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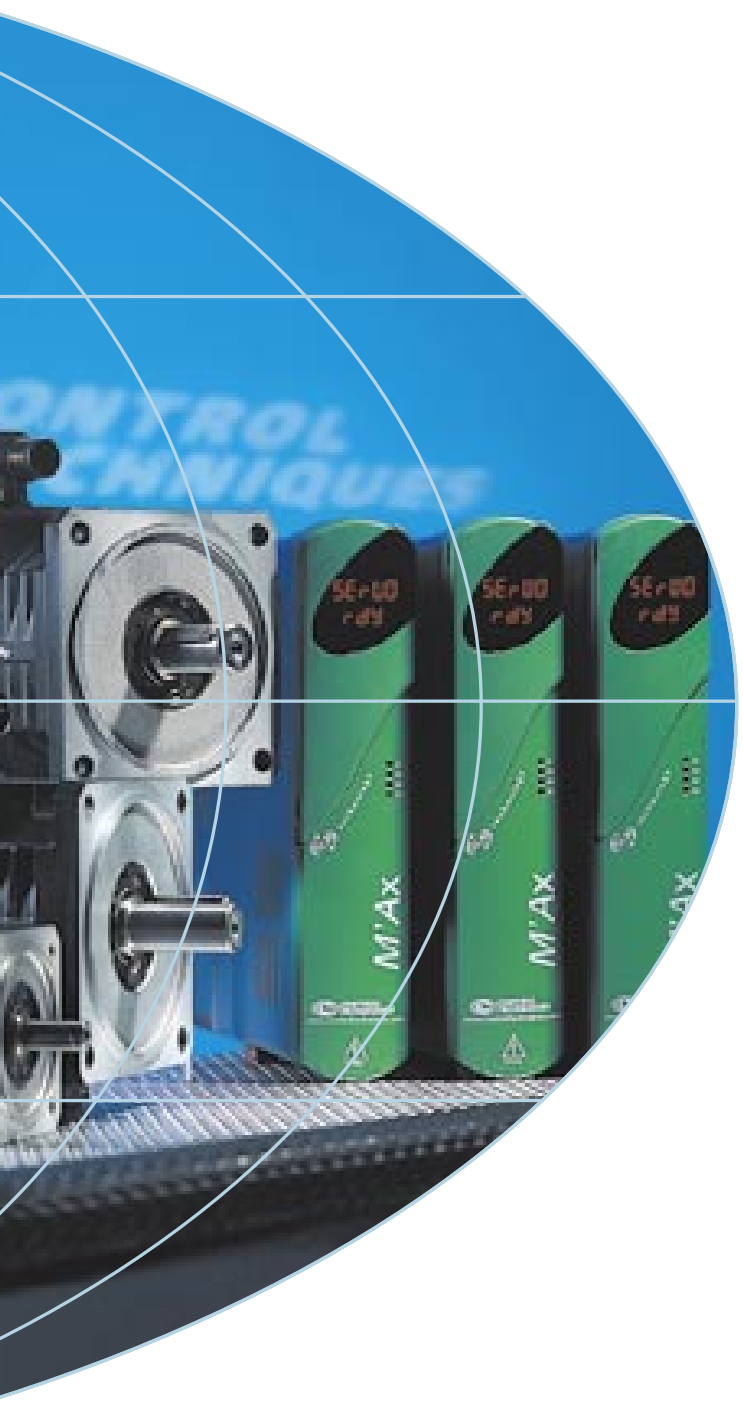

M'Ax Servo -

Precision AC servo performance
with Unimotor SLM

1 2 3 4 5 reasons for choosing the ultimate servo- M'Ax...

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...1 Easy Start Up

with automatic motor mapping

Easy Start

M'Ax's Automatic Motor Mapping sets itself and gets you going in minutes... No longer do you need to worry about determining and programming the motor type, current, phase angle, inertia, Kt, Ke etc. It is automatic, immediately at power up, even without the need for a PC, thereby ensuring a trouble free and fast start up - Easy Start!

Tuning Is Easy With M'Ax's Gains Calculator...

One step keypad programming calculates the PID gains and gets you running. Better still, if you know your machinery inertia then simply dial it in and one step recalculates the optimal gains for best running.

With A PC It Is Even Easier With M'AxSoft...

M'AxSoft is a windows based drive set-up program that is designed to enable the complete control and display of all parameters within M'Ax.

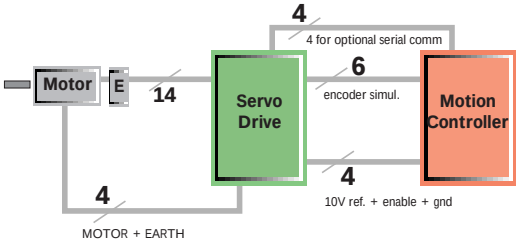
...And if that is not easy enough, then the Wizard walks you through the setup...

...2 Total System Costs Reduced!

