Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 • E-mail: sales@modular.u-net.com • Facsimile: 01942 820431

MODULAR ROBOTIC SYSTEMS

Leaders by Design

Founded in 1987 Modular Robotic Systems is acknowledged as leader in the field of linear actuation and factory automation having represented Neff Antriebstechnik Automation GMBH of Germany for many years and offering a comprehensive range of services from individual products to turnkey systems.

Our philosophy is to provide a complete engineering service to our customers ranging from highly trained application engineers, who are experts in the specifying and use of our products, electrical engineers who can assist with the use of appropriate control equipment and design engineers who provide CAD drawings and calculation checks for customers schemes.

Our commitment to quality was recognised by the awarding of the ISO 9001:1994. This commitment runs throughout the company from the initial design phase through to manufacture and after sales support.

The company operates from a modern factory in Lancashire and utilises the latest in manufacturing methods to ensure both the high quality of its products and minimal lead times.

Our products:

Linear Rodless Actuators

High precision mechanical linear actuators driven by ball screws or belts.

Frameworks

Norcan framework and guarding systems.

Screws

Ball and trapezoidal nuts and screws.

Linear Rodded Actuators

High thrust units driven by ball or trapezoidal screws

Movac Benefits

Technical Support

Our technical department is there to assist you in actuator selection and advise on any aspect of their use or control.

High Performance

Repeatabilities of up to ±0.01mm and speeds of up to 10m/s meet the majority of operating requirements.

Reliable

Proven designs, based upon years of experience, together with features such as integrated bearings and centralised lubrication ensure a long service life.

Space Saving

There is no loss of stroke due to using bellows. Integration of bearings allows a compact cross sectional area to be maintained.

Easy Installation

Installation is simple using the mounting feet provided.

Modular Design

Allows multi-axis systems to be quickly designed and assembled.

After Sales Service

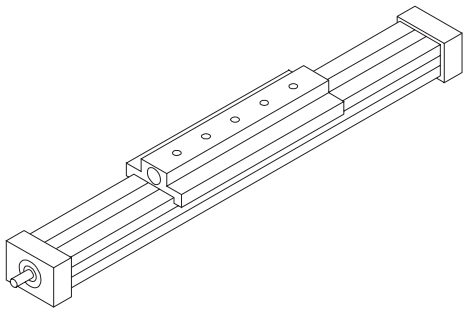
Our dedicated service department ensure that in the event of a breakdown, repairs are undertaken quickly to ensure minimal downtime.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 • E-mail: sales@modular.u-net.com • Facsimile: 01942 820431

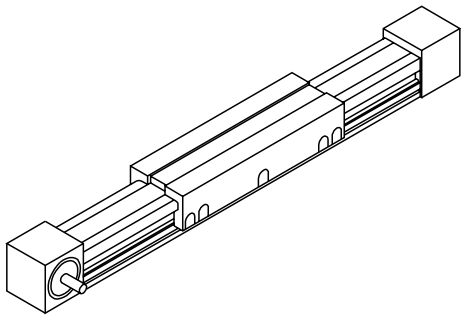
MODULAR ROBOTIC SYSTEMS

Contents

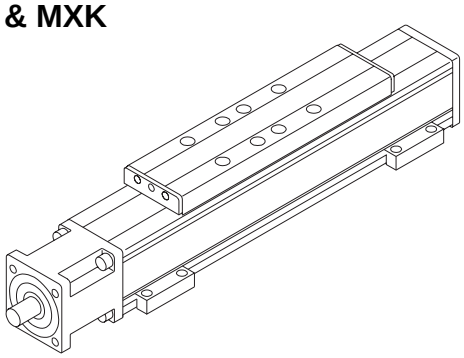
MSK



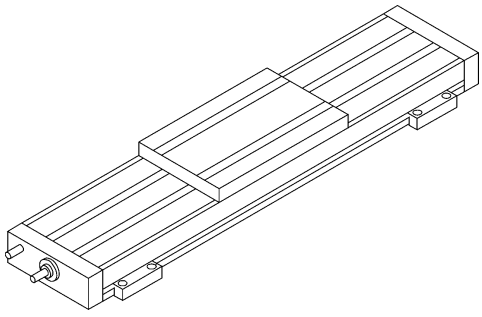
MRB



MDK & MXK



MTK



Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

INTRODUCTION

Introduction

This catalogue has been designed to assist in the selection, sizing and application of Movac® actuators.

What is a Movac® ?

Movacs® are a range of modular cylinders that combine the functions of guidance and positioning in one neat package. Inside the anodised aluminium cylinder there is either a belt or screw drive which is connected to a carriage to provide a controllable thrust.

A compatible range of accessories allows multi-axis systems to be built quickly and economically.

Why use a Movac® ?

The Movac® contains all the mechanical elements of a guidance and positioning system. Instead of designing and sourcing a drive, bearings, protection and devising a means of transferring the power from the drive to the load everything is available in one tried and tested package.

A complementary range of accessories allows system designers to obtain all components from a single source.

Where are Movacs® used ?

Although Movacs® are used in wide variety of applications across a broad range of industries their use is generally characterised by one of the following.

Where a fast, controllable feed is required

- Drive and guidance modules for feed mechanisms
- Transfer devices and mechanisms
- Drive units for X-Y tables

Where exact positioning and repeatability are needed

- Positioning stops on presses
- Machine tool drives
- Manipulators

Where two or three axes of movement is required

- Guillotines
- Gluing machines
- Welding Rigs
- Profile and contouring machines
- Pick and place machines

Actuator Selection

Actuators in the Movac® range fall into two main categories; screw and belt driven.

The tables on the following pages will help you decide which is the most appropriate unit for your application or, alternatively, our engineers would be pleased to assist you.

Actuators are available with four main drive options and are described by a three letter code:

M - Movac®

X - Drive Method
K - Screw drive
B - Belt drive

X - Guidance system
S - Synthetic bearings
D - Two sets of twin rails with recirculating bearings inside the profile
X - No bearings , intended for use only with external bearings
R - Roller bearing guidance
T - Table systems with high load bearing rails for heavy duty use.

Ball Screw with Double nut (K-MM)

Used for high repeatability (up to +/- .01mm). This unit has zero backlash and is suitable for the most arduous of duty cycles. The efficiency of the drive is 90% and the rotational speed can be up to 3000 RPM.

Ball Screw Single nut (K-M)

Similar to the double nut but has a small amount of backlash.

Trapezoidal Screw and nut (T-M)

Incorporates a plastic or bronze nut. Has a repeatability of +/- 0.2mm but efficiency is relatively low (0.6-0.3) but can, dependent on the application, be self locking. Can be subject to wear and should therefore be used on less demanding applications. Rotational speed is limited to 1500 RPM.

Belt drive (B)

Incorporates a steel braided belt and pulleys which allows high speeds of up to 10 m/s at a more economical price than ball screws. Repeatability is up to +/- 0.05mm however belts are not generally suitable for high thrust or contouring applications requiring a high accuracy of movement. Motors may need a gearbox.

FREQUENTLY ASKED QUESTIONS

SECTION 1.2

Degree of protection

Movacs are sealed to IP 44 i.e. splash and dust proof. Where conditions could include very fine dust particles or water spray we recommend the fitting of bellows.

Temperature range

Movacs are designed to operate in ambient temperatures of 0°C up to 80°C.

Internal Screw Supports (IS)

These are internally fitted devices which eliminate whipping of the screw that occurs at the critical speed of the screw. The number of IS required can be found from the graph on each product page where they are not fitted as standard.
The length of the Movac will be increased by the length shown.

External Support (ES)

Where applicable the correct number can be found from the graph on each product page. The number necessary is a function of load and length.

End Dampers (ED)

Internal buffers can be fitted to screw driven actuators to provide limited protection in a crash situation. The length of the Movac will be increased by the distance designated as LED.

Mounting tolerances

Movacs should be aligned along their length with an accuracy of ± 0.1/1000mm.

Maintenance and lubrication

The units must be lubricated every 400 operating hours and at least every three months. The original lubricant is Shell Alvania R2 or Reiner Urethyn E/M2.
The sealing strip and external guides (dependent on model) should be re-lubricated at the same intervals with a light engineering oil.

Spares and service

There are no user serviceable parts. In the event of a break-down please contact our service department. Spare parts are generally available from stock.

Stroke limitation

This is marked by an adhesive tape. Over running these marks can cause damage and nullifies the warranty.

Design factors

The designer should ensure that the stroke length used takes into account any acceleration, de-acceleration or overrun distances required.

Drive information

Repeatability and accuracy

Ball screw accuracy -	+/- 0.05/300mm
Repeatability -	+/- 0.01mm (max)
Trapezoidal screw accuracy -	+/- 0.05/300mm
Repeatability -	+/- 0.2mm
Belt drive Repeatability -	+/- 0.05mm

Beam flexing

The maximum deflection of the actuator can be found from the formula

$$d = \frac{FxL^3 \times 10^{-5}}{192xExI}$$

Where:

d = deflection (mm)
F = total load (N)
E = 70 000 (N/mm^2)
I = moment of inertia (cm^4)
L= length between supports (mm)

The value of I is shown on each data sheet and the formula is valid where the unit is firmly fixed at each end.

Inherent torque

The figures given are empirical and will be the maximum seen at the stated RPM.

Mounting attitude

Movacs can be mounted with the carriage in any position provided the forces and moments acting on it fall within the maximum values specified.

Vertically mounted units

It is advisable to use a brake in all vertical applications as a screw will not, generally, be self locking. Belt drives have no protection against belt failure.

Life

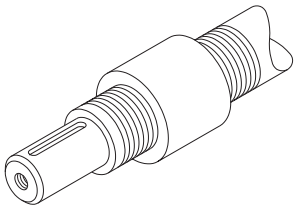
Because of the many factors which affect this we are unable to publish specific data. Our design department would be pleased to advise on the life for any particular application.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

SECTION 1.3

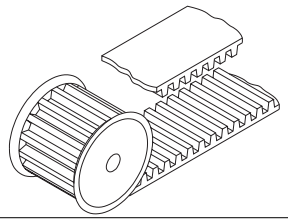
MOVAC SELECTION GUIDE

Screw Drive



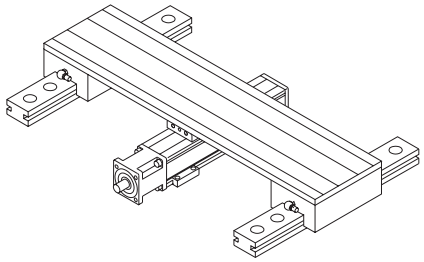
Repeatability to +/- 0.01mm
Speeds to 2.5m/s
Thrust to 12000N

Belt Drive

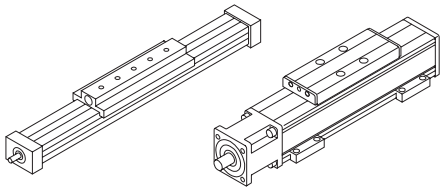


Repeatability to +/- 0.05mm
Speeds to 10m/s
Thrust to 5000N

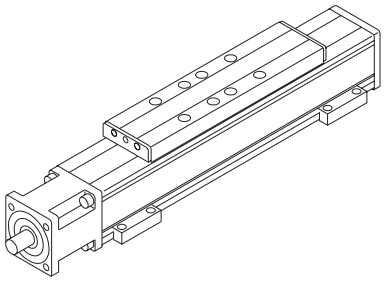
Light Loads or External Guides



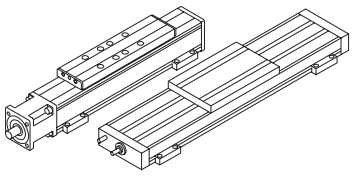
MSK and MXK



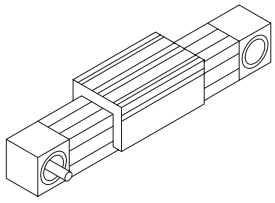
Integrated Bearings



MDK and MTK



MRB and MLB



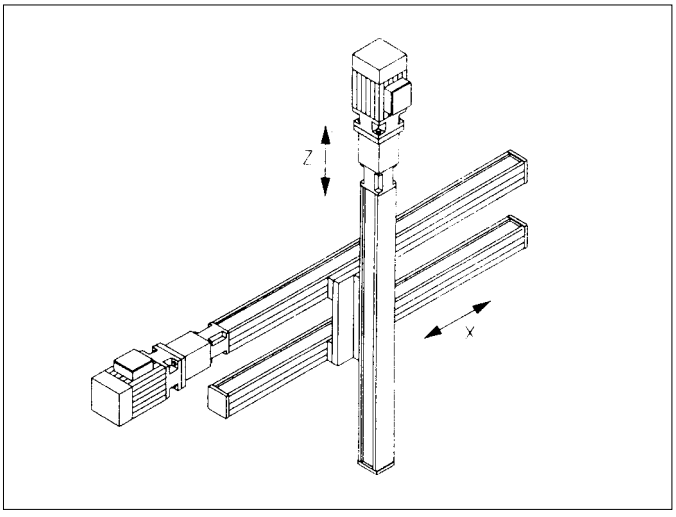
Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

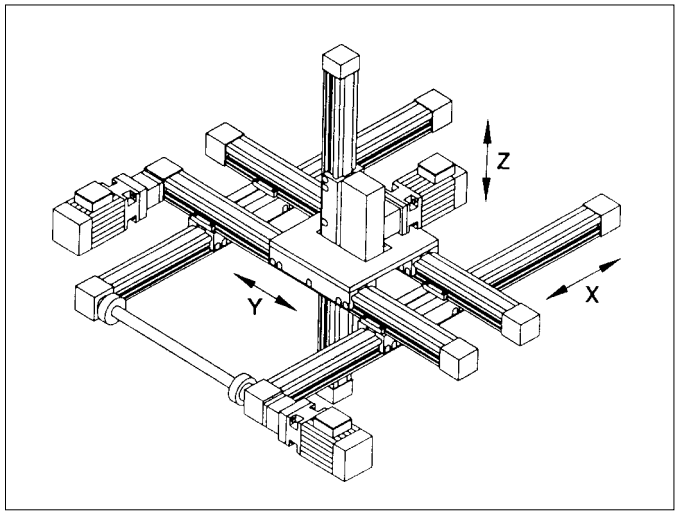
Belt Drive Models

Model	Size (mm)	Drive/ Pitch	Feed Force Fx (N)	Repeatablity (mm)	Speed (m/s)	Load Fz (N)	Fy (N)	Mx (Nm)	My (Nm)	Mz (Nm)
MRB-50	50x50	Belt/120	650	±0.05	6.5	700	400	15	80	50
MRB-80	80x80	Belt/200	2700	±0.05	10.0	2100	800	75	230	100
MRB-120	120x120	Belt/260	5000	±0.05	10.0	9000	4900	500	930	500
MRB-50Z	50x50	Belt/120	650	±0.05	6.5	N/A	400	15	80	50
MRB-80Z	80x80	Belt/200	1500	±0.05	10.0	N/A	800	75	230	100
MLB - 80	80x80	Belt/120	400	±0.2	5.0	1200	600	30	175	220

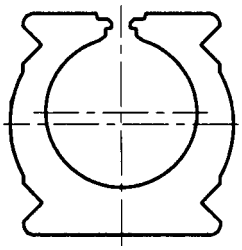
Screw Drive Models

Model	Size (mm)	Drive/ Pitch	Feed Force Fx (N)	Repeatablity (mm)	Speed (m/s)	Load Fz (N)	Fy (N)	Mx (Nm)	My (Nm)	Mz (Nm)
MSK - 50	50x50	Screw Ø 12	200	±0.05	0.25	250	200	6	15	10
MSK - 80	80x80	Screw Ø 20	2500	±0.05	1.0	650	500	30	70	50
MDK - 60	60x60	Screw Ø 20	4000	±0.01	2.5	2000	2000	100	200	200
MDK - 80	80x80	Screw Ø 25	5000	±0.01	2.5	3000	3000	350	300	300
MDK - 120	120x120	Screw Ø 32	12000	±0.01	2.0	6000	6000	500	600	600
MXK - 60	60x60	Screw Ø 20	4000	±0.01	2.5	-	-	-	-	-
MXK - 80	80x80	Screw Ø 25	5000	±0.01	2.5	-	-	-	-	-
MXK - 120	120x120	Screw Ø 32	12000	±0.01	2.0	-	-	-	-	-
MTK - 180	180x74	Screw Ø 20	4000	±0.05	2.5	12000	2600	660	980	1540
MTK - 240	240x78	Screw Ø 20	4000	±0.05	2.5	18000	4200	1050	1200	2000
MLK - 80	80x80	Screw Ø 20	4000	±0.05	1	1200	600	30	175	220





MOVAC MSK MODELS



Description

Movac MSK Models consist of an anodised aluminium profile with either a ball screw or trapezoidal drive. External, adjustable, synthetic gib strips provide guidance and support for the load. With large loads and moments they can be used with external linear guides.

- Precision ball screw with double nuts, single nut or trapezoidal screw
- External synthetic gib strip guidance
- Optional screw supports (IS) to prevent whirling of the shaft allow speeds up to 3000 rpm

Accessories

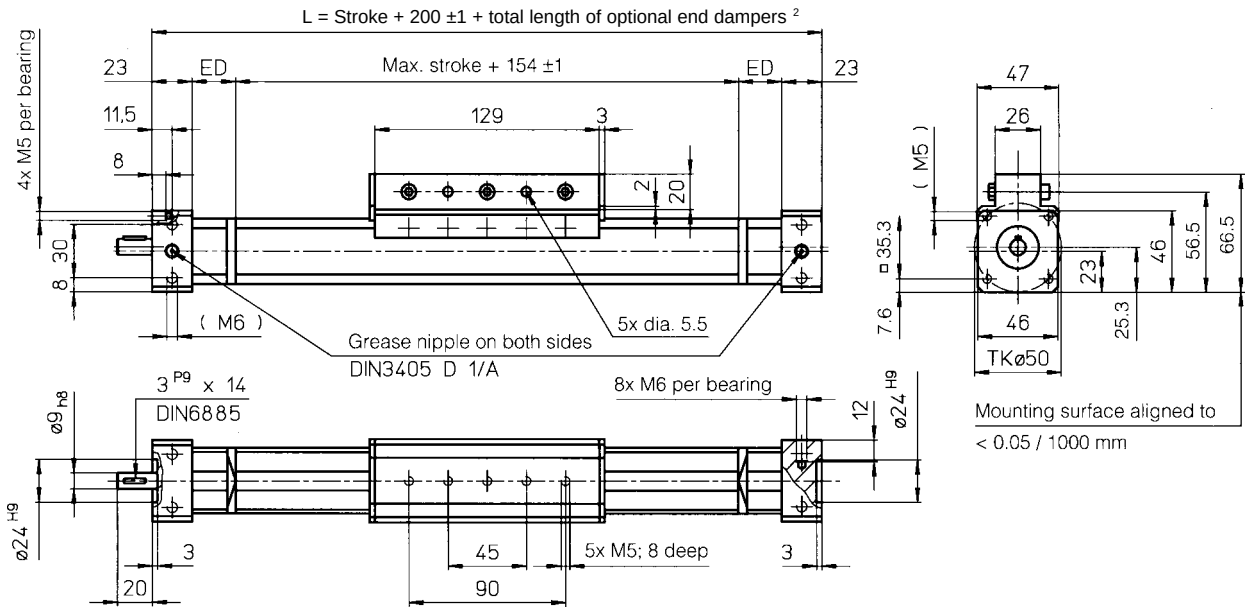
- Additional carriage
- Lower carriage
- Mounting feet
- Bevel gear box drive
- Right angled belt drive
- Parallel belt drive
- Limit switches

Order Code

M S K						
Model	Size	Drive Ref	Nut type	Pitch	Stroke	Overall length

I S	E S	E D
Number of internal supports	Number of external supports	Optional end dampers (either 0 or 2)

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431



[2] Optional end dampers (ED) add 30mm to the overall length.

