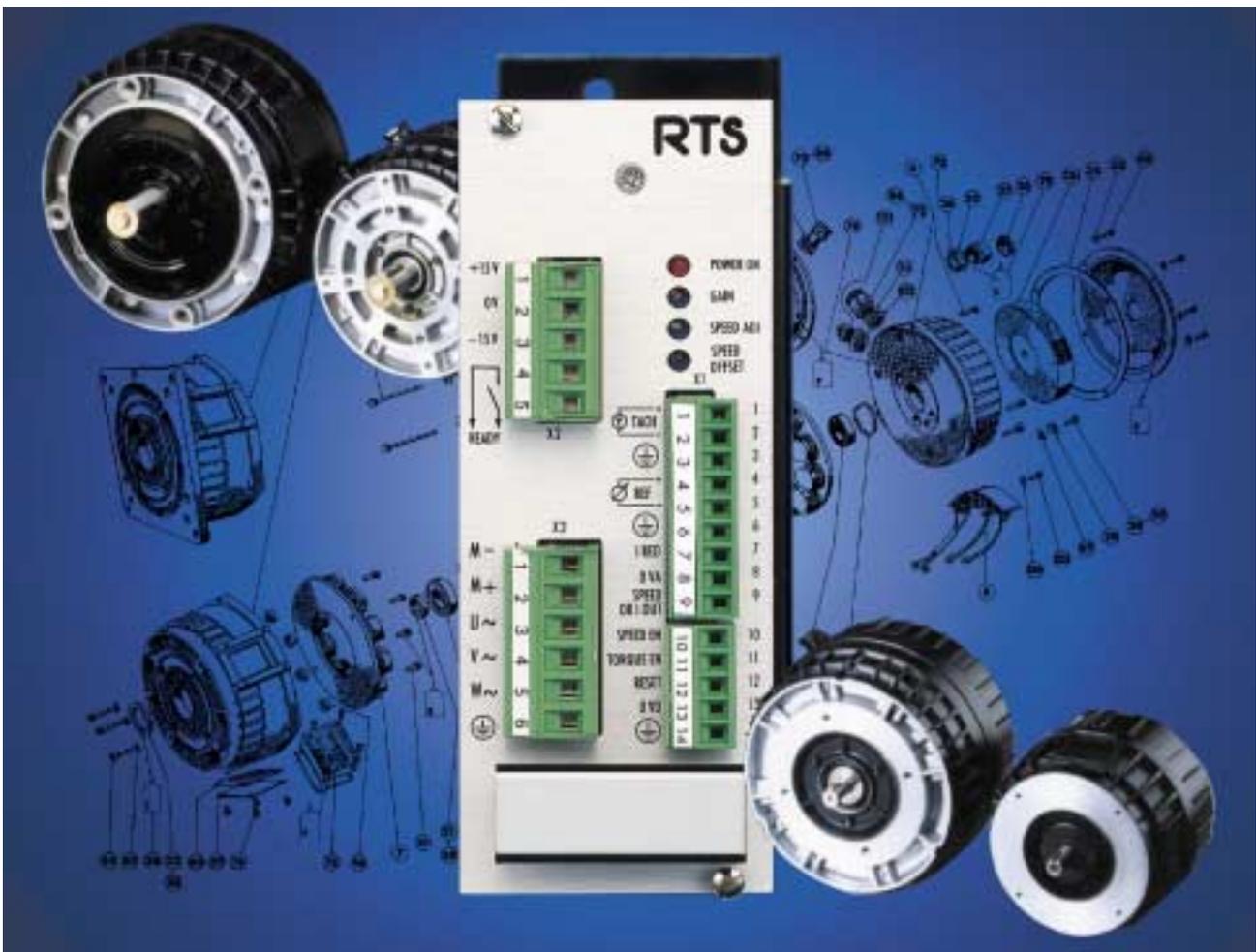


# AXEM Series

Direct current  
Disc-servomotor



# AXEM

## A complete range

### ➤ AXEM advantages

No maintenance.

Rotor made solely of copper and electrical insulation, therefore no speed variation caused by the slot effect, and no switching limit (little or no brush wear)

Multi-blade, radial commutator gives smooth, silent and vibration-free running.

Constant torque available right across the speed range, and exceptional, low speed rotation regularity.

### ➤ Method of construction

Direct current, toroidal magnetic field servo-motor driven by magnets.

- Mounting:
  - F, MC13S ranges: threaded hole bracket
  - MC range: threaded or smooth hole bracket.
- Protection: Generally IP44, IP20 for ventilated servo-motors.
- Insulation: class F.
- Balance: N
- Bearings are greased for life
- Shaft loads: Please refer to chart in the following pages.  
Please contact us with reference to accumulated, radial, axial loads
- Electrical connection: via terminals, cable is used in some cases.

### ➤ F series

designed for dynamic, low powered systems; it can be used for all applications requiring small, robust drive systems.

### ➤ MC series

designed to comply with any type of position and speed servo system.



