.8	2.0	1.5
MASS (Only motor. No system)	M	kg	0.38	0.50	0.62
RADIAL LOAD (at mid-length of shaft)	F <sub>R</sub>	N	150	150	150
AXIAL LOAD	F <sub>A</sub>	N	80	80	80
(1) With an aluminium heat sink plate			150x150x10	150x150x10	150x150x10



WITH ENCODER OPTION

	CML-30	CML-50	CML-60
A	47.5	62.5	77.5
B	84	99	114

WITH TACHO OPTION (\*)

	CML-30	CML-50	CML-60
A	29	44	59
B	86	101	116

# DC Servo Motors EExdIIC Series

EExdIIC Series are axial air-gap servomotors housed in an enclosure into which gas can gain access: the gas can be ignited within the enclosure without the explosion damaging the enclosure or being transmitted to any flammable atmosphere external to the enclosure. These motors comply with the requirements for Apparatus Group IIC specified in EN 50 018 (1977) + A1 to 3 and EN 50 014 (1977) + A1 to 5.

The temperature classification referred to an ambient temperature of 70°C is:

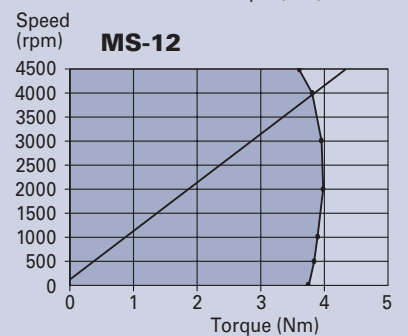
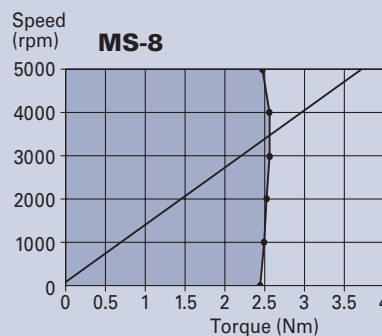
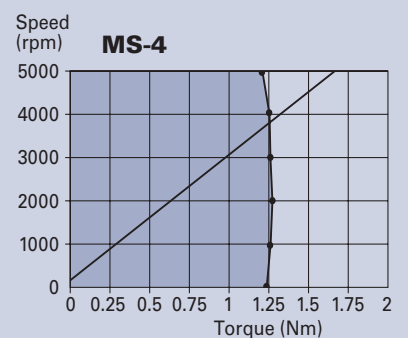
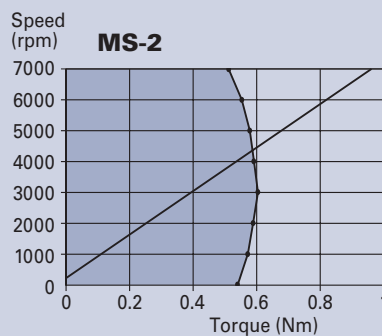
T5 for  $\left\{ \begin{array}{l} \text{MS-2 / MS-12 / MS-22} \\ \text{MA-3 / MA-20 / MA-30} \end{array} \right.$

T3 for  $\left\{ \begin{array}{l} \text{MS-4 / MS-6 / MS-8} \\ \text{MA-6 / MA-10} \end{array} \right.$

D.C. and A.C. "brushless" motors are included in EExdIIC Series, incorporating options of tachometer, resolver and parking brake fitted internally.



## Performance Curves





## Technical Specifications

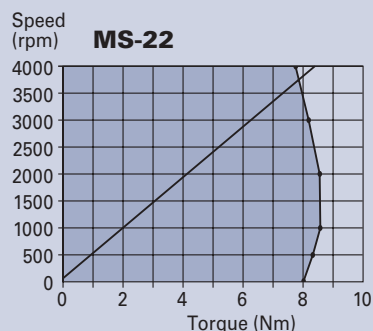
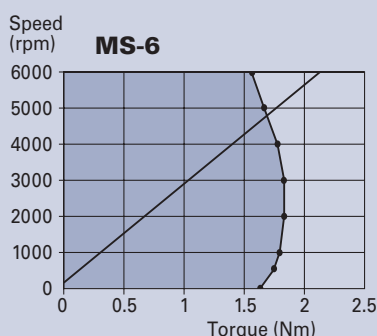
ALL CHARACTERISTICS MEASURED AT 40°C AMBIENT TEMPERATURE EXCEPT TERMINAL RESISTANCE (25°C)		SYMBOLS	UNITS	MS-2	MS-4	MS-6	MS-8	MS-12	MS-22
RATED SPEED	n	rpm		3,000	3,000	3,000	3,000	3,000	3,000
RATED VOLTAGE ±5%	U	V		39.4	67	67.8	89.7	106.7	181
RATED CURRENT	I	A		6.5	7.8	10.7	10.7	14	16
RATED OUTPUT POWER <sup>(1)</sup>	P	W		190.3	397	575	805	1,240	2,573
EFFICIENCY	η	%		74	76	80	84	83	89
RATED TORQUE	T	Nm		0.6	1.26	1.83	2.56	3.95	8.19
MAXIMUM TORQUE <sup>(2)</sup>	T <sub>max</sub>	Nm		3.6	7.58	11	15.38	23.7	49.14
MAXIMUM SPEED <sup>(3)</sup>	n max	rpm		7,000	6,000	6,000	5,000	4,500	4,000
EMF CONSTANT ±5%	K <sub>E</sub>	V/1000 rpm		10.4	18	19	26.3	30.85	55.6
TORQUE CONSTANT ±5%	K <sub>T</sub>	Nm/A		0.099	0.172	0.181	0.251	0.295	0.53
FRICTION TORQUE	T <sub>F</sub>	Nm		0.03	0.05	0.05	0.06	0.09	0.09
DAMPING CONSTANT	K <sub>D</sub>	Nm/1000 rpm		0.003	0.009	0.018	0.021	0.02	0.05
TERMINAL RESISTANCE (25°C)	R	Ω		1	1.25	0.75	0.82	0.75	0.67
ARMATURE INDUCTANCE	L	μH		<102	<130	<120	<150	<200	<250
INERTIA	J	kg m <sup>2</sup> 10 <sup>-3</sup>		0.15	0.37	0.40	0.82	1.7	5.1
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms		14.38	15	9	10.17	14	11.6
TRANSITORY POWER	P <sub>S</sub>	kW/s		89	155	300	288	330	473
THERMAL TIME CONSTANT ROTOR TO HOUSING	T <sub>AC</sub>	s		170	180	190	200	300	360
THERMAL TIME CONSTANT <sup>(1)</sup> HOUSING TO AMBIENT	T <sub>CA</sub>	s		1,700	1,750	1,800	2,000	2,700	3,000
THERMAL RESISTANCE ROTOR TO HOUSING	R <sub>AC</sub>	°C/W		0.8	0.5	0.5	0.5	0.3	0.2
THERMAL RESISTANCE <sup>(1)</sup> HOUSING TO AMBIENT	R <sub>CA</sub>	°C/W		0.5	0.3	0.4	0.4	0.3	0.2
RADIAL LOAD (at mid-length of shaft)	F <sub>R</sub>	N		200	200	300	300	500	600
AXIAL LOAD	F <sub>A</sub>	N		150	200	200	200	250	400
MASS (Only motors. No options)	M	kg						28	
				300x300x10		400x400x10			
				3	3.5	4	7	10	
				9,000		6,000		4,500	

(1) With an aluminium heat sink plate

(2) For an S3 cycle

(3) Maximum speed in continuous service. During a very short time (r.p.m.)

## Tachometer Specifications

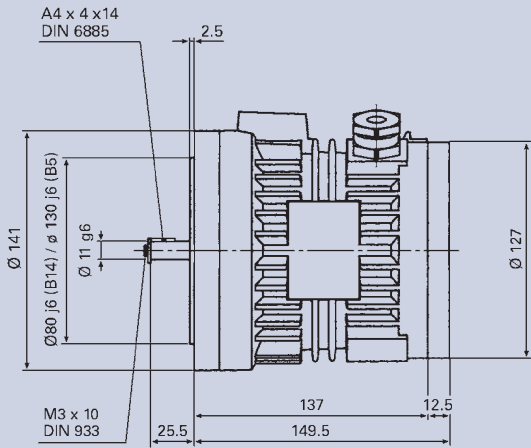


	UNITS	MS-2	MS-4	MS-6	MS-8	MS-12	MS-22
	SIZE	<b>D40</b>	<b>D40</b>	<b>D40</b>	<b>D40</b>	<b>D40</b>	<b>D26</b>
Voltage Constant	V/krpm	10 ± 5%*	10 ± 5%*	10 ± 5%*	10 ± 5%*	10 ± 5%*	10 ± 5%*
Ripple @ 1000 rpm (pp)	%	<1.5	<1.5	<1.5	<1.5	<1.5	<1.2
Linearity @ 6000 rpm	%	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1
Reversing Error	%	≤0.12	≤0.12	≤0.12	≤0.12	≤0.12	≤0.12
Temperature Coefficient	%/°C	0.03	0.03	0.03	0.03	0.03	0.02
Rotor Inertia	kg m <sup>2</sup> 10 <sup>-3</sup>	0.004	0.004	0.004	0.004	0.004	0.024
Resistance	Ω	86	86	86	86	86	90
Inductance	mH	13	13	13	13	13	25
Current	mA	2	2	2	2	2	4
Maximum Current	mA	8	8	8	8	8	17
Maximum Speed	rpm	9,000	9,000	9,000	9,000	9,000	8,000
Mass	kg	0.105	0.105	0.105	0.105	0.105	0.295

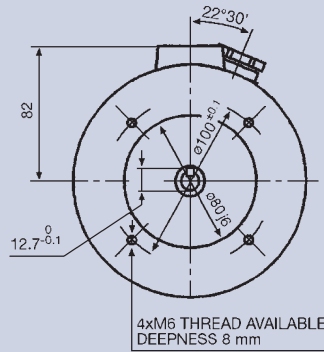
\*other voltages available

**MS-2 EExdIIC**

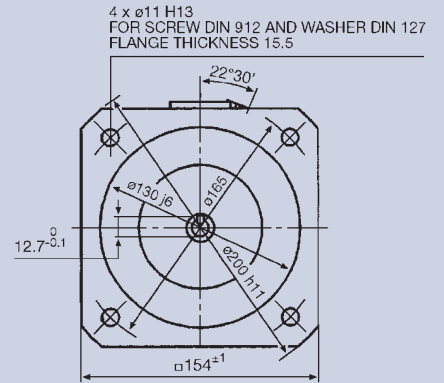
**MA-3 EExdIIC**



FLANGE B-14

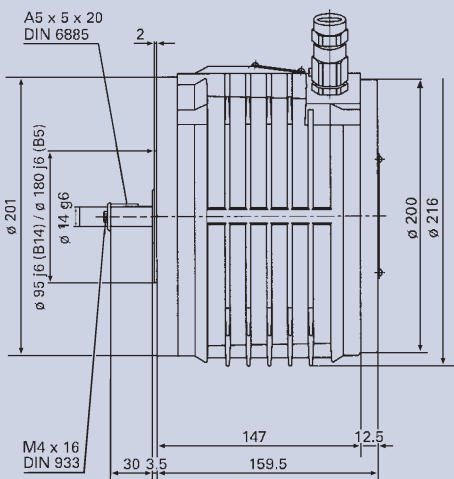


FLANGE B-5 (OPTIONAL)

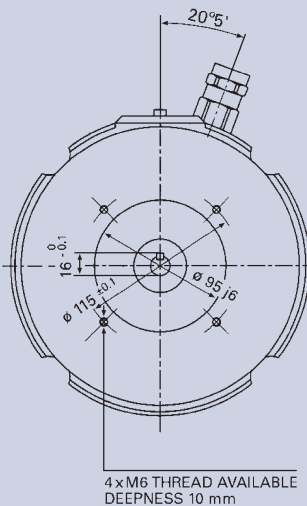


**MS-4 EExdIIC  
MS-6 EExdIIC  
MS-8 EExdIIC**

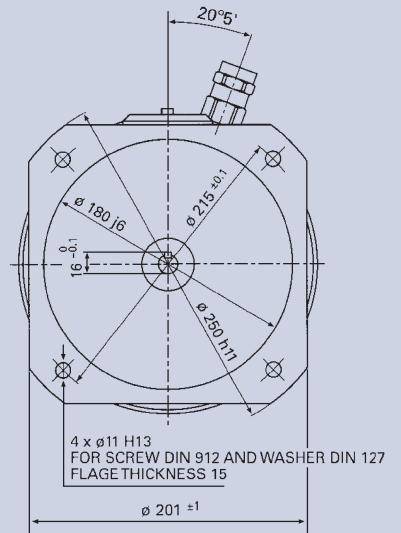
**MA-6 EExdIIC  
MA-10 EExdIIC**



FLANGE B-14

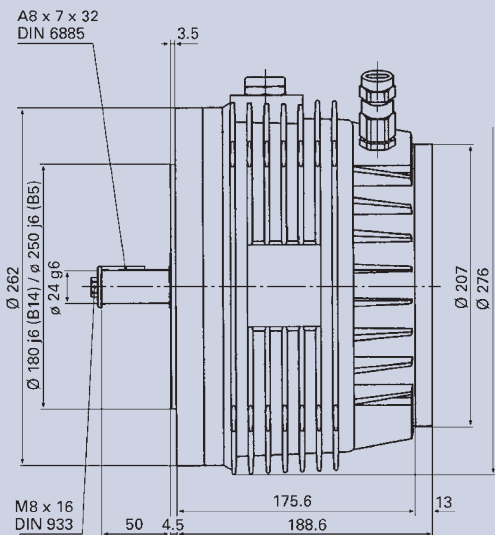


FLANGE B-5 (OPTIONAL)

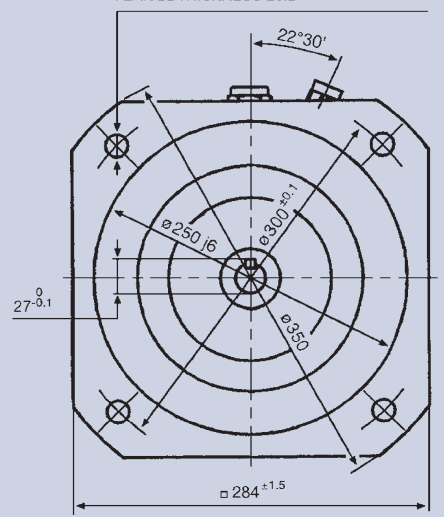
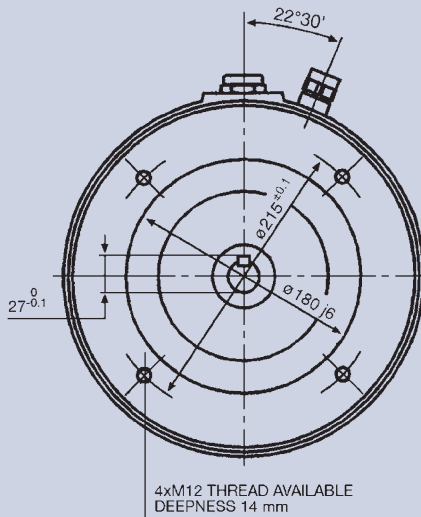


**MS-12 EExdIIC  
MS-22 EExdIIC**

**MA-20 EExdIIC  
MA-30 EExdIIC**



4 x Ø18 H13 FOR SCREW DIN 912 AND WASHER DIN 127 FLANGE THICKNESS 20.2



FLANGE B-14

FLANGE B-5 (OPTIONAL)

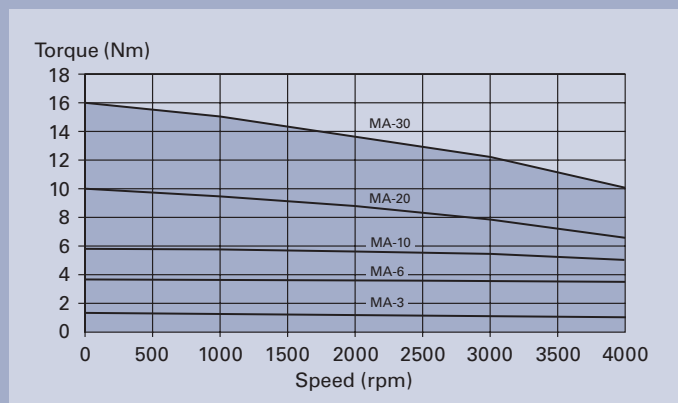


# AC Servo Motors EExdIIC Series

## Technical Specifications

ALL CHARACTERISTICS MEASURED AT 40° AMBIENT TEMPERATURE EXCEPT TERMINAL RESISTANCE (25° C)			SYMBOLS	UNITS	MA-3	MA-6	MA-10	MA-20	MA-30
MAX MECHANICAL SPEED	n	rpm			9,000	6,000	6,000	6,000	6,000
STALL TORQUE (1) ±10%	M <sub>S</sub>	Nm			1.3	3.6	5.8	10.0	16.0
STALL CURRENT	I <sub>S</sub>	A			2.2	4.2	6.8	10.3	16.5
PEAK TORQUE ±10%	M <sub>J</sub>	Nm			5.2	28.5	40.7	69.8	96.0
TORQUE-WEIGHT RATIO ±10%	T <sub>W</sub>	Nm/kg			0.7	0.8	1.1	1.2	1.6
EMF CONSTANT ±5%	K <sub>E</sub>	Vs/rad			0.3	0.5	0.5	0.6	0.6
TORQUE CONSTANT ±5%	K <sub>T</sub>	Nm/A			0.6	0.9	0.9	1.0	1.0
RELUCTANCETORQUE ±10%	T <sub>R</sub>	Nm			<0.02	<0.1	<0.1	<0.2	<0.3
WINDING RESISTANCE ±5%	R	Ω			10.2	5.3	2.2	1.4	0.5
WINDING INDUCTANCE ±5%	L	mH			25.0	11.6	0.4	7.0	4.0
ROTOR INERTIA	J	kg m <sup>2</sup> 10 <sup>-3</sup>			0.04	0.30	2.10	0.80	1.60
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms			2.0	3.8	3.6	2.1	1.6
ELECTRICAL TIME CONSTANT	T <sub>E</sub>	ms			2.5	2.2	7.5	5.0	7.5
THERMAL TIME CONSTANT	T <sub>TH</sub>	s			1,500	1,500	1,800	1,500	1,500
THERMAL RESISTANCE	R <sub>TH</sub>	°C/W			1.1	0.6	0.5	0.4	0.4
MASS (motor with resolver)	M	kg						34	36
RADIAL LOAD (at mid-length of shaft)	F <sub>R</sub>	N			218	410	410	600	600
AXIAL LOAD	F <sub>A</sub>	N			218	225	225	390	390
INSULATION					CLASS-F				
PROTECTION					IP-65				
(1) With an aluminium heat sink plate					300x300x10	400x400x10		830x830x10	

## Performance Curves



## Resolver Specifications

	UNITS	2T8 (Transmitter Speed 1)
Input Voltage/Frequency	V/kHz	10/4.5
Primary Element		Rotor
Number of Speed		1X
Transformation Ratio		0.5 ± 5%
Electrical Error	minutes	±10 max.
Dielectric Strength	VAC/1 minute	500
Mass	kg	0.230
Rotor Moment of Inertia	kg m <sup>2</sup> 10 <sup>-3</sup>	0.0123
Operating Temperature Range	°C	-55 ~ +155

## Brake Specifications

	UNITS	MS-2	MS-4	MS-6	MS-8	MS-12	MS-22	MA-3	MA-6	MA-10	MA-20	MA-30
	SIZE	04	06	06	06	07	09	07 (*)	10	10	10	10
Holding Torque	Nm	1.2	2.5	2.5	2.5	5	12	1	4	4	8	8
DC Voltage	V	24	24	24	24	24	24	4.8	24	24	24	24
Input Power	W	8	12	12	12	16	18	5	22	22	22	22
Inertia	kg cm <sup>2</sup>	0.05	0.23	0.23	0.23	0.65	2.14	0.08	0.3	0.3	0.3	0.3
Response Time												
Disengagement	ms	4	7	7	7	15	30	7	30	30	30	30
Engagement	ms	3	5	5	5	7	13	5	7	7	7	7
Mass	kg	0.19	0.3	0.3	0.3	0.6	1.1	0.3	0.8	0.8	0.8	0.8

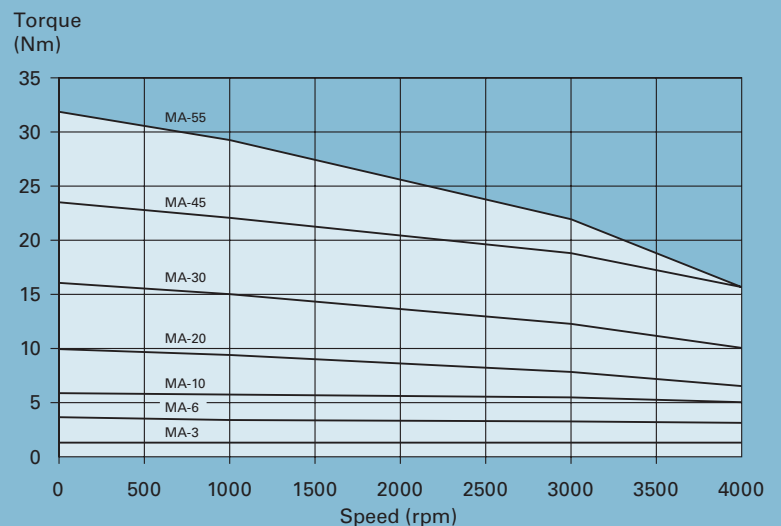
(\*) with chopper

# AC Servo Motors MA Series

- The short mechanical time constant makes it ideal for control operations.
- An extremely short electrical constant provides high peak torque at high speed.
- A high "theoretical" acceleration gives an extremely fast response time.
- High stall torque due to the absence of commutators bars.
- Low thermal resistance provides low working temperatures.
- High power to weight ratio, ideal for manipulator mounted motors.
- Air gap design, small diameter and short length.
- For many applications a separate position sensor is not required, the resolver can be used for deriving a position feed back signal as well as speed/current information.