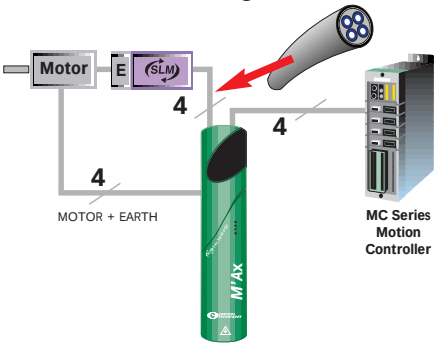
M'Ax cuts the costs of multiaxes servo systems by:-

- **Reducing** wiring in the feedback loop - 4 wire system offers significant advantage over the conventional encoder requiring 14 wires
- **Reducing** cubicle size - M'Ax is compact, only 62mm wide, the minimum of machinery space required for multi axes installation
- **Reducing** AC supply connections as M'Ax's can be DC supply fed in parallel connection
- **Reducing** cabling as motor thermistors are no longer required - M'Ax offers intelligent thermal modelling for accurate and reliable protection of the motor

Conventional Servo Wiring = 32 Connections



M'Ax Servo Wiring = 12 Connections



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M'Ax - Simplicity, Flexibility and Performance

M'Ax redefines what you expect from a servo

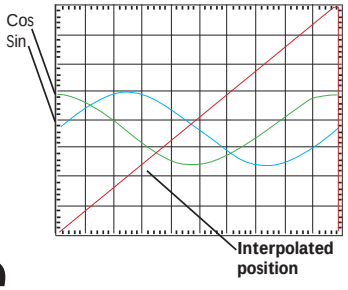
The quantum leap in servo design that is M'Ax, redefines totally what a User can and should expect from a servo system in terms of simplicity to use and install, installation costs, set up times, axis performance, precision and resolution.

By achieving substantial advances in all of these crucial areas, M'Ax provides machine builders with a simple, powerful, and cost effective way of improving the competitiveness and performance of their own machines!

...3 Highest Resolution Feedback

"Perfect" feedback and at an affordable price level!

- Advanced Sin Cos encoders are **standard** and with (SLM) technology the sensitive signals are processed at source to produce the highest resolution in digital form.
- Digital clarity is maintained by use of high speed serial link (2.5Mbaud, 4 wire system) to interface between the drive and motor - supports cable runs of up to 50 metres with high level of noise immunity.
- M'Ax feedback is "intelligent" and enables vital dataflow between the motor, drive and also host motion controller if required. For example condition monitoring of motor temperature, performance data and many more control parameters.

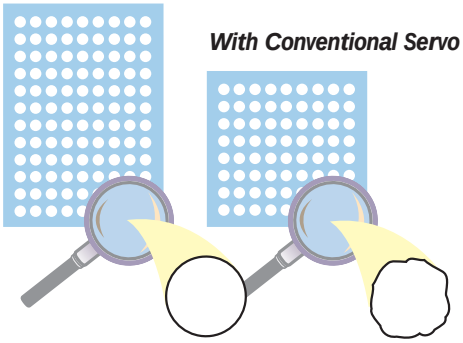


...4 Higher Performance and Precision

Superb precision performance is standard thanks to the revolutionary (SLM) technology! M'Ax's feedback provides 8.3 million points per revolution for the speed loop control. With this high resolution we are able to track the smallest deviation and work with gains that do not reach the threshold of instability. The result is high dynamic response with good motion regularity and ultra smoothness in rotation. M'Ax can give your machinery that extra competitive edge through improved machinery performance!

The graphic opposite shows how (SLM) technology makes the difference for a hole cutting machine. In 1 minute - Higher productivity, cuts faster, better accuracy and quality (roundness) is up fourfold.

With (SLM) technology



Roundness 50µm (0.002") Roundness 200µm (0.008")

...5 inside

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...5 SLM technology

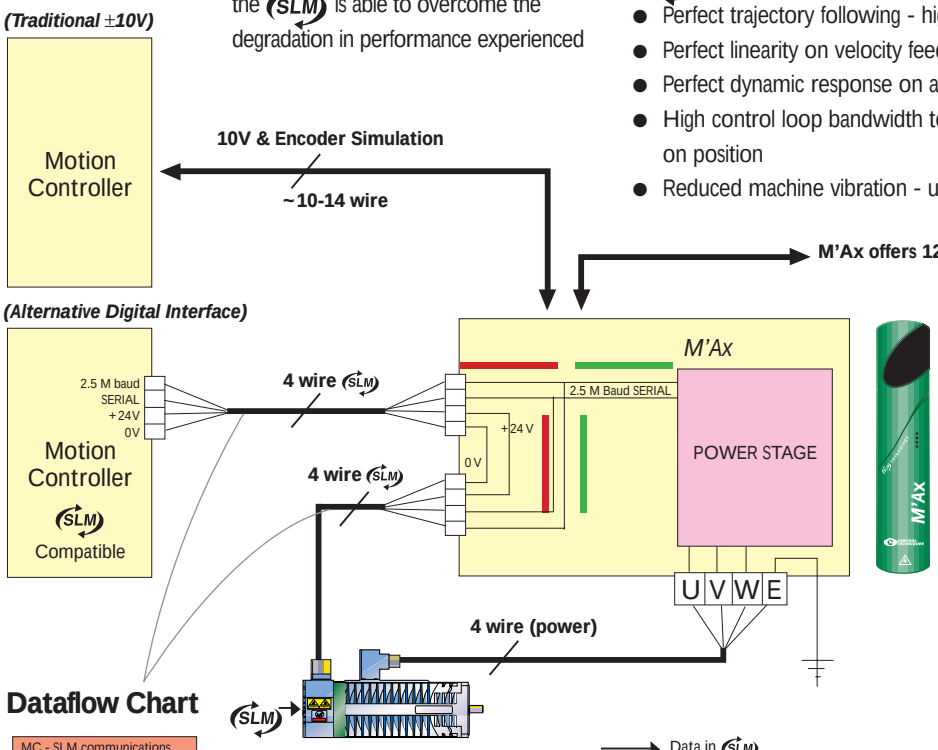
Tomorrow's Technology NOW!