### ➤ AXEM servo-motors comply with the following norms

	AFNOR (F)	DIN/VDE	INTERNATIONAL
IP protection	EN 60034-5	DIN 40050	CEI 34-5
bracket	C 51-104	DIN 42948	CEI 72
Shaft end	C 51-105	DIN 42946	CEI 72
Bracket tolerance	C 51-105	DIN 42946	CEI 72
Noise	C 51-119	DIN42955	CEI 34-9
Balance	C 51-111 (additive 1)	DIN 45665	ISO 2373
Electrical rate (1)	C 51-111 no power limit	VDE 0530/1	CEI 34-1

(1) With the exception of the F and MC 27 motors: 350V dielectric test

AXEM servo-motors (with the exception of model MC27P) are marked «CE» in accordance with French directive no. 73/23/CEE dated the 19<sup>th</sup> February 1973 amended by French directive no. 93/68/CEE dated the 22<sup>nd</sup> July 1993.

➤ **Integrated tachogenerators.**

Mounted directly on the drive shaft, making them, therefore, very rigid, the PARVEX precision tachogenerators have outstanding qualities. There are two different technologies available:

- F disc tacho
- T B N coiled tacho.

Motor	Tacho	Volts per 1000 r.p.m.	Inertia	Mass
	-	Ke	kgm <sup>2</sup> .10 <sup>-5</sup>	kg
F9	F9T	3	3.5	1
F12 - MC	FC12T	6	15	1.5
F9 - F12	TBN 206	6	5	0.2
MC	TBN 420	20	14.5	0.71

Selection of an F 9 T or FC 12 T tacho on an F series motor does not allow for brake and/or encoder adaptation.

➤ **No current holding brakes.**

The brake jams the drive shaft at power-down: static use in order to avoid the tacho accumulating dust.

Voltage 24V CC ± 10%.

Motor	Holding torque		Power	Inertia	Mass
	Magnet brake	Spring brake			
	Nm	Nm	W	kgm <sup>2</sup> .10 <sup>-5</sup>	kg
F9 - F12	-	1.5	11	1	0.47
MC13	2	-	12	2.3	0.3
MC17 - MC19	5	-	16	6.5	0.6
MC23 - MC24	12	-	10	21.4	1.1
MC27	20	-	22	57	1.9
MC17	-	4	20	2.5	1.4
MC19	-	8	25	7	1.9
MC23 - 24 - 27	-	16	40	13.5	2.8

➤ **Incremental encoder.**

Very compact, the K9 encoder is mounted directly on the shaft, accordingly axial loads on the shaft are not permitted.

The excellent protection of the C6B means that it is particularly well-suited to a highly industrial environment.

Motor	Encoder	Connection	Standard revolution graduations	Optional revolution graduations	Inertia	Mass
	-	-	-	-	kgm <sup>2</sup> .10 <sup>-5</sup>	kg
F	K 9	1m cable	500	250	0.03	0.075
	C 4	1m cable	500	250 - 1000 2500	0.23	0.20
MC	C 6 B	connector	500	1000 2500 5000	0.3	0.45

➤ **Gear motor (please contact us).**

This range of gear motors, perfectly integrated into the servo-motor, results in a compact, high-performance unit.

- Low clearance
- Excellent performance
- Considerable stiffness
- Practically zero maintenance

➤ **Ventilation system.**

Some of the AXEM servo-motors in the MC range can be fitted with an independent ventilation system. The ventilation system drive unit is fitted in place of one of the casing side cover plates; the supplied exhaust nozzle can be mounted by removing the second plate.

Power supply: one or three-phase 230/400V - 50/60Hz.

Power rating: 20W

Mass: 2.25kg

Lead connection (L=250mm)

➤ **Smoothing choke coil.**

The very low inductance of the AXEM is beneficial to brush life, but makes it compulsory to use a coil in tandem with the servo-motor when the power supply for the servo-motor comes from a quench servo-amplifier.

Reference	Inductance	Rated current	Terminal	Dimensions			Mass
				Width	Depth	Height	
SF 02031	mH	A	mm <sup>2</sup>	mm	mm	mm	kg
SF 02031	1	12	1.5	60	70	63	0.56
SF 02022	2.5	16	4	126	105	115	4.2
SF 02023	1.5	25	10	126	130	135	5.9
SF 02024	1	40	-	126	180	110	8.8

