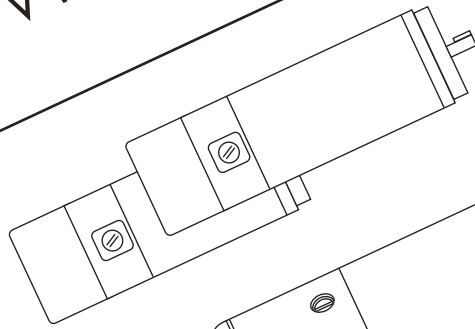
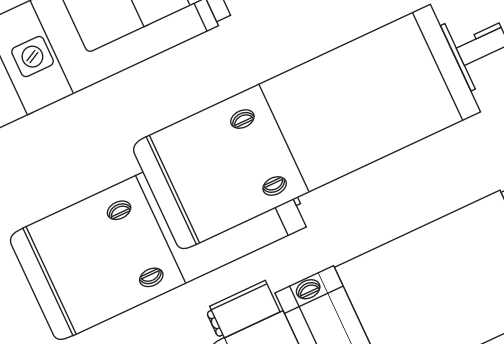


Permanent Magnet D.C. Servomotors

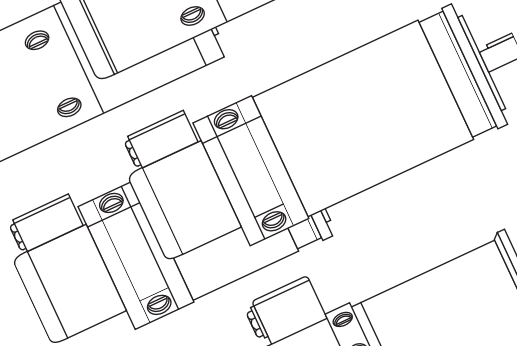
MT22
SERIES



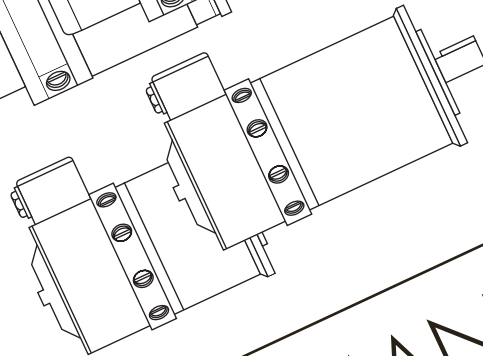
MT30
SERIES



MT40
SERIES



MT52
SERIES



TECHNICAL DATA MANUAL

ISSUE 2



SEM

controlled motor technology

| CONTENTS | PAGE |
|---|---------|
| 1 USER INFORMATION | 2 |
| 2 MT22 TECHNICAL INFORMATION | 4 |
| - Technical Data and Performance Curves | 4 - 9 |
| - Mechanical Detail | 10 |
| - Engineering Drawings | 11 - 12 |
| - Standard/optional features | 13 |
| 3 MT30 TECHNICAL INFORMATION | 14 |
| - Technical Data and Performance Curves | 14 - 27 |
| - Mechanical Detail | 28 |
| - Engineering Drawings | 29 - 31 |
| - Standard/optional features | 32 - 33 |
| 4 MT40 TECHNICAL INFORMATION | 34 |
| - Technical Data and Performance Curves | 34 - 39 |
| - Mechanical Detail | 40 |
| - Engineering Drawings | 41 - 43 |
| - Standard/optional features | 44 - 45 |
| 5 MT52 TECHNICAL INFORMATION | 46 |
| - Technical Data and Performance Curves | 46 - 57 |
| - Mechanical Detail | 58 |
| - Engineering Drawings | 59 - 61 |
| - Standard/optional features | 62 - 63 |

PERMANENT MAGNET DC SERVOMOTORS - USER INFORMATION

E.C. DIRECTIVES

There are 3 main directives that effect applications incorporating servomotors.

Machinery Directive 89/392/EEC

This directive applies to complete machines.

In accordance with the directive, SEM provides a Certificate of Incorporation which includes installation instructions and general service guidelines in different languages.

Low Voltage Directive 73/23/EEC

This directive applies to electrical equipment for use with a DC voltage of 75V to 1500V and AC voltage of 50V to 1000V.

SEM DC servomotors in the ranges MT22, MT30, MT40 and MT52 conform to the EC directive.

A certificate of conformity is available from SEM sales on request.

EMC Directive (Electro Magnetic Compatibility) 89/336/EEC.

This directive applies to products or appliances with an intrinsic function for the end user in which:

1. They contain electrical/electronic systems liable to cause an electro magnetic disturbance.
2. They contain electrical/electronic systems which may have their performance affected by an electromagnetic disturbance.

SEM can provide data sheets outlining the EMC characteristics of a standard SEM DC servomotor and giving advice on cable screening and other related subjects.

SEM will be pleased to discuss any EMC related problem encountered by customers incorporating SEM DC servomotors into such products or appliances which are governed by the EMC directive.

GENERAL DESCRIPTION

This range of DC Servomotors has been specially designed to meet the application requirements of Machine Tools, Transfer Lines, Robotics and the like. They provide a high torque to inertia ratio, giving fast acceleration and rapid dynamic response. Our data sheets give the full specification.

The motors are suitable for most servo and variable speed applications and are compatible with most drives available. It must be remembered that all SEM data on its range of Servomotors assumes unity Form Factor (i.e. pure DC) and that derating of the motor may be necessary when supplied from a power source exceeding unity Form Factor.

SEM DC brushed servomotors are rated for the temperature rises specified in NEMA standard MG1 part 12.63.2.

Receiving & Storage

On receipt the motors should be inspected. Any damage found should be reported immediately to SEM and the carrier.

The shaft and flange have been coated with a rust inhibitor; this can be removed with a suitable solvent.

If the motors are not to be put into service immediately they should be stored in a clean dry location, and should be run on a light load or no load prior to being put in service. This is to clean any possible filming that may occur due to oxidation on the commutators .

Nameplate Information

When contacting SEM regarding a motor, the type and serial number should be quoted.

Location/Accessibility

The motors should be installed such that they are readily accessible for routine inspection and maintenance.

Environmental Protection

SEM Servomotors are protected against ingress of fluid and dust to the following degrees:-

The MT22 range is protected to IP65 (IP64 at drive end shaft seal).

The MT30, 40 and 52 ranges are protected to IP44/65 as standard, IP54 is available as an option. This increases to IP64/65 when

a shaft seal (option WO1) is fitted and the fixing boltholes are sealed. Blower ventilated motors are protected to the following degrees:- The MT30 blower ventilated range is protected to IP20. The MT40 and 52 blower ventilated ranges are protected to IP10.

Mounting of Motors

Where a toothed belt drive is proposed the motors should be face or flange mounted to an angle bracket, or similar, as close as possible to the line of action of the drive. The motor pulley should be positioned as close as possible to the mounting face and the pulley diameter chosen to maintain dynamic shaft loading within the limits indicated on the loading graphs. Particular attention must be given to tensioning of drive belts, with reference to belt manufacturers instructions, so that unnecessarily high shaft loads are avoided on installation.

When a motor is close coupled to a reduction gearbox, it is strongly recommended that to withstand the reaction of high output torques, the complete unit is fitted to the final product by attachment at the gearbox, not by foot mounting the motor.

A foot mounting option is available on SEM servomotors but this should generally be restricted to in-line drives where high lateral moments can be avoided.

Electrical Connections

A diagram plate is fitted under the terminal box lid. (Or attached to each motor in the case of motors fitted with an MS connector).

IMPORTANT - When the motor is to be used in a closed loop circuit, the polarity of the tacho relative to the rotation of the motor must be as diagram plate. Incorrect polarity could cause the motor to over-speed. Commutator flashover and field demagnetisation could occur.

Viewed from main shaft end:

| ROTATION | MOTOR | TACHO |
|----------------|-------------|-------------|
| Clockwise | A1 Positive | T1 Positive |
| | A2 Negative | T2 Negative |
| Anti-Clockwise | A2 Positive | T2 Positive |
| | A1 Negative | T1 Negative |

Thermal Protection

MT30, 40 and 52. Servomotors have fitted as standard equipment a thermal protector to monitor temperature and protect the armature winding. The protector contacts are of the normally closed type and should be connected in such a manner as to shut down the motor controller when the contacts open.

Under continuous full Load conditions the motor body can be expected to reach a maximum temperature of 100C° before the trip operates. **IMPORTANT** - The protector can only be relied upon to sense over temperature produced by long term overload operation of the motor. As the motor has a large thermal mass, short duration high currents will not be sensed by the thermal overload and could result in damage to the motor. The overload is not capable of switching motor line currents and must be used only in the motor drive circuitry.

Maintenance & Servicing

All routine maintenance can be carried out by the user, but it is recommended that, for major repairs and reconditioning, the motor be sent to an approved motor repair specialist or returned to SEM. If the motor is to be dismantled, any feedback package fitted to the rear shaft, the tachometer armature, and any electrical connections must be removed first.

Brushes - Motor

It is recommended that the motor brushes in the commutator end housing be inspected for wear every 500 hours of operation or at intervals which are found satisfactory after a usage pattern has been established. The brushes, under normal usage, should give 4,000 hours of life on a unity form factor drive. When the brush has worn to 7mm it should be replaced. Only recommended spares obtainable from SEM should be fitted, as brush grade and spring

tension have been specially selected for the motors. Brushes should move freely in their holders and care should be taken to ensure that good contact is made between the brush tag and the brush holder. When inspecting for carbon brush wear, we recommend that any carbon brush dust is cleared from the motor by removal of **all** the brushes from their holders, and blowing clean, dry air into one of the brush holders.

IMPORTANT - It must be noted that commutation and brush wear progressively deteriorate as the commutation limit is approached. If required acceleration or deceleration results in operation regularly close to the limit brushlife will be considerably reduced.

Commutator

The normal colour of the commutator is dark brown: do not remove this film unless commutator is in poor condition. Minor cleaning of the commutator can be carried out by removing one brush and inserting a glass fibre cleaning stick of brush cross sectional area, and rotating the armature; remove other brushes and blow out after cleaning.

Permanent Magnet Field

The permanent magnets used in our Servomotors are made from a highly coercive ferrite material and are designed to withstand high demagnetising fields. The field will be demagnetised if a momentary current exceeds the peak current rating given on the data sheet. Special note should be made when using thyristor drives. The permanent magnet field is open circuit stabilised and the motor armature removal will not affect subsequent motor performance.

On blower ventilated machines, despite the inlet filter, there may be a danger that metal particles and foreign matter may enter the air outlet holes by attraction of the permanent magnets. Care must be taken with ventilated machines.

Should the magnets become demagnetised for any reason the machine must be returned to SEM for re-magnetising.

Bearings

All Servomotors are fitted with single row radial ball bearings, double shielded and permanently lubricated and under normal conditions require no maintenance.

If the commutator end bearing is to be removed, care should be taken so as not to damage or distort the rear shaft extension or shaft pin, as these must run to close tolerances.

Tachometer

The tachometer fits over the main shaft and has a permanent magnet field. This device is a precision instrument and must be treated with care. Foreign matter must not be allowed to enter this area.

The brushes and commutator should be maintained in the same manner as the motor parts.

It is essential that the undercutting is maintained free from mica and copper swarf and the commutator surface is free of burrs to keep the ripple performance within tolerance.

When re-assembling brush ring to motor, note alignment mark to retain correct orientation of parts for optimum performance.

Holding Brake Options

A fail safe brake is available as a standard option.

The brake is primarily a holding brake. For example:- to hold a vertical feed axis under a no voltage condition, however, it can also in some applications be used for emergency stopping.

The brake is located in front of the armature, the stationary body is built into the drive end cover.

The brake fitted is of the "Springset" fail to safe type.

The brake should be connected so that when the motor is started the brake coil is energised, thus releasing the brake. Under normal operating conditions no maintenance is required other than making sure the armature and stationary plates are kept free from foreign matter. Ratings are as follows:-

| Frame | Brake Holding Torque | Voltage (DC) | Power Consumed (Guide only) |
|-------|----------------------|--------------|-----------------------------|
| MT22 | 2 Nm | 24v (90v) | 6.3 Watts (9 Watts) |
| MT30 | 5 Nm | 24v (90v) | 11 Watts (13 Watts) |
| MT40 | 18 Nm | 24v (90v) | 27 Watts (27 Watts) |
| MT52 | 18 Nm | 24v (90v) | 27 Watts (27 Watts) |

Other voltages DC and AC can be ordered

Blower Options

The motor of the blower type used by SEM is sealed for life and should require no maintenance under normal usage.

The inlet filter should be cleaned at regular intervals, as a dirty filter would restrict the airflow through the servomotor, causing overheating. When dirty this filter can be regenerated by washing in warm water with added detergent and drying.

Mechanical

It is recommended that a general inspection be made at regular intervals to check all bolts, nuts, couplings, etc. to make sure they have not worked loose, and thus prevent serious damage.

End Cover Alignments

The proper orientation of the motor end cover to the motor body is necessary for optimum performance of the motor; an alignment mark should be scribed over end housing and adjacent shell before dismantling, so machine can be re-assembled with correct orientation.

The drive end cover is pinned to the shell. The developed torque of the motor is transmitted by the pins and associated friction between D.E. cover and shell.(Not applicable to MT22)

The commutator end housing is not pinned, as under normal conditions no torque is transmitted.

Recommended Stand By Replacement Parts List per motor.

| MOTOR PART | MOTOR TYPE | | | | |
|---|------------|------|------|------|--------|
| | MT22 | MT30 | MT40 | MT52 | DBMT52 |
| Motor Brush | 2 | 4 | 4 | 8 | 16 |
| Brush Caps | 2 | 4 | 4 | 8 | 16 |
| Brush Cap Sealing Discs | 2 | 4 | 4 | 8 | 16 |
| Tacho Brush Ring Assembly complete with Brushes | 1 | 1 | 1 | 1 | 1 |

Note: When ordering replacement parts the motor Serial No. stamped on Nameplate must be quoted, along with the Type No. so that proper selection of parts can be made.

Fault Finding

Note: Trouble which at first appears to be with the motor may in many cases lie outside the motor

| PROBLEM | POSSIBLE CAUSES |
|----------------------------|--|
| No Rotation at Motor Shaft | 1 Check Fuses and Connections 2 Brushes Worn Past Limit 3 Motor Load Excessive 4 Motor Overload Open Circuit 5 Armature Open Circuit 6 Brake Failure on Motors Fitted with Brake |
| Excessive Brush Arcing | 1 Motor Load Excessive 2 Armature Input Current or Voltage Excessive 3 Damaged Commutator 4 Motor Speed Exceeding Maximum 5 Incorrect Brush Grade 6 Incorrect Neutral Setting 7 Shorted/Earthed Armature |
| Over Speed | 1 Armature Volts Over Limit 2 Wrong Connection Motor/Tacho 3 No Tacho Output 4 Field Demagnetised |
| Poor Tachometer Ripple | 1 Tacho Brushes Not Seated 2 Incorrect Neutral Setting 3 Shorted Tachometer Armature 4 Rough Commutator Surface |
| Noise/Vibration | 1 Loose Components/Through Bolt 2 Defective Bearings 3 Armature Incorrectly Balanced |

MT22D2 D.C. Servomotors

Technical Data

| Parameter | Unit | MT22D2-19 | MT22D2-10 | MT22D2-5 |
|---|------------------------------|-------------|-------------|-------------|
| GENERAL | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 19 | 10 | 5 |
| Max. Terminal Voltage | Volts | 95 | 50 | 25 |
| Max. Speed | RPM | 5000 | 5000 | 5000 |
| Continuous Stall Torque TENV*** | Nm | 0.5 | 0.5 | 0.5 |
| | lb - in | 4.4 | 4.4 | 4.4 |
| (Size 300x300x12.5mm) | Nm | 0.6 | 0.6 | 0.6 |
| Cont Stall Torque when fitted to Heatsink*** | | | | |
| (Size 12x12x0.5in) | lb - in | 5.3 | 5.3 | 5.3 |
| Continuous Stall Current TENV*** | Amps | 2.8 | 5 | 10 |
| Armature Polar Moment of Inertia | Kgm ² | 0.00017 | 0.00017 | 0.00017 |
| | lb - in Sec ² | 0.0015 | 0.0015 | 0.0015 |
| Torque Constant KT** | Nm/Amp* | 0.18 | 0.10 | 0.05 |
| | lb - in/Amp* | 1.59 | 0.88 | 0.44 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.18 | 0.10 | 0.05 |
| Peak Stall Torque** | Nm | 2.0 | 2.0 | 2.0 |
| | lb - in | 18 | 18 | 18 |
| Current at Peak Torque** | Amps | 11 | 21 | 43 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 12000 | 12000 | 12000 |
| Winding | | | | |
| Armature Resistance Less Brushes** | Ohms* | 3.5 | 1.0 | 0.28 |
| Armature Inductance | Millihenrys* | 14.1 | 4.0 | 1.12 |
| Mechanical Time Constant** | Milliseconds | 18.0 | 18.0 | 18.0 |
| Thermal | | | | |
| Insulation Class | | F | F | F |
| Max. Ambient Temperature | °C | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 25 | 25 | 25 |
| Mechanical | | | | |
| Static Friction Torque (Shaft Seal Lubricated) | Nm | 0.055 | 0.055 | 0.055 |
| | lb - in | 0.486 | 0.486 | 0.486 |
| Motor Weight | Kg | 2.7 | 2.7 | 2.7 |
| | lb | 5.9 | 5.9 | 5.9 |
| TACHOMETER | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | 7 | |
| | Volts Sec Rad ^{-1*} | 0.095 | 0.067 | |
| Ripple | Per Cent | 1.0 | 1.0 | |
| | Cycles/Rev | 33 | 33 | |
| Armature Resistance** | Ohms | 90 | 65 | |
| Armature Inductance | Millihenrys* | 15 | 8 | |
| Maximum Current | Amps | 0.02 | 0.03 | |

* Tolerance Plus or Minus 10%

** At 25°C

*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

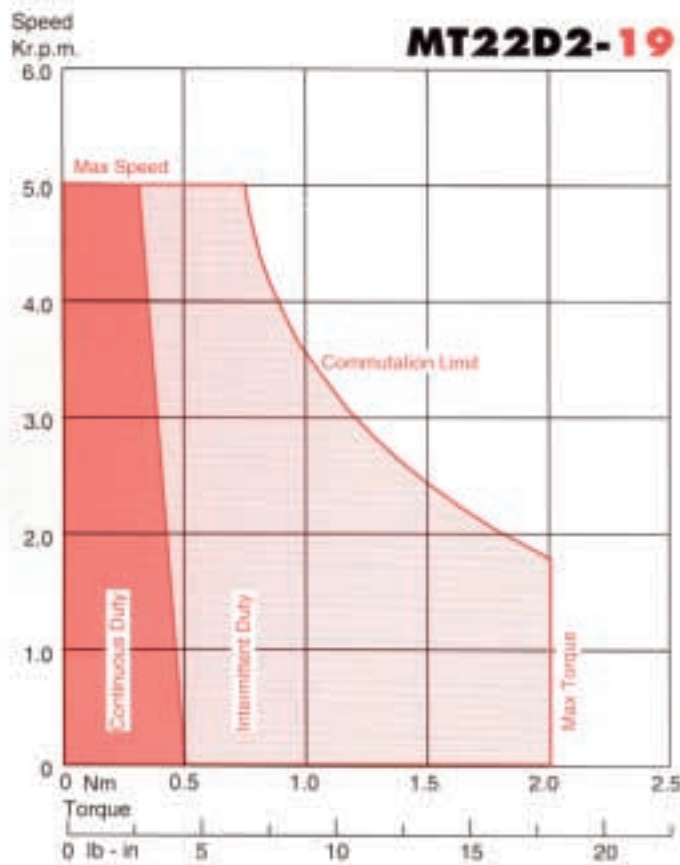
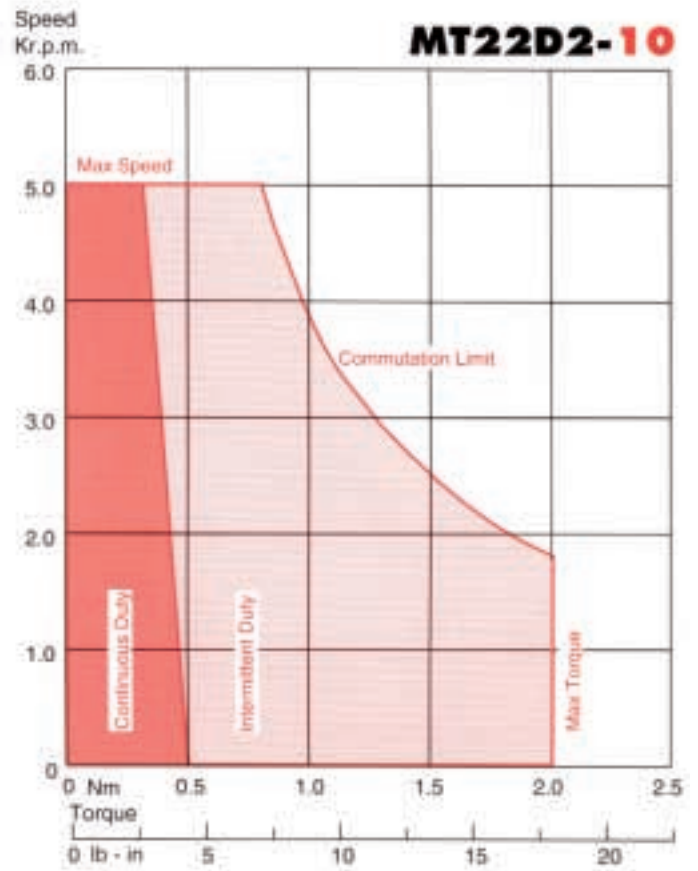
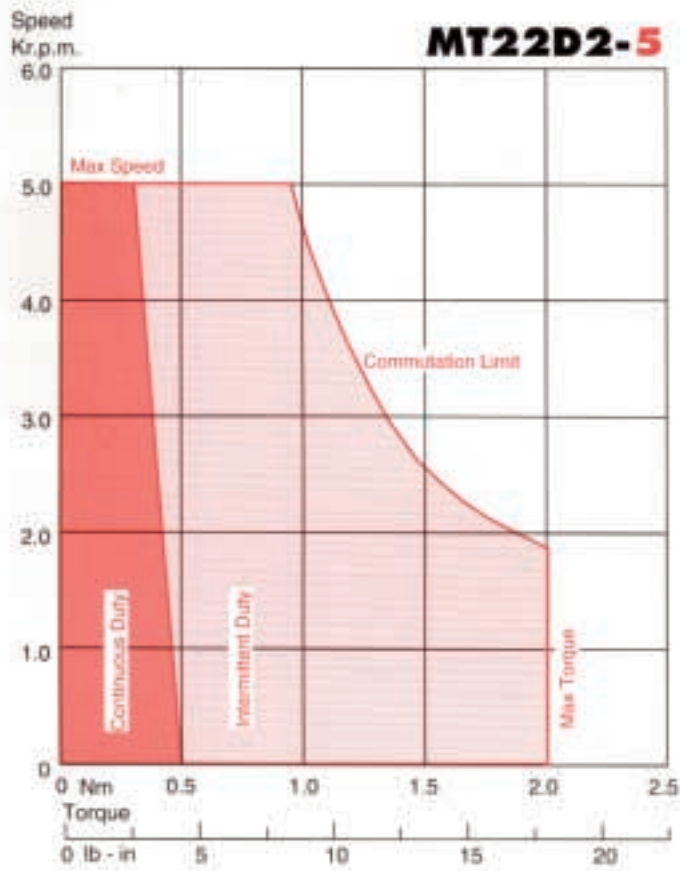
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (300mm x 300mm x 12mm)
(12" x 12" x 0.5")

STALL TORQUE 0.5Nm / 4.4lb-in

● (0.6Nm / 5.3lb-in)

Performance Curves



MT22G2 D.C. Servomotors

Technical Data

| Parameter | Unit | MT22G2-19 | MT22G2-10 | MT22G2-5 |
|---|------------------------------|-------------|-------------|-------------|
| GENERAL | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 19 | 10 | 5 |
| Max. Terminal Voltage | Volts | 95 | 50 | 25 |
| Max. Speed | RPM | 5000 | 5000 | 5000 |
| Continuous Stall Torque TENV*** | Nm | 0.7 | 0.7 | 0.7 |
| | lb - in | 6.2 | 6.2 | 6.2 |
| (Size 300x300x12.5mm) | Nm | 0.8 | 0.8 | 0.8 |
| Cont Stall Torque when fitted to Heatsink*** | | | | |
| | (Size 12x12x0.5in) | lb - in | 7.1 | 7.1 |
| Continuous Stall Current TENV*** | Amps | 3.9 | 7 | 14 |
| Armature Polar Moment of Inertia | Kgm ² | 0.00028 | 0.00028 | 0.00028 |
| | lb - in Sec ² | 0.0024 | 0.0024 | 0.0024 |
| Torque Constant KT** | Nm/Amp* | 0.18 | 0.10 | 0.05 |
| | lb - in/Amp* | 1.59 | 0.88 | 0.44 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.18 | 0.10 | 0.05 |
| Peak Stall Torque** | Nm | 4.0 | 4.0 | 4.0 |
| | lb - in | 35.4 | 35.4 | 35.4 |
| Current at Peak Torque** | Amps | 22.0 | 42.0 | 84.0 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 14000 | 14000 | 14000 |
| Winding | | | | |
| Armature Resistance Less Brushes** | Ohms* | 2.5 | 0.63 | 0.16 |
| Armature Inductance | Millihenrys* | 8.2 | 2.1 | 0.5 |
| Mechanical Time Constant** | Milliseconds | 17.0 | 17.0 | 17.0 |
| Thermal | | | | |
| Insulation Class | | F | F | F |
| Max. Ambient Temperature | °C | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 25 | 25 | 25 |
| Mechanical | | | | |
| Static Friction Torque (Shaft Seal Lubricated) | Nm | 0.055 | 0.055 | 0.055 |
| | lb - in | 0.486 | 0.486 | 0.486 |
| Motor Weight | Kg | 3.3 | 3.3 | 3.3 |
| | lb | 7.3 | 7.3 | 7.3 |
| TACHOMETER | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | 7 | |
| | Volts Sec Rad ^{-1*} | 0.095 | 0.067 | |
| Ripple | Per Cent | 1.0 | 1.0 | |
| | Cycles/Rev | 33 | 33 | |
| Armature Resistance** | Ohms | 90 | 65 | |
| Armature Inductance | Millihenrys* | 15 | 8 | |
| Maximum Current | Amps | 0.02 | 0.03 | |

- * Tolerance Plus or Minus 10%
- ** At 25°C
- *** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

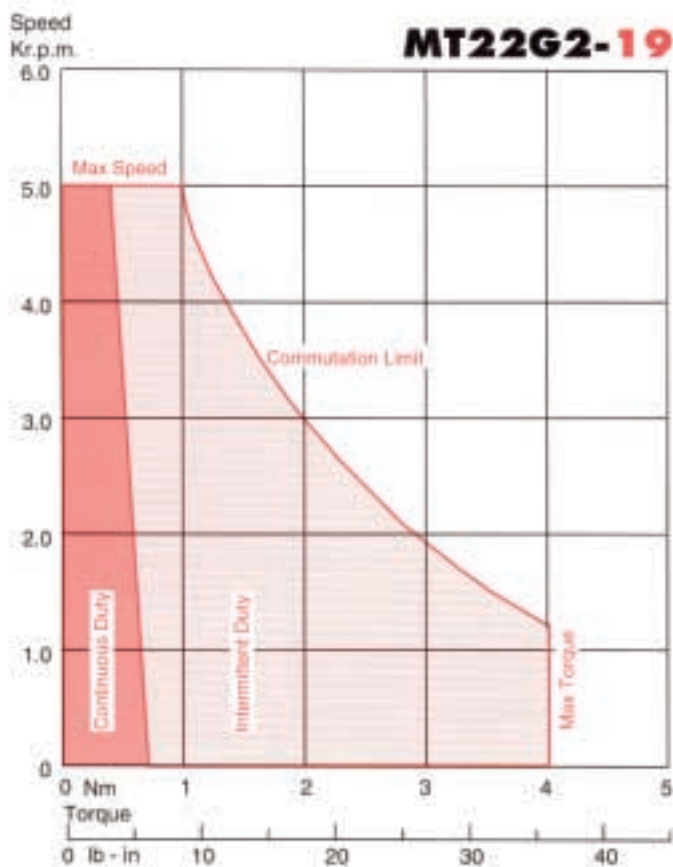
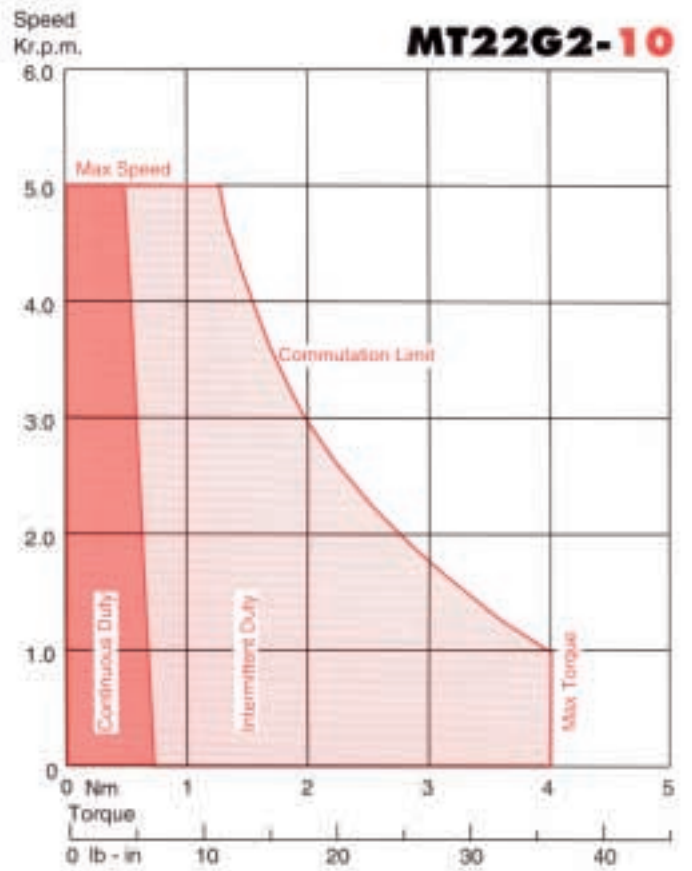
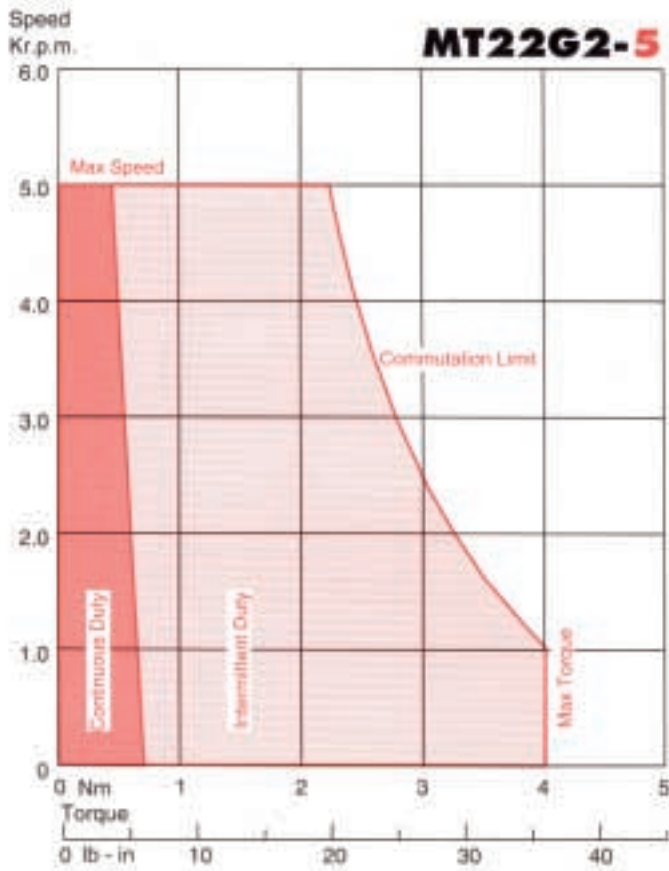
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (300mm x 300mm x 12mm)
(12" x 12" x 0.5")

STALL TORQUE 0.7Nm / 6.2lb-in

● (0.8Nm / 7.1lb-in)

Performance Curves



MT22R2 D.C. Servomotors

Technical Data

| Parameter | Unit | MT22R2-24 | MT22R2-19 | MT22R2-12 | MT22R2-10 |
|---|------------------------------|-------------|-------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 24 | 19 | 12 | 10 |
| Max. Terminal Voltage | Volts | 120 | 95 | 60 | 50 |
| Max. Speed | RPM | 5000 | 5000 | 5000 | 5000 |
| Continuous Stall Torque TENV*** | Nm | 1.2 | 1.2 | 1.2 | 1.2 |
| | lb - in | 10.6 | 10.6 | 10.6 | 10.6 |
| (Size 300x300x12.5mm) | Nm | 1.35 | 1.35 | 1.35 | 1.35 |
| Cont Stall Torque when fitted to Heatsink*** | | | | | |
| (Size 12x12x0.5in) | lb - in | 11.9 | 11.9 | 11.9 | 11.9 |
| Continuous Stall Current TENV*** | Amps | 5.2 | 6.7 | 10.9 | 12.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.0006 | 0.0006 | 0.0006 | 0.0006 |
| | lb - in Sec ² | 0.00531 | 0.00531 | 0.00531 | 0.00531 |
| Torque Constant KT** | Nm/Amp* | 0.23 | 0.18 | 0.11 | 0.10 |
| | lb - in/Amp* | 2.03 | 1.59 | 0.97 | 0.88 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.23 | 0.18 | 0.11 | 0.10 |
| Peak Stall Torque** | Nm | 8.0 | 8.0 | 8.0 | 8.0 |
| | lb - in | 71.0 | 71.0 | 71.0 | 71.0 |
| Current at Peak Torque** | Amps | 35 | 44 | 70 | 84 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 13,300 | 13,300 | 13,300 | 13,300 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 1.6 | 0.98 | 0.34 | 0.26 |
| Armature Inductance | Millihenrys* | 4.1 | 2.6 | 0.89 | 0.65 |
| Mechanical Time Constant** | Milliseconds | 16 | 16 | 16 | 16 |
| Thermal | | | | | |
| Insulation Class | | F | F | F | F |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 25 | 25 | 25 | 25 |
| Mechanical | | | | | |
| Static Friction Torque (Shaft Seal Lubricated) | Nm | 0.055 | 0.055 | 0.055 | 0.055 |
| | lb - in | 0.486 | 0.486 | 0.486 | 0.486 |
| Motor Weight | Kg | 5 | 5 | 5 | 5 |
| | lb | 11 | 11 | 11 | 11 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.09 | | 0.067 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 33 | | 33 | |
| Armature Resistance** | Ohms | 90 | | 65 | |
| Armature Inductance | Millihenrys* | 15 | | 8 | |
| Maximum Current | Amps | 0.02 | | 0.03 | |

- * Tolerance Plus or Minus 10%
- ** At 25°C
- *** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