## Performance Curves



## Technical Specifications

ALL CHARACTERISTICS MEASURED AT 25°C AMBIENT TEMPERATURE			MA-3	MA-6	MA-10	MA-20	MA-30	MA-45	MA-55	
	SYMBOLS	UNITS								
MAX MECHANICAL SPEED	n	rpm	9000	6000	6000	6000	6000	6000	6000	
STALL TORQUE <sup>(1)</sup> ±10%	M <sub>S</sub>	Nm	1.3	3.6	5.8	10.0	16.0	23.4	31.8	
STALL CURRENT	I <sub>S</sub>	A	2.2	4.2	6.8	10.3	16.5	24.1	32.7	
PEAK TORQUE ±10%	M <sub>J</sub>	Nm	5.2	28.5	40.7	69.8	96.0	140.5	190.8	
TORQUE-WEIGHT RATIO ±10%	T <sub>W</sub>	Nm/kg	0.7	0.8	1.1	1.2	1.6	1.7	1.9	
EMF CONSTANT ±5%	K <sub>E</sub>	Vs/rad	0.3	0.5	0.5	0.6	0.6	0.6	0.6	
TORQUE CONSTANT ±5%	K <sub>T</sub>	Nm/A	0.6	0.9	0.9	1.0	1.0	1.0	1.0	
RELUCTANCE TORQUE ±10%	T <sub>R</sub>	Nm	<0.02	<0.1	<0.1	<0.2	<0.3	<0.4	<0.6	
WINDING RESISTANCE ±5%	R	Ω	10.2	5.3	2.2	1.4	0.5	0.4	0.2	
WINDING INDUCTANCE ±5%	L	mH	25.0	11.6	8.0	7.0	4.0	2.7	1.9	
ROTOR INERTIA	J	kg m <sup>2</sup> 10 <sup>-3</sup>	0.04	0.30	0.40	0.80	1.60	2.20	3.60	
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms	2.0	3.8	2.1	2.1	1.6	1.6	1.6	
ELECTRICAL TIME CONSTANT	T <sub>E</sub>	ms	2.5	2.2	3.6	5.0	7.5	6.6	7.6	
THERMAL TIME CONSTANT	T <sub>TH</sub>	s	1,500	1,500	1,800	1,500	1,500	1,500	1,500	
THERMAL RESISTANCE	R <sub>TH</sub>	°C/W	1.1	0.6	0.5	0.4	0.4	0.2	0.2	
MASS (motor with resolver)	M	kg	1.9	4.4	5.3	8.2	10.0	14.0	16.8	
RADIAL LOAD (at mid-length of shaft)	F <sub>R</sub>	N	218	410	410	600	600	830	830	
AXIAL LOAD	F <sub>A</sub>	N	218	225	225	390	390	410	410	
INSULATION	CLASS-F									
PROTECTION	IP-54									
(1) With an aluminium heat sink plate			300x300x10	400x400x10				830x830x10		

## Resolver Specifications

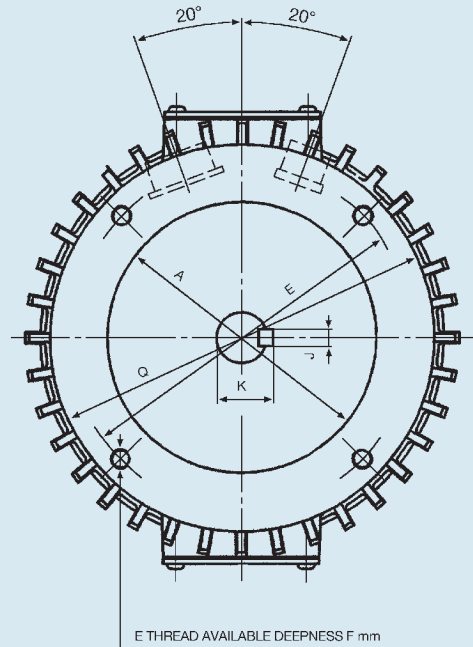
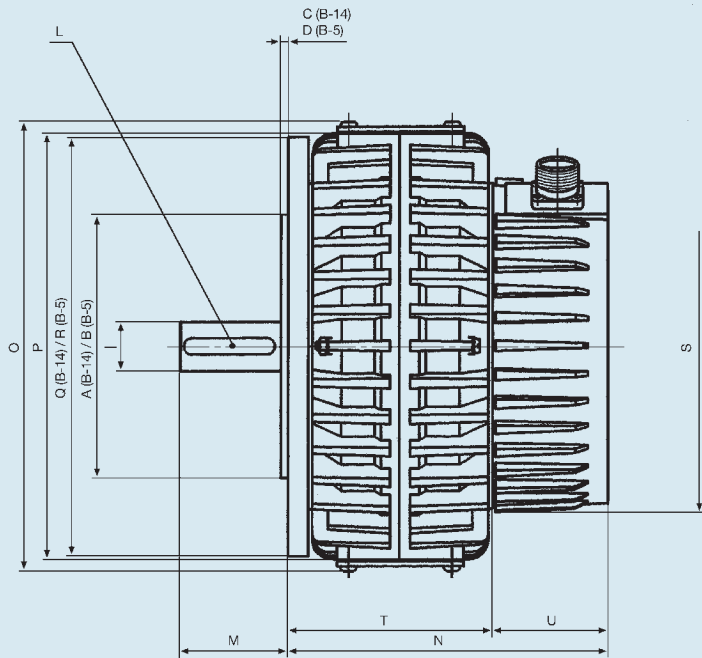
	UNITS	2T8 (Transmitter Speed 1)
Input Voltage/Frequency	V/kHz	10/4.5
Primary Element		Rotor
Number of Speed		1X
Transformation Ratio		0.5 ± 5%
Electrical Error	minutes	±10 max.
Dielectric Strength	VAC/1 minute	500
Mass	kg	0.230
Rotor Moment of Inertia	kg m <sup>2</sup> 10 <sup>-3</sup>	0.0123
Operating Temperature Range	°C	-55 ~ +155

## Brake Specifications

	SIZE	TORQUE Nm	INERTIA kg cm <sup>2</sup>	MASS kg
<b>MA-3</b>	07 (*)	1	0.08	0.3
<b>MA-6 / 10</b>	10	4	0.30	0.8
<b>MA-20 / 30</b>	10	8	0.30	0.8
<b>MA-45 / 55</b>	10	12	0.30	0.8
(*) With chopper				

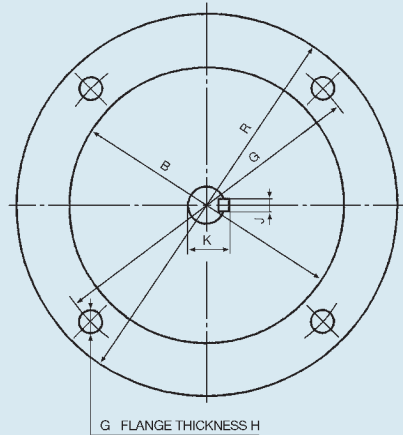
The MA Series incorporates the option of a fail-safe holding brake within the structure of the motor which holds the shaft without backlash on loss of electric current.





E THREAD AVAILABLE DEEPNESS F mm

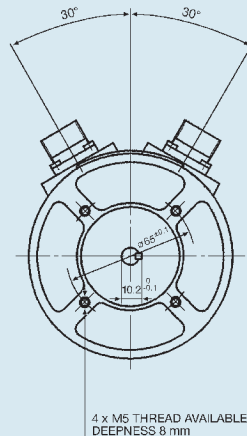
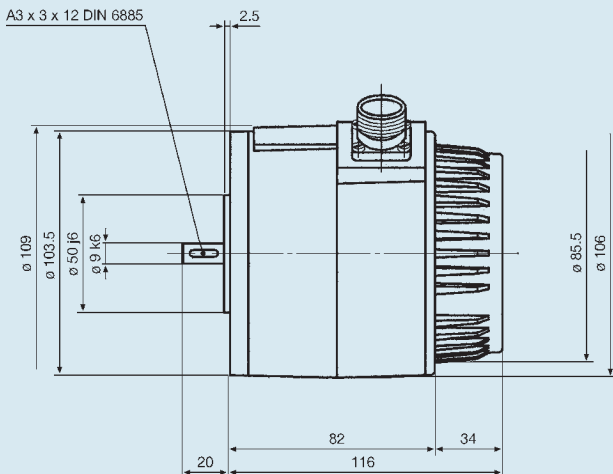
FLANGE B-14



G FLANGE THICKNESS H

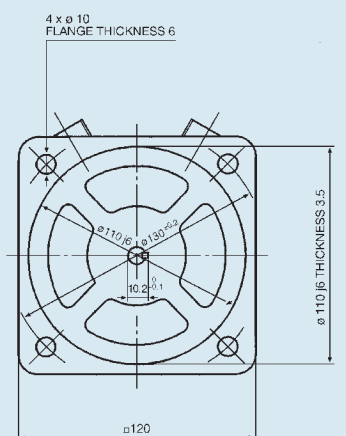
FLANGE B-5 (OPTIONAL)

**MA-3**



4 x M6 THREAD AVAILABLE DEEPNESS 8 mm

FLANGE B-14

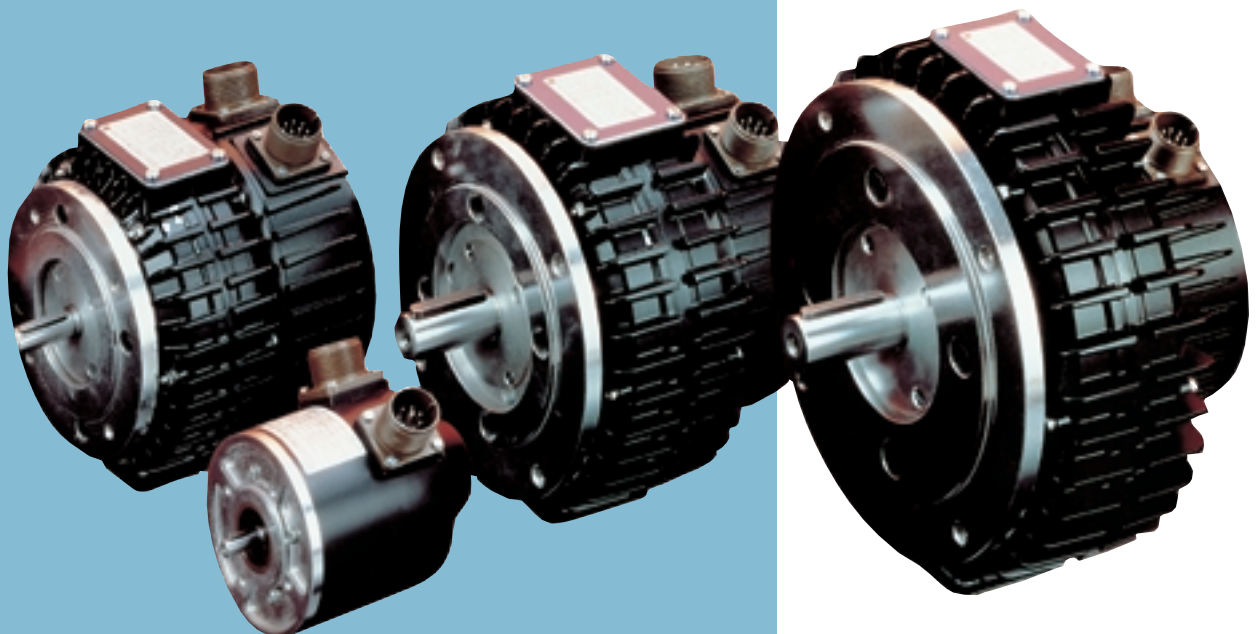


FLANGE B-5 (OPTIONAL)

# AC Servo Motors MA Series

## Dimensions

	MA-6	MA-10	MA-20	MA-30	MA-45	MA-55
A (j6)	ø95		ø130		ø180	
B (j6)	ø180			ø250		
C	3		3.5		4	
D	4			5		
E	ø115 4xM8		ø165 4xM10		ø215 4xM12	
F	10			12		
G	ø215 4xø15			ø300 4xø19		
H	10			17		
I (k6)	ø14		ø24		ø28	
J (N9)	5		8			
K ( $\frac{3}{1}$ )	16		27		31	
L (DIN 6885)	A5x5x28		A8x7x45		A8x7x50	
M	34		50		60	
N	137.5		152.5		161.5	
O	ø178		ø218		ø278	
P	ø170		ø210		ø270	
Q	ø140		ø186		ø242	
R	ø250			□265		
S	ø165					
T	80		95		104	
U	57.5					

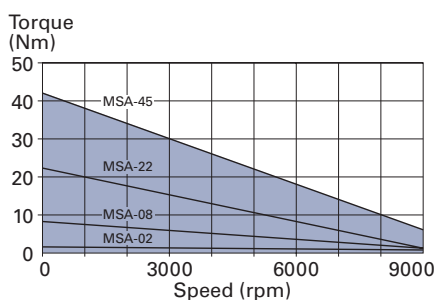


# AC Servo Motors MSA Series

- Very compact.
- Reduced diameter and length.
- Axial magnetic flux.
- Low cogging torque.
- Excellent torque/weight/volume ratio.



## Performance Curves



## Brake Specifications

	SIZE	TORQUE Nm	INERTIA kg cm <sup>2</sup>	MASS kg
<b>MSA-2</b>	03	2	0.068	0.18
<b>MSA-8</b>	06	9	0.54	0.50
<b>MSA-22</b>	08	36	5.56	1.75
<b>MSA-45</b>	08	36	5.56	1.75

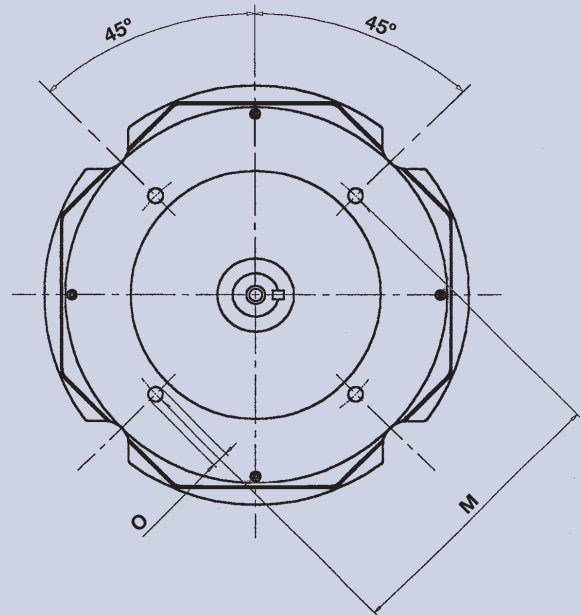
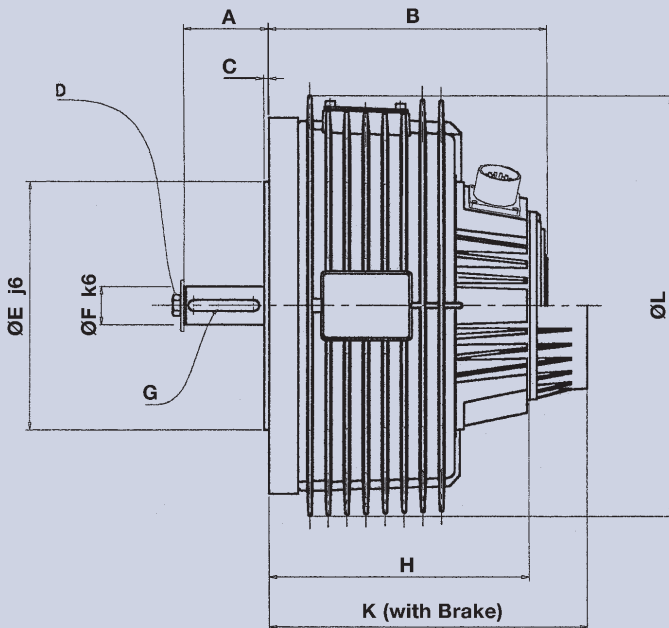
## Resolver Specifications

	UNITS	2T8 (Transmitter Speed 1)
Input Voltage/Frequency	V/kHz	10/4.5
Primary Element		Rotor
Number of Speed		1X
Transformation Ratio		0.5 ± 5%
Electrical Error	minutes	±10 max.
Dielectric Strength	VAC/1 minute	500
Mass	kg	0.230
Rotor Moment of Inertia	kg m <sup>2</sup> 10 <sup>-3</sup>	0.0123
Operating Temperature Range	°C	-55 ~ +155



# Technical Specifications

ALL CHARACTERISTICS MEASURED AT 25°C AMBIENT TEMPERATURE				MSA-2	MSA-2	MSA-8	MSA-8	MSA-22	MSA-22	MSA-45
	SYMBOLS	UNITS		220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	400 VAC
MAX MECHANICAL SPEED	n	rpm		10000	10000	6500	6500	6000	6000	4500
STALL TORQUE <sup>(1)</sup> ±10%	M <sub>S</sub>	Nm		1.9	1.9	9	9	26	26	44
STALL CURRENT	A	A		5.48	3.54	9.12	9.12	27.85	15.97	26.19
PEAK TORQUE ±10%	M <sub>J</sub>	Nm		7.6	7.6	36	36	104	104	176
TORQUE-WEIGHT RATIO	T <sub>W</sub>	Nm/kg		0.70	0.70	1.125	1.125	1.48	1.48	1.63
EMF CONSTANT ±5%	K <sub>E</sub>	Vs/rad		0.20	0.31	0.57	0.57	0.54	0.94	0.97
TORQUE CONSTANT ±5%	K <sub>T</sub>	Nm/A		0.35	0.54	0.99	0.99	0.93	1.63	1.68
RELUCTANCE TORQUE (Respect to the Stall Torque)	T <sub>R</sub>	Nm		<1.5%	<1.5%	<1.5%	<1.5%	<1.5%	<1.5%	<1.5%
WINDING RESISTANCE ±5%	R	Ω		2.90	7.07	1.50	1.50	0.26	0.78	0.41
WINDING INDUCTANCE ±5%	L	mH		11.50	28.00	15.00	15.00	5.56	14.00	10.90
ROTOR INERTIA	J	kg m <sup>2</sup> 10 <sup>-3</sup>		0.05	0.05	0.45	0.45	2.3	2.3	4
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms		2.09	2.12	1.20	1.20	1.19	1.17	1.01
ELECTRICAL TIME CONSTANT	T <sub>E</sub>	ms		3.97	3.96	10.00	10.00	21.38	17.95	26.59
MASS (Motor with resolver)	M	kg		2.7	2.7	8	8	17.6	17.6	27
RADIAL LOAD	F <sub>R</sub>	N		218	218	410	410	600	600	700
AXIAL LOAD	F <sub>A</sub>	N		218	218	225	225	400	400	400
INSULATION				CLASS-F	CLASS-F	CLASS-F	CLASS-F	CLASS-F	CLASS-F	CLASS-F
PROTECTION				IP-65	IP-65	IP-65	IP-65	IP-65	IP-65	IP-65
(1) With an aluminium heat sink plate				300x300x10		400x400x10		700x700x20		



MODELS	A	B	C	D	E	F	G	H	K	L	M	O
				DIN933	j6	k6	DIN6885					
<b>MSA-2</b>	23	94.5	2.5	M4x8	Ø50	Ø11	A4x4x14	85.5	151	Ø118	Ø65	4xM5
<b>MSA-8</b>	40	145	3	M6x16	Ø95	Ø16	A5x5x30	136	170	Ø192	Ø115	4xM8
<b>MSA-22</b>	50	178	3.5	M8x16	Ø130	Ø24	A8x7x32	166	202	Ø275	Ø165	4xM10
<b>MSA-45</b>	60	200	3.5	M10x22	Ø180	Ø28	A8x7x50	188	224	Ø305	Ø215	4xM12

# AC Servo Motors BL 40/50/70 Series

The BL Series are synchronous electrical servomotors, with 3 winding phases, supplied with Sinusoidal or Trapezoidal current wave forms. The Feed-Back devices that produce the synchronization signal and speed (position, also in the Sinusoidal case), are a Resolver (BLS Series) or a Hall Effect devices (BLT Series). This "BRUSHLESS" technology provides:

- High dynamic response.
- Full speed condition, not limited by the "Brush Sparking effect".
- High thermal and dynamic characteristics, because of the motor's windings which are located in the stators.
- Very low maintenance.



