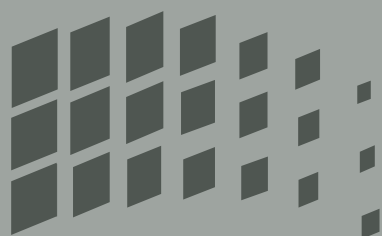


# ***Motion Control Electronics***



**ELMEQ**



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Member of the ERMIS Group

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# Elmeq

## Motion

## Control

## Technology

**T**he Elmeq group of companies specialises in “small” drive technology. Elmeq began life in the Netherlands in 1978 as an importer and agent for a number of foreign manufacturers.

Over the years branches have been established in Spain and Belgium and the parent company in the Netherlands has expanded its activities to include engineering consultancy and the manufacture of products. As a result of these various developments, Elmeq now has an extensive product range of drive engineering components encompassing products from leading specialist companies as well as “in house” products. Company expertise covers: electronics, precision mechanics and information technology. Within these fields, both individually and in combination (mechatronics), Elmeq plays an innovative role. Elmeq is used to developing and supplying complete solutions for complex drive problems. Servo and computer control technologies are coming increasingly to the forefront in these areas.

The Elmeq product range of electronic products includes one-, two- and four quadrant DC brush- and brushless amplifiers, AC servo drivers as well as stepper drivers. All these configurations have both non programmable and programmable models. Stepper drivers have half, full and micro stepping models. Automation projects ranging from the simple to the complex can be realised using the Elmeq Motion Control System (EMCS), even if only a few items or only small numbers are required. Modularity, flexibility, software programs refined to perfection and immediate availability are the reason why. The products in the Elmeq ‘stock range’ have been carefully selected from our complete range to ensure excellent and rapid service when it comes to supplying drive components and assemblies. In this catalogue you will find three main groups of amplifiers/controllers.

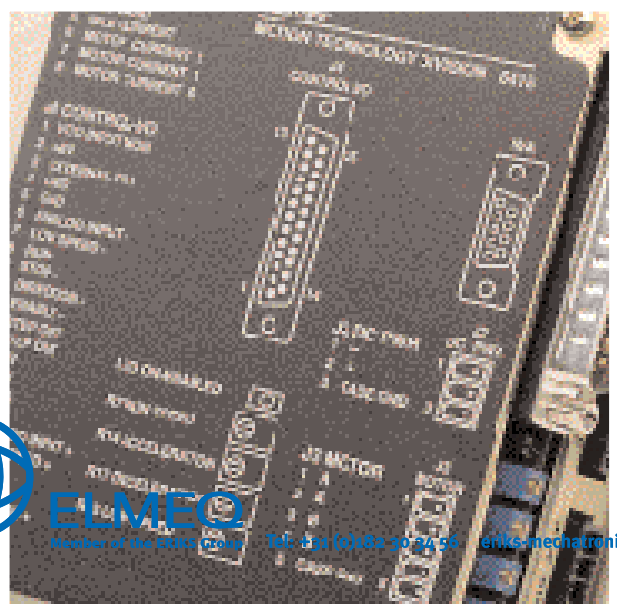
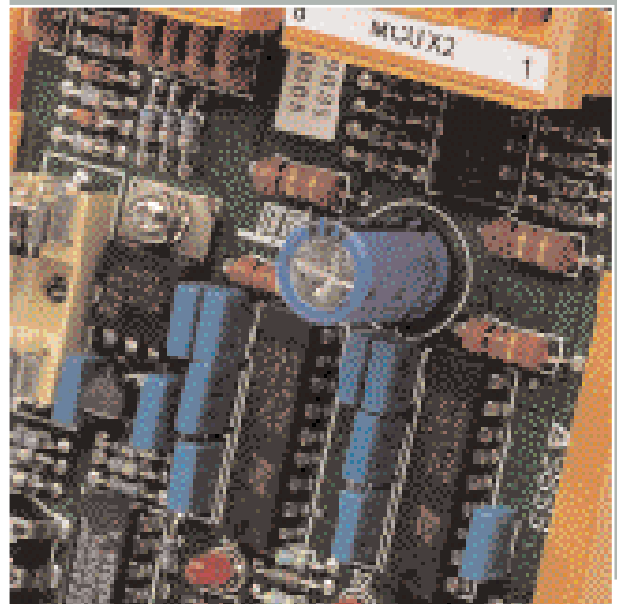
Selection can be made as follows:

- Determine the type of motor which is desired.
- Does the application require just controlled output or also intelligence?
- Determine the necessary power, current and voltage.