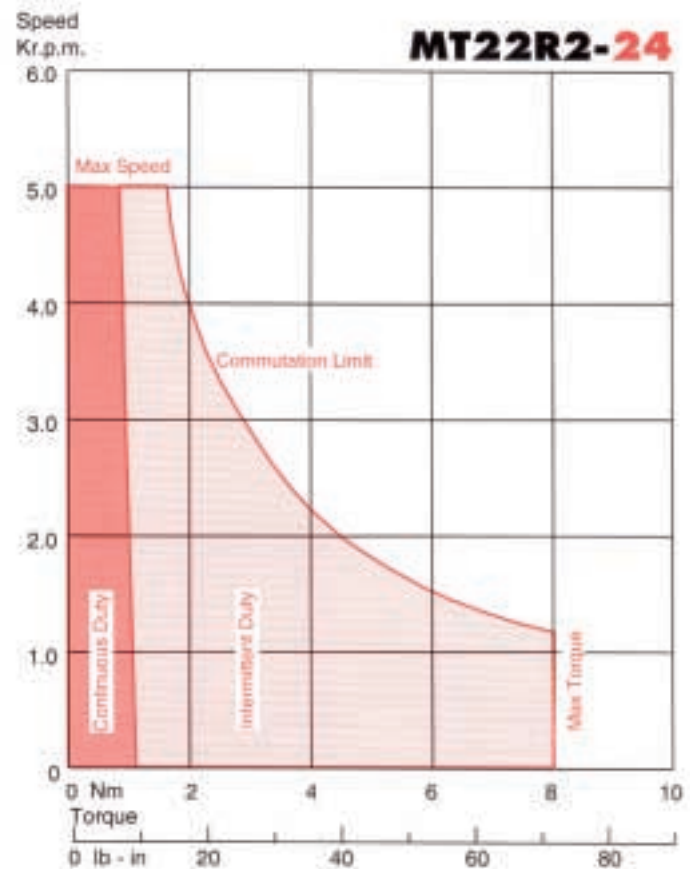
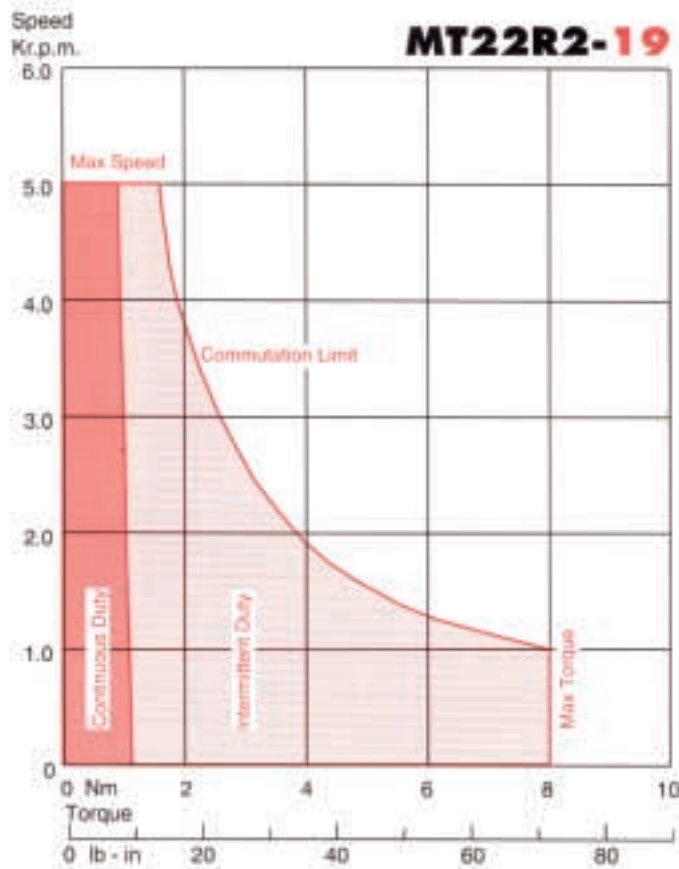
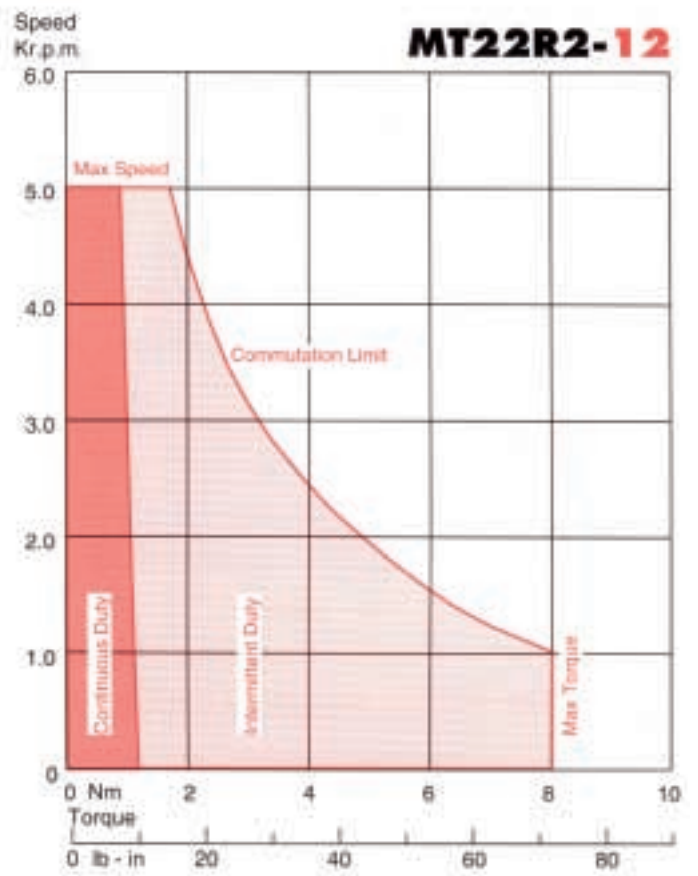
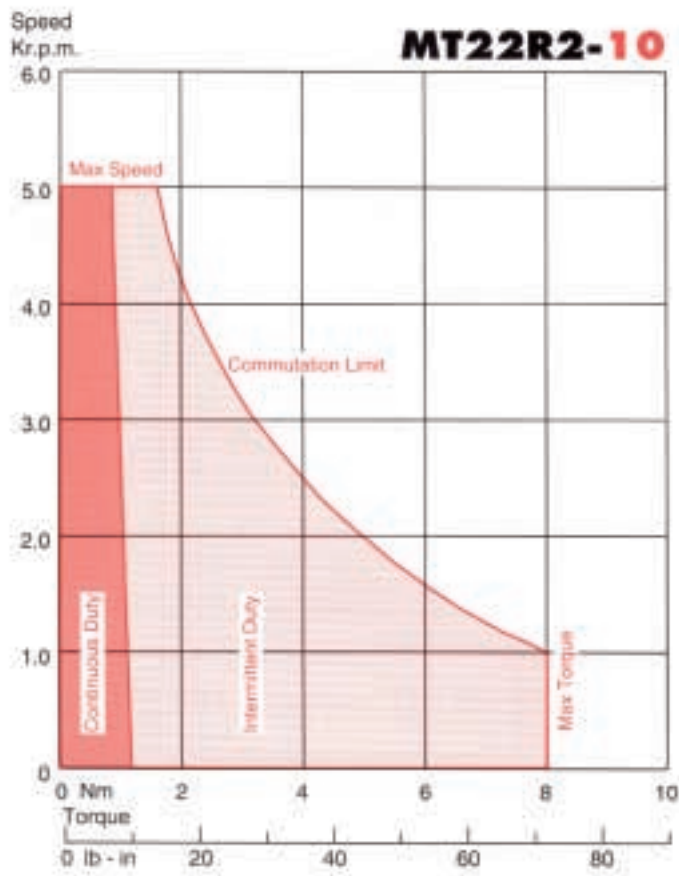
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (300mm x 300mm x 12mm)
(12" x 12" x 0.5")

STALL TORQUE 1.2Nm / 10.6lb-in

● (1.35Nm / 11.9lb-in)

Performance Curves



STANDARD ARRANGEMENT

TACHOGENERATOR

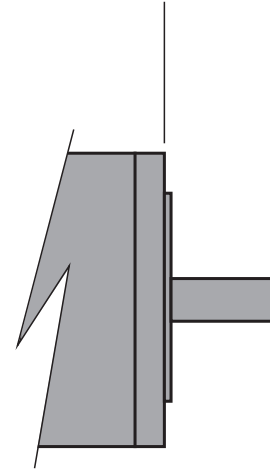
MOTOR WITH ENCODER ADAPTOR AND PIN TO SUIT BEC 755 ENCODER OR SUMTAK LHT ENCODER

∅ 5.992
∅ 5.980

10

ENCODER ADAPTOR

FACE & SPIGOT ARE SQUARE & CONCENTRIC TO SHAFT WITHIN 0.08 TOTAL INDICATOR READING (0.04 FOR OPTION R01 ONLY)



RUN OUT OF SHAFT WITHIN 0.05 TOTAL INDICATOR READING

STANDARD TOLERANCES CONFORM TO IEC72 (DIN 42955 TOLERANCE N)
OPTION R01 CLOSE TOLERANCES CONFORM TO IEC72 PRECISION (DIN 42955 TOLERANCE R)

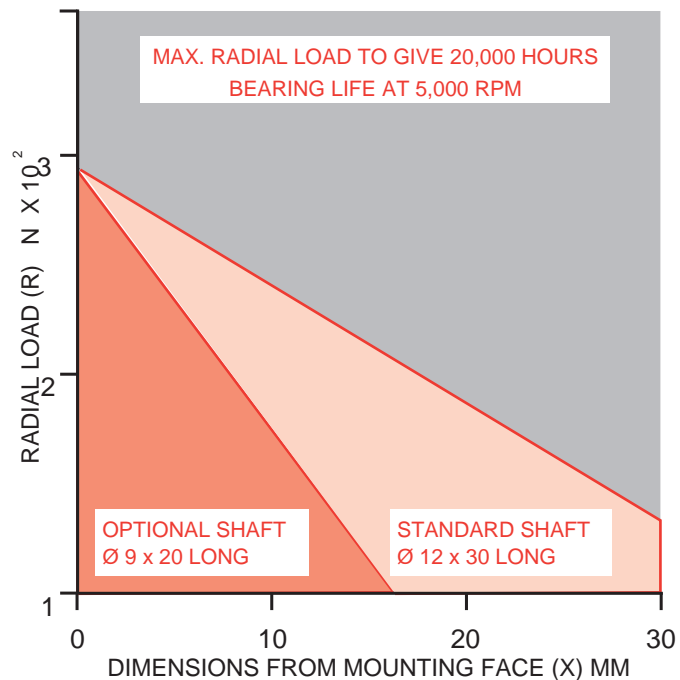
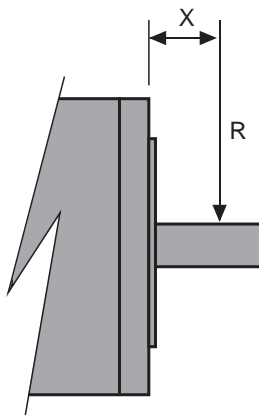
NON DRIVE END SHAFT ARRANGEMENT

DRIVE END INTERFACE TOLERANCES

DIMENSIONS IN MILLIMETRES

FOR INCH SERIES SEE DRAWING C-05623

SHAFT LOADING LIMITS



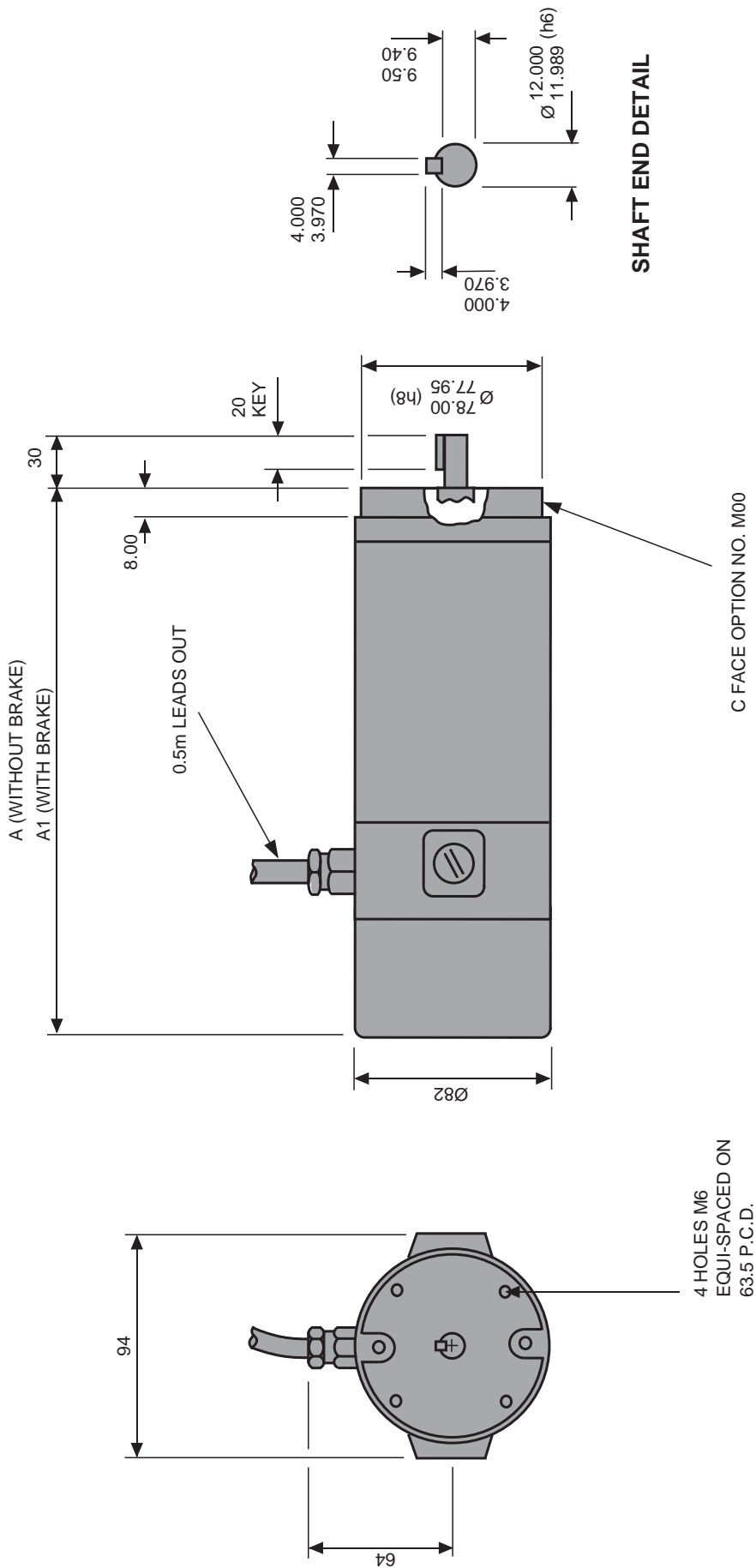
The above graph may be used as a guide for applications and includes an adequate safety factor for normal industrial use. If axial loads are to be applied, SEM should be consulted. Where radial loading in excess of the above maximum is deemed essential, the specific case should be referred to SEM.

METRIC D.C. SERVOMOTORS
MT22 SERIES

MECHANICAL DETAIL

C - 05622
SHEET 1 OF 2 SHEETS

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-05623



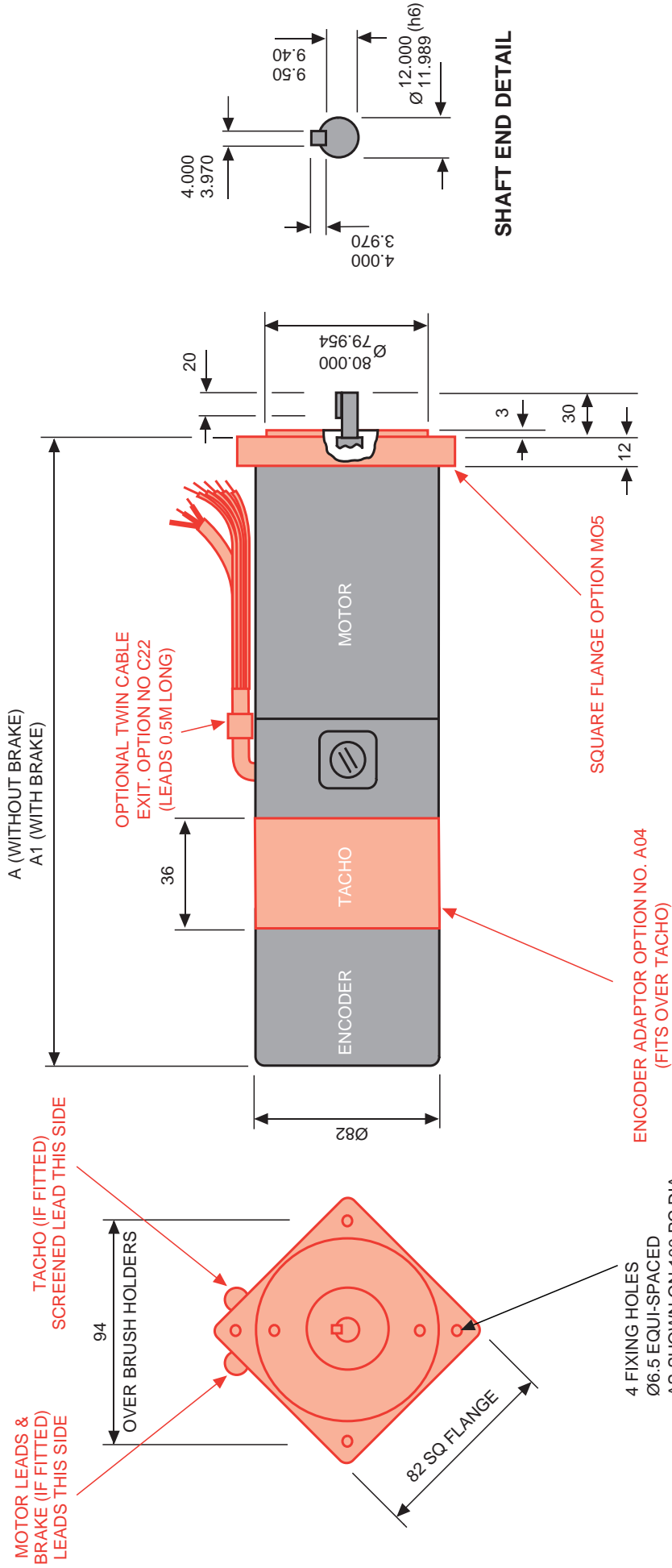
| TYPE | A | A1 |
|---------|-----|-----|
| MT 22D2 | 173 | 203 |
| MT 22G2 | 203 | 233 |
| MT 22R2 | 263 | 293 |

METRIC D.C. SERVOMOTORS
MT22 SERIES

STANDARD MT22 SERVOMOTOR

C - 05622
 SHEET 2 OF 2 SHEETS

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-05623



| TYPE | A | A1 |
|---------|-----|-----|
| MT 22D2 | 209 | 239 |
| MT 22G2 | 239 | 269 |
| MT 22R2 | 299 | 329 |

METRIC D.C. SERVO MOTORS
MT22 SERIES

MT22 SERVO MOTOR
 WITH TWIN CABLE EXIT, SQUARE FLANGE AND ENCODER ADAPTOR
 TO SUIT THE BEC755 & SUMTAK LHT ENCODERS SHOWN IN RED

C - 05730
 SHEET 1 OF 1 SHEETS

Standard features are shown by ● in black.

Available fitted options are shown in red.

Please quote No. and reference of options along with motor type No. when placing an order.

If options or features are required which are not detailed below, they may be possible, so please ask SEM sales.

| NO. | REFERENCE | DESCRIPTION |
|--------------------------------|--------------------------------------|---|
| MECHANICAL INTERFACE | | |
| ● M00 | FACE | See page 11 |
| M05 | SQUARE FLANGE | See page 12 |
| R01 | CLOSE TOLERANCE | Interface (face & shaft) to IEC72 PRECISION (DIN 42955 Tolerance R) |
| ● S00 | SHAFT | See page 11 |
| S01 | SHAFT | 9mm Dia X 20mm Long (See page 12) |
| ● K00 | KEYWAY | See page 11 |
| K01 | KEYWAY | 3mm x 3mm x 12mm long |
| K99 | NO KEYWAY | Plain shaft |
| D02 | SHAFT END TAPPED | M4 X 12mm Deep tapped in drive shaft |
| H01 | HAND CRANK | Rear shaft to enable hand rotation of motor |
| MOTOR PROTECTION | | |
| ● P00 | IP64 / IP65 | Enclosure protection IP65. Shaft sealing IP64 |
| P01 | IP44 | Enclosure protection IP44 when cable exit C22 is incorporated |
| ● W01 | SHAFT SEAL | Oil seal fitted at drive end/shaft interface |
| P99 | TROPICALISED | Special treatment on internal parts |
| BRAKES | | |
| B00 | 24V DC BRAKE | 2 Nm torque, 24V DC supply |
| B01 | 90V DC BRAKE | 2 Nm torque, 90V DC supply |
| L01 | RECTIFIER | 110V AC input, 90V DC output for B01 (supplied loose for external mounting) |
| ELECTRICAL TERMINATIONS | | |
| ● C00 | LEADS OUT | 0.5 metre long radial exit (No terminal box) |
| C01 | MS CONNECTOR (IP44) | Receptacle MS3102A-24-7P (16 Pin) fitted to rear side cast cover G08 (IP44) |
| C04 | MS PLUG & CABLE CLAMP FOR C01 (IP65) | Straight plug MS3106A-18-1S and cable clamp 97-3057-1010-1 (IP44) |
| C12 | MS CONNECTOR (IP65) | Receptacle MS 3102E-24-7P (16 pin). As C01 but IP65 |
| C13 | MS PLUG & CABLE CLAMP FOR C12 (IP65) | Straight plug MS 3106E-18-1S (IP65) |
| C22 | TWIN LEADS OUT (IP44 ONLY) | See page 12. Separate motor and tachometer leads out 0.5 m long secured to motor body |
| TACHOGENERATORS | | |
| T07 | TACHOGENERATOR | 7V/1000 RPM |
| ● T95 | TACHOGENERATOR | 9.5V/1000 RPM |
| T14 | TACHOGENERATOR | 14V/1000 RPM |
| N99 | NO TACHOGENERATOR | No velocity feedback |
| ENCODERS | | |
| E01 | ENCODER | HEIDENHAIN ERN1120 Series - 250 PPR |
| E02 | ENCODER | HEIDENHAIN ERN1120 Series - 500PPR |
| E03 | ENCODER | HEIDENHAIN ERN1120 Series - 1000 PPR |
| ENCODER FITTINGS | | |
| A04 | ENCODER ADAPTOR | for BEC 755 encoder & SUMTAK model LHT encoder |
| A08 | ENCODER ADAPTOR | for Heidenhain 1251/2 encoder |
| G01 | ENCODER COVER (IP65) | Cast cover with 1 X M10 tapped hole and cable gland |
| G02 | ENCODER COVER (IP65) | Cast cover with 1 X PG7 tapped hole and cable gland |
| C04 | MS PLUG & CABLE CLAMP FOR G08 (IP44) | Straight plug MS3102A-24-7S & cable clamp 97-3057-1016-1 |
| G08 | ENCODER COVER (IP44) | Cast cover with receptacle MS3102A-24-7P (16 Pin) fitted |
| G14 | ENCODER COVER (IP65) | Cast cover with receptacle MS 3102E-24-7P (16 Pin) |
| G26 | MS PLUG & CABLE CLAMP FOR G14 (IP65) | Straight plug MS 3102E-24-7PS (IP75) |

MT30E4 D.C. Servomotors

Technical Data

| Parameter | Unit | MT30E4-52 | MT30E4-32 | MT30E4-25 | MT30E4-20 |
|--|------------------------------|-------------|-------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 52 | 32 | 25 | 20 |
| Max. Terminal Voltage | Volts | 140 | 130 | 100 | 80 |
| Max. Speed | RPM | 2700 | 4000 | 4000 | 4000 |
| Continuous Stall Torque TENV*** | Nm | 1.2 | 1.2 | 1.2 | 1.2 |
| | lb - in | 10.6 | 10.6 | 10.6 | 10.6 |
| Continuous Stall Torque Blower Cooled*** | Nm | 2.0 | 2.0 | 2.0 | 2.0 |
| | lb - in | 18 | 18 | 18 | 18 |
| Continuous Stall Current TENV*** | Amps | 2.5 | 4.1 | 5.4 | 7.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| | lb - in Sec ² | 0.01 | 0.01 | 0.01 | 0.01 |
| Torque Constant KT** | Nm/Amp* | 0.48 | 0.29 | 0.22 | 0.17 |
| | lb - in/Amp* | 4.2 | 2.6 | 1.9 | 1.5 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.48 | 0.29 | 0.22 | 0.17 |
| Peak Stall Torque** | Nm | 6.0 | 6.0 | 6.0 | 6.0 |
| | lb - in | 53 | 53 | 53 | 53 |
| Current at Peak Torque** | Amps | 13 | 22 | 29 | 37 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 5500 | 5500 | 5500 | 5500 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 5.9 | 2.2 | 1.25 | 0.9 |
| Armature Inductance | Millihenrys* | 28 | 10 | 6 | 3.7 |
| Mechanical Time Constant** | Milliseconds | 30 | 30 | 30 | 30 |
| Thermal | | | | | |
| Insulation Class | | F | F | F | F |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 40 | 40 | 40 | 40 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 0.15 | 0.15 | 0.15 | 0.15 |
| | lb - in | 1.3 | 1.3 | 1.3 | 1.3 |
| Motor Weight | Kg | 5.1 | 5.1 | 5.1 | 5.1 |
| | lb | 11 | 11 | 11 | 11 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | | 0.067 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 25 | | 25 | |
| Armature Resistance** | Ohms | 36 | | 24 | |
| Armature Inductance | Millihenrys* | 55 | | 36 | |
| Maximum Current | Amps | 0.025 | | 0.035 | |

* Tolerance Plus or Minus 10%

** At 25°C

*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

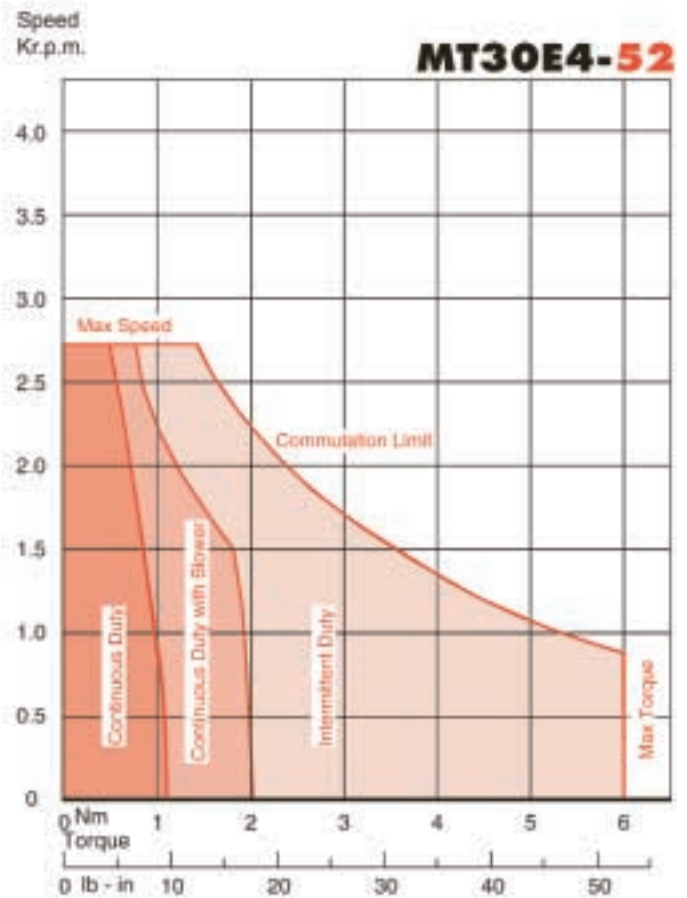
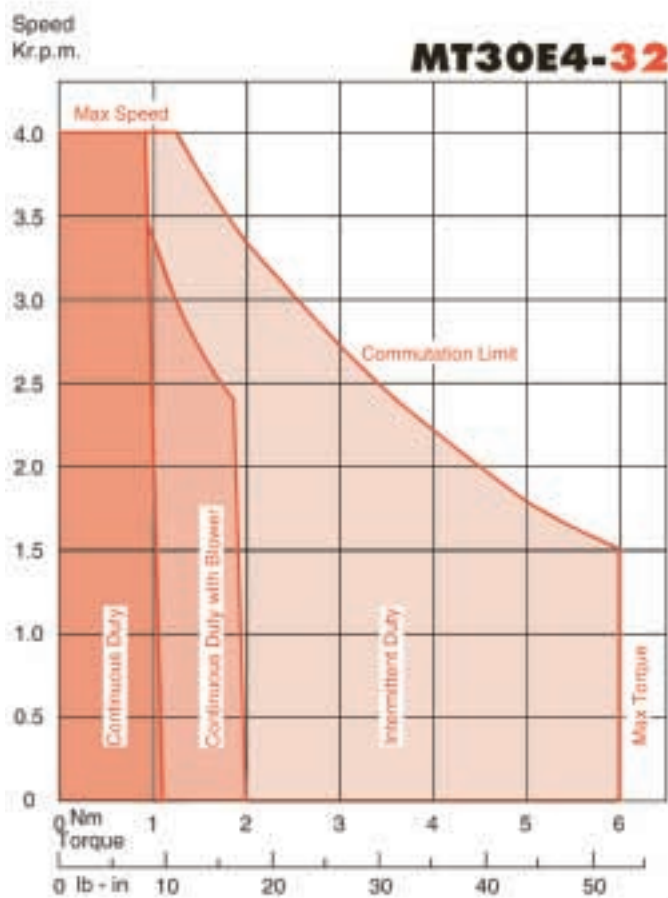
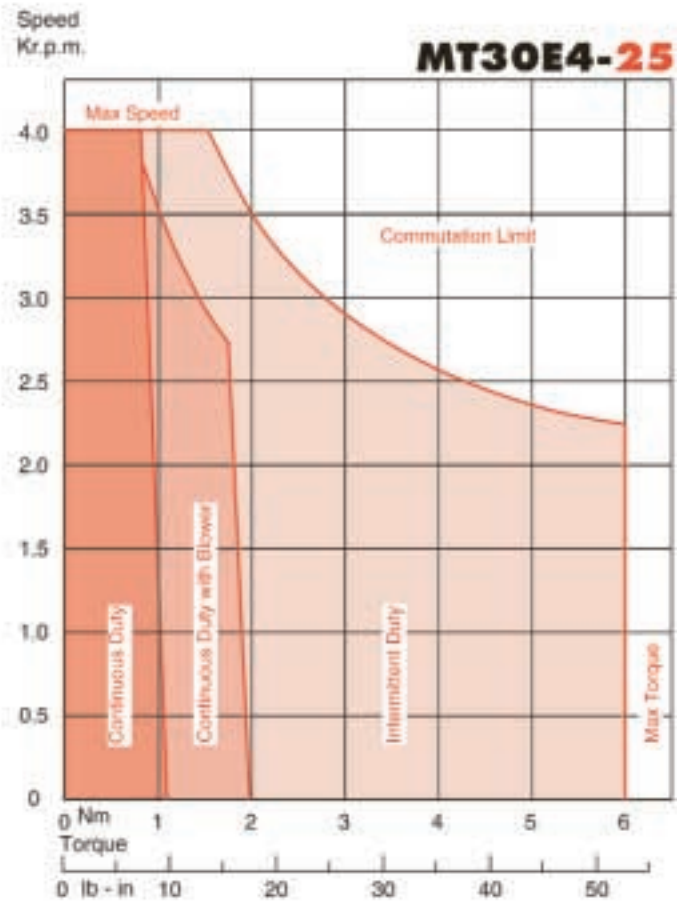
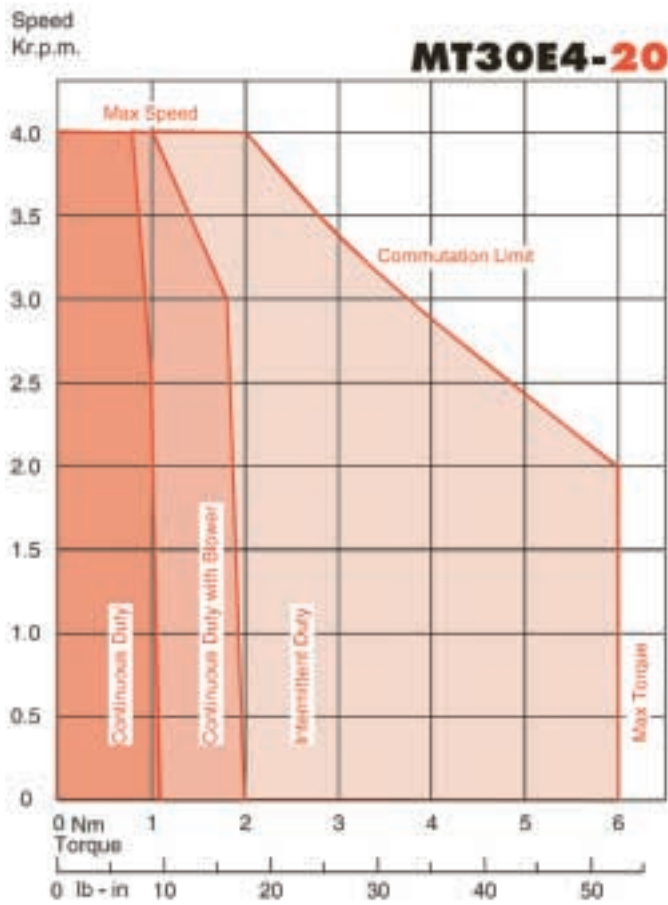
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (300mm x 300mm x 12mm)
(12" x 12" x 0.5")

STALL TORQUE 1.2Nm / 10.6lb-in

● (1.4Nm / 12.4lb-in)

Performance Curves



MT30F4 D.C. Servomotors

Technical Data

| Parameter | Unit | MT30F4-52 | MT30F4-45 | MT30F4-39 | MT30F4-25 |
|--|------------------------------|-------------|-------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 52 | 45 | 39 | 25 |
| Max. Terminal Voltage | Volts | 140 | 140 | 140 | 100 |
| Max. Speed | RPM | 2700 | 3100 | 3600 | 4000 |
| Continuous Stall Torque TENV*** | Nm | 1.6 | 1.6 | 1.6 | 1.6 |
| | lb - in | 14 | 14 | 14 | 14 |
| Continuous Stall Torque Blower Cooled*** | Nm | 3.0 | 3.0 | 3.0 | 3.0 |
| | lb - in | 26 | 26 | 26 | 26 |
| Continuous Stall Current TENV*** | Amps | 3.4 | 3.9 | 4.4 | 7.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.0012 | 0.0012 | 0.0012 | 0.0012 |
| | lb - in Sec ² | 0.011 | 0.011 | 0.011 | 0.011 |
| Torque Constant KT** | Nm/Amp* | 0.47 | 0.41 | 0.36 | 0.23 |
| | lb - in/Amp* | 4.2 | 3.6 | 3.2 | 2.0 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.47 | 0.41 | 0.36 | 0.23 |
| Peak Stall Torque** | Nm | 7.5 | 7.5 | 7.5 | 7.5 |
| | lb - in | 66 | 66 | 66 | 66 |
| Current at Peak Torque** | Amps | 18 | 21 | 24 | 34 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 6200 | 6200 | 6200 | 6200 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 4.0 | 3.1 | 2.3 | 1.0 |
| Armature Inductance | Millihenrys* | 22.0 | 16.0 | 13.0 | 5.0 |
| Mechanical Time Constant** | Milliseconds | 23 | 23 | 23 | 25 |
| Thermal | | | | | |
| Insulation Class | | F | F | F | F |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 40 | 40 | 40 | 40 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 0.15 | 0.15 | 0.15 | 0.15 |
| | lb - in | 1.3 | 1.3 | 1.3 | 1.3 |
| Motor Weight | Kg | 5.4 | 5.4 | 5.4 | 5.4 |
| | lb | 12 | 12 | 12 | 12 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | | 0.67 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 25 | | 25 | |
| Armature Resistance** | Ohms | 36 | | 24 | |
| Armature Inductance | Millihenrys* | 55 | | 36 | |
| Maximum Current | Amps | 0.025 | | 0.035 | |