# AXEM SERVO-MOTOR TYPE F 9 - 12

## AXEM characteristics Type F9 - 12

Characteristics (1) at 40°C Form factor de $\leq 1,02$	Marking	Rated torque	Rated speed	Rated Power output	Rated voltage	Rated current	Rated torque S3 cycle (50 ms, 1%) E.M.F.	Torque constant (25°C)	Armature resistant (25°C)	Inertia	Mechanical time constant	Thermal time constant (disc)	Thermal time constant (housing)	Axial load	Radial load at half shaft lenght	Mass e
Symbols	Mn	Nn	Pn	Un	Io	C imp.	Ke	Kt	R	J	t <sub>m</sub>	t <sub>thd</sub>	t <sub>thc</sub>	Fa **	Fr **	M
Units	Nm	rpm	W	V	A	Nm	V	Nm/A	Ω	10 <sup>-5</sup> kg.m <sup>2</sup>	ms	s	min	daN	daN	kg
<b>F 9 M 4 R</b>	CE 0,14	4800	70	22	6,4	1,15	3,1	0,030	1,1	3,5	39,6	52	25	2,5	14	1,1
<b>F 9 M 2</b>	CE 0,282	3000	88	14	11	1,73	3,1	0,030	0,43	2,9	13,2	21	16	2,5	14	2,3
<b>F 9 M 4</b>	CE 0,346	3000	108	26	6,7	3,45	6,2	0,059	1,1	3,5	10,2	21	16	2,5	14	2,3
<b>F 9 M 4 H</b>	CE 0,537	3000	168	35	6,5	4,9	9,2	0,088	1,1	3,4	4,5	21	16	2,5	14	2,8
<b>F 12 M 4 R</b>	CE 0,42	4800	210	37	8	2,9	6,2	0,059	0,93	15	37,6	37	22	2,5	14	2,9
<b>F 12 M 2</b>	CE 0,61	3000	190	24	11,7	4,3	6	0,057	0,47	10,5	14	30	24	2,5	14	3,85
<b>F 12 M 4</b>	CE 0,77	3000	240	43	7,7	8,6	12	0,115	0,93	15	10	30	24	2,5	14	3,85
<b>F 12 M 4 H</b>	CE 1,1	3000	345	61	7,2	13	18	0,172	0,93	16	4,7	30	24	2,5	14	5

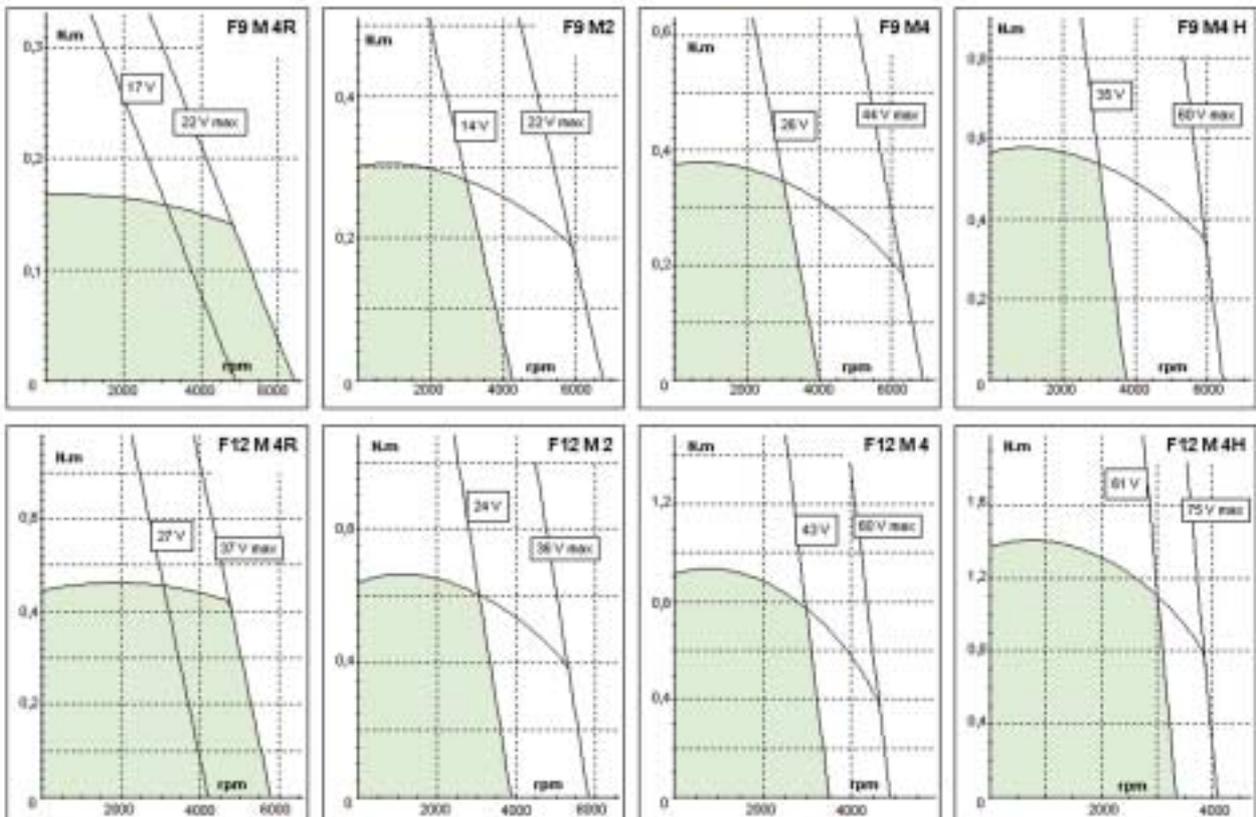
(1) Characteristics given for non insulated servomotor