Technical Data

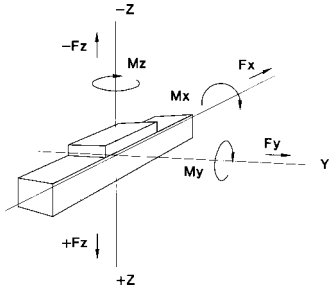
Linear Speed	max 0.25m/s	Base weight	2.0 Kg
Acceleration	max 5m/s^2	100mm stroke	0.2 Kg
Stroke Length	max 1000 mm	Carriage	0.2 Kg
Inertia Ix =	9.76cm^4	Screw Diameter	12mm
Inertia Iy =	9.26cm^4		

IS - Internal Supports

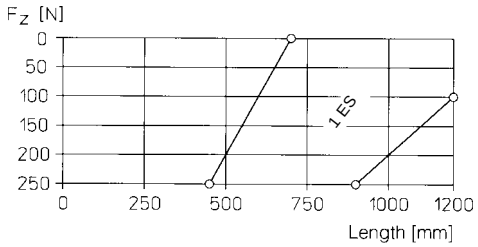
Not available on this model

Loads and moments

Load (Max)	Force (N)
Fx	200
Fy	200
+/- Fz	250
Moments (Max)	Nm
Mx	6
My	15
Mz	10



ES - External Support Diagram



Drive Options

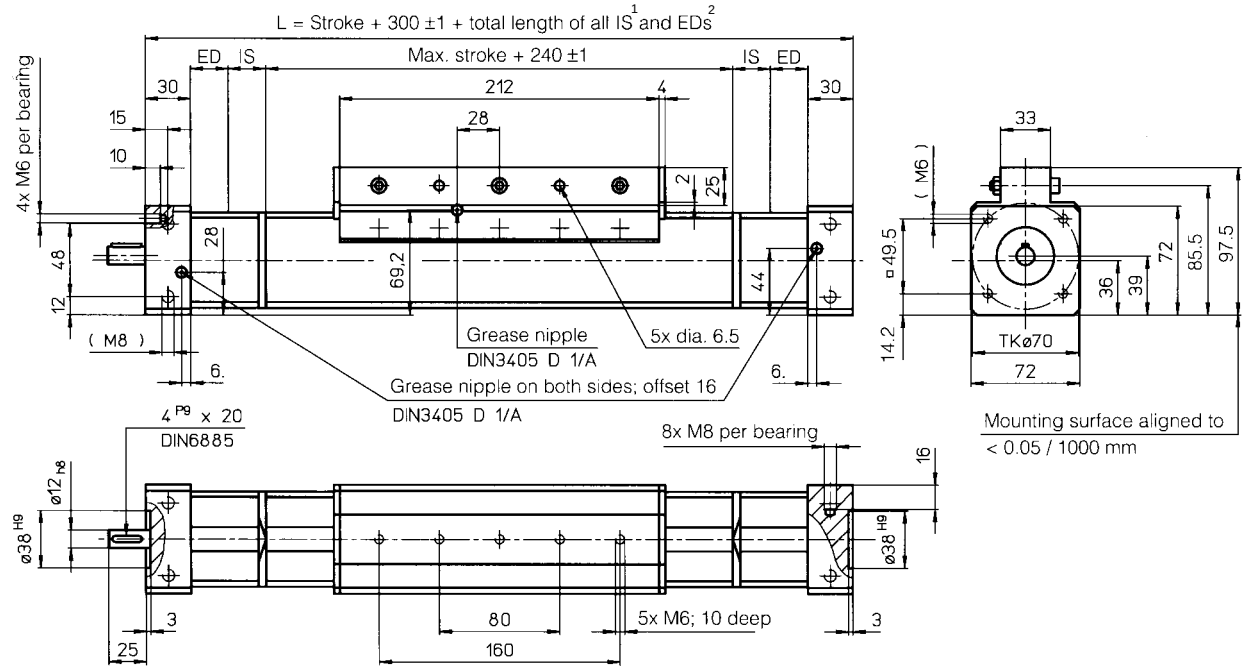
Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	M	5	0.25	3000	±.05	0.1
Ball screw	K	M	4	0.20	3000	±.05	0.1
Trapezoidal	T	M	4	0.10	1500	±.2	0.2
Trapezoidal	T	M	8	0.20	1500	±.2	0.2
Trapezoidal	T	M	12	0.30	1500	±.2	0.2

Inherent Torque

Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - M - 4	0.20	0.35	0.50
K - M - 5	0.25	0.40	0.55
T - M - 4	0.25	0.40	-
T - M - 8	0.30	0.45	-
T - M - 12	0.30	0.50	-

MOVAC MSK 80

WITH SCREW DRIVE AND SYNTHETIC BEARINGS



[1] See IS - Internal Supports

[2] Optional end dampers (ED) add 70mm to the overall length

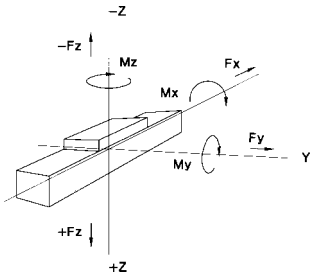
Technical Data

Linear Speed	max 1m/s	Base weight	3.6 Kg
Acceleration	max 5m/s^2	100mm stroke	0.70 Kg
Stroke Length	max 5200 mm	Carriage	0.60 Kg
Inertia Ix =	65cm^4	Screw Diameter	20mm
Inertia Iy =	60cm^4		

Loads and moments

Load (Max)	Force (N)
Fx	2500/1500*
Fy	500
+/- Fz	650
Moments (Max)	Nm
Mx	30
My	70
Mz	50

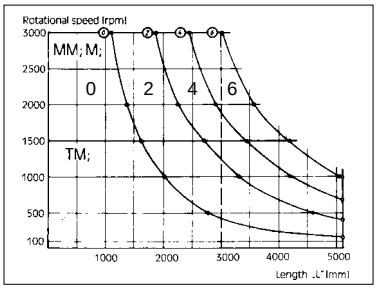
* 1500 N for TM, M and MM20



Drive Options

Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	M	5	0.25	3000	±.05	0.1
Ball screw	K	M	20	1.00	3000	±.05	0.2
Ball screw	K	MM	5	0.25	3000	±.05	0
Ball screw	K	MM	20	1.00	3000	±.05	0
Trapezoidal	T	M	4	0.10	1500	±.2	0.2
Trapezoidal	T	M	8	0.20	1500	±.2	0.2
Trapezoidal	T	M	16	0.40	1500	±.2	0.2
Trapezoidal	T	M	20	0.50	1500	±.2	0.2

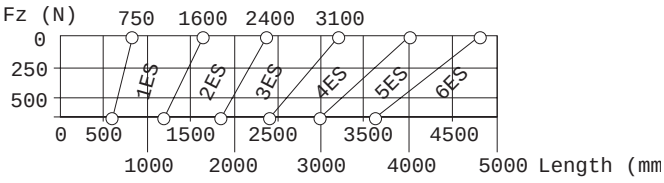
IS - Internal Supports



Additional length (1) due to IS

No.	IS(mm)
2 IS	0
4 IS	30
6 IS	60

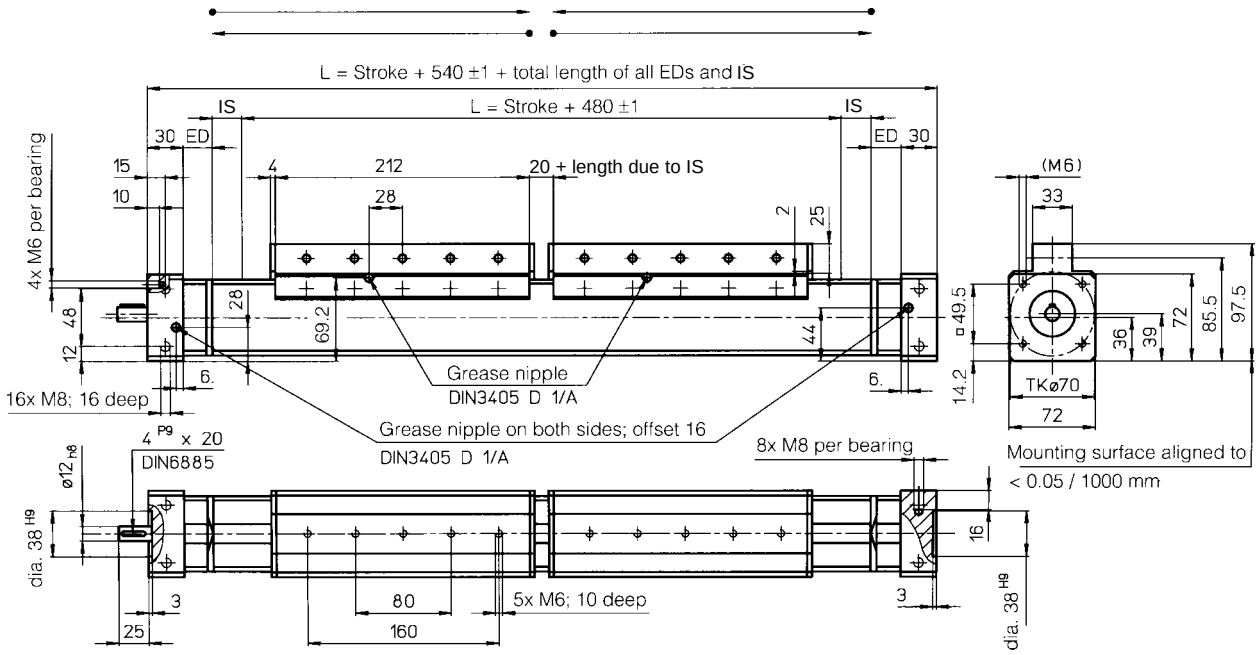
ES - External Support



Inherent Torque

Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - M - 5	0.5	1.0	1.5
K - M - 20	0.7	1.4	1.8
K - MM - 5	0.8	1.3	1.8
K - MM - 20	1.0	1.5	2.0
T - M - 4	0.5	0.7	-
T - M - 8	0.6	1.0	-
T - M - 16	0.8	1.0	-
T - M - 20	0.9	1.1	-

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431



Technical Data

This unit drives both carriages in opposite directions. Technical details are the same as the standard MSK 80.

Drive Options

Trapezoidal

T - M - 4 with 4mm of movement for each carriage

T - M - 8 with 8mm of movement for each carriage

T - M - 16 with 16mm of movement for each carriage

Ball screw

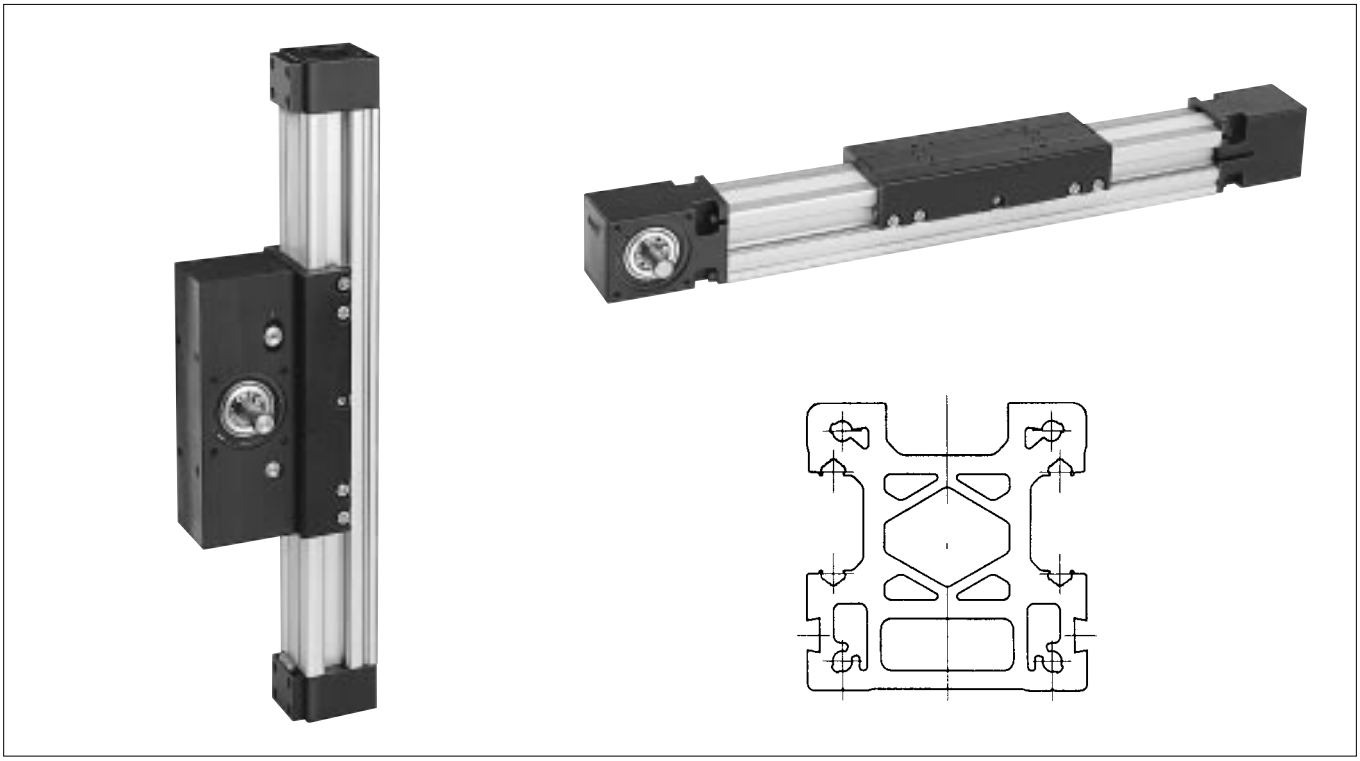
K - M - 5 or K - MM - 5 with 5mm of movement for each carriage.

Note: End dampers do not provide protection in the centre of the unit and the length for the IS will be double the figures for the standard MSK 80.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MRB MODELS

SPEED® LINE



Description

The MRB range consists of an anodised cylinder with integrated precision belt drive.

The unique roller bearing arrangement allows high loads and moments to be carried with high precision.

- High precision steel braided drive belt
- Pre-loaded roller bearing guidance
- The belt acts as a sealing strip
- Simple maintenance
- Specialised low inertia 'Z' axis models available where the carriage and motor remain stationary (MRB 50Z and MRB 80Z)

Accessories

- Additional mounting feet
- Cross coupling shaft
- Limit switches
- Long carriages

Order Code

M R B					
Model	Size	Pitch	Stroke	Overall length	

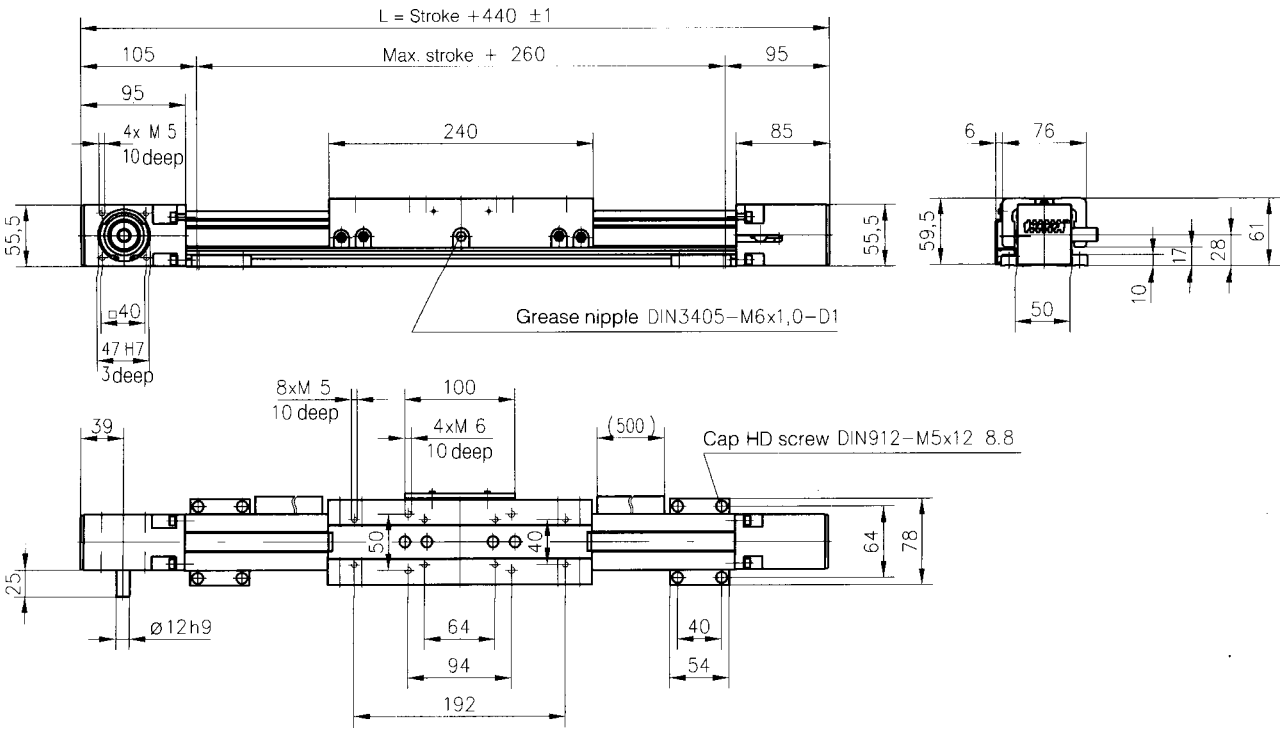
		M F	S	
Number of mounting feet			Shaft configuration	

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MRB-50

WITH BELT DRIVE AND ROLLER BEARING GUIDE

SECTION 3.1



Technical Data

Linear Speed	max 6.5m/s	Base weight	3.5 Kg
Acceleration	max 40m/s^2	100mm stroke	0.44 Kg
Stroke Length	max 3000 mm	Carriage	0.90 Kg
Inertia Ix =	33cm^4		
Inertia Iy =	26cm^4		

Drive Data

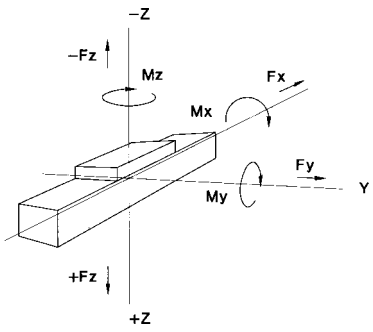
Type:	Steel braided belt - 16 wide
Stroke/Rev:	120mm
Pulley Dia:	38.20mm
Repeatability:	+/- 0.05mm

MF - Mounting Feet

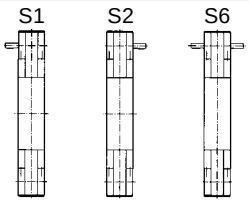
Clamp feet mounted anywhere on the actuator profile, four supplied as standard. Additional feet are required at intevals of 750mm for strokes over 1000mm

Loads and moments

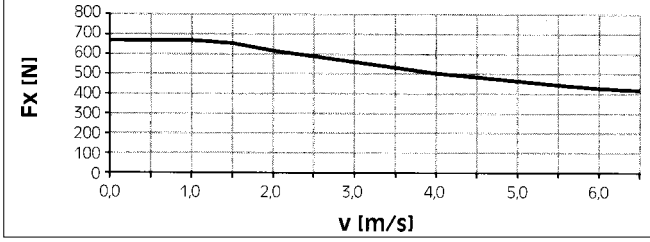
Load (Max)	Force (N)
Fx	650 max
Fy	400
+/- Fz	700
Moments (Max)	Nm
Mx	15
My	80
Mz	50



Drive Shaft Options



Fx - Speed dependant



Inherent Torque

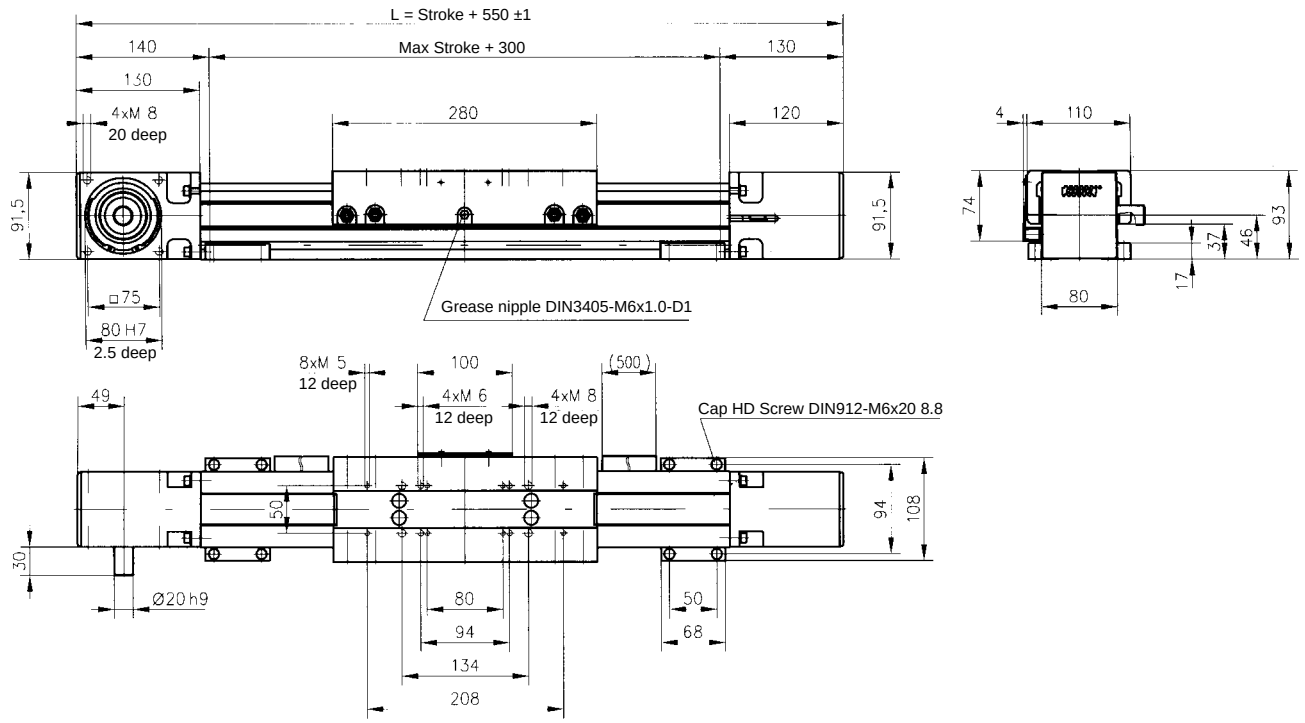
150 RPM: 1.7Nm 1500 RPM: 2.4Nm 3250 RPM: 3.8Nm

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

SECTION 3.2

MOVAC MRB-80

WITH BELT DRIVE AND ROLLER BEARING GUIDE



Technical Data

Linear Speed	max 10m/s	Base weight	8.63 Kg
Acceleration	max 40m/s^2	100mm stroke	0.93 Kg
Stroke Length	max 11000 mm	Carriage	2.75 Kg
Inertia Ix =	193cm^4		
Inertia Iy =	180cm^4		

Drive Data

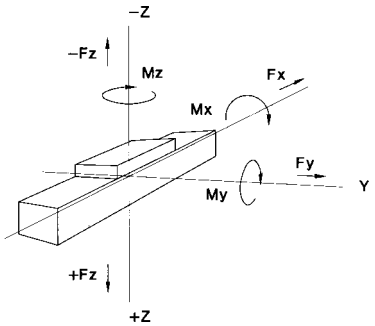
Type:	Steel braided belt - 32 wide
Stroke/Rev:	200mm
Pulley Dia:	63.66mm
Repeatability:	+/- 0.05mm

MF - Mounting Feet

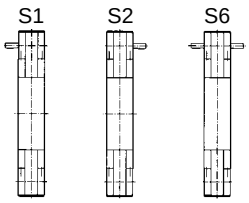
Clamp feet mounted anywhere on the actuator profile, four supplied as standard. Additional feet are required at intervals of 750mm for strokes over 1000mm.