* Tolerance Plus or Minus 10%

** At 25°C

*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

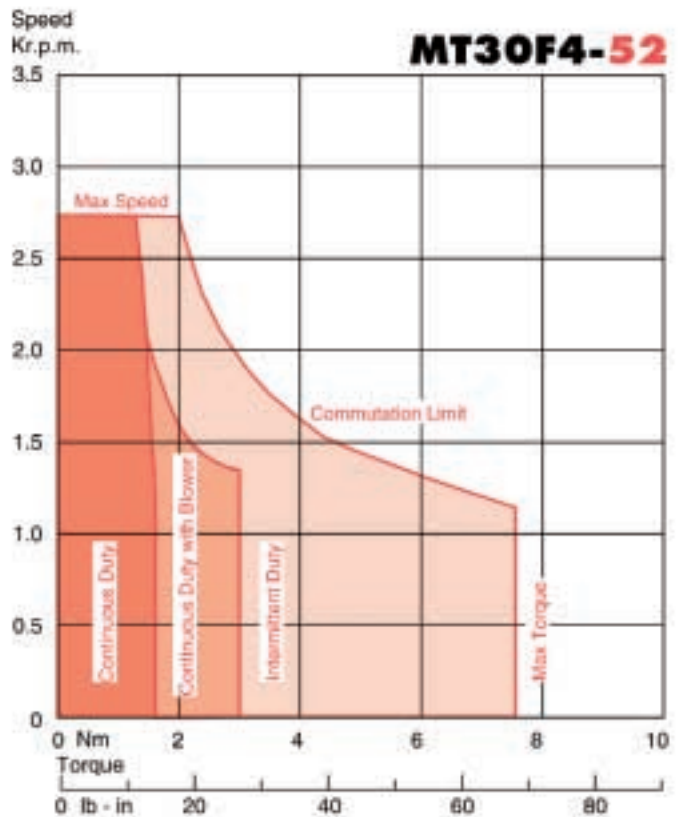
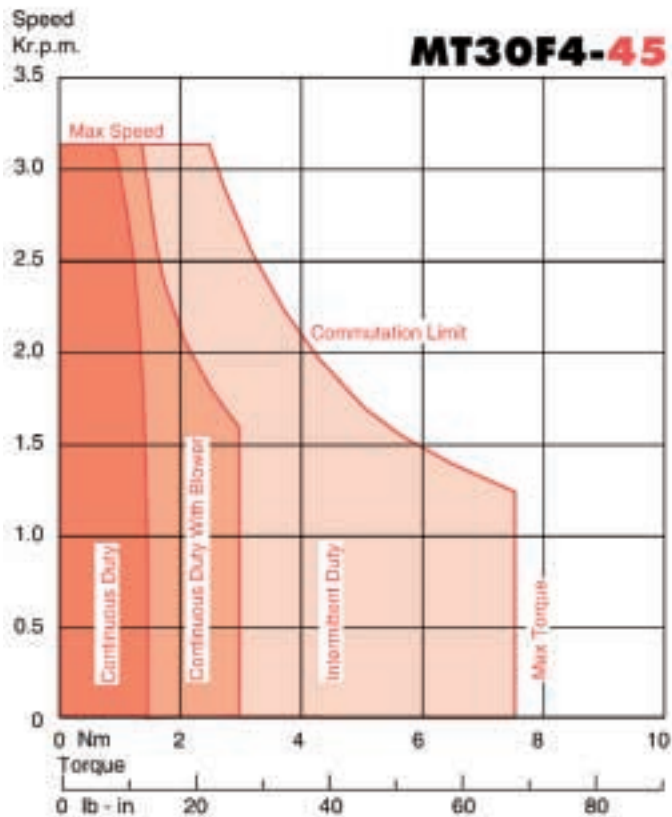
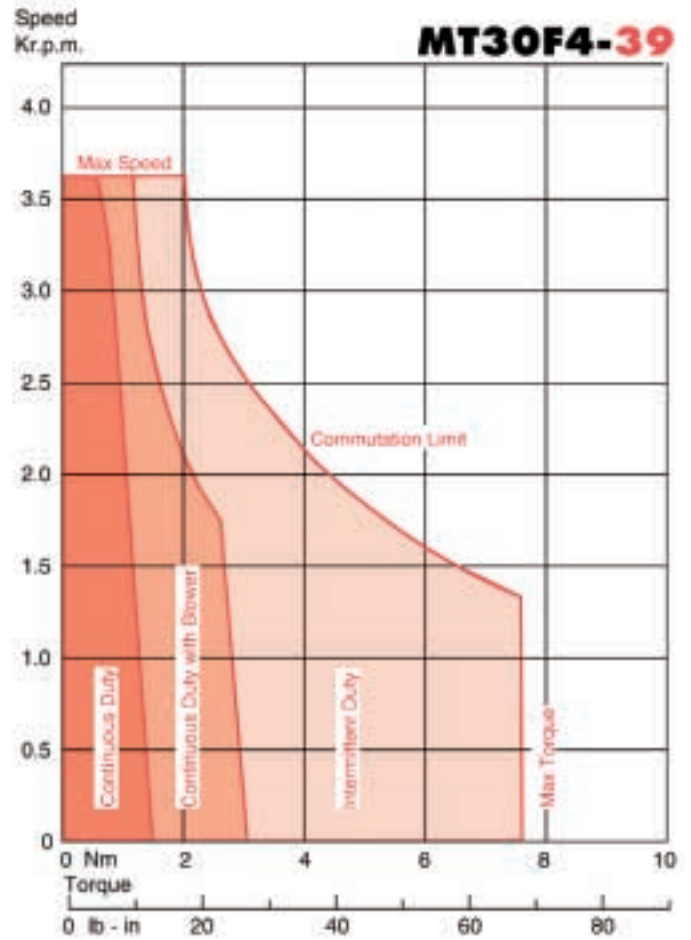
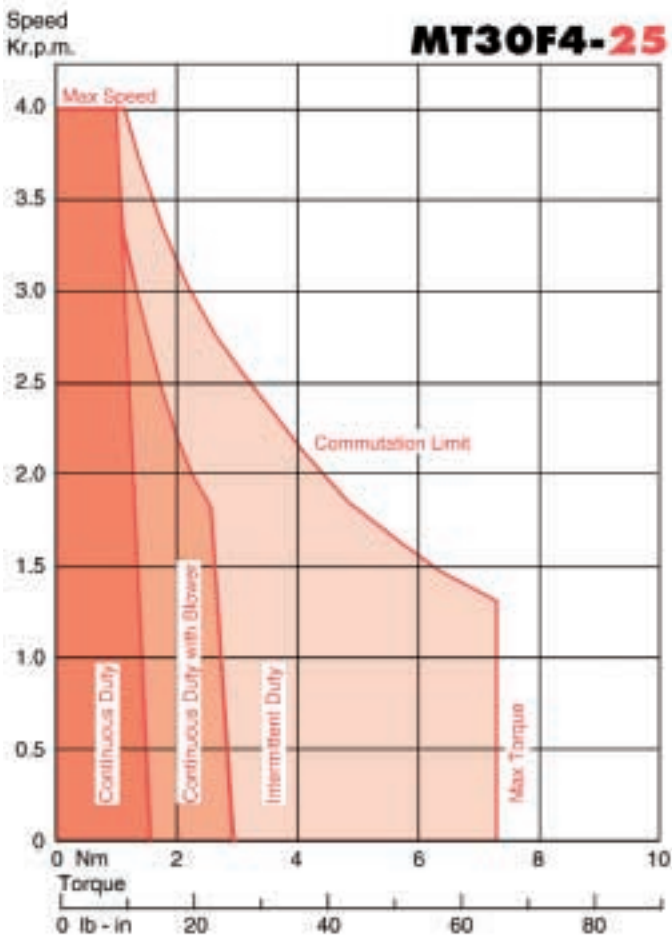
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (300mm x 300mm x 12mm)
(12" x 12" x 0.5")

STALL TORQUE 1.6Nm / 14lb-in

● (1.8Nm / 16.0lb-in)

Performance Curves



MT30H4 D.C. Servomotors

Technical Data

| Parameter | Unit | MT30H4-65 | MT30H4-44 | MT30H4-33 | MT30H4-22 |
|--|------------------------------|-------------|-------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 65 | 44 | 33 | 22 |
| Max. Terminal Voltage | Volts | 140 | 140 | 130 | 90 |
| Max. Speed | RPM | 2100 | 3100 | 4000 | 4000 |
| Continuous Stall Torque TENV*** | Nm | 2.1 | 2.1 | 2.1 | 2.1 |
| | lb - in | 19 | 19 | 19 | 19 |
| Continuous Stall Torque Blower Cooled*** | Nm | 4.0 | 4.0 | 4.0 | 4.0 |
| | lb - in | 35 | 35 | 35 | 35 |
| Continuous Stall Current TENV*** | Amps | 3.5 | 4.4 | 6.8 | 10.5 |
| Armature Polar Moment of Inertia | Kgm ² | 0.0014 | 0.0014 | 0.0014 | 0.0014 |
| | lb - in Sec ² | 0.012 | 0.012 | 0.012 | 0.012 |
| Torque Constant KT** | Nm/Amp* | 0.61 | 0.43 | 0.31 | 0.20 |
| | lb - in/Amp* | 5.4 | 3.8 | 2.7 | 1.7 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.61 | 0.43 | 0.31 | 0.20 |
| Peak Stall Torque** | Nm | 10.0 | 10.0 | 10.0 | 10.0 |
| | lb - in | 88 | 88 | 88 | 88 |
| Current at Peak Torque** | Amps | 18 | 26 | 37 | 57 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 7100 | 7100 | 7100 | 7100 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 4.6 | 2.0 | 1.3 | 0.4 |
| Armature Inductance | Millihenrys* | 24.0 | 12.0 | 6.0 | 2.4 |
| Mechanical Time Constant** | Milliseconds | 18 | 18 | 18 | 18 |
| Thermal | | | | | |
| Insulation Class | | F | F | F | F |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 50 | 50 | 50 | 50 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 0.15 | 0.15 | 0.15 | 0.15 |
| | lb - in | 1.3 | 1.3 | 1.3 | 1.3 |
| Motor Weight | Kg | 6.5 | 6.5 | 6.5 | 6.5 |
| | lb | 14 | 14 | 14 | 14 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | | 0.067 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 25 | | 25 | |
| Armature Resistance** | Ohms | 36 | | 24 | |
| Armature Inductance | Millihenrys* | 55 | | 36 | |
| Maximum Current | Amps | 0.025 | | 0.035 | |

- * Tolerance Plus or Minus 10%
- ** At 25°C
- *** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

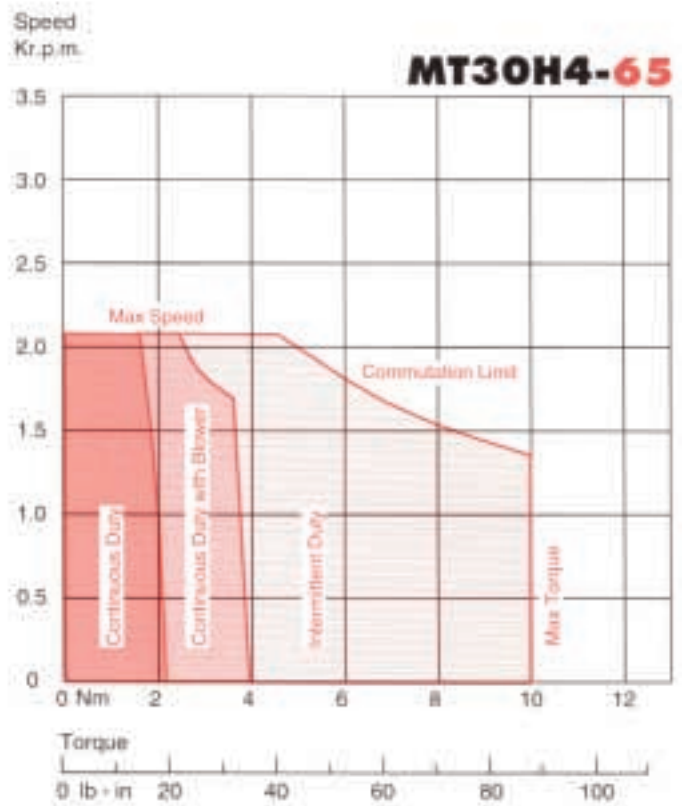
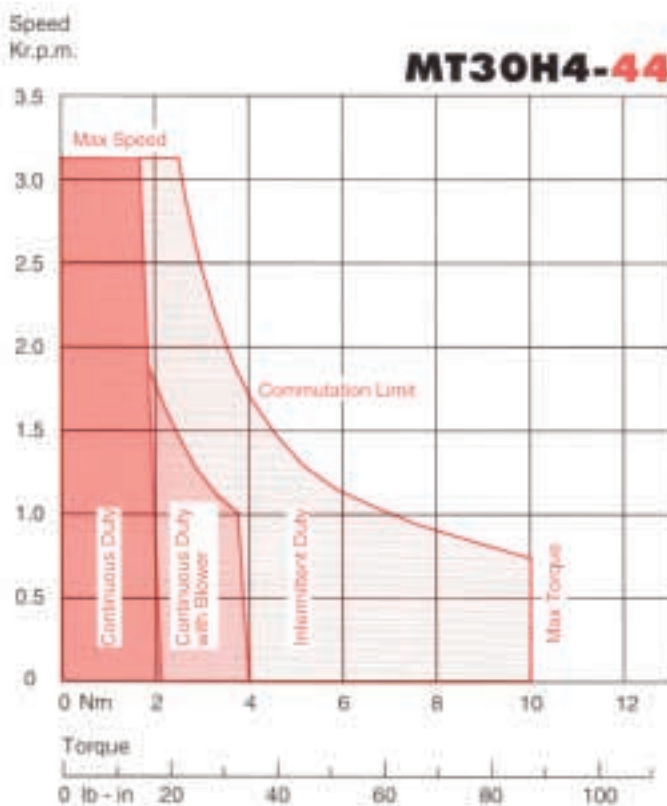
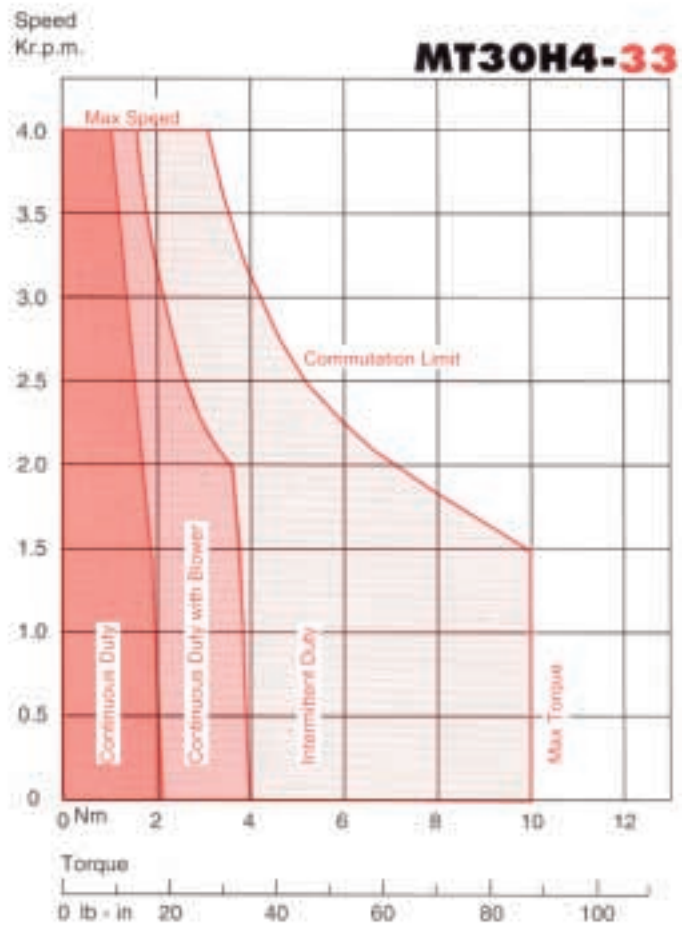
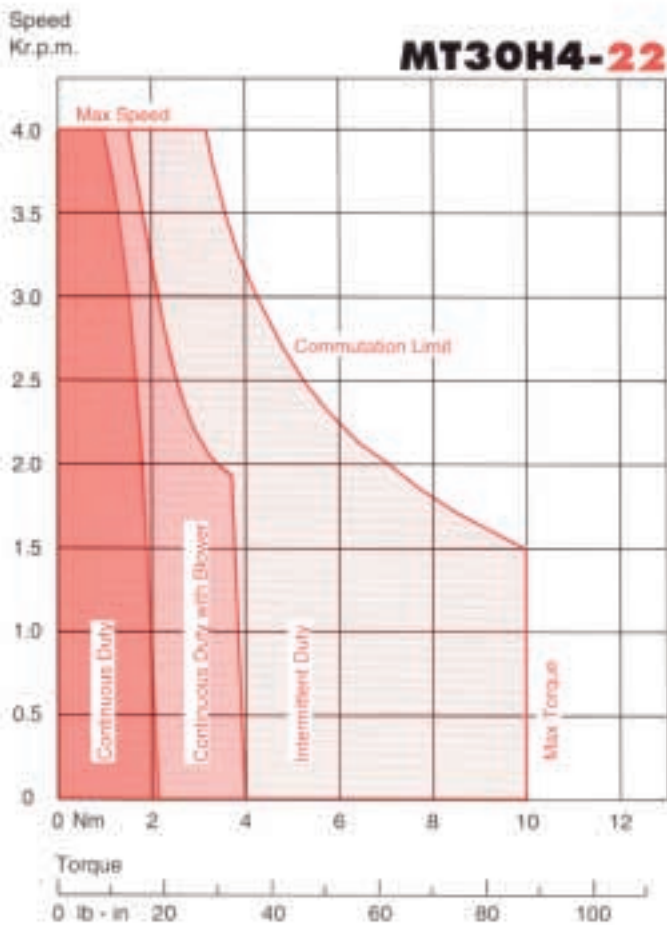
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● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (300mm x 300mm x 12mm)
(12" x 12" x 0.5")

STALL TORQUE 2.1Nm / 19lb-in

● (2.3Nm / 20.4lb-in)

Performance Curves



MT30M4 D.C. Servomotors

Technical Data

| Parameter | Unit | MT30M4-59 | MT30M4-48 | MT30M4-38 | MT30M4-24 |
|--|------------------------------|-------------|-------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 59 | 48 | 38 | 24 |
| Max. Terminal Voltage | Volts | 140 | 140 | 140 | 100 |
| Max. Speed | RPM | 2400 | 3000 | 3700 | 4000 |
| Continuous Stall Torque TENV*** | Nm | 3.0 | 3.0 | 3.0 | 3.0 |
| | lb - in | 26 | 26 | 26 | 26 |
| Continuous Stall Torque Blower Cooled*** | Nm | 5.5 | 5.5 | 5.5 | 5.5 |
| | lb - in | 49 | 49 | 49 | 49 |
| Continuous Stall Current TENV*** | Amps | 5.5 | 6.8 | 8.6 | 13.6 |
| Armature Polar Moment of Inertia | Kgm ² | 0.0017 | 0.0017 | 0.0017 | 0.0017 |
| | lb - in Sec ² | 0.015 | 0.015 | 0.015 | 0.015 |
| Torque Constant KT** | Nm/Amp* | 0.54 | 0.44 | 0.35 | 0.22 |
| | lb - in/Amp* | 4.8 | 3.9 | 3.1 | 1.9 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.54 | 0.44 | 0.35 | 0.22 |
| Peak Stall Torque** | Nm | 14 | 14 | 14 | 14 |
| | lb - in | 124 | 124 | 124 | 124 |
| Current at Peak Torque** | Amps | 30 | 37 | 47 | 75 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 8200 | 8200 | 8200 | 8200 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 2.0 | 1.3 | 0.82 | 0.33 |
| Armature Inductance | Millihenrys* | 15.5 | 10.5 | 6.5 | 2.6 |
| Mechanical Time Constant** | Milliseconds | 13 | 13 | 15 | 18 |
| Thermal | | | | | |
| Insulation Class | | F | F | F | F |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 50 | 50 | 50 | 50 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 0.15 | 0.15 | 0.15 | 0.15 |
| | lb - in | 1.3 | 1.3 | 1.3 | 1.3 |
| Motor Weight | Kg | 7.3 | 7.3 | 7.3 | 7.3 |
| | lb | 16 | 16 | 16 | 16 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | | 0.067 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 25 | | 25 | |
| Armature Resistance** | Ohms | 36 | | 24 | |
| Armature Inductance | Millihenrys* | 55 | | 36 | |
| Maximum Current | Amps | 0.025 | | 0.035 | |

* Tolerance Plus or Minus 10%

** At 25°C

*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

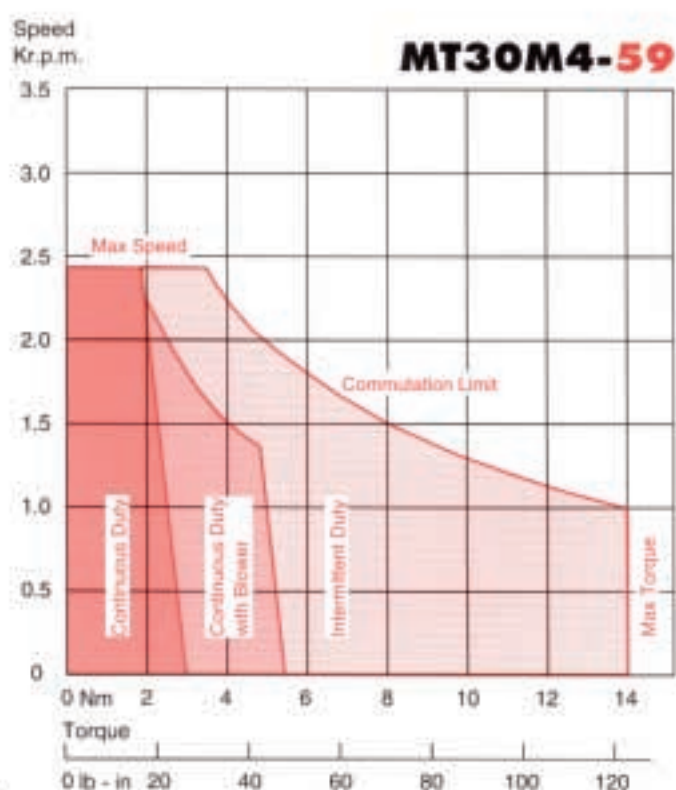
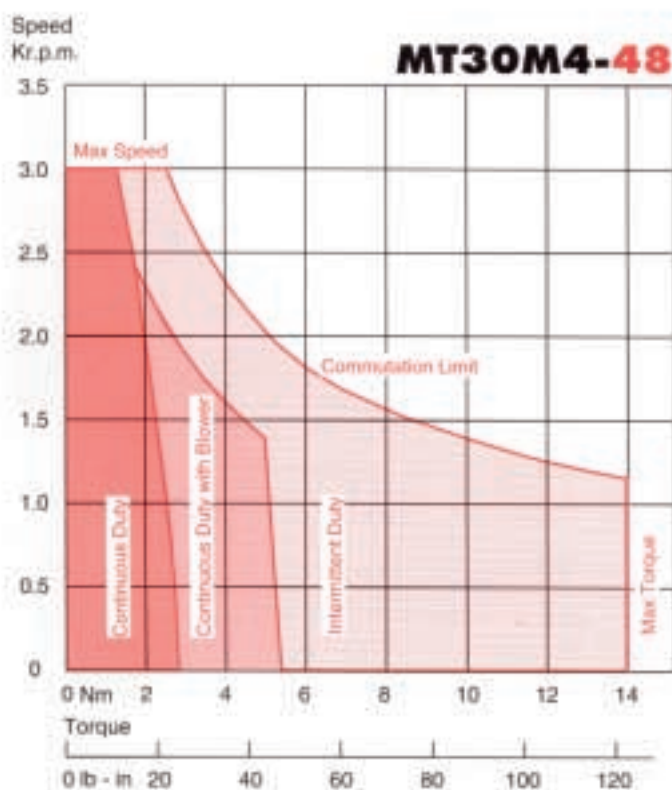
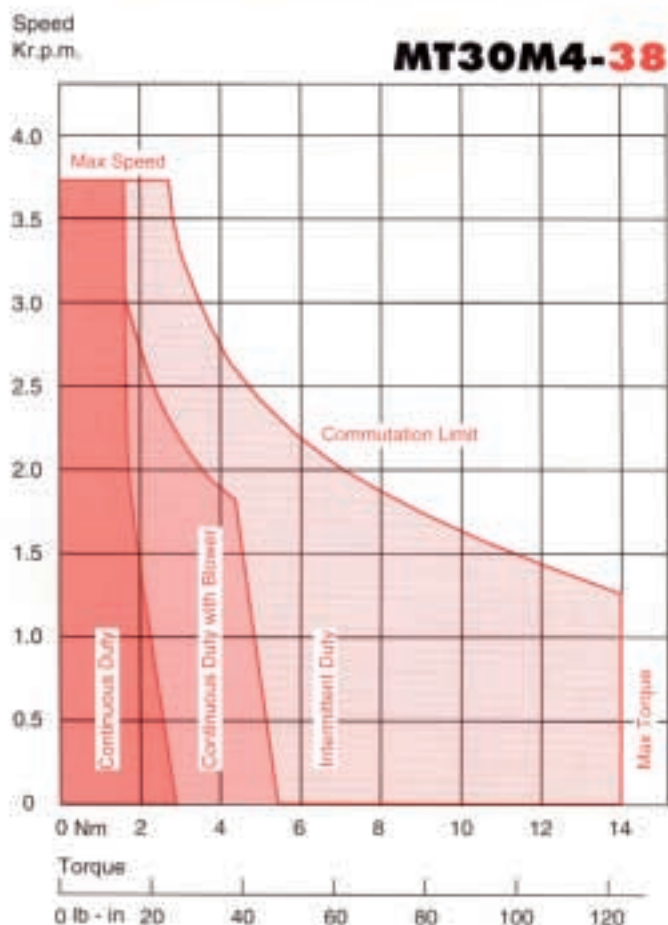
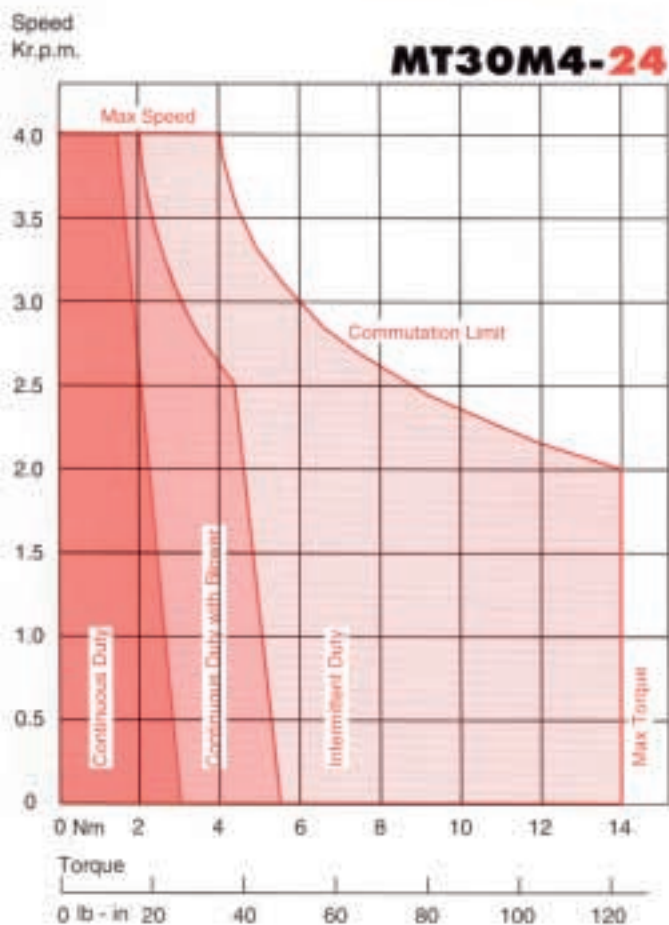
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (300mm x 300mm x 12mm)
(12" x 12" x 0.5")

STALL TORQUE 3.0Nm / 26lb-in

● (3.3Nm / 29lb-in)

Performance Curves



MT3OR4 D.C. Servomotors

Technical Data

| Parameter | Unit | MT3OR4-58 | MT3OR4-46 | MT3OR4-37 | MT3OR4-25 |
|--|------------------------------|-------------|-----------------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 58 | 46 | 37 | 25 |
| Max. Terminal Voltage | Volts | 140 | 140 | 140 | 100 |
| Max. Speed | RPM | 2500 | 3000 | 3800 | 4000 |
| Continuous Stall Torque TENV*** | Nm | 3.5 | 3.5 | 3.5 | 3.2 |
| | lb - in | 30.0 | 30.0 | 30.0 | 28.0 |
| Continuous Stall Torque Blower Cooled*** | Nm | 6.0 | 6.0 | 6.0 | 6.0 |
| | lb - in | 53 | 53 | 53 | 53 |
| Continuous Stall Current TENV*** | Amps | 6.1 | 7.6 | 9.5 | 13.3 |
| Armature Polar Moment of Inertia | Kgm ² | 0.0020 | 0.0020 | 0.0020 | 0.0020 |
| | lb - in Sec ² | 0.018 | 0.018 | 0.018 | 0.018 |
| Torque Constant KT** | Nm/Amp* | 0.57 | 0.46 | 0.37 | 0.24 |
| | lb - in/Amp* | 5.0 | 4.0 | 3.3 | 2.1 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.57 | 0.46 | 0.37 | 0.24 |
| Peak Stall Torque** | Nm | 18.0 | 18.0 | 18.0 | 18.0 |
| | lb - in | 160 | 160 | 160 | 160 |
| Current at Peak Torque** | Amps | 37 | 47 | 57 | 86 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 9000 | 9000 | 9000 | 9000 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 1.7 | 0.90 | 0.72 | 0.40 |
| Armature Inductance | Millihenrys* | 11.5 | 7.0 | 5.0 | 2.2 |
| Mechanical Time Constant** | Milliseconds | 11.0 | 11.0 | 12.0 | 14.0 |
| Thermal | | | | | |
| Insulation Class | | F | F | F | F |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 60 | 60 | 60 | 60 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 0.20 | 0.20 | 0.20 | 0.20 |
| | lb - in | 1.8 | 1.8 | 1.8 | 1.8 |
| Motor Weight | Kg | 8.3 | 8.3 | 8.3 | 8.3 |
| | lb | 18 | 18 | 18 | 18 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | STANDARD FOR USA ONLY | | 7 |
| | Volts Sec Rad ^{-1*} | | 0.090 | 0.067 | |
| Ripple | Per Cent | 1.0 | | | 1.0 |
| | Cycles/Rev | 25 | | | 25 |
| Armature Resistance** | Ohms | 36 | | | 24 |
| Armature Inductance | Millihenrys* | 55 | | | 36 |
| Maximum Current | Amps | 0.025 | | | 0.035 |

- * Tolerance Plus or Minus 10%
- ** At 25°C
- *** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

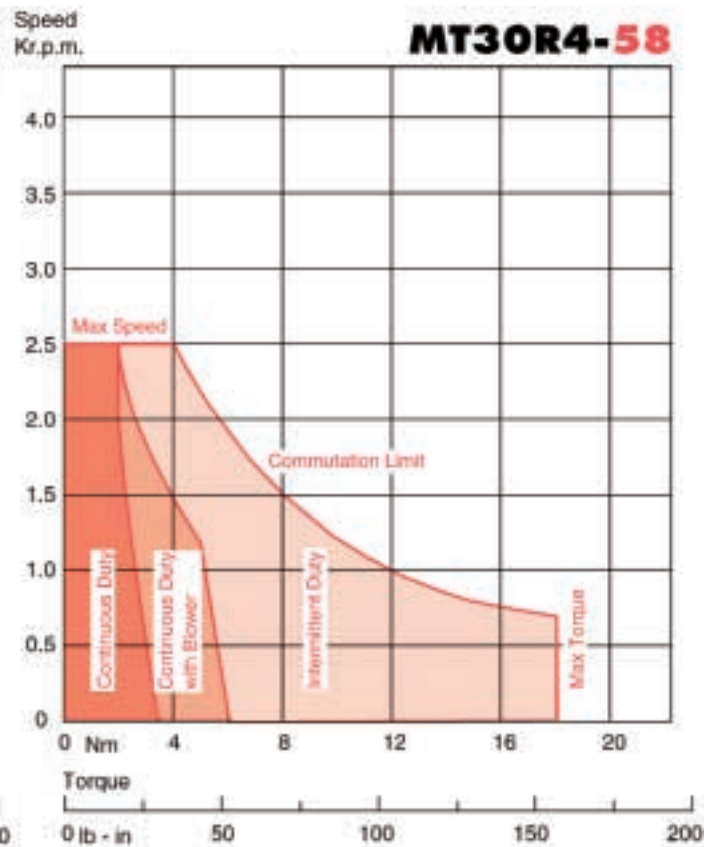
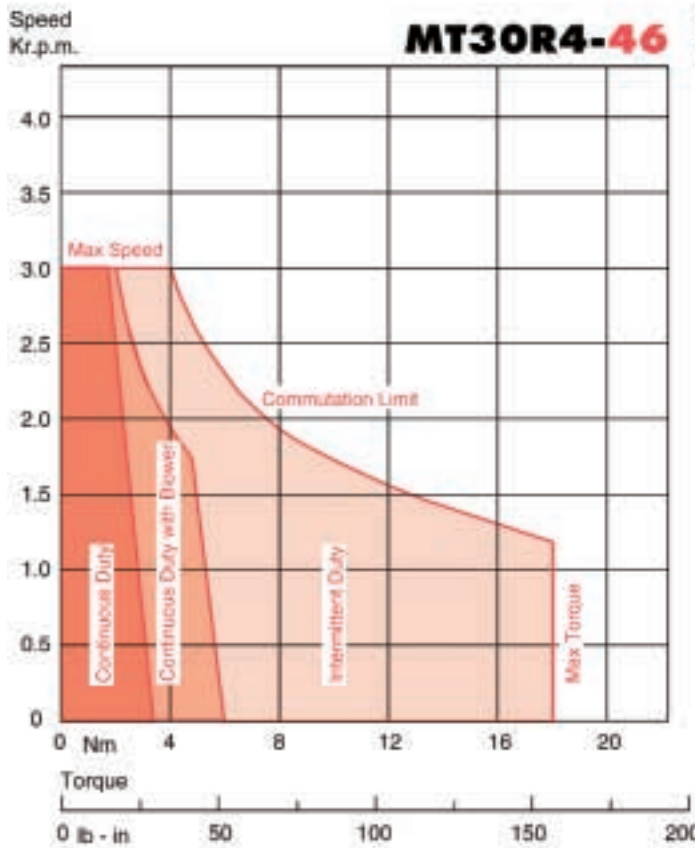
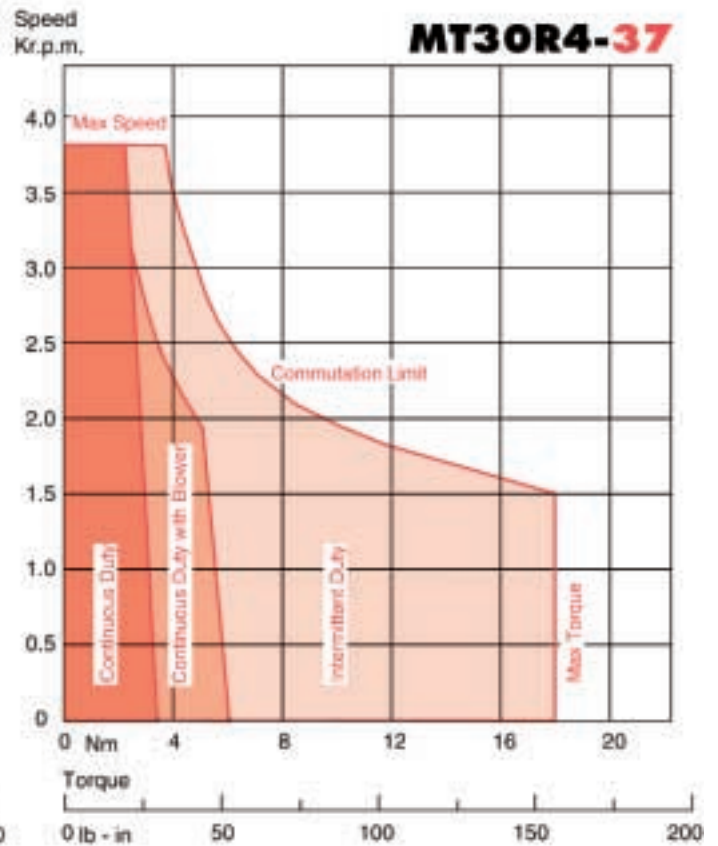
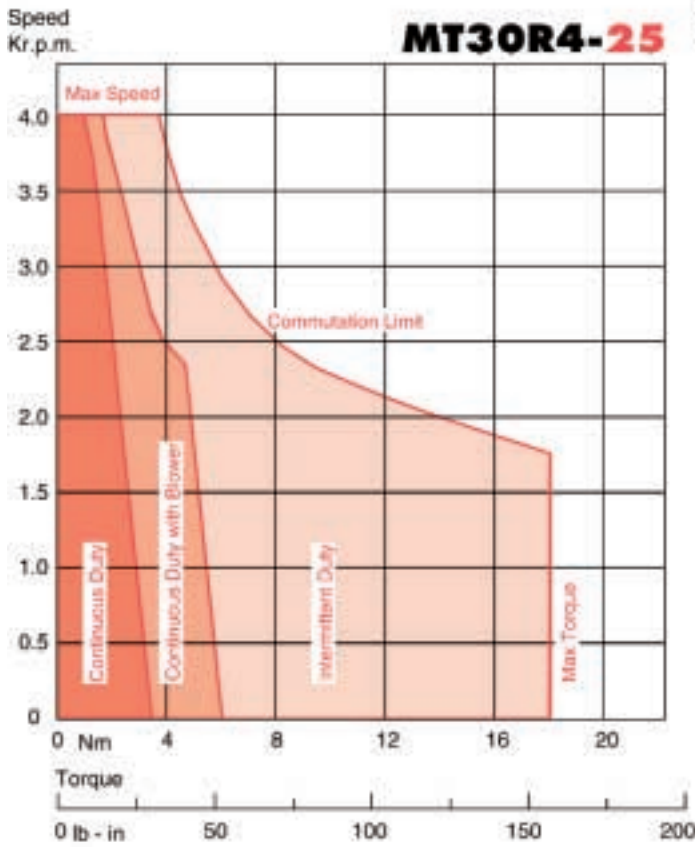
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (300mm x 300mm x 12mm)
(12" x 12" x 0.5")

