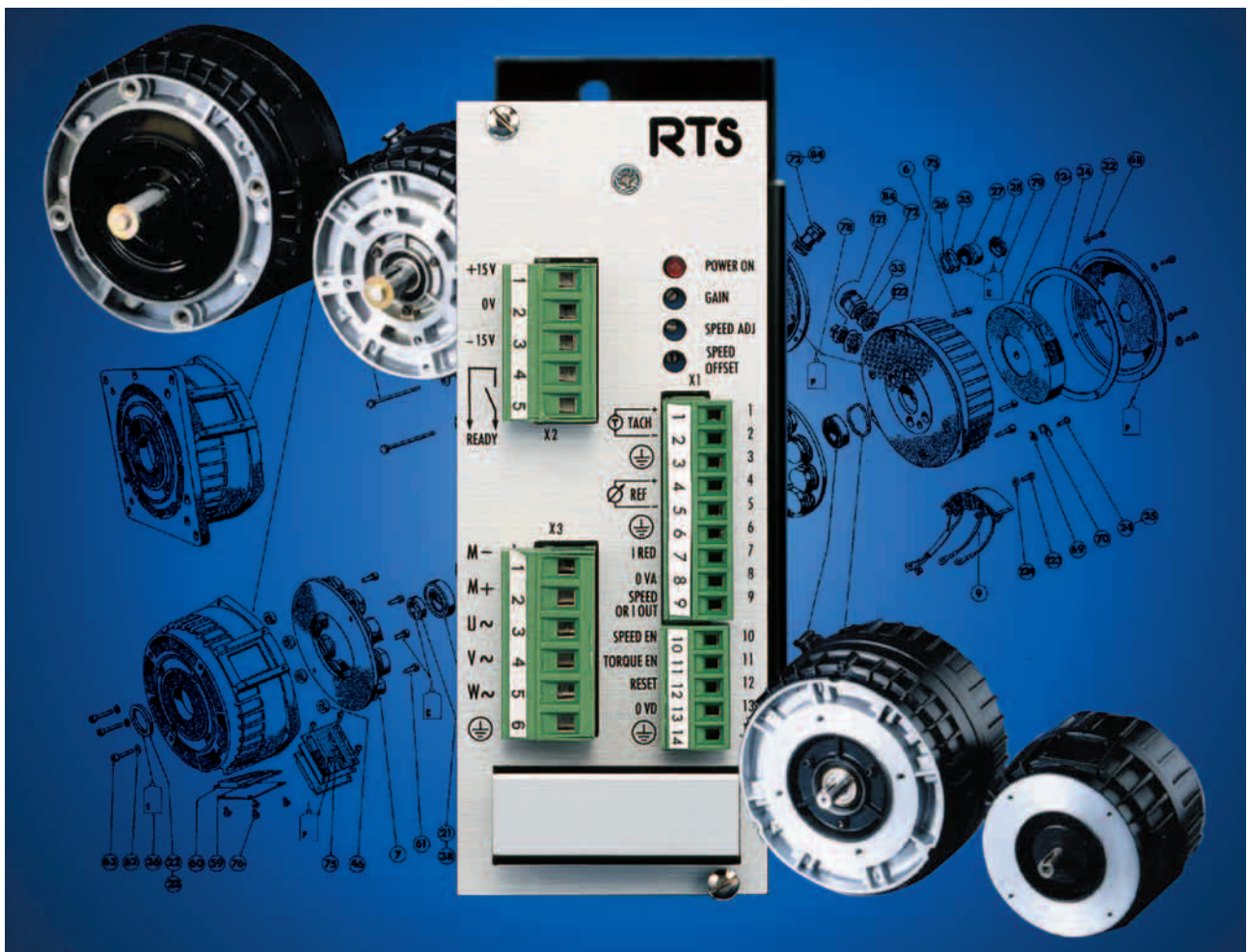


AXEM Series

Direct current
Disc-servomotor



PARVEX

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.