\*\* FA et Fr not cumulative

### Performance curves

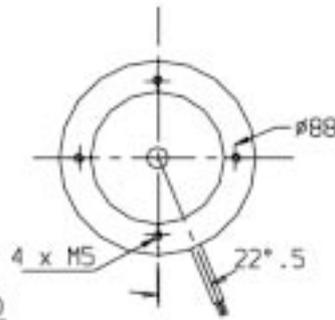
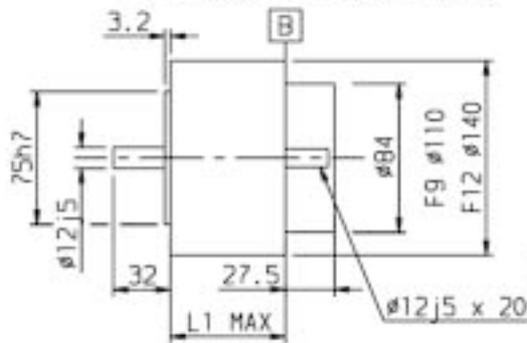
thermal continuous duty

F 9-12

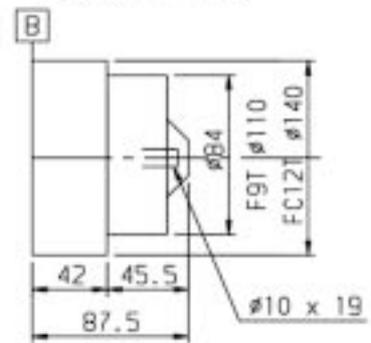


# AXEM SERVO-MOTOR TYPE F 9 - 12

F SERVOMOTOR AND AXEM TACHO



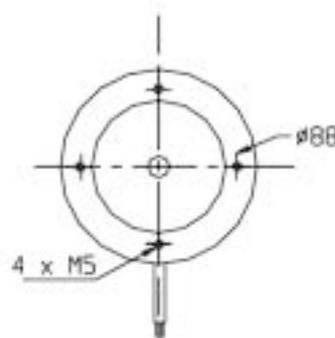
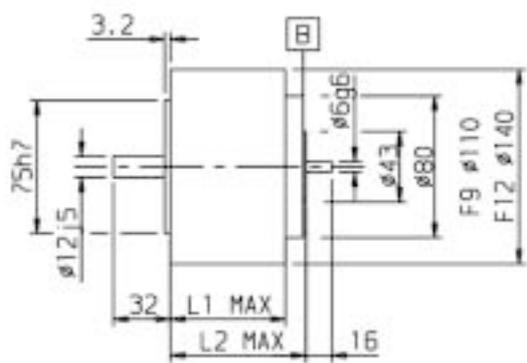
F9T, FC12T TACHO