The SLM technology uses a combination of Control Techniques 4-wire, DriveLink ASIC and motor-mounted SinCos encoders to achieve an application invariant 20-fold increase in position feedback resolution (over 8.3 million points per revolution). This is achieved by integrating speed & position control within the feedback system on-board the servomotor. As a result, the SLM is able to overcome the degradation in performance experienced with encoder feedback signals when synchronising multiple servo axes on machines as operating speeds increase.

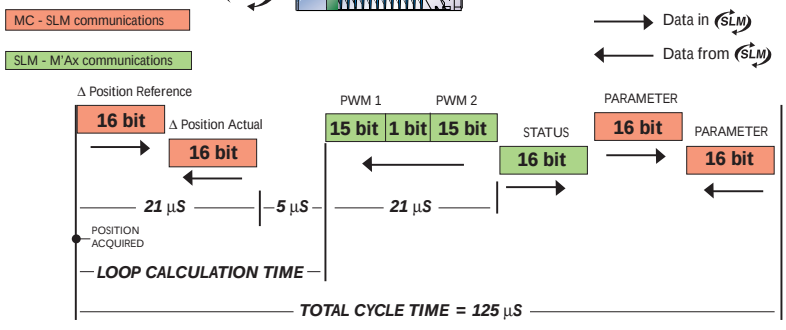
For the ultimate interpolated multiaxes performance, control loops are deterministic and synchronised to give the lowest jitter in the industry - of 50 nanoseconds. As well as being a performance enhancer now, SLM technology is also a gateway to the future. Its integration into PC-based motion systems opens up a whole new vista for optimised multi-axes control in the new future.

SLM technology - Your Control Benefits

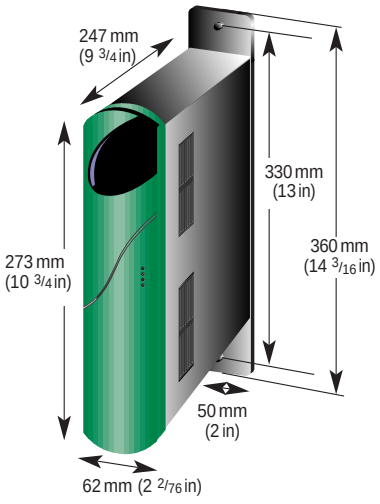
- Perfect trajectory following - high resolution feedback
- Perfect linearity on velocity feed forward
- Perfect dynamic response on acceleration feed forward
- High control loop bandwidth to achieve sub micron precision on position
- Reduced machine vibration - ultra smooth operation



Dataflow Chart



Dimension M'Ax 403-412



M'Ax Menu Structure

Menu 0 – Basic Set up
Menu 1 – Speed Reference Selection
Menu 2 – Ramp Selection
Menu 3 – Speed Loop PID Gains
Menu 4 – Torque Control
Menu 5 – Motor Control
Menu 6 – Sequencer Functions
Menu 7 – Analogue I/O Settings
Menu 8 – Digital I/O Settings
Menu 10 – Status and Diagnostic
Menu 11 – Serial Communications
Menu 13 – Pulse reference selection and scaling

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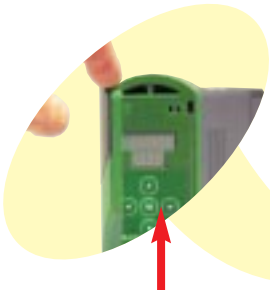
Key Design Features

Back-up Power Supply
- 24Vdc for SLM encoder
- 28/32Vdc for drive logic suitable for standby, evacuation system - reduced dc bus running

Digital I/O
- Opto-isolated
- Eight digital inputs
- Four digital outputs
- 24V user supply



Standalone
- Frequency & direction or quadrature inputs
- 16 bit High precision ±10V differential (if keypad fitted)
- SLM and user back up supply
- 24V user supply