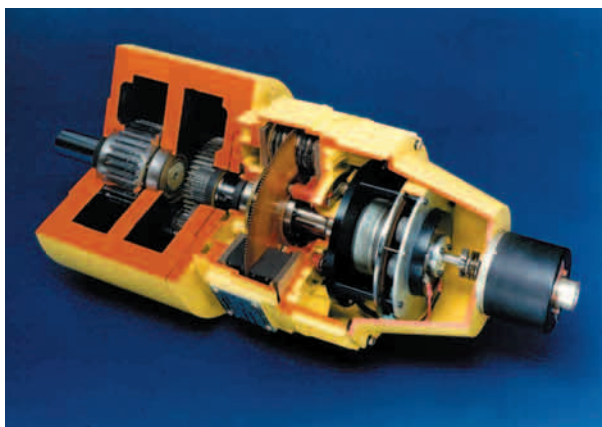
- Mounting:
 - F, MC13S ranges: threaded hole bracket
 - MC range: threaded or smooth hole bracket.
- Protection: Generally IP44, IP20 for ventilated servo-motors.
- Insulation: class F.
- Balance: N
- Bearings are greased for life
- Shaft loads: Please refer to chart in the following pages.
Please contact 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 19th February 1973 amended by French directive no. 93/68/CEE dated the 22nd 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 ² .10 ⁻⁵ | 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 ² .10 ⁻⁵ | 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 ² .10 ⁻⁵ | 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 ² | 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. at 1000 rpm (C) | Torque constant (25°C) | Armature resistant (25°C) | Inertia | Mechanical time constant | Thermal constant | Thermal constant (using) | Axial load | Radial load at half shaft length | Mass |
|--|----------|--------------|-------------|--------------------|---------------|---------------|--------------------------------------|---------------------------|---------------------------|------------------------------|----------------|-----------------------------|------------------|--------------------------|------------|-------------------------------------|------|
| Symbols | Mn | Nn | Pn | Un | Io | C imp. | Ke | Kt | R | J | t _m | t _{thd} | t _{thc} | Fa ** | Fr ** | M | |
| Units | Nm | rpm | W | V | A | Nm | V | Nm/A | Ω | 10^{-5} kg.m^2 | ms | s | min | daN | daN | kg | |
| F 9 M 4 R | 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 | |
| F 9 M 2 | 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 | |
| F 9 M 4 | 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 | |
| F 9 M 4 H | 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 | |
| F 12 M 4 R | 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 | |
| F 12 M 2 | 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 | |
| F 12 M 4 | CE 0,77 | 3000 | 240 | 43 | 7,7 | 8,6 | 12 | 0,115 | 0,93 | 15 | 10 | 30 | 24 | 2,5 | 14 | 3,85 | |
| F 12 M 4 H | CE 1,1 | 3000 | 345 | 61 | 7,2 | 13 | 18 | 0,172 | 0,93 | 16 | 4,7 | 30 | 24 | 2,5 | 14 | 5 | |