STALL TORQUE 3.2 - 3.5Nm / 28 - 30lb-in

- (R4-25 3.3Nm / 29lb-in)
- (R4-37 3.6Nm / 31lb-in)
- (R4-46 & 58 4.0Nm / 35lb-in)

Performance Curves



MT30U4 D.C. Servomotors

Technical Data

| Parameter | Unit | MT30U4-57 | MT30U4-48 | MT30U4-36 | MT30U4-26 |
|--|------------------------------|-------------|-------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 57 | 48 | 36 | 26 |
| Max. Terminal Voltage | Volts | 140 | 140 | 140 | 100 |
| Max. Speed | RPM | 2500 | 3000 | 4000 | 4000 |
| Continuous Stall Torque TENV*** | Nm | 4.5 | 4.5 | 4.5 | 4.0 |
| | lb - in | 40 | 40 | 40 | 35 |
| Continuous Stall Torque Blower Cooled*** | Nm | 8.0 | 8.0 | 8.0 | 7.0 |
| | lb - in | 71 | 71 | 71 | 62 |
| Continuous Stall Current TENV*** | Amps | 8.3 | 10.2 | 13.2 | 16.6 |
| Armature Polar Moment of Inertia | Kgm ² | 0.0023 | 0.0023 | 0.0023 | 0.0023 |
| | lb - in Sec ² | 0.020 | 0.020 | 0.020 | 0.020 |
| Torque Constant KT** | Nm/Amp* | 0.54 | 0.44 | 0.34 | 0.24 |
| | lb - in/Amp* | 4.8 | 3.9 | 3.0 | 2.1 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.54 | 0.44 | 0.34 | 0.24 |
| Peak Stall Torque** | Nm | 22 | 22 | 22 | 22 |
| | lb - in | 195 | 195 | 195 | 195 |
| Current at Peak Torque** | Amps | 47 | 57 | 75 | 100 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 9600 | 9600 | 9600 | 9600 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 1.1 | 0.72 | 0.45 | 0.22 |
| Armature Inductance | Millihenrys* | 8.1 | 5.5 | 3.3 | 1.7 |
| Mechanical Time Constant** | Milliseconds | 10 | 11 | 13 | 16 |
| Thermal | | | | | |
| Insulation Class | | F | F | F | F |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 60 | 60 | 60 | 60 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 0.20 | 0.20 | 0.20 | 0.20 |
| | lb - in | 1.8 | 1.8 | 1.8 | 1.8 |
| Motor Weight | Kg | 9.3 | 9.3 | 9.3 | 9.3 |
| | lb | 20 | 20 | 20 | 20 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | | 0.067 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 25 | | 25 | |
| Armature Resistance** | Ohms | 36 | | 24 | |
| Armature Inductance | Millihenrys* | 55 | | 36 | |
| Maximum Current | Amps | 0.025 | | 0.035 | |

* Tolerance Plus or Minus 10%

** At 25°C

*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

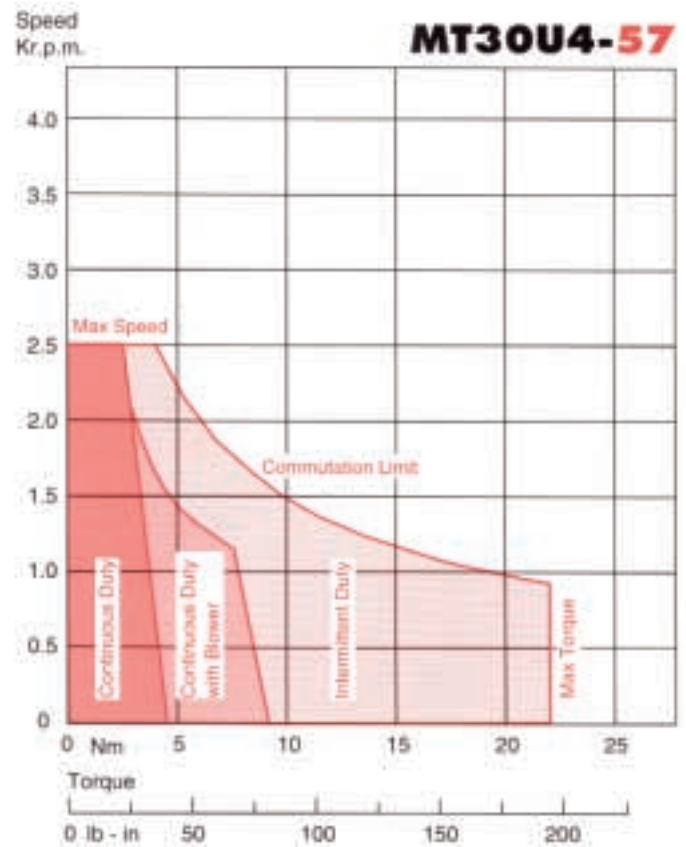
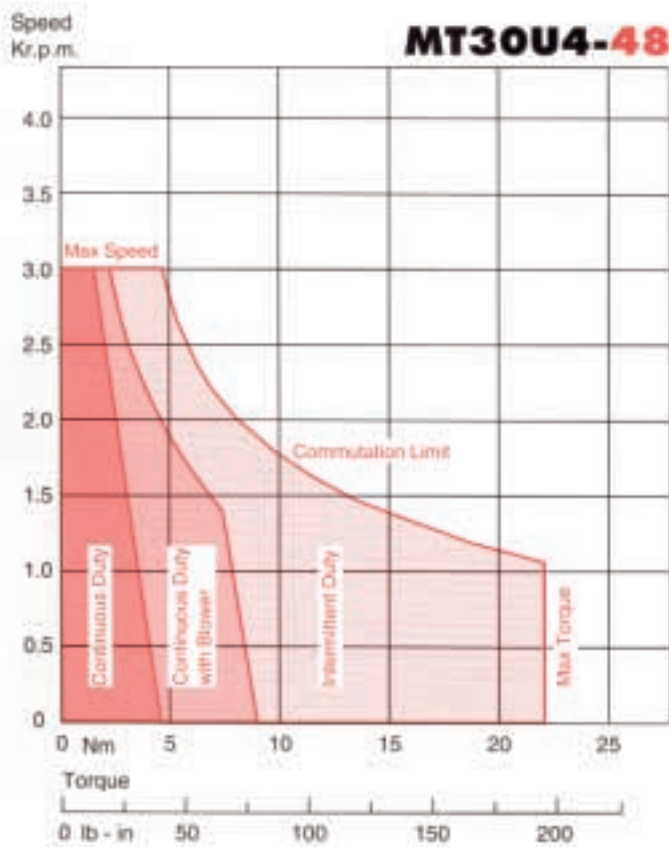
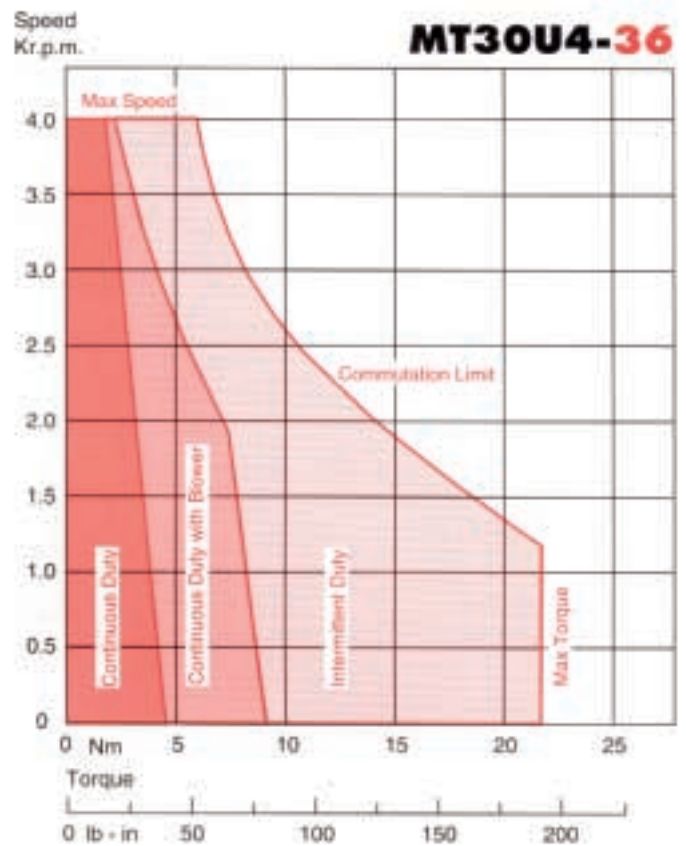
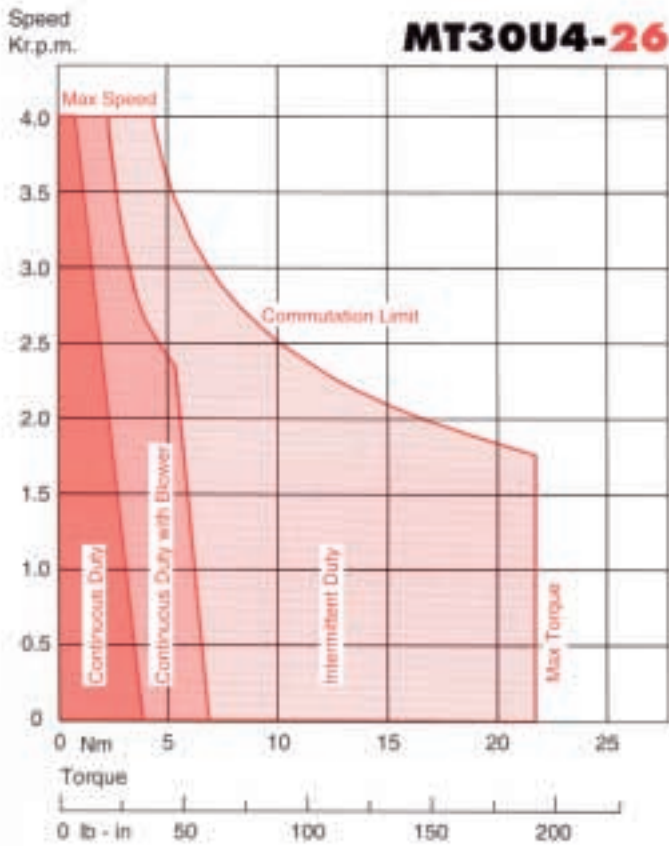
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● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (300mm x 300mm x 12mm)
(12" x 12" x 0.5")

STALL TORQUE 4.0 - 4.5Nm / 35 - 40lb-in

- (U4-26 4.3Nm / 38lb-in)
- (U4-36 4.6Nm / 41lb-in)
- (U4-48 & 57 4.9Nm / 43lb-in)

Performance Curves



MT30Z4 D.C. Servomotors

Technical Data

| Parameter | Unit | MT30Z4-85 | MT30Z4-61 | MT30Z4-37 |
|--|------------------------------|-------------|-------------|-------------|
| GENERAL | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 85 | 61 | 37 |
| Max. Terminal Voltage | Volts | 140 | 140 | 140 |
| Max. Speed | RPM | 1600 | 2300 | 3750 |
| Continuous Stall Torque TENV*** | Nm | 5.5 | 5.0 | 4.4 |
| | lb - in | 48 | 44 | 39 |
| Continuous Stall Torque Blower Cooled*** | Nm | 10.0 | 9.0 | 8.0 |
| | lb - in | 88 | 80 | 70 |
| Continuous Stall Current TENV*** | Amps | 6.8 | 8.6 | 12.6 |
| Armature Polar Moment of Inertia | Kgm ² | 0.0030 | 0.0030 | 0.0030 |
| | lb - in Sec ² | 0.027 | 0.027 | 0.027 |
| Torque Constant KT** | Nm/Amp* | 0.81 | 0.58 | 0.35 |
| | lb - in/Amp* | 7.2 | 5.1 | 3.1 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.81 | 0.58 | 0.35 |
| Peak Stall Torque** | Nm | 26.0 | 26.0 | 26.0 |
| | lb - in | 230 | 230 | 230 |
| Current at Peak Torque** | Amps | 32.0 | 50.0 | 86.0 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 8700 | 8700 | 8700 |
| Winding | | | | |
| Armature Resistance Less Brushes** | Ohms* | 2.2 | 1.2 | 0.35 |
| Armature Inductance | Millihenrys* | 17.0 | 8.0 | 3.0 |
| Mechanical Time Constant** | Milliseconds | 12.0 | 12.0 | 10.0 |
| Thermal | | | | |
| Insulation Class | | F | F | F |
| Max. Ambient Temperature | °C | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 60 | 60 | 60 |
| Mechanical | | | | |
| Static Friction Torque | Nm | 0.20 | 0.20 | 0.20 |
| | lb - in | 1.8 | 1.8 | 1.8 |
| Motor Weight | Kg | 11.3 | 11.3 | 11.3 |
| | lb | 25 | 25 | 25 |
| TACHOMETER | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | 0.067 | |
| Ripple | Per Cent | 1.0 | 1.0 | |
| | Cycles/Rev | 25 | 25 | |
| Armature Resistance** | Ohms | 36 | 24 | |
| Armature Inductance | Millihenrys* | 55 | 36 | |
| Maximum Current | Amps | 0.025 | 0.035 | |

* Tolerance Plus or Minus 10%

** At 25°C

*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

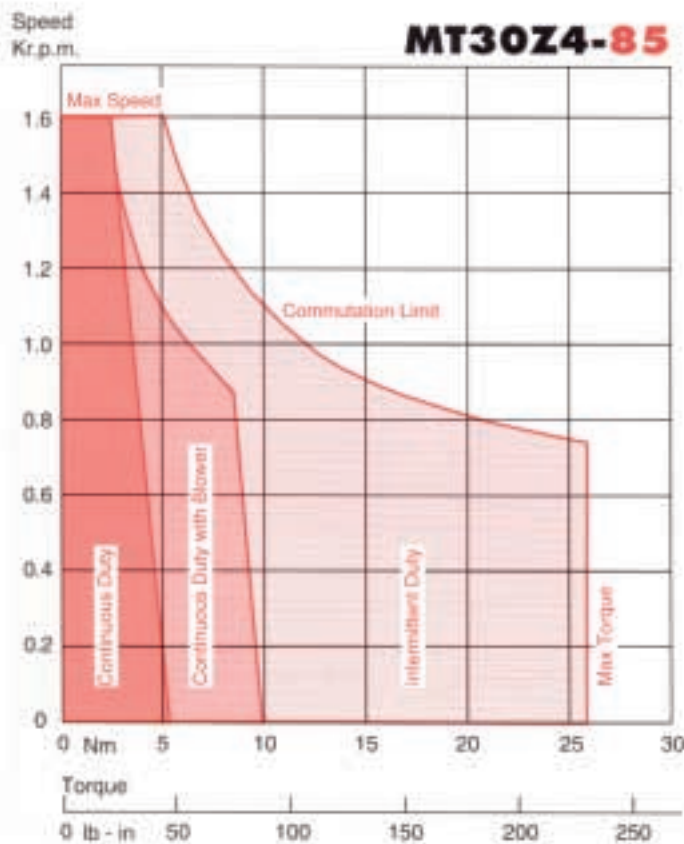
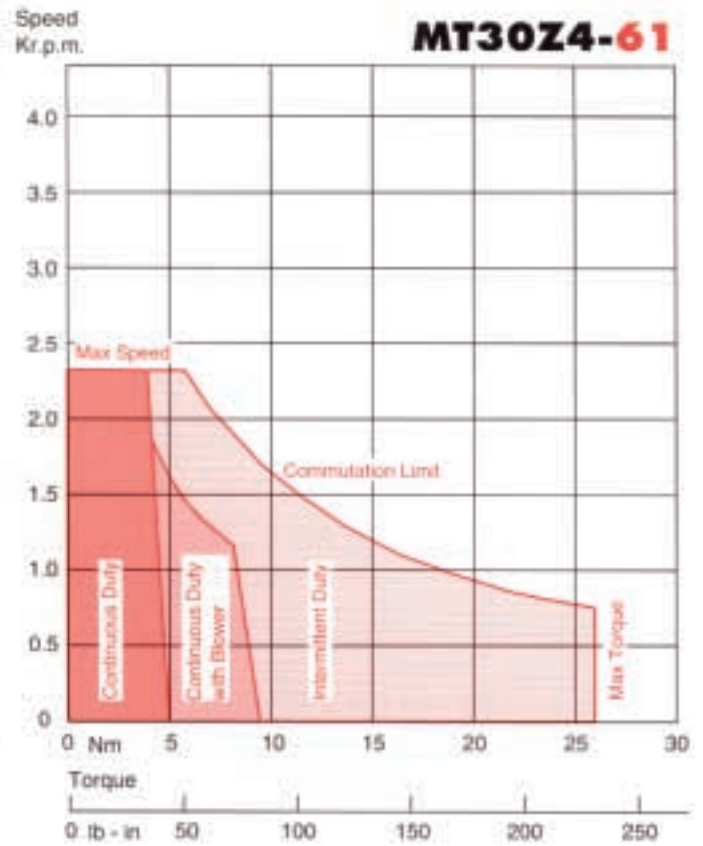
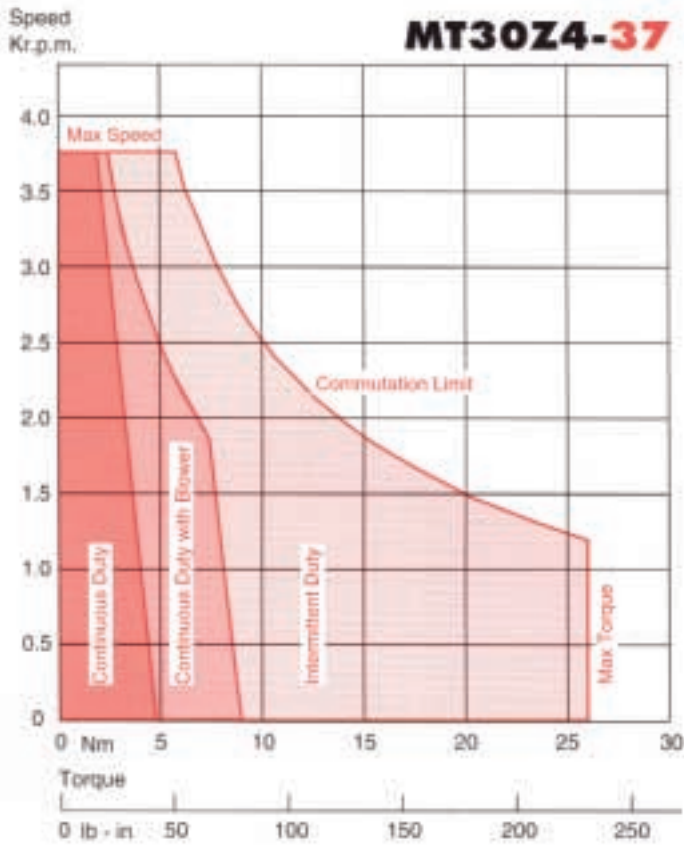
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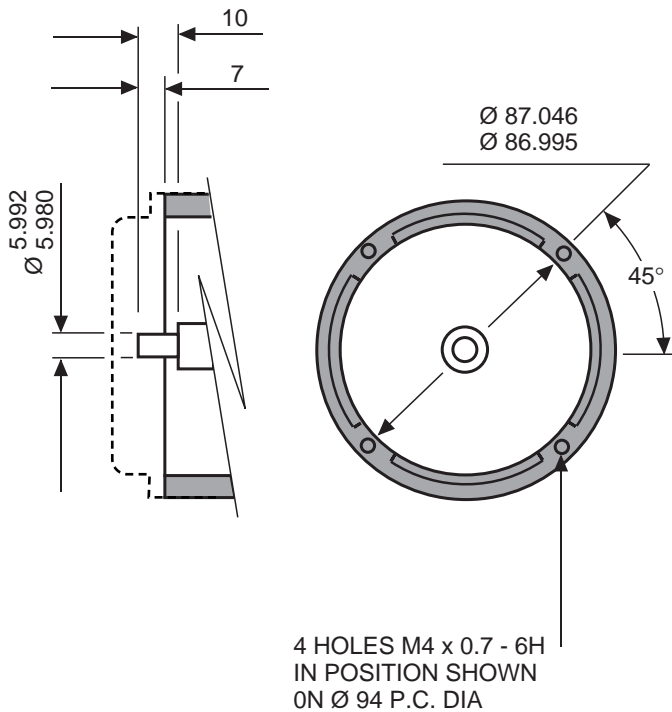
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(12" x 12" x 0.5")

STALL TORQUE 4.4 - 5.5Nm / 39 - 48lb-in

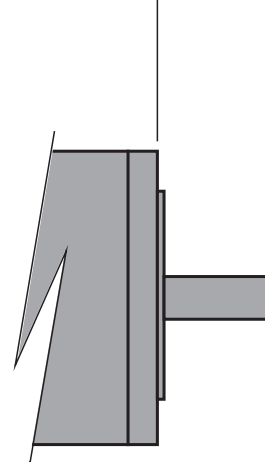
- (Z4-37 4.6Nm / 41lb-in)
- (Z4-61 5.2Nm / 46lb-in)
- (Z4-85 6.0Nm / 53lb-in)

Performance Curves





FACE & SPIGOT ARE SQUARE & CONCENTRIC TO SHAFT WITHIN 0.08 TOTAL INDICATOR READING
(0.04 FOR OPTION R01 ONLY)



RUN OUT OF SHAFT WITHIN 0.05 TOTAL INDICATOR READING

STANDARD TOLERANCES CONFORM TO IEC72 (DIN 42955 TOLERANCE N)
OPTION R01 CLOSE TOLERANCES CONFORM TO IEC72 PRECISION (DIN 42955 TOLERANCE R)

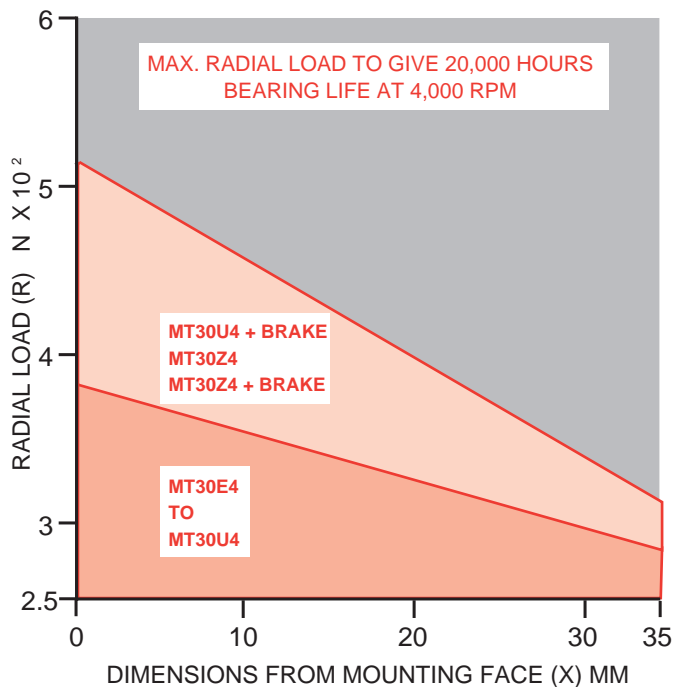
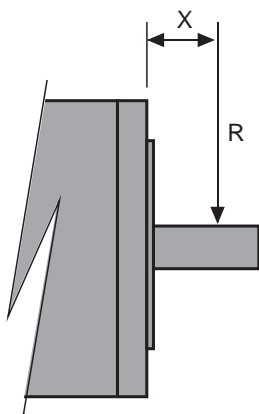
NON DRIVE END SHAFT ARRANGEMENT

DRIVE END INTERFACE TOLERANCES

DIMENSIONS IN MILLIMETRES

FOR INCH SERIES SEE DRAWING C5130/0

SHAFT LOADING LIMITS



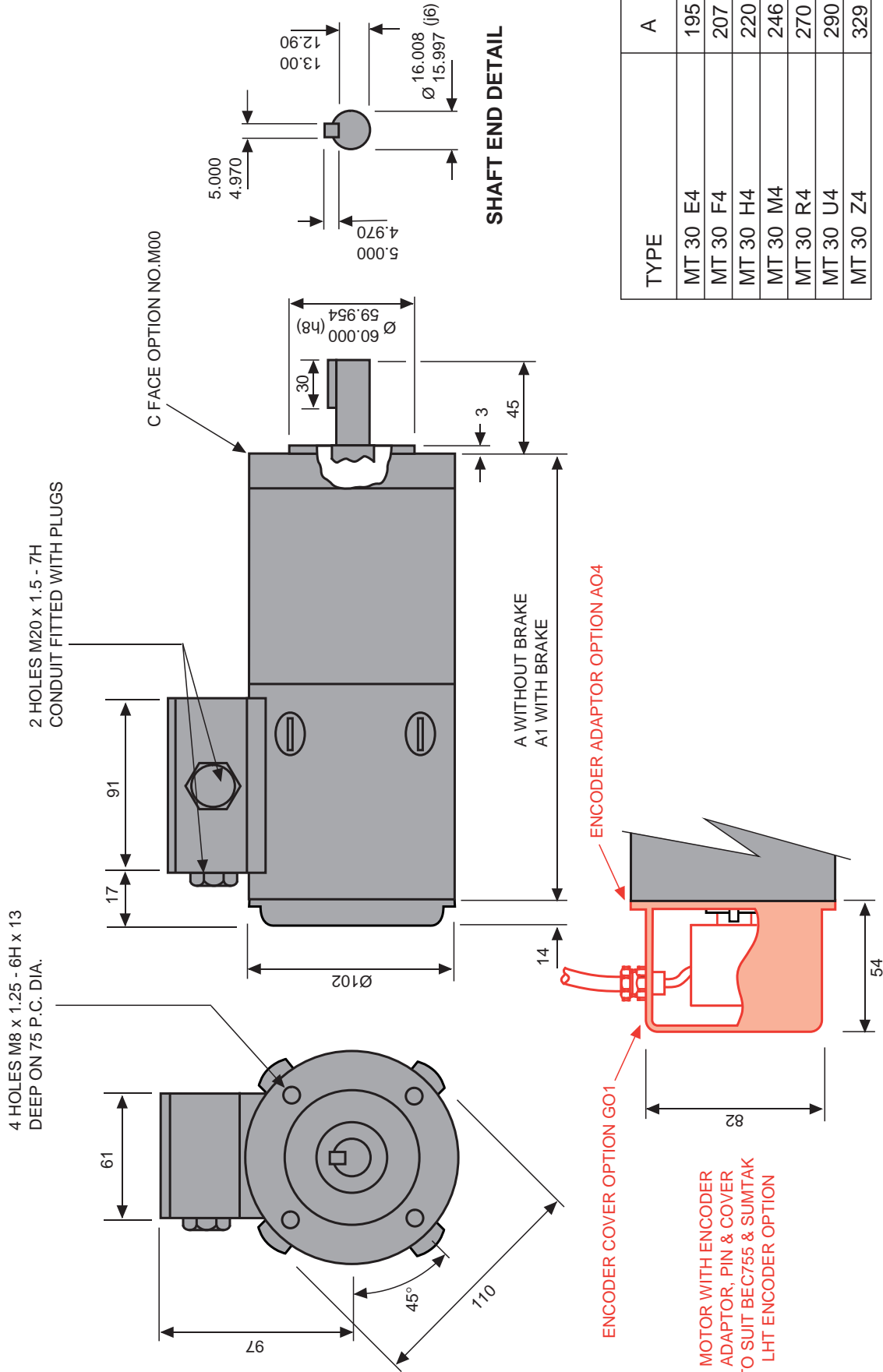
The above graph may be used as a guide for applications and includes an adequate safety factor for normal industrial use. If axial loads are to be applied, SEM should be consulted. Where radial loading in excess of the above maximum is deemed essential, the specific case should be referred to SEM.

METRIC D.C. SERVOMOTORS
MT30 SERIES

MECHANICAL DETAIL

C5130/OM
SHEET 1 OF 4 SHEETS

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-5130/0



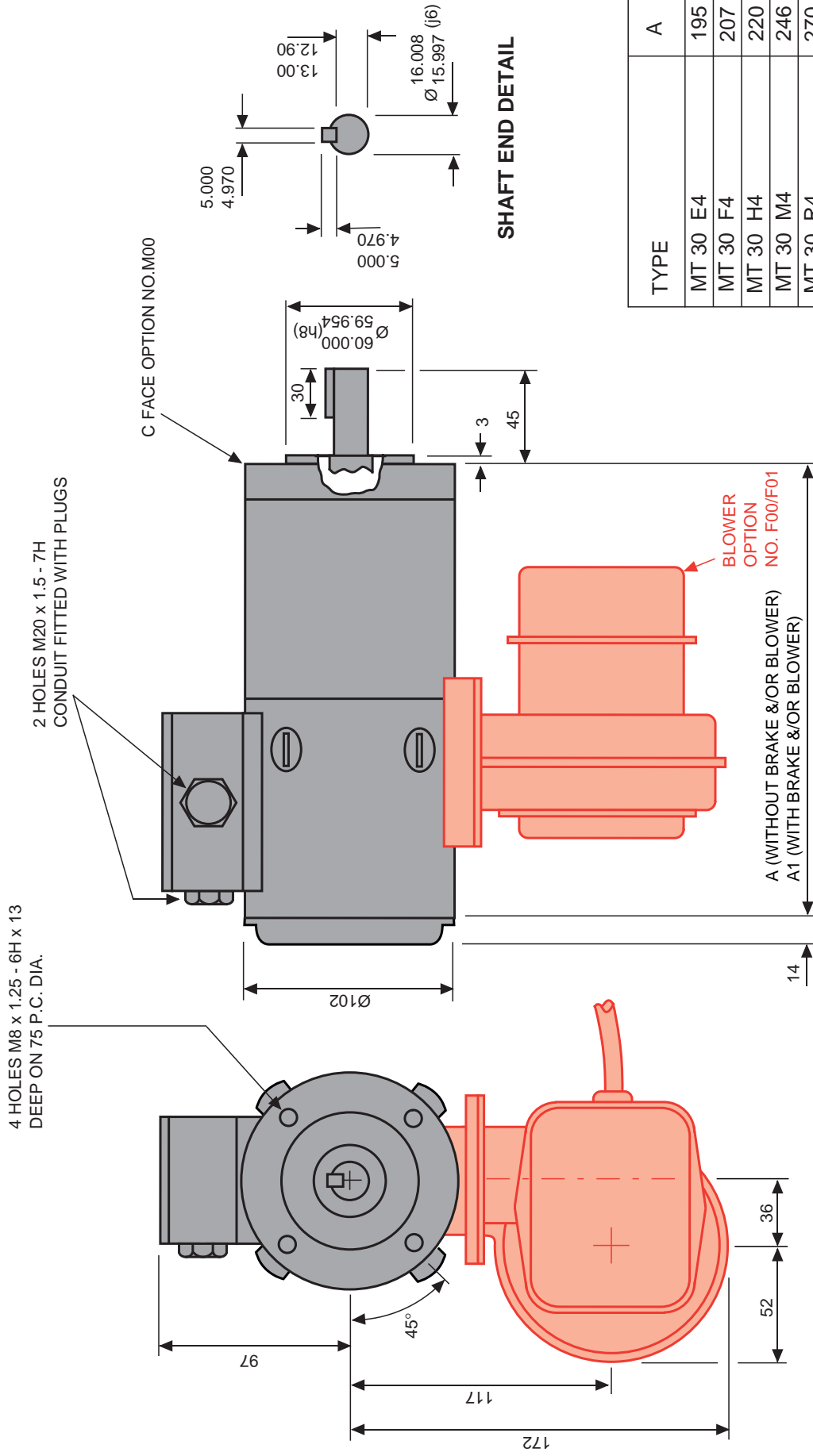
| TYPE | A | A1 |
|----------|-----|-----|
| MT 30 E4 | 195 | 242 |
| MT 30 F4 | 207 | 254 |
| MT 30 H4 | 220 | 267 |
| MT 30 M4 | 246 | 293 |
| MT 30 R4 | 270 | 317 |
| MT 30 U4 | 290 | 341 |
| MT 30 Z4 | 329 | 376 |

METRIC D.C. SERVOMOTORS
MT30 SERIES

STANDARD MT30 SERVOMOTOR
WITH ADAPTOR AND COVER FOR BEC755 OR
SUMTAK ENCODER SHOWN IN RED

C5130/OM
SHEET 2 OF 4 SHEETS

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-5130/0



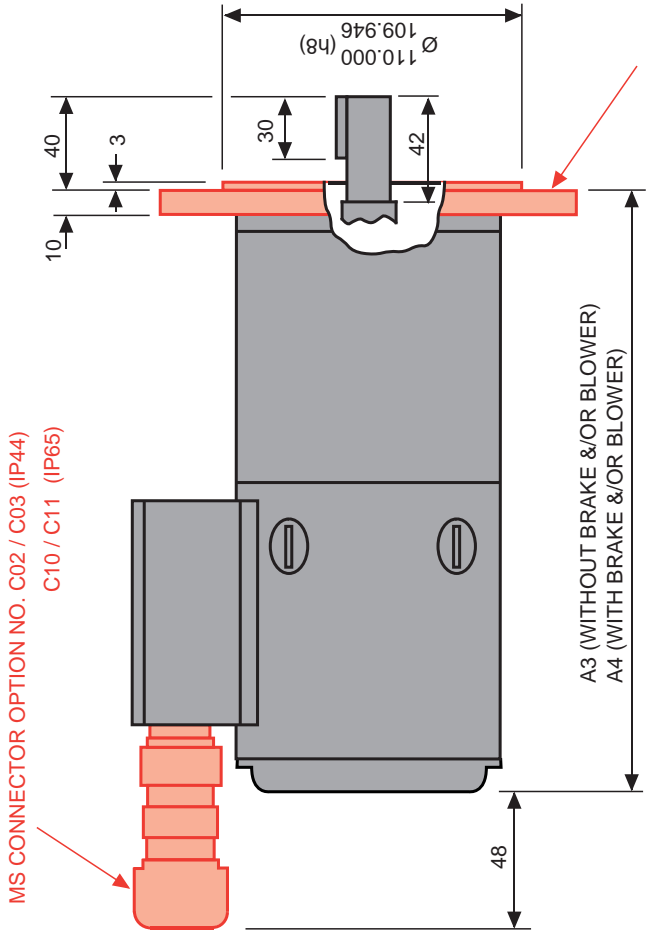
| TYPE | A | A1 |
|----------|-----|-----|
| MT 30 E4 | 195 | 242 |
| MT 30 F4 | 207 | 254 |
| MT 30 H4 | 220 | 267 |
| MT 30 M4 | 246 | 293 |
| MT 30 R4 | 270 | 317 |
| MT 30 U4 | 290 | 341 |
| MT 30 Z4 | 329 | 376 |

METRIC D.C. SERVOMOTORS
MT30 SERIES

STANDARD MT30 SERVOMOTOR
WITH BLOWER OPTION SHOWN IN RED

C5130/OM
SHEET 3 OF 4 SHEETS

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-5130/0



MS CONNECTOR OPTION NO. C02 / C03 (IP44)
C10 / C11 (IP65)

C FLANGE OPTION NO. M05

A3 (WITHOUT BRAKE &/OR BLOWER)
A4 (WITH BRAKE &/OR BLOWER)

4 HOLES E11 EQUI-
SPACED ON
130 P.C.D.

FLANGE FACE & SPIGOT ARE SQUARE
& CONCENTRIC TO SHAFT WITHIN 0.2
TOTAL INDICATOR READING

| TYPE | A3 | A4 |
|----------|-----|-----|
| MT 30 E4 | 211 | 258 |
| MT 30 F4 | 223 | 270 |
| MT 30 H4 | 236 | 283 |
| MT 30 M4 | 262 | 309 |
| MT 30 R4 | 286 | 333 |
| MT 30 U4 | 306 | 357 |
| MT 30 Z4 | 345 | 392 |

METRIC D.C. SERVO MOTORS
MT30 SERIES

MT30 SERVOMOTOR
WITH MS CONNECTOR AND 'C' FLANGE
OPTIONS SHOWN IN RED

C5130/OM
SHEET 4 OF 4 SHEETS

Standard Features are shown by ● in black.