## BLS Technical Specifications

ALL CHARACTERISTICS MEASURED  
AT 25°C AMBIENT TEMPERATURE

SYMBOLS

UNITS

MAX MECHANICAL SPEED	n	rpm
STALL TORQUE <sup>(1)</sup> ±10%	M <sub>S</sub>	Nm
STALL CURRENT	I <sub>S</sub>	A
PEAK TORQUE ±10%	M <sub>J</sub>	Nm
TORQUE-WEIGHT RATIO	T <sub>W</sub>	Nm/kg
EMF CONSTANT ±5%	K <sub>E</sub>	Vs/rad
TORQUE CONSTANT ±5%	K <sub>T</sub>	Nm/A
RELUCTANCE TORQUE <sup>(*)</sup>	T <sub>R</sub>	Nm
WINDING RESISTANCE ±5%	R	Ω
WINDING INDUCTANCE ±5%	L	mH
ROTOR INERTIA	J	kg m <sup>2</sup> 10 <sup>-3</sup>
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms
ELECTRICAL TIME CONSTANT	T <sub>E</sub>	ms
THERMAL TIME CONSTANT	T <sub>TH</sub>	s
THERMAL RESISTANCE	R <sub>TH</sub>	°C/W
MASS	M	kg
RADIAL LOAD (at mid-length of shaft)	F <sub>R</sub>	N
AXIAL LOAD	F <sub>A</sub>	N
INSULATION		
PROTECTION		

(1) With an aluminium heat sink plate

(\*) Respect to the Stall Torque

## BLT Technical Specifications

ALL CHARACTERISTICS MEASURED  
AT 25°C AMBIENT TEMPERATURE

SYMBOLS

UNITS

MAX MECHANICAL SPEED	n	rpm
STALL TORQUE <sup>(1)</sup> ±10%	M <sub>S</sub>	Nm
STALL CURRENT	I <sub>S</sub>	A
PEAK TORQUE ±10%	M <sub>J</sub>	Nm
TORQUE-WEIGHT RATIO	T <sub>W</sub>	Nm/kg
EMF CONSTANT ±5%	K <sub>E</sub>	Vs/rad
TORQUE CONSTANT ±5%	K <sub>T</sub>	Nm/A
RELUCTANCE TORQUE <sup>(*)</sup>	T <sub>R</sub>	Nm
WINDING RESISTANCE ±5%	R	Ω
WINDING INDUCTANCE ±5%	L	mH
ROTOR INERTIA	J	kg m <sup>2</sup> 10 <sup>-3</sup>
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms
ELECTRICAL TIME CONSTANT	T <sub>E</sub>	ms
THERMAL TIME CONSTANT	T <sub>TH</sub>	s
THERMAL RESISTANCE	R <sub>TH</sub>	°C/W
MASS	M	kg
RADIAL LOAD (at mid-length of shaft)	F <sub>R</sub>	N
AXIAL LOAD	F <sub>A</sub>	N
INSULATION		
PROTECTION		

(1) With an aluminium heat sink plate

(\*) Respect to the Stall Torque

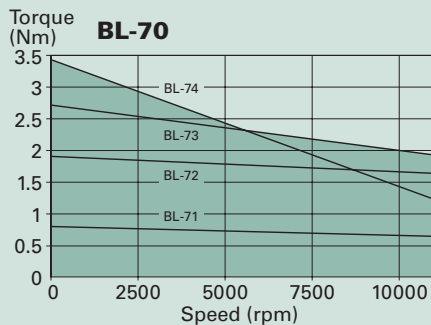
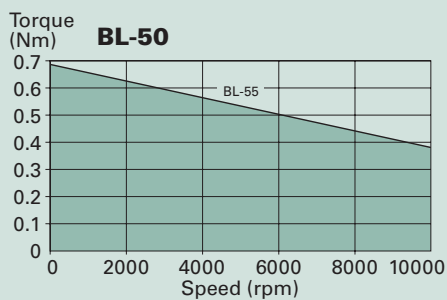
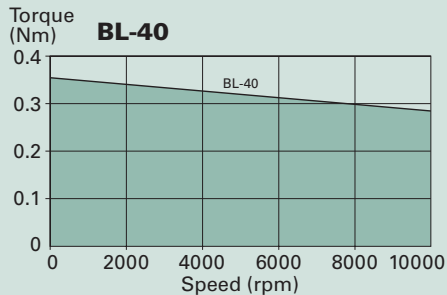
BLS-40		BLS-55		BLS-71		BLS-72		BLS-73		BLS-74	
110 VAC	220 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC
10,000		10,000		11,000		11,000		11,000		11,000	
0.36	0.36	0.7	0.7	0.8	0.8	1.9	1.9	2.7	2.7	3.4	3.4
2.57	1.24	1.4	0.77	2.11	1.13	3.96	2.37	3.91	2.2	4.2	2.25
1.44	1.44	2.8	2.8	3.2	3.2	7.6	7.6	10.8	10.8	13.6	13.6
0.6	0.6	0.5	0.5	0.53	0.53	1	1	1.17	1.17	1.21	1.21
0.08	0.17	0.29	0.53	0.22	0.41	0.28	0.46	0.4	0.71	0.47	0.87
0.14	0.29	0.5	0.91	0.38	0.71	0.48	0.8	0.69	1.23	0.81	1.51
<6%		<4%		<3.5%		<3.5%		<3.5%		<3.5%	
6	24.4	14.7	47	10.7	33.8	5.3	15.5	6.4	18.9	5.7	18.6
3.23	12	18.6	61	7.4	24	5.4	13.2	6.4	20	6.7	22
0.0024	0.0024	0.017	0.017	0.027	0.027	0.051	0.051	0.074	0.074	0.097	0.097
1.19	1.19	1.72	1.66	3.46	3.14	2.01	2.15	1.72	1.6	1.45	1.37
0.54	0.49	1.27	1.3	0.69	0.71	1.02	0.85	1	1.06	1.18	1.18
1,190	1,190	1,120	1,120	1,100	1,100	1,280	1,280	1,560	1,560	1,990	1,990
1.53	1.53	1.99	2.06	1.21	1.34	0.69	0.69	0.59	0.63	0.57	0.61
0.6	0.6	1.4	1.4	1.5	1.5	1.9	1.9	2.3	2.3	2.8	2.8
150		250		216		245		274		314	
80		100		98		98		98		98	
CLASS-F		CLASS-F		CLASS-F		CLASS-F		CLASS-F		CLASS-F	
IP-65		IP-65		IP-65		IP-65		IP-65		IP-65	
300x300x10		300x300x10		300x300x10		300x300x10		300x300x10		300x300x10	

BLT-40		BLT-55		BLT-71		BLT-72		BLT-73		BLT-74	
110 VAC	220 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC
10,000		10,000		11,000		11,000		11,000		11,000	
0.36	0.36	0.7	0.7	0.8	0.8	1.9	1.8	2.7	2.7	3.4	3.4
3	1.50	1.71	0.95	2.58	1.4	4.87	2.77	4.82	2.7	5.15	2.76
1.44	1.44	2.8	2.8	3.2	3.2	7.6	7.20	10.8	10.8	13.6	13.6
0.6	0.63	0.51	0.51	0.54	0.54	1.02	0.96	1.19	1.19	1.23	1.23
0.12	0.24	0.41	0.74	0.31	0.57	0.39	0.65	0.56	1	0.66	1.23
0.12	0.24	0.41	0.74	0.31	0.57	0.39	0.65	0.56	1	0.66	1.23
<6%		<4%		<3.5%		<3.5%		<3.5%		<3.5%	
6	24.4	14.7	47	10.7	33.8	5.3	15.5	6.4	18.9	5.7	18.6
3.23	12	18.6	61	7.4	24	5.4	13.2	6.4	20	6.7	22
0.0024	0.0024	0.017	0.017	0.027	0.027	0.051	0.051	0.074	0.074	0.097	0.097
1.02	1.02	1.49	1.46	3.01	2.81	1.78	1.87	1.51	1.4	1.27	1.19
0.54	0.49	1.27	1.3	0.69	0.71	1.02	0.85	1	1.06	1.18	1.18
1,190	1,190	1,120	1,120	1,100	1,100	1,280	1,280	1,560	1,560	1,990	1,990
1.53	1.57	2.01	2.05	1.21	1.29	0.68	0.72	0.58	0.62	0.57	0.61
0.6	0.57	1.37	1.37	1.47	1.47	1.87	1.87	2.27	2.27	2.77	2.77
150		250		216		245		274		314	
80		100		98		98		98		98	
CLASS-F		CLASS-F		CLASS-F		CLASS-F		CLASS-F		CLASS-F	
IP-65		IP-65		IP-65		IP-65		IP-65		IP-65	
300x300x10		300x300x10		300x300x10		300x300x10		300x300x10		300x300x10	



# AC Servo Motors BL 40/50/70 Series

## Performance Curves



## Resolver Specifications

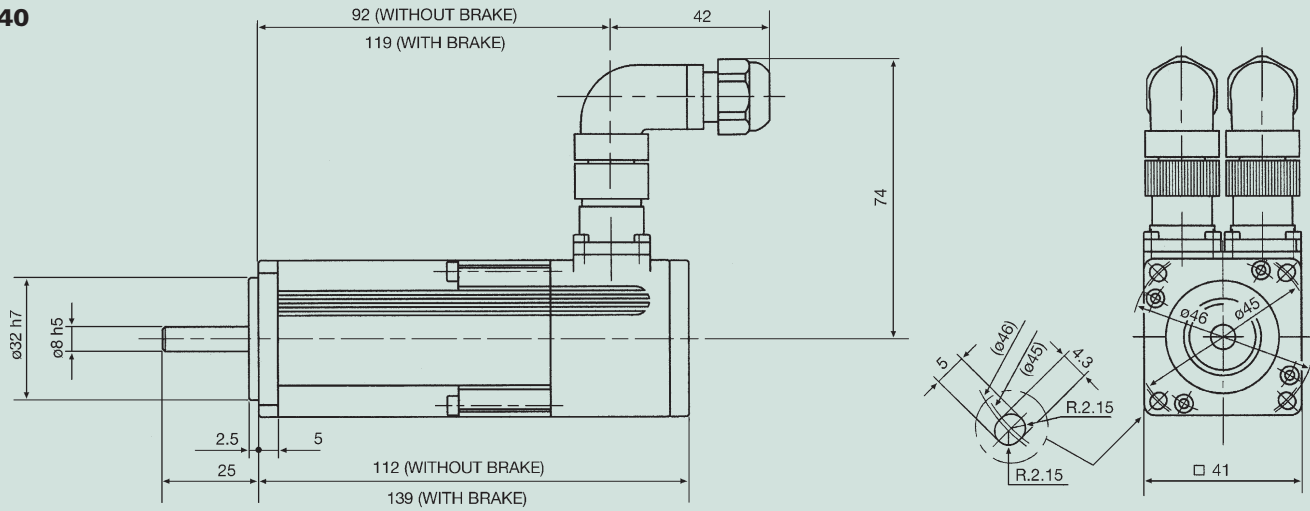
	UNITS	BL-40	BL-50	BL-70
2T8 (Transmitter Speed 1)				
Input Voltage/Frequency	V/kHz	7/10	10/4.5	
Primary Element		Rotor	Rotor	
Number of Speed		1X	1X	
Transformation Ratio		0.5 ± 5%	0.5 ± 5%	
Electrical Error	minutes	±10 max	±10 max	
Dielectric Strength	VAC/1 minute	500	500	
Mass	kg	0.04	0.13	
Rotor Moment of Inertia	kg m <sup>2</sup> 10 <sup>-3</sup>	0.0006	0.0032	
Operating Temperature Range	°C	-55 ~ +155	-55 ~ +155	

## Brake Specifications

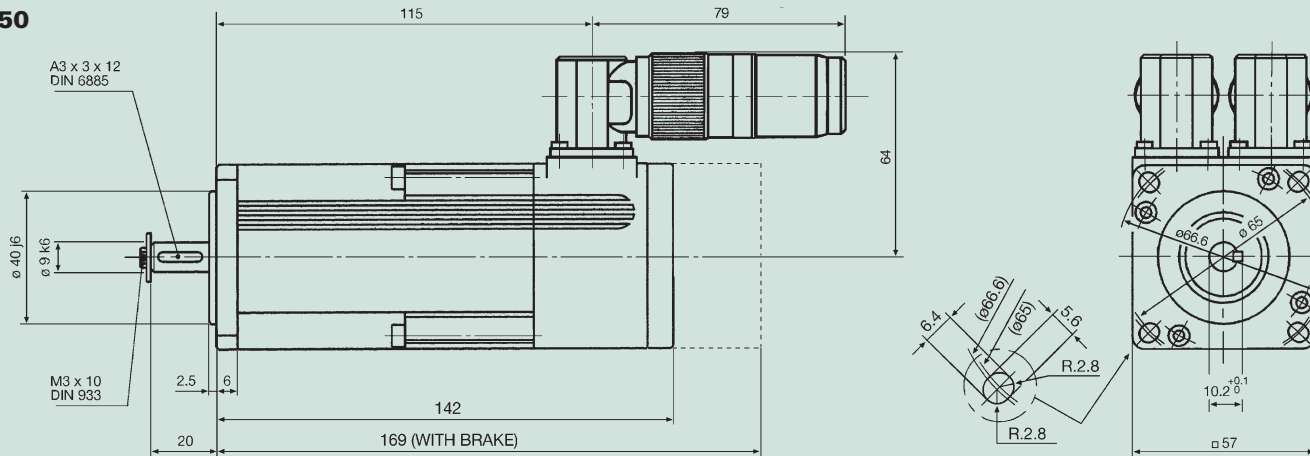
	SIZE	TORQUE Nm	INERTIA kg cm <sup>2</sup>	MASS kg
<b>BL-40</b>	01	0.4	0.016	0.10
<b>BL-55</b>	02	0.75	0.021	0.15
<b>BL-71 / 72</b>	03	1.5	0.068	0.18
<b>BL-73 / 74</b>	06	3	0.38	0.30

The BL Series incorporates the option of a fail-safe holding brake within the structure of the motor. Brake option is not available for short length version.

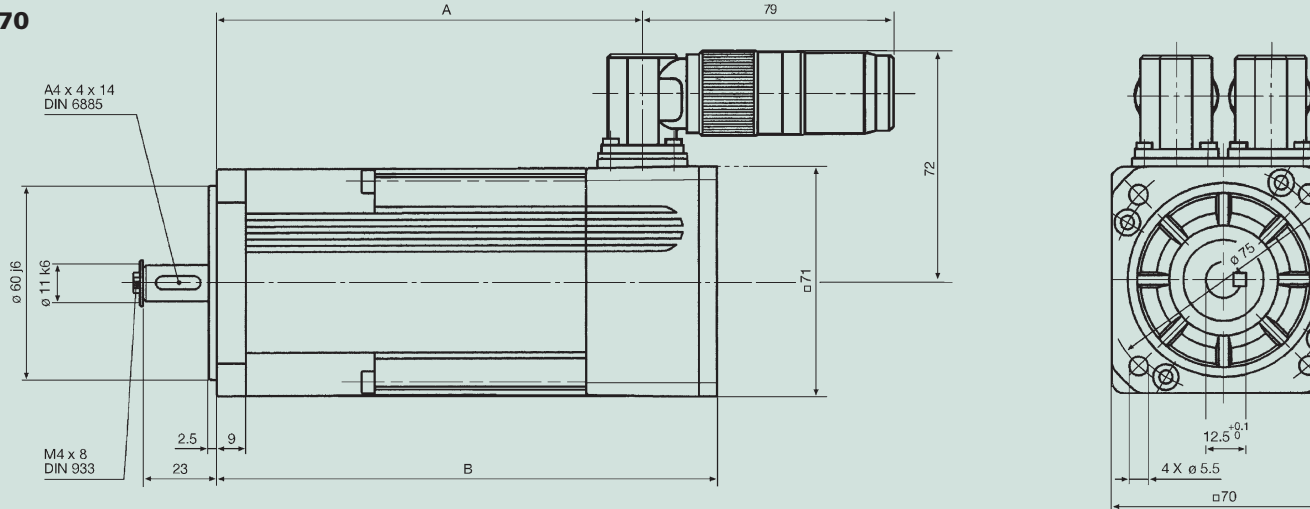
### BL-40



### BL-50



### BL-70



#### SHORT LENGTH VERSION (Not available with brake option)

	BL-71	BL-72	BL-73	BL-74
A	76.5	96.5	114.5	132.5
B	100.5	120.5	138.5	156.5

#### STANDARD VERSION (With or without brake option)

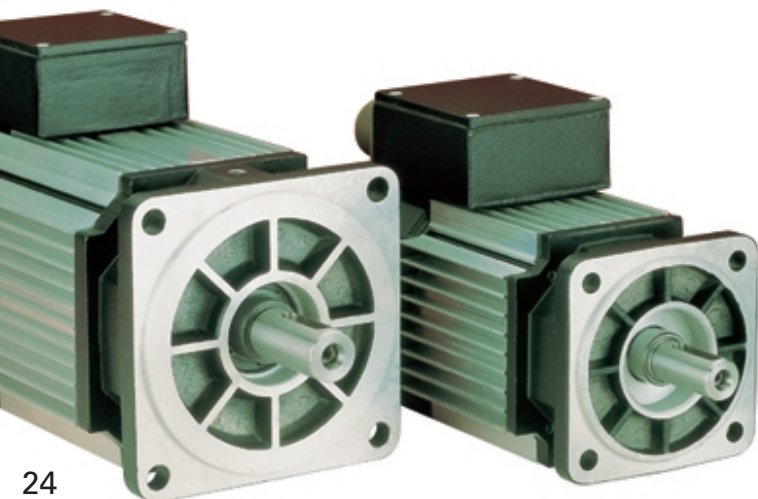
	BL-71	BL-72	BL-73	BL-74
A	81	101	119	137
B	128.5	148.5	166.5	184.5

The short length version must be specifically indicated in the order, as the product code applies to the standard version only.

# AC Servo Motors BL 110/140/190 Series

The BL Series are synchronous electrical servomotors, with 3 winding phases, supplied with Sinusoidal or Trapezoidal current wave forms. The Feed-Back devices that produce the synchronization signal and speed (position, also in the Sinusoidal case), are a Resolver (BLS Series) or a Hall effect devices (BLT Series). This "BRUSHLESS" technology provides:

- High dynamic response.
- Full speed condition, not limited by the "Brush Sparking effect".
- High thermal and dynamic characteristics, because of the motor's windings which are located in the stators.
- Very low maintenance.
- Connection box with four available positions from the standard construction.



## BLS Technical Specifications

ALL CHARACTERISTICS MEASURED  
AT 25° C AMBIENT TEMPERATURE

SYMBOLS

UNITS

MAX MECHANICAL SPEED	n	rpm
STALL TORQUE <sup>(1)</sup> ±10%	M <sub>S</sub>	Nm
STALL CURRENT	I <sub>S</sub>	A
PEAK TORQUE ±10%	M <sub>J</sub>	Nm
TORQUE-WEIGHT RATIO	T <sub>W</sub>	Nm/kg
EMF CONSTANT ±5%	K <sub>E</sub>	Vs/rad
TORQUE CONSTANT ±5%	K <sub>T</sub>	Nm/A
RELUCTANCE TORQUE <sup>(*)</sup>	T <sub>R</sub>	Nm
WINDING RESISTANCE ±5%	R	Ω
WINDING INDUCTANCE ±5%	L	mH
ROTOR INERTIA	J	kg m <sup>2</sup> 10 <sup>-3</sup>
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms
ELECTRICAL TIME CONSTANT	T <sub>E</sub>	ms
THERMAL TIME CONSTANT	T <sub>TH</sub>	s
THERMAL RESISTANCE	R <sub>TH</sub>	°C/W
MASS	M	kg
RADIAL LOAD (at mid-length of shaft)	F <sub>R</sub>	N
AXIAL LOAD	F <sub>A</sub>	N
INSULATION		
PROTECTION		

(1) With an aluminium heat sink plate

(\*) Respect to the Stall Torque

## BLT Technical Specifications

ALL CHARACTERISTICS MEASURED  
AT 25° C AMBIENT TEMPERATURE

SYMBOLS

UNITS

MAX MECHANICAL SPEED	n	rpm
STALL TORQUE <sup>(1)</sup> ±10%	M <sub>S</sub>	Nm
STALL CURRENT	I <sub>S</sub>	A
PEAK TORQUE ±10%	M <sub>J</sub>	Nm
TORQUE-WEIGHT RATIO	T <sub>W</sub>	Nm/kg
EMF CONSTANT ±5%	K <sub>E</sub>	Vs/rad
TORQUE CONSTANT ±5%	K <sub>T</sub>	Nm/A
RELUCTANCE TORQUE <sup>(*)</sup>	T <sub>R</sub>	Nm
WINDING RESISTANCE ±5%	R	Ω
WINDING INDUCTANCE ±5%	L	mH
ROTOR INERTIA	J	kg m <sup>2</sup> 10 <sup>-3</sup>
MECHANICAL TIME CONSTANT	T <sub>M</sub>	ms
ELECTRICAL TIME CONSTANT	T <sub>E</sub>	ms
THERMAL TIME CONSTANT	T <sub>TH</sub>	s
THERMAL RESISTANCE	R <sub>TH</sub>	°C/W
MASS	M	kg
RADIAL LOAD (at mid-length of shaft)	F <sub>R</sub>	N
AXIAL LOAD	F <sub>A</sub>	N
INSULATION		
PROTECTION		

(1) With an aluminium heat sink plate

(\*) Respect to the Stall Torque

BLS-111		BLS-112		BLS-113		BLS-114		BLS-115	
220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC
8,500		8,500		8,500		8,500		8,500	
2.9	2.9	5.0	5.0	8.4	8.4	10.6	10.6	13.9	13.9
3.49	2.04	6.02	3.29	9.88	5.71	12.77	7.31	17.16	9.79
11.6	11.6	20.0	20.0	33.6	33.6	42.4	42.4	55.6	55.6
0.73	0.73	1.0	1.0	1.33	1.33	1.43	1.43	1.64	1.64
0.48	0.82	0.48	0.88	0.49	0.85	0.48	0.84	0.47	0.82
0.83	1.42	0.83	1.52	0.85	1.47	0.83	1.45	0.81	1.42
<3%		<3%		<3%		<3%		<3%	
7.2	20.6	2.4	7.1	1.3	3.79	0.8	2.58	0.6	1.84
10	31	4.8	13.2	2.7	8.5	1.9	5.8	1.5	5.1
0.2	0.2	0.38	0.38	0.56	0.56	0.74	0.74	0.93	0.93
3.61	3.54	2.29	2.02	1.75	1.70	1.49	1.57	1.47	1.47
1.39	1.5	2.0	1.86	2.08	2.24	2.38	2.25	2.5	2.77
2,520	2,520	1,910	1,910	2,260	2,260	2,510	2,510	3,700	3,700
0.65	0.67	0.66	0.75	0.45	0.46	0.44	0.42	0.32	0.33
4	4	5	5	6.3	6.3	7.4	7.4	8.5	8.5
515		515		515		515		515	
255		255		255		255		255	
CLASS-F		CLASS-F		CLASS-F		CLASS-F		CLASS-F	
IP-65		IP-65		IP-65		IP-65		IP-65	
400x400x10									

BLS-141		BLS-142		BLS-143		BLS-144		BLS-191	BLS-192
220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	400 VAC	400 VAC
6,500		6,500		6,500		6,500		2,800	
13.6	13.6	17.4	17.4	26.8	26.8	33	33	56	82
13.6	7.01	15.4	8.02	19.14	10.19	17.55	9.38	25.11	34.60
54.4	54.4	69.6	69.6	107.2	107.2	132.0	132.0	224.0	328.0
1.3	1.3	1.41	1.41	1.63	1.63	1.64	1.64	1.9	2.1
0.58	1.12	0.65	1.25	0.81	1.52	1.09	2.03	1.29	1.37
1	1.94	1.13	2.17	1.4	2.63	1.88	3.52	2.23	2.37
<2.5%		<2.5%		<2.5%		<2.5%		<2%	
0.86	2.9	0.73	2.46	0.63	2.04	0.74	2.5	0.39	0.26
2.8	11.5	2.6	9	2.7	9.6	3.2	11	1.9	1.5
1.71	1.71	2.34	2.34	3.34	3.34	4.59	4.59	14.7	22
2.54	2.28	2.33	2.12	1.86	1.70	1.66	1.61	1.99	1.76
3.26	3.97	3.56	3.66	4.29	4.71	4.32	4.4	4.87	5.77
3,740	3,740	4,500	4,500	4,626	4,626	4,800	4,800	4,400	4,090
0.36	0.40	0.33	0.36	0.25	0.27	0.25	0.26	0.23	0.18
10.5	10.5	12.3	12.3	16.4	16.4	20.1	20.1	29.5	39
784		784		784		784		1,400	
343		343		343		343		690	
CLASS-F		CLASS-F		CLASS-F		CLASS-F		CLASS-F	
IP-65		IP-65		IP-65		IP-65		IP-65	
700x700x20									