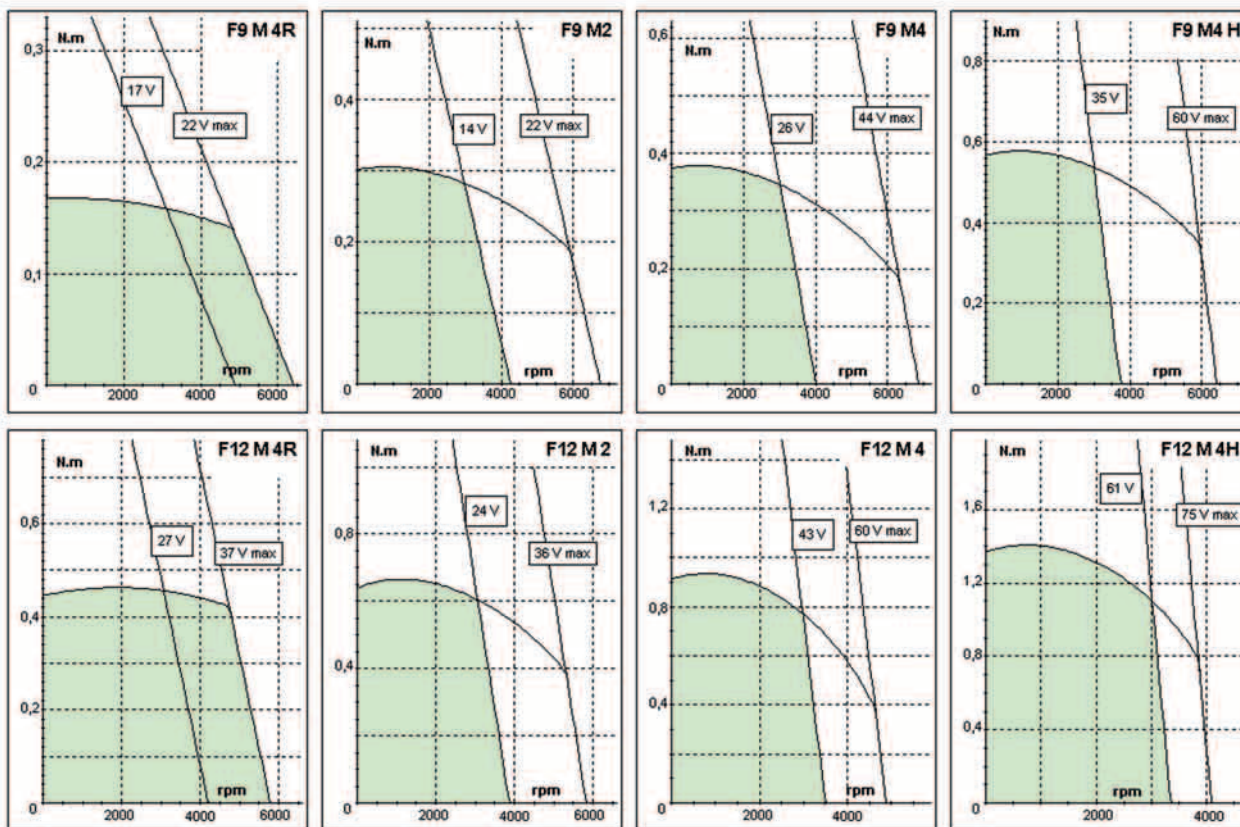
(1) Characteristics given for non insulated servomotor

** FA et Fr not cumulative

Performance curves

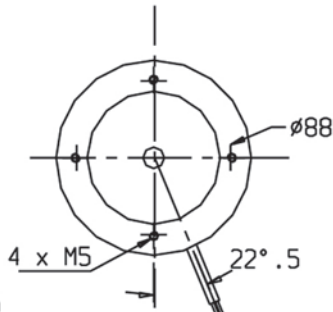
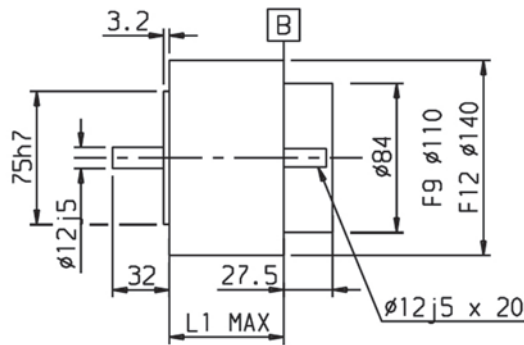
thermal continuous duty