Available fitted options are shown in red.

Please quote No. and reference of options along with motor type No. when placing an order.

If options or features are required which are not detailed below, they may be possible, so please ask SEM sales.

| NO. | REFERENCE | DESCRIPTION |
|-----------------------------|---------------------------|--|
| MECHANICAL INTERFACE | | |
| ● M00 | FACE | See page 29 |
| M05 | FLANGE | See page 31 |
| R01 | CLOSE TOLERANCE INTERFACE | Interface (face & shaft) to IEC72 PRECISION (DIN 42955 Tolerance R) |
| ● S00 | SHAFT | See page 29 |
| S01 | SHAFT | 14mm Dia x 30mm Long |
| ● K00 | KEYWAY | See page 29 |
| K99 | NO KEYWAY | Plain Shaft |
| D01 | SHAFT END TAPPED | M6 x 15mm Deep tapped in drive shaft |
| H01 | HAND CRANK | Rear shaft to enable hand rotation of motor |
| MOTOR PROTECTION | | |
| ● P00 | IP44/65 | Enclosure protection IP44/65 as supplied. IP64/65 if shaft seal is fitted and fixing bolt holes are sealed |
| W01 | SHAFT SEAL | Oil seal fitted at drive end/shaft interface |
| P99 | TROPICALISED | Special treatment on internal parts |
| BRAKES | | |
| B00 | 24V DC BRAKE | 5 Nm torque 24V DC supply |
| B01 | 90V DC BRAKE | 5 Nm torque 90V DC supply |
| L01 | RECTIFIER | 110V AC input 90V DC output for B01 Mounted inside motor terminal box (supplied loose for external mounting when motor MS Connectors are fitted) |
| FORCED VENTILATION | | |
| V00 | 220V BLOWER | 220 volt 50HZ single phase input |
| V01 | 110V BLOWER | 110 volt 50HZ single phase input |
| V99 | PREPARED FOR BLOWER | Motor prepared for blower but no blower fitted (covers are fitted over blower preparation) |

| NO. | REFERENCE | DESCRIPTION |
|--------------------------------|--|--|
| ELECTRICAL TERMINATIONS | | |
| ● C00 | TERMINAL BOX | With 2 x M20 tapped holes |
| C01 | TERMINAL BOX | With 2 x PG16 tapped holes |
| C02 | MS CONNECTOR (IP44) | Receptacle MS3102A-18-1P(10 pin) fitted to terminal box |
| C03 | MS PLUG AND CABLE CLAMP FOR C02 (IP44) | Straight plug MS3106A-18-1S and Cable clamp 97-3057-1010-1 |
| C09 | FLYING LEADS OUT | 0.5 metre long (No terminal box) radial exit |
| C10 | MS CONNECTOR (IP65) | Receptacle MS3102E-18-1P(10 pin) fitted to terminal box |
| C11 | MS PLUG & CABLE CLAMP FOR C10 (IP65) | Straight plug MS 3106E-18-1S (IP65) |
| TACHOGENERATORS | | |
| T07 | TACHOGENERATOR | 7V/1000 RPM |
| ● T95 | TACHOGENERATOR | 9.5V/1000 RPM |
| T19 | TACHOGENERATOR | 19.5V/1000 RPM |
| T30 | TACHOGENERATOR | 30V/1000 RPM |
| N99 | NO TACHOGENERATOR | No velocity feedback |
| ENCODERS | | |
| E01 | ENCODER | HEIDENHAIN ERN1120 Series - 250 PPR |
| E02 | ENCODER | HEIDENHAIN ERN1120 Series - 500 PPR |
| E03 | ENCODER | HEIDENHAIN ERN1120 Series - 1000 PPR |
| ENCODER FITTINGS | | |
| A01 | ENCODER ADAPTOR | for Heidenhain ROD 426, 436, 456, Litton G60 & Leine & Linde type 63 |
| A02 | ENCODER ADAPTOR | for Heidenhain ROD 420 & 450 |
| A03 | ENCODER ADAPTOR | for Muirhead H25E & Litton G70 |
| A04 | ENCODER ADAPTOR | for BEC 755 |
| A05 | ENCODER ADAPTOR | for Tamagawa TS5300 series |
| A06 | ADAPTOR | for Size 11 resolver |
| A10 | SYNCHRO CLAMPS | for A01, A03 and A06 |
| G01 | ENCODER COVER | Cast cover with 1 X M10 tapped hole, and cable gland for A04 only |
| G02 | ENCODER COVER (IP65) | Cast cover with 1 X PG7 tapped hole, and cable gland for A04 only |
| G03 | ENCODER COVER (IP44) | Cast cover with MS receptacle MS3102A-18-1P, for A04 only |
| G07 | ENCODER COVER (IP65) | Cast cover with 2 x axial exit cable glands for A05 & A06 only |
| G15 | ENCODER COVER (IP65) | Cast cover with MS receptacle MS 3102E-18-1P for A04 only (IP65) |
| C05 | MS PLUG AND CABLE CLAMP FOR G03 (IP44) | Straight plug MS3106A-18-1S Cable clamp 97-3057-1010-1 (IP44) |
| C11 | MS PLUG & CABLE CLAMP FOR G15 (IP65) | Straight plug MS3106E-18-1S & cable clamp (IP65) |

MT4OP4 D.C. Servomotors

Technical Data

| Parameter | Unit | MT4OP4-76 | MT4OP4-61 | MT4OP4-38 |
|--|------------------------------|-------------|-------------|-------------|
| GENERAL | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 76 | 61 | 38 |
| Max. Terminal Voltage | Volts | 180 | 180 | 150 |
| Max. Speed | RPM | 2400 | 3000 | 4000 |
| Continuous Stall Torque TENV*** | Nm | 6.0 | 6.0 | 6.0 |
| | lb - in | 53 | 53 | 53 |
| Continuous Stall Torque Blower Cooled*** | Nm | 12.0 | 12.0 | 12.0 |
| | lb - in | 106 | 106 | 106 |
| Continuous Stall Current TENV*** | Amps | 8.7 | 11.0 | 17.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.0077 | 0.0077 | 0.0077 |
| | lb - in Sec ² | 0.068 | 0.068 | 0.068 |
| Torque Constant KT** | Nm/Amp* | 0.69 | 0.55 | 0.35 |
| | lb - in/Amp* | 6.1 | 4.9 | 3.1 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.69 | 0.55 | 0.345 |
| Peak Stall Torque** | Nm | 34.0 | 34.0 | 34.0 |
| | lb - in | 300 | 300 | 300 |
| Current at Peak Torque** | Amps | 50.0 | 63.0 | 100.0 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 4400 | 4400 | 4400 |
| Winding | | | | |
| Armature Resistance Less Brushes** | Ohms* | 1.0 | 0.6 | 0.25 |
| Armature Inductance | Millihenrys* | 4.5 | 3.0 | 1.2 |
| Mechanical Time Constant** | Milliseconds | 19.0 | 18.0 | 20.0 |
| Thermal | | | | |
| Insulation Class | | H | H | H |
| Max. Ambient Temperature | °C | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 90 | 90 | 90 |
| Mechanical | | | | |
| Static Friction Torque | Nm | 0.23 | 0.23 | 0.23 |
| | lb - in | 2.0 | 2.0 | 2.0 |
| Motor Weight | Kg | 17.5 | 17.5 | 17.5 |
| | lb | 38.5 | 38.5 | 38.5 |
| TACHOMETER | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | 0.067 | |
| Ripple | Per Cent | 1.0 | 1.0 | |
| | Cycles/Rev | 25 | 25 | |
| Armature Resistance** | Ohms | 36 | 24 | |
| Armature Inductance | Millihenrys* | 55 | 36 | |
| Maximum Current | Amps | 0.025 | 0.035 | |

- * Tolerance Plus or Minus 10%
- ** At 25°C
- *** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

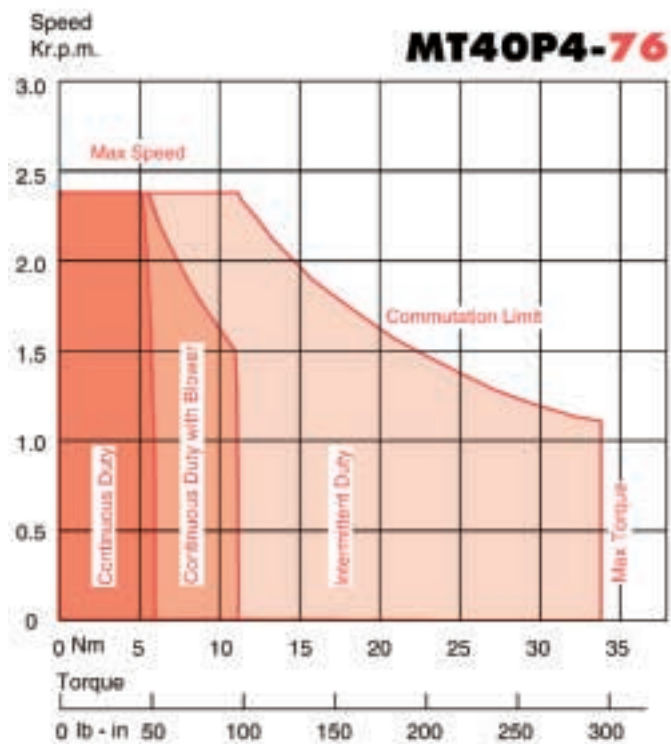
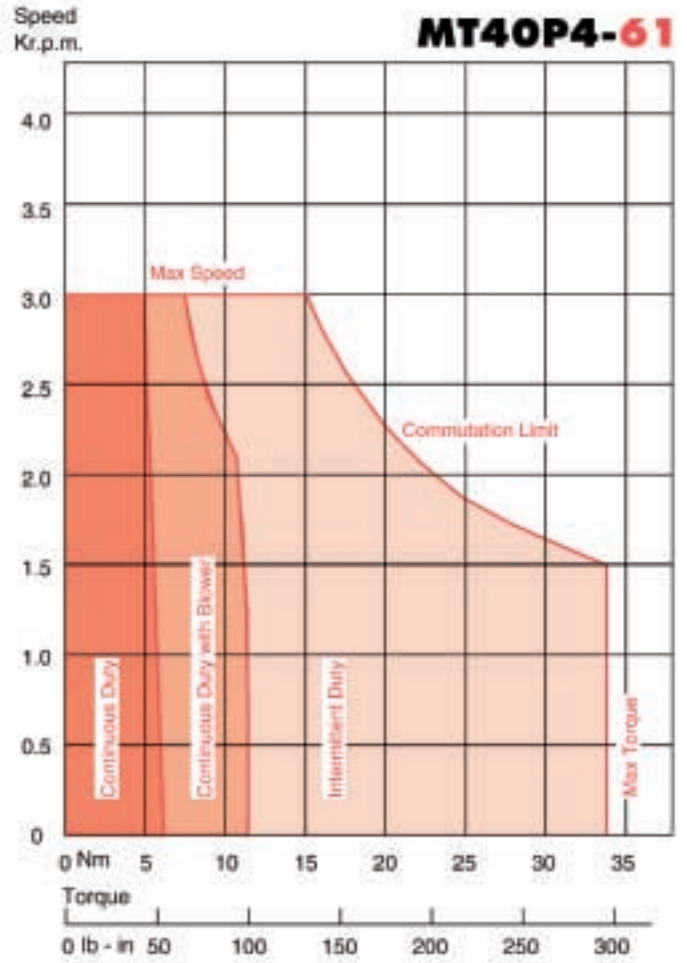
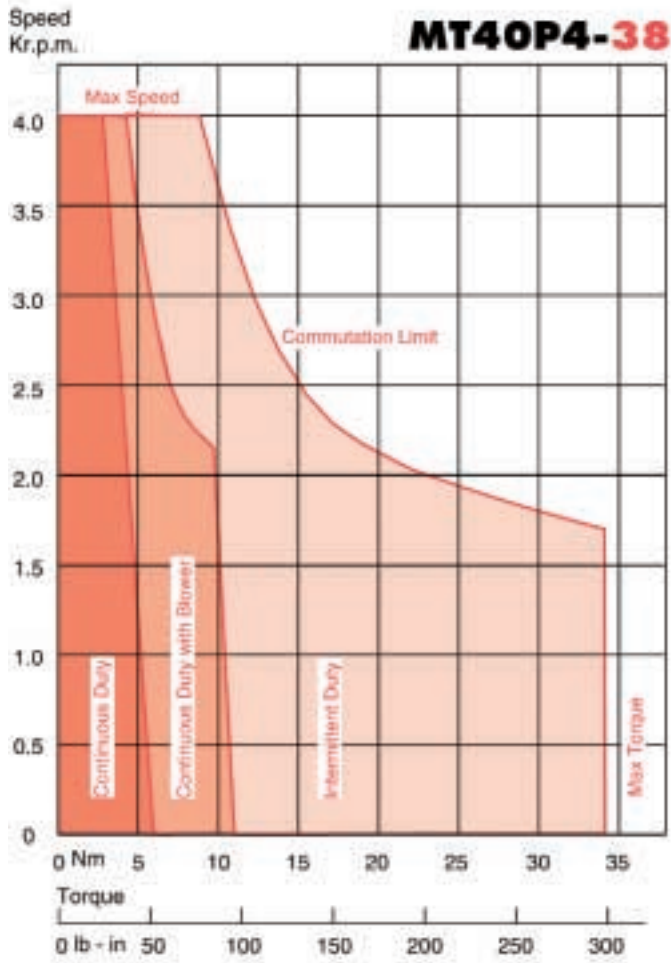
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (450mm x 450mm x 20mm)
(18" x 18" x 0.8")

STALL TORQUE 6.0Nm / 53lb-in

● (6.8Nm / 60lb-in)

Performance Curves



MT40W4 D.C. Servomotors

Technical Data

| Parameter | Unit | MT40W4-90 | MT40W4-68 | MT40W4-45 |
|--|------------------------------|-------------|-------------|-------------|
| GENERAL | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 90 | 68 | 45 |
| Max. Terminal Voltage | Volts | 180 | 180 | 180 |
| Max. Speed | RPM | 2000 | 2600 | 4000 |
| Continuous Stall Torque TENV*** | Nm | 8.5 | 8.5 | 8.5 |
| | lb - in | 75 | 75 | 75 |
| Continuous Stall Torque Blower Cooled*** | Nm | 16.0 | 16.0 | 16.0 |
| | lb - in | 140 | 140 | 140 |
| Continuous Stall Current TENV*** | Amps | 10.0 | 13.0 | 20.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.011 | 0.011 | 0.011 |
| | lb - in Sec ² | 0.094 | 0.094 | 0.094 |
| Torque Constant KT** | Nm/Amp* | 0.85 | 0.64 | 0.42 |
| | lb - in/Amp* | 7.5 | 5.7 | 3.7 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.85 | 0.64 | 0.42 |
| Peak Stall Torque** | Nm | 50 | 50 | 50 |
| | lb - in | 440 | 440 | 440 |
| Current at Peak Torque** | Amps | 65 | 86 | 130 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 4500 | 4500 | 4500 |
| Winding | | | | |
| Armature Resistance Less Brushes** | Ohms* | 0.80 | 0.47 | 0.20 |
| Armature Inductance | Millihenrys* | 6.0 | 3.3 | 1.2 |
| Mechanical Time Constant** | Milliseconds | 14.0 | 17.0 | 17.0 |
| Thermal | | | | |
| Insulation Class | | H | H | H |
| Max. Ambient Temperature | °C | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 100 | 100 | 100 |
| Mechanical | | | | |
| Static Friction Torque | Nm | 0.23 | 0.23 | 0.23 |
| | lb - in | 2.0 | 2.0 | 2.0 |
| Motor Weight | Kg | 21.5 | 21.5 | 21.5 |
| | lb | 47 | 47 | 47 |
| TACHOMETER | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | 0.067 | |
| Ripple | Per Cent | 1.0 | 1.0 | |
| | Cycles/Rev | 25 | 25 | |
| Armature Resistance** | Ohms | 36 | 24 | |
| Armature Inductance | Millihenrys* | 55 | 36 | |
| Maximum Current | Amps | 0.025 | 0.035 | |

- * Tolerance Plus or Minus 10%
- ** At 25°C
- *** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

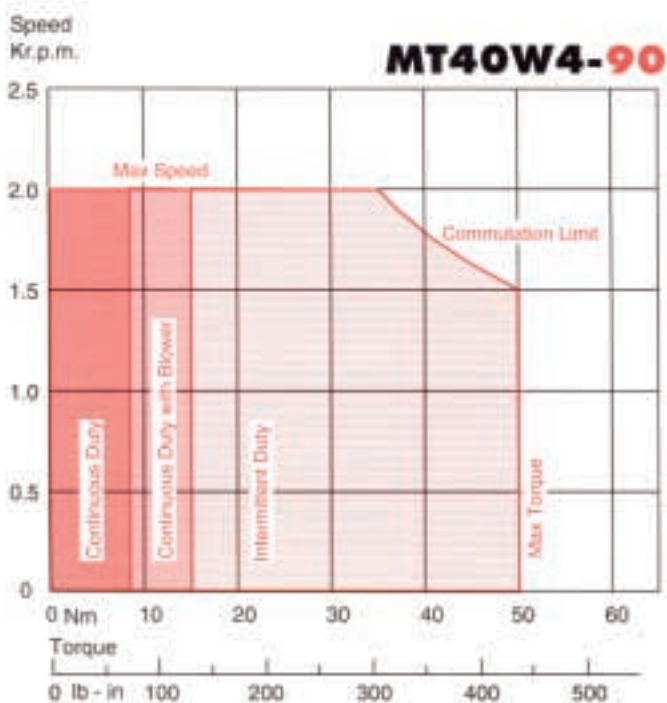
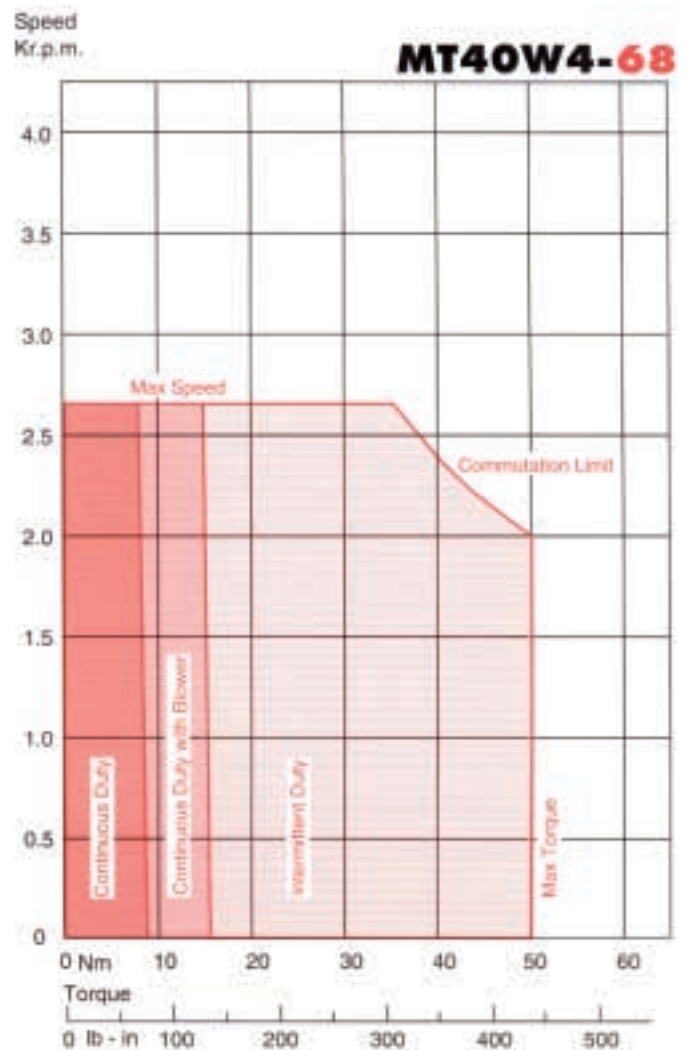
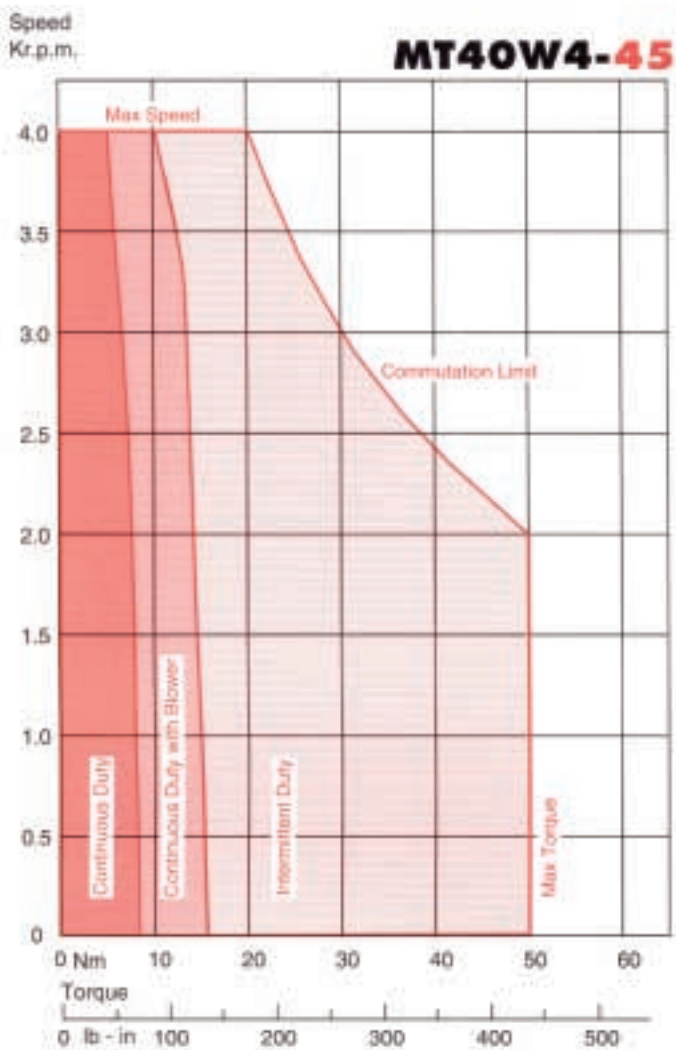
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (450mm x 450mm x 20mm)
(18" x 18" x 0.8")

STALL TORQUE 8.5Nm / 75lb-in

● (10.0Nm / 88.5lb-in)

Performance Curves



MT40ZD4 D.C. Servomotors

Technical Data

| Parameter | Unit | MT40ZD4-90 | MT40ZD4-60 | MT40ZD4-45 |
|--|------------------------------|-------------|-------------|-------------|
| GENERAL | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 90 | 60 | 45 |
| Max. Terminal Voltage | Volts | 180 | 180 | 180 |
| Max. Speed | RPM | 2000 | 3000 | 4000 |
| Continuous Stall Torque TENV*** | Nm | 11.0 | 11.0 | 11.0 |
| | lb - in | 97 | 97 | 97 |
| Continuous Stall Torque Blower Cooled*** | Nm | 21.0 | 21.0 | 21.0 |
| | lb - in | 185 | 185 | 185 |
| Continuous Stall Current TENV*** | Amps | 13.5 | 20.0 | 26.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.014 | 0.014 | 0.014 |
| | lb - Sec ² | 0.13 | 0.13 | 0.13 |
| Torque Constant KT** | Nm/Amp* | 0.82 | 0.55 | 0.41 |
| | lb - in/Amp* | 7.5 | 4.8 | 3.6 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.85 | 0.55 | 0.41 |
| Peak Stall Torque** | Nm | 66 | 66 | 66 |
| | lb - in | 580 | 580 | 580 |
| Current at Peak Torque** | Amps | 85 | 125 | 170 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 4700 | 4700 | 4700 |
| Winding | | | | |
| Armature Resistance Less Brushes** | Ohms* | 0.56 | 0.25 | 0.15 |
| Armature Inductance | Millihenrys* | 4.0 | 1.8 | 1.0 |
| Mechanical Time Constant** | Milliseconds | 14.0 | 16.0 | 17.0 |
| Thermal | | | | |
| Insulation Class | | H | H | H |
| Max. Ambient Temperature | °C | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 100 | 100 | 100 |
| Mechanical | | | | |
| Static Friction Torque | Nm | 0.25 | 0.25 | 0.25 |
| | lb - in | 2.2 | 2.2 | 2.2 |
| Motor Weight | Kg | 26.0 | 26.0 | 26.0 |
| | lb | 57 | 57 | 57 |
| TACHOMETER | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | 0.067 | |
| Ripple | Per Cent | 1.0 | 1.0 | |
| | Cycles/Rev | 25 | 25 | |
| Armature Resistance** | Ohms | 36 | 24 | |
| Armature Inductance | Millihenrys* | 55 | 36 | |
| Maximum Current | Amps | 0.025 | 0.035 | |

- * Tolerance Plus or Minus 10%
- ** At 25°C
- *** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

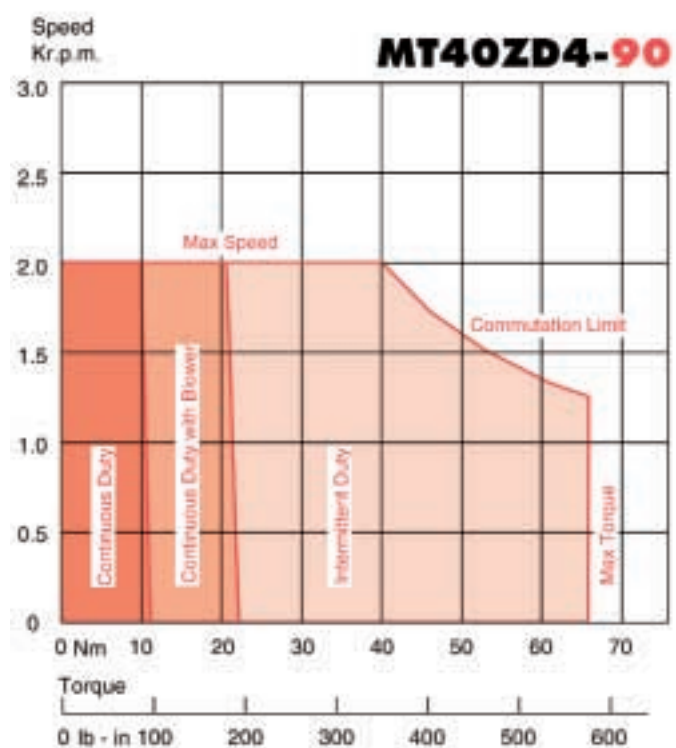
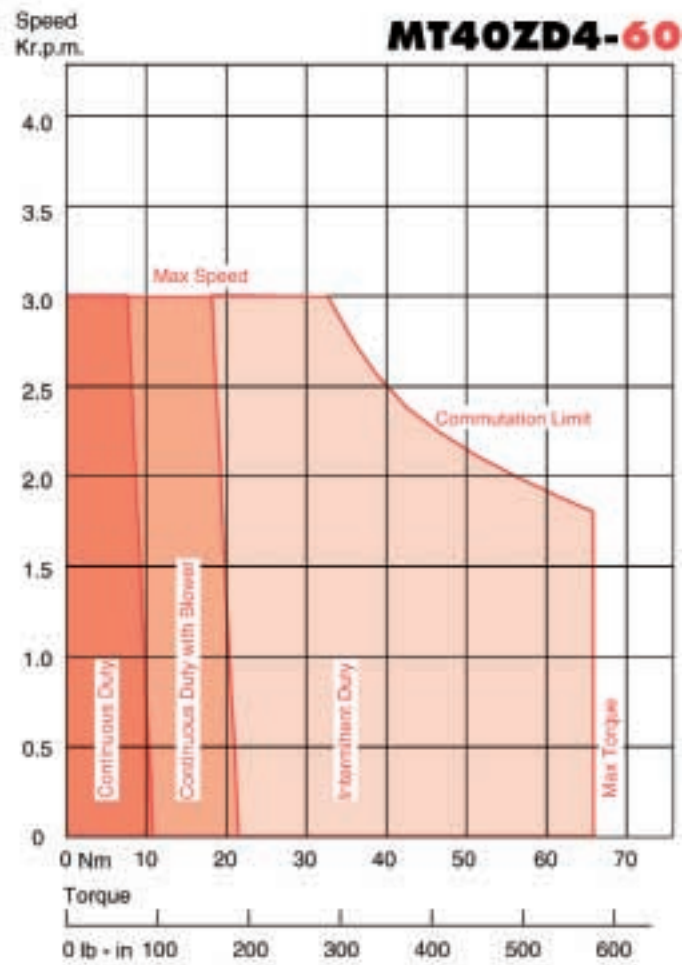
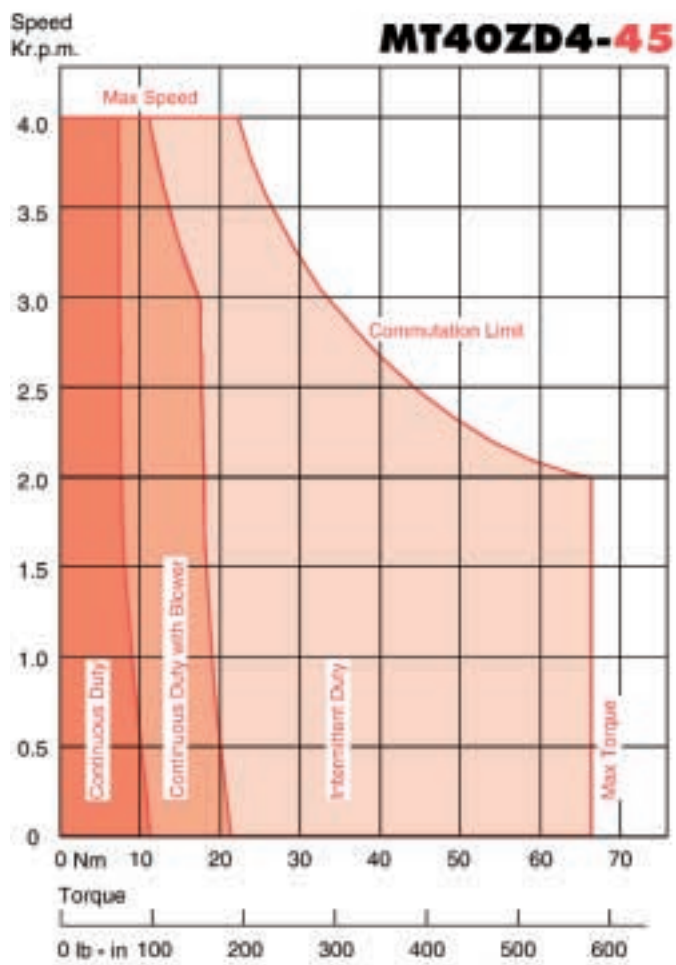
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

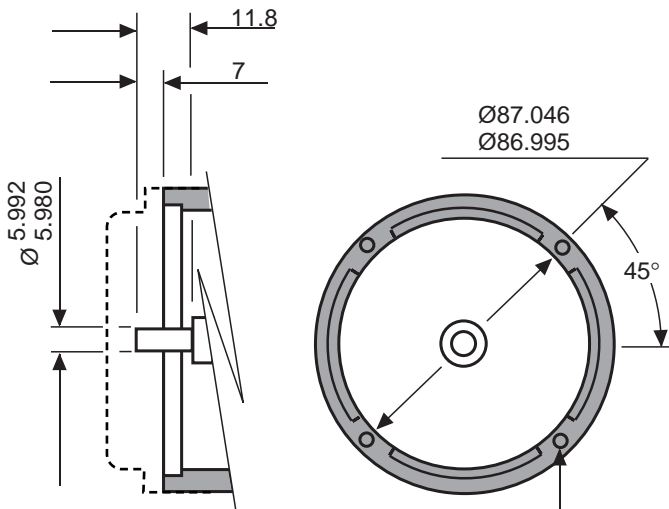
● **Heatsink Ratings** Torque ratings shown in brackets (opposite top right) are correct for motors when fitted to a heatsink size (450mm x 450mm x 20mm)
(18" x 18" x 0.8")

STALL TORQUE 11.0Nm / 97lb-in

● (12.0Nm / 106lb-in)

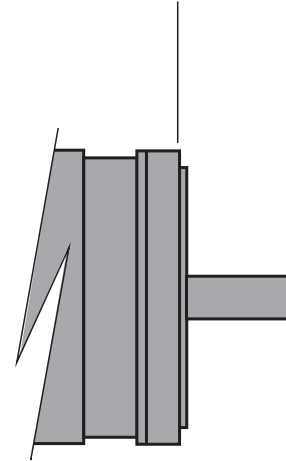
Performance Curves





4 HOLES M4 x 0.7 - 6H
IN POSITION SHOWN
ON Ø 94 P.C. DIA

FACE & SPIGOT ARE SQUARE & CONCENTRIC TO
SHAFT WITHIN 0.10 TOTAL INDICATOR READING
(0.05 FOR OPTION R01 ONLY)



RUN OUT OF SHAFT WITHIN
0.05 TOTAL INDICATOR READING

STANDARD TOLERANCES CONFORM TO
IEC72 (DIN 42955 TOLERANCE N)
OPTION R01 CLOSE TOLERANCES CONFORM TO
IEC72 PRECISION (DIN 42955 TOLERANCE R)

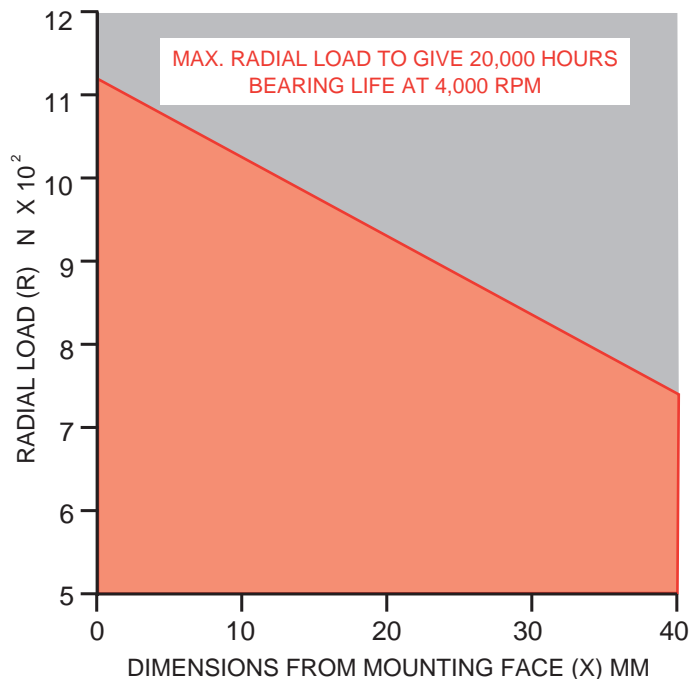
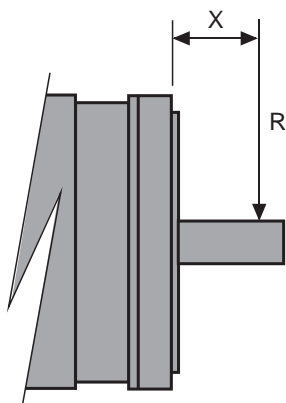
NON DRIVE END SHAFT ARRANGEMENT

DRIVE END INTERFACE TOLERANCES

DIMENSIONS IN MILLIMETRES

FOR INCH SERIES SEE DRAWING C5240/0

SHAFT LOADING LIMITS



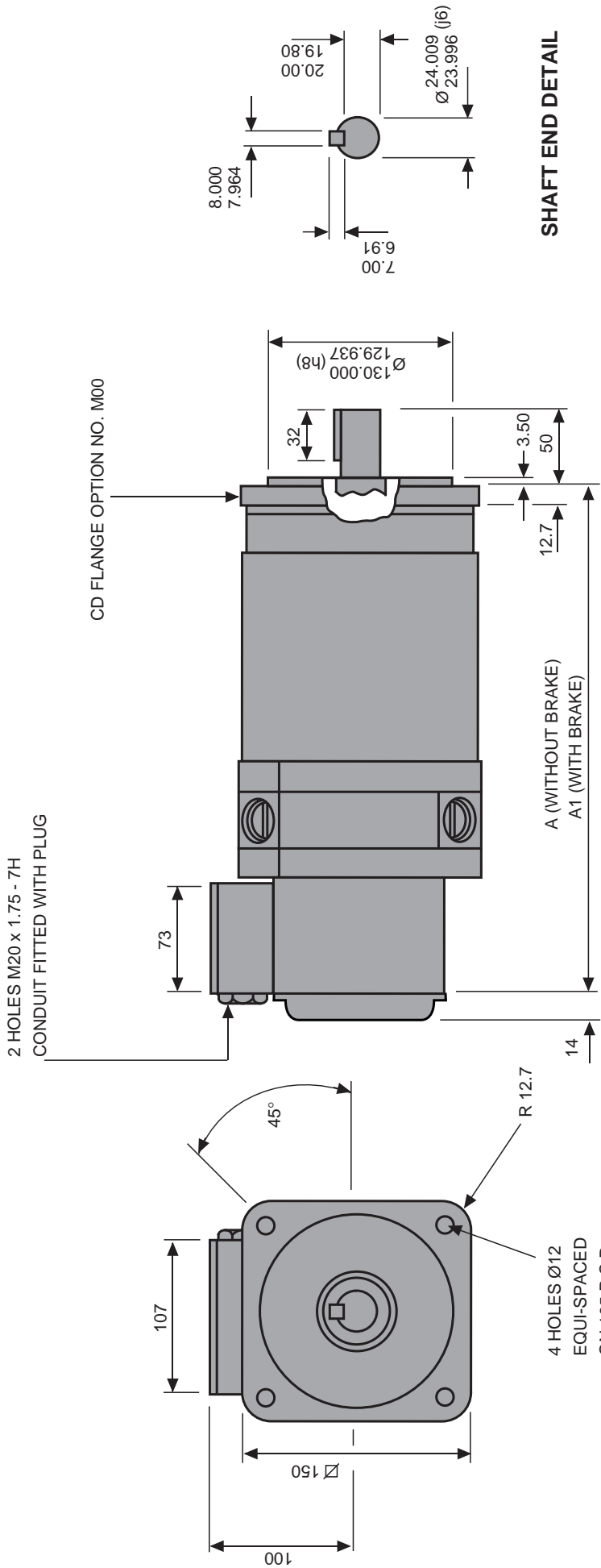
The above graph may be used as a guide for applications and includes an adequate safety factor for normal industrial use. If axial loads are to be applied, SEM should be consulted. Where radial loading in excess of the above maximum is deemed essential, the specific case should be referred to SEM.