	L1 MAX		L1 MAX
F9M4R	37	F12M4R	37.7
F9M2/M4	55.5	F12M2/M4	64.5
F9M4H	67	F12M4H	77

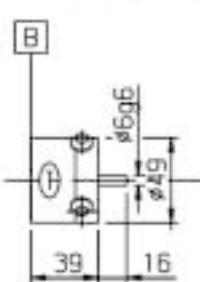
CABLE L=1.5m ONLY FOR MOTORS WITH TACHO

F SERVOMOTOR AND WOUND TACHO

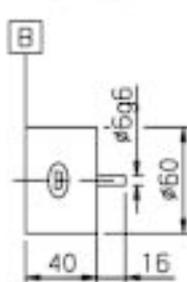


	L1 MAX	L2 MAX
F9M4R	34	46.5
F9M2/M4	52.5	65
F9M4H	64	76.5
F12M4R	37.5	51
F12M2/M4	61.5	71.5
F12M4H	74	84

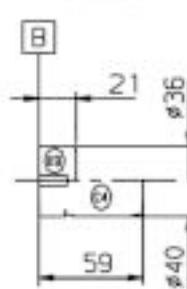
TBN206 TACHO



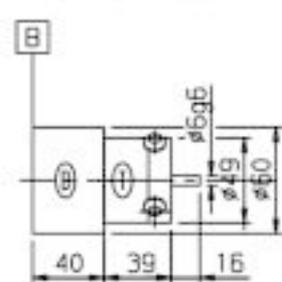
BRAKE



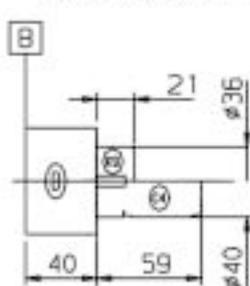
ENCODER



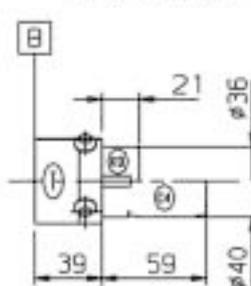
BRAKE+TACHO



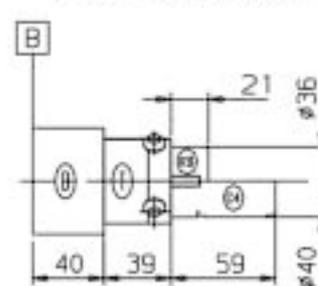
BRAKE+ENCODER



TACHO+ENCODER



BRAKE+TACHO+ENCODER



FOR MOTORS WITH TACHO+BRAKE+ENCODER OUTPUT CABLE LENGTH = 1m

# AXEM SERVO-MOTOR TYPE MC 13 - 17 - 19

## AXEM characteristics Type MC 13 - 17 - 19

Characteristics (1) at 40°C Form factor de $\leq 1,02$	Marking	Rated torque	Rated speed	Rated Power output	Rated voltage	Rated current	Rated torque S3 cycle (50 ms, 1%) E.M.F.	Ke at 1000 rpm (25°C)	Torque constant (25°C)	Armature resistant (25°C)	Inertia	Mechanical time constant	Thermal time constant (disc)	Thermal time constant (housing)	Axial load	Radial load at half shaft length	Mass
Symbols	Mn	Nn	Pn	Un	Io	C imp.	Ke	Kt	R	J	t <sub>m</sub>	t <sub>thd</sub>	t <sub>thc</sub>	Fa **	Fr **	M	
Units	Nm	rpm	W	V	A	Nm	V	Nm/A	$\Omega$	$10^{-5} \text{ kg.m}^2$	ms	s	min	daN	daN	kg	
MC 13 S	CE	1,2	3000	375	64	7,6	8,5	17,5	0,167	1,5	23,5	12,6	45	41	13	35	4
MC 17 H	CE	1,8	3000	565	102	6,9	14	30	0,286	1,8	79	17,2	52	34	35	60	6,5
MC 17 B	CE	1,2	3200	400	23,5	24	12	6	0,057	0,175	79	40	35	32	35	60	6,5
MC 19 P	CE	3,2	3000	1000	83	14,5	24,4	25,5	0,244	0,46	100	7,4	36	34	35	60	9,7
MC 19 P <sup>(2)</sup>	CE	5,1	3000	1600	87	22,2	24,4	25,5	0,244	0,46	100	7,4	29	15	35	60	9,7
MC 19 S	CE	3,2	3000	1000	165	7,3	24,4	51	0,488	1,6	100	6,5	36	34	35	60	9,7
MC 19 S <sup>(2)</sup>	CE	5,1	3000	1600	171	11,1	24,4	51	0,488	1,6	100	6,5	29	15	35	60	9,7
MC 19 B	CE	2,8	3000	880	23,5	46	24,4	7	0,067	1,6	100	11	36	34	35	60	9,7