Loads and moments

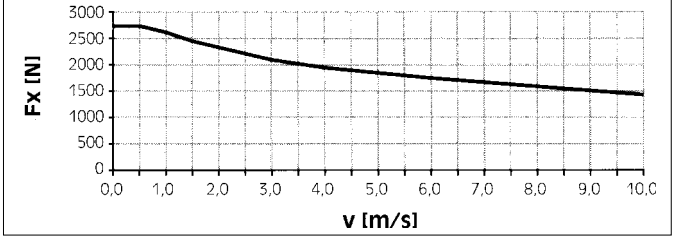
Load (Max)	Force (N)
Fx	2700 max
Fy	800
+/- Fz	2100
Moments (Max)	Nm
Mx	75
My	230
Mz	100



Drive Shaft Options



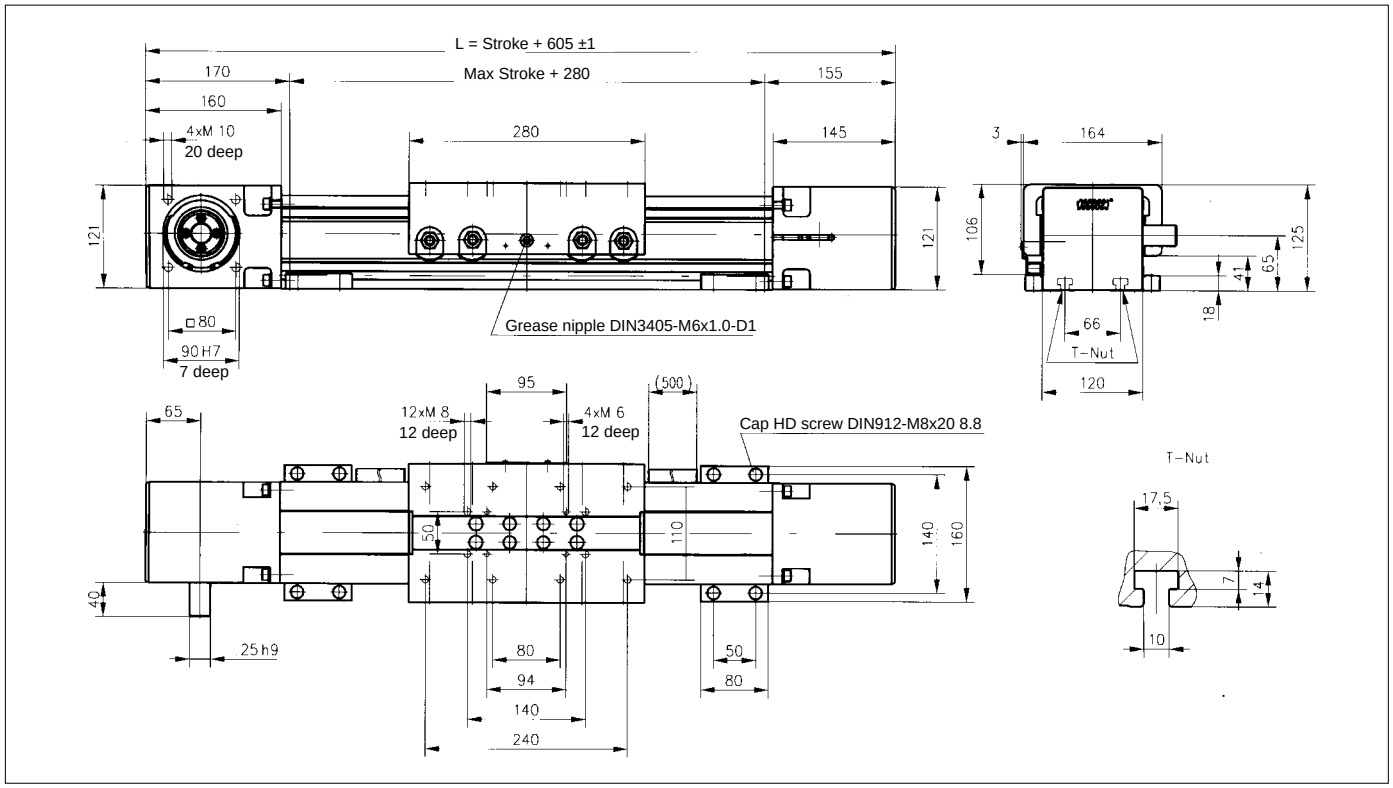
Fx - Speed dependant



Inherent Torque

150 RPM: 2.4Nm 1500 RPM: 3.5Nm 3000 RPM: 5.0Nm

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

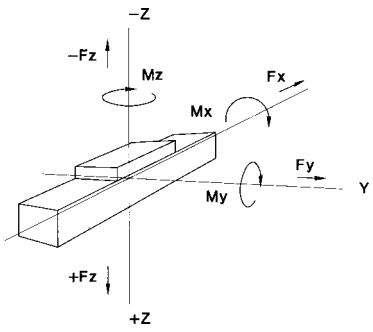


Technical Data

Linear Speed	max 10m/s	Base weight	17.00 Kg
Acceleration	max 40m/s^2	100mm stroke	1.64 Kg
Stroke Length	max 11000 mm	Carriage	5.50 Kg
Inertia Ix =	669cm^4		
Inertia Iy =	688cm^4		

Loads and moments

Load (Max)	Force (N)
Fx	4900 max
Fy	9000
+/- Fz	9300
Moments (Max)	Nm
Mx	500
My	930
Mz	500



Inherent Torque

150 RPM: 4.8Nm 1500 RPM: 7Nm 3000 RPM: 10Nm

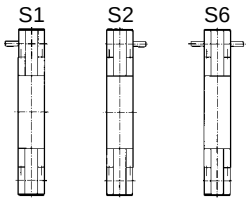
Drive Data

Type: Steel braided belt - 50 wide
Stroke/Rev: 260mm
Pulley Dia: 82.76mm
Repeatability: +/- 0.05mm

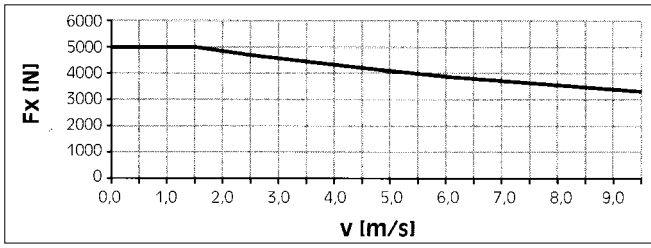
MF - Mounting Feet

Clamp feet mounted anywhere on the actuator profile, four supplied as standard. Additional feet are required at intervals of 750mm for strokes over 1000mm.

Drive Shaft Options



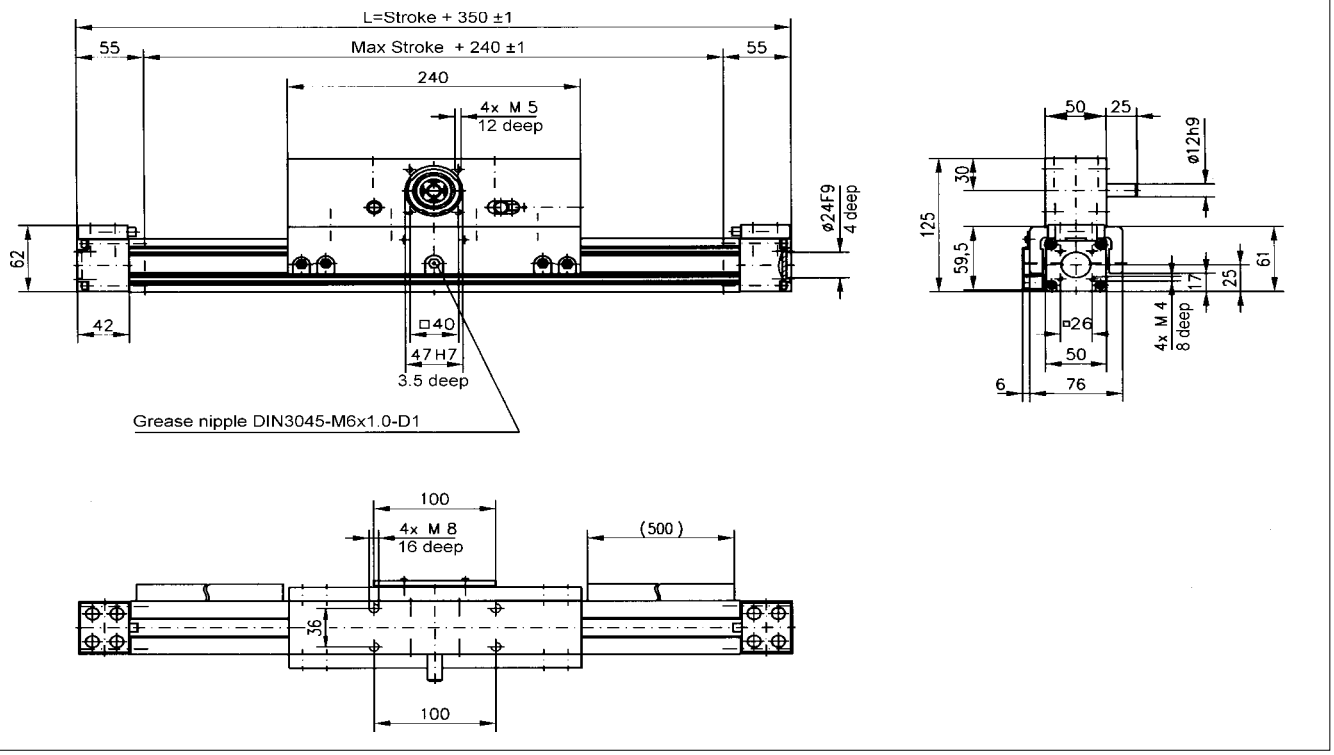
Fx - Speed dependant



SECTION 3.4

MOVAC MRB-50 Z

WITH BELT DRIVE AND ROLLER BEARING GUIDE



Technical Data

Linear Speed	max 6.5m/s	Base weight	4.50 Kg
Acceleration	max 40m/s^2	100mm stroke	0.42Kg
Stroke Length	max 1500 mm	Carriage	2.90 Kg
Inertia Ix =	33cm^4		
Inertia Iy =	26cm^4		

Drive Data

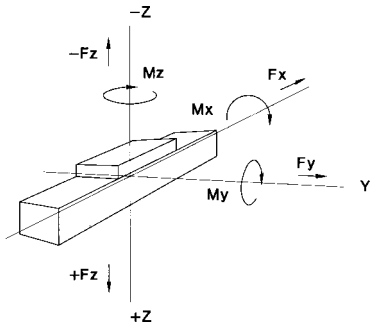
Type:	Steel braided belt - 16 wide
Stroke/Rev:	120mm
Pulley Dia:	38.20mm
Repeatability:	+/- 0.05mm

MF - Mounting Feet

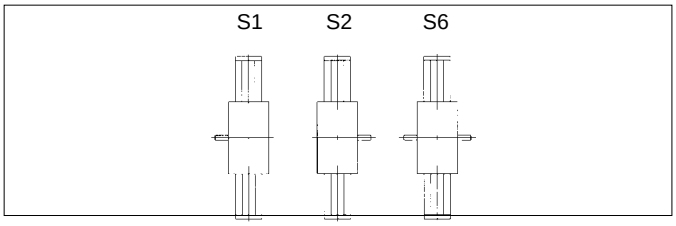
This unit is designed for mounting using the carriage.

Loads and moments

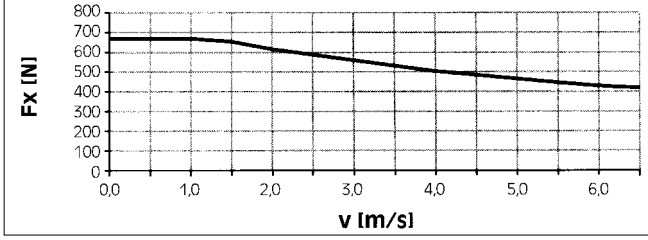
Load (Max)	Force (N)
Fx	650 max
Fy	400
+/- Fz	N/A
Moments (Max)	Nm
Mx	15
My	80
Mz	50



Drive Shaft Options



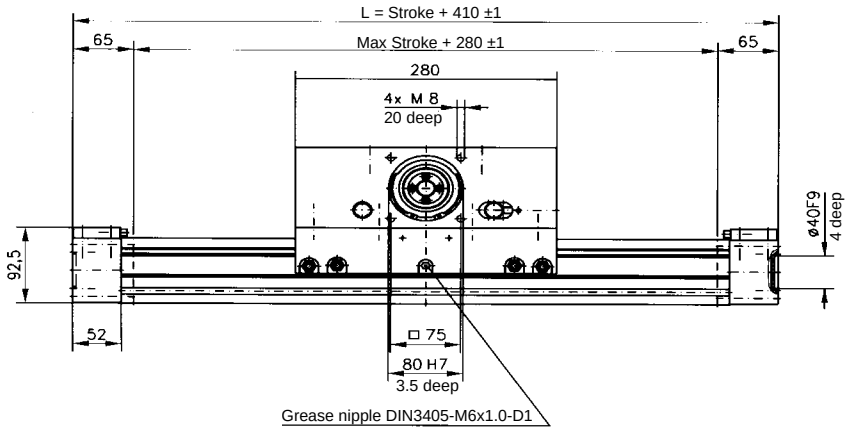
Fx - Speed dependant

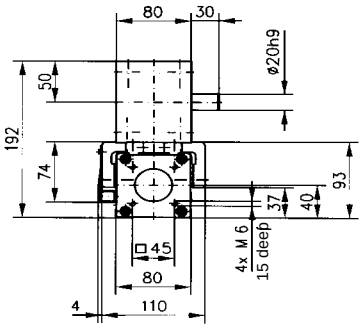


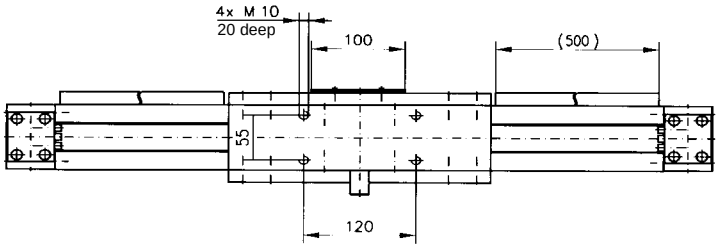
Inherent Torque

150 RPM: 1.7Nm 1500 RPM: 2.4Nm 3000 RPM: 3.8Nm

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431







Technical Data

Linear Speed	max 10m/s	Base weight	11.20 Kg
Acceleration	max 40m/s^2	100mm stroke	0.91 Kg
Stroke Length	max 3000 mm	Carriage	6.65 Kg
Inertia Ix =	193cm^4		
Inertia Iy =	180cm^4		

Drive Data

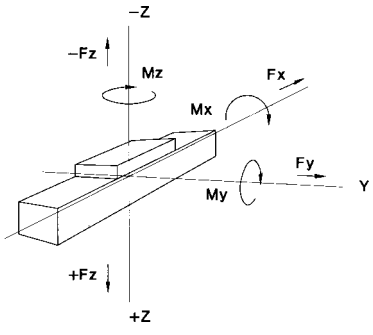
Type:	Steel braided belt - 32 wide
Stroke/Rev:	200mm
Pulley Dia:	63.66mm
Repeatability:	+/- 0.05mm

MF - Mounting Feet

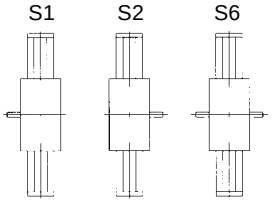
This unit is designed for mounting using the carriage.

Loads and moments

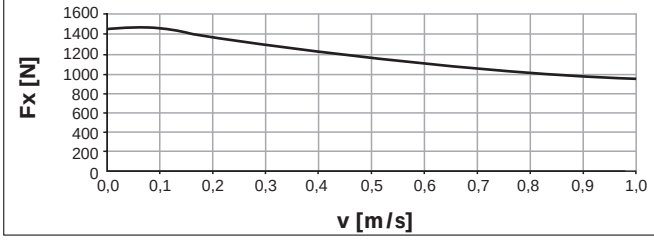
Load (Max)	Force (N)
Fx	1500 max
Fy	800
+/- Fz	N/A
Moments (Max)	Nm
Mx	75
My	230
Mz	100



Drive Shaft Options



Fx - Speed dependant



Inherent Torque

150 RPM: 2.4Nm 1500 RPM: 3.5Nm 3000 RPM: 5.0Nm

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MXK AND MDK

DYNA®LINE AND POWER®LINE

Description

The MXK and MDK range consist of an anodised aluminium cylinder with an integrated ball screw drive.

MXK models are designed to provide feed forces only and have internal synthetic bearings. They are designed for use with external bearing rails.

MDK Models are designed to handle large load and moments and incorporate recirculating bearings mounted internally on either side of the profile.

- High precision preloaded ball screw with zero backlash
- Recirculating ball bearing guidance (MDK only) on both sides of the actuator
- Self adjusting sealing strip
- Screw supports fitted as standard allow speeds of 3000 RPM even on long stroke models
- Centralised lubrication point for the bearings and nuts

Accessories

- Additional carriage
- Additional mounting feet
- Bevel gear box drive
- Right angled belt drive
- Limit switches
- Long carriage

Order Code

M		K				M	M											M	F
Model			Size			Nut		Pitch		Stroke					Overall length				Number of mounting feet

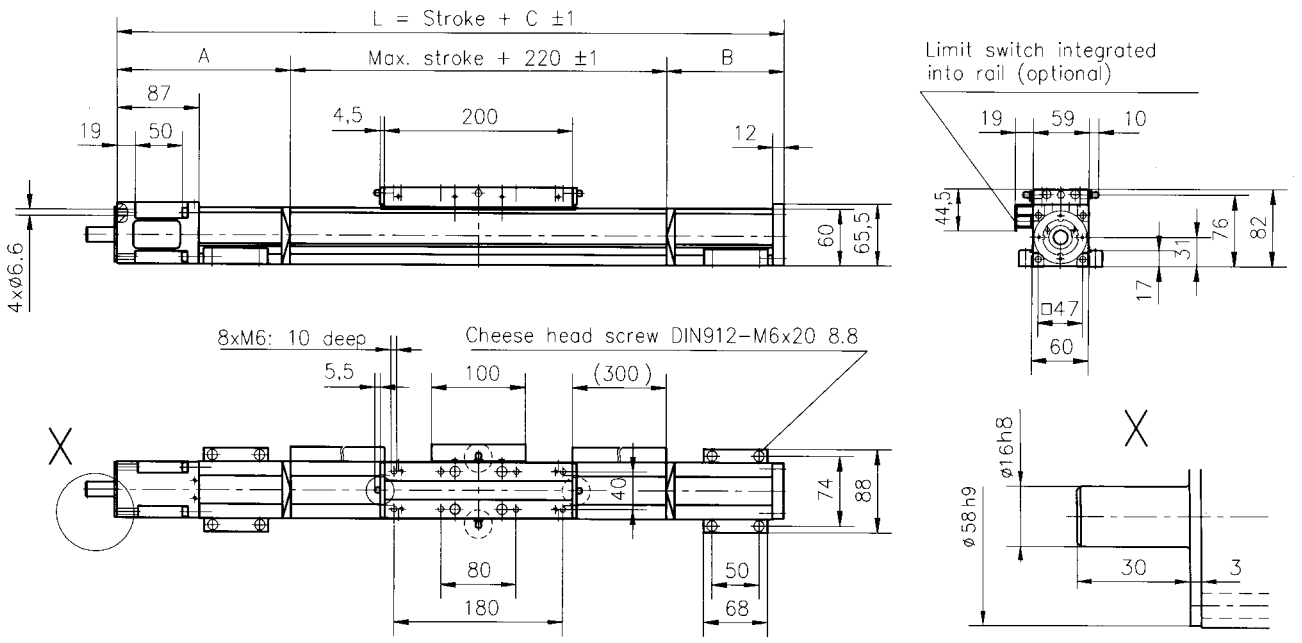
Important: MXK models may only be used with external linear guides.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MODEL MXK 60

WITH BALL SCREW AND NO GUIDANCE

SECTION 4.1



◯ Tapered lubricating nipple to DIN 71 412 AM6 on fixed– bearing side as standard feature.