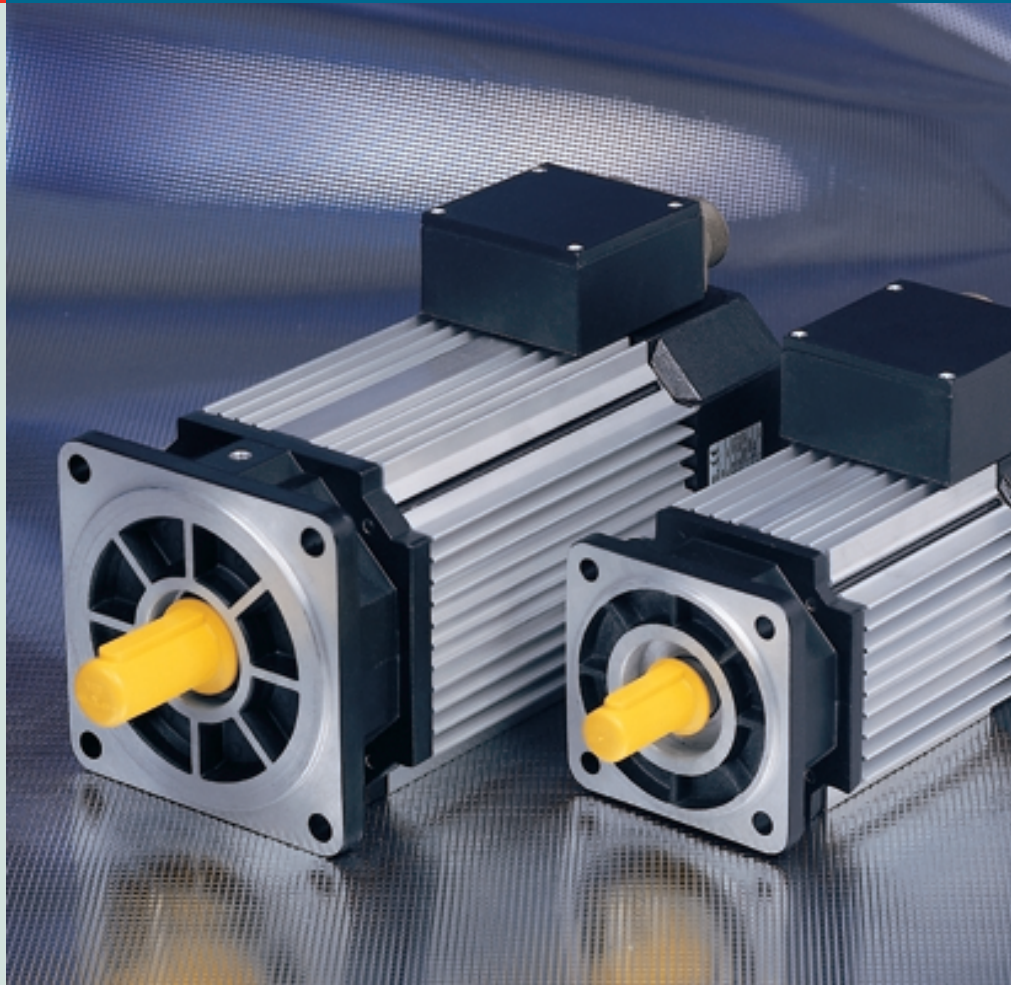
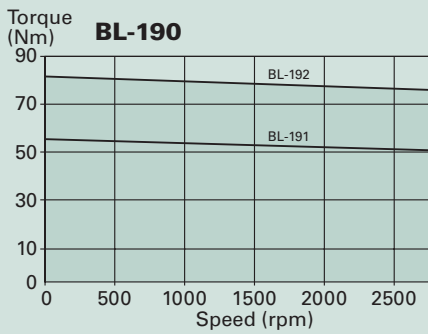
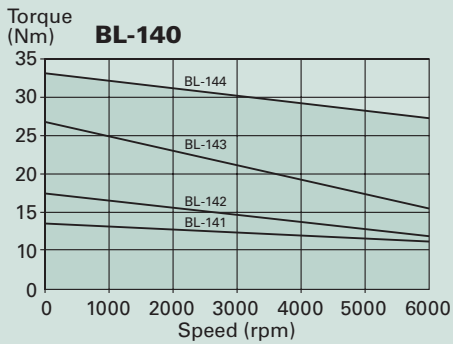
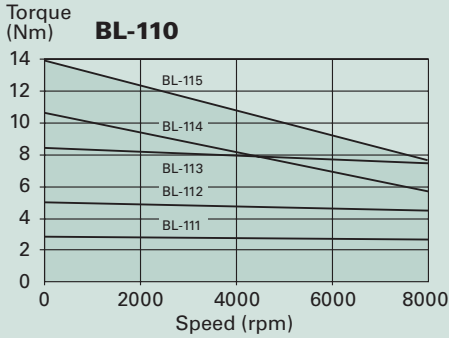
BLT-111		BLT-112		BLT-113		BLT-114		BLT-115	
220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC
8,500		8,500		8,500		8,500		8,500	
2.9	2.9	5.0	5.0	8.4	8.4	10.6	10.6	13.9	13.9
4.33	2.5	7.46	4.03	12.17	7.0	15.82	8.98	21.06	11.98
11.6	11.6	20.0	20.0	33.6	33.6	42.4	42.4	55.6	55.6
0.73	0.73	1.01	1.01	1.34	1.34	1.44	1.44	1.64	1.64
0.67	1.16	0.67	1.24	0.69	1.2	0.67	1.18	0.66	1.16
0.67	1.16	0.67	1.24	0.69	1.2	0.67	1.18	0.66	1.16
<3%		<3%		<3%		<3%		<3%	
7.2	20.6	2.4	7.1	1.3	3.79	0.8	2.58	0.6	1.84
10	31	4.8	13.2	2.7	8.5	1.9	5.8	1.5	5.1
0.2	0.2	0.38	0.38	0.56	0.56	0.74	0.74	0.93	0.93
3.21	3.06	2.03	1.75	1.53	1.47	1.32	1.37	1.28	1.27
1.39	1.5	2.0	1.86	2.08	2.24	2.38	2.25	2.5	2.77
2,520	2,520	1,910	1,910	2,260	2,260	2,510	2,510	3,700	3,700
0.64	0.67	0.64	0.75	0.45	0.46	0.43	0.41	0.32	0.33
3.97	3.97	4.97	4.97	6.27	6.27	7.37	7.37	8.47	8.47
515		515		515		515		515	
255		255		255		255		255	
CLASS-F		CLASS-F		CLASS-F		CLASS-F		CLASS-F	
IP-65		IP-65		IP-65		IP-65		IP-65	
400x400x10									

BLT-141		BLT-142		BLT-143		BLT-144		BLT-191	BLT-192
220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	220 VAC	400 VAC	400 VAC	400 VAC
6,500		6,500		6,500		6,500		2,800	
13.6	13.6	17.4	17.4	26.8	26.8	33	33	56	82
16.59	8.61	18.91	9.89	23.51	12.47	21.43	11.5	30.43	42.49
54.4	54.4	69.6	69.6	107.2	107.2	132.0	132.0	224.0	328.0
1.3	1.3	1.42	1.42	1.64	1.64	1.64	1.64	1.9	2.1
0.82	1.58	0.92	1.76	1.14	2.15	1.54	2.87	1.84	1.93
0.82	1.58	0.92	1.76	1.14	2.15	1.54	2.87	1.84	1.93
<2.5%		<2.5%		<2.5%		<2.5%		<2%	
0.86	2.9	0.73	2.46	0.63	2.04	0.74	2.5	0.39	0.26
2.8	11.5	2.6	9	2.7	9.6	3.2	11	1.9	1.5
1.71	1.71	2.34	2.34	3.34	3.34	4.59	4.59	14.7	22
2.19	1.99	2.02	1.86	1.62	1.47	1.43	1.39	1.69	1.54
3.26	3.97	3.56	3.66	4.29	4.71	4.32	4.4	4.87	5.77
3,740	3,740	4,500	4,500	4,626	4,626	4,800	4,800	4,400	4,090
0.36	0.4	0.33	0.36	0.25	0.27	0.25	0.26	0.24	0.18
10.47	10.47	12.27	12.27	16.37	16.37	20.7	20.7	29.47	38.97
784		784		784		784		1,400	
343		343		343		343		690	
CLASS-F		CLASS-F		CLASS-F		CLASS-F		CLASS-F	
IP-65		IP-65		IP-65		IP-65		IP-65	
700x700x20									



# AC Servo Motors BL 110/140/190 Series

## Performance Curves



## Resolver Specifications

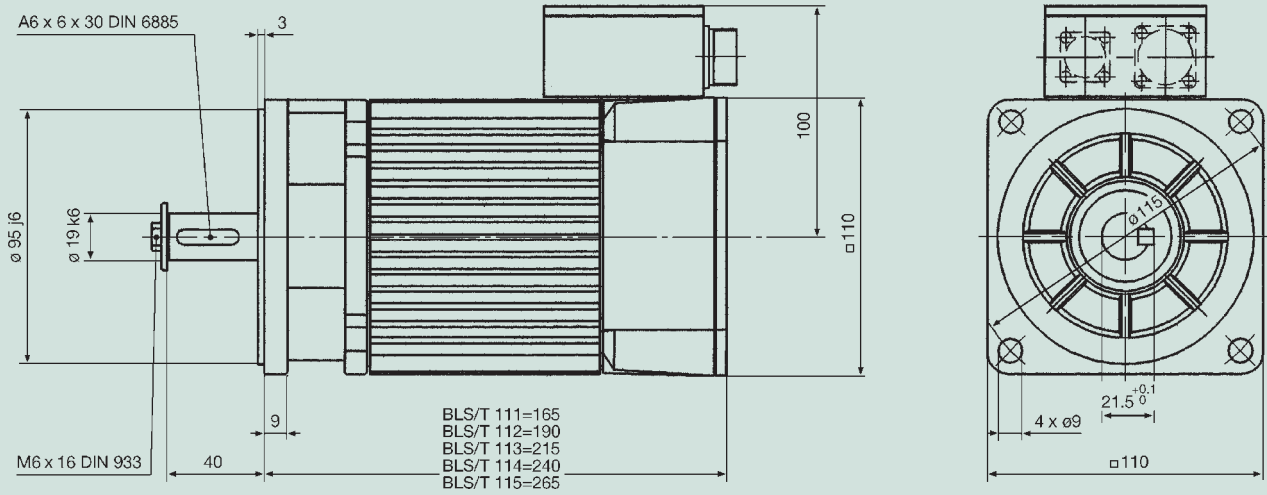
	UNITS	2T8 (Transmitter Speed 1)
Input Voltage/Frequency	V/kHz	10/4.5
Primary Element		Rotor
Number of Speed		1X
Transformation Ratio		0.5 ± 5%
Electrical Error	minutes	±10 max.
Dielectric Strength	VAC/1 minute	500
Mass	kg	0.230
Rotor Moment of Inertia	kg m <sup>2</sup> 10 <sup>-3</sup>	0.0123
Operating Temperature Range	°C	-55 ~ +155

## Brake Specifications

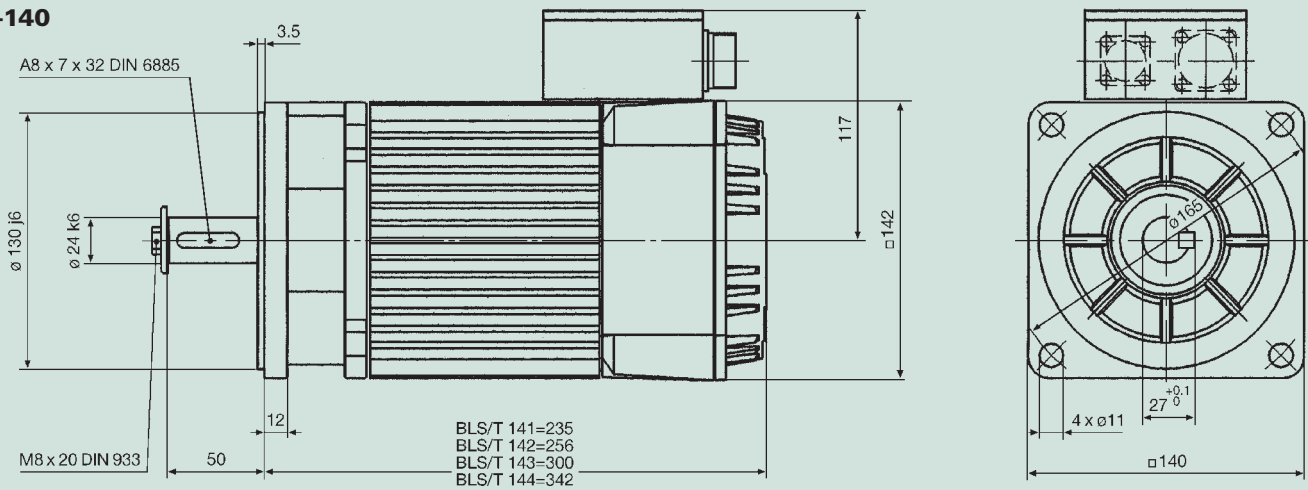
	SIZE	TORQUE Nm	INERTIA kg cm <sup>2</sup>	MASS kg
<b>BL-111 / 112</b>	10	8	0.30	0.8
<b>BL-113 / 114 / 115</b>	10	12	0.30	0.8
<b>BL-141 / 142 / 143 / 144</b>	11	20	9.5	1.9
<b>BL-191 / 192</b>	09	72	16	2.85

The BL Series incorporates the option of a fail-safe holding brake within the structure of the motor.

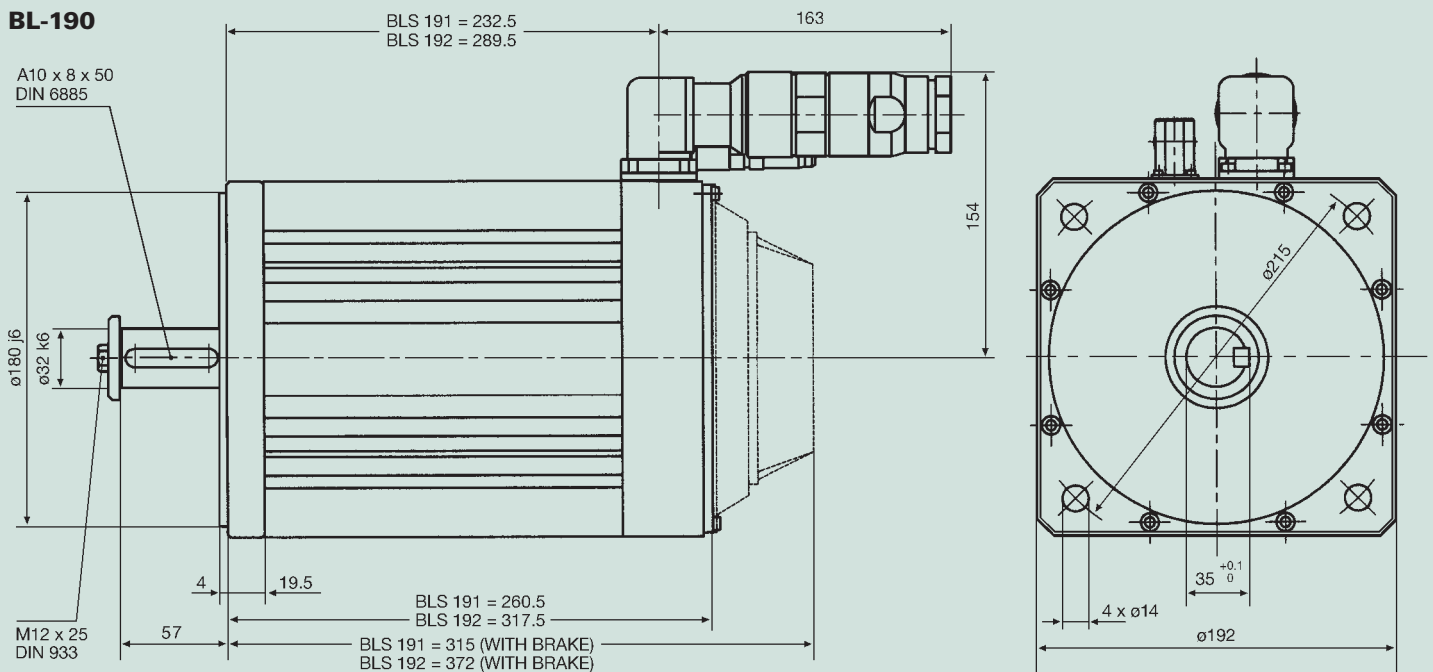
### BL-110



### BL-140



### BL-190



# ROLIVAM Tachogenerators

ROLIVAM TACHOGENERATORS are designed and produced by a leading manufacturer of precision A.C. and D.C. servomotors. They have been designed to stop, position, accelerate or change direction without cogging and with fluctuations of less than 1.5 % (pp).

Electro-mechanic configuration with winding on 2 parallel branches, four brushes (2 on each line), a copper-silver alloy commutator with a great number of segments, good surface finish, rare-earth permanent magnets, very low inertia and high manufacturing quality.

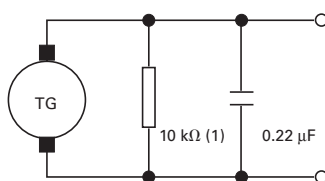
The above means that the ROLIVAM TACHOGENERATORS insure reliable transmission of the output signal and contributes to the ultrafast response in situations where rapid reversals are an essential element in the servo-drive system, without cyclic variation.



## Technical Specifications

	UNITS	D-23 A D-25 A D-26			D-40 D-41 A D-41 B		
		7 v	10 v	20 v	7 v	10 v	20 v
Voltage Constant $\pm 5\%$	V/1000 rpm	7	10	20	7	10	20
Ripple at 1000 rpm (*) (pp)	%	<1.2	<1.2	<1.2	<1.5	<1.5	<1.5
Linearity at 6000 rpm	%	$\leq 0.1$	$\leq 0.1$	$\leq 0.1$	$\leq 0.1$	$\leq 0.1$	$\leq 0.1$
Reversing Error	%	$\leq 0.12$	$\leq 0.12$	$\leq 0.12$	$\leq 0.12$	$\leq 0.12$	$\leq 0.12$
Temperature Coefficient	$^{\circ}\text{C}/\%$	0.02	0.02	0.02	0.03	0.03	0.03
Rotor Inertia	$\text{kg m}^2 \cdot 10^{-3}$	0.024	0.024	0.024	0.004	0.004	0.004
Resistance	$\Omega$	72	90	380	60	86	275
Inductance	mH	16	25	190	6.3	13	42
Current	mA	5	4	3	2	2	1.5
Maximum Current	mA	20	17	10	8	8	6
Maximum Speed	rpm	8,000	8,000	8,000	9,000	9,000	6,000
Brushes Life Expectancy	revolutions	$1.1 \times 10^9$	$1.1 \times 10^9$	$1.1 \times 10^9$	$3.24 \times 10^9$	$3.24 \times 10^9$	$3.24 \times 10^9$
Number of Poles		4	4	4	4	4	4

(\*) Ripple Test Circuit



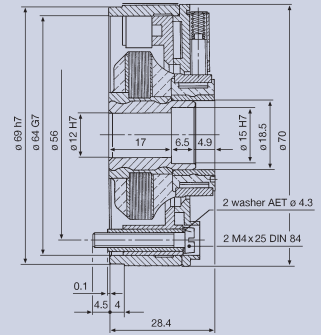
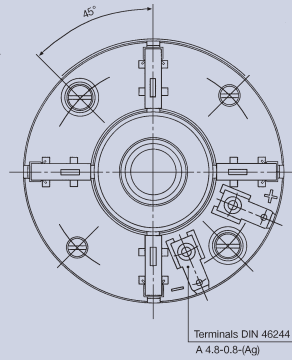
(1) 20 v = 20 k $\Omega$

MODELS	D-23 A	D-25 A	D-26	D-40	D-41 A	D-41 B
MASS (kg)	0.28	0.64	0.29	0.11	0.32	0.32

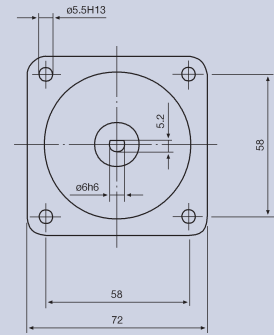
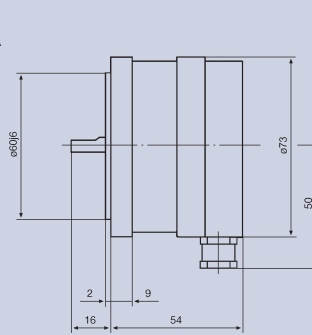




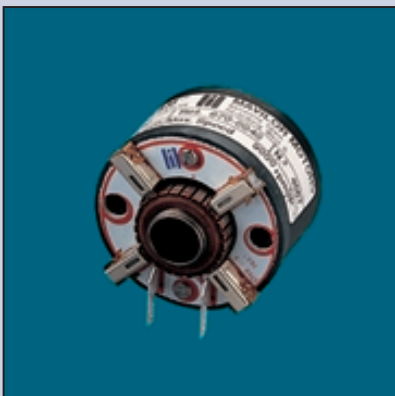
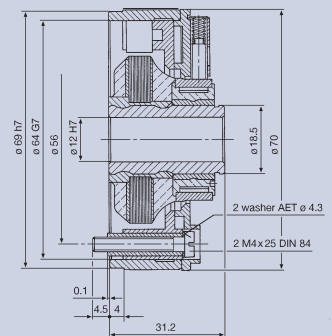
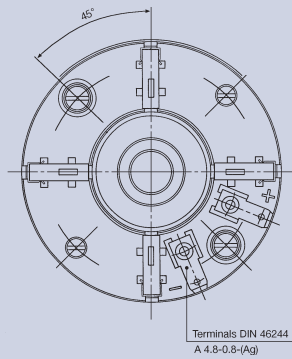
D-23 A



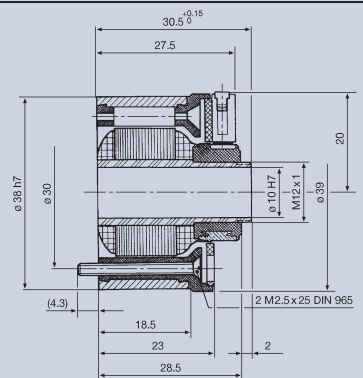
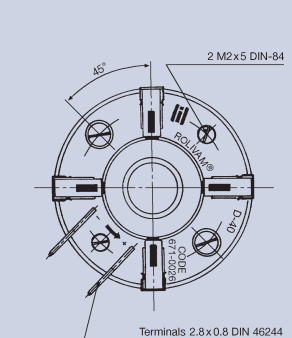
D-25 A