F 9-12

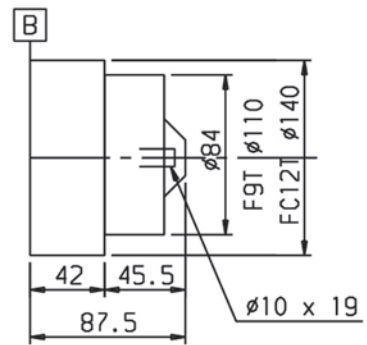


AXEM SERVO-MOTOR TYPE F 9 - 12

F SERVOMOTOR AND AXEM TACHO



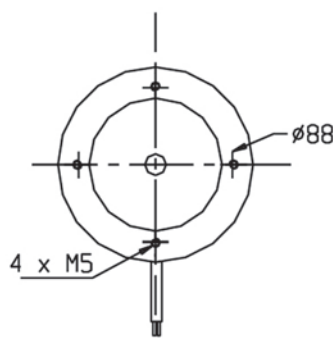
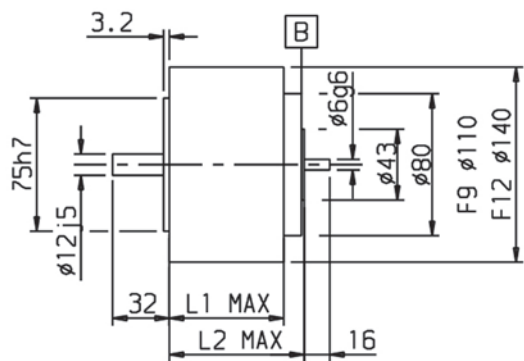
F9T, FC12T TACHO



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

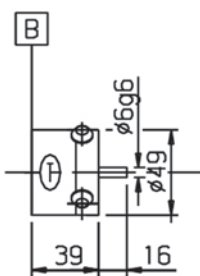
CABLE L=1.5m ONLY FOR MOTORS WITH TACHO

F SERVOMOTOR AND WOUND TACHO

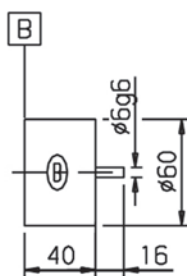


| | L1 MAX | L2 MAX |
|----------|--------|--------|
| F9M4R | 34 | 46.5 |
| F9M2/M4 | 52.5 | 65 |
| F9M4H | 64 | 76.5 |
| F12M4R | 37.5 | 51 |
| F12M2/M4 | 61.5 | 71.5 |
| F12M4H | 74 | 84 |