If the right controller is found, please contact Elmeq for price and delivery. It is possible that the described controller in this catalogue does not match your requirements. We have mentioned the main specification of each controller to keep the catalogue as readable as possible and to show a selection of the most common sold stocked products. There are more amplifier- and controller combinations available from Elmeq. Elmeq also has the capability to develop customised electronics for medium and large series, as well as to develop software to meet all your requirements. By using a programmable controller, high flexibility is a fact and almost every application is possible.

Please send you requirements to the sales engineers of Elmeq or call them for information.

Detailed information can be sent to you on request.



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# Contents and Overview

			Model	Quadrant control* (Q)	Nominal Power (W)	Figure	Page	
DC-servomotor/amplifier	Brush	Non programmable	MC403D	4	65		4	
			MC175	1	130		4	
			12A8	4	480		5	
			MC102	1	600		4	
			MC202	2	600	1	4	
			25A8		1000		5	
			20A14		1400		5	
			20A20		2000		5	
	Brushless	Programmable	DIMC241	4	2 x 24		6	
			IMC242		75	2	6	
			IIF32		75	1	6	
			IMC2410	-	360		6	
			IMC102	2	500		7	
			IMC510	4	500	2	7	
			MDC2		500		7	
			AC-servomotor amplifier	Non programmable	SCE903		5000	
SCE904		10000				10		
SCE905		15000				10		
SCE906		22500			2	10		
Programmable	SCE953	4			5000		11	
	SCE954				10000		11	
	SCE955			15000		11		
	SCE956			22500		11		
Stepper motor driver	Half/full step	Non programmable		IB462		80		12
				IB463		140		12
			IB104		320	3	12	
			IB106		480		12	
			IB1010		720		12	
	Microstep	Non programmable	IM481H	-	45		13	
			IM483		145		13	
			IM804		300		13	
			6410		375	4	13	
			6415		375		13	
			IM1007		560		13	
		Programmable	IM48312		145		14	
			6420		375		14	
			IM100712		560		14	
EMCS							15	
Accessories							16	
Design Guide for motors and amplifiers							17 - 18	

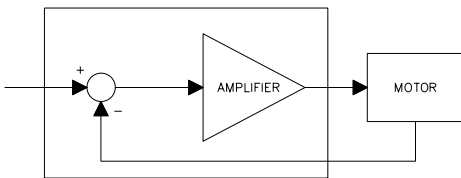


Figure 1

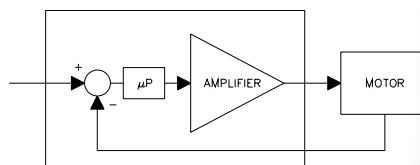


Figure 2

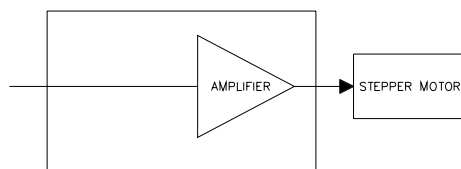


Figure 3

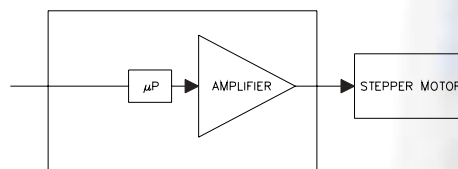


Figure 4

\*) 1Q (1 quadrant) control: is for speed or torque control in one direction.

2Q (2 quadrant) control: is for speed or torque control in one direction with dynamic braking.

4Q (4 quadrant) control: is for speed or torque control in two directions with dynamic braking.