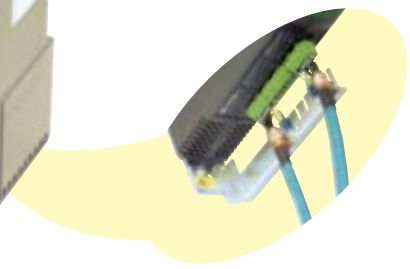
Simulated Encoder
- Encoder quadrature A, B plus Zmarker-pulse outputs (4096, 2048, 1024ppr)
- Two analogue outputs
- Standard-precision analogue differential reference input (12 bit)

Communications Port
- RS232
- RS485
- ANSI 3.28/Modbus RTU

Keypad
- 7 segment removable display
- Memory Pad stores identical set of parameters for easy upload
- 16 bit high precision ±10V differential

Braking
- Standard internal resistor **'failsafe'** design
- Electronic I^2t protection for internal braking resistor
- External resistor connectable

Compact Design
- One size for the range 3.5 to 12.5Amps
- Protection to IP20
- Only 62mm wide

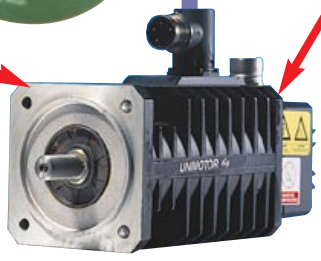


Practical Grounding Bar and Cable Support
- Pluggable terminals for
  - mains supply
  - motor power
  - external braking resistor
- Earthing clamps for motor cable screen

Easy Start
- Automatic motor mapping
- Gains calculator
- MaxSoft with Wizard

DC Bus
- Can be supplied from a common DC power supply in parallel with other models
- Reduced DC bus running with drive backup supply

'Electronic' Thermistor
- Intelligent thermal modelling
- Accurate monitoring and protection
- Serial data link employed – NO need for thermistor in motor and NO extra cabling requirements



Advanced Feedback
- SinCos encoder as standard
- Reduced cabling 4 wire system – up to 50 metres
- Intelligent capability
- High resolution (8.3 million points per revolution)

2 YEAR Digital Drive Warranty

CE

UL

c UL us LISTED E147827

Electrical Data

	Output Current		External RFI Filter (IP20) Complies with EN50081/1 or 2					Internal Braking Resistor				
	Continuous Amps	Peak Current Amps (2sMax)	Part Number	Max Power Dissipation	L (mm)	W (mm)	D (mm)	Value (mm)	Operating Voltage (Vr)	Peak Current Amps Vr)	Peak Power (kW)	Max.Cont Braking Power (Wr)
M'Ax 403	3.5	7	4200-1645	6	250	45	70	75ohm	780V	10.9	8.9	150
M'Ax 406	6.5	13										
M'Ax 409	9.5	19										
M'Ax 412†	12.5	25										

Supply Voltage 380 - 480V ±10%
Rated ambient 45ºC (up to 55ºC with derating)
Altitude: derate above 1000m
Relative humidity: 95% non-condensing
†Under certain conditions AC line chokes may be required

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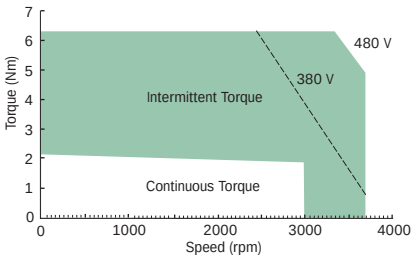
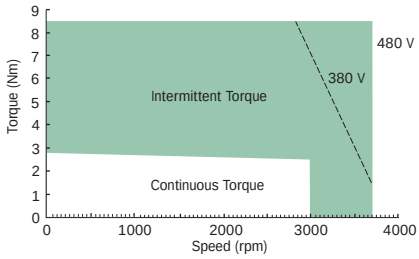
Speed Torque Characteristics