(1) Characteristics given for non insulated servomotor

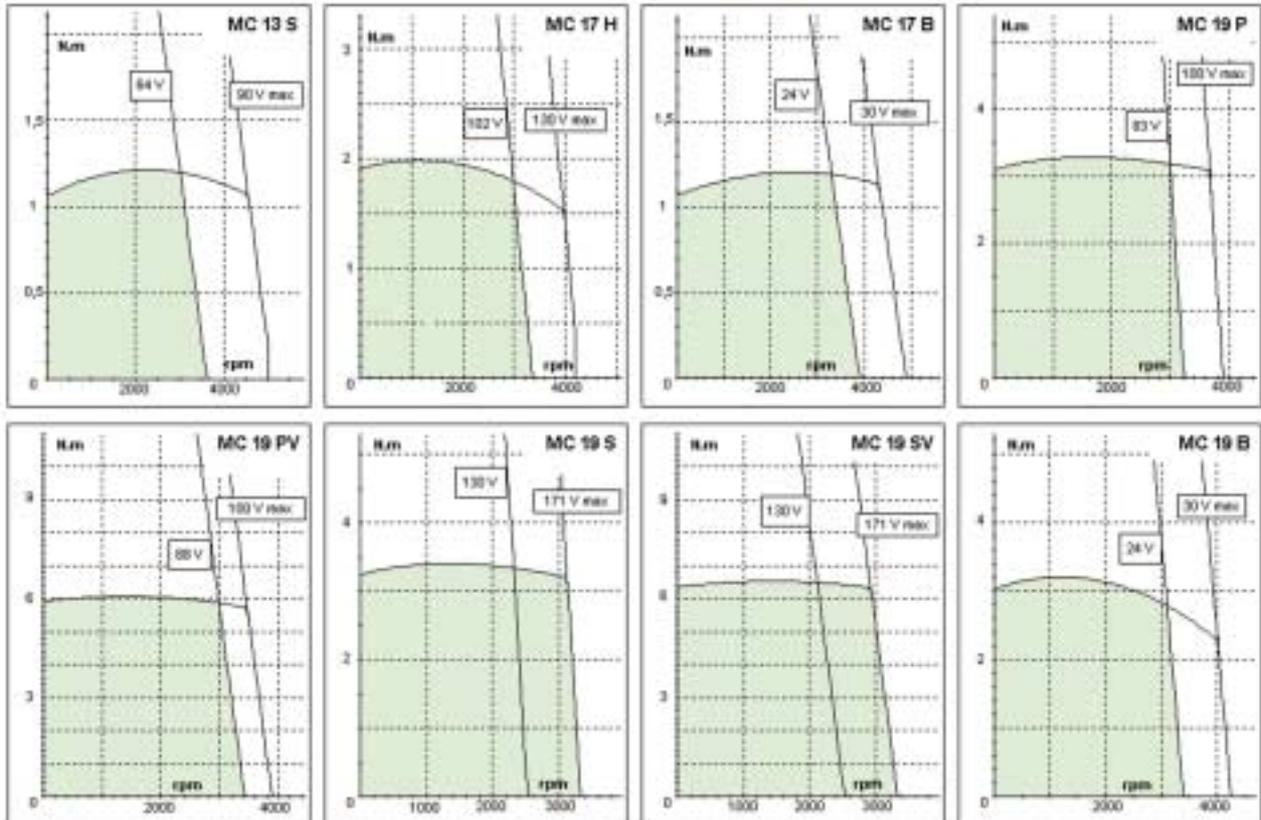
\*\* FA et Fr not cumulative

(2) Motor is cooled by an external fan 10 l / sec

### Performance curves

thermal continuous duty

MC 13-17-19





# AXEM SERVO-MOTOR TYPE MC 23 - 24 - 27

## AXEM characteristics Type MC 23 - 24 - 27

Characteristics ( 1 ) at 40°C without (3) Form factor de $\leq 1,02$	Marking	Rated torque	Rated speed	Rated Power output	Rated voltage	Rated current	Rated torque S3 cycle ( 50 ms, 1% ) E.M.F.	Ke at 1000 rpm ( 25°C )	Torque constant ( 25°C )	Armature resistant ( 25°C )	Inertia	Mechanical time constant	Thermal time constant (disc)	Thermal time constant (housing)	Axial load	Radial load at half shaft length	Mass e
Symbols	Mn	Nn	Pn	Un	Io	C imp.	Ke	Kt	R	J	t <sub>m</sub>	t <sub>thd</sub>	t <sub>thc</sub>	Fa **	Fr **	M	
Units	Nm	rpm	W	V	A	Nm	V	Nm/A	$\Omega$	$10^{-5} \text{ kg.m}^2$	ms	s	min	daN	daN	kg	
MC 23 S	CE	6,1	3000	1900	170	13	50	53	0,506	0,9	230	8	25	37	40	75	17
MC 23 S <sup>(2)</sup>	CE	10,5	3000	3300	178	21,8	50	53	0,506	0,9	230	8	16	20	40	75	17
MC 24 P	CE	7,3	3000	2300	136	18,9	84	43,5	0,415	0,285	320	5,3	38	50	45	80	23
MC 24 P <sup>(2)</sup>	CE	14,3	3000	4500	142	36	84	43,5	0,415	0,285	320	5,3	25	39	45	80	23
MC 27 P <sup>(3)</sup>	-	14,3	3000	4500	152	33	115	48,3	0,46	0,2	740	7	56	55	50	90	35
MC 27 P <sup>(2)</sup>	-	19,2	3000	6000	154	44	115	48,3	0,46	0,2	740	7	30	25	50	90	35

(1) Characteristics given for non insulated servomotor

\*\* FA et Fr not cumulative

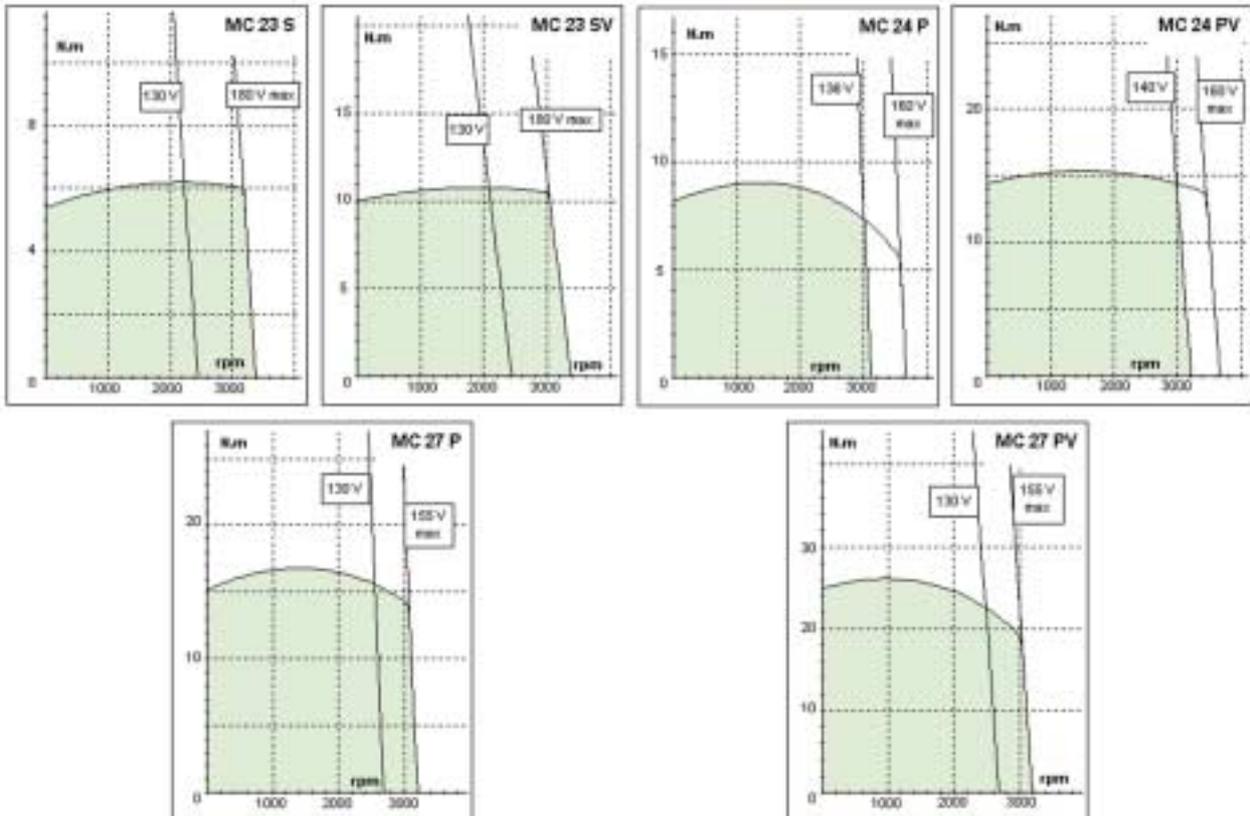
(2) Motor is cooled by an external fan 10 l / sec