◌ Can be changed over to one of the three alternative lubricating points by the customer.

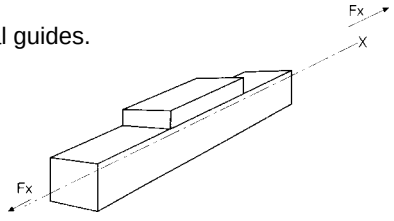
Technical Data

Linear Speed	max 2.5m/s	Base weight	4.72 Kg
Acceleration	max 20m/s^2	100mm stroke	0.63 Kg
Stroke Length	max 11000 mm*	Carriage	1.42 Kg
Inertia Ix =	58cm^4	Ball screw Diameter	20mm
Inertia Iy =	59cm^4		

* 50mm pitch up to 5000mm only

Loads and moments

Fx: 4000 N.
Must be used with external guides.



IS - Internal Support

Supplied as standard

Additional lengths as a function of the stroke

Stroke Length (mm)	A(mm)	B(mm)	No of SA	C(mm)
0 - 690	130	80	0	430
691 - 1415	155	105	2	480
1416 - 2155	175	125	4	520
2156 - 2885	200	150	6	570
2886 - 3625	220	170	8	610
3626 - 4355	245	195	10	660
4356 - 5096	265	215	12	700

MF - Mounting Feet

Clamp feet mounted anywhere on the actuator profile, four supplied as standard. One pair required for each 750mm of stroke over 1000mm.

Drive Options

Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	MM	5	0.25	3000	±0.01	0
Ball screw	K	MM	20	1.00	3000	±0.01	0
Ball screw	K	MM	50	2.50	3000	±0.01	0

Inherent Torque

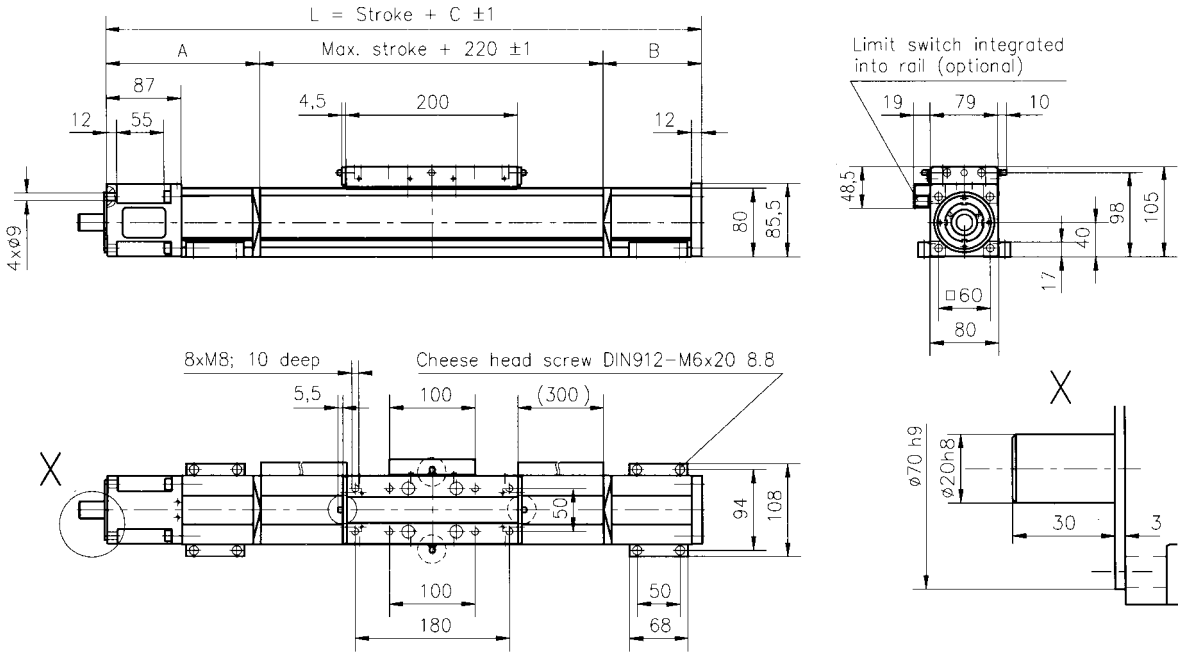
Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - MM - 5	0.6	1.1	1.5
K - MM - 10	0.7	1.2	1.7
K - MM - 50	0.8	1.3	1.9

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

SECTION 4.2

MOVAC MODEL MXK 80

WITH BALL SCREW AND NO GUIDANCE



◯ Tapered lubricating nipple to DiN 71 412 AM6 on fixed- bearing side as standard feature.
◌ Can be changed over to one of the three alternative lubricating points by the customer.

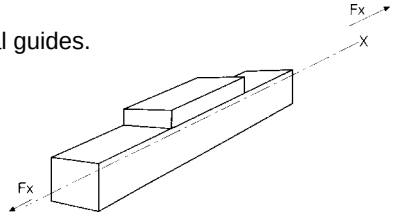
Technical Data

Linear Speed	max 2.5m/s	Base weight	7.95 Kg
Acceleration	max 20m/s^2	100mm stroke	0.99 Kg
Stroke Length	max 11000 mm*	Carriage	2.25 Kg
Inertia Ix =	190cm^4	Ball screw Diameter	25mm
Inertia Iy =	190cm^4		

* 50mm pitch up to 5000mm only

Loads and moments

Fx: 5000 N.
Must be used with external guides.



IS - Internal Support

Supplied as standard

Additional lengths as a function of the stroke

Stroke Length (mm)	A(mm)	B(mm)	No of SA	C(mm)
0 - 775	125	50	0	395
776 - 1670	145	95	2	460
1671 - 2505	170	115	4	505
2506 - 3340	190	140	6	550
3341 - 4175	210	160	8	590
4176 - 5015	235	180	10	635

MF - Mounting Feet

Clamp feet mounted anywhere on the actuator profile, four supplied as standard. One pair required for each 750mm of stroke over 1000mm.

Drive Options

Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	MM	5	0.25	3000	±0.01	0
Ball screw	K	MM	10	0.50	3000	±0.01	0
Ball screw	K	MM	20	1.00	3000	±0.01	0
Ball screw	K	MM	50	2.50	3000	±0.01	0

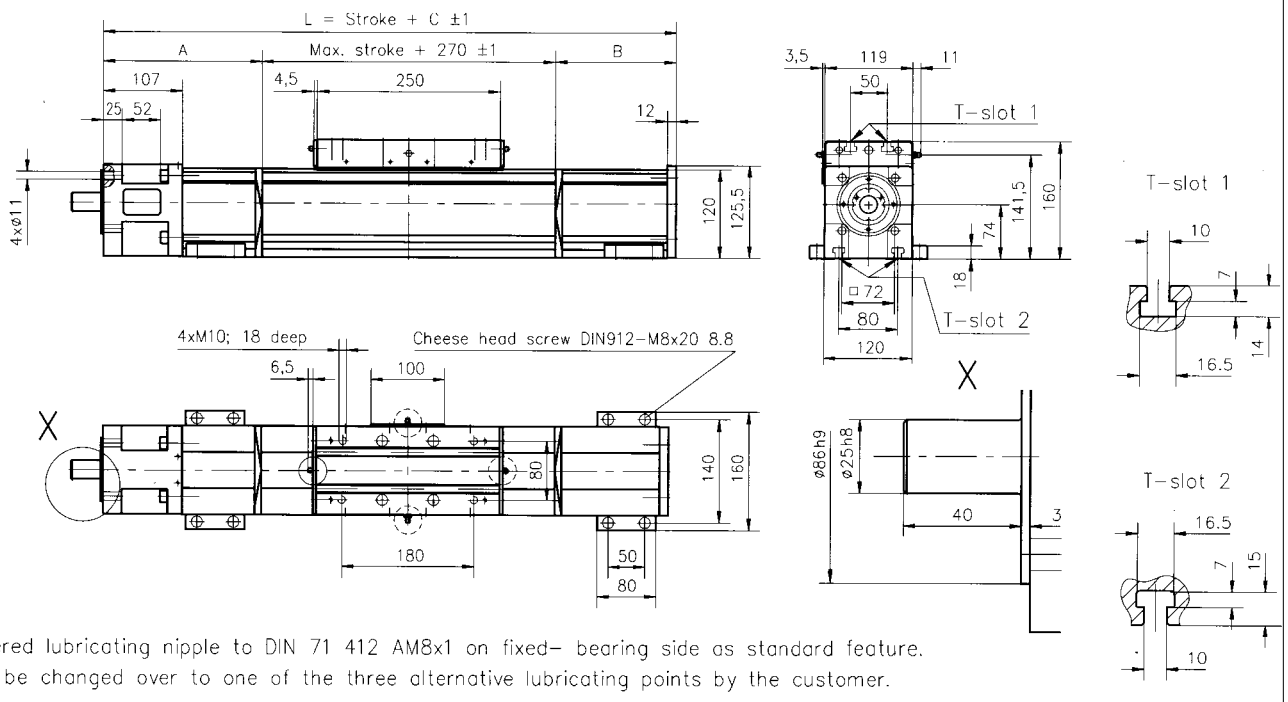
Inherent Torque

Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - MM - 5	1.0	1.7	2.2
K - MM - 10	1.0	1.8	2.3
K - MM - 20	1.1	1.9	2.4
K - MM - 50	1.2	2.0	2.6

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MXK 120
WITH BALL SCREW AND NO GUIDANCE

SECTION 4.3



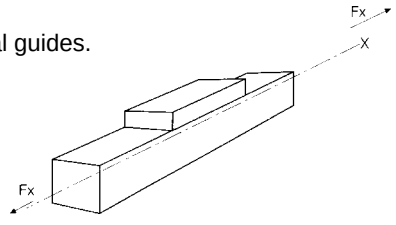
Technical Data

Linear Speed	max 2m/s	Base weight	18.1 Kg
Acceleration	max 20m/s^2	100mm stroke	1.94 Kg
Stroke Length	max 11000 mm*	Carriage	4.75 Kg
Inertia Ix =	770cm^4	Ball screw Diameter	32mm
Inertia Iy =	940cm^4		

* 40mm pitch up to 5000mm only

Loads and moments

Fx: 12000 N
Must be used with external guides.



IS - Internal Support

Supplied as standard

Additional lengths as a function of the stroke

Stroke Length (mm)	A(mm)	B(mm)	No of SA	C(mm)
0 - 890	145	50	0	465
891 - 1860	180	120	2	570
1861 - 2790	215	155	4	640
2791 - 3720	250	190	6	710
3721 - 4650	285	225	8	780
4651 - 5500	320	255	10	845

MF - Mounting Feet

Clamp feet mounted anywhere on the actuator profile, four supplied as standard. One pair required for each 750mm of stroke over 1000mm.

Drive Options

Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	MM	5	0.25	3000	±0.01	0
Ball screw	K	MM	10	0.50	3000	±0.01	0
Ball screw	K	MM	20	1.00	3000	±0.01	0
Ball screw	K	MM	40	2.00	3000	±0.01	0

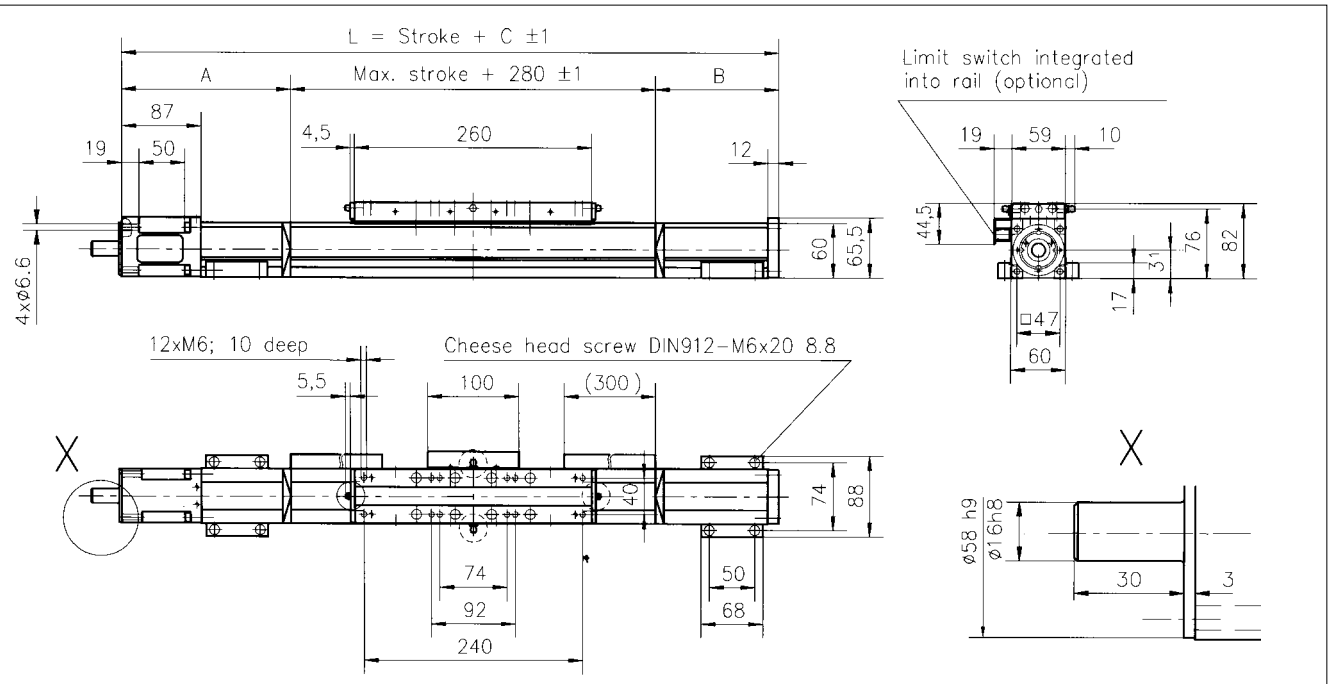
Inherent Torque

Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - MM - 5	1.0	2.1	2.4
K - MM - 10	1.0	2.2	2.6
K - MM - 20	1.1	2.3	2.7
K - MM - 40	1.2	2.5	3.0

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MDK 60

WITH BALL SCREW AND TWIN BEARINGS



○ Tapered lubricating nipple to DIN 71 412 AM6 on fixed– bearing side as standard feature.
◌ Can be changed over to one of the three alternative lubricating points by the customer.

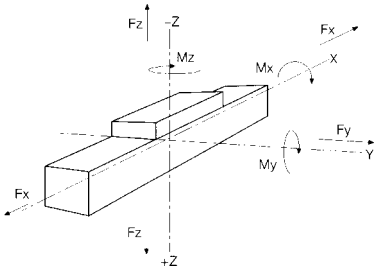
Technical Data

Linear Speed	max 2.5m/s	Base weight	6.16 Kg
Acceleration	max 20m/s^2	100mm stroke	0.63 Kg
Stroke Length	max 11000 mm*	Carriage	1.99 Kg
Inertia Ix =	58cm^4	Ball screw Diameter	20mm
Inertia Iy =	59cm^4		

* 50mm pitch up to 5000mm only

Loads and moments

Load (Max)	Force (N)
Fx	4000
Fy	2000
+/- Fz	2000
Moments (Max)	Nm
Mx	100
My	200
Mz	200



IS - Internal Support

Supplied as standard

Additional lengths as a function of the stroke

Stroke Length (mm)	A(mm)	B(mm)	No of SA	C(mm)
0 - 695	115	65	0	460
696 - 1335	165	115	2	560
1336 - 2075	185	135	4	600
2076 - 2780	210	160	6	650
2781 - 3545	230	180	8	690
3546 - 4285	250	200	10	730
4286 - 5015	275	225	12	780

MF - Mounting Feet

Clamp feet mounted anywhere on the actuator profile, four supplied as standard. One pair required for each 750mm of stroke over 1000mm.

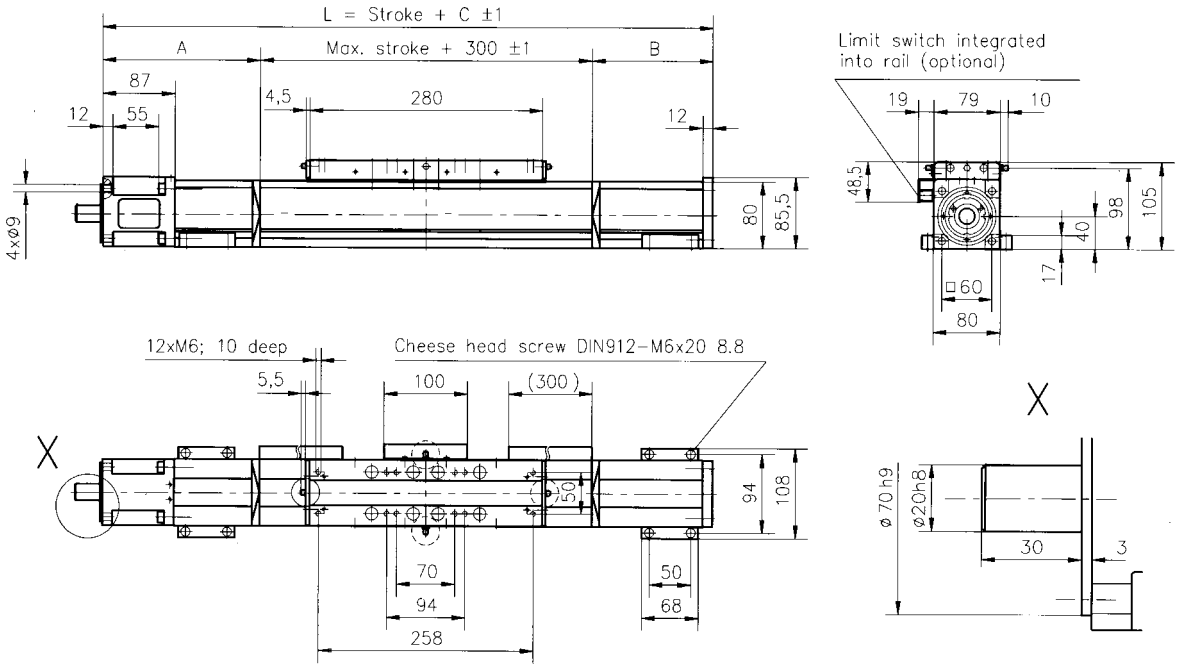
Drive Options

Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	MM	5	0.25	3000	±0.01	0
Ball screw	K	MM	20	1.00	3000	±0.01	0
Ball screw	K	MM	50	2.50	3000	±0.01	0

Inherent Torque

Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - MM - 5	0.9	1.5	1.8
K - MM - 20	1.0	1.7	2.0
K - MM - 50	1.1	1.9	2.2

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431



◯ Tapered lubricating nipple to DIN 71 412 AM6 on fixed- bearing side as standard feature.
◌ Can be changed over to one of the three alternative lubricating points by the customer.

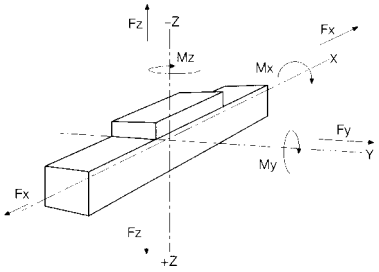
Technical Data

Linear Speed	max 2.5m/s	Base weight	11.57 Kg
Acceleration	max 20m/s^2	100mm stroke	1.08 Kg
Stroke Length	max 11000 mm*	Carriage	4.26 Kg
Inertia Ix =	190cm^4	Ball screw Diameter	25mm
Inertia Iy =	190cm^4		

* 50mm pitch up to 5000mm only

Loads and moments

Load (Max)	Force (N)
Fx	5000
Fy	3000
+/- Fz	3000
Moments (Max)	Nm
Mx	350
My	300
Mz	300



IS - Internal Support

Supplied as standard

Additional lengths as a function of the stroke

Stroke Length (mm)	A(mm)	B(mm)	No of SA	C(mm)
0 - 780	120	80	0	500
781 - 1535	170	125	2	595
1536 - 2370	190	145	4	635
2371 - 3205	215	170	6	685
3206 - 4045	235	190	8	725
4046 - 4885	255	210	10	765
4886 - 5000	280	235	12	815

MF - Mounting Feet

Clamp feet mounted anywhere on the actuator profile, four supplied as standard. One pair required for each 750mm of stroke over 1000mm.