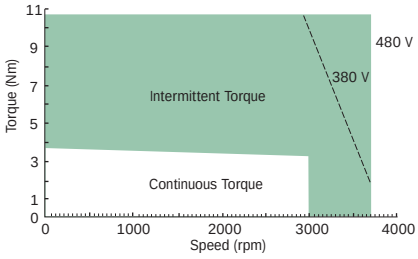
(2) 75SLB300 with M'Ax 403



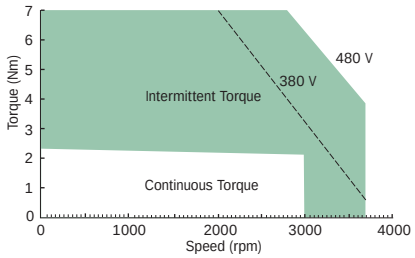
(3) 75SLC300 with M'Ax 403



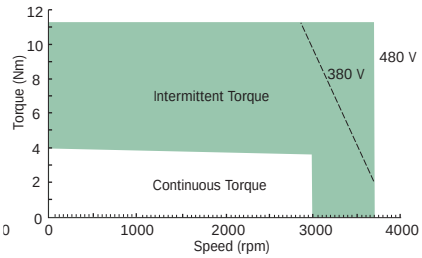
(4) 75SLD300 with M'Ax 403



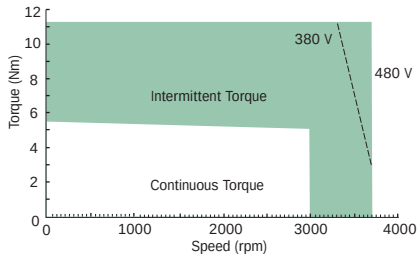
(5) 95SLA300 with M'Ax 403



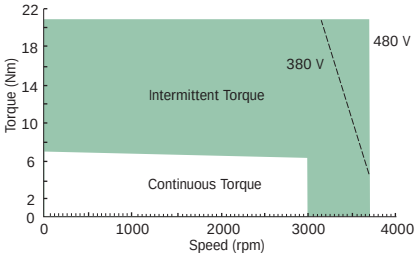
(6) 95SLB300 with M'Ax 403



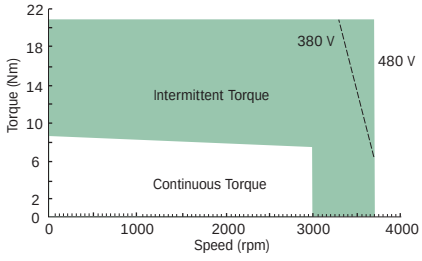
(7) 95SLC300 with M'Ax 403



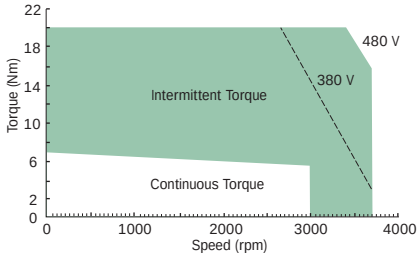
(8) 95SLD300 with M'Ax 406



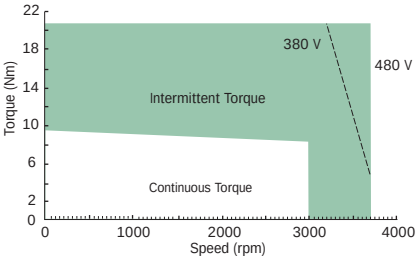
(9) 95SLE300 with M'Ax 406



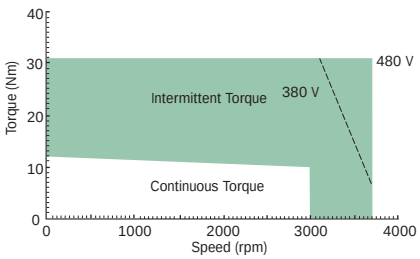
(11) 115SLB300 with M'Ax 406



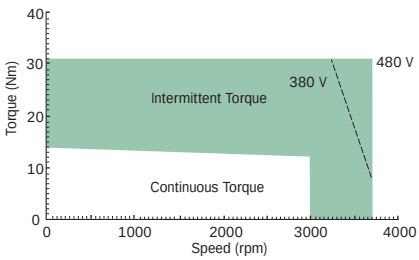
(12) 115SLC300 with M'Ax 406



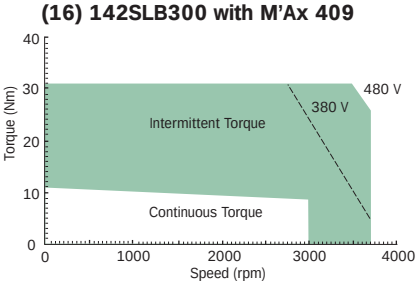
(13) 115SLD300 with M'Ax 409



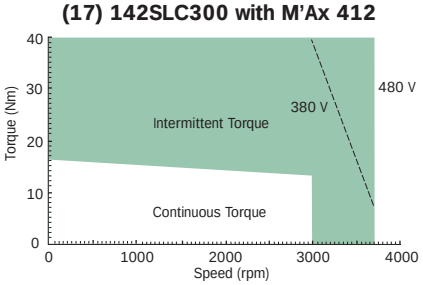
(14) 115SLE300 with M'Ax 409



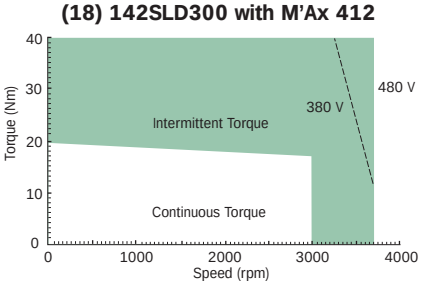
(16) 142SLB300 with M'Ax 409



(17) 142SLC300 with M'Ax 412



(18) 142SLD300 with M'Ax 412



40ºC Ambient, up to ΔT100; 10% tolerance on all performance data

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Performance Matched Motors & Drives