(3) Characteristics at 20°C

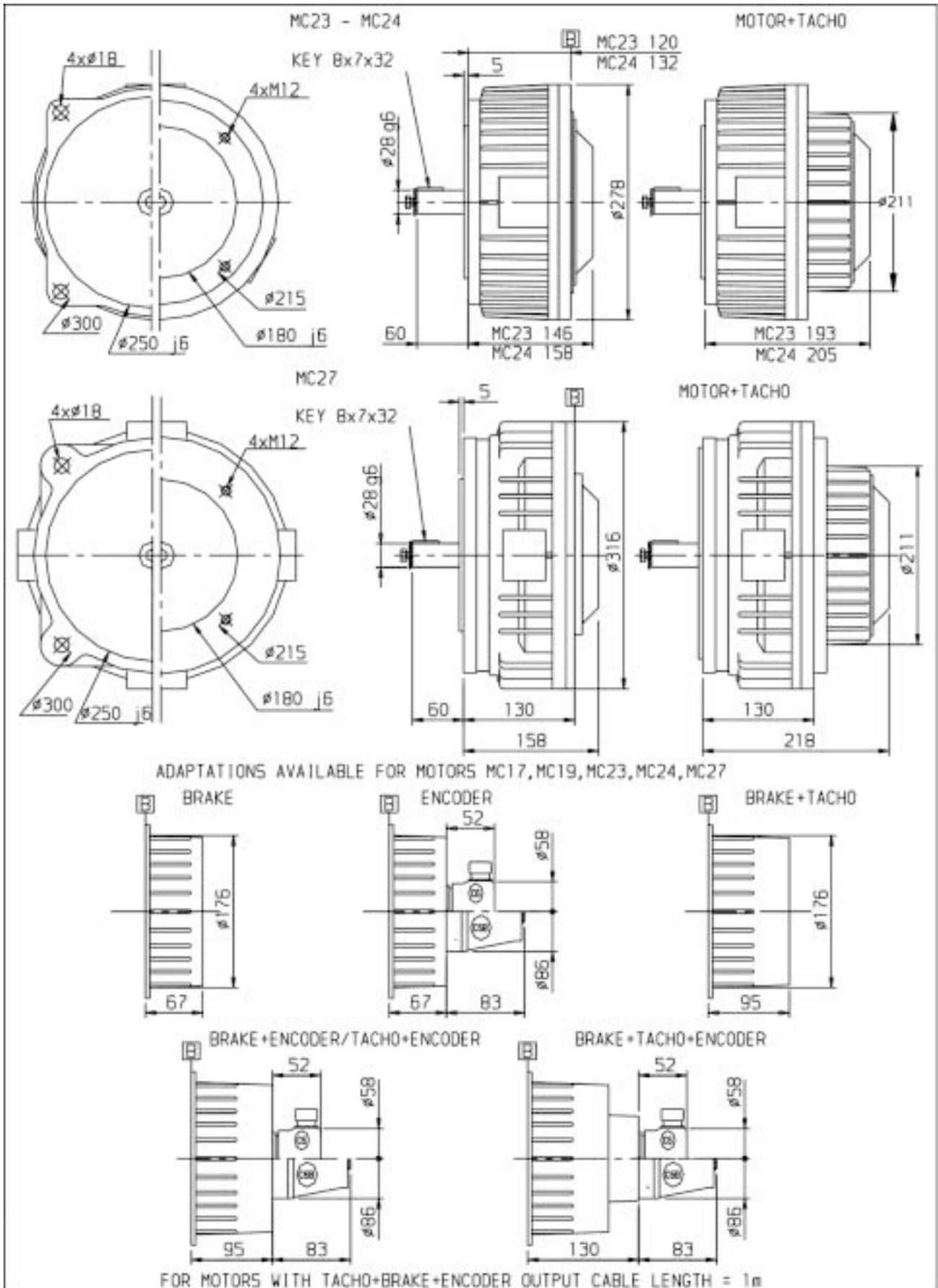
### Performance curves

thermal continuous duty

MC 23-24-27



# AXEM SERVO-MOTOR TYPE MC 23 - 24 - 27



# RTS SERVOAMPLIFIERS

The RTS servo-amplifier is designed for direct current servo-motors, up to a mechanical power rating of 2,500W, with four quadrant control.

It integrates the provision of power and quenching, and, depending on the version, includes braking energy dissipation resistance.

It is available in two different formats:

- Wall panel mounting using a rear right angle bracket.
- 3 U Europe single DIN rack mounting.

Several axes can thus be integrated into a 19" rack.