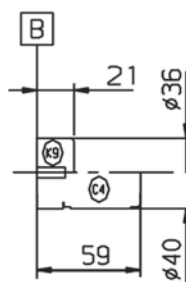
TBN206 TACHO



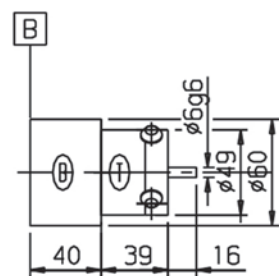
BRAKE



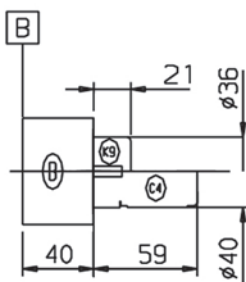
ENCODER



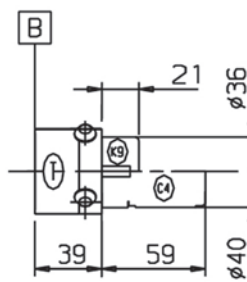
BRAKE+TACHO



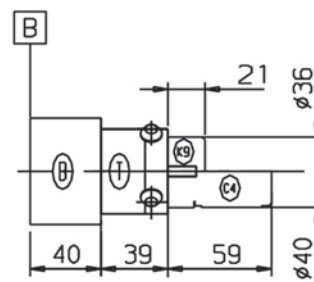
BRAKE+ENCODER



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. at 1000 rpm (°C) | Torque constant (25°C) | Armature resistant (25°C) | Inertia | Mechanical time constant | Thermal constant (using) | Thermal constant (using) | Axial load | Radial load at half shaft length Masse | |
|--|---------|--------------|-------------|--------------------|---------------|---------------|--------------------------------------|----------------------------|---------------------------|------------------------------------|----------------|-----------------------------|-----------------------------|-----------------------------|------------|--|-----|
| Symbols | Mn | Nn | Pn | Un | Io | C imp. | Ke | Kt | R | J | t _m | t _{thd} | t _{thc} | Fa ** | Fr ** | M | |
| Units | Nm | rpm | W | V | A | Nm | V | Nm/A | Ω | 10 ⁻⁵ 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⁽²⁾ | 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⁽²⁾ | 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