Unimotor (SLM) - M'Ax Combinations

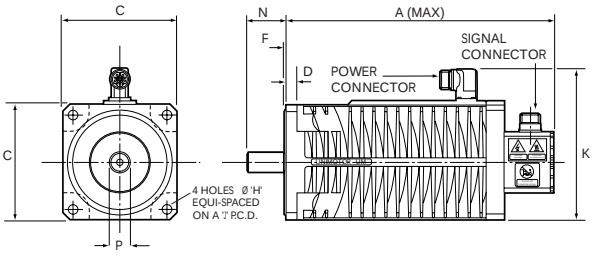
Reference No.	Motor Type (#) 3000rpm Kt (1.6Nm/A rms)	Drive Type	Stall Torque (Nm)	Stall Current (Arms)	Peak Torque (Nm)	Torque @ 3000rpm (Nm)	Standard Inertia(*) ($kgcm^2$)	Motor Weight (kg)
1	75SLA300CBPAA	M'Ax 403	1.2	0.73	3.6	1.1	0.6	3
2	75SLB300CBPAA	M'Ax 403	2.1	1.29	6.3	1.9	1.0	3.7
3	75SLC300CBPAA	M'Ax 403	2.8	1.74	8.4	2.5	1.5	4.4
4	75SLD300CBPAA	M'Ax 403	3.6	2.25	10.8	3.3	1.9	5.1
5	95SLA300CBPAA	M'Ax 403	2.3	1.42	6.9	2.1	1.4	5
6	95SLB300CBPAA	M'Ax 403	3.9	2.45	11.2 (†)	3.6	2.5	6.1
7	95SLC300CBPAA	M'Ax 403	5.5	3.41	11.2 (†)	5.0	3.6	7.2
8	95SLD300CBPAA	M'Ax 406	6.9	4.32	20.7	6.3	4.7	8.3
9	95SLE300CBPAA	M'Ax 406	8.4	5.23	20.8 (†)	7.6	5.8	9.5
10	115SLA300CBPAA	M'Ax 403	4.1	2.53	11.2 (†)	3.3	3.2	6.5
11	115SLB300CBPAA	M'Ax 406	6.7	4.16	20.1	5.5	5.5	8.2
12	115SLC300CBPAA	M'Ax 406	9.5	5.91	20.8 (†)	7.7	7.8	9.9
13	115SLD300CBPAA	M'Ax 409	12.0	7.48	30.4 (†)	9.7	10.0	11.6
14	115SLE300CBPAA	M'Ax 409	14.1	8.83	30.4 (†)	11.4	12.3	13.2
15	142SLA300CBPAA	M'Ax 406	6.3	3.94	18.9	5.4	7.8	10.9
16	142SLB300CBPAA	M'Ax 409	10.8	6.75	30.4 (†)	9.0	14.1	13.2
17	142SLC300CBPAA	M'Ax 412	15.3	9.56	40.0	12.2	20.5	15.5
18	142SLD300CBPAA	M'Ax 412	19.8	12.38	40.0	15.8	26.8	17.8

Preferred stocking frames are B and D. For other combinations - consult Drive Centre.
(#): Motors in table are connectorised, no brake, no key - plain shaft, IEC flange, standard inertia.
Other base speeds are 2000rpm (2.4Nm/A rms), 4000rpm (1.2Nm/A rms); 6000rpm also available
Options available: Brake, cable assemblies, fan cool cowlings, planetary gearboxes, keyed shaft
(†): Motor is capable of higher peak torques when used with next higher rating M'Ax.
(*): Higher inertia stators are available as options.

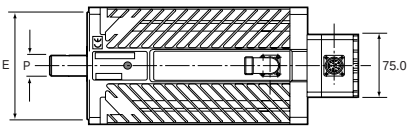
Unimotor (SLM)

The Unique 'finned' design improves heat dissipation, and with its single piece design optimises torque output and reduces cogging torque. The compact design gives additional torsional stiffness.

Laminations and coils are optimised to give high efficiency and low harmonic distortion. All this combined with high energy magnets and a choice of rotor inertia, give Unimotor (SLM) truly dynamic performance to suit all applications.