## ➤ TECHNICS

- SMD components (surface mounted).
- Genuine galvanic, power rating insulation to avoid interference.
- Hall effect current pick-up shoe.
- 17 kHz quench frequency.
- Speed frequency range up to 150 Hz.
- Integrated short-circuit protection.
- Speed range: With tacho 1: 10,000  
Using U-RI 1:10
- Speed or current instruction differential +/- 10V.
- Tacho input differential.

## ➤ FUNCTIONALITIES

- U-RI tacho switching control.
- Current or speed control.
- Current reduction in line with the speed.
- Current reduction in line with the temperature.
- External current reduction.
- Zero speed setting.
- Zero torque setting.
- Fault clearing (RESET).
- Analogue speed or torque data.
- Servo-amplifier state relay.
- +/- 15V availability.

Association example <sup>(*)</sup>		Permanent thermal duty				Limits pulsed		Inertia motor
Servo-motor	Motion controller	Slow rot.	Maximum limits			pT (n.m)	pS (rpm)	10 <sup>-5</sup> kg.m <sup>2</sup>
		srT (n.m)	pmT (n.m)	pmS (rpm)	pmP (W)			
F9 M4 R	RTS 10/20-60 (x)	0.16	0.14	5200	75	0.38	3000	3.5
F9 M4 H	RTS 10/20-60 (x)	0.5	0.47	4050	200	1.1	3000	3.5
F12 M4 R	RTS 10/20-60 (x)	0.44	0.42	5000	220	1	3500	15
F12 M4	RTS 10/20-60 (x)	0.8	0.7	3500	257	1.8	2800	15
MC 13 S	RTS 12/24-130 T	1.1	1.1	2800	320	2.5	2100	23.5
MC 19 S	RTS 12/24-130 T	3.7	3.5	2300	843	8.1	2000	100
MC 23 S	RTS 16/32-190 T	6	6	3200	2000	14	2900	230
MC 27	RTS 40/80-190 T	15	14	3070	4500	36	2750	740

(x): M single-phase or T three-phase

\* Associating an AXEM servo-motor with an RTS servo-amplifier requires the addition of a smoothing choke coil (cf. page 3) for correct running.

# RTE SERVOAMPLIFIERS

The RTE servo-amplifier is derived from the RTS model.

In addition, the RTE model includes an interface for a resolver connection.

This association (motor + resolver) can offer advantages compare to (motor + tachy + encoder) association in case of applications where compacity and low inertia are needed.

## ➤ TECHNICS

- Resolver interface
- Integrated encoder emulation, 1024 graduations/revolution with optocoupled outputs

## ➤ FUNCTIONALITIES

- Auxiliary power supply for conserving speed and position information in the event of mains failure (available for all single phase and three phase models).
- Limited regeneration.

Association example <sup>(*)</sup>		Permanent thermal duty				Limits pulsed		Inertia motor
Servo-motor	Motion controller	Slow rot. srT (n.m)	Maximum limits			pT (n.m)	pS (rpm)	10 <sup>-5</sup> kg.m <sup>2</sup>
			pmT (n.m)	pmS (rpm)	pmP (W)			
F9 M4 R	RTE 10/20-60 (x)	0.16	0.14	5200	75	0.38	3000	3.5
F9 M4 H	RTE 10/20-60 (x)	0.5	0.47	4050	200	1.1	3000	3.5
F12 M4 R	RTE 10/20-60 (x)	0.44	0.42	5000	220	1	3500	15
F12 M4	RTE 10/20-60 (x)	0.8	0.7	3500	257	1.8	2800	15
MC 13 S	RTE 12/24-130 T	1.1	1.1	2800	320	2.5	2100	23.5
MC 19 S	RTE 12/24-130 T	3.7	3.5	2300	843	8.1	2000	100
MC 23 S	RTE 16/32-190 T	6	6	3200	2000	14	2900	230
MC 27	RTE 40/80-190 T	15	14	3070	4500	36	2750	740

(x): M single-phase or T three-phase

\* Associating an AXEM servo-motor with an RTE servo-amplifier requires the addition of a smoothing choke coil (cf. page 3) for correct running.

## **OTHERS PRODUCTS IN THE PARVEX RANGE**

- AXEM, RS, RX, DC servomotors combined with RTS servoamplifiers.
- “ EEx ” brushless servomotors for explosive atmospheres (XD series + DIGIVEX).
- Brushless servomotors NX, H and L series.
- LV, LW, HV, HW spindle servomotors
- Digital variable speed drive
  - ✓ SINGLE-AXIS DSD
  - ✓ COMPACT SINGLE-AXIS DLD
  - ✓ POWER SINGLE-AXIS DPD
  - ✓ MULTIPLE-AXIS (RACK) DMD
- Variable speed drive positioner
  - ✓ SINGLE-AXIS DSM
  - ✓ POWER SINGLE-AXIS DPM
  - ✓ MULTIAXES (RACK) DMM
- CYBER 2000 et 4000 numerical controllers (1 to 4 axis).
- “ AXL ” range : range of planetary gears integrated into servomotors to form a compact unit :

### **AXL range comprises of :**

- “ BRUSHLESS ” servomotors
- GB1/5 ou 1/25 gears



Parvex

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