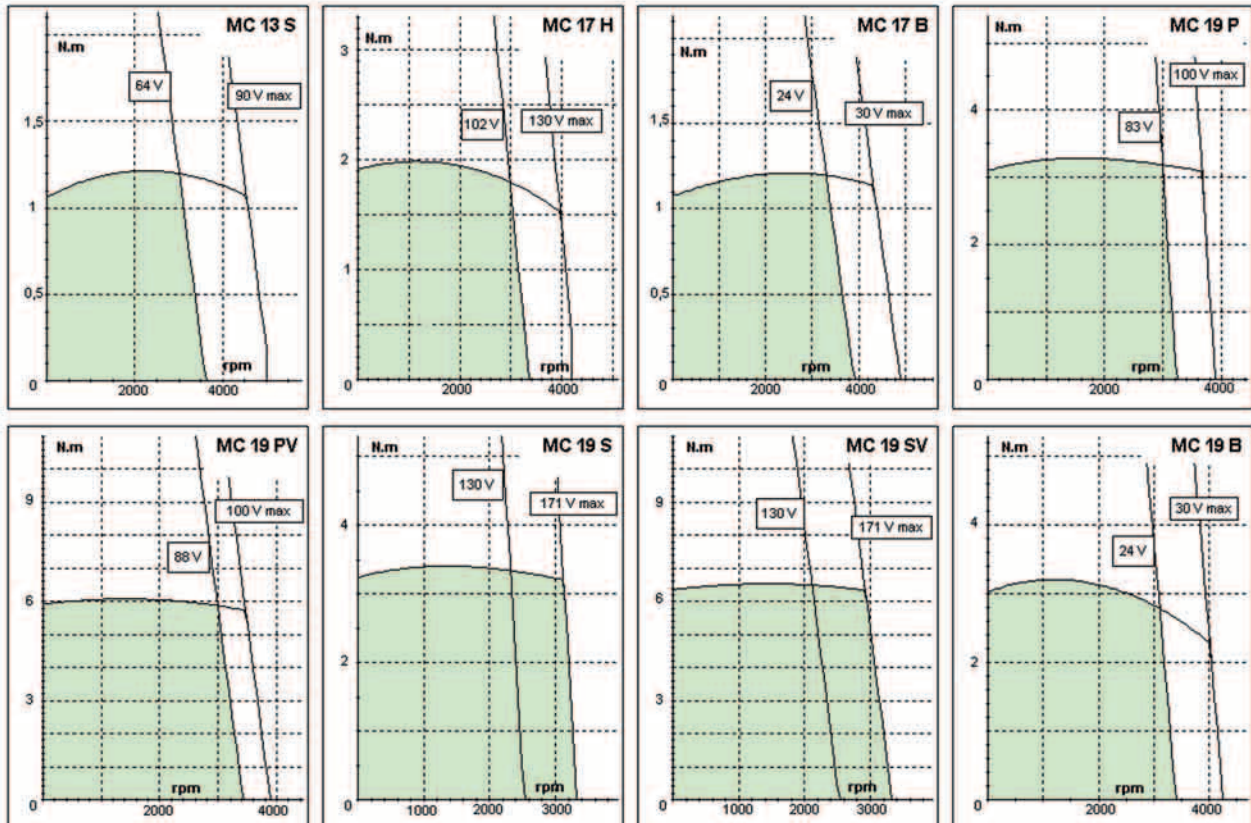
** FA et Fr not cumulative

(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 at 40°C Form factor de $\leq 1,02$ (3) | Marking | Rated torque | Rated speed | Rated Power output | Rated voltage | Rated current** | Rated torque S3 cycle / 50 ms, 1% | E.M.F. at 1000 rpm (°C) | Torque constant (25°C) | Armature resistant (25°C) | Inertia | Mechanical time constant | Thermal time constant | Thermal time constant (using) | Axial load | Radial load at half shaft length | Mass |
|--|---------|--------------|-------------|--------------------|---------------|-----------------|--------------------------------------|-------------------------------|---------------------------|------------------------------------|----------