METRIC D.C. SERVOMOTORS
MT40 SERIES

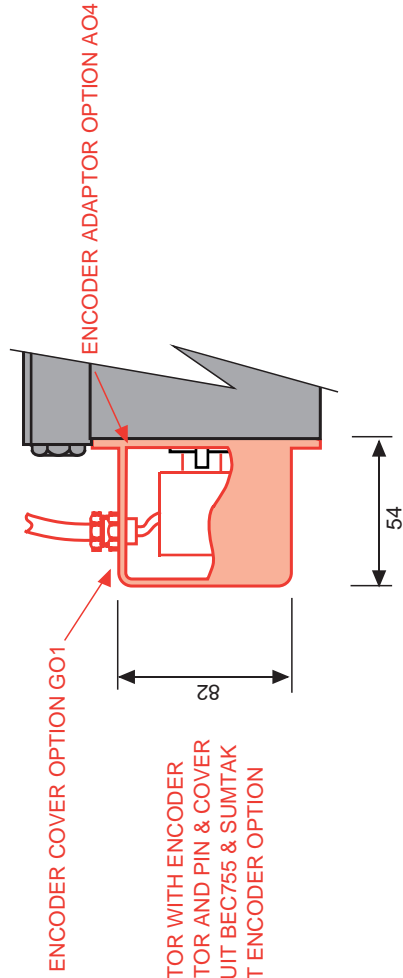
MECHANICAL DETAIL

C5240/OM
SHEET 1 OF 4 SHEETS

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-5240/0



SHAFT END DETAIL



| TYPE | A | A1 |
|-----------|-----|-----|
| MT 40 P4 | 337 | 382 |
| MT 40 W4 | 382 | 427 |
| MT 40 ZD4 | 427 | 472 |

METRIC D.C. SERVO MOTORS
MT40 SERIES

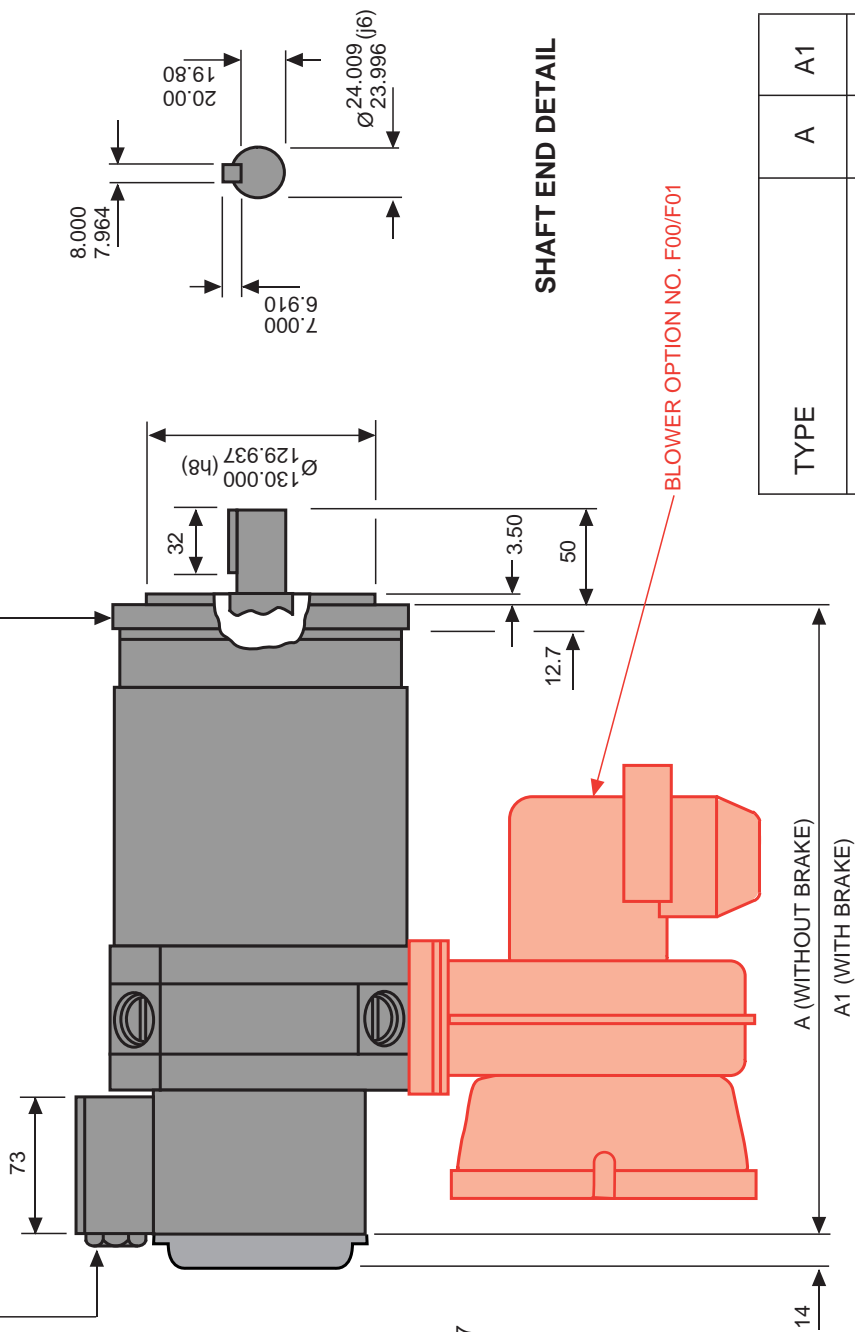
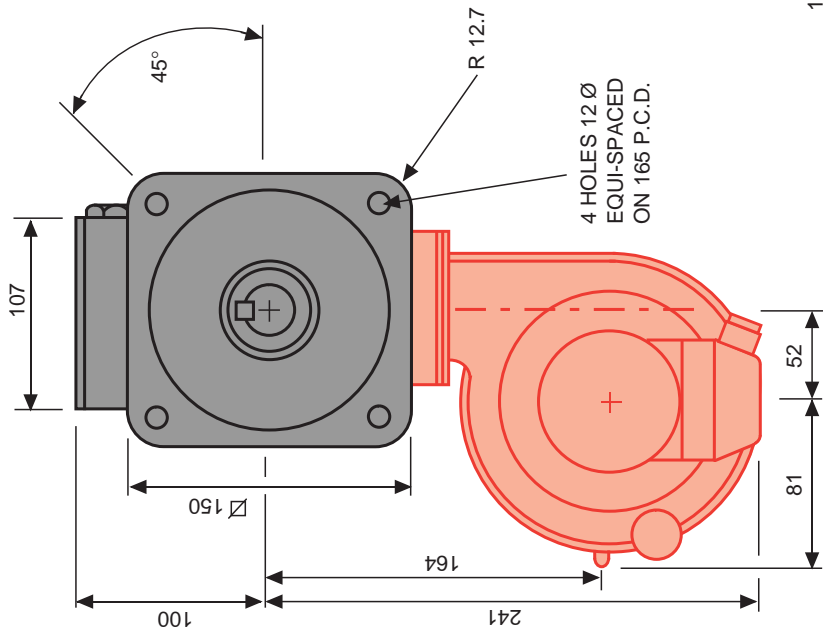
STANDARD MT40 SERVO MOTOR

C5240/OM
SHEET 2 OF 4 SHEETS

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-5240/0

2 HOLES M20 x 1.75 - 7H
CONDUIT FITTED WITH PLUG

CD FLANGE OPTION NO. M00



SHAFT END DETAIL

BLOWER OPTION NO. F00/F01

| TYPE | A | A1 |
|-----------|-----|-----|
| MT 40 P4 | 337 | 382 |
| MT 40 W4 | 382 | 427 |
| MT 40 ZD4 | 427 | 472 |

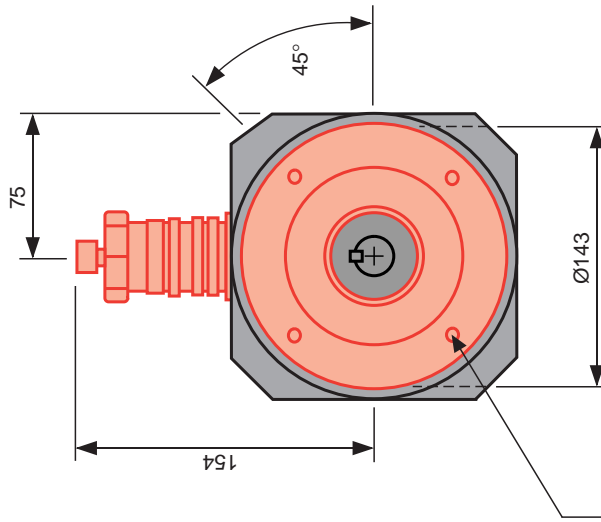
METRIC D.C. SERVOMOTORS
MT40 SERIES

MT40 SERVOMOTOR
WITH BLOWER OPTION SHOWN IN RED

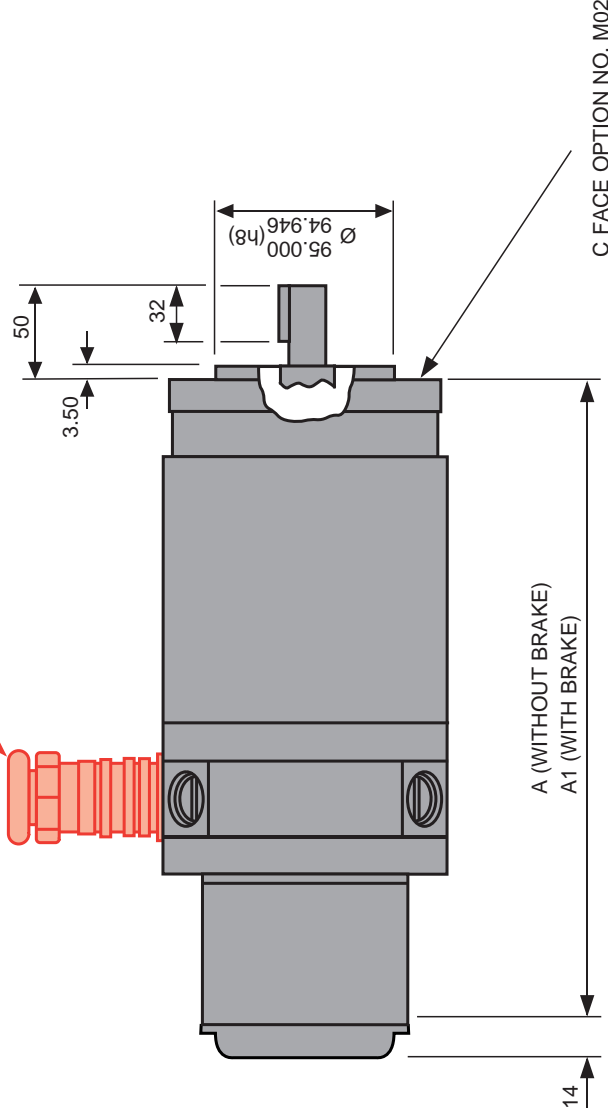
C5240/OM
SHEET 3 OF 4 SHEETS

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-5240/0

MS CONNECTOR OPTION NO. C02 / C03 (IP44)
C10 / C11 (IP65)



4 HOLES M8 x 1.25 - 6H
EQUI-SPACED ON 115 P.C.D.
MAX. DEPTH 16



C FACE OPTION NO. M02

A (WITHOUT BRAKE)
A1 (WITH BRAKE)

| TYPE | A | A1 |
|-----------|-----|-----|
| MT 40 P4 | 337 | 382 |
| MT 40 W4 | 382 | 427 |
| MT 40 ZD4 | 427 | 472 |

METRIC D.C. SERVOMOTORS
MT40 SERIES

MT40 SERVOMOTOR
WITH MS CONNECTOR AND 'C' FACE OPTIONS SHOWN IN RED

C5240/OM
SHEET 4 OF 4 SHEETS

Standard features are shown by ● in black.

Available fitted options are shown in red.

Please quote No. and reference of option along with motor type No. when placing an order.

If options or features are required which are not detailed below, they may be possible, so please ask SEM sales.

| NO. | REFERENCE | DESCRIPTION |
|-----------------------------|---------------------------|--|
| MECHANICAL INTERFACE | | |
| ● M00 | FLANGE | See page 41 |
| M02 | FACE | See page 43 |
| R01 | CLOSE TOLERANCE INTERFACE | Interface (face & shaft) to IEC72 PRECISION (DIN 42955 Tolerance R) |
| ● S00 | SHAFT | See page 41 |
| ● K00 | KEYWAY | See page 41 |
| K99 | NO KEYWAY | Plain shaft |
| D01 | SHAFT END TAPPED | M8 x 15mm Deep tapped in drive shaft |
| H01 | HAND CRANK | Rear shaft to enable hand rotation of motor |
| MOTOR PROTECTION | | |
| ● P00 | IP44/65 PROTECTION | Enclosure protection IP44 at shaft. IP65 for remainder of motor. IP64/65 if option W01 shaft seal is fitted |
| W01 | SHAFT SEAL | Oil seal fitted at drive end/shaft interface |
| P99 | TROPICALISED | Special treatment on internal parts |
| BRAKES | | |
| B00 | 24V DC BRAKE | 18 Nm torque 24V DC supply |
| B01 | 90V DC BRAKE | 18 Nm torque 90V DC supply |
| L01 | RECTIFIER | 110V AC input 90V DC output for B01 mounted inside motor terminal box (supplied loose for external mounting when motor MS Connectors are fitted) |
| FORCED VENTILATION | | |
| V00 | 220V BLOWER | 220 volt 50HZ single phase input |
| V01 | 110V BLOWER | 110 volt 50HZ single phase input |
| V99 | PREPARED FOR BLOWER | Motor prepared for blower but no blower fitted (covers are fitted over blower preparation) |

| NO. | REFERENCE | DESCRIPTION |
|--------------------------------|--|--|
| ELECTRICAL TERMINATIONS | | |
| ● C00 | TERMINAL BOX | With 2 x M20 tapped holes |
| C01 | TERMINAL BOX | With 2 X PG16 tapped holes |
| C02 | MS CONNECTOR (IP44) | Receptacle MS3102A-24-11P(9 pin) fitted to motor (IP44) |
| C03 | MS PLUG AND CABLE CLAMP FOR C02 (IP44) | Straight plug MS3106A-24-11S and Cable clamp 97-3057-1016-12 (IP44) |
| C09 | FLYING LEADS OUT | 0.5 metre long (No terminal box radial exit) |
| C10 | MS CONNECTOR (IP65) | Receptacle MS 3102E-24-11P (9 pin) fitted to motor (IP65) |
| C11 | MS PLUG (IP65) | Straight plug MS 3106E-24-11S (IP65) |
| TACHOGENERATORS | | |
| T07 | TACHOGENERATOR | 7V/1000 RPM |
| ● T95 | TACHOGENERATOR | 9.5V/1000 RPM |
| T19 | TACHOGENERATOR | 19.5V/1000 RPM |
| T30 | TACHOGENERATOR | 30V/1000 RPM |
| N99 | NO TACHOGENERATOR | No velocity feedback |
| ENCODERS | | |
| E01 | ENCODER | HEIDENHAIN ERN1120 Series - 250 PPR |
| E02 | ENCODER | HEIDENHAIN ERN1120 Series - 500 PPR |
| E03 | ENCODER | HEIDENHAIN ERN1120 Series 1000 PPR |
| ENCODER FITTINGS | | |
| A01 | ENCODER ADAPTOR | for Heidenhain ROD 426, 436, 456, Litton G60 & Leine & Linde type 63 |
| A02 | ENCODER ADAPTOR | for Heidenhain ROD 420 & 450 |
| A03 | ENCODER ADAPTOR | for Muirhead H25E & Litton G70 |
| A04 | ENCODER ADAPTOR | for BEC 755 & SUMTAK model LHT |
| A05 | ENCODER ADAPTOR | for Tamagawa TS5300 series |
| A06 | ADAPTOR | for Size 11 resolver |
| A10 | SYNCHRO CLAMPS | for A01, A03 and A06 |
| G01 | ENCODER COVER | Cast cover with 1 X M10 tapped hole, and cable gland for A04 only |
| G02 | ENCODER COVER (IP65) | Cast cover with 1 X PG7 tapped hole, and cable gland for A04 only |
| G03 | ENCODER COVER (IP44) | Cast cover with MS receptacle MS3102A-18-1P, for A04 only |
| G07 | ENCODER COVER (IP65) | Cast cover with 2 x axial exit cable glands for A05 & A06 only |
| G15 | ENCODER COVER (IP65) | Cast cover with MS receptacle MS 3102E-18-1P for A04 only (IP65) |
| C05 | MS PLUG AND CABLE CLAMP FOR G03 (IP44) | Straight plug MS3106A-18-1S (IP44) Cable clamp 97-3057-1010-1 |
| C27 | MS PLUG & CABLE CLAMP FOR G15 (IP65) | Straight plug MS3106E-18-1S (IP65) |

MT52K8 D.C. Servomotors

Technical Data

| Parameter | Unit | MT52K8-87 | MT52K8-62 | MT52K8-50 | MT52K8-37 |
|--|------------------------------|-------------|-----------------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 87 | 62 | 50 | 37 |
| Max. Terminal Voltage | Volts | 130 | 130 | 130 | 130 |
| Max. Speed | RPM | 1500 | 2100 | 2600 | 3500 |
| Continuous Stall Torque TENV*** | Nm | 8.0 | 8.0 | 8.0 | 8.0 |
| | lb - in | 70 | 70 | 70 | 70 |
| Continuous Stall Torque Blower Cooled*** | Nm | 16 | 16 | 16 | 16 |
| | lb - in | 140 | 140 | 140 | 140 |
| Continuous Stall Current TENV*** | Amps | 9.7 | 13.5 | 17.0 | 22.8 |
| Armature Polar Moment of Inertia | Kgm ² | 0.013 | 0.013 | 0.013 | 0.013 |
| | lb - in Sec ² | 0.115 | 0.115 | 0.115 | 0.115 |
| Torque Constant KT** | Nm/Amp* | 0.82 | 0.59 | 0.47 | 0.35 |
| | lb - in/Amp* | 7.3 | 5.2 | 4.2 | 3.1 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.82 | 0.59 | 0.47 | 0.35 |
| Peak Stall Torque** | Nm | 59 | 59 | 59 | 59 |
| | lb - in | 520 | 520 | 520 | 520 |
| Current at Peak Torque** | Amps | 71 | 100 | 125 | 170 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 4500 | 4500 | 4500 | 4500 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 1.10 | 0.55 | 0.35 | 0.19 |
| Armature Inductance | Millihenrys* | 5.0 | 2.45 | 1.50 | 0.90 |
| Mechanical Time Constant** | Milliseconds | 22.0 | 22.0 | 22.0 | 22.0 |
| Thermal | | | | | |
| Insulation Class | | H | H | H | H |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 40 | 40 | 40 | 40 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 0.50 | 0.50 | 0.50 | 0.50 |
| | lb - in | 4.4 | 4.4 | 4.4 | 4.4 |
| Motor Weight | Kg | 23 | 23 | 23 | 23 |
| | lb | 51 | 51 | 51 | 51 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | STANDARD FOR USA ONLY | | |
| | Volts Sec Rad ^{-1*} | | 7 | | |
| Ripple | Per Cent | 1.0 | 0.067 | | |
| | Cycles/Rev | | 1.0 | | |
| Armature Resistance** | Ohms | 36 | 24 | | |
| Armature Inductance | Millihenrys* | 55 | 36 | | |
| Maximum Current | Amps | 0.025 | 0.035 | | |

* Tolerance Plus or Minus 10%

** At 25°C

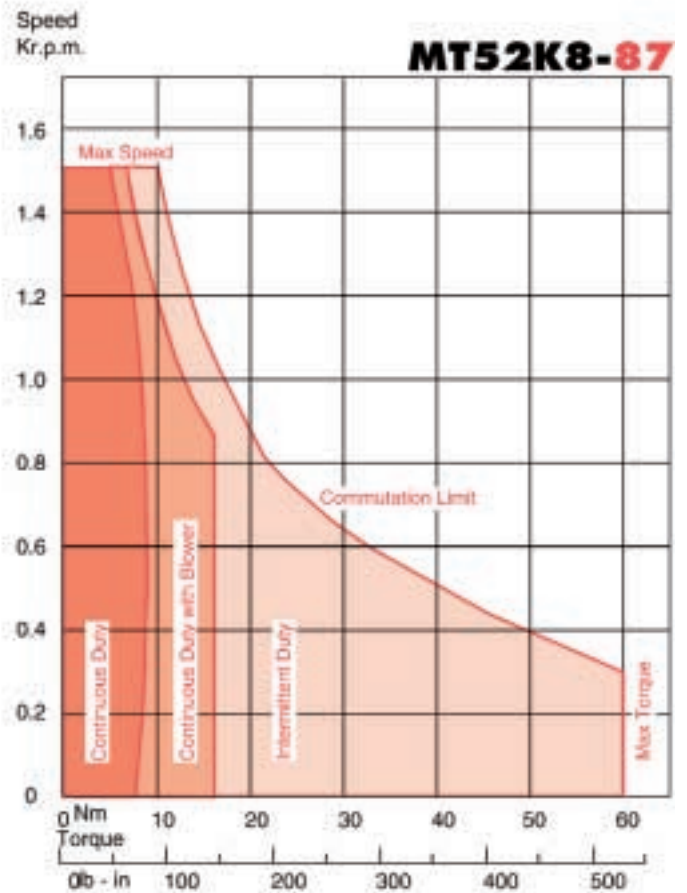
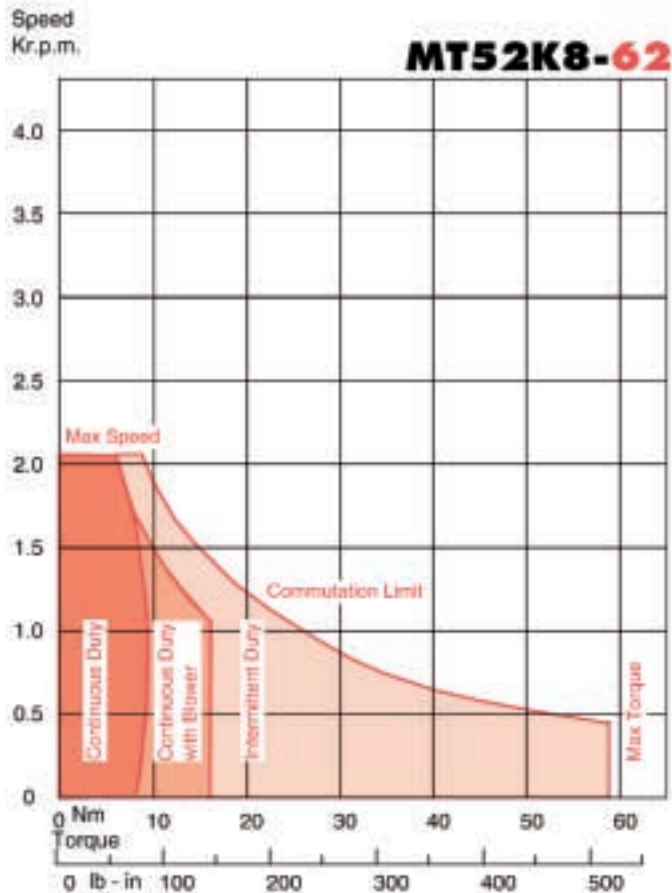
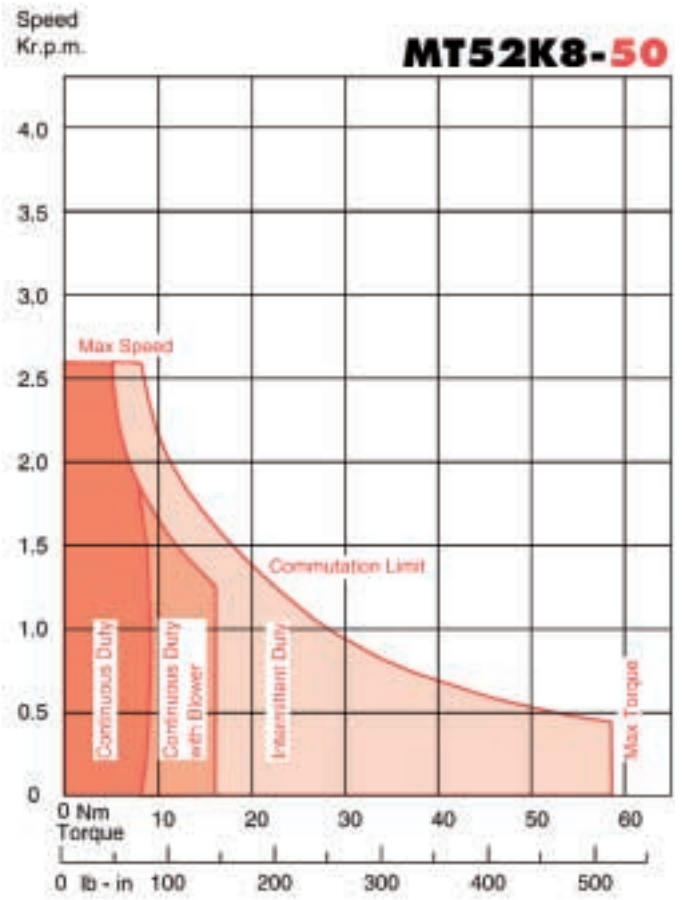
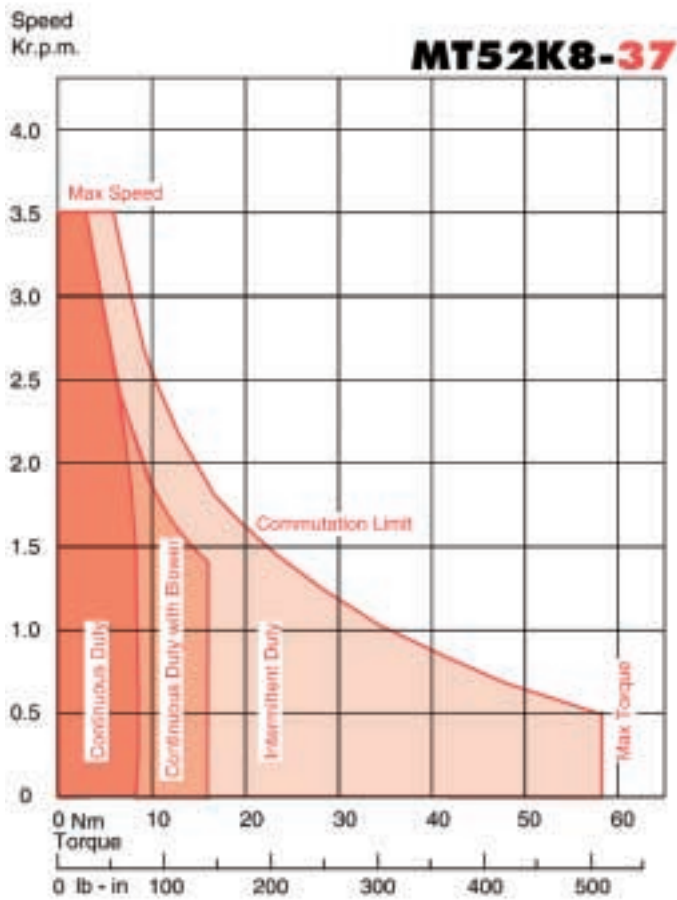
*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

STALL TORQUE 8.0Nm / 70lb-in

Performance Curves



MT52V8 D.C. Servomotors

Technical Data

| Parameter | Unit | MT52V8-87 | MT52V8-69 | MT52V8-50 | MT52V8-37 |
|--|------------------------------|-------------|-------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 87 | 69 | 50 | 37 |
| Max. Terminal Voltage | Volts | 130 | 130 | 130 | 130 |
| Max. Speed | RPM | 1500 | 1900 | 2600 | 3500 |
| Continuous Stall Torque TENV*** | Nm | 15.0 | 15.0 | 15.0 | 15.0 |
| | lb - in | 130 | 130 | 130 | 130 |
| Continuous Stall Torque Blower Cooled*** | Nm | 30.0 | 30.0 | 30.0 | 30.0 |
| | lb - in | 265 | 265 | 265 | 265 |
| Continuous Stall Current TENV*** | Amps | 18.3 | 23.8 | 33.3 | 44.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.026 | 0.026 | 0.026 | 0.026 |
| | lb - in Sec ² | 0.230 | 0.230 | 0.230 | 0.230 |
| Torque Constant KT** | Nm/Amp* | 0.82 | 0.65 | 0.47 | 0.34 |
| | lb - in/Amp* | 7.2 | 5.8 | 4.1 | 3.0 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.82 | 0.63 | 0.45 | 0.34 |
| Peak Stall Torque** | Nm | 110 | 110 | 110 | 110 |
| | lb - in | 970 | 970 | 970 | 970 |
| Current at Peak Torque** | Amps | 140 | 180 | 250 | 330 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 4200 | 4200 | 4200 | 4200 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 0.41 | 0.25 | 0.13 | 0.07 |
| Armature Inductance | Millihenrys* | 2.0 | 1.3 | 0.7 | 0.4 |
| Mechanical Time Constant** | Milliseconds | 18.0 | 18.0 | 18.0 | 18.0 |
| Thermal | | | | | |
| Insulation Class | | H | H | H | H |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant** | Minutes* | 60 | 60 | 60 | 60 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 0.60 | 0.60 | 0.60 | 0.60 |
| | lb - in | 5.3 | 5.3 | 5.3 | 5.3 |
| Motor Weight | Kg | 31 | 31 | 31 | 31 |
| | lb | 68 | 68 | 68 | 68 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | | 0.067 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 25 | | 25 | |
| Armature Resistance** | Ohms | 36 | | 24 | |
| Armature Inductance | Millihenrys* | 55 | | 36 | |
| Maximum Current | Amps | 0.025 | | 0.035 | |