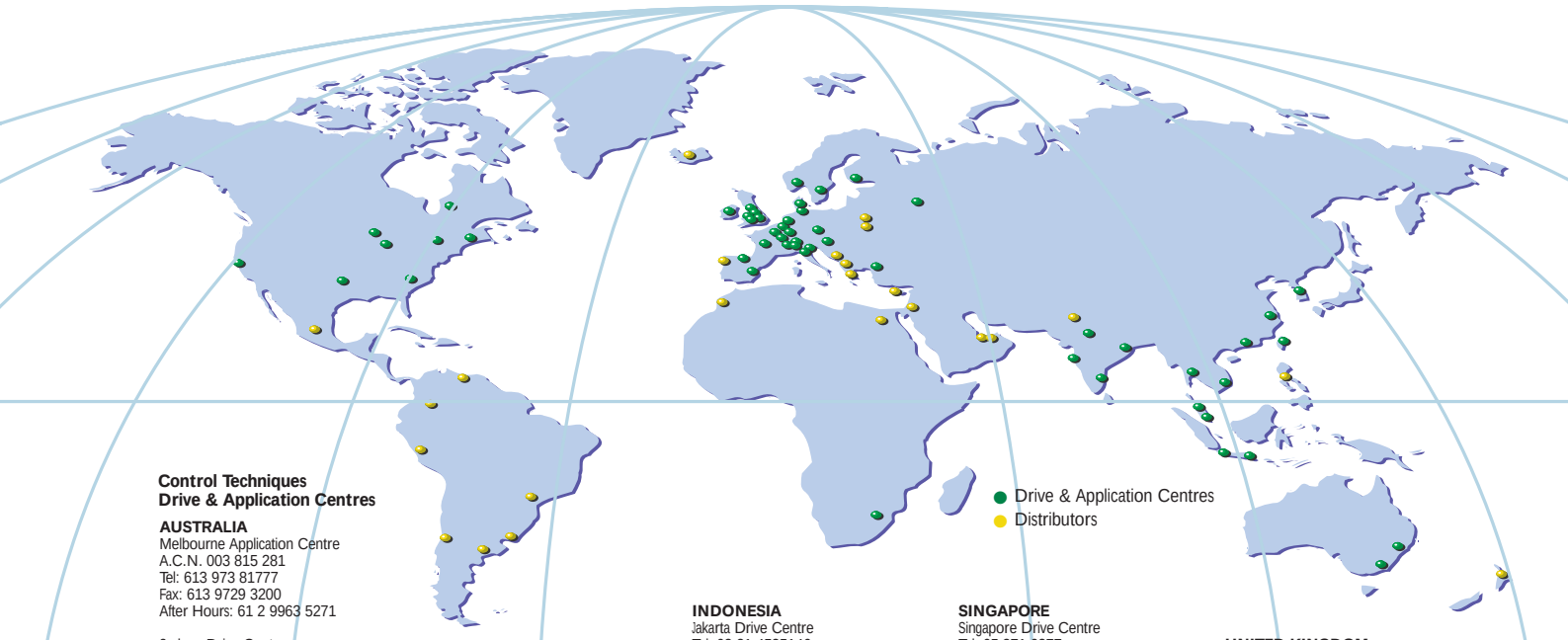
Unimotor (SLM) - Frame Sizes 75 - 142



Unimotor Dimensions

Ref	Description	75B	75C	75D	95A	95B	95C	95D	95E	115B	115C	115D	115E	142B	142C	142D
A	Length overall (unbraked)	241	271	301	222	252	282	312	342	272	302	332	362	255	285	315
A	Length overall (braked)	271	301	331	252	282	312	342	372	302	332	362	392	315	345	375
C	Flange Square	75	75	75	95	95	95	95	95	115	115	115	115	142	142	142
D	Flange Thickness	7	7	7	9	9	9	9	9	11	11	11	11	12.3	12.3	12.3
E	Register Diameter (J6)	60	60	60	80	80	80	80	80	95	95	95	95	130	130	130
F	Register Length	2.4	2.4	2.4	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3.4	3.4	3.4
H	Fixing Holes Diameter (H14)	5.8	5.8	5.8	7	7	7	7	7	10	10	10	10	12	12	12
J	Fixing Hole p.c.d	75	7.5	75	100	100	100	100	100	115	115	115	115	165	165	165
K	Overall Height	126	126	126	146	146	146	146	146	166	166	166	166	193	193	193
N	Shaft Length (front)	30	30	30	30	40	40	40	40	40	40	50	50	50	50	50
P	Shaft Diameter (front)	14	14	14	14	19	19	19	19	19	19	24	24	24	24	24

Driving the world...



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Drive & Application Centres

AUSTRALIA
Melbourne Application Centre
A.C.N. 003 815 281
Tel: 613 973 81777
Fax: 613 9729 3200
After Hours: 61 2 9963 5271

Sydney Drive Centre
A.C.N. 003 815 281
Tel: 61 2 9838 7222
Fax: 61 2 9838 7764
After Hours: 61 2 9963 5271

AUSTRIA
Linz Drive Centre
Tel: 43 7229 789480
Fax: 43 7229 7894810
After Hours: 43 7215 3502

BELGIUM
Brussels Drive Centre
Tel: 32 2725 2721
Fax: 32 2725 4940

CANADA
Toronto Drive Centre
Tel: 1 905 475 4699
Fax: 1 905 475 4694

CHINA
Shanghai Drive Centre
Tel: 86 21 64085747
Fax: 86 21 64083282

CZECH REPUBLIC
Brno Drive Centre
Tel: 420 541 192111
Fax: 420 541 192115
After Hours: 420 5 411 92119

DENMARK
Copenhagen Drive Centre
Tel: 45 4369 6100
Fax: 45 4369 6101
After Hours: 45 4369 6100

FINLAND
Helsinki Drive Centre
Tel: 358 985 2661
Fax: 358 985 26823
After Hours: 358 500 423271

FRANCE
Leroy Somer
Angouleme Drive Centre
Tel: 33 5 4564 5454
Fax: 33 5 4564 5400