Drive Options

Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	MM	5	0.25	3000	±0.01	0
Ball screw	K	MM	10	0.50	3000	±0.01	0
Ball screw	K	MM	20	1.00	3000	±0.01	0
Ball screw	K	MM	50	2.50	3000	±0.01	0

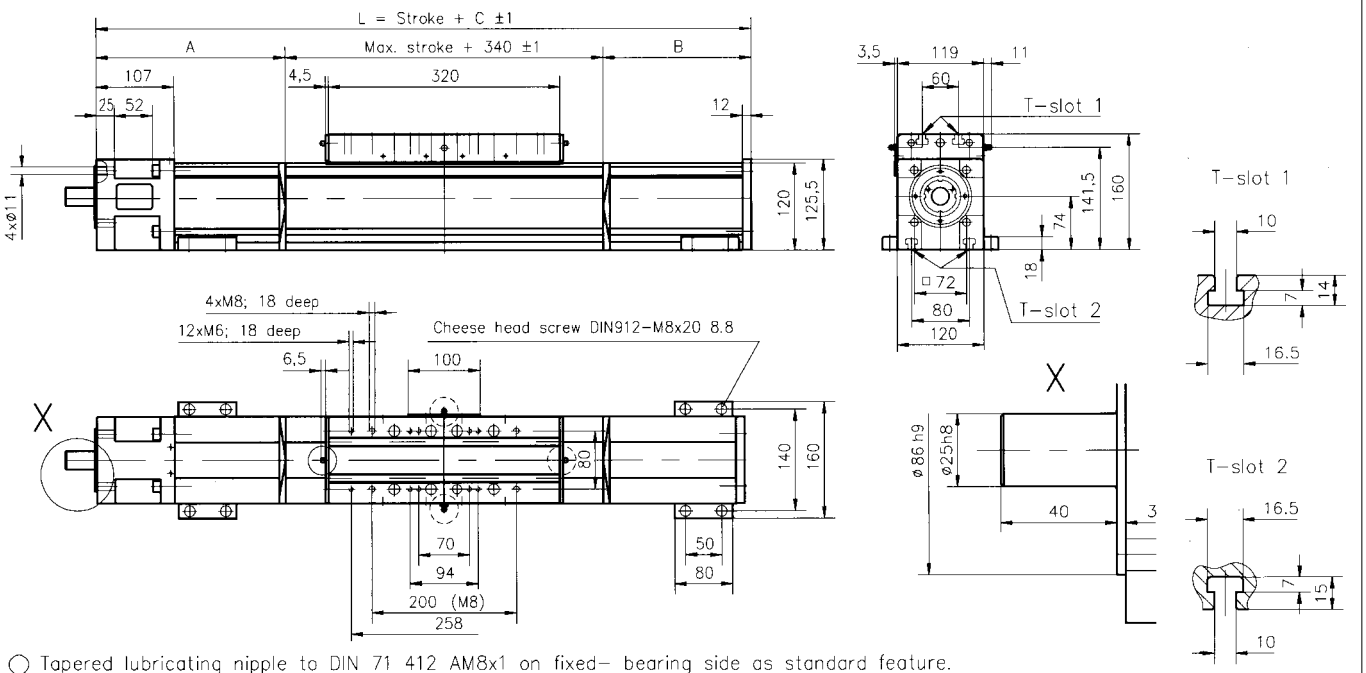
Inherent Torque

Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - MM - 5	1.3	1.7	2.2
K - MM - 10	1.4	1.8	2.3
K - MM - 20	1.5	1.9	2.4
K - MM - 50	1.6	2.1	2.6

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MDK 120

WITH BALL SCREW AND TWIN BEARINGS



○ Tapered lubricating nipple to DIN 71 412 AM8x1 on fixed– bearing side as standard feature.
◌ Can be changed over to one of the three alternative lubricating points by the customer.

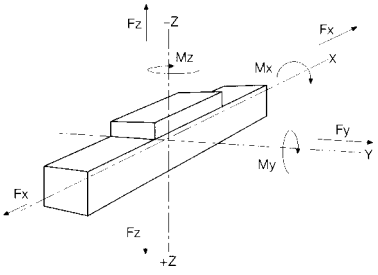
Technical Data

Linear Speed	max 2m/s	Base weight	25.9 Kg
Acceleration	max 20m/s^2	100mm stroke	1.93 Kg
Stroke Length	max 11000mm*	Carriage	9.25 Kg
Inertia Ix =	770cm^4	Ball screw Diameter	32mm
Inertia Iy =	940cm^4		

* 40mm pitch up to 5000mm only

Loads and moments

Load (Max)	Force (N)
Fx	12000
Fy	6000
+/- Fz	6000
Moments (Max)	Nm
Mx	500
My	600
Mz	600



IS - Internal Support

Supplied as standard

Additional lengths as a function of the stroke

Stroke Length (mm)	A(mm)	B(mm)	No of SA	C(mm)
0 - 890	155	100	0	595
891 - 1695	225	170	2	735
1696 - 2625	260	205	4	805
2626 - 3555	295	240	6	875
3556 - 4485	330	275	8	945
4486 - 4885	365	310	10	1015
4886 - 5000	400	345	12	1085

MF - Mounting Feet

Clamp feet mounted anywhere on the actuator profile, four supplied as standard. Additional feet are required for each 750mm of stroke over 1000mm.

Drive Options

Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	MM	5	0.25	3000	±0.01	0
Ball screw	K	MM	10	0.50	3000	±0.01	0
Ball screw	K	MM	20	1.00	3000	±0.01	0
Ball screw	K	MM	40	2.00	3000	±0.01	0

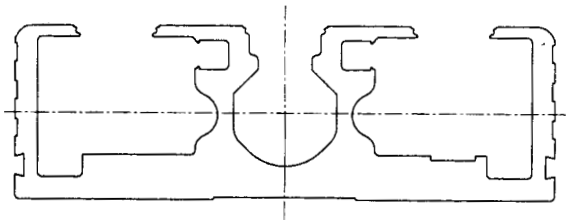
Inherent Torque

Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - MM - 5	1.8	2.3	2.8
K - MM - 10	1.9	2.5	2.9
K - MM - 20	2.0	2.6	3.1
K - MM - 40	2.2	2.9	3.4

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MTK MODEL

HEAVY DUTY LINEAR TABLES



Description

Movac heavy duty linear tables, made from high quality aluminium with a preloaded ball screw and heavy duty linear bearings incorporate the following features:

- High precision preloaded ball screw
- Integral limit switches (normally closed PNP)
- Integral end dampers
- Simple mounting using clamp feet
- Sealed to help prevent contamination
- Twin linear bearing rails
- Low profile construction
- Full use of stroke

Accessories

- Additional carriage
- Additional mounting feet

Order Code

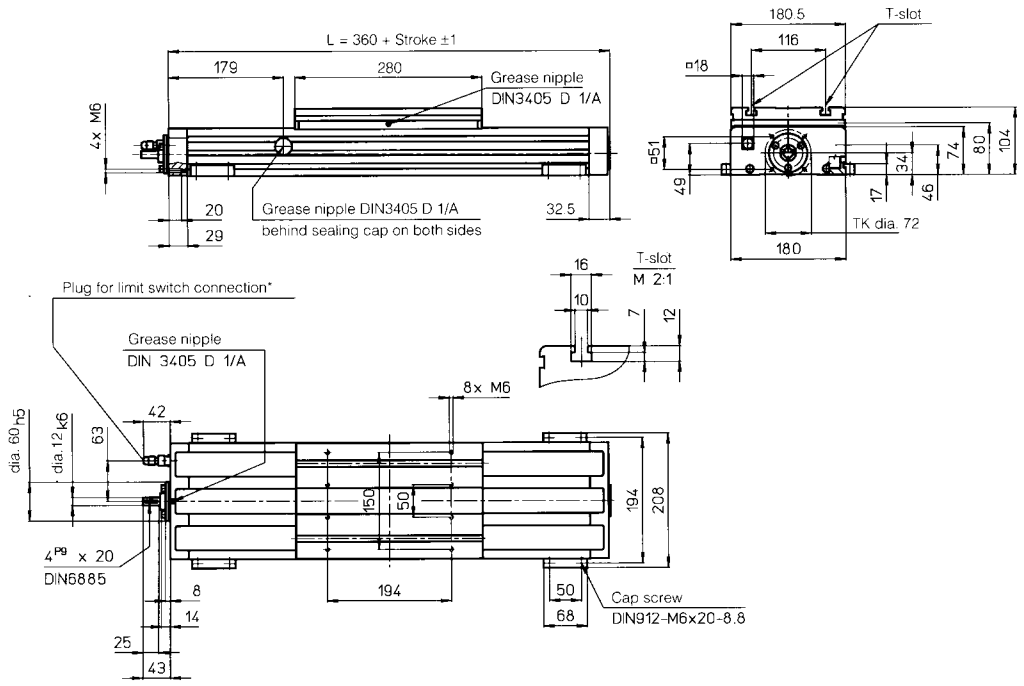
M T K		K	M M			
Model	Size	Drive Ref	Nut type	Pitch	Stroke	Overall length

	I S		M F
Number of spindle supports		Number of mounting feet	

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MTK 180

HEAVY DUTY TABLE WITH BALL SCREW AND LINEAR BEARINGS

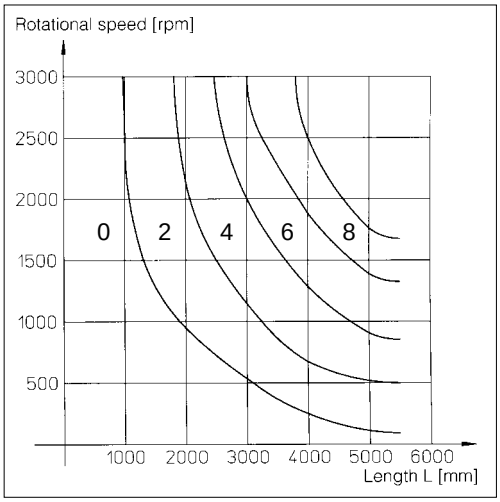


* Standard: 3 inductive proximity switches (normally closed) in-built.

Technical Data

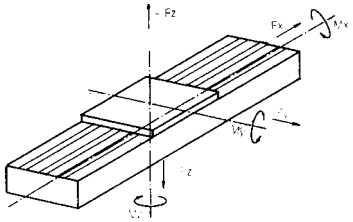
Linear Speed	max 2.5m/s	Base weight	7.0 Kg
Acceleration	max 10m/s^2	100mm stroke	1.5 Kg
Stroke Length	max 2640 mm	Carriage	6.5 Kg
Inertia Ix =	282cm^4	Ball screw Diameter	20mm
Inertia Iy =	1520cm^4		

IS - Internal Support Diagram



Loads and moments

Load (Max)	Force (N)
Fx	4000
Fy	2600
+/- Fz	12000/9600
Moments (Max)	Nm
Mx	660
My	980
Mz	1540



MF - Mounting Feet

Clamp feet mounted anywhere on the actuator profile, four supplied as standard. Additional feet are required for each 500mm of stroke above 500mm.

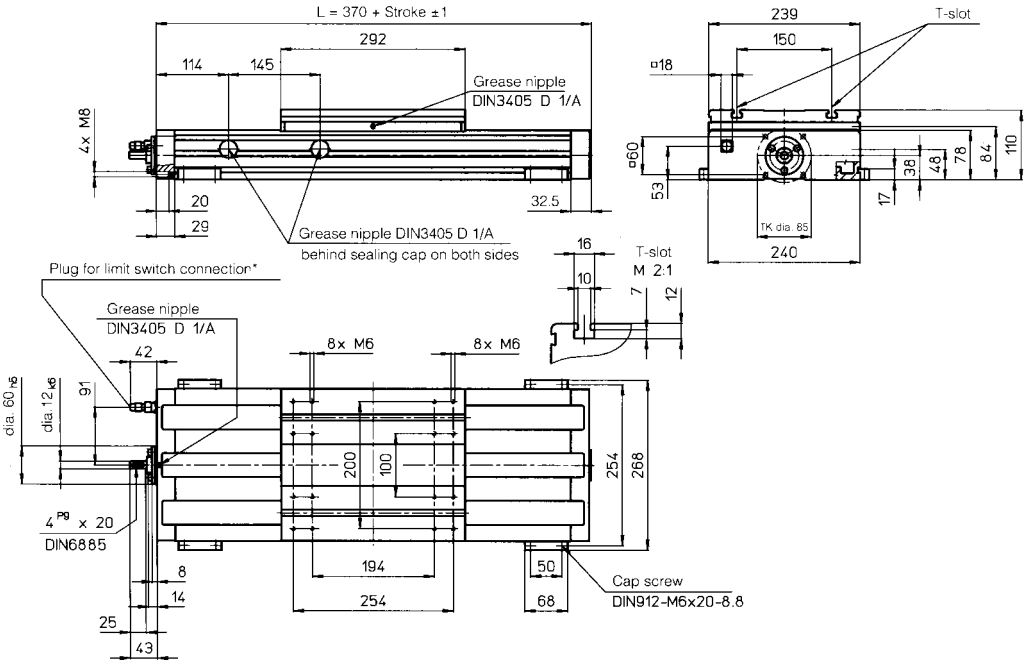
Drive Options

Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	MM	5	0.25	3000	±0.05	0
Ball screw	K	MM	20	1.0	3000	±0.05	0
Ball screw	K	MM	50	2.5	3000	±0.05	0

Inherent Torque

Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - MM - 5	0.4	0.6	1.1
K - MM - 20	0.8	1.1	1.6
K - MM - 50	0.7	1.0	1.5

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

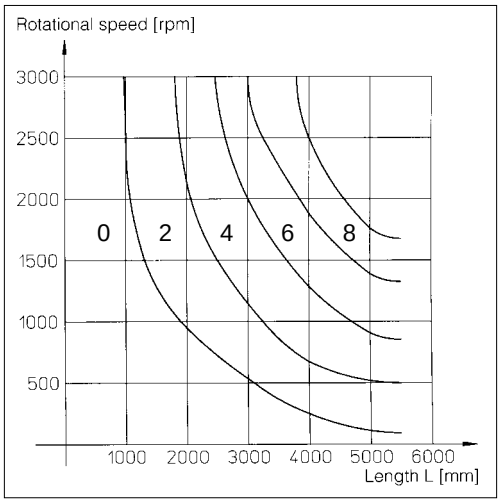


* Standard: 3 inductive proximity switches (normally closed) in-built.

Technical Data

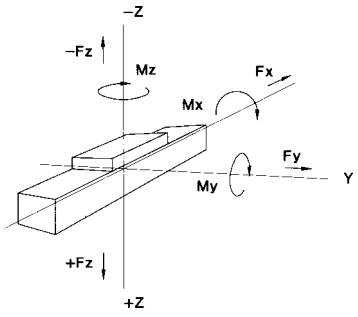
Linear Speed	max 2.5m/s	Base weight	12.0 Kg
Acceleration	max 10m/s^2	100mm stroke	3.0 Kg
Stroke Length	max 2630 mm*	Carriage	7.0 Kg
Inertia Ix =	452cm^4	Ball screw Diameter	20mm
Inertia Iy =	3560cm^4		

IS - Internal Support Diagram



Loads and moments

Load (Max)	Force (N)
Fx	4000
Fy	4200
+/- Fz	18000
Moments (Max)	Nm
Mx	1050
My	1200
Mz	2000



MF - Mounting Feet

Clamp feet mounted anywhere on the actuator profile, four supplied as standard. Additional feet are required for each 500mm of stroke above 500mm.

Drive Options

Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	MM	5	0.25	3000	±0.05	0
Ball screw	K	MM	20	1.0	3000	±0.05	0
Ball screw	K	MM	50	2.5	3000	±0.05	0

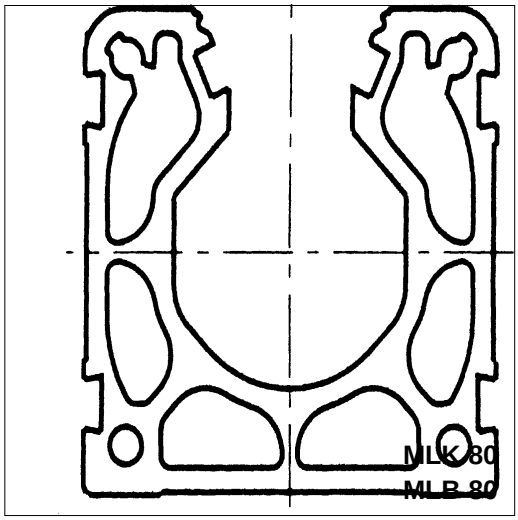
Inherent Torque

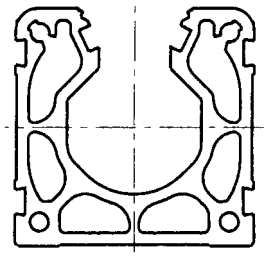
Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - MM - 5	0.6	0.9	1.4
K - MM - 20	1.1	1.4	2.1
K - MM - 50	0.9	1.3	2.0

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MLK & MLB MODELS

WITH BALL BEARING GUIDANCE





Description

MODELS MLK & MLB

Both models consist of an anodised profile into which a pair of hardened and ground steel guides are inserted. Twin bearings, beneath the carriage, guide the load smoothly and accurately.

- Precision ball screw with double nuts or steel braided belt drive
- Ball bearing guidance
- Optional screw supports to prevent whirling on ball screw models

Options

- Additional carriages
- 450mm long carriage
- Bevel gear box drive
- Right angled belt drive
- Parallel belt drive

Order Code

M L K	8 0	K	M M				
Model	Size	Drive Ref	Nut type	Pitch	Stroke	Overall length	

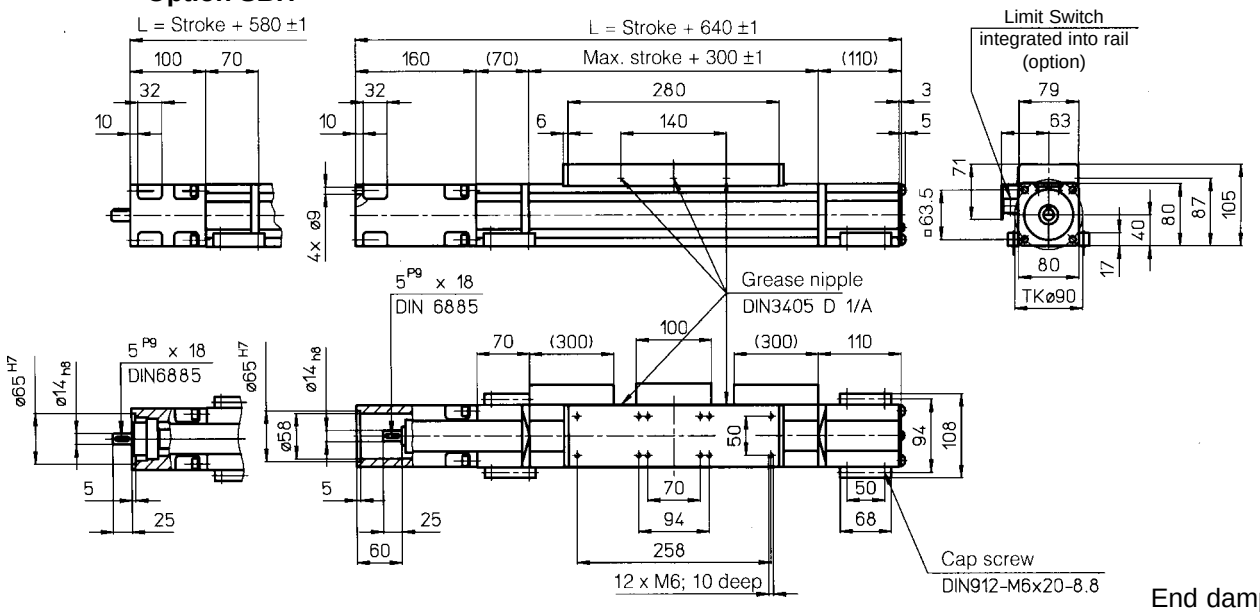
	I S	M F	
Number of internal supports		Number of mounting feet	Option

or

M L B	8 0	1 2 0					
Model	Size	Pitch	Stroke	Overall length	Number of mounting feet	Shaft configuration	

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

Option SBH



Note: Optional 450mm long carriage available

End dampers fitted as standard

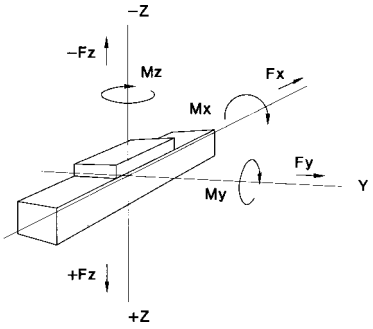
Technical Data

Linear Speed	max 2.5m/s	Base weight	10.2 Kg
Acceleration	max 10m/s^2	100mm stroke	0.85 Kg
Stroke Length	max 11000 mm	Carriage	2.30 Kg
Inertia Ix =	143cm^4	Ball screw Diameter	20mm
Inertia Iy =	170cm^4		

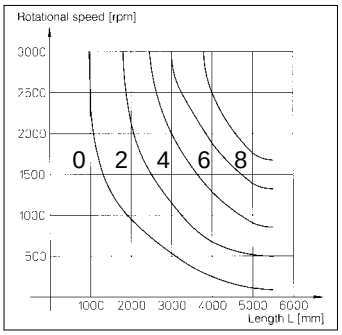
* 50 pitch up to 5000mm only

Loads and moments

Load (Max)	Force (N)
Fx	4000
Fy	600
+/- Fz	1200/600
Moments (Max)	Nm
Mx	30
My	175
Mz	220



IS - Internal Supports



Internal supports do not increase the overall length of this unit.