------|--------------------------|-----------------------|-------------------------------|------------|----------------------------------|------|
| Symbols | Mn | Nn | Pn | Un | Io | C imp. | Ke | Kt | R | J | t _m | t _{thd} | t _{thc} | Fa ** | Fr ** | M | |
| Units | Nm | rpm | W | V | A | Nm | V | Nm/A | Ω | 10 ⁻⁵ 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 ⁽²⁾ | 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 ⁽²⁾ | 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 ⁽³⁾ | - | 14,3 | 3000 | 4500 | 152 | 33 | 115 | 48,3 | 0,46 | 0,2 | 740 | 7 | 56 | 55 | 50 | 90 | 35 |
| MC 27 P ⁽²⁾ | - | 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

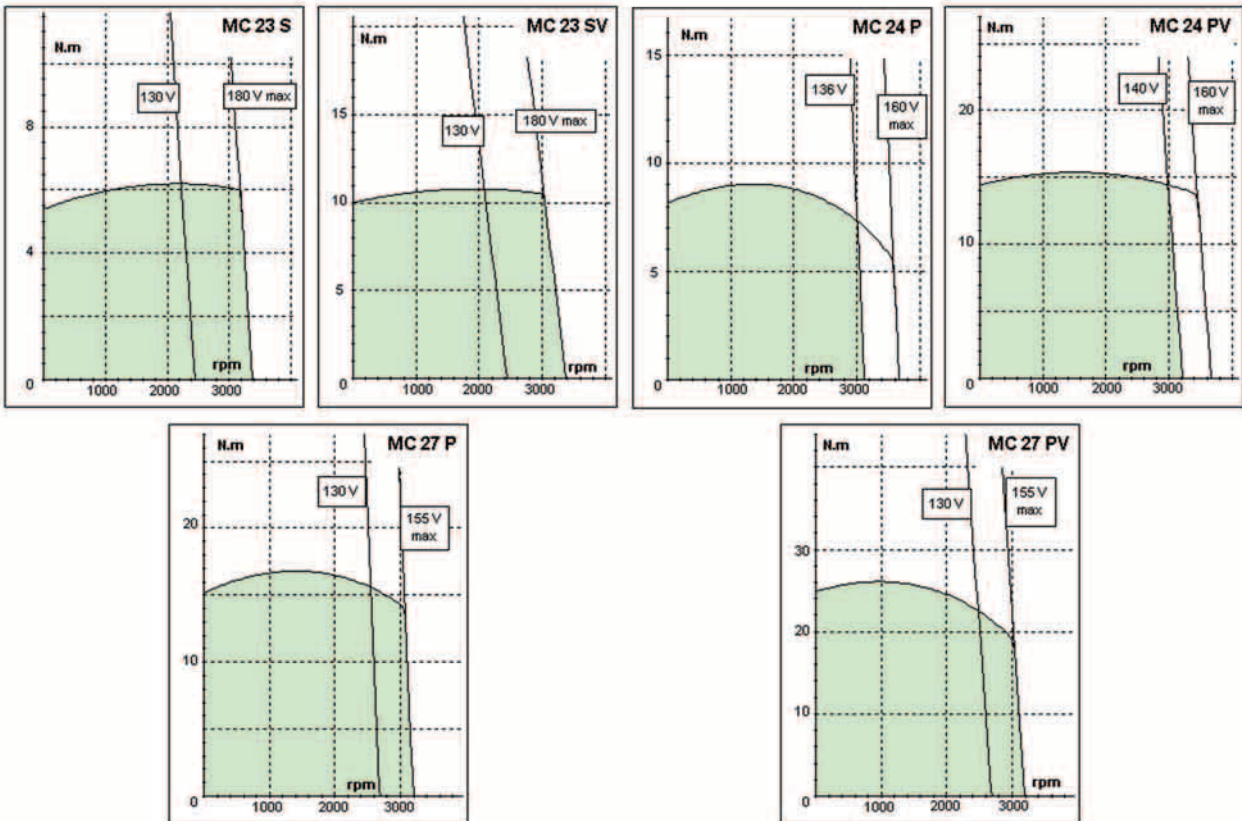
(2) Motor is cooled by an external fan 10 l / sec