D-26

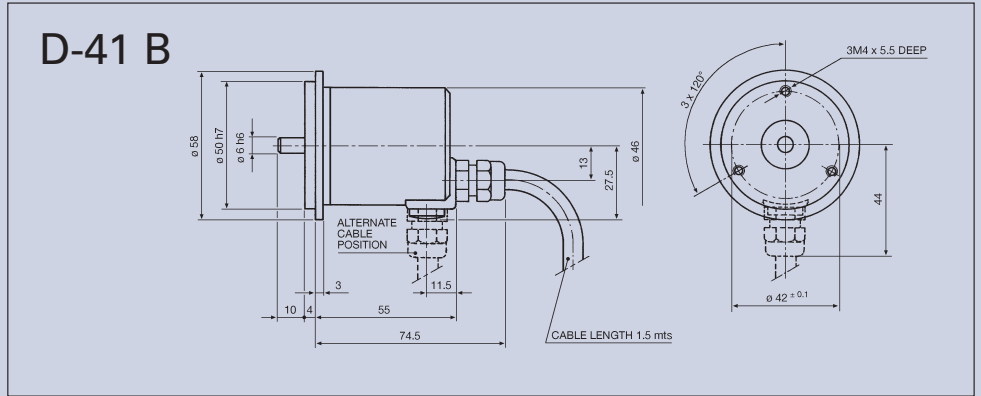
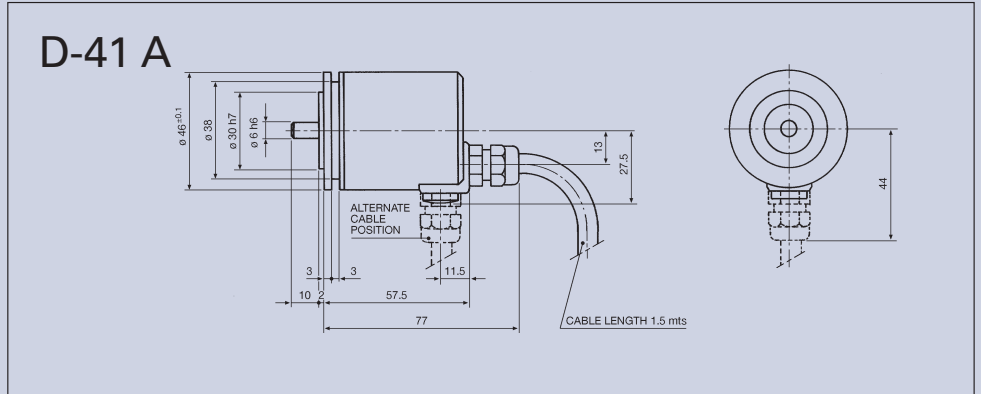


D-40





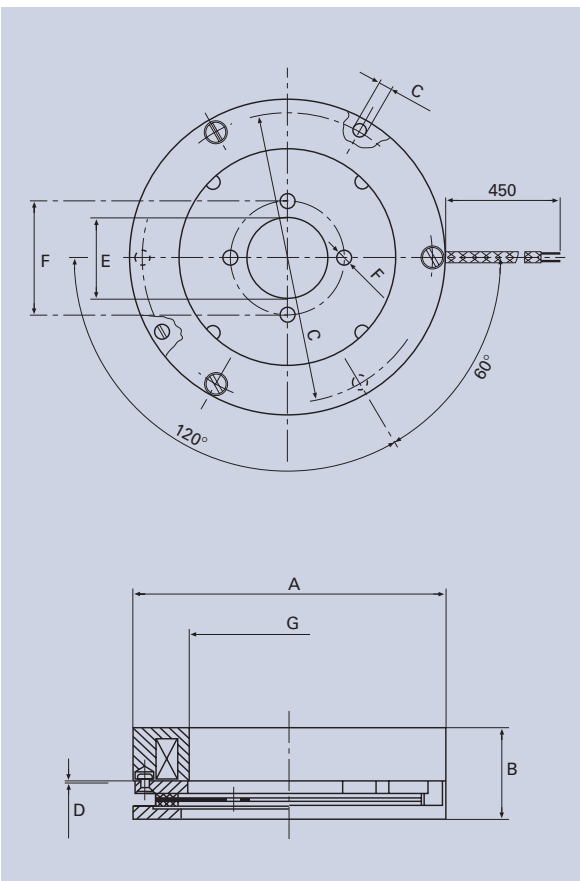
# ROLIVAM Tachogenerators



# ROLIVAM Brakes

## Brakes

These Electro-Magnetic Brakes are Single Disc units which operate on the Fail Safe principle. Functionally the brake is released by energisation of the operating coil with D.C. supply, and is applied by interruption of the coil current or power failure.



## Technical Specifications

	STATIC TORQUE (Nm)	VOLTAGE (V)	CURRENT (A)	INERTIA OF FRICTION DISC (kg cm <sup>2</sup> )	MASS (kg)
<b>FB-00</b>	4	24	1.2	0.3	0.8
	8				
	12				

\* without chopper

	STATIC TORQUE (Nm)	START POWER (W)	CONSTANT POWER (W)	INERTIA OF FRICTION DISC (kg cm <sup>2</sup> )	MASS (kg)
<b>FB-07</b>	0.35	142	5	0.08	0.3
	0.7				
	1				
<b>FB-10</b>	1	210	9.5	0.3	0.8
	2				
	4				
	8				
	16				
<b>FB-14</b>	3.5	220	10	1.54	1.5
	7.5				
	15				
	30				

\* with chopper

## Chopper Specifications

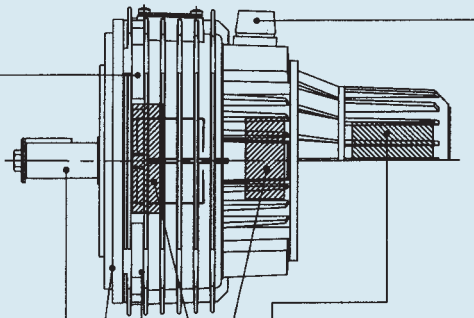
	SYMBOLS	UNITS	DATA
Supply Voltage (-30%+15%) ripple max. 4%	U <sub>1</sub>	V	24
Overexcitation Voltage	U	V	-2
Overexcitation Time	T	ms	150
Overexcitation Current	I	A	10 max
Retention Voltage (Chopper for FB-10/14)	U <sub>3</sub>	V	5.5
Retention Voltage (Chopper for FB-07)	U <sub>3</sub>	V	4.8
Retention Current	I <sub>3</sub>	A	2
Response Time	T	ms	50
Chopper Frequency	F	kHz	20
Operating Temperature	T	°C	0-70
Mass	M	kg	0.095

## Dimensions

	<b>FB-00</b>	<b>FB-07</b>	<b>FB-10</b>	<b>FB-14</b>
A h8	101	75	101	142
B	34	23.7	29	33.7
C	93	69.5	93	134
H12	3 x ø4.3	3 x ø3.4	3 x ø4.3	3 x ø4.3
D ±0.05	0.3	0.2	0.3	0.4
E	26	20	26	26
F	36	28	36	36
H12	ø4.3	ø4.3	ø4.3	ø4.3
G H8	60	56	65	102

# Motor-Codification Diagrams

## MSS Series



(1) AS PER ESPECIFICATION OF GEAR TYPE

MS \_\_\_\_\_

SPECIFICATION		GEOMETRIC TOLERANCES DIN 42955	
		STANDARD	REDUCED
WATERPROTECTION (DIN 40050)	IP 54	00	0R
	IP 65	65	6R
BRUSH-CONTROL CONNECTION	BY CABLE	1B	1R
	CONNECTOR	2B	2R
SPECIAL		TWO ALPHANUMERIC SIGNS PLUS SPECIFICATION SHEETS	

CODE	02	04	06	08	12	22	35	45
MODEL	2	4	6	8	12	22	35	45

Speed (r.p.m.)	3000	3000	3000	3000	3000	3000	3000	3000
TENSION (volts)	0	39.4	67	67.8	89.7	106.7	181	200
	9	SPECIAL VOLTAGE						

0	STANDARD
1	PREPARED FOR GEAR ASSEMBLY (1)
2	STANDARD WITHOUT KEYWAY
9	SPECIAL

4	ROUND FLANGE (B14)
5	SQUARE FLANGE (B5)
6	PREPARED FOR GEAR ASSEMBLY (1)
9	SPECIAL

0	CLOSED
9	SPECIAL

CODE: **MS1202502G0300**

MOTOR FAMILY	12	12
ELECTRICAL CHARACTERISTICS	106.7 V.	0
SHAFT	STANDARD WITHOUT KEYWAY	2
FLANGE	SQUARE FLANGE B-5	5
HOUSING	CLOSED	0
BRAKE	WITH BRAKE	2
TACHO	ROLIVAM D-40 10/1000 r.p.m.	G
ENCODER KIT	WITHOUT ENCODER KIT	0
ELECTRICAL CONNECTION	STANDARD CONNECTOR VERSION B	3
SPECIFICATION	STANDARD	00

MOTOR FAMILY

ELECTRICAL CHARACTERISTICS

OUTPUT SHAFT

FRONT FLANGE

HOUSING

SPECIFICATION

ELECTRICAL CONNECTION

ENCODER KIT

TACHO

BRAKE

CABLE GLAND	WITHOUT CABLE	0	
	WITH CABLE 1.5 mt.	1	
CONNECTOR	STANDARD	VERSION A	2
		VERSION B	3
	MILITARY SPECIFICATION (MIL-C-5015)	VERSION A	5
		VERSION B	6
SPECIAL		9	

A - 1 CONNECTOR - MOTOR (OR MOTOR + BRAKE)
B - 2 CONNECTORS - MOTOR (OR MOTOR + BRAKE) TACHO
C - 2 CONNECTORS - MOTOR (OR MOTOR + BRAKE) ENCODER (OR ENCODER + TACHO)
D - 3 CONNECTORS (Only Military version) - MOTOR (OR MOTOR + BRAKE) ENCODER TACHO

WITHOUT KIT		0	
WITH ENCODER OR KIT	NOT MECHANIZED KIT	1	
	MECHANIZED KIT	WITH FITTED ENCODER	PREPARED TO MOUNT
MODEL	WITH PROT.	WITHOUT PROT.	WITH PROT.
SIEMENS V23	2	-	-
PG-45	-	5	-
BASIC (*)	-	3	6
SPECIAL	9		

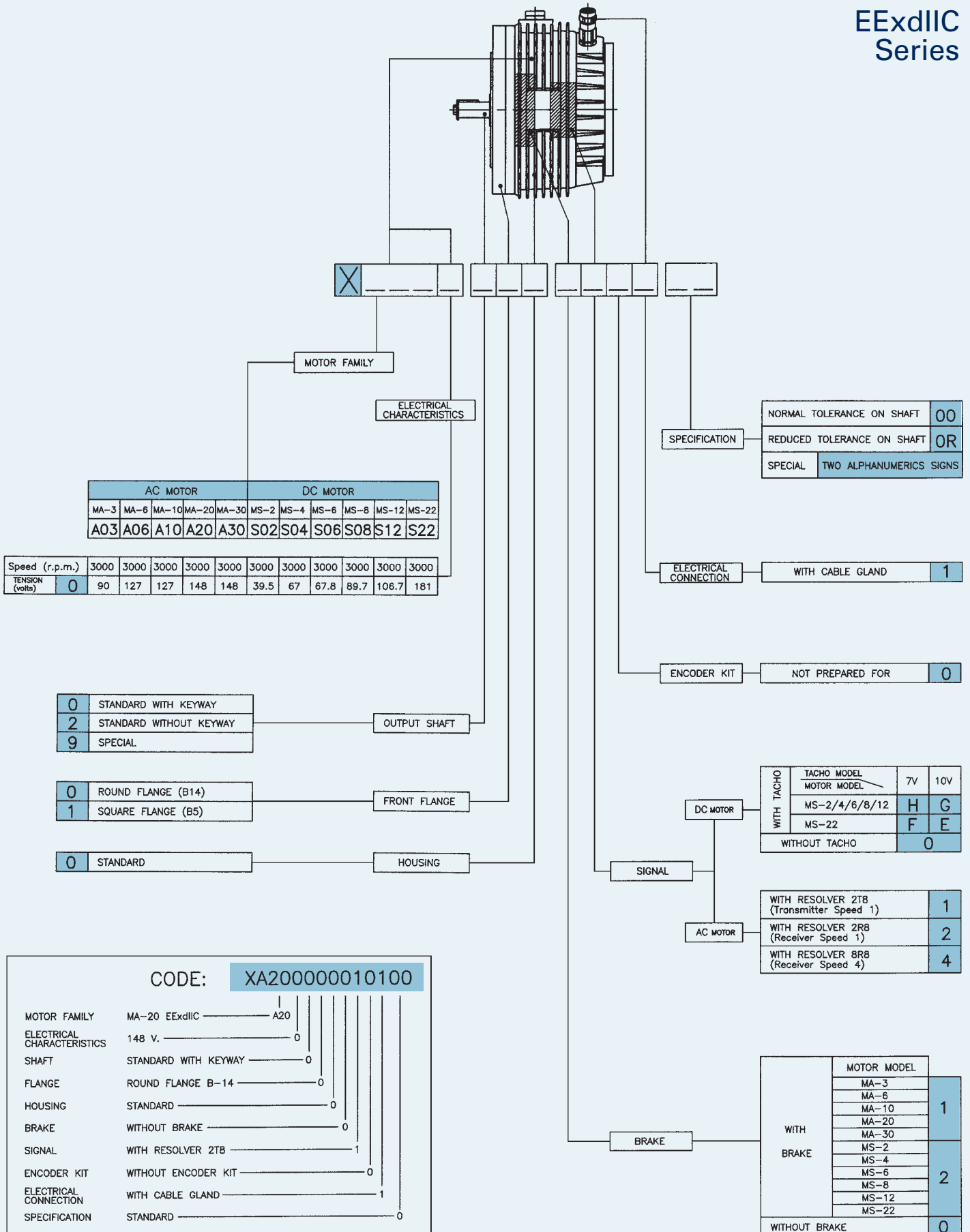
(\*) MOUNTING PILOT OF 50 mm. DIAMETER AND 3 HOLES M4 ON A 67.3 DIAMETER BOLT CIRCLE FOR FIXING CLAMPS

WITHOUT TACHO		0		
WITH TACHO	MOTOR TYPE	TENSION 1000 r.p.m.	7V.	10V.
		TACHO MODEL		20V.
	2-4-6-8-12	ROLIVAM D-40	H	G P
22-35-45	ROLIVAM D-26	F	E K	
SPECIAL TACHO		9		

WITH BRAKE	WITHOUT BRAKE	0
	SPECIAL	9
	BASIC	2
	MOTOR TYPE	BRAKE MODEL
	2	04/0.8
	4	
	6	06/2
	8	
	12	07/4.5
	22	09/10
35		
45	11/18	

# Motor-Codification Diagrams

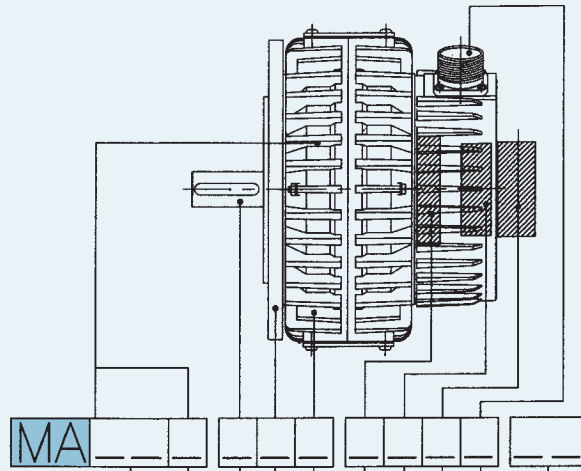
EExdIIC Series





# Motor-Codification Diagrams

## MA Series



- (1) AS PER SPECIFICATION OF GEAR TYPE SEE SPECIFICATION NUMBER
- (2) GEOMETRIC TOLERANCES
- (3) TWO ALPHANUMERIC SIGNS PLUS SPECIFICATION SHEETS

CODE	03	06	10	20	30	45	55
MODEL	3	6	10	20	30	45	55

Speed (r.p.m.)	3000	3000	3000	3000	3000	3000	3000
TENSION (volts)	0	119	153	157	168	169	163
	1		109	104	118	115	116
	9	SPECIAL VOLTAGE					

0	STANDARD
1	PREPARED FOR GEAR ASSEMBLY (1)
2	STANDARD WITHOUT KEYWAY
3	STANDARD WITH SHAFT SEAL
4	STANDARD WITHOUT KEYWAY AND WITH SHAFT SEAL
9	SPECIAL

0	FLANGE B14
1	FLANGE B5
2	PREPARED FOR GEAR ASSEMBLY (1)
3	WITHOUT FLANGE
9	SPECIAL

0	IP 54 (WATERPROTECTION DIN 40050)
5	TROPICAL FINISHED
6	IP 65 (WATERPROTECTION DIN 40050)
7	IP 65 + TROPICAL FINISHED
9	SPECIAL

SPECIAL		(3)
STANDARD		(2) 00
REDUCED TOLERANCE		(2) 0R
AKIM	2S-R84/0	A0
	2S-R84/1	A1
	2S-R84/2	A2
	2S-R84/3	A3
	2S-R84/4	A4
CYCLO	Gr.07	C1
	Gr. 2	C2
	Gr. 3	C3
	Gr. 4	C4
	Gr. 5	C5
	Gr. 6	C6
HEYNAU	G2V1/G2V2/G2V39-69/G2V3-7	H2
	G4V1/G4V2/G4V30-60	H3
	G4V31-61/G4V32-62	H4
	G5V1/G5V2/G5V28/G5V45	H5
	G7V1/G7V2/G7V72/G7V120	H7
	G9V1/G9V2/G9V120	H9
MAVILOR	SPF 0	M0
	SPF 1	M1
	SPF 2	M2

CABLE GLAND	WITHOUT CABLE	0
	WITH CABLE	1
2 CONNECTORS (Mill-Standard)	WITHOUT PLUGS	2
	WITH ANGULAR PLUGS (90°)	B
	WITH STRAIGHT PLUG	K
SCREW TERMINALS		8
SPECIAL		9

WITHOUT CABLE		0
WITH NOT MECHANIZED KIT		1
WITH FITTED ENCODER (*)		3
WITH BASIC KIT (*) (Prepared to mount)	WITHOUT PROTECTOR	4
	WITH PROTECTOR	6
SPECIAL		9

(\*) MOUNTING PILOT OF 50mm. DIAMETER AND 3 HOLES M4 ON A 67.3 DIAMETER BOLT CIRCLE FOR FIXING CLAMPS

WITHOUT RESOLVER		0
WITH RESOLVER 2T8 (Transmitter Speed 1)		1
WITH RESOLVER 2R8 (Receiver Speed 1)		2
WITH RESOLVER 8R8 (Receiver Speed 4)		4
SPECIAL		9

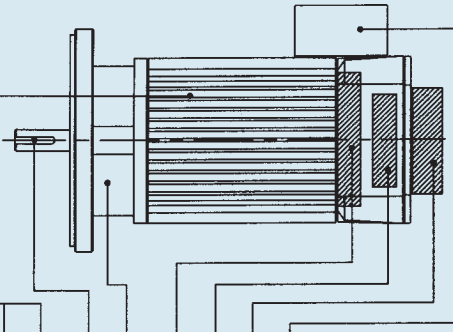
WITHOUT BRAKE		0
WITH BRAKE	SPECIAL	9
	BASIC	
MOTOR TYPE	WITH CHOPPER	1
	WITHOUT CHOPPER	2
3	07/1	06/2
6		
10	10/4	10/4
20		
30	10/8	10/8
45		
55	10/16	10/12

CODE: MA100210210200

MOTOR FAMILY	10	10
ELECTRICAL CHARACTERISTICS	153 v	0
SHAFT	STANDARD WITHOUT KEYWAY	2
FLANGE	FLANGE B-5	1
HOUSING	IP 54	0
BRAKE	WITH BRAKE	2
RESOLVER	WITH RESOLVER 2T8	1
ENCODER KIT	WITHOUT ENCODER KIT	0
ELECTRICAL CONNECTION	2 STANDARD CONNECTORS	2
SPECIFICATION	STANDARD	00

# Motor-Codification Diagrams

BL Series



S	SINUSOIDAL VERSION
T	TRAPEZOIDAL VERSION

	04	05	07	11	14	19
SIZE	40	50	70	110	140	190

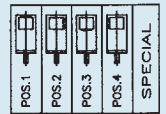
STALL TORQUE (Nm)	0	0.33	-	-	-	-
	1	-	-	0.8	2.9	13.6
	2	-	-	1.9	5	17.4
	3	-	-	2.7	8.4	26.8
	4	-	-	3.4	10.6	33
	5	-	0.7	-	13.9	-
	9	SPECIAL				

A	WINDING A
B	WINDING B
4	WINDING 400 V
9	SPECIAL

	SIZE	40	50	70	110	140	190
--	------	----	----	----	-----	-----	-----

STANDARD DIAMETER	0	WITH KEYWAY (SIZE 40 WITHOUT KEYWAY)	8h5	-	-	-	-
	2	WITHOUT KEYWAY	-	9k6	11k6	19k6	24k6
	3	WITH KEYWAY + SHAFT SEAL	-	-	-	-	-
	4	WITHOUT KEYWAY + SHAFT SEAL	-	-	-	-	-
SMALLER STANDARD DIAMETER	5	WITH KEYWAY	-	-	-	16k6	22k6
	6	WITHOUT KEYWAY	-	-	-	-	-
	7	WITH KEYWAY + SHAFT SEAL	-	-	-	-	-
	8	WITHOUT KEYWAY + SHAFT SEAL	-	-	-	-	-
	1	PREPARED FOR GEAR ASSEMBLY	-	-	-	-	-
	9	SPECIAL	-	-	-	-	-

WITH ENCLOSURE IP-65 (SHAFT IP-54)	0 0
WITH ENCLOSURE IP-67 (SHAFT IP-54) (ONLY BL-50/70)	6 7
WITH REDUCED TOLERANCE ON SHAFT	0 R
SPECIAL	TWO ALPHANUMERIC SIGNS



SIZE 40	CONNECTOR (with plug)	X - Z - 9
---------	-----------------------	-----------

SIZE 50/70	CONNECTOR (without plug)	5 - 7 -
	CONNECTOR (with plug)	N - Q - 9
	WITH TWO CABLES	T - W -