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# MC-Series

## DC-brush motor amplifiers



The MC-series amplifiers are low cost electronic speed controllers to drive DC brush type permanent magnet motors. Due to pulse width modulation a very high efficiency is achieved. They require only a single unregulated DC power supply. Several settings such as loop gain, current limit, offset, etc. can be made by activating potentiometers.

**MC403** is a small and low cost four-quadrant speed controller. The amplifier is controlled by a number of digital inputs, which determine the rotation direction and the two adjustable speed limits.

**MC175** and **MC102**, are low cost one-quadrant speed controllers for controlling one-direction applications.

**MC202** is a two-quadrant speed controller. It's the same as the MC102, however with dynamic braking in one direction.

General Specifications		MC403	MC175	MC102	MC202
Input voltage (optional)	[ VDC ]	20 - 45	(12) 18 - 35	(12) 24 - 60	
Peak Current (with heat sink)	[ A ]	3 (5)	12	20	
Cont. Current (with heat sink)	[ A ]	1,5 (2,5)	4	10	
Autom. Switch off at overload	[ - ]	yes ▶			
Current limiting	[ - ]	yes ▶			
Switching frequency	[ kHz ]	20 ▶			
Minimum load inductance	[ μH ]	>150 ▶			
Feedback possibilities	[ - ]	IxR/ Tacho/Voltage		IxR/ Tacho/voltage/Encoder	
Speed control by potentiometer	[ - ]	yes ▶			
Analog control	[ VDC ]	+/-10	0 -10		
Peak current limit adj.	[ - ]	yes		3 x I nominal	
Nom. current limit adj.	[ - ]	no	no	yes	
Soft start/ramping	[ - ]	no	yes		
Under and/or over volt. protection	[ - ]	no		yes	
Thermal protection	[ - ]	yes	no	yes	
Mal-conn./Short-circuit protection	[ - ]	yes	no	yes	
Electronic Braking	[ - ]	yes	no		yes
Start/stop and/or direction input	[ - ]	yes	no	no	
Screw terminal	[ - ]	yes ▶			
Plug connector	[ - ]	yes	optional		
Communication (serial/parallel)	[ - ]	no ▶			
Program Language/memory size	[ - ]	- ▶			
Dimensions (l x h x d)	[ mm ]	160 x 100 x 35 (Eurocard) ▶			
Weight	[ kg ]	0,120	0,225	0,295	

Inputs	MC403	MC175	MC102	MC202
Analog	Supply, Ref. in, +/- Tacho			
				NTC
Digital	Start/stop (PNP)			
	High/low speed (PNP) -			
	Direction (PNP)			
Outputs				
Analog	Motor outputs + and -			
	+10 VDC			
Digital (max. 100mA)	General overload		DC ok -	Current limit activ
	Temperature		Temperature	Over voltage

### Typical applications are a.o.:

**MC403:** timing belts, mixers, small feeder drives for drills, etc, etc.

**MC175 and MC102:** mixers, ventilation motors, rotation tables, pumps, conveyors, etc, etc.

**MC202:** one-direction timing belts, small drills (with fast stop), paper feeders, etc, etc.

Request product manual for full specifications



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# A-Series

## DC-brush servomotor amplifiers

The A-series servo amplifiers are designed to drive brush type DC motors at a high switching frequency.

All models are fully protected against over-voltage, over-current, overheating and short-circuits across motor, ground and power leads. All models interface with digital controllers or can be used as stand-alone drive. They require only a single unregulated DC power supply. Loop gain, current limit, input gain and offset can be adjusted using the 14-turn potentiometers. The A-series are very compact and reliable because of the use of SMD technology.