(3) Characteristics at 20°C

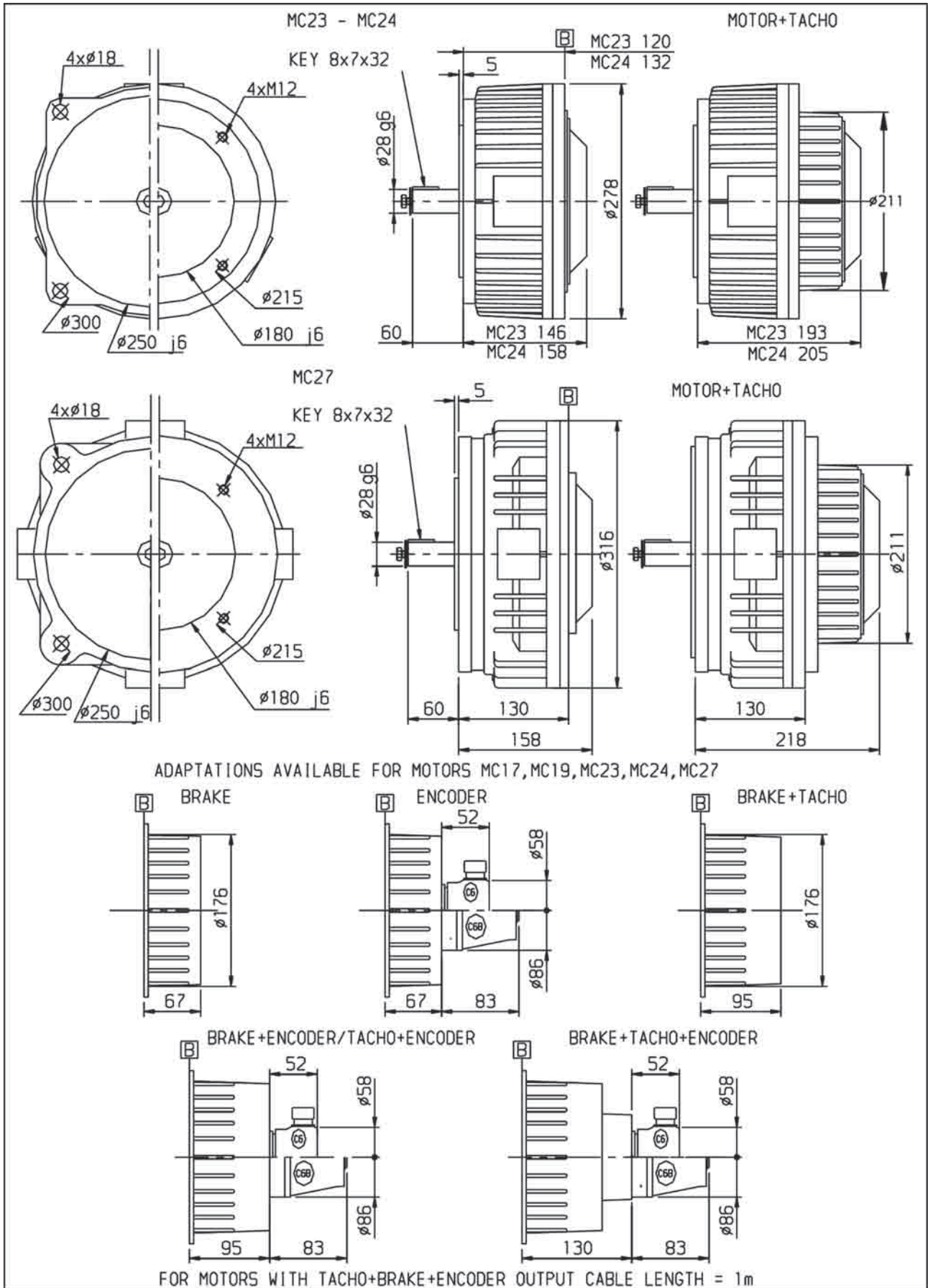
Performance curves

thermal continuous duty

MC 23-24-27



AXEM SERVO-MOTOR TYPE MC 23 - 24 - 27



RTS SERVOAMPLIERS

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 ^(*) | | Permanent thermal duty | | | | Limits | | Inertia |
|------------------------------------|-------------------|------------------------|----------------|--------------|------------|-------------|-------------|---|
| Servo-motor | Motion controller | Slow rot. | Maximum limits | | | pulsed | | motor 10 ⁻⁵ kg.m ² |
| | | srT (n.m) | pmT (n.m) | pmS (rpm) | pmP (W) | pT (n.m) | pS (rpm) | |
| 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 ^(*) | | Permanent thermal duty | | | | Limits | | Inertia |
|------------------------------------|-------------------|------------------------|----------------|--------------|------------|-------------|-------------|---|
| Servo-motor | Motion controller | Slow rot. | Maximum limits | | | pulsed | | motor 10 ⁻⁵ kg.m ² |
| | | srT (n.m) | pmT (n.m) | pmS (rpm) | pmP (W) | pT (n.m) | pS (rpm) | |
| 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

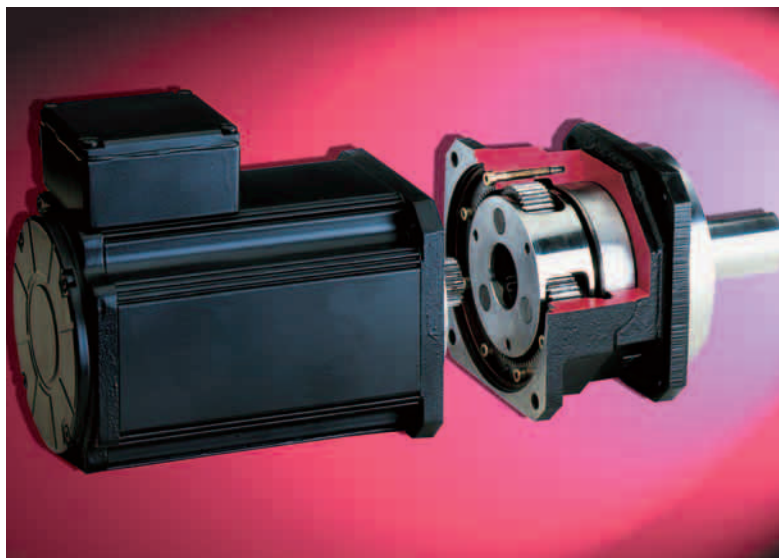
* Associating an AXEM servo-motor with an RTE servo-amplifier requires the addition of a smoothing choke coil (cf. page 3) for correct running.

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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