MF - Mounting Feet

Clamp feet mounted anywhere on the actuator profile, four supplied as standard. One pair required for each 750mm of stroke over 1000mm.

Drive Options

Drive	Ref	Nut	Pitch mm	Vmax m/s	Nmax RPM	Repeatability mm	Backlash mm
Ball screw	K	MM	5	0.25	3000	±0.05	0
Ball screw	K	MM	20	1.00	3000	±0.05	0
Ball screw	K	MM	50	2.50	3000	±0.05	0

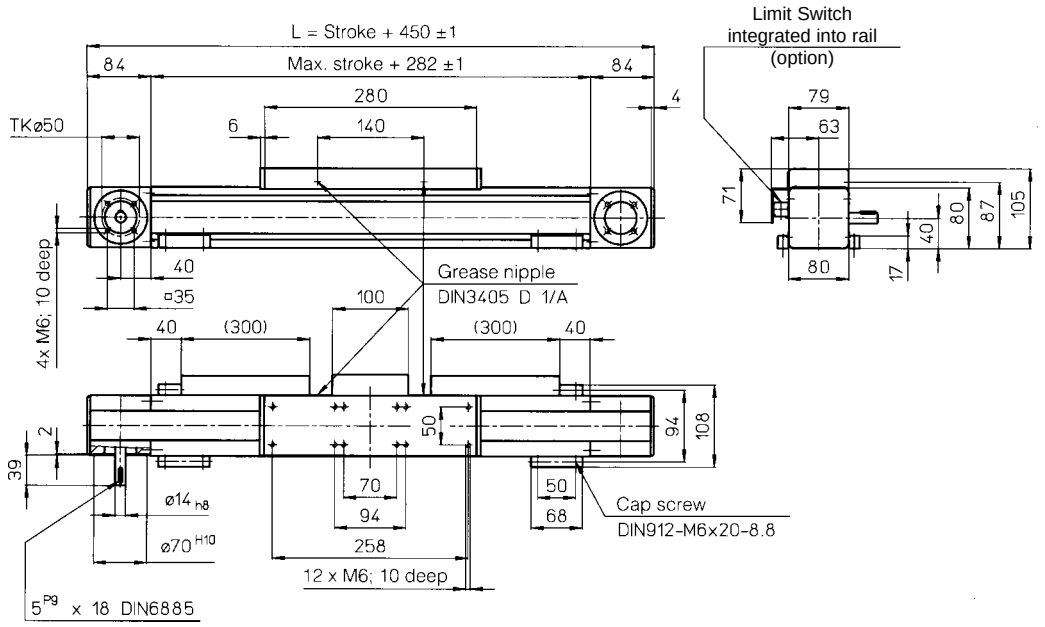
Inherent Torque

Drive - Nut - Pitch	Nm at 150 RPM	Nm at 1500 RPM	Nm at 3000 RPM
K - MM - 5	0.9	1.5	2.0
K - MM - 20	1.2	1.7	2.2
K - MM - 50	1.0	1.6	2.1

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOVAC MODEL MLB 80

WITH BALL SCREW AND BALL BEARING GUIDANCE



Note: Optional 450mm long carriage available

Technical Data

Linear Speed	max 5m/s	Base weight	6.50 Kg
Acceleration	max 20m/s^2	100mm stroke	0.65 Kg
Stroke Length	max 11000 mm	Carriage	2.30 Kg
Inertia Ix =	143 cm^4		
Inertia Iy =	170 cm^4		

Drive Data

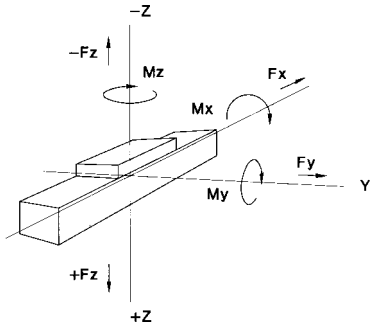
Type:	Steel braided belt
Stroke/Rev:	120mm
Pulley Dia:	38.21mm
Repeatability:	+/- 0.2mm

MF - Mounting Feet

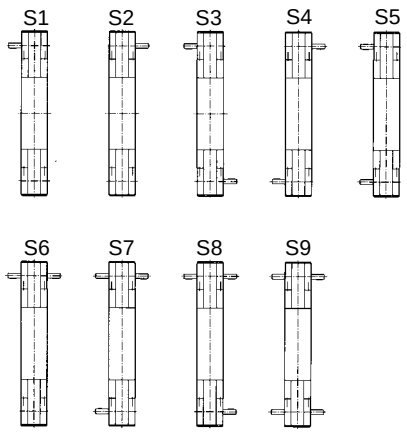
Clamp feet mounted anywhere on the actuator profile, four supplied as standard. One pair required for each 750mm of stroke over 1000mm.

Loads and moments

Load (Max)	Force (N)
Fx	400
Fy	600
+/- Fz	1200/ 600
Moments (Max)	Nm
Mx	30
My	175
Mz	220



Drive Shaft Options

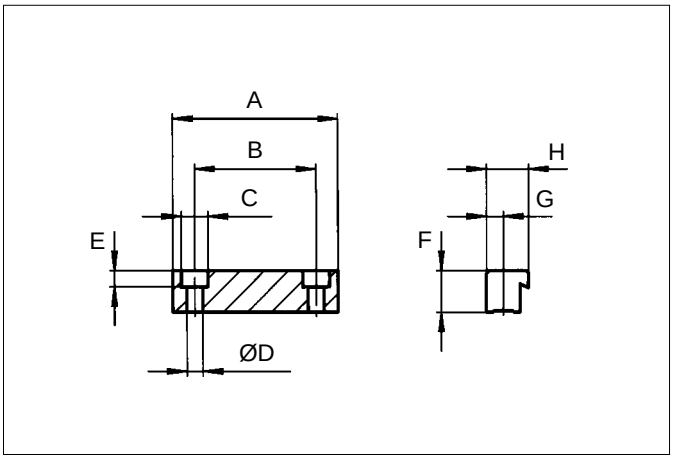


Inherent Torque

150 RPM: 2.4NM 1500 RPM: 3.5NM 3000 RPM: 5.0NM

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MF - Mounting Feet



For MDK, MXK 60 and 80, MLK, MLB 80 and MKT

A	B	ØC	ØD	E	F	G	H	Part No.
68	50	11	6.6	6.5	17	7	17.5	1201

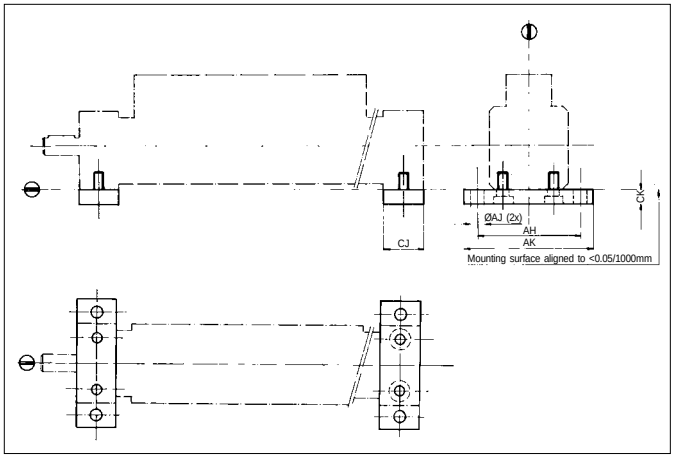
For MDK, MXK and MRB 120

A	B	ØC	ØD	E	F	G	H	Part No.
80	50	15	9	9	18	10	25	1202

For MRB 50

A	B	ØC	ØD	E	F	G	H	Part No.
54	40	10	5.5	5.7	10	7	16	1204

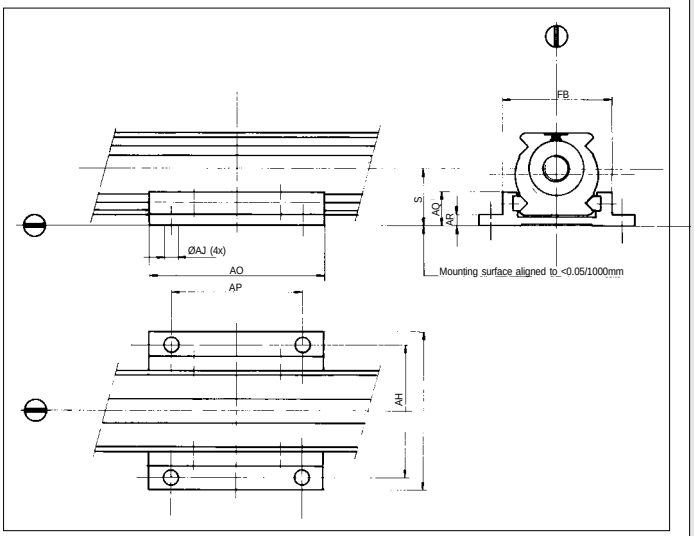
MF - Mounting Feet for MSK



Used to mount the Movac when it is not possible to mount it directly from underneath.

Movac	AH	AJ	AK	CJ	CK	Part No.
MSK - 50	60	7	72	20	10	1210
MSK - 80	92	9	108	30	12	1212

ES - External Supports for MSK



Used to prevent the profile deflecting under load (see product details for the number required). Can also be used as a mounting method.

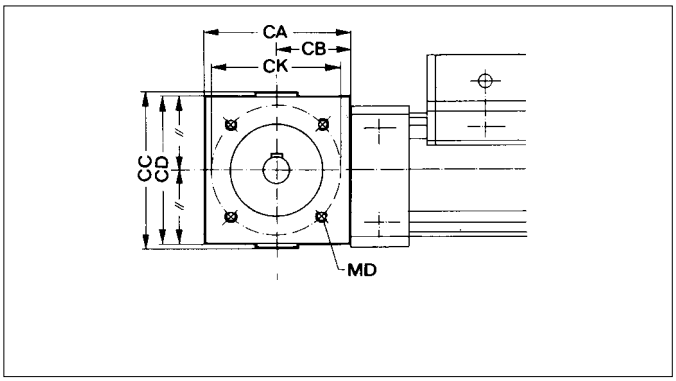
Movac	AH	AJ	AK	AO	AP	AQ	AR	FB	S	Part No.
MSK - 50	60	7	72	80	60	15.5	4.5	49	25.3	1220
MSK - 80	92	9	108	120	90	24	6.5	74	39.0	1222

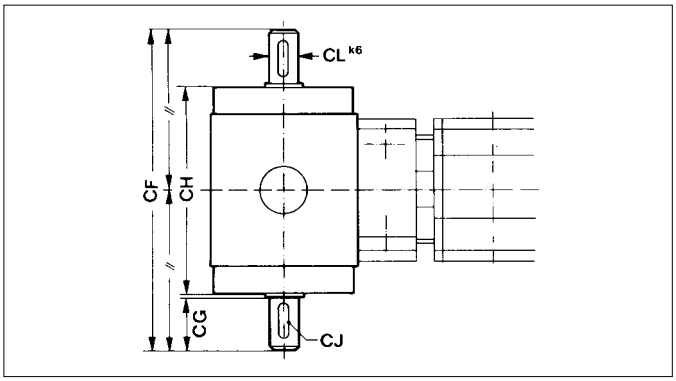
Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

Bevel gearbox drive

Available only for screw driven actuators. Bevel gearboxes can be used to mount a motor at right angles to the actuators or to connect two Movac units in parallel to allow drive from a common motor. Note that we also supply connecting shafts and couplings. Please contact us for further details.

MSK Models

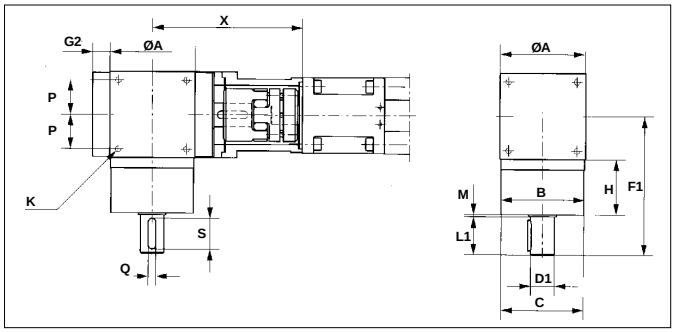


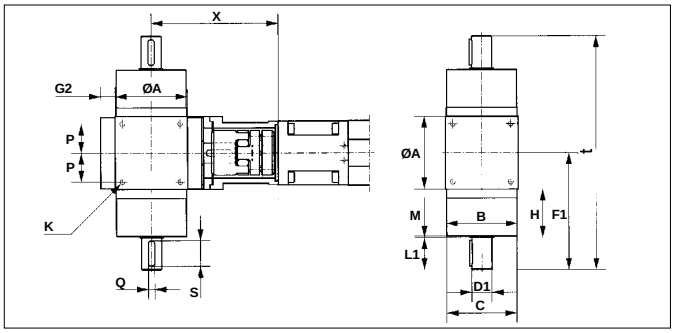


For Model	CA	CB	CC	CD	CF	CG	CH	CJ	CK	CL	MD
MSK 80	75	37.5	84	75	166	30	105	5 x 5 x 25	70	14	M6x14

For Model	Inherent Torque (Nm)	Efficiency	Ratio	Part No.
MSK 80	0.6	0.80	1:1	1380

MDX and MXK Models





For Model	A	B	C	D1	F1	G2	H	K	L1	M	P	Q	S	X	T
MD/MXK 60	75	73	72.9	20	125	18.5	52.5	M6	35	2	30	6	32	142.5	250
MD/MXK 80	90	88	87	25	145	18	60	M6	40	2	36	8	32	158	290
MD/MXK 120	110	108	107	35	180	23	65	M8	60	2	44	10	50	203	360

For Model	Inherent Torque (Nm)	Ratio	Efficiency	Part No. with double shaft	Part No. with single shaft
MD/MXK 60	0.3	1:1	0.95	1390	1393
MD/MXK 80	0.5	1:1	0.95	1391	1394
MD/MXK 120	0.8	1:1	0.95	1392	1395

Please note all gearboxes are available with a 2:1 ratio.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

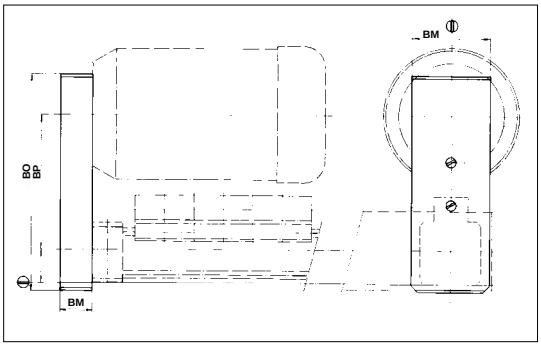
Right Angled Belt Drive System

The right angled belt drive minimises the overall length of the installed Movac. It can be rotated in positions offset by 90º

MSK/MLK Standard Models

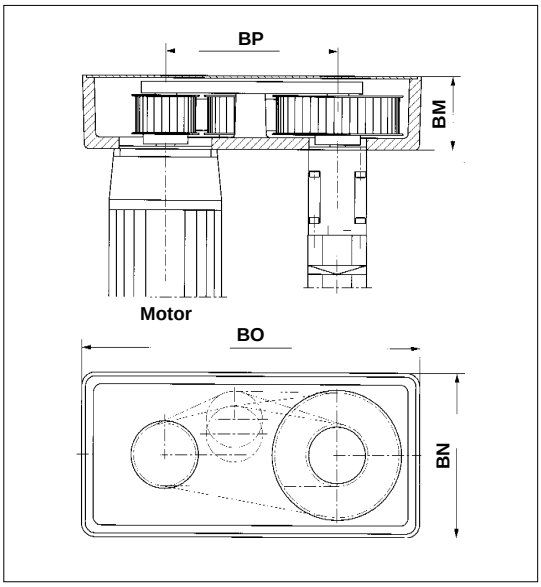
Model	BM	BN	BO	BP	Efficiency	Ratio	Mmax Nm	Part No. 1:1	Part No. 2:1
MSK 50	30	68	176	110	0.85	1:1,2:1	6	1402	-
MS/MLK 80	40	80	243	128	0.85	1:1,2:1	6	1404	1406

When using a motor other than those shown in this catalogue please contact our technical department for advice.



MSK/MLK Heavy Duty Models

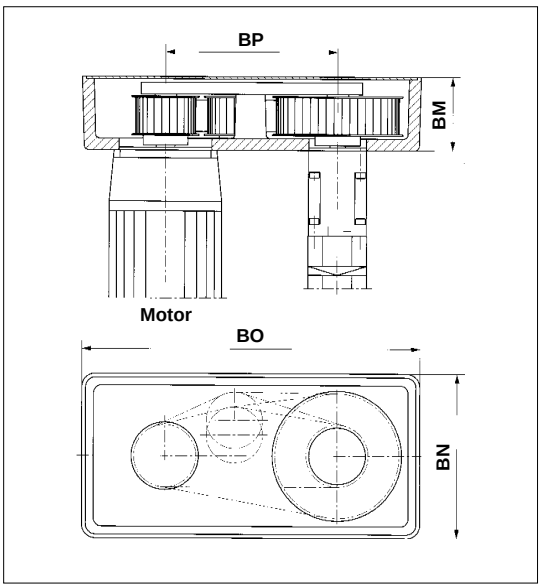
Model	BM	BN	BO	BP	Efficiency	Ratio	Mmax Nm	Part No. 1:1	Part No. 2:1
MSK/MLK	82	151	306	172	0.85	1:1,2:1	12	1410	1412



MDK/MXK Models

Suitable for sizes 60 and 80 only.

Model	BM	BN	BO	BP	Efficiency	Ratio	Mmax Nm	Part No. 1:1	Part No. 2:1
MDK/MXK 60 & 80	74	170	345	175	0.85	1:1,2:1	15	1414	1416



Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

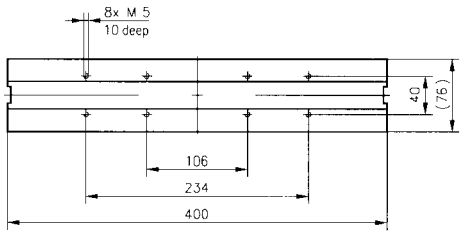
Additional and Optional Longer Carriages

- Adding a longer or additional carriage increases the maximum allowable moment My.
  The centre distance between the two carriages can be calculated as follows $L=My/F_{MAX}$
- Provides a large area for mounting.
- The overall length of the Movac will increase by the difference between the standard and longer carriage or, where an additional carriage is used, by the distance between them plus the length of the additional carriage.

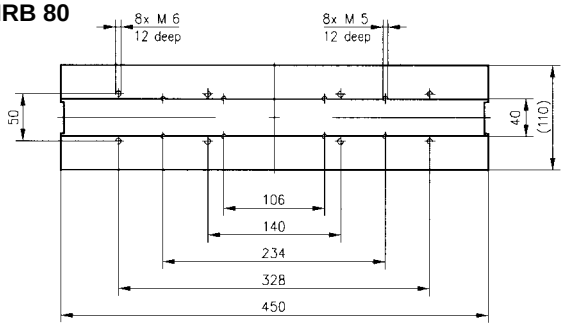
MRB Models

Additional standard free sliding carriages can be fitted inline with the standard carriage (see section 3 for details).
Larger carriages are available as shown below.

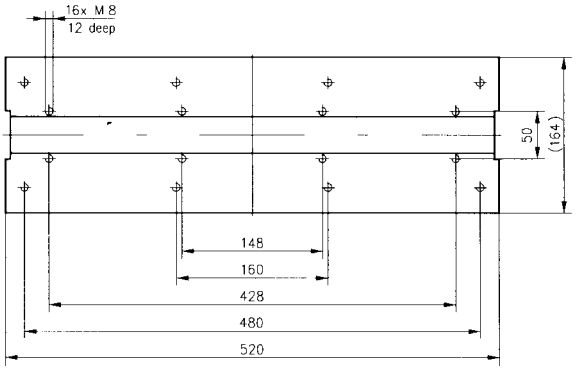
MRB 50



MRB 80



MRB 120



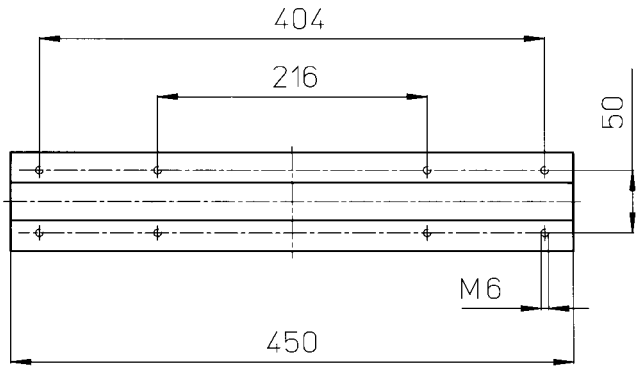
Model	Length of carriage	My (Nm)	Mz (Nm)	Part No
MRB 50	400	130	75	1302
MRB 80	450	340	150	1304
MRB 120	520	1400	750	1306

MSK Models

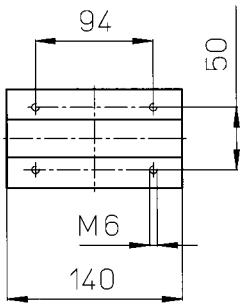
Additional free sliding carriages can be fitted either alongside or below the standard carriage (see section 2 for details).