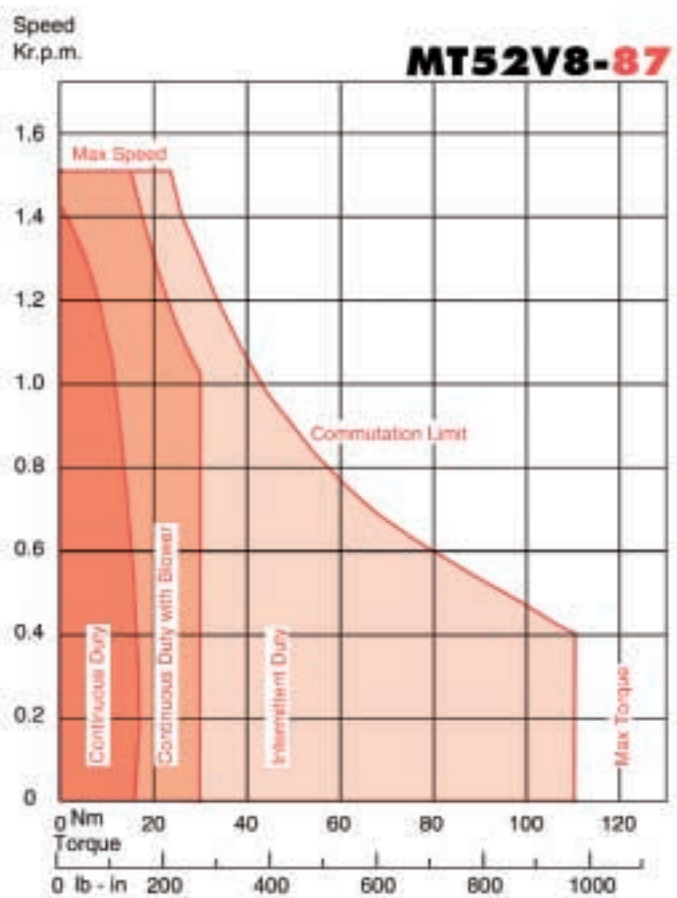
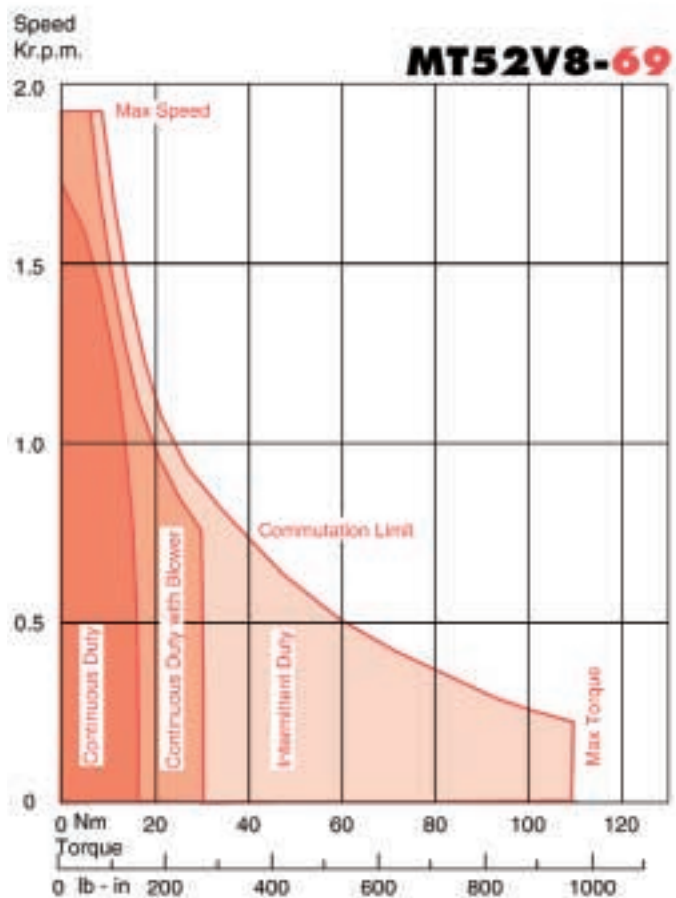
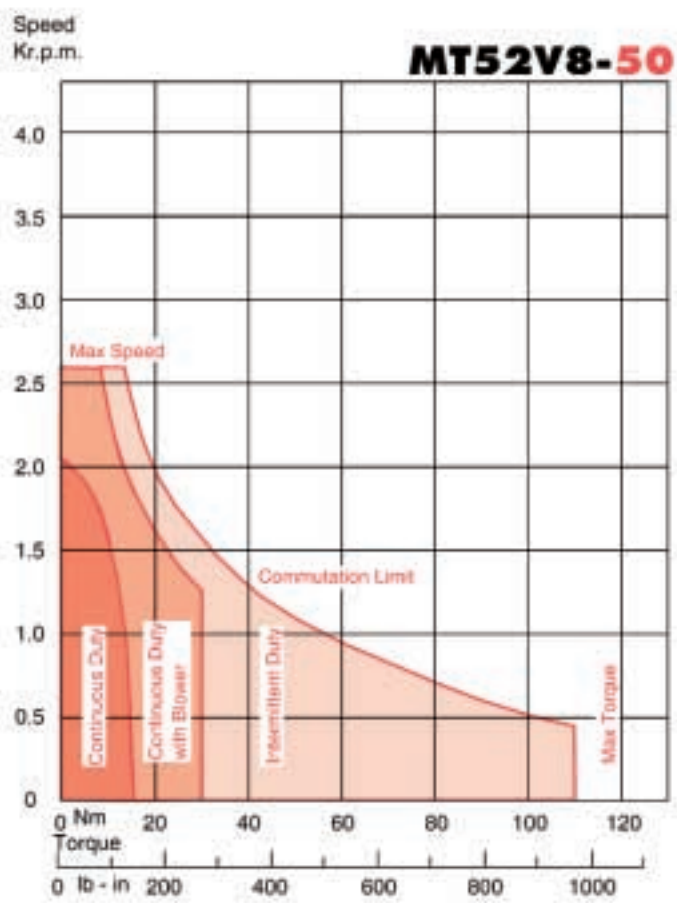
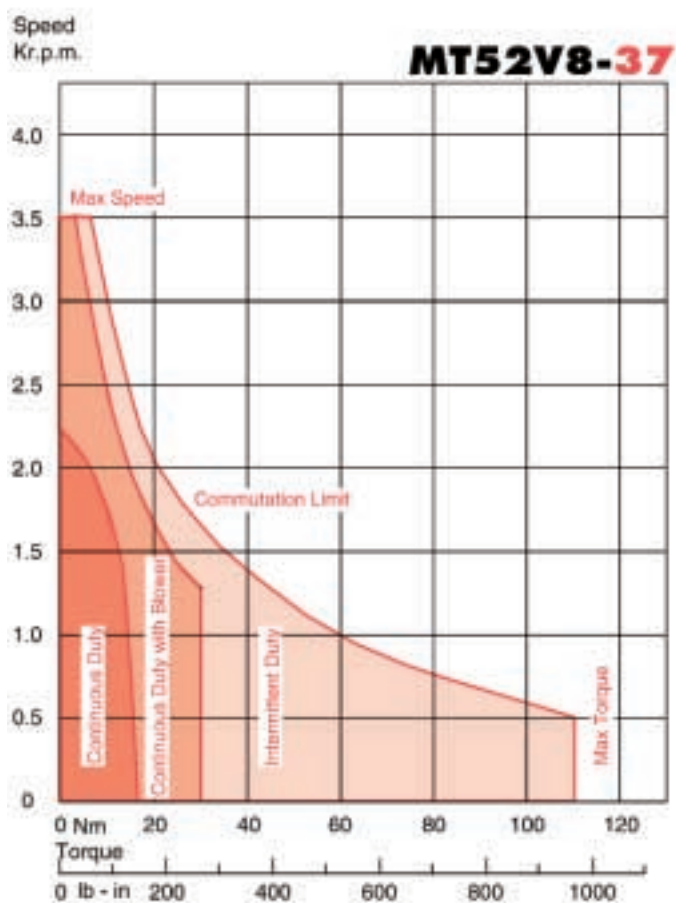
- * Tolerance Plus or Minus 10%
- ** At 25°C
- *** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

STALL TORQUE 15.0Nm / 130lb-in

Performance Curves



MT52ZF8 D.C. Servomotors

Technical Data

| Parameter | Unit | MT52ZF8-86 | MT52ZF8-67 | MT52ZF8-48 | MT52ZF8-38 |
|--|------------------------------|-------------|-------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 86 | 67 | 48 | 38 |
| Max. Terminal Voltage | Volts | 130 | 130 | 130 | 130 |
| Max. Speed | RPM | 1500 | 2000 | 2700 | 3500 |
| Continuous Stall Torque TENV*** | Nm | 22.0 | 22.0 | 18.0 | 16.0 |
| | lb - in | 190 | 190 | 160 | 140 |
| Continuous Stall Torque Blower Cooled*** | Nm | 45.0 | 45.0 | 35.0 | 30.0 |
| | lb - in | 400 | 400 | 310 | 265 |
| Continuous Stall Current TENV*** | Amps | 26.0 | 34.0 | 39.0 | 43.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.034 | 0.034 | 0.034 | 0.034 |
| | lb - in Sec ² | 0.300 | 0.300 | 0.300 | 0.300 |
| Torque Constant KT** | Nm/Amp* | 0.81 | 0.65 | 0.46 | 0.37 |
| | lb - in/Amp* | 7.2 | 5.7 | 4.1 | 3.3 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.84 | 0.65 | 0.46 | 0.37 |
| Peak Stall Torque** | Nm | 180 | 180 | 180 | 180 |
| | lb - in | 1600 | 1600 | 1600 | 1600 |
| Current at Peak Torque** | Amps | 220 | 285 | 400 | 500 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 5300 | 5300 | 5300 | 5300 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 0.216 | 0.136 | 0.060 | 0.043 |
| Armature Inductance | Millihenrys* | 1.0 | 0.6 | 0.3 | 0.2 |
| Mechanical Time Constant** | Milliseconds | 11.0 | 11.0 | 11.0 | 11.0 |
| Thermal | | | | | |
| Insulation Class | | H | H | H | H |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant** | Minutes* | 75 | 75 | 75 | 75 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 0.70 | 0.70 | 0.70 | 0.70 |
| | lb - in | 6.2 | 6.2 | 6.2 | 6.2 |
| Motor Weight | Kg | 39 | 39 | 39 | 39 |
| | lb | 86 | 86 | 86 | 86 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | | 0.067 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 25 | | 25 | |
| Armature Resistance** | Ohms | 36 | | 24 | |
| Armature Inductance | Millihenrys* | 55 | | 36 | |
| Maximum Current | Amps | 0.025 | | 0.035 | |

* Tolerance Plus or Minus 10%

** At 25°C

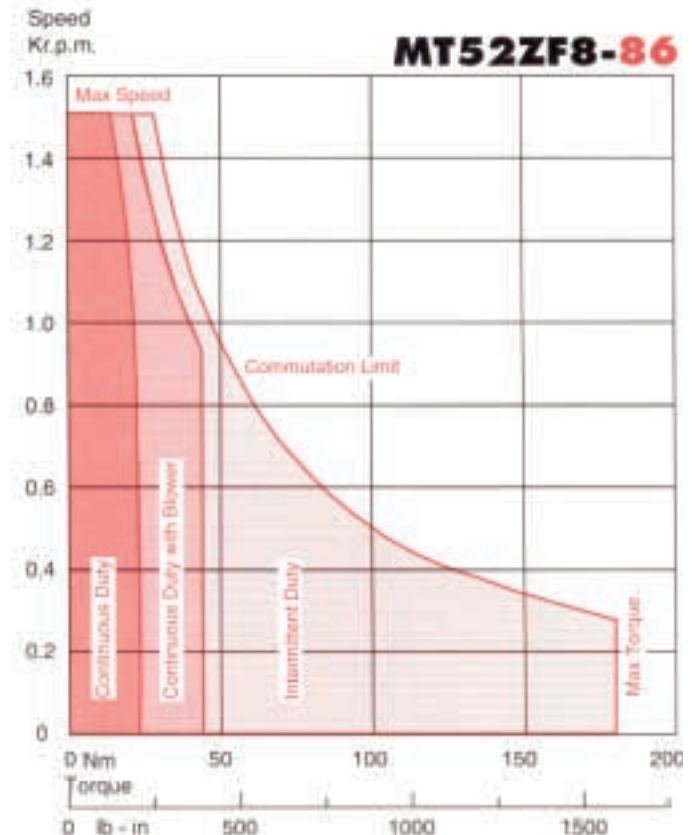
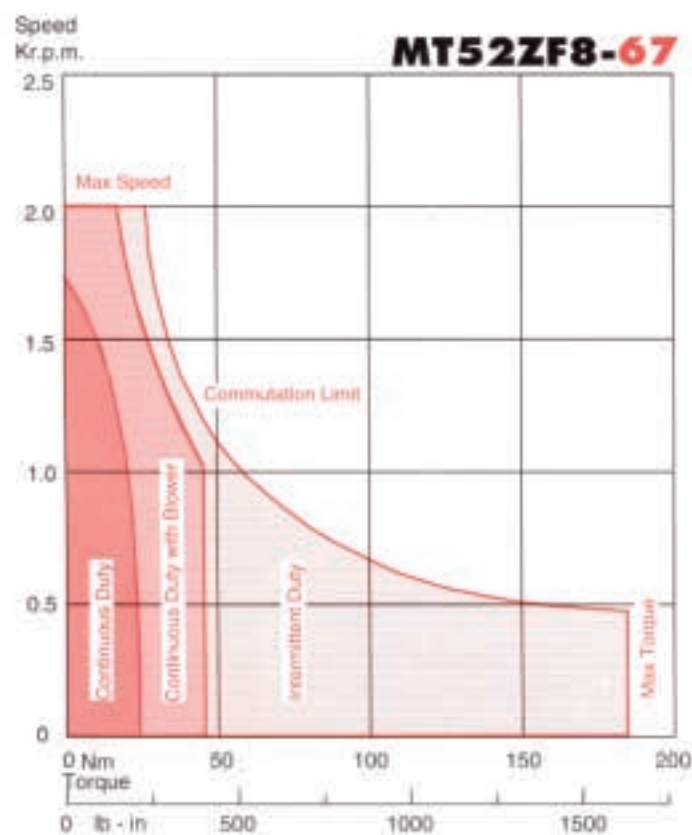
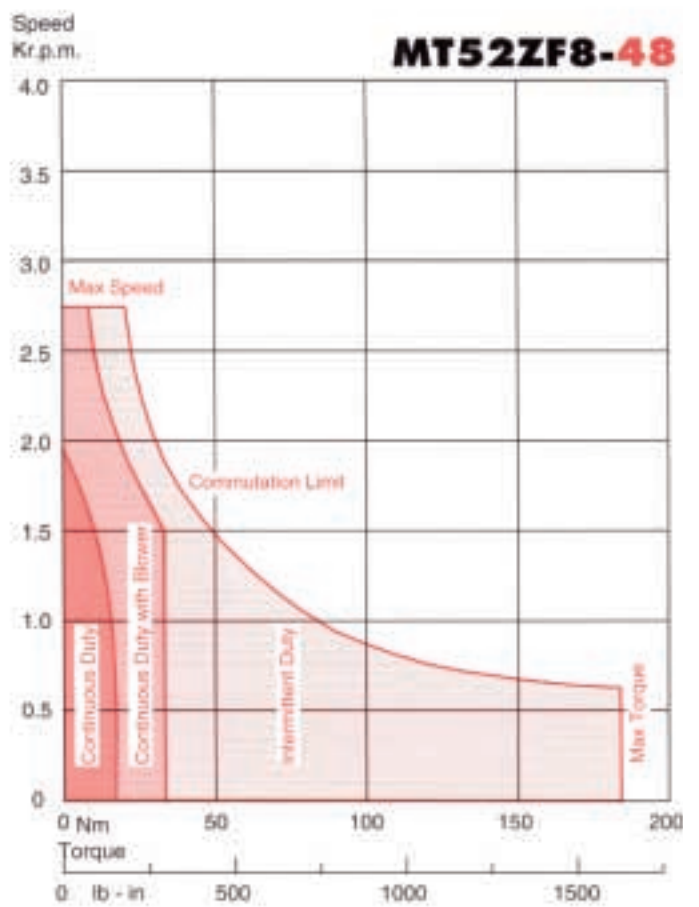
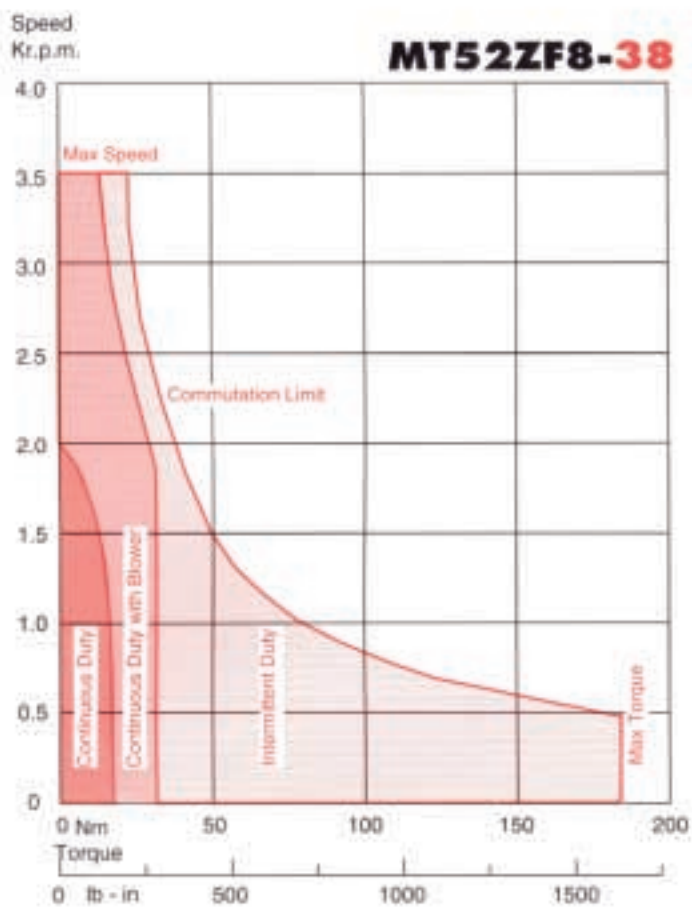
*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

STALL TORQUE 16 - 22Nm / 140 - 190lb-in

Performance Curves



MT52ZR8 D.C. Servomotors

Technical Data

| Parameter | Unit | MT52ZR8-92 | MT52ZR8-66 | MT52ZR8-53 | MT52ZR8-39 |
|--|------------------------------|-------------|-------------|-------------|-------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 92 | 66 | 53 | 39 |
| Max. Terminal Voltage | Volts | 130 | 130 | 130 | 130 |
| Max. Speed | RPM | 1400 | 2000 | 2500 | 3300 |
| Continuous Stall Torque TENV*** | Nm | 30.0 | 24.0 | 21.0 | 16.0 |
| | lb - in | 260 | 210 | 190 | 140 |
| Continuous Stall Torque Blower Cooled*** | Nm | 55.0 | 45.0 | 40.0 | 30.0 |
| | lb - in | 490 | 400 | 350 | 270 |
| Continuous Stall Current TENV*** | Amps | 36.0 | 40.0 | 42.0 | 43.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.043 | 0.043 | 0.043 | 0.043 |
| | lb - in Sec ² | 0.380 | 0.380 | 0.380 | 0.380 |
| Torque Constant KT** | Nm/Amp* | 0.85 | 0.61 | 0.5 | 0.37 |
| | lb - in/Amp* | 7.5 | 5.4 | 4.4 | 3.3 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.85 | 0.61 | 0.5 | 0.37 |
| Peak Stall Torque** | Nm | 240 | 240 | 240 | 240 |
| | lb - in | 2100 | 2100 | 2100 | 2100 |
| Current at Peak Torque** | Amps | 285 | 400 | 500 | 650 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 5600 | 5600 | 5600 | 5600 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 0.170 | 0.084 | 0.054 | 0.029 |
| Armature Inductance | Millihenrys* | 0.78 | 0.40 | 0.25 | 0.14 |
| Mechanical Time Constant** | Milliseconds | 10.0 | 10.0 | 10.0 | 10.0 |
| Thermal | | | | | |
| Insulation Class | | H | H | H | H |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 90 | 90 | 90 | 90 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 0.70 | 0.70 | 0.70 | 0.70 |
| | lb - in | 6.2 | 6.2 | 6.2 | 6.2 |
| Motor Weight | Kg | 48 | 48 | 48 | 48 |
| | lb | 106 | 106 | 106 | 106 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | | 0.067 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 25 | | 25 | |
| Armature Resistance** | Ohms | 36 | | 24 | |
| Armature Inductance | Millihenrys* | 55 | | 36 | |
| Maximum Current | Amps | 0.025 | | 0.035 | |

* Tolerance Plus or Minus 10%

** At 25°C

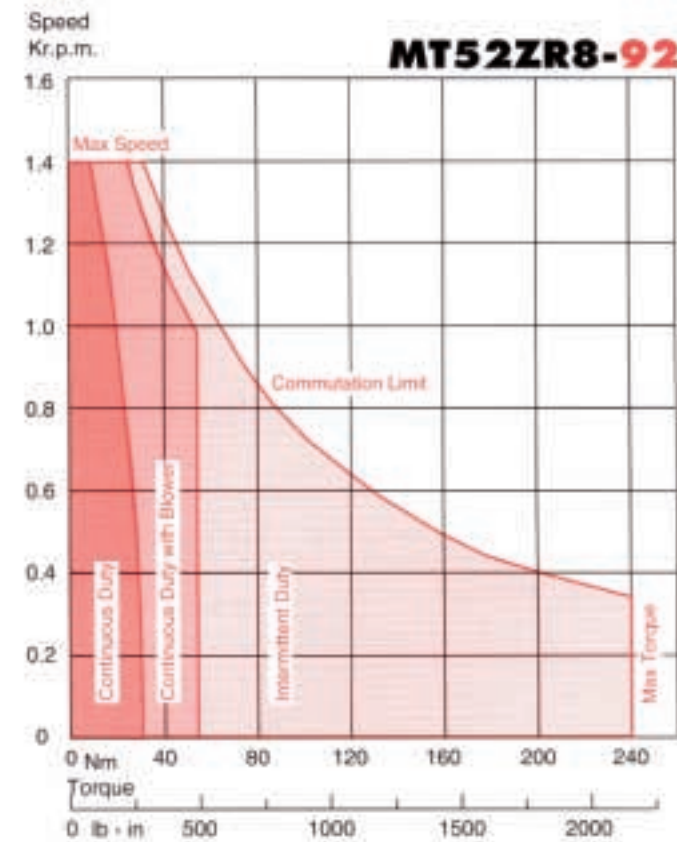
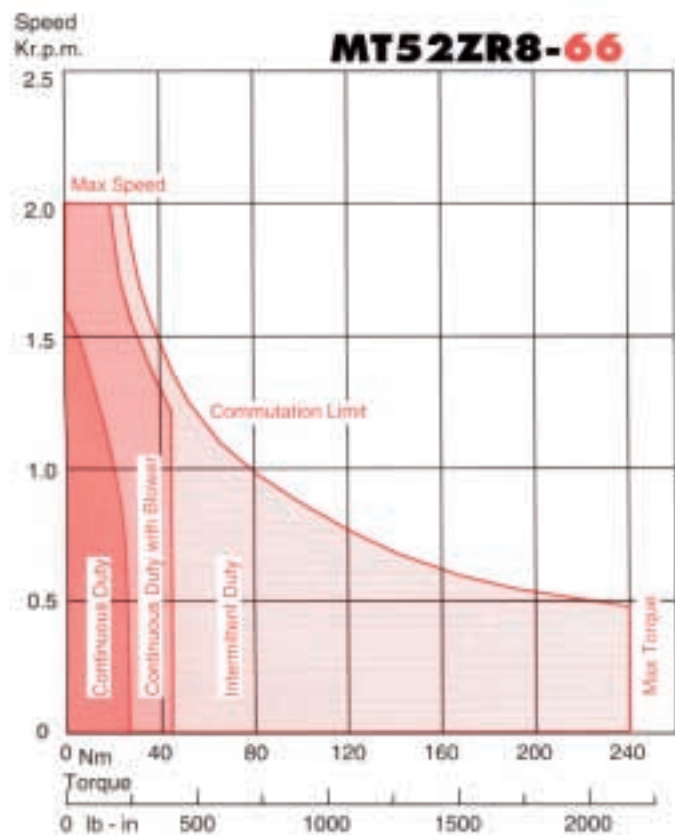
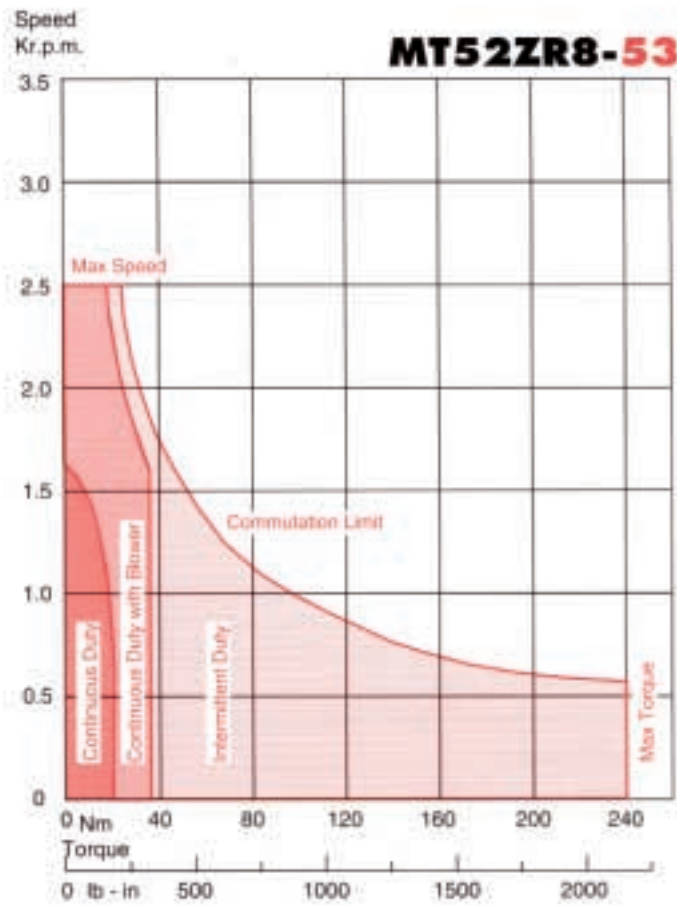
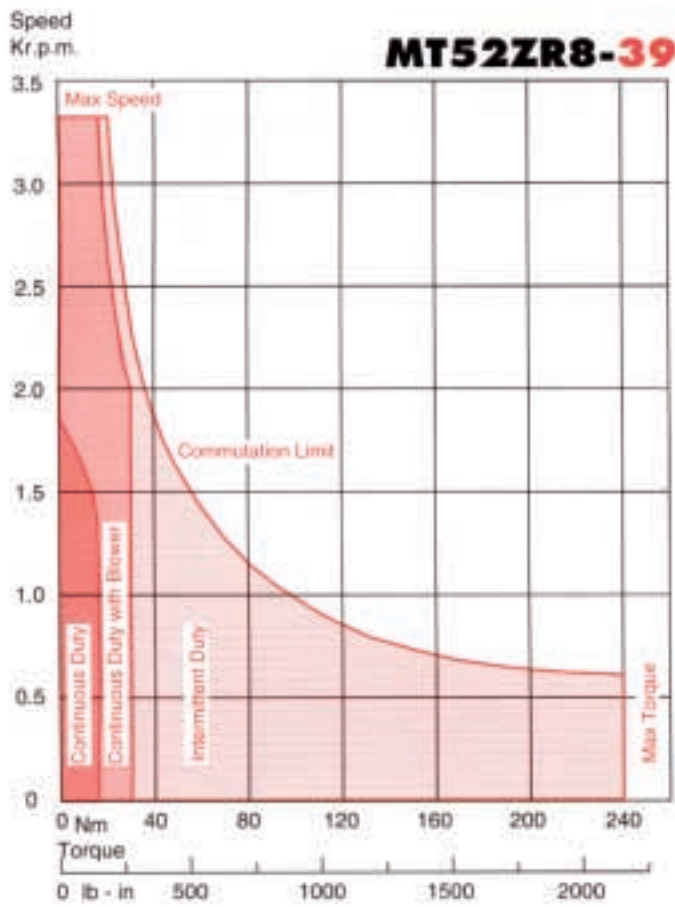
*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

STALL TORQUE 16 - 30Nm / 140 - 260lb-in

Performance Curves



DBMT52ZF8 D.C. Servomotors

Technical Data

| Parameter | Unit | DBMT52ZF8-86 | DBMT52ZF8-67 | DBMT52ZF8-48 | DBMT52ZF8-38 |
|--|------------------------------|--------------|--------------|--------------|--------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 86 | 67 | 48 | 38 |
| Max. Terminal Voltage | Volts | 130 | 130 | 130 | 130 |
| Max. Speed | RPM | 1500 | 2000 | 2700 | 3500 |
| Continuous Stall Torque TENV*** | Nm | 27.5 | 27.5 | 27.5 | 27.5 |
| | lb - in | 240 | 240 | 240 | 240 |
| Continuous Stall Torque Blower Cooled*** | Nm | 45 | 45 | 45 | 45 |
| | lb - in | 400 | 400 | 400 | 400 |
| Continuous Stall Current TENV*** | Amps | 34.0 | 43.0 | 60.0 | 74.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.038 | 0.038 | 0.038 | 0.038 |
| | lb - in Sec ² | 0.34 | 0.34 | 0.34 | 0.34 |
| Torque Constant KT** | Nm/Amp* | 0.81 | 0.65 | 0.46 | 0.37 |
| | lb - in/Amp* | 7.2 | 5.7 | 4.1 | 3.3 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.81 | 0.65 | 0.46 | 0.37 |
| Peak Stall Torque** | Nm | 180 | 180 | 180 | 180 |
| | lb - in | 1600 | 1600 | 1600 | 1600 |
| Current at Peak Torque** | Amps | 220 | 285 | 400 | 500 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 4700 | 4700 | 4700 | 4700 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 0.216 | 0.136 | 0.060 | 0.043 |
| Armature Inductance | Millihenrys* | 1.0 | 0.6 | 0.3 | 0.2 |
| Mechanical Time Constant** | Milliseconds | 12.5 | 12.5 | 12.5 | 12.5 |
| Thermal | | | | | |
| Insulation Class | | H | H | H | H |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 75 | 75 | 75 | 75 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 1.0 | 1.0 | 1.0 | 1.0 |
| | lb - in | 9.0 | 9.0 | 9.0 | 9.0 |
| Motor Weight | Kg | 41 | 41 | 41 | 41 |
| | lb | 90 | 90 | 90 | 90 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.090 | | 0.067 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 25 | | 25 | |
| Armature Resistance** | Ohms | 36 | | 24 | |
| Armature Inductance | Millihenrys* | 55 | | 36 | |
| Maximum Current | Amps | 0.025 | | 0.035 | |

* Tolerance Plus or Minus 10%

** At 25°C

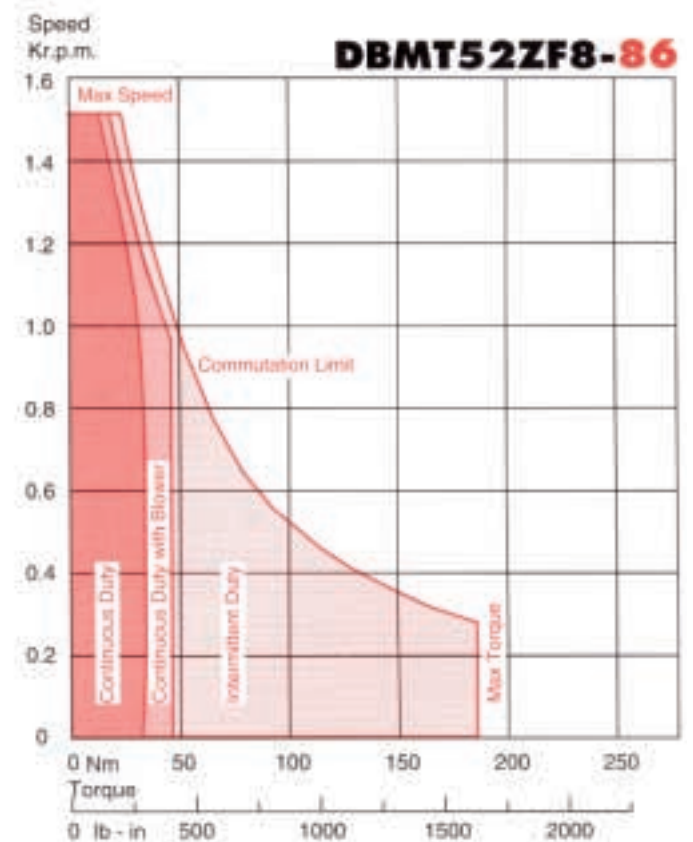
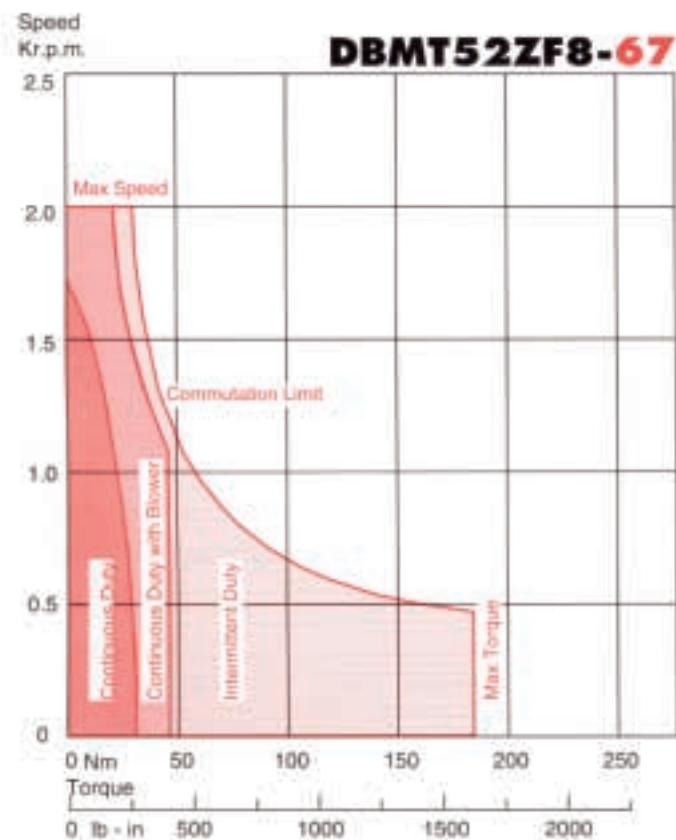
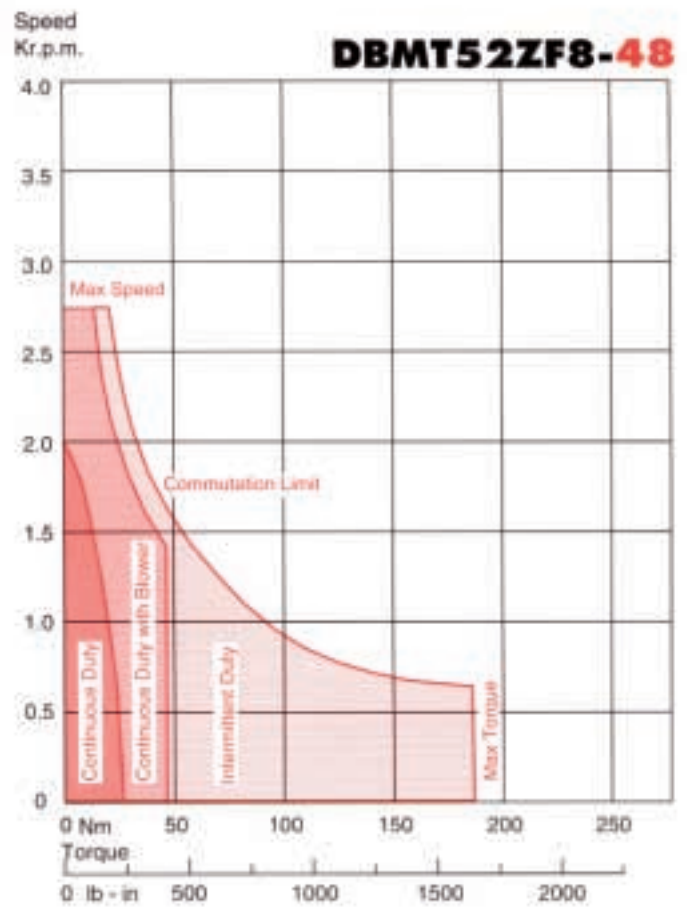
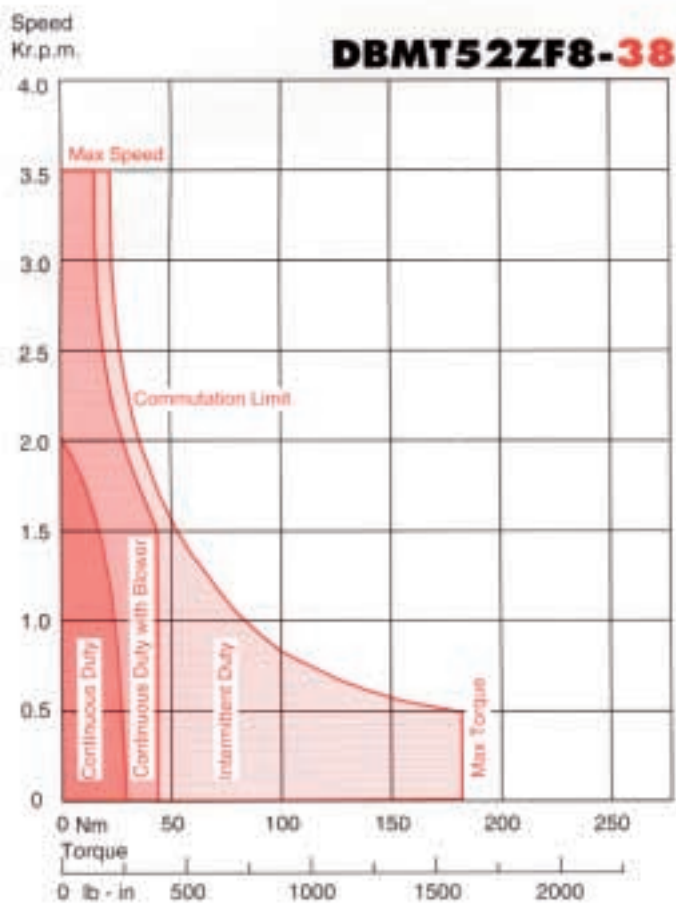
*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