General Specifications	12A8	25A8	20A14	20A20
Input voltage [ VDC ]	20-80		40-140	40-190
Peak Current [ A ]	12	25	20	20
Cont. Current [ A ]	6	12,5	10	10
Autom. Switch off at overload [-]	no	▶		
Current limiting [-]	yes	▶		
Switching frequency [ kHz ]	36		22	
Minimum load inductance [ μH ]	200		250	
Feedback possibilities [-]	I x R/ Tacho / Voltage/Current ▶			
Speed control by potentiometer [-]	yes	▶		
Analog control [ VDC ]	+/-15 ▶			
Peak current limit adj. [-]	yes	▶		
Nom. current limit adj. [-]	yes	▶		
Soft start [-]	no	▶		
Under and/or over volt. protection [-]	yes	▶		
Thermal protection [-]	yes	▶		
Mal-conn./Short-circuit protection [-]	yes	▶		
Electronic Braking [-]	yes	▶		
Start / stop and direction input [-]	yes	▶		
Screw terminal [-]	yes	▶		
Plug connector [-]	MOLEX ▶			
Communication (serial/parallel) [-]	no	▶		
Program Language/memory size [-]	-	▶		
Dimensions ( l x h x d ) [ mm ]	186,7 x 111,7 x 25,4 ▶			
Weight [ kg ]	0,68 ▶			

Inputs	12A8	25A8	20A14	20A20
Analog			+/- Ref. in	
			+/- Tacho	
Digital			Inhibit	
			+/- Inhibit	
Outputs				
Analog			Motor outputs + and -	
			Current monitor	
			Current reference	
			+/- 5 VDC	
Digital			Fault (TTL)	

**Typical applications are a.o.:**

Dynamic production machines, CNC machines, laser cutting machines, simulators, non-constant speed applications, etc., etc.

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# IMC-Series

## Programmable DC-brush motor amplifiers



All controllers mentioned below can be programmed. The DIMC241, IMC242, IIF32 and IMC 2410 are designed for small and medium series of customized applications, which will be programmed in machine code. Usually this is done by Elmeq.

**DIMC241** is a 2 axis controller with 2 motor amplifiers onboard. This design makes it possible to synchronize two motors. It consists of a 8 bits ST6260 micro controller, AD-converter, EEPROM and Auto Reload Timer. Programming is done in machine code and stored into the onboard memory. Controlling of different speeds of the 2 motors is possible as well. The onboard potentiometers can be used for that purpose.

**IMC242**, with potentiometer feedback and available I/O can be used as a position controller. Instead of position feedback, this analog input can also be used for other purposes. The memory can be programmed with customized software.

**IIF32**, is designed for multiplexing and PLC-alike functions. Integrated on the PCB is a small 4 quadrant motor controller. The PWM-output of it can be used as input for a more powerful amplifier or other peripheral equipment.

**IMC2410**, is a simplified motor controller, which is able to control motor speed and direction via a relay. Inputs are controlling the motion, outputs are determined by software functions.

General Specifications		DIMC241	IMC242	IIF32	IMC2410
Input voltage	[ VDC ]	24	12 to 30	24VDC and/or 30VAC	12 or 24
Peak Current	[ A ]	2 x 2	5	5	20
Cont. Current (RMS)	[ A ]	2 x 1	2,5	2,5	15
Autom. Switch off at overload	[ - ]	software ▶			
Current limiting	[ - ]	software ▶			
Switching frequency	[ kHz ]	20			
Minimum load inductance	[ μH ]	NAP ▶			
Feedback possibilities	[ - ]	I x R/Voltage/Current	I x R/Tacho/Encoder*	I x R	Current/Encoder **
Speed control by potentiometer	[ - ]	yes	yes		no
Analog control	[ VDC ]	no	0 - 5		no
Peak current limit adj.	[ - ]	software ▶			
Nom. current limit adj.	[ - ]	software ▶			
Soft start/ramping	[ - ]	software			no
Under and/or over voltage protection	[ - ]	no		yes	no
Thermal protection	[ - ]	yes	no	yes	
Mal-conn./Short-circuit protection	[ - ]	no ▶			
Electronic Braking	[ - ]	yes			no
Start / stop and/or direction input	[ - ]	yes		software	yes
Screw terminal	[ - ]	yes			optional
Plug connector	[ - ]	yes	no		yes
Optional communication	[ - ]	no	SPI	SPI (24V) / CAN	no
Program Language/memory size	[ - ]	machine code/2x 4K	machine code/4K		
Dimensions (l x h x d)	[ mm ]	75 x 60 x 110	79 x 20 x 71	240 x 70 x 125	98 x 58 x max 170
Weight	[ kg ]	0.145	0.065	0.5	0.9