SIZE 110/140/190	CONNECTOR (without plug)	5 6 7 8
	CONNECTOR (with angular plug)	E F G H 9
	CONNECTOR (with straight plug)	N P Q R

WITHOUT KIT	0
WITH BASIC KIT WITH PROTECTOR (*) (Size 110/140)	6
WITH FITTED ENCODER (500 ppr/A,B,Z)	A
WITH FITT. ENCODER+COMMUTATION (1000 ppr/L.D.)	H
WITH FITT. ENCODER+COMMUTATOR (2048 ppr/L.D.)	K
SPECIAL	9

(\*) MOUNTING PILOT OF 50mm. DIAMETER AND 3 HOLES M4 ON A 67.3 DIAMETER BOLT CIRCLE FOR FIXING CLAMPS

WITH RESOLVER 2TB (Transmitter Speed 1)	1
WITH RESOLVER 2RB (Receiver Speed 1)	2
WITH RESOLVER 8RB (Receiver Speed 4)	4
WITH HALL EFFECT SENSOR	5
SPECIAL	9

WITHOUT BRAKE	0
WITH FLEXIBLE BRAKE (Size 110)	2
WITH BRAKE (Size 40/50/70/140/190)	3
SPECIAL	9

STANDARD (B5)	0
OPTIONAL STANDARD (See Catalogue)	1
PREPARED FOR GEAR ASSEMBLY	2
SPECIAL	9

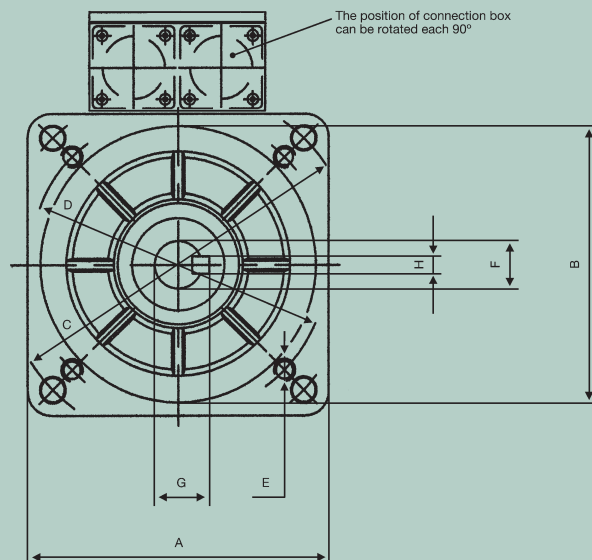
CODE: **BS111A51210E00**

COMMUTATION SYSTEM	SINUS	S
MOTOR SIZE	110	11
TORQUE	2.9 Nm	1
WINDING	A	A
SHAFT	STANDARD (Smaller diameter)	5
FLANGE	BIGGER STANDARD	1
BRAKE	WITH STANDARD BRAKE	2
SIGNAL	WITH RESOLVER TRANSMITTER 2TB	1
ENCODER	WITHOUT ENCODER	0
ELECTRICAL CONNECTION	WITH CONNECTORS (Pos.1)	E
SPECIFICATION	WITH IP-65 ENCLOSURE (IP-54 on shaft)	00

# Code list

Model	Motor	Motor with IP-65	With Brake	With Encoder Kit	With Encoder (A)	With Encoder (H)	With Encoder (K)
BLT-55	BT055A00050N00	BT055A00050N00	BT055A00350N00	-----	BT055A0005AN00	BT055A0000HN00	BT055A0000KN00
BLT-71	BT071A00050N00	BT071A00050N00	BT071A00350N00	-----	BT071A0005AN00	BT071A0000HN00	BT071A0000KN00
BLT-72	BT072A00050N00	BT072A00050N00	BT072A00350N00	-----	BT072A0005AN00	BT072A0000HN00	BT072A0000KN00
BLT-73	BT073A00050N00	BT073A00050N00	BT073A00350N00	-----	BT073A0005AN00	BT073A0000HN00	BT073A0000KN00
BLT-74	BT074A00050N00	BT074A00050N00	BT074A00350N00	-----	BT074A0005AN00	BT074A0000HN00	BT074A0000KN00
BLT-111	BT111A00050E00	BT111A00050E00	BT111A00250E00	BT111A00056E00	BT111A0005AE00	BT111A0000HE00	BT111A0000KE00
BLT-112	BT112A00050E00	BT112A00050E00	BT112A00250E00	BT112A00056E00	BT112A0005AE00	BT112A0000HE00	BT112A0000KE00
BLT-113	BT113A00050E00	BT113A00050E00	BT113A00250E00	BT113A00056E00	BT113A0005AE00	BT113A0000HE00	BT113A0000KE00
BLT-114	BT114A00050E00	BT114A00050E00	BT114A00250E00	BT114A00056E00	BT114A0005AE00	BT114A0000HE00	BT114A0000KE00
BLT-115	BT115A00050E00	BT115A00050E00	BT115A00250E00	BT115A00056E00	BT115A0005AE00	BT115A0000HE00	BT115A0000KE00
BLT-141	BT141A00050E00	BT141A00050E00	BT141A00350E00	BS141A00056E00	BT141A0005AE00	BT141A0000HE00	BT141A0000KE00
BLT-142	BT142A00050E00	BT142A00050E00	BT142A00350E00	BS142A00056E00	BT142A0005AE00	BT142A0000HE00	BT142A0000KE00
BLT-143	BT143A00050E00	BT143A00050E00	BT143A00350E00	BS143A00056E00	BT143A0005AE00	BT143A0000HE00	BT143A0000KE00
BLT-144	BT144A00050E00	BT144A00050E00	BT144A00350E00	BS144A00056E00	BT144A0005AE00	BT144A0000HE00	BT144A0000KE00
BLS-40	BS040A00010X00	BS040A00010X00	BS040A00310X00	-----			
BLS-55	BS055A00010N00	BS055A00010N00	BS055A00310N00	-----			
BLS-71	BS071A00010N00	BS071A00010N00	BS071A00310N00	-----			
BLS-72	BS072A00010N00	BS072A00010N00	BS072A00310N00	-----			
BLS-73	BS073A00010N00	BS073A00010N00	BS073A00310N00	-----			
BLS-74	BS074A00010N00	BS074A00010N00	BS074A00310N00	-----			
BLS-111	BS111A00010E00	BS111A00010E00	BS111A00210E00	BS111A00016E00			
BLS-112	BS112A00010E00	BS112A00010E00	BS112A00210E00	BS112A00016E00			
BLS-113	BS113A00010E00	BS113A00010E00	BS113A00210E00	BS113A00016E00			
BLS-114	BS114A00010E00	BS114A00010E00	BS114A00210E00	BS114A00016E00			
BLS-115	BS115A00010E00	BS115A00010E00	BS115A00210E00	BS115A00016E00			
BLS-141	BS141A00010E00	BS141A00010E00	BS141A00310N00	BS141A00016E00			
BLS-142	BS142A00010E00	BS142A00010E00	BS142A00310N00	BS142A00016E00			
BLS-143	BS143A00010E00	BS143A00010E00	BS143A00310N00	BS143A00016E00			
BLS-144	BS144A00010E00	BS144A00010E00	BS144A00310N00	BS144A00016E00			
BLS-191	BS191A00010E00	BS191A00010E00	BS191A00310N00				
BLS-192	BS192A00010E00	BS192A00010E00	BS192A00310N00				
MA-3	MA030006010B00	MA030006010B00	MA030006210B00	MA030006016B00			
MA-6	MA060000010B00	MA060006010B00	MA060000210B00	MA060000016B00			
MA-10	MA100000010B00	MA100006010B00	MA100000210B00	MA100000016B00			
MA-20	MA200000010B00	MA200006010B00	MA200000210B00	MA200000016B00			
MA-30	MA300000010B00	MA300006010B00	MA300000210B00	MA300000016B00			
MA-45	MA450000010B00	MA450006010B00	MA450000210B00	MA450000016B00			
MA-55	MA550000010B00	MA550006010B00	MA550000210B00	MA550000016B00			
MA-3 EExdIIC	XA030000010100	-----	XA030000210100	-----			
MA-6 EExdIIC	XA060000010100	-----	XA060000210100	-----			
MA-10 EExdIIC	XA100000010100	-----	XA100000210100	-----			
MA-20 EExdIIC	XA200000010100	-----	XA200000210100	-----			
MA-30 EExdIIC	XA300000010100	-----	XA300000210100	-----			
MS-2 EExdIIC	XS020000000100	-----	XS020000200100	-----	XS0200000G0100	XS0200002G0100	
MS-4 EExdIIC	XS040000000100	-----	XS040000200100	-----	XS0400000G0100	XS0400002G0100	
MS-6 EExdIIC	XS060000000100	-----	XS060000200100	-----	XS0600000G0100	XS0600002G0100	
MS-8 EExdIIC	XS080000000100	-----	XS080000200100	-----	XS0800000G0100	XS0800002G0100	
MS-12 EExdIIC	XS120000000100	-----	XS120000200100	-----	XS1200000G0100	XS1200002G0100	
MS-22 EExdIIC	XS220000000100	-----	XS220000200100	-----	XS2200000E0100	XS2200002E0100	
MSK-08	MSK800000000000	MSK800000000000	-----	-----	MSK800000G0100	-----	
MSS-2	MS020040000000	MS020040000065	MS020040200100	MS020040006100	MS0200400G0100	MS0200402G0100	
MSS-4	MS040040000000	MS040040000065	MS040040200100	MS040040006100	MS0400400G0100	MS0400402G0100	
MSS-6	MS060040000000	MS060040000065	MS060040200100	MS060040006100	MS0600400G0100	MS0600402G0100	
MSS-8	MS080040000000	MS080040000065	MS080040200100	MS080040006100	MS0800400G0100	MS0800402G0100	
MSS-12	MS120040000000	MS120040000065	MS120040200100	MS120040006100	MS1200400G0100	MS1200402G0100	
MSS-22	MS220040000000	MS220040000065	MS220040200100	MS220040006100	MS2200400E0100	MS2200402E0100	
MSS-35	MS350040000000	MS350040000065	MS350040200100	MS350040006100	MS3500400E0100	MS3500402E0100	
MSS-45	MS450040000000	MS450040000065	MS450040200100	MS450040006100	MS4500400E0100	MS4500402E0100	

# Optional Dimensions



## Optional flange mounting

	BL-110	BL-140
A	□ 115	□ 140
B	∅110 j6	∅110 j6
C	∅130	∅165
D	—	∅130
E	—	4xM10

## Smaller output Shaft

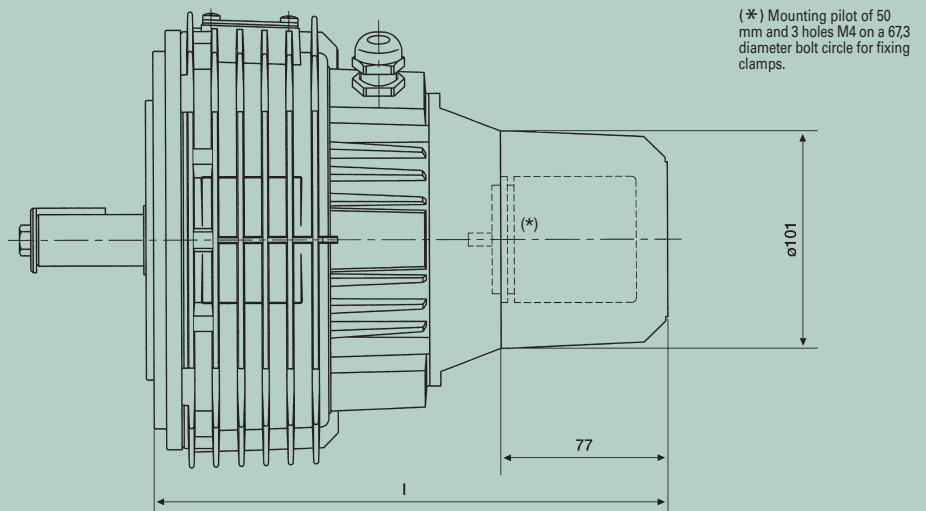
	BL-110	BL-140
F	∅16 k6	∅22 k6
G	18 <sup>+0.1</sup> <sub>0</sub>	24.5 <sup>+0.1</sup> <sub>0</sub>
H	5x5x30	6x6x32



# Optional Accessories

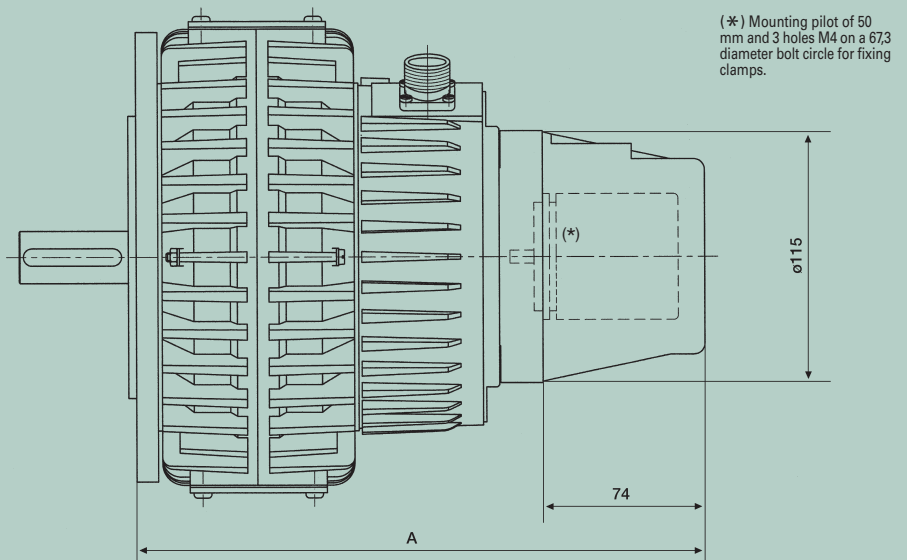
## MSS Encoder Kit (no encoder)

	l
<b>MSS-2</b>	235
<b>MSS-4</b>	233
<b>MSS-6</b>	233
<b>MSS-8</b>	243.5
<b>MSS-12</b>	237.5
<b>MSS-22</b>	265.5
<b>MSS-35</b>	291
<b>MSS-45</b>	291



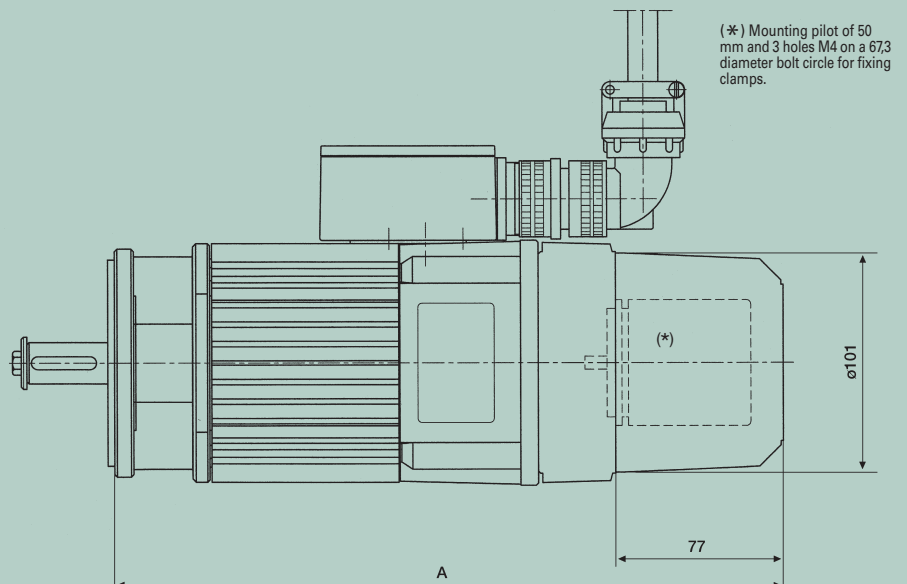
## MA Encoder Kit (no encoder)

	A
<b>MA-6</b>	237.5
<b>MA-10</b>	237.5
<b>MA-20</b>	252.5
<b>MA-30</b>	261.5
<b>MA-45</b>	274
<b>MA-55</b>	274

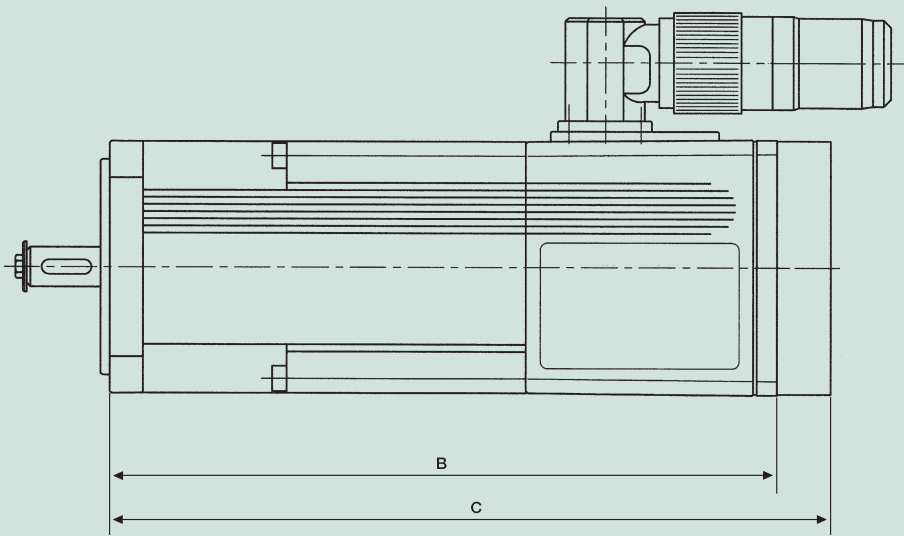


## BL 110/140 Encoder Kit (no encoder)

	A
<b>BL-111</b>	282
<b>BL-112</b>	307
<b>BL-113</b>	332
<b>BL-114</b>	357
<b>BL-115</b>	382
<b>BL-141</b>	346
<b>BL-142</b>	367
<b>BL-143</b>	411
<b>BL-144</b>	453



# Optional Accessories



## BL 50/70 With Fitted Encoder

### Dimensions

WITHOUT BRAKE		BL-55	BL-71	BL-72	BL-73	BL-74
B		142	128.5	148.5	166.5	184.5
C	Encoder Type "A"	142	147	167	185	203
	Encoder Type "H"	142	128,5	148,5	166.5	184.5
	Encoder Type "K"	—	128,5	148,5	166.5	184.5

WITH BRAKE		BL-55	BL-71	BL-72	BL-73	BL-74
B		180.5	128.5	148.5	166.5	184.5
C	Encoder Type "A"	180.5	147	167	185	203
	Encoder Type "H"	—	136	156	166.5	184.5
	Encoder Type "K"	—	136	156	166.5	184.5

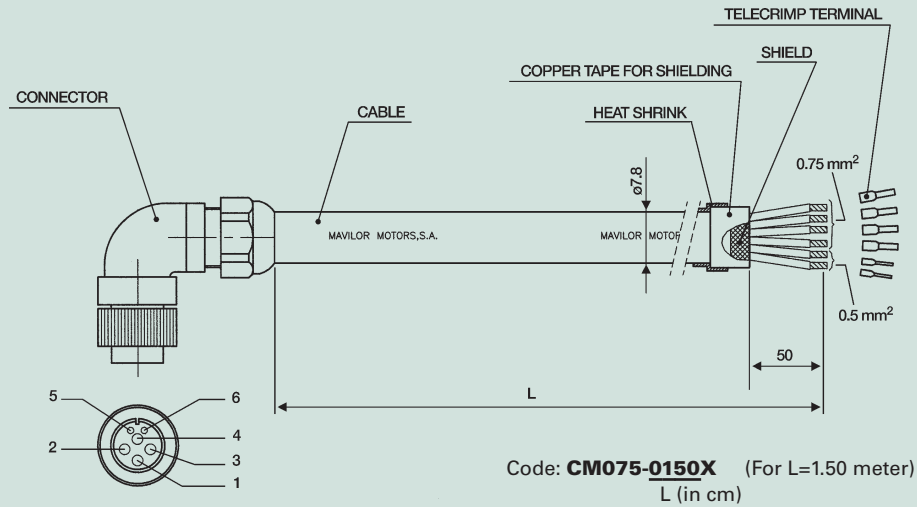
### Encoder Specifications

	TYPE "A"	TYPE "H"	TYPE "K"
Waveform	Square Wave	Square Wave	
Line Counts	500 ppr	1000 ppr	2048 ppr
Channels	A, B, Z Open-Collector	A, B, Z, $\bar{A}$ , $\bar{B}$ , $\bar{Z}$ / U, V, W, $\bar{U}$ , $\bar{V}$ , $\bar{W}$ Line drives (RS422)	
Supply Voltage	5VDC $\pm$ 10%	5VDC $\pm$ 10%	
Frequency Response	100 kHz	200 kHz	
Operating Temperature	-40 °C ~ +100 °C	-40 °C ~ +120 °C	

# Power Cable Assembly Kit

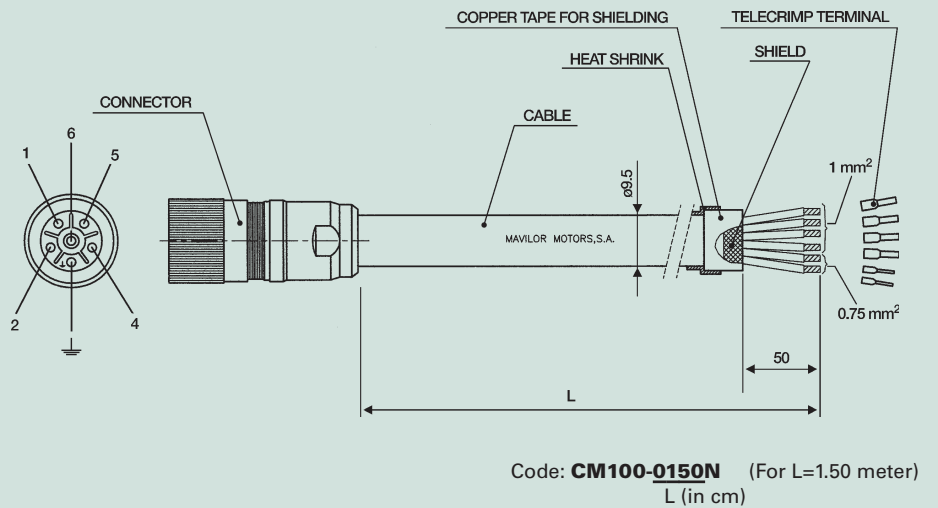
## BL-40

CONTACT	COLOR	FUNCTION
1	Brown	Phase 1 U
2	Black	Phase 2 V
3	Blue	Phase 3 W
4	Yellow/Green	Ground $\oplus$
5	Red	Brake +
6	White	Brake -