GERMANY
Bonn Drive Centre
Tel: 49 2242 8770
Fax: 49 2242 877277
After Hours: 49 1714 964777

Chemnitz Drive Centre
Tel: 49 3722 52030
Fax: 49 3722 520330
After Hours: 49 1714 964777

Darmstadt Drive Centre
Tel: 49 6251 17700
Fax: 49 6251 177098
After Hours: 49 1714 964777

Stuttgart Drive Centre
Tel: 49 7156 95560
Fax: 49 7156 955698
After Hours: 49 1714 964777

HOLLAND
Rotterdam Drive Centre
Tel: 31 1844 20555
Fax: 31 1844 20721
After Hours: 31 1844 20555

HONG KONG
Hong Kong Application Centre
Tel: 852 2979 5271
Fax: 852 2979 5220

HUNGARY
Budapest Drive Centre
Tel: 361 431 1160
Fax: 361 260 5483

INDIA
Bombay Application Centre
Tel: 91 620 613954
Fax: 91 620 6113312

Calcutta Application Centre
Tel: 91 33 357 5302/357 5306
Fax: 91 33 357 3435
After Hours: 91 33 358 3622

Madras Drive Centre
Tel: 91 44 4961123/4961130/4961083
Fax: 91 44 4961602

New Delhi Application Centre
Tel: 91 11 576 4782/581 3166
Fax: 91 11 576 4782

INDONESIA
Jakarta Drive Centre
Tel: 62 21 4525146
Fax: 62 21 4525142
After Hours: 62 81 687 0443

Surabaya Application Centre
Tel: 62 31 7347881/7347882
Fax: 62 31 7347883
After Hours: 62 81 687 0443

IRELAND
Dublin Drive Centre
Tel: 353 45 433044
Fax: 353 45 433622

ITALY
Milan Drive Centre
Tel: 39 02575 751
Fax: 39 02575 12858
After Hours: 39 02575 751

Vicenza Drive Centre
Tel: 39 0444 396200
Fax: 39 0444 341317
After Hours: 39 0257 57 751

KOREA
Seoul Application Centre
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Fax: 82 2 3445 6181
After Hours: 82 23 445 6183

MALAYSIA
Kuala Lumpur Drive Centre
Tel: 60 3734 9776
Fax: 60 3733 9592
After Hours: 60 12 333 8355

NORWAY
Oslo Application Centre
Tel: 47 32 235100
Fax: 47 32 235101
After Hours: 47 92 22 3292

REPUBLIC OF SOUTH AFRICA
Johannesburg Drive Centre
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Fax: 27 11 462 1941
After Hours: 27 11 462 1740

RUSSIA
Moscow Application Centre
Tel: 7 095 232-9472
Fax: 7 095 956-4862

SINGAPORE
Singapore Drive Centre
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Fax: 65 272 1302
After Hours: 65 9752 5828

SPAIN
Barcelona Drive Centre
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Fax: 34 93 680 0903
/34 93 680 0763
/34 93 680 2823
After Hours: 34 610 554540

Bilbao Application Centre
Tel: 34 94 620 3646
Fax: 34 94 681 1406

Valencia Drive Centre
Tel: 34 96 154 2900
Fax: 34 96 153 2906

SWEDEN
Stockholm Application Centre
Tel: 46 8 554 24100
Fax: 46 8 554 24120

SWITZERLAND
Lausanne Application Centre
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Fax: 41 21 635 8596
After Hours: 41 79 357 8683

Zurich Drive Centre
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Fax: 41 56 201 4243
After Hours: 41 79 357 8683

TAIWAN
Taipei Application Centre
Tel: 886 22325 9555
Fax: 886 22705 9131

THAILAND
Bangkok Drive Centre
Tel: 66 2580 7644/954 3080
Fax: 66 2591 4559/954 3085

TURKEY
Istanbul Drive Centre
Tel: 90 216 4182420
Fax: 90 216 4182423
After Hours: 90 216 418 2420

UNITED KINGDOM
Leeds Drive Centre
Tel: 44 113 2423400
Fax: 44 113 2423892
After Hours: 44 113 2423400

Luton Drive Centre
Tel: 44 1582 567700
Fax: 44 1582 567703
After Hours: 44 1582 567700

Telford Drive Centre
Tel: 44 1952 213700
Fax: 44 1952 213701
After Hours: 44 1952 213700

USA
Charlotte Application Centre
Tel: 1 704 393 3366
Fax: 1 704 393 0900
After Hours: 1 800 893 2321

Chicago Drive Centre
Tel: 1 630 893 5249
Fax: 1 630 893 4156
After Hours: 1 800 893 2321

Cleveland Drive Centre
Tel: 1 440 717 0123
Fax: 1 440 717 0133
After Hours: 1 800 893 2321

Minneapolis Application Centre
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Fax: 1 952 995 8011
After Hours: 1800 893 2321

Providence Drive Centre
Tel: 1 401 333 3331
Fax: 1 401 333 6330
After Hours: 1 800 893 2321

VIETNAM
Ho Chi Minh Application Centre
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/84 8 849 1980
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