MLK and MLB Models

Additional free sliding carriages can be fitted alongside the standard carriage.
Additional larger and smaller carriages are available as shown. The 450mm long carriage can be fitted in place of the standard carriage.



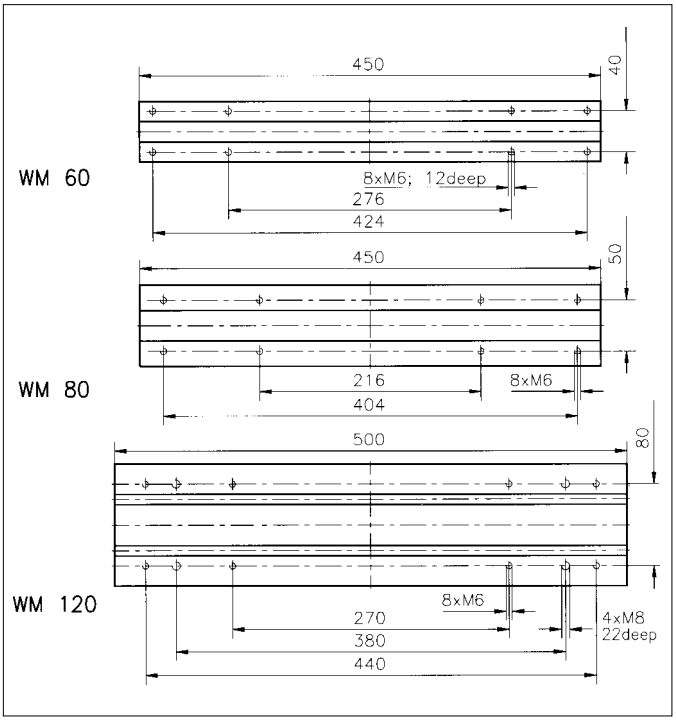
Part No. 1310



Part No. 1312
(free sliding only)

MDK and MXK Models

Additional standard free sliding carrriages can be fitted. Longer carriages are available as shown below.



Model	Length of carriage	My (Nm)	Mz (Nm)	Part No
MD/MXK 60	450	500	500	1320
MD/MXK 80	450	750	750	1322
MD/MXK 120	500	1500	1500	1324

MKT Models

Additional free sliding carriages are available (see section 5 for details).

DRIVE TECHNOLOGY

Actuators and electric drives from a single source

One contact and one responsibility

For all drive calculations, installation, maintenance and service you need only contact one supplier.

Functional reliability guaranteed

Every actuator and drive combination is guaranteed to meet your specifications.

Optional price/performance

Let us specify your drives and you can be assured that all components are perfectly matched.

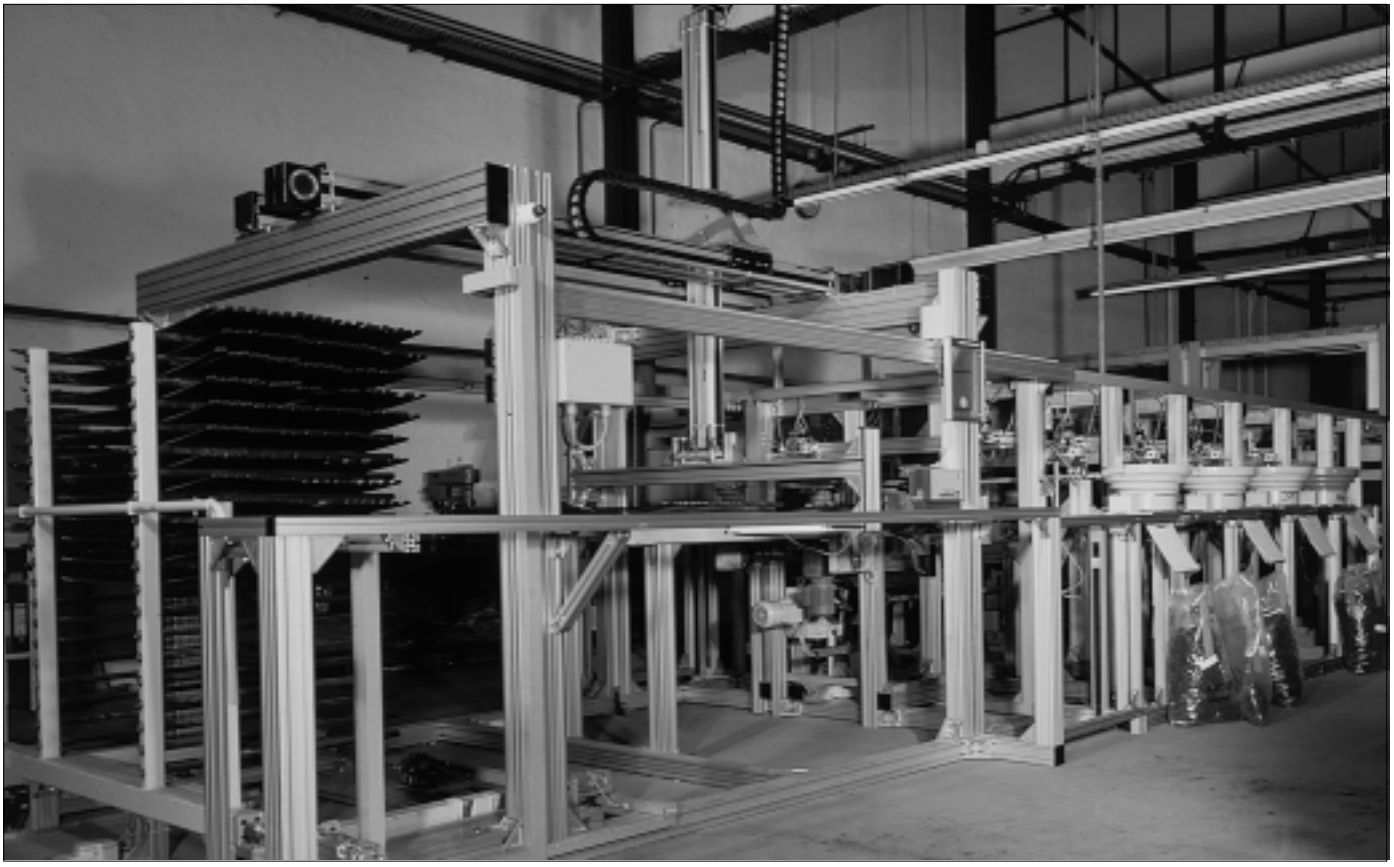
Should I use DC or AC servo technology?

DC servo motors

Generally a lower cost option but the motors are larger than the equivalent AC brushless servomotor.
Suitable for the majority of applications using ball screws where direct drive is the preferred option.

AC brushless servo motors

The motors are more compact and do not have brushes hence there is less maintenance. Due to their small size they are particularly suitable for use with gearboxes on belt driven actuators.



A two axis gantry loading system

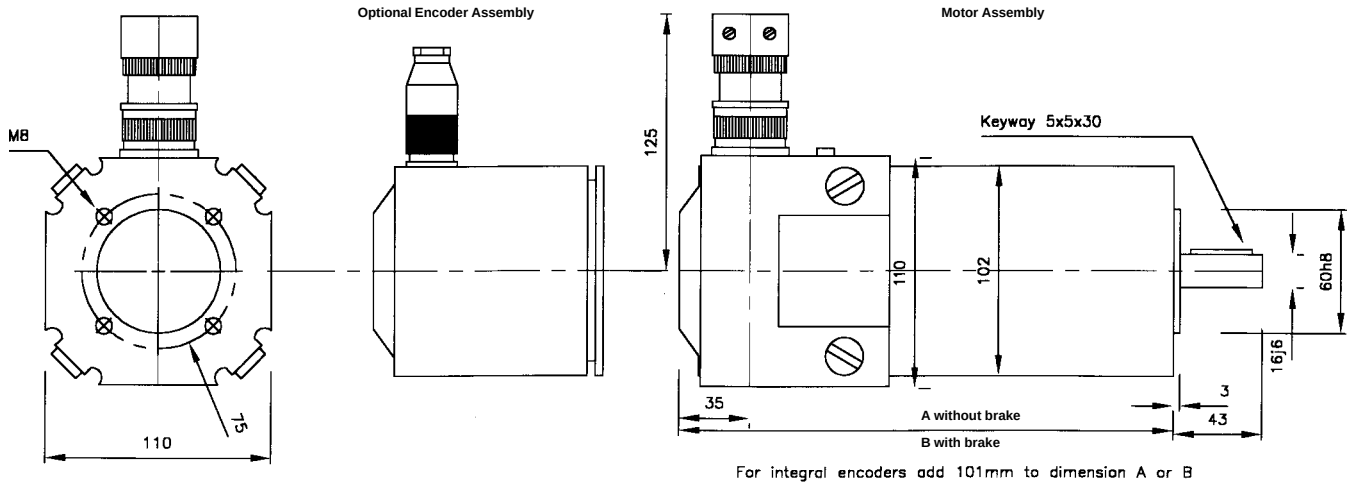
Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

DC SERVO MOTOR AND ENCODER SDA RANGE

SECTION 8.1

Description

These DC permanent magnet motors when combined with an encoder assembly are the standard method of driving Movacs. A servo amplifier and transformer will also be required as shown in section 8.2.



Motor Part No	Amplifier Part No	Transformer Part No	Torque Cont. Nm	Torque Peak Nm	Rotor Inertia gm^2	Current Cont. A	RPM Max	A	B	Weight Kg
12525	12550	12560	3.0	15	1.6	7	3000	241	281	7
12526	12551	12560	4.5	23	2.4	11	3000	281	321	8.5
12527	12551	12561	5.6	30	3.2	14	3000	321	361	12
12528	12552	12562	7.5	37.5	4.0	20	3000	361	401	12

For motors with brakes please add a “B” to the motor Part No. e.g. 12525B.

Encoder

The encoder assembly consists of a heavy duty aluminium housing in which the encoder is mounted. All encoders feature A, B and zero phases together with their complements.

The standard voltage is 5-30V DC with a line driver output. Open collector outputs are available on request.

When ordering it is necessary to state the number of pulses per revolution (P.P.R.) that you require.
Standard P.P.R’s of 100, 200, 250, 500 and 1000 are available.

Encoder Part No.	**P.P.R.**			
12571 -				

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

SECTION 8.2

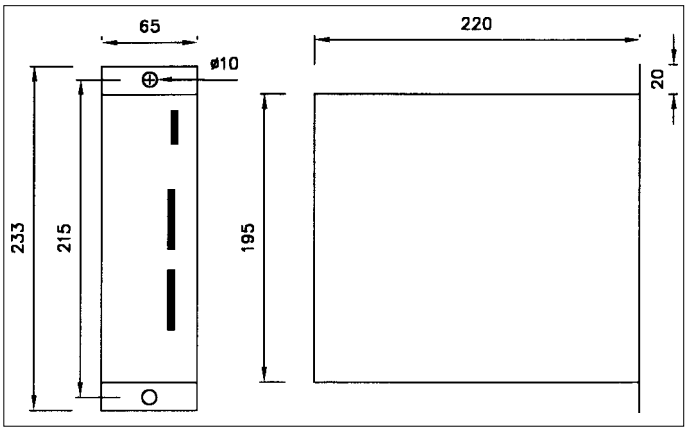
DC SERVO AMPLIFIER SDA RANGE

Description

This low cost PWM servo amplifier complements the DC servo motors in section 8.1.

Features

- Panel Mount
- I^2t protection
- 105V AC input
- Silent operation
- External trip input
- Personality module
- Short circuit protected
- Integral braking resistor
- Stand alone packaged drive
- Accurate speed and current loop
- Screw in terminal connections
- Detachable parameter module for easy transfer



Connections

SIGNAL CONNECTOR

1. IMOT - Current in motor test point
2. TPRC - Requested current test point
3. COMMON - OV
4. I^2t - Current limit active signal
5. ENABLE - Needs 10-30V DC to enable the amplifier
6. +10V
7. -10V
8. COMMON - 0V
9. REF+ - Speed reference input +ve
10. REF- - Speed reference input -ve
11. TACHO+ - Tacho signal from motor +ve
12. TACHO- - Tacho signal from motor -ve
13. DRIVE STATUS } Connected via 14 goes open circuit
14. DRIVE STATUS } if a fault exists
15. STOP - Enables the stop function by applying 10-30V DC

POWER CONNECTOR

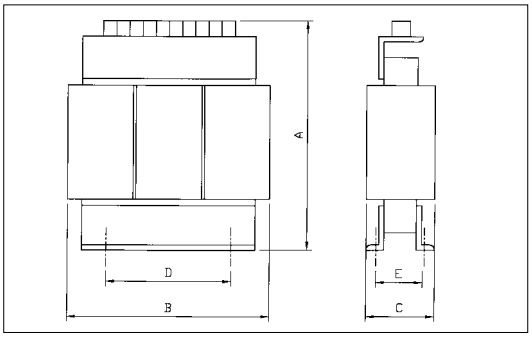
16. +DC - High power DC+
17. MOT1 - Output to motor +
18. MOT2 - Output to motor -
19. -DC - High power DC-
20. E - Ground
21. L1 - Phase 1 from transformer
22. L2 - Phase 2 from transformer
23. L3 - Phase 3 from transformer
24. EXT DBR - External brake restrictor if required

Adjustments

- Ramptime
- Zero offset voltage
- Full scale speed
- Proportional and derivative gain

Transformer

The transformer is required to step the three phase supply down to 105V AC. Primary voltages of 220, 380, 415 and 440V are catered for.



Transformer Part No	Rating KVA	Dimensions A	B	C	D	E	Weight Kg
12550	1	230	250	95	200	74	15
12551	2	245	270	104	200	77	21
12552	3	260	305	115	200	84	34

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

AC BRUSHLESS SERVO MOTOR SAA RANGE

SECTION 8.3

Description

AC brushless motors use rare earth magnets to provide an exceptional power-to-size ratio. This type of motor has a low rotor inertia allowing rapid responses to step inputs and is maintenance free. All motors feature an Integral resolver and are protected to IP 65. A separate encoder and transformer are not required.

Technical Data

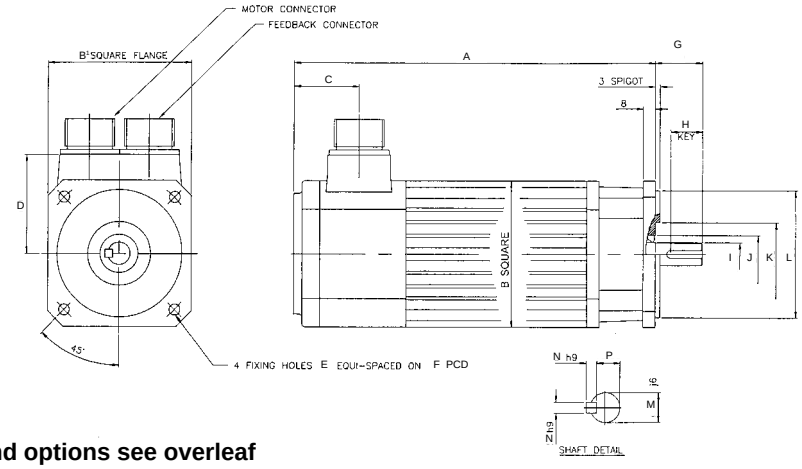
Motor Part No	Amp Part No	Torque Cont. Nm	Torque Peak Nm	RPM Max	Rotor Inertia gm^2	Weight Kg	Brake voltage V	Holding Torque Nm	Brake Inertia gm^2
12532	12579*	2.2	6.7	3000	0.13	5.1	24	5	0.12
12534	12580	3.8	9.0	3000	0.20	6.6	24	5	0.12
12537	12580	6.8	9.0	3000	0.51	9	24	12	0.12
12539	12580	9.8	27	3000	0.75	9.8	24	12	0.12

* Accepts single phase inputs 240V

Options

An integral failsafe brake can be provided to prevent the actuator backdriving with the power off.
There is no increase in the overall length of the motor. The order code is the motor code “B” e.g. 12532B

Dimensions



For connectors and options see overleaf

Motor Part No.	A	B	B^1	C	D	ØE	F	G	H	I	J	K	L	ØM	N	P
12532	250	92	92	42	60	7	100	30	20	15	24	40	80	14	5 x 5	11
12534	290	92	92	42	60	7	100	30	20	15	24	40	80	14	5 x 5	11
12537	275	115	105	40	68	9	115	40	30	20	35	50	95	19	6 x 6	15.5
12539	315	115	105	40	68	9	115	40	30	20	35	50	95	19	6 x 6	15.5

Note: Planetary gearboxes can be used with these motors (see section 8.5). Please see section 8.4 for motor accessories.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

SECTION 8.4

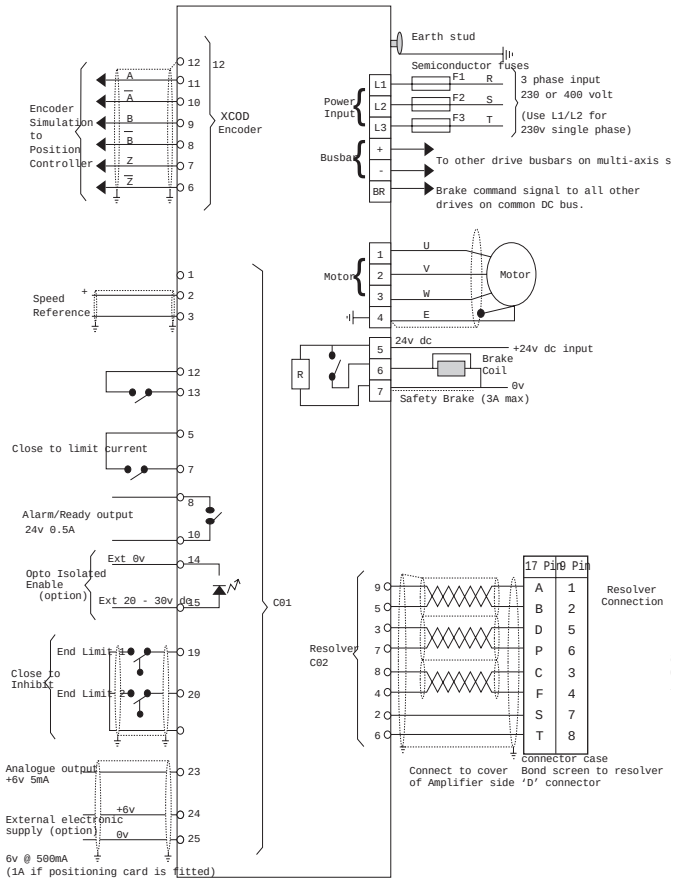
AC BRUSHLESS SERVO AMPLIFIER SAA RANGE

Description

This fully digital servo amplifier complements the AC brushless servo motors in section 8.3

Description

- Direct connection to 3 phase
- Fan Cooled
- Encoder simulation
- Built in EMC filter
- Direct 24V brake control (option)
- Short circuit and earth fault protected
- I^2t protection
- RS232 and 485 as standard
- Speed or current control
- End limit switch inputs
- External trip input
- On board diagnostics
- Parameters set via PC



Amplifier Information

Amplifier Part No	Mains Voltage	RMS Current A	Rated Power KW	Input Cable mm^2	Footprint h x w x d	Encoder Simulation PPR
12579	1 x 240V +10-20%	5	2	2.5	300 x 74 x 200	1 - 2048
12580	3 x 400 +10-20%	5	3.5	2.5	300 x 74 x 200	1 - 2048

AC Brushless Motor Accessory Information

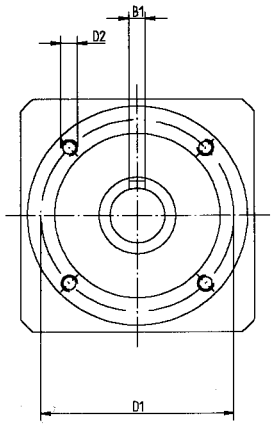
Part No.	Description
12540	Motor and resolver connectors straight
12542	Motor and resolver connectors right angle
12582	Brake option module
12584	Encoder fitted (to motor)
12586	Resolver cable 5m with plugs at both ends
12588	Motor cable 5m with plugs at both ends

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

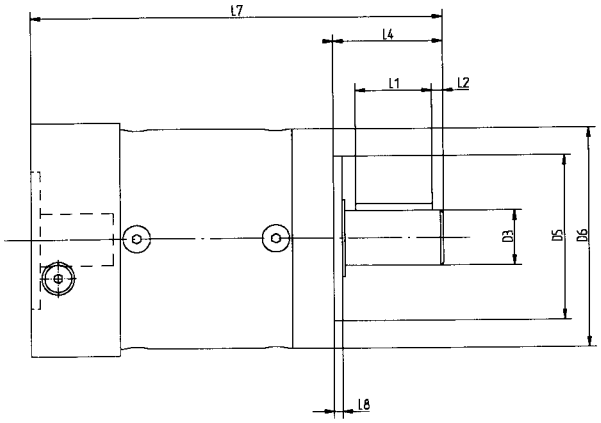
Description

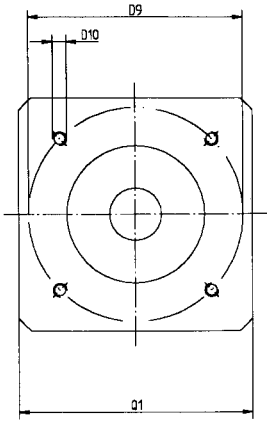
This planetary gearbox fits directly onto SAA and SDA motors. It is particularly useful where high torques and low motor speeds are required as the torque of the motor will be increased by the ratio selected whereas the speed will be reduced by the same factor.