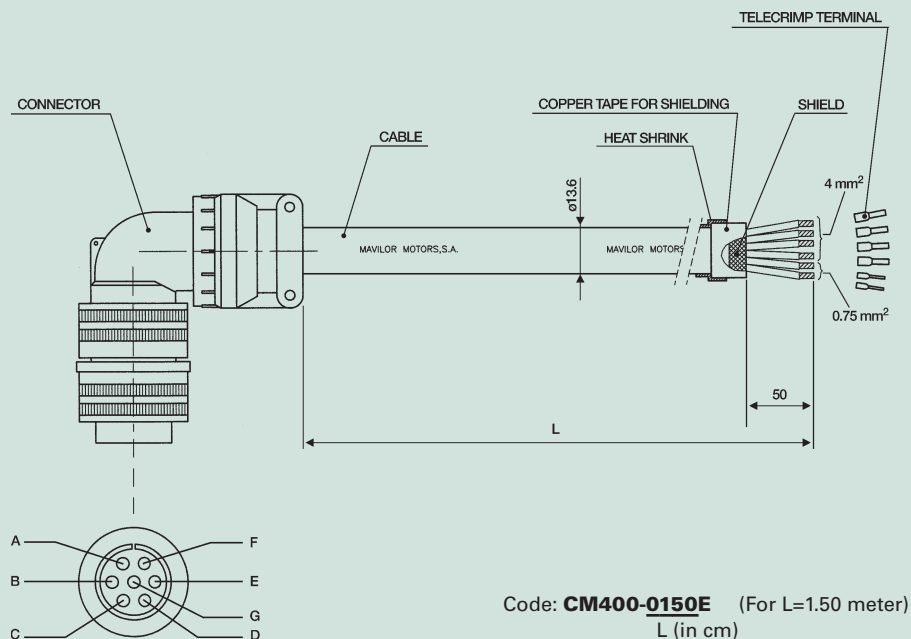
## BL-50/70

CONTACT	COLOR	FUNCTION
1	Blue	Phase 3 W
2	Brown	Phase 1 U
$\oplus$	Yellow/Green	Ground $\oplus$
4	Black	Phase 2 V
5	Red	Brake +
6	White	Brake -

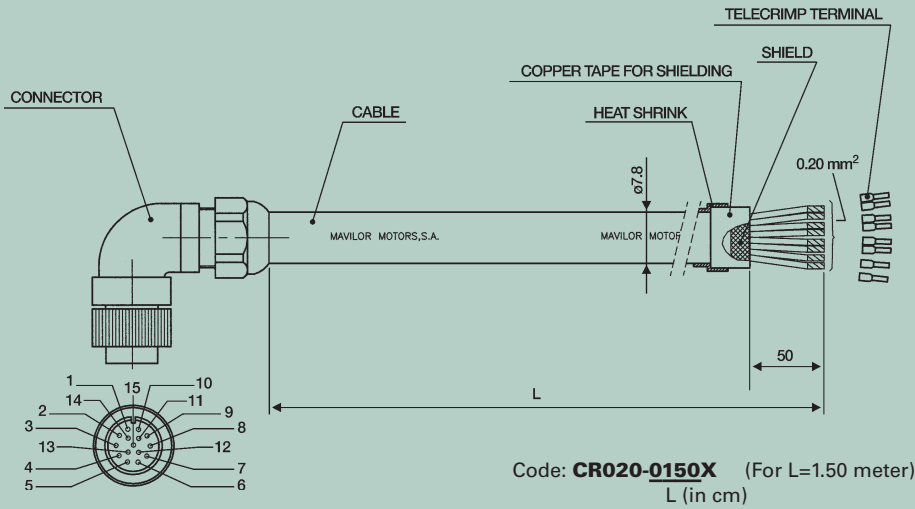


## BL-110/140 MA-6 to MA-55

CONTACT	COLOR	FUNCTION
A	Brown	Phase 1 U
B	Black	Phase 2 V
C	Blue	Phase 3 W
D	Yellow/Green	Ground $\oplus$
E	Red	Brake +
F	White	Brake -

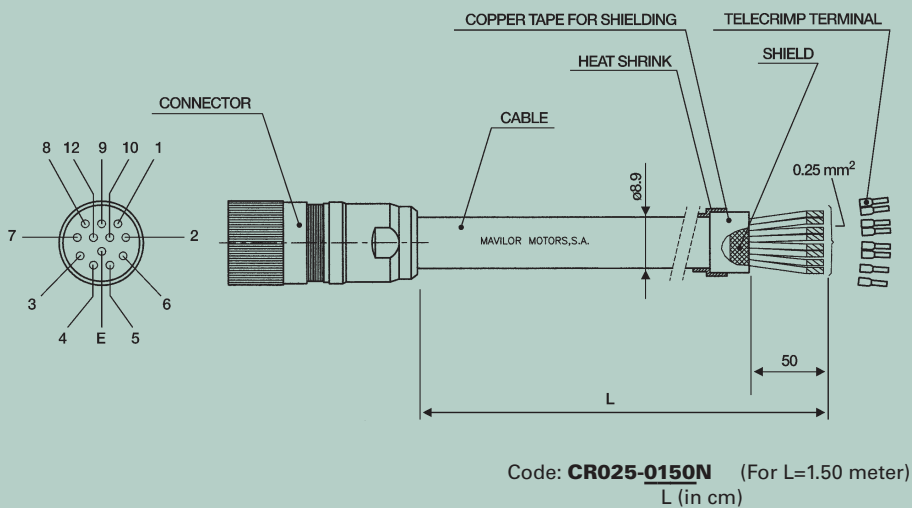


# Resolver Cable Assembly Kit



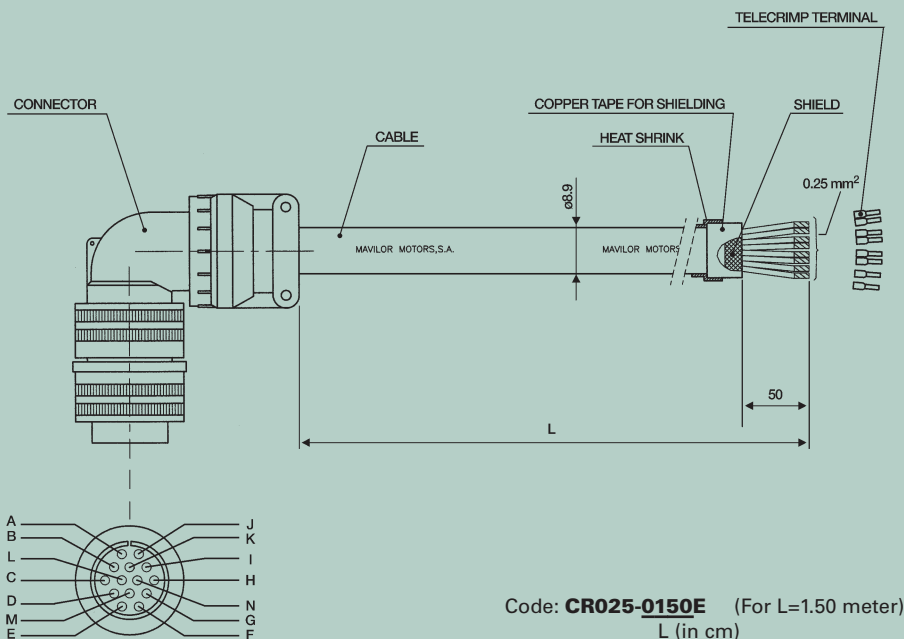
## BL-40

CONTACT	COLOR	FUNCTION
1	Grey	S4 (SEN -)
2	Pink	S2 (SEN +)
3	Blue	S1 (COS -)
4	Red	S3 (COS +)
5	Yellow	R1 (REF +)
6	Green	R2 (REF -)
7	Brown	Temp. Contact
8	White	Temp. Contact



## BL-50/70

CONTACT	COLOR	FUNCTION
2	Pink	S2 (SEN +)
1	Grey	S4 (SEN -)
3	Blue	S1 (COS -)
4	Red	S3 (COS +)
8	Yellow	R1 (REF +)
7	Green	R2 (REF -)
5	Brown	Temp. Contact
6	White	Temp. Contact



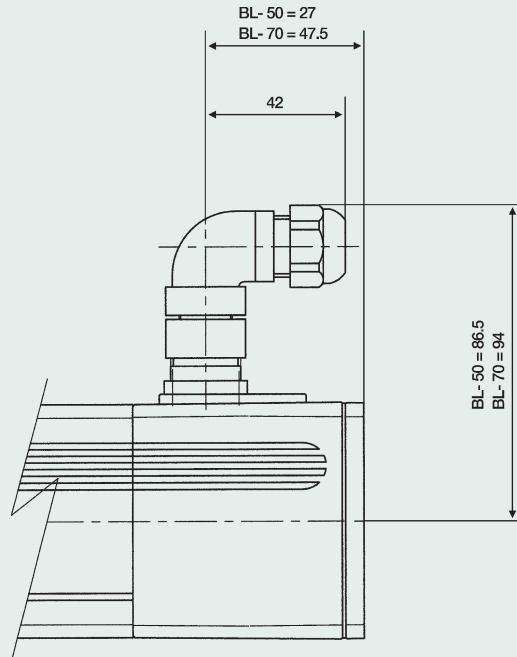
## BL-110/140 MA-3 to MA-55

CONTACT	COLOR	FUNCTION
A	Pink	S2 (SEN +)
B	Grey	S4 (SEN -)
C	Blue	S1 (COS -)
D	Red	S3 (COS +)
E	Yellow	R1 (REF +)
F	Green	R2 (REF -)
H	Brown	Temp. Contact
I	White	Temp. Contact



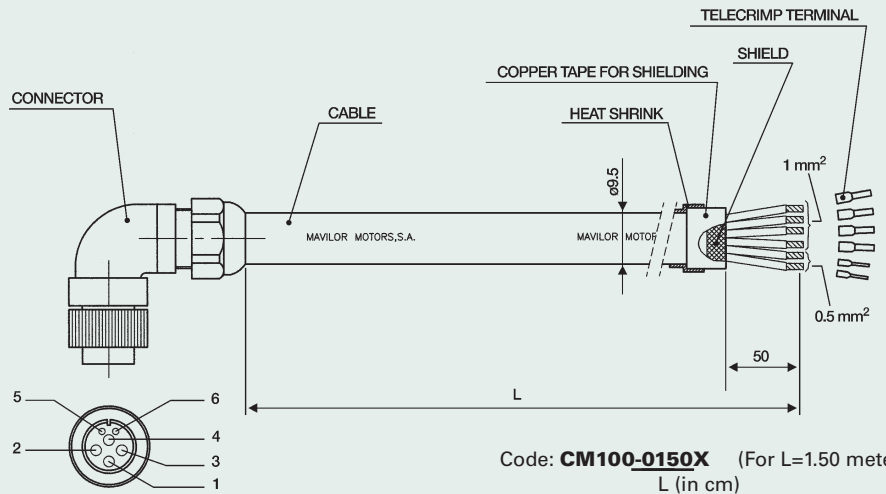
# Optional Connectors

## BL-50/70



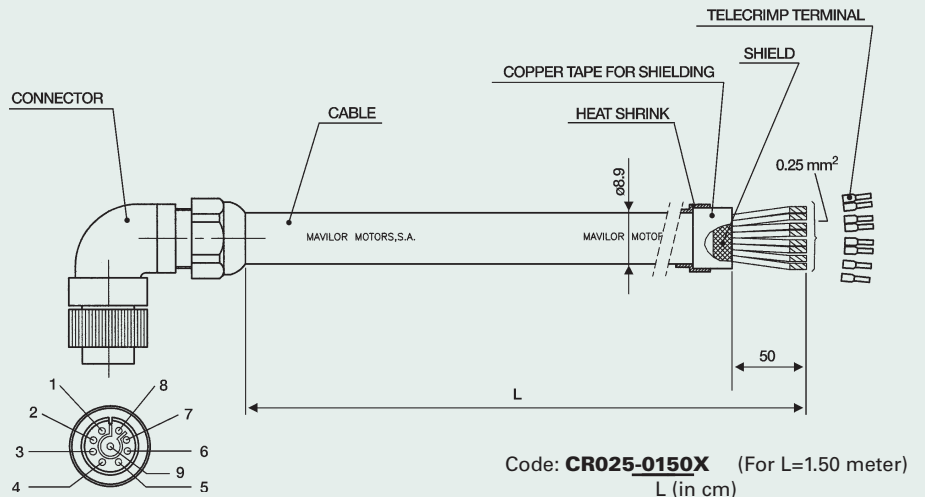
## BL-50/70 Power Cable Assembly Kit (optional)

CONTACT	COLOR	FUNCTION
1	Brown	Phase 1 U
2	Black	Phase 2 V
3	Blue	Phase 3 W
4	Yellow/Green	Ground $\oplus$
5	Red	Brake +
6	White	Brake -



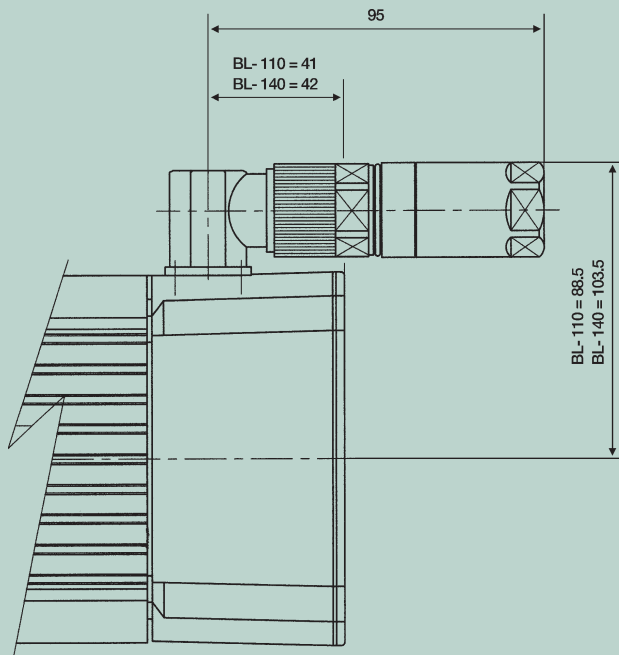
## BL-50/70 Resolver Cable Assembly Kit (optional)

CONTACT	COLOR	FUNCTION
1	Grey	S4 (SEN -)
2	Pink	S2 (SEN +)
3	Blue	S1 (COS -)
4	Red	S3 (COS +)
5	Yellow	R1 (REF +)
6	Green	R2 (REF -)
7	Brown	Temp. Contact
8	White	Temp. Contact

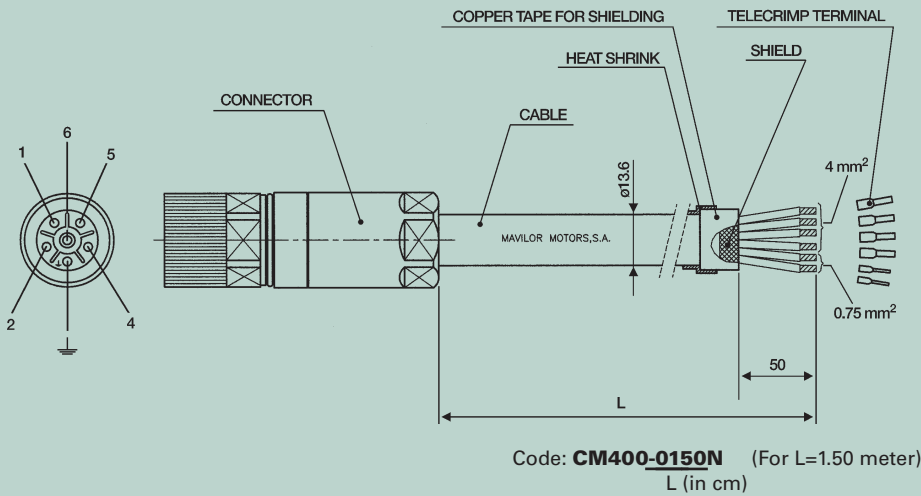


# Optional Connector

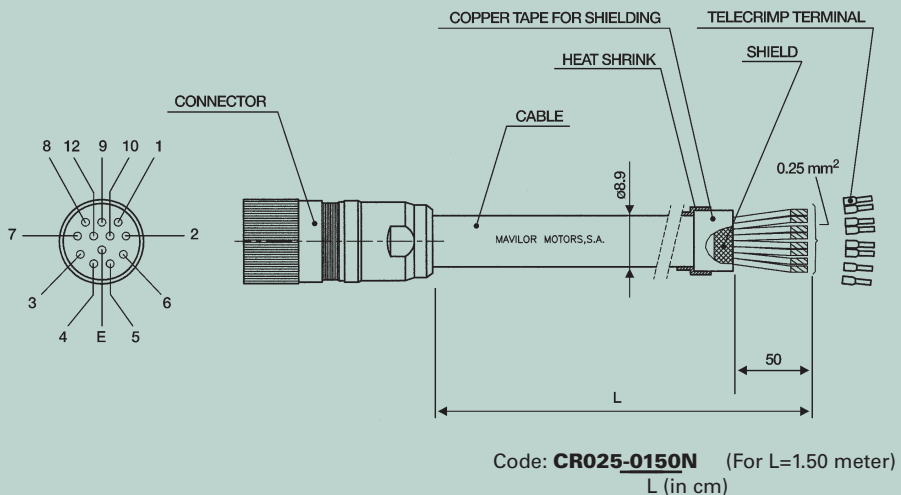
## BL-110/140 (No terminal BOX)



## BL-110/140 Power Cable Assembly Kit (optional)



CONTACT	COLOR	FUNCTION
1	Blue	Phase 3 W
2	Brown	Phase 1 U
⊕	Yellow/Green	Ground ⊕
4	Black	Phase 2 V
5	Red	Brake +
6	White	Brake -

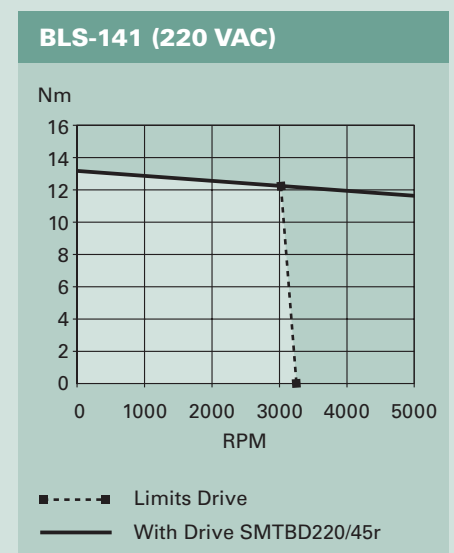
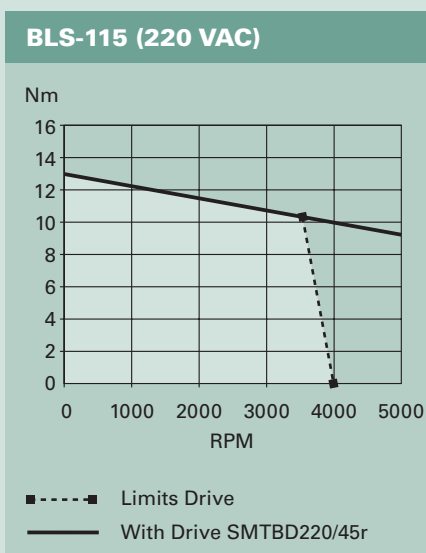
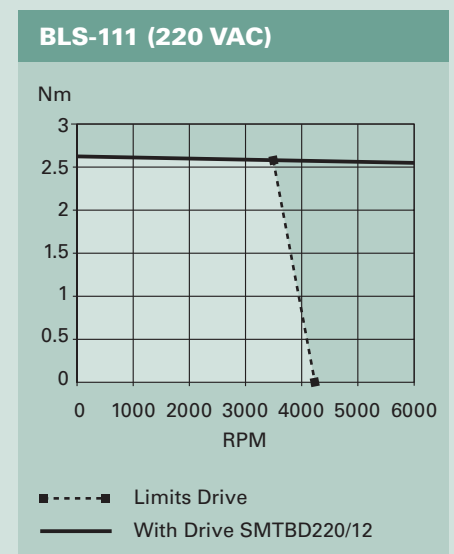
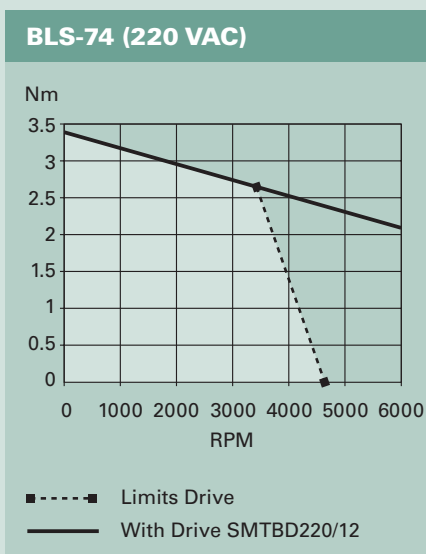
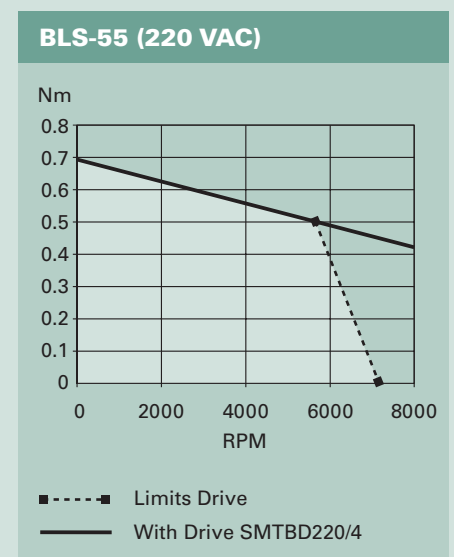
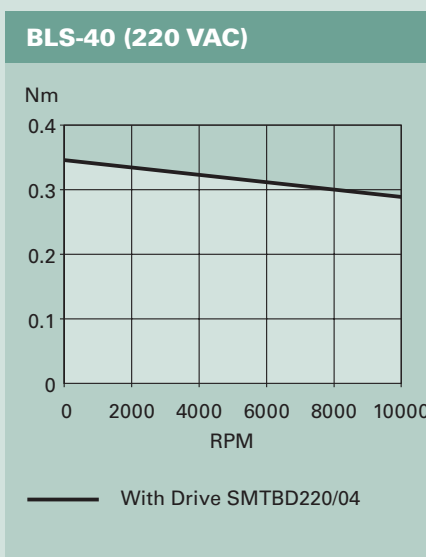


## BL-110/140 Resolver Cable Assembly Kit (optional)

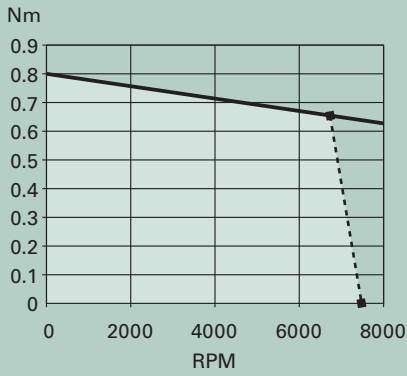
CONTACT	COLOR	FUNCTION
2	Pink	S2 (SEN +)
1	Grey	S4 (SEN -)
3	Blue	S1 (COS -)
4	Red	S3 (COS +)
8	Yellow	R1 (REF +)
7	Green	R2 (REF -)
5	Brown	Temp. Contact
6	White	Temp. Contact

# Performance curves with some Infranor's drives

- These curves have been obtained using the most adequate drive in terms of current and voltage to the motor to be controlled.
- The current loop adjustment of the drive has been adapted depending on the characteristics of the motor.
- The limits drive curves refer to the maximum speed with and without load at the nominal voltage of the drive.