STALL TORQUE **27.5Nm / 240lb-in**

Performance Curves



DBMT52ZR8 D.C. Servomotors

Technical Data

| Parameter | Unit | DBMT52ZR8-92 | DBMT52ZR8-66 | DBMT52ZR8-53 | DBMT52ZR8-39 |
|--|------------------------------|--------------|--------------|--------------|--------------|
| GENERAL | | | | | |
| Voltage Gradient No Load | Volts/1000RPM* | 92 | 66 | 53 | 39 |
| Max. Terminal Voltage | Volts | 130 | 130 | 130 | 130 |
| Max. Speed | RPM | 1400 | 2000 | 2500 | 3300 |
| Continuous Stall Torque TENV*** | Nm | 37.0 | 37.0 | 34.0 | 28.0 |
| | lb - in | 330 | 330 | 300 | 250 |
| Continuous Stall Torque Blower Cooled*** | Nm | 55.0 | 55.0 | 55.0 | 55.0 |
| | lb - in | 490 | 490 | 490 | 490 |
| Continuous Stall Current TENV*** | Amps | 44.0 | 61.0 | 71.0 | 76.0 |
| Armature Polar Moment of Inertia | Kgm ² | 0.046 | 0.046 | 0.046 | 0.046 |
| | lb - in Sec ² | 0.410 | 0.410 | 0.410 | 0.410 |
| Torque Constant KT** | Nm/Amp* | 0.85 | 0.61 | 0.5 | 0.37 |
| | lb - in/Amp* | 7.5 | 5.4 | 4.4 | 3.3 |
| Voltage Constant KV** | Volts Sec Rad ^{-1*} | 0.85 | 0.61 | 0.48 | 0.37 |
| Peak Stall Torque** | Nm | 240 | 240 | 240 | 240 |
| | lb - in | 2100 | 2100 | 2100 | 2100 |
| Current at Peak Torque** | Amps | 285 | 400 | 500 | 650 |
| Theoretical Acceleration at Peak Torque | Rad/Sec ² | 5200 | 5200 | 5200 | 5200 |
| Winding | | | | | |
| Armature Resistance Less Brushes** | Ohms* | 0.170 | 0.084 | 0.054 | 0.029 |
| Armature Inductance | Millihenrys* | 0.78 | 0.40 | 0.25 | 0.14 |
| Mechanical Time Constant** | Milliseconds | 11.0 | 11.0 | 11.0 | 11.0 |
| Thermal | | | | | |
| Insulation Class | | H | H | H | H |
| Max. Ambient Temperature | °C | 40 | 40 | 40 | 40 |
| Thermal Time Constant | Minutes* | 90 | 90 | 90 | 90 |
| Mechanical | | | | | |
| Static Friction Torque | Nm | 1.0 | 1.0 | 1.0 | 1.0 |
| | lb - in | 9.0 | 9.0 | 9.0 | 9.0 |
| Motor Weight | Kg | 50 | 50 | 50 | 50 |
| | lb | 110 | 110 | 110 | 110 |
| TACHOMETER | | | | | |
| Voltage Gradient | Volts/1000RPM* | 9.5 | | 7 | |
| | Volts Sec Rad ^{-1*} | 0.90 | | 0.067 | |
| Ripple | Per Cent | 1.0 | | 1.0 | |
| | Cycles/Rev | 25 | | 25 | |
| Armature Resistance** | Ohms | 36 | | 24 | |
| Armature Inductance | Millihenrys* | 55 | | 36 | |
| Maximum Current | Amps | 0.025 | | 0.035 | |

* Tolerance Plus or Minus 10%

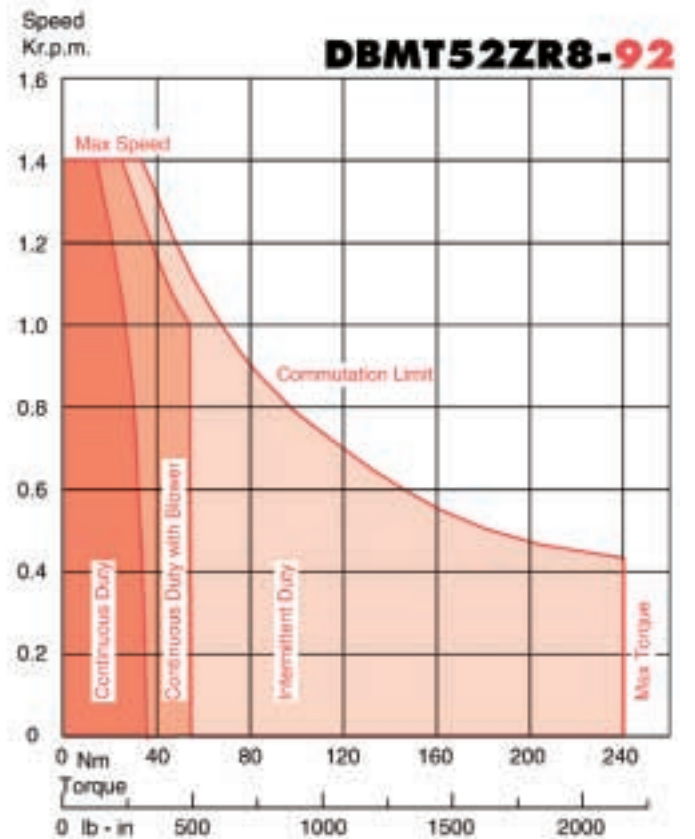
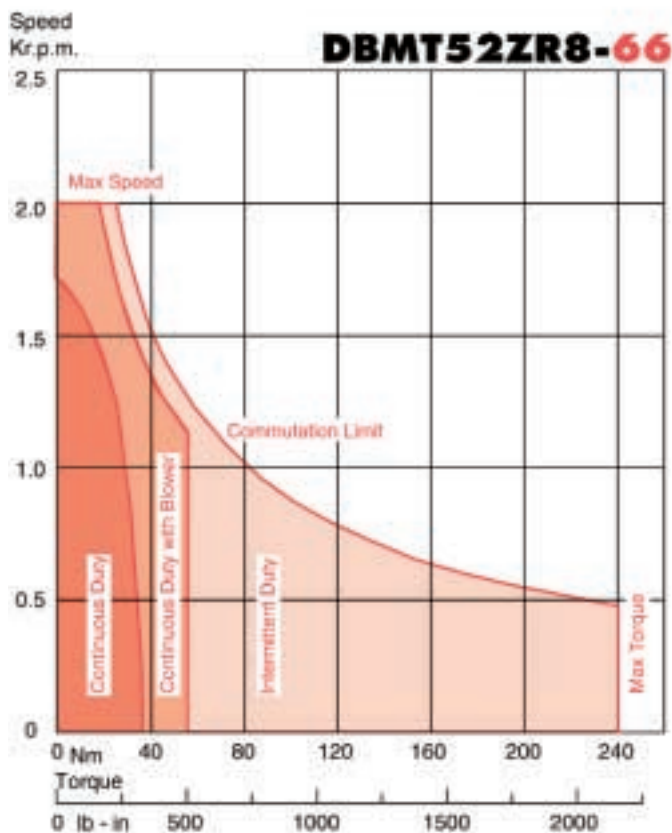
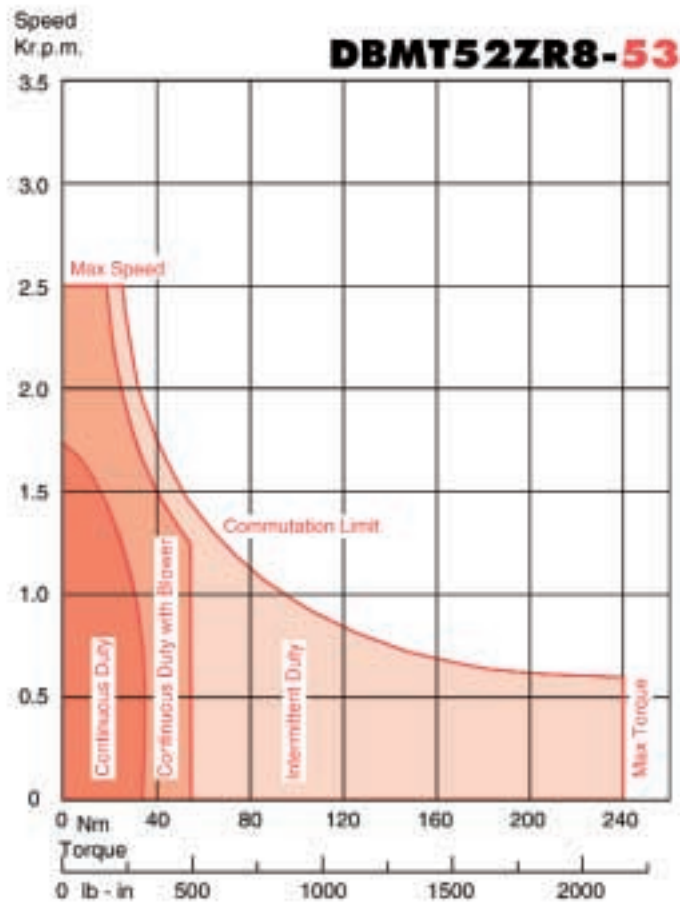
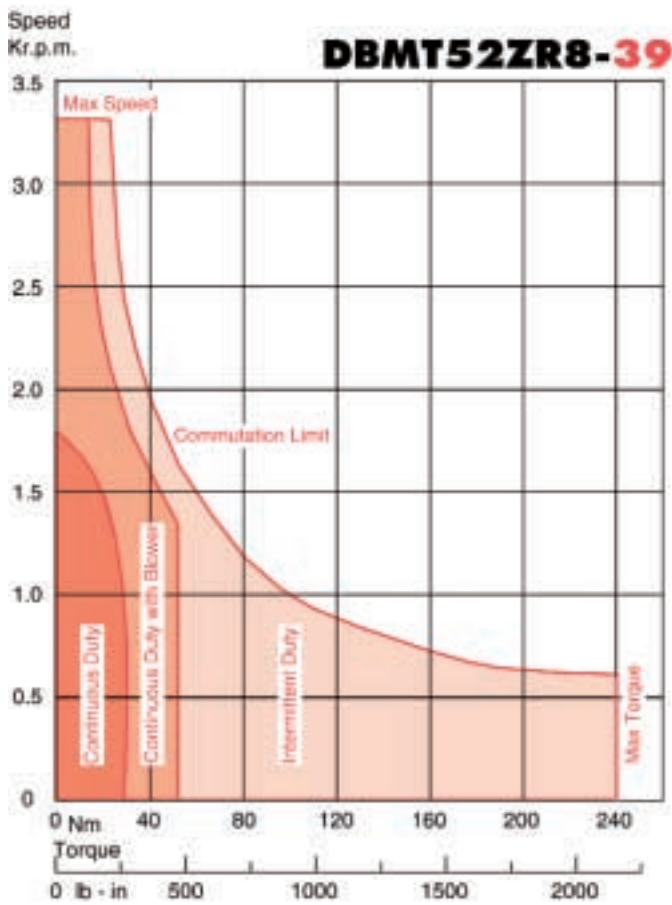
** At 25°C

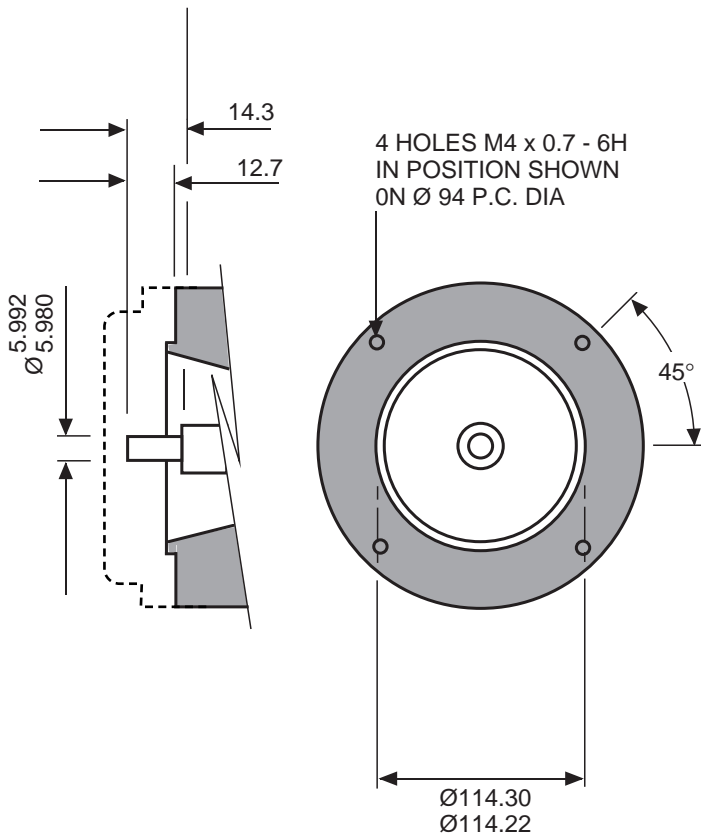
*** At 40°C Ambient

■ **Motor Performance** data is on the basis of a pure D.C. i.e. unity system form factor supply. Appropriate performance derating is necessary when using a supply with a system form factor greater than unity.

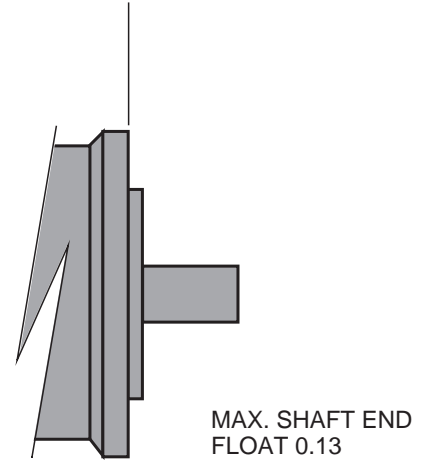
■ **Commutation Curves** opposite and peak torque are based on the **peak value** of the current wave form. For a form factor greater than unity the maximum torque permitted will be lower than that detailed on the performance curves. **IMPORTANT** The commutation curves are based on a load inertia equal to the motor inertia. Advice should be taken in the event the load inertia is greater than the motor inertia.

STALL TORQUE 28 - 37Nm / 250 - 330lb-in





FACE & SPIGOT ARE SQUARE & CONCENTRIC TO
SHAFT WITHIN 0.10 TOTAL INDICATOR READING
(0.05 FOR OPTION R01 ONLY)



RUN OUT OF SHAFT WITHIN
0.05 TOTAL INDICATOR READING

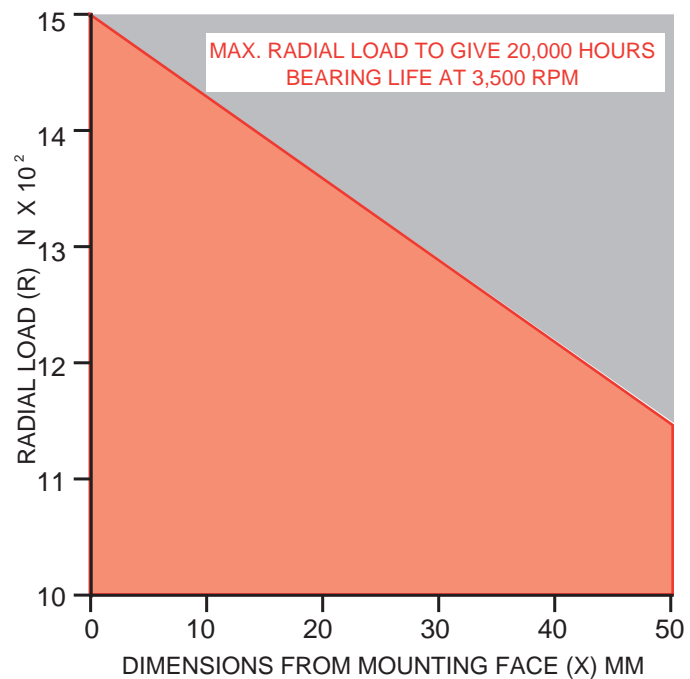
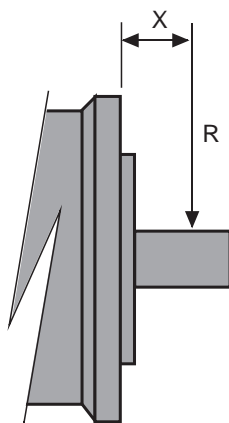
STANDARD TOLERANCES CONFORM TO
IEC72 (DIN 42955 TOLERANCE N)
OPTION R01 CLOSE TOLERANCES CONFORM TO
IEC72 PRECISION (DIN 42955 TOLERANCE R)

NON DRIVE END SHAFT ARRANGEMENT

DRIVE END INTERFACE TOLERANCES

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C5152/0

SHAFT LOADING LIMITS



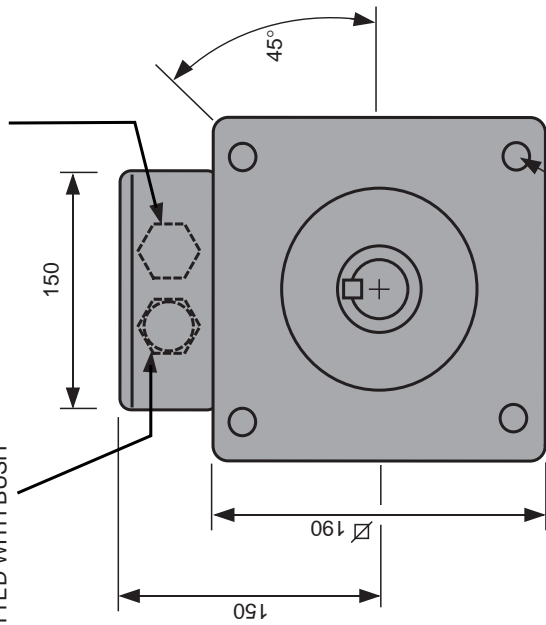
The above graph may be used as a guide for applications and includes an adequate safety factor for normal industrial use. If axial loads are to be applied, SEM should be consulted. Where radial loading in excess of the above maximum is deemed essential, the specific case should be referred to SEM.

METRIC D.C. SERVOMOTORS
MT52 SERIES

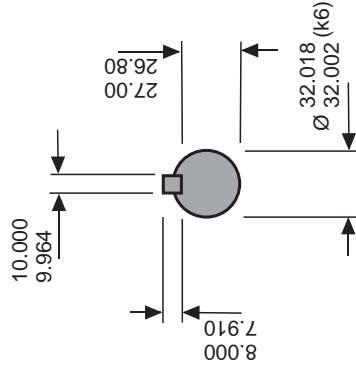
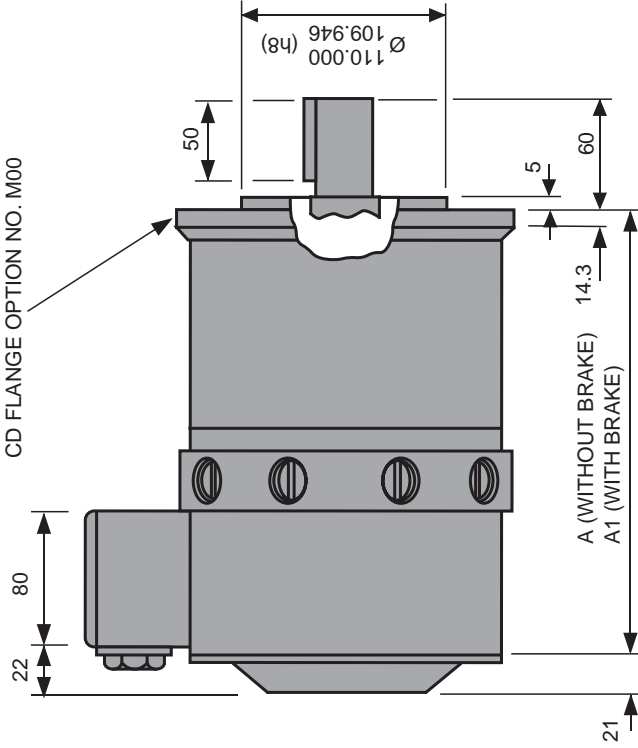
MECHANICAL DETAIL

C5152/OM
SHEET 1 OF 4 SHEETS

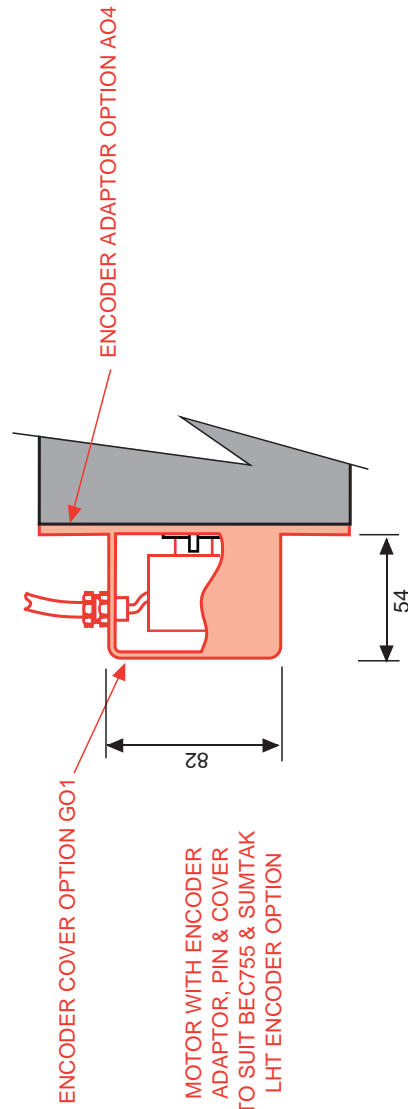
1 HOLE M25 x 1.5 - 7H CONDUIT
FITTED WITH BUSH



CD FLANGE OPTION NO. M00



SHAFT END DETAIL



| TYPE | A | A1 |
|-------------|-----|-----|
| MT 52 K8 | 259 | 331 |
| MT 52 V8 | 331 | 403 |
| MT 52 ZF8 | 403 | 475 |
| MT 52 ZR8 | 475 | 532 |
| DBMT 52 ZF8 | 430 | 502 |
| DBMT 52 ZR8 | 502 | 559 |

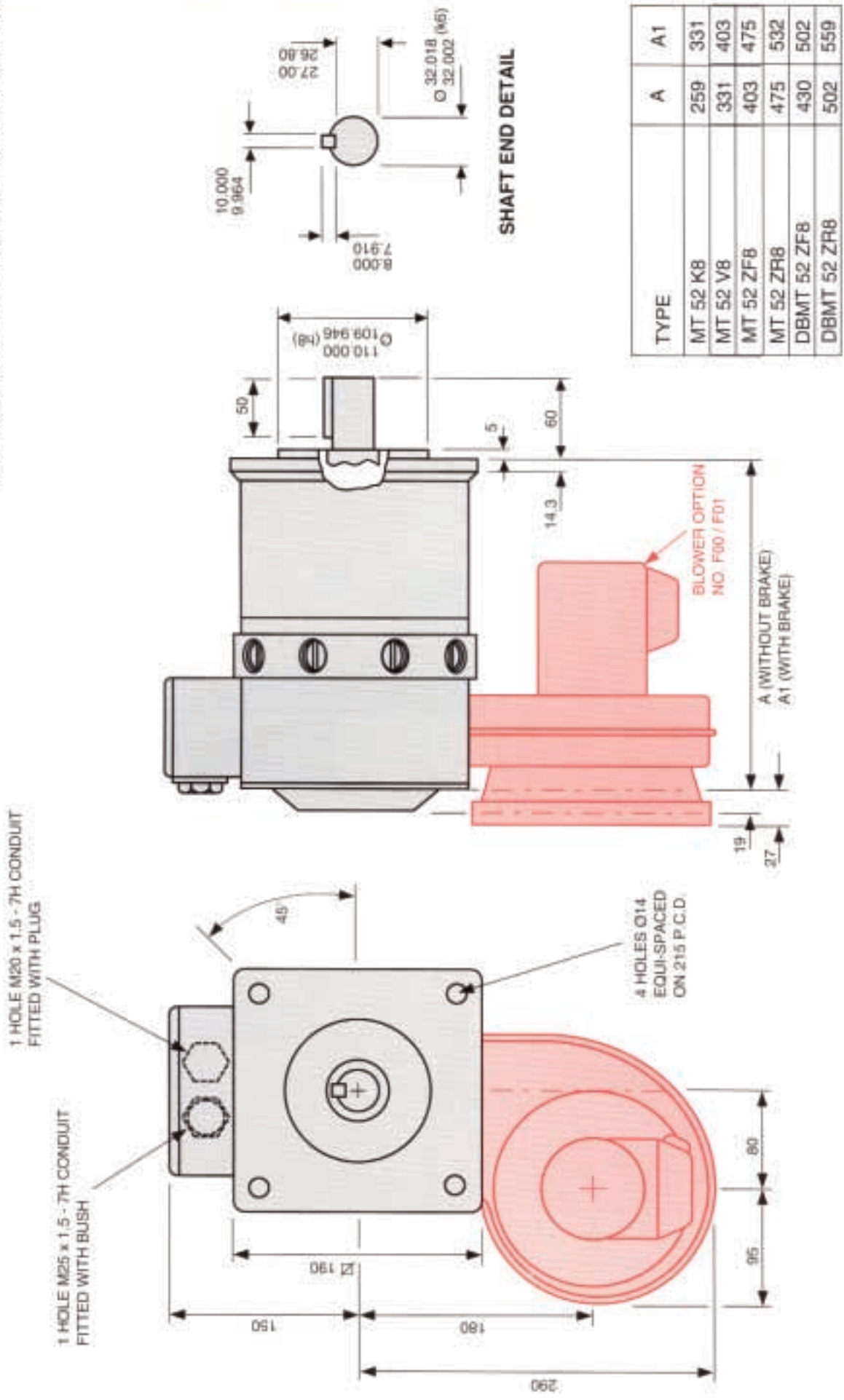
METRIC D.C. SERVO MOTORS
MT52 SERIES

STANDARD MT52 SERVO MOTOR
WITH ADAPTOR AND COVER FOR BEC755 OR SUMTAK
ENCODER SHOWN IN RED

C5152/OM
SHEET 2 OF 4 SHEETS

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-5152/0

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-5152/0

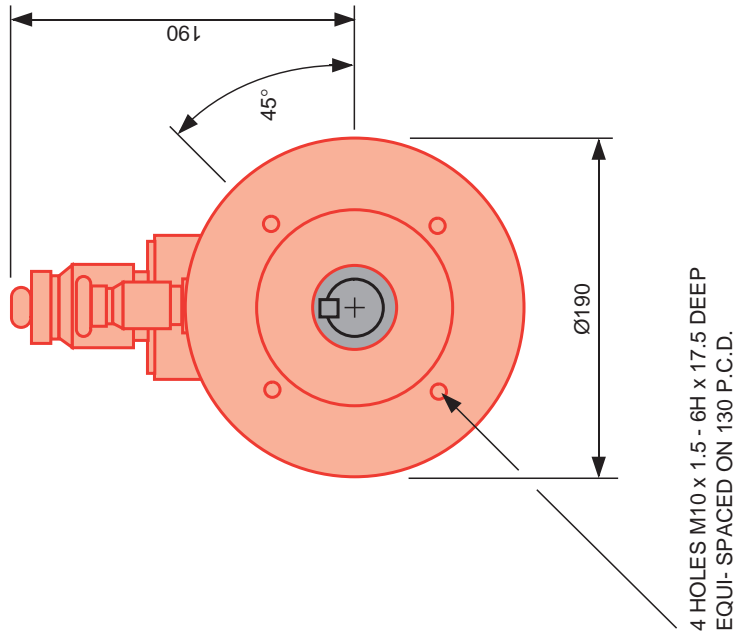
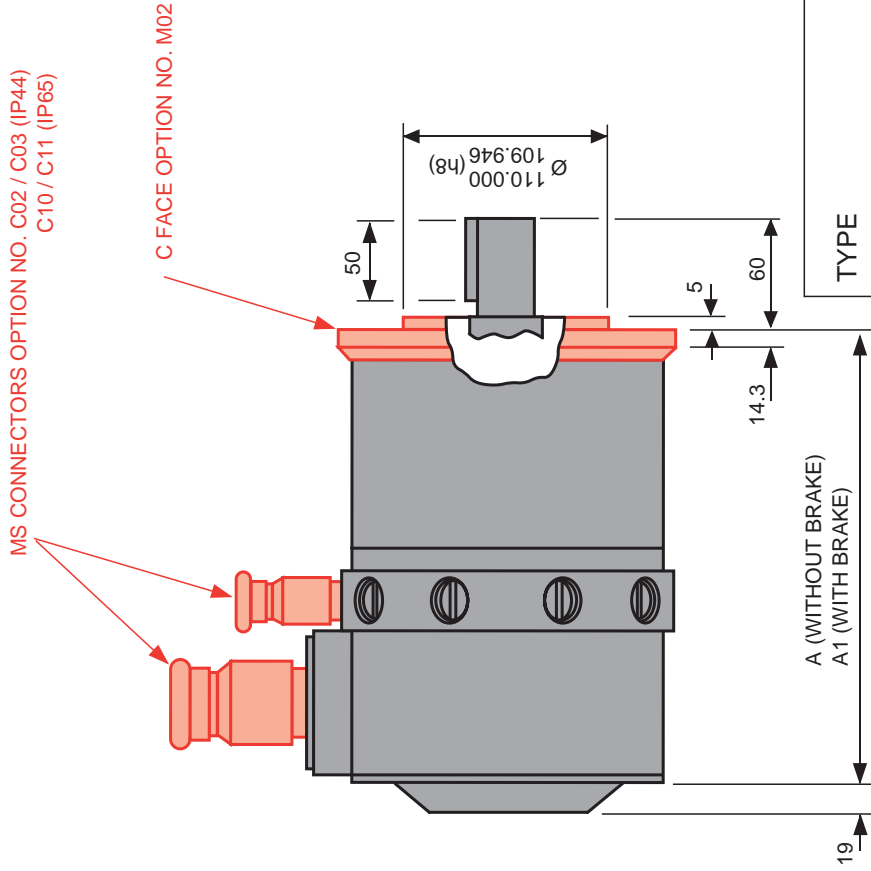


METRIC D.C. SERVOMOTORS
MT52 SERIES

MT52 SERVOMOTOR
 WITH BLOWER OPTION SHOWN IN RED

C5152/OM
 SHEET 3 OF 4 SHEETS

DIMENSIONS IN MILLIMETRES FOR INCH SERIES SEE DRAWING C-5152/O



| TYPE | A | A1 |
|-------------|-----|-----|
| MT 52 K8 | 259 | 331 |
| MT 52 V8 | 331 | 403 |
| MT 52 ZF8 | 403 | 475 |
| MT 52 ZR8 | 475 | 532 |
| DBMT 52 ZF8 | 430 | 502 |
| DBMT 52 ZR8 | 502 | 559 |

METRIC D.C. SERVOMOTORS
MT52 SERIES

MT52 SERVOMOTOR
 WITH MS CONNECTOR AND 'C' FACE OPTIONS SHOWN IN RED

C5152/OM
 SHEET 4 OF 4 SHEETS

Standard features are shown by ● in black.

Available fitted options are shown in red.

Please quote No. and reference of options along with motor type No. when placing an order.

If options or features are required which are not detailed below, they may be possible, so please ask SEM sales.

| NO. | REFERENCE | DESCRIPTION |
|-----------------------------|---------------------------|--|
| MECHANICAL INTERFACE | | |
| ● M00 | FLANGE | See page 59 |
| M02 | FACE | See page 61 |
| R01 | CLOSE TOLERANCE INTERFACE | Interface (face & shaft) to IEC72 PRECISION (DIN 42955 Tolerance R) |
| ● S00 | SHAFT | See page 59 |
| ● K00 | KEYWAY | See page 59 |
| K99 | NO KEYWAY | Plain shaft |
| D01 | SHAFT END TAPPED | M12 x 20mm Deep tapped in drive shaft |
| H01 | HAND CRANK | Rear shaft to enable hand rotation of motor |
| MOTOR PROTECTION | | |
| ● P00 | IP44/65 PROTECTION | Enclosure protection IP44 at shaft. IP65 for remainder of motor. IP64/65 if shaft seal option W01 is fitted |
| W01 | SHAFT SEAL | Oil seal fitted at drive end/shaft interface |
| P99 | TROPICALISED | Special treatment on internal parts |
| BRAKES | | |
| B00 | 24V DC BRAKE | 18 Nm torque 24V DC supply |
| B01 | 90V DC BRAKE | 18 Nm torque 90V DC supply |
| L01 | RECTIFIER | 110V AC input 90V DC output for B01 Mounted inside terminal box (supplied loose for external mounting when motor MS Connectors are fitted) |
| FORCED VENTILATION | | |
| V00 | 220V BLOWER | 220 volt 50HZ single phase input |
| V01 | 110V BLOWER | 110 volt 50HZ single phase input |
| V99 | PREPARED FOR BLOWER | Motor prepared for blower but no blower fitted (covers are fitted over blower preparation) |

| NO. | REFERENCE | DESCRIPTION |
|--------------------------------|--|---|
| ELECTRICAL TERMINATIONS | | |
| ● C00 | TERMINAL BOX | With 1x M20 and 1 x M25 tapped holes |
| C01 | TERMINAL BOX | With 1 x PG16 and 1 x PG21 tapped holes |
| C02 | MS CONNECTORS (IP44) | Motor receptacle MS3102A-32-5P (2 pin) and Feedback receptacle MS3102A-14S-6P (6 pin) fitted to motor |
| C03 | MS PLUGS AND CABLE CLAMPS FOR C02 (IP44) | MS3106A-32-5S and MS3106A-14S-6S straight plugs and cable clamps 97-3057-1020-1 and 97-3057-1007-1 |
| C09 | FLYING LEADS OUT | 0.5 metre long radial exit (No terminal box) |
| C10 | MS CONNECTORS (IP65) | Motor receptacle MS 3102E-32-5P (2 pin) and feedback receptacle MS 3102E-14S-6P (6 pin) fitted to motor |
| C11 | MS PLUGS FOR C10 (IP65) | MS 3106E-32-5S and MS 3106-14S-6S straight plugs |
| TACHOGENERATORS | | |
| T07 | TACHOGENERATOR | 7V/1000 RPM |
| ● T95 | TACHOGENERATOR | 9.5V/1000 RPM |
| T19 | TACHOGENERATOR | 19.5V/1000 RPM |
| T30 | TACHOGENERATOR | 30V/1000 RPM |
| N99 | NO TACHOGENERATOR | No velocity feedback |
| ENCODERS | | |
| E01 | ENCODER | HEIDENHAIN ERN1120 Series - 250 PPR |
| E02 | ENCODER | HEIDENHAIN ERN1120 Series - 500 PPR |
| E03 | ENCODER | HEIDENHAIN ERN1120 Series - 1000 PPR |
| ENCODER FITTINGS | | |
| A01 | ENCODER ADAPTOR | for Heidenhain ROD 426, 436, 456, Litton G60 & Leine & Linde type 63 |
| A02 | ENCODER ADAPTOR | for Heidenhain ROD 420 & 450 |
| A03 | ENCODER ADAPTOR | for Muirhead H25E & Litton G70 |
| A04 | ENCODER ADAPTOR | for BEC 755 & SUMTAK model LHT |
| A05 | ENCODER ADAPTOR | for Tamagawa TS5300 series |
| A06 | ADAPTOR | for Size 11 resolver |
| A10 | SYNCHRO CLAMPS | for A01, A03 and A06 |
| G01 | ENCODER COVER (IP65) | Cast cover with 1 X M10 tapped hole, and cable gland for A04 only |
| G02 | ENCODER COVER (IP65) | Cast cover with 1 X PG7 tapped hole, and cable gland for A04 only |
| G03 | ENCODER COVER (IP44) | Cast cover with MS receptacle MS3102A-18-1P, for A04 only (IP44) |
| G07 | ENCODER COVER (IP65) | Cast cover with 2 x axial exit cable glands for A05 & A06 only |
| G15 | ENCODER COVER (IP65) | Cast cover with MS receptacle MS 3102E-18-1P for A04 only (IP65) |
| C05 | MS PLUG AND CABLE (IP44) CLAMP FOR G03 | Straight plug MS3106A-18-1S Cable clamp 97-3057-1010-1 |
| C27 | MS PLUG FOR G15 (IP65) | MS 3106E-18-1S (IP65) Straight plug |