Dimensions



Output shaft view





Input shaft view

Part No.	For Motors	B1	D1	D2	D3	D5	D6	D9	D10	L1	L2	L4	L8	L7	Ratios	Torque Max Nm	Weight Kg
12800*	SDA (ALL)	6	70	M6x10	20	60	80	100	M6x15	28	4	40	3	149	3,4,5,8:1	40	2.1
12810	12532/534	6	70	M6x10	20	60	80	100	M6x10	28	4	40	3	134	3,4,5,8:1	40	2.1
12820	12537/539	8	100	M10x16	25	80	115	115	M8x20	40	5	55	4	176.5	3,4,5,8:1	80	6.0

* Suitable for stationary axes only. Additional support must be provided for the motor on moving axes.

Part No.	For Motors	Inertia Kg-mm²					Efficiency %	Backlash Arc min	Degree of Protection
		Ratio	3:1	4:1	5:1	8:1			
12800	SDA-ALL		77	52	45	39	90	<15	IP43
12810	12532/534		77	52	45	39	90	<15	IP43
12820	12537/539		263	179	153	132	90	<10	IP43

Technical data for all gearboxes

Lifetime (Av)	10,000 hrs	Lubrication	Lifetime
Input Speed (max)	5,000 RPM	Noise (max)	65 DBA
Operating temperature	-25 - +90ºC	Shaft key to DIN6885	

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

SECTION 8.6

CONTROLLER FOR SERVO AMPLIFIERS - 1, 2 OR 3 AXIS

Description

The smartmove controller provides up to three axis control for servo amplifiers from the SDA or SAA range.

Features

- Panel Mount
- RS232 or RS485 communication port
- 18VAC or 24VDC power input
- Opto isolated 24V outputs
- Inbuilt 5V encoder power supply
- Inbuilt LCD display for diagnostics
- Available in 1,2 or 3 axis form
- EMC compliant
- Opto isolated inputs
- Hardware position latch for high accuracy registration
- Direct connection to optional control panel
- Control area network (CAN) 1Mbit link

Programme Features

Incorporates a basic style motion interpreter which is widely acknowledged to be one of the leading motion control programmes.

- Structured basic style language
- Trapezoidal or S ramp velocity profiles
- Three axis linear and two axis circular interpolation (optional)
- Master /slave operation with software gearbox and software cams
- User interrupts on inputs
- Comprehensive I/O facilities
- High speed capture of axis positions for registration and infeed systems
- 28 K bytes on non-volatile memory for programme and data storage

Software Options

Process Firmware
This is the standard firmware

HPGL Firmware
Provides high performance continuous path control and is compatible with HPGL.

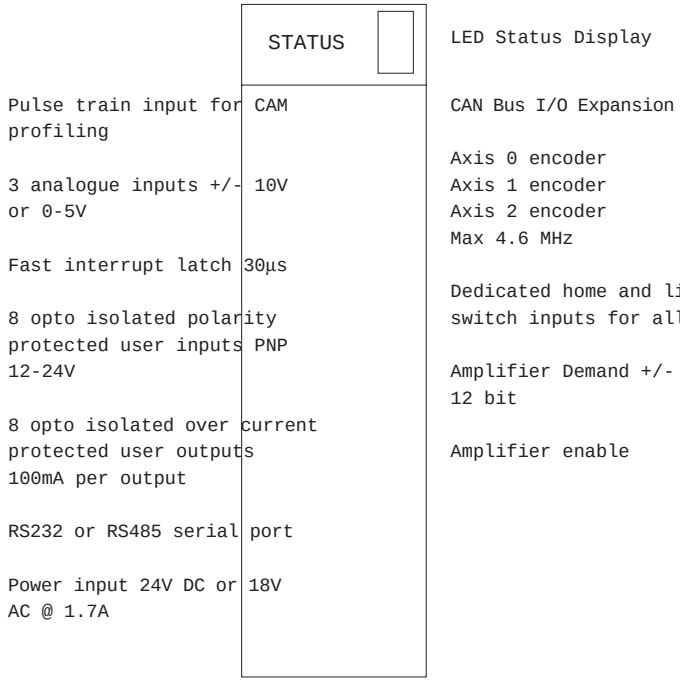
Process Firmware
Intended for applications where the controller simply responds to commands from a host computer provides for up to 16 controllers on one RS485 link.

- Dimensions: 310mm by 264mm by 60mm
- Weight: 3.1 Kgs
- Connectors are plug in screw terminations for all signals except encoders (9 way D type female), RS232/485 serial port (9 way D type male) and CAN bus (RJ45)
- Operating temperatures 0-50°C

Operator Panel

- 20 Character by 4 line backlit display
- Ribbon cable connection, max 5m
- 27 Keys X,Y,Z, cursor and six user definable keys
- Operating temperatures 0-50°C

Control Schematic



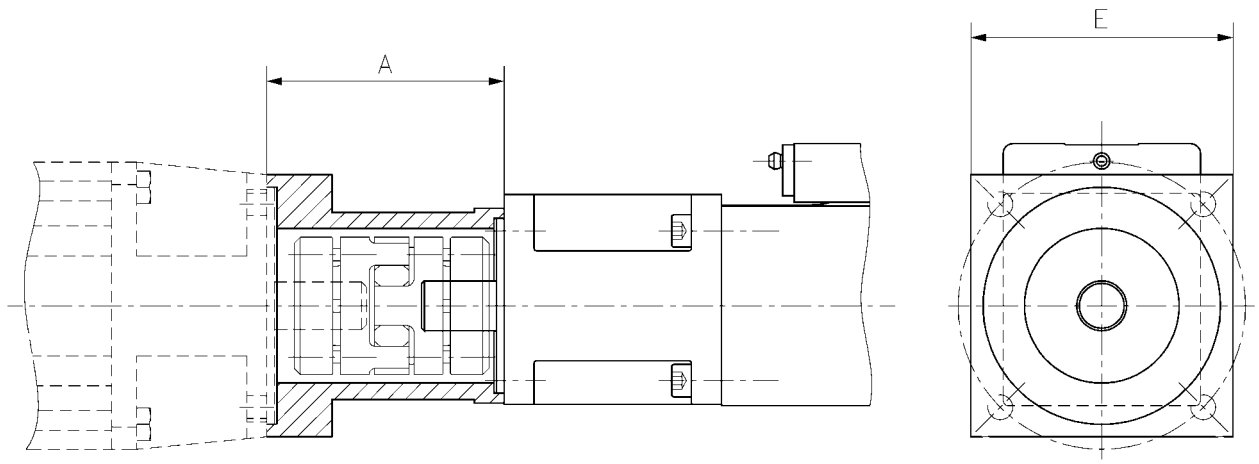
Order Codes

Part No	Description
12700	1 axis controller RS 232
12703	2 axis controller RS 232
12705	3 axis controller RS 232
12711	Operator panel
12719	Operator panel cable L=xm
12720	Controller manual

For other options please contact our technical sales department.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

The motor cage allows the motor to be mounted in line with the Movac. A range of standard units is shown below. Please contact us for any special requirements.



Movac	Part No.	Motor or gearbox	A	E □ or Ø
MSK 80	13100	SDA	85	100
MXK & MDK 60	13102	SDA	90	100
MXK & MDK 80	13104	SDA	90	100
MXK & MDK 120	13106	SDA	100	100
MTK 180 & MTK 240	13108	SDA	105	100
MSK 80	13110	SAA12532 & 4	75	92
	13112	SAA12537 & 9	80	105
MXK & MDK 60	13114	SAA12532 & 4	80	92
	13116	SAA12537 & 9	85	105
MXK & MDK 80	13118	SAA12532 & 4	80	92
	13120	SAA12537 & 9	85	105
MXK & MDK 120	13122	SAA12532 & 4	85	92
	13124	SAA12537 & 9	95	105
MTK 180	13126	SAA12532 & 4	95	92
& MTK 240	13128	SAA12537 & 9	100	105
MRB 50	13130	PGB12800	80	80
	13132	PGB12810	80	80
	13134	PGB12820	95	115
MRB 80	13136	PGB12800	85	80
	13138	PGB12810	85	80
	13140	PGB12820	100	115
MRB 120	13142	PGB12800	100	80
	13144	PGB12810	100	80
	13146	PGB12820	110	115

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

LIMIT SWITCHES, ELECTRICAL

Description

Inductive proximity switches are used to indicate that the actuator has reached its end of travel. They are also used to mark a datum position.
The time taken for the control to recognise a switch has been activated and the distance from the switch to the physical stop should be taken into account when deciding upon their positions.

Technical Data

Operating distance	2mm
Power Supply	10-30V DC

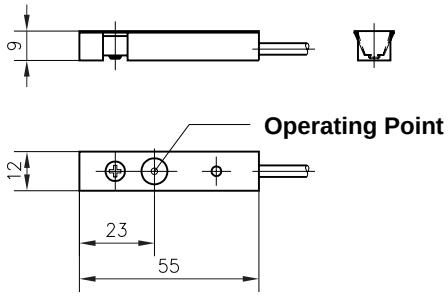
Protection	IP 67
Load current	200mA max

Mounting

These switches are mounted in a profile which is fixed to the actuator body (excepting MDK, MXK and MRB 120 which have an integral groove in the profile into which the switches are fitted).

Details of the switch actuation flag are shown on the relevant actuator data sheets.

Dimensions



Order Codes

Part No.	Description	Type
1360	Switch	Normally closed 2m cable
1362	Switch	Normally closed 10m cable
1364	Switch	Normally open 2m cable
1366	Switch	Normally open 10m cable
1372	Switch rail	L = 300mm
1374	Switch rail	L = 500mm

Switch Flags

These are ordered using the Part No. 1380 followed by the actuator model e.g. 1380-MRB120.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

Description

Mechanical limit switches are used for the same function as the proximity switch, however because they are mechanical, they are particularly suitable as over run and safety switches. They should be used when a health and safety hazard exists.

Technical Data

Dual circuit	NO & NC
Cable Length	1m

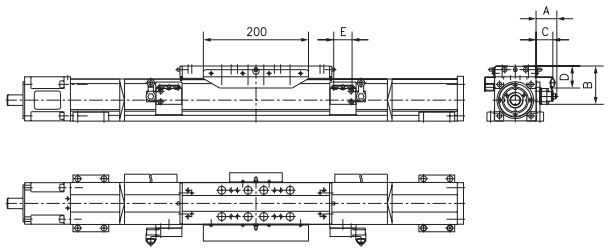
Protection	IP 67
Actuation	Mechanical

Mounting

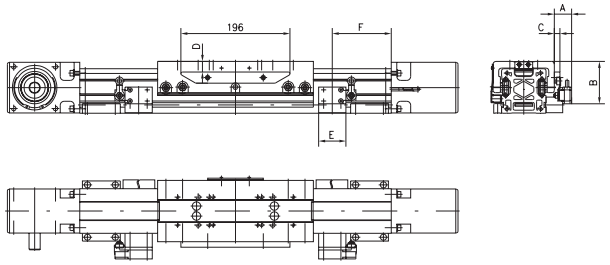
These switches are fitted, using a bracket, into the same groove that the mounting feet utilise.

Dimensions

MXK/MDK Actuators



MRB Actuators



Dimensions and Order Codes

	Dimensions						Part Numbers		
Movac Type	**A**	**B**	**C**	**D**	**E**	**F**	**Switch**	**Bracket**	**Flag**
MRB 50	34	61	10	26	49	83	1380	1396	1412
MRB 80	31	76	10	39	49	103	1382	1398	1414
MRB 120	34	88	10	51	49	103	1384	1400	1416
MRB 50Z	47	125	23	90	49	83	1386	1402	1418
MRB 80Z	46	175	25	138	49	103	1388	1404	1420
MXK/MDK 60	40	70	32	38	35	-	1390	1406	1422
MSK/MDK 80	40	73	32	42	35	-	1392	1408	1424
MSK/MDK 120	40	90	32	58	30	-	1394	1410	1426

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOTOR SELECTION GUIDE

The tables in sections 9.1 and 9.2 are an aid to selecting motors for a given thrust at a particular speed. If you are unsure of your requirements, please contact our sales department.

Ball screw Movacs - Section 9.1

Because of the permutations of pitch and inherent torque it is impossible to produce a table that covers all possibilities.

As a general rule:

(i) Calculate Fx required (see section 9.3).

(ii) Select your Movac and the pitch you require.

(iii) At the maximum speed look up the inherent torque from the actuator data sheet, interpolating if necessary.

(iv) Choose either an AC brushless (SAA) or DC servo motor (SDA).

(v) Go to the section of the table nearest (always rounding upwards) the inherent torque for your selection.

(vi) Look down the pitch column selecting the force required.

(vii) The motor can be read off from the left hand columns.

Belt Drive Actuators - Section 9.2

(i) Calculate Fx required (see section 9.3).

(ii) Select the appropriate Movac.

(iii) Look up on the table the combination of motor and gearbox that provides the correct thrust.

Note that speed tables showing the speed at different combinations of R.P.M and pitch are shown in section 9.2.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

Motor Selection for screw driven actuators

Motor		Torque	Max Speed	Inherent	Thrust available Fx (N) at pitch (mm)				
Type	Part No.	(Nm)	(RPM)	Torque (Nm)	5	10	20	40	50
SAA	12532	2.2	3000	0.5	2130	1060	530	260	210
SDA	12525	3.0	3000	0.5	3140	1570	780	390	310
SAA	12534	3.8	3000	0.5	4140	2070	1030	510	410
SDA	12526	4.5	3000	0.5	5020	2510	1250	620	500
SDA	12527	5.6	3000	0.5	6400	3200	1600	800	640
SAA	12537	6.8	3000	0.5	7910	3950	1970	980	790
SDA	12528	7.5	3000	0.5	8790	4390	2190	1090	870
SAA	12539	9.8	3000	0.5	11680	5840	2920	1460	1160
SAA	12532	2.2	3000	1.0	1500	750	370	180	150
SDA	12525	3.0	3000	1.0	2510	1250	620	310	250
SAA	12534	3.8	3000	1.0	3510	1750	870	430	350
SDA	12526	4.5	3000	1.0	4390	2190	1090	540	430
SDA	12527	5.6	3000	1.0	5780	2890	1440	720	570
SAA	12537	6.8	3000	1.0	7280	3640	1820	910	720
SDA	12528	7.5	3000	1.0	8160	4080	2040	1020	810
SAA	12539	9.8	3000	1.0	11050	5520	2760	1380	1100
SAA	12532	2.2	3000	1.5	870	430	210	100	80
SDA	12525	3.0	3000	1.5	1880	940	470	230	180
SAA	12534	3.8	3000	1.5	2890	1440	720	360	280
SDA	12526	4.5	3000	1.5	3760	1880	940	470	370
SDA	12527	5.6	3000	1.5	5150	2570	1280	640	510
SAA	12537	6.8	3000	1.5	6660	3330	1660	830	660
SDA	12528	7.5	3000	1.5	7530	3760	1880	940	750
SAA	12539	9.8	3000	1.5	10430	5210	2600	1300	1040
SAA	12532	2.2	3000	2.0	250	120	60	30	20
SDA	12525	3.0	3000	2.0	1250	620	310	150	120
SAA	12534	3.8	3000	2.0	2260	1130	560	280	220
SDA	12526	4 5	3000	2.0	3140	1570	780	390	310
SDA	12527	5.6	3000	2.0	4520	2260	1130	560	450
SAA	12537	6.8	3000	2.0	6030	3010	1500	750	600
SDA	12528	7.5	3000	2.0	6910	3450	1720	860	690
SAA	12539	9.8	3000	2.0	9800	4900	2450	1220	980
SDA	12525	3.0	3000	2.5	620	310	150	70	60
SDA	12534	3.8	3000	2.5	1630	810	400	200	160
SAA	12526	4.5	3000	2.5	2510	1250	620	310	250
SDA	12527	5.6	3000	2.5	3890	1940	970	480	380
SAA	12537	6.8	3000	2.5	5400	2700	1350	670	540
SDA	12528	7.5	3000	2.5	6280	3140	1570	780	620
SAA	12539	9.8	3000	2.5	9170	4580	2290	1140	910

For speeds and/or thrusts not shown above please contact our sales department.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOTOR SELECTION TABLES

Motor Selection for belt driven actuators

Movac Type	Pitch (mm)	Motor Type	Part No.	Torque	Thrust available Fx (N) gearbox ratio N:1		
					4:1	5:1	8:1
MRB-50	120	SAA	12532	2.2	407	535	-
MRB-80	200	SAA	12532	2.2	219	296	526
MRB-80	200	SAA	12534	3.8	443	575	973
MRB-80	200	SAA	12537	6.8	861	1099	1811
MRB-80	200	SAA	12539	9.8	1280	1622	2649
MRB-120	260	SAA	12532	2.2	96	155	332
MRB-120	260	SAA	12534	3.8	268	370	676
MRB-120	260	SAA	12537	6.8	590	773	1321
MRB-120	260	SAA	12539	9.8	912	1176	1965

Speed table for belt driven actuators

Movac Type	Pitch (mm)	Speed in mm/s at gearbox ratio N:1		
		4:1	5:1	8:1
MRB-50	120	1500	1200	750
MRB-80	200	2500	2000	1250
MRB-120	260	3250	2600	1625

For speeds and/or thrusts not listed above please contact our sales department.

Speed table for ball screw actuators

Pitch / RPM	Speed in mm/s for pitches as shown				
	5	10	20	40	50
1500	125	250	500	1000	1250
3000	250	500	1000	2000	2500

For speeds and/or thrusts not listed above please contact our sales department.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

MOTOR SELECTION CALCULATIONS

SECTION 9.3

Definitions

Torque and Force

T_T = Total torque

T_L = Torque reqd to move the load at a constant velocity

T_F = Inherent torque reqd to move the unit with no load

T_A = Torque reqd to accelerate the load

F_A = Force reqd to accelerate the load

F_s = Force reqd to move the load at a constant velocity

Speed and Velocity

a = Acceleration (m/s^2)
$V_{(max)}$ = (Maximum) velocity (m/s)
U = Initial velocity (m/s)
$T_{(Tot)}$ = Time for moving (S_{tot})
$S_{(Tot)}$ = (Total) distance to move
N_{max} = Maximum screw/pulley rotational speed

Constants

μ = Coefficient of friction of the bearing
μ_1 = Efficiency of gearbox/beltdrive if used
g = Gravity (9.81 m/s^2)
Sf = Safety factor (Normally 2)

Other

L = Movac Length (m)
p = Movac Pitch (mm)
m = Load weight (Kg)
P = Power (Kw)

Moments

Mx, My, Mz = moment in X,Y or Z planes

Notes

In vertical application μ = 1 and the acceleration used in the torque calculation is found by adding “a” to “g”.

These calculations only apply for horizontal or vertical applications. Please contact our technical department if actuators are mounted at an angle.

1. Velocity and acceleration calculations

Generalised velocity calculations

$V^2 = u^2 + 2.a.S$ $S = U.t + {}^1/_2.a.t^2$ $V = at$

In the special case of a trapezoidal move with an equal time period for acceleration, movement at constant velocity and decceleration.

$a_{max} = 9.S_{tot}/2.T^2_{tot}$ $Vmax = a.T_{tot}/3$

Calculate and check that speeds and accelerations are within the operating envelope of the Movac.

2. Calculation of moments

Calculate static and dynamic moments for each plane (X,Y and Z) with reference to the force diagram on each product page.

Sum and check that these are acceptable.

3. Calculation of forces

$F_s = m.g.\mu$
$F_a = m.a$

4. Friction μ

Model	μ
MSK	0.2
MLK, MLB, MDK	0.1
MTK	0.05
MXK	Value for guide

5. Calculation of torque

$F_{tot} = F_s + F_A$

$$T_T = \frac{F_{tot} \bullet S_F \bullet P}{2000 \bullet þ \bullet \mu_1} + T_F \text{ Nm}$$

For the value of T_F see appropriate data sheet

$$P = \frac{T_T \bullet N_{max}}{9550} \text{ Kw}$$

The torque required to accelerate the belt or screw is normally negligible.

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

NOTES

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

NOTES

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431

Modular Robotic Systems Ltd, Kirkless Industrial Estate, Cale Lane, Wigan WN2 1HQ, UK
Telephone: 01942 820088 ¥ E-mail: sales@modular.u-net.com ¥ Facsimile: 01942 820431