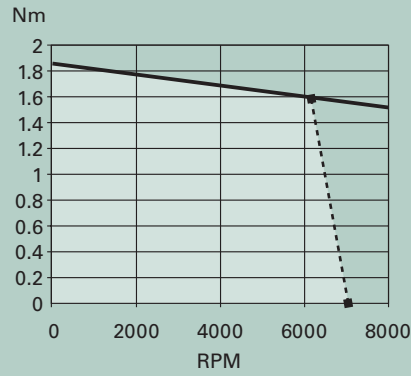


**BLS-71 (220 VAC)**



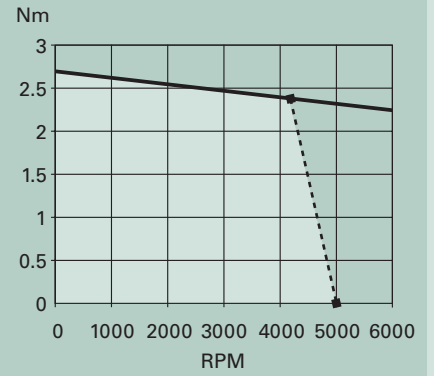
■ - - - ■ Limits Drive  
— With Drive SMTBD220/8

**BLS-72 (220 VAC)**



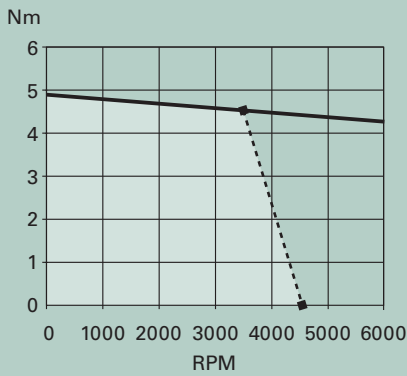
■ - - - ■ Limits Drive  
— With Drive SMTBD220/8

**BLS-73 (220 VAC)**



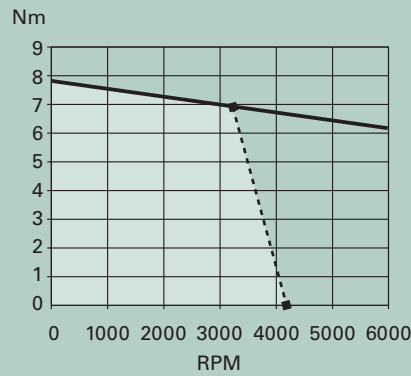
■ - - - ■ Limits Drive  
— With Drive SMTBD220/8

**BLS-112 (220 VAC)**



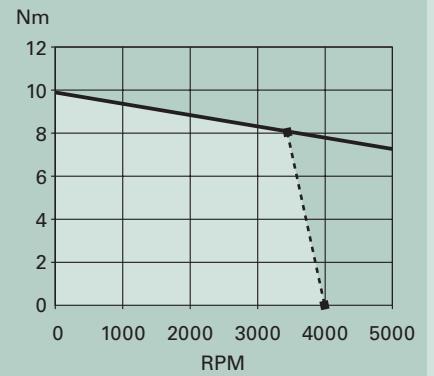
■ - - - ■ Limits Drive  
— With Drive SMTBD220/17

**BLS-113 (220 VAC)**



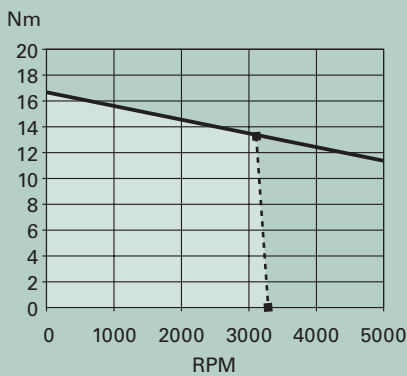
■ - - - ■ Limits Drive  
— With Drive SMTBD220/45r

**BLS-114 (220 VAC)**



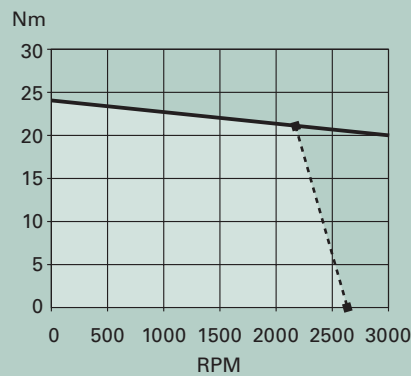
■ - - - ■ Limits Drive  
— With Drive SMTBD220/45r

**BLS-142 (220 VAC)**



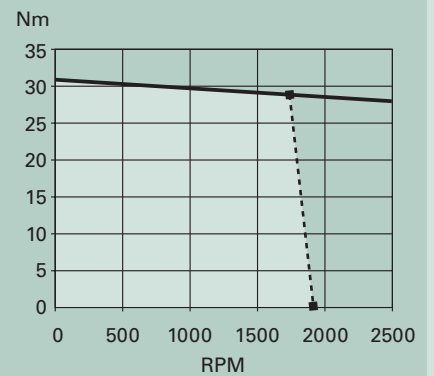
■ - - - ■ Limits Drive  
— With Drive SMTBD220/45r

**BLS-143 (220 VAC)**



■ - - - ■ Limits Drive  
— With Drive SMTBD220/45

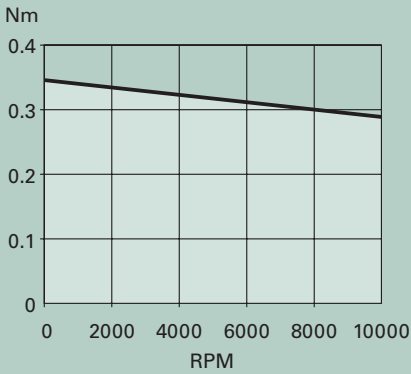
**BLS-144 (220 VAC)**



■ - - - ■ Limits Drive  
— With Drive SMTBD220/45r

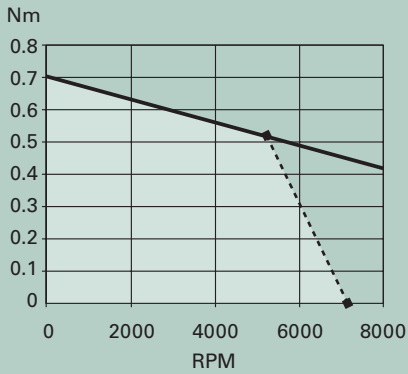
# Performance curves with some Infranor's drives

**BLS-40 (110 VAC)**



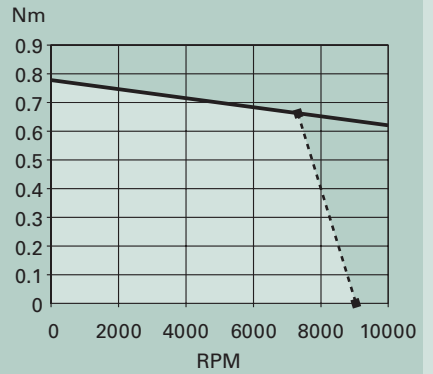
— With Drive SMTBD1a220/12 (Adapted)

**BLS-55 (400 VAC)**



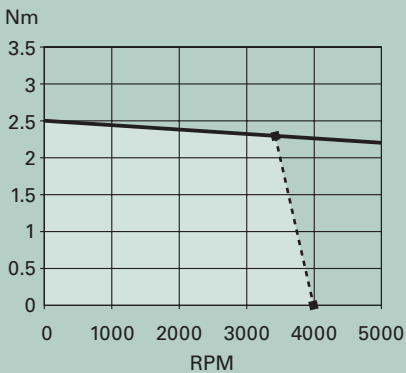
■ - - - ■ Limits Drive  
— With Drive CD1a-400/2.7

**BLS-71 (400 VAC)**



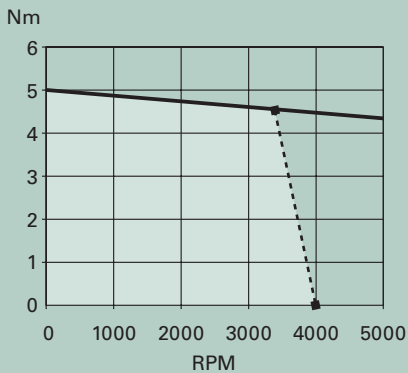
■ - - - ■ Limits Drive  
— With Drive CD1a-400/2.7

**BLS-111 (400 VAC)**



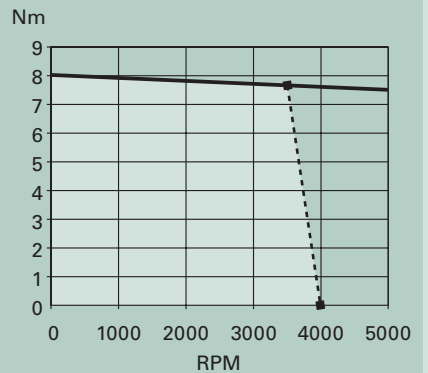
■ - - - ■ Limits Drive  
— With Drive SMTBD400/15

**BLS-112 (400 VAC)**



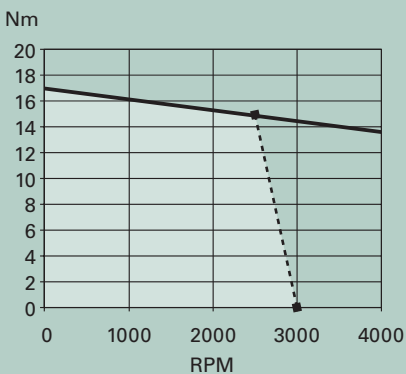
■ - - - ■ Limits Drive  
— With Drive SMTBD400/15

**BLS-113 (400 VAC)**



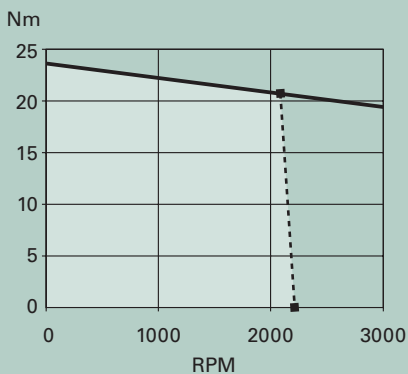
■ - - - ■ Limits Drive  
— With Drive SMTBD400/15

**BLS-142 (400 VAC)**



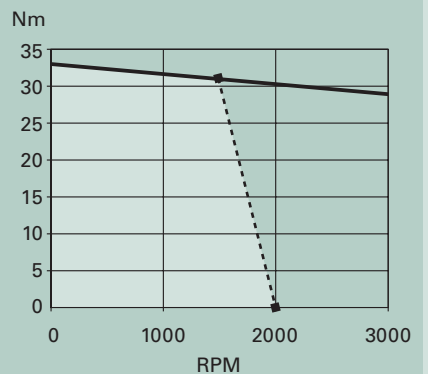
■ - - - ■ Limits Drive  
— With Drive SMTBD400/45

**BLS-143 (400 VAC)**



■ - - - ■ Limits Drive  
— With Drive SMTBD400/30

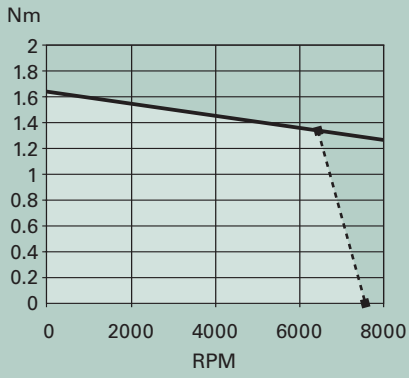
**BLS-144 (400 VAC)**



■ - - - ■ Limits Drive  
— With Drive SMTBD400/45

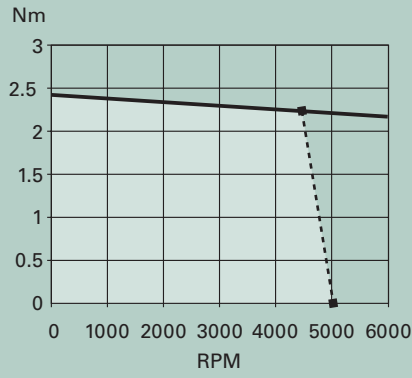


**BLS-72 (400 VAC)**



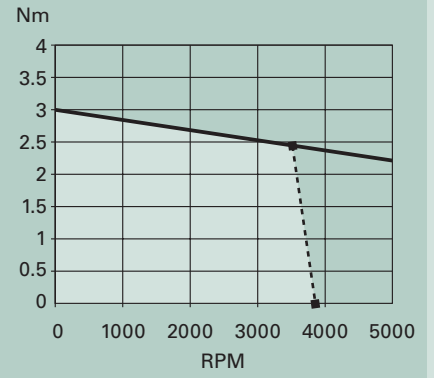
■ - - - ■ Limits Drive  
— With Drive SMTBD400/15

**BLS-73 (400 VAC)**



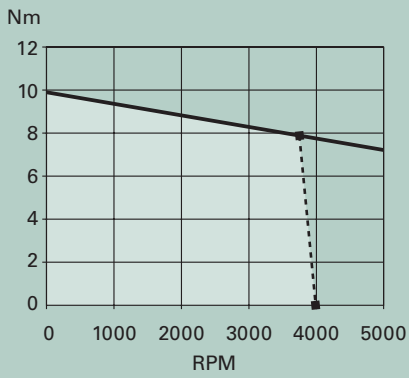
■ - - - ■ Limits Drive  
— With Drive CD1a-400/7.2

**BLS-74 (400 VAC)**



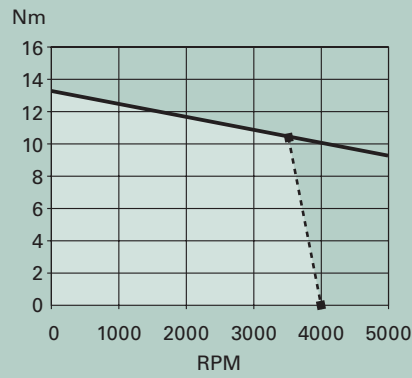
■ - - - ■ Limits Drive  
— With Drive SMTBD400/15

**BLS-114 (400 VAC)**



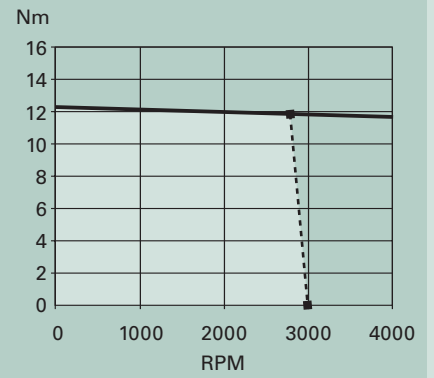
■ - - - ■ Limits Drive  
— With Drive SMTBD400/15

**BLS-115 (400 VAC)**



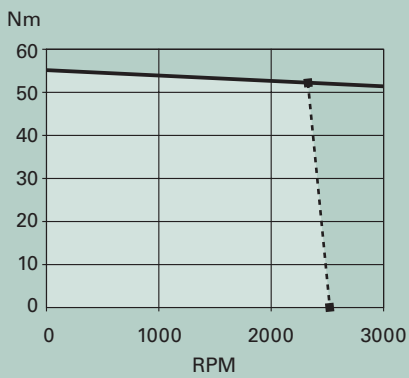
■ - - - ■ Limits Drive  
— With Drive SMTBD400/45

**BLS-141 (400 VAC)**



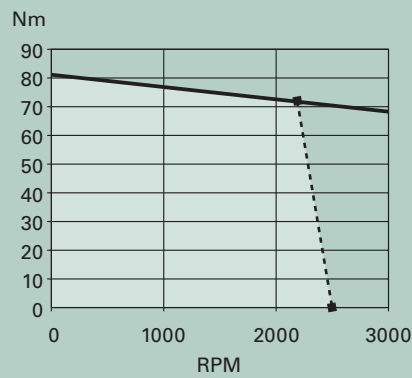
■ - - - ■ Limits Drive  
— With Drive SMTBD400/30

**BLS-191 (400 VAC)**



■ - - - ■ Limits Drive  
— With Drive SMTBD400/60

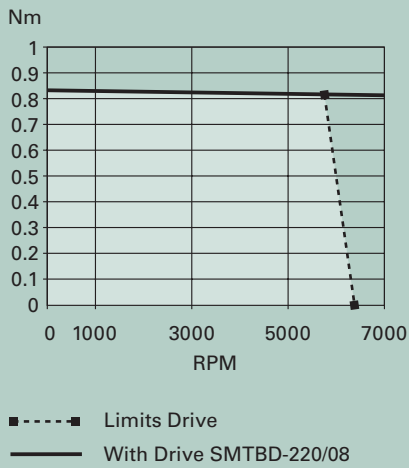
**BLS-192 (400 VAC)**



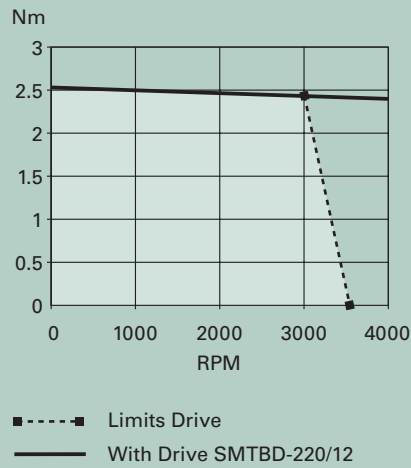
■ - - - ■ Limits Drive  
— With Drive SMTBD400/60

# Performance curves with some Infranor's drives

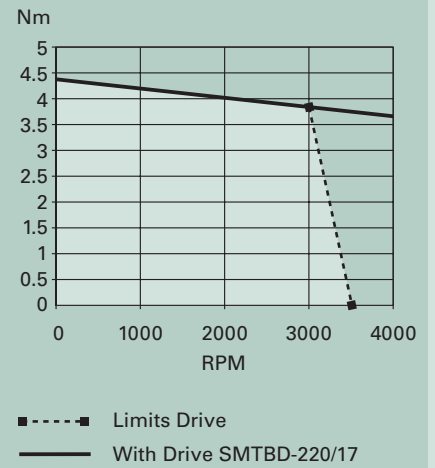
**MA-03 (220 VAC)**



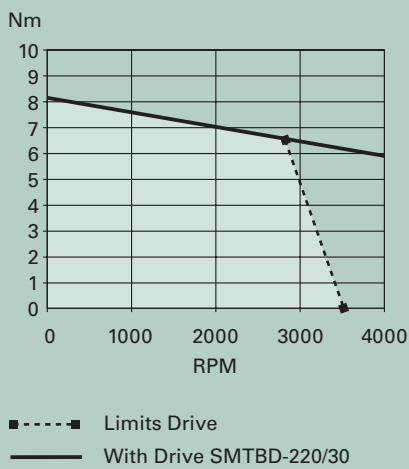
**MA-06 (220 VAC)**



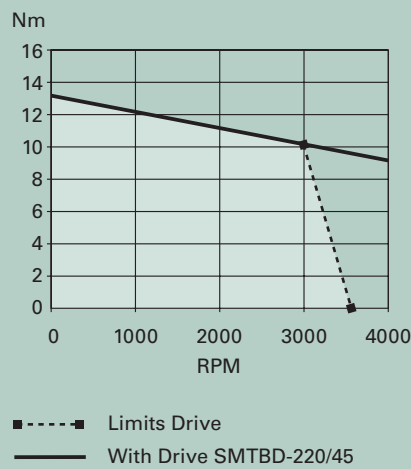
**MA-10 (220 VAC)**



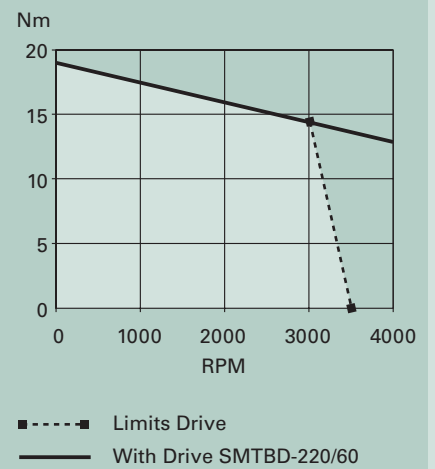
**MA-20 (220 VAC)**



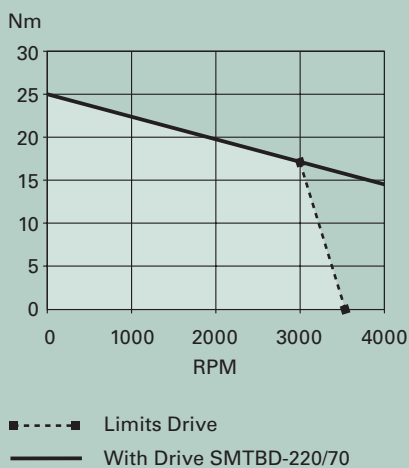
**MA-30 (220 VAC)**



**MA-45 (220 VAC)**



**MA-55 (220 VAC)**







INFRANOR GROUP COMPANY

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