\*)120 Hz \*\*)250Hz

Inputs	DIMC241	IMC242	IIF32	IMC2410
Analog	Supply			
Digital	2x digital High/low speed	4x analog 4x in or out	17 x inputs	start/stop, direction 4x inputs
Outputs	Motor outputs + and -			
Analog	5 VDC		0 - 5 VDC	12 VDC
Digital	Error (max. 50 mA)	4x in or out 1 x 2A output	16x 0,5 A 1 x 2A output	1 x output (3 A)

### Typical applications are a.o.:

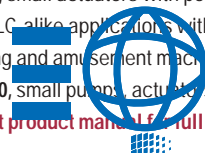
**DIMC241**, Synchronized timing belts, duo motor applications etc., etc.

**IMC242**, small actuators with position feed back, winding control.

**IIF32**, PLC alike applications with one motor or up to 16 motors using multiplexing, gambling and amusement machines, door automation.

**IMC2410**, small pumps, actuators, etc., etc.

Request product manual for full specifications



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## Extended programmable DC-brush motor controllers

**IMC102** is a two-quadrant speed controller. It can operate in closed loop in combination with a slow encoder or tacho. With the available I/O simple automation solutions are possible, without using a PLC.

**IMC510**, is a four quadrant position/speed controller and especially suitable for linear motors with an encoder or potentiometer feedback. It features both analog and digital in- and outputs, which can be used for customized applications.

**MDC2**, as well is a four-quadrant position/speed controller like the IMC510. It features however a 16-bits microprocessor, extended I/O, large memory and also a battery charger. Using a battery it can operate during power break down and in emergency situations. It can accomplish very sophisticated applications. In combination with a terminal or keyboard the MDC2 is a perfect stand-alone controller. The MDC2 can be programmed by the customer in pascal based software.



General Specifications		IMC102	IMC510	MDC2
Input voltage	[ VDC ]	12 - 50 ▶		
Peak Current	[ A ]	20 ▶		
Cont. Current (RMS)	[ A ]	10 ▶		
Autom. Switch off at overload	[ - ]	software ▶		
Current limiting	[ - ]	software ▶		
Switching frequency	[ kHz ]	20 ▶		
Minimum load inductance	[ μH ]	200 ▶		
Feedback possibilities	[ - ]	IxR/Tacho/Encoder (120 Hz)	IxR/Tacho /Encoder (120 Hz)	Encoder (500 kHz)
Speed control by potentiometer	[ - ]	yes		no
Analog control	[ VDC ]	0 - 10	0 - 12	no
Peak current limit adj.	[ - ]	software ▶		
Nom. current limit adj.	[ - ]	software ▶		
Soft start/ramping	[ - ]	software ▶		
Under and/or over volt. protection	[ - ]	yes ▶		
Thermal protection	[ - ]	yes ▶		
Mal-conn./Short-circuit protection	[ - ]	yes ▶		
Electronic Braking	[ - ]	yes ▶		
Start / stop and/or direction input	[ - ]	yes ▶		
Screw terminal	[ - ]	yes ▶		
Plug connector	[ - ]	Phoenix		9 SUBD/Phoenix
Optional communication	[ - ]	SPI	CAN / SPI	CAN / RS232 (2x)
Program Language/memory size	[ - ]	machine code/ 4K		pascal based/1Mb
Dimensions ( l x h x d )	[ mm ]	98 x 58 x 164	98 x 58 x 225	
Weight	[ kg ]	0.9	1.2	

Inputs	IMC102	IMC510	MDC2
Analog	3x Analog input		
	+/- tacho	+/- tacho	
	Ref. in	Ref. in	
Digital	2x inputs	6x digital Encoder A	13x digital, Encoder A/B/C, 5 or 24 V encoder interface
Outputs	Motor outputs + and -		
	Motor outputs + and -	Motor outputs + and -	Battery Charge (27 VDC)
	5x output (100 mA)	5x output (3 A)	Second motor output (2 A)
Digital	2x 5 A output	1x 10 A (bleeding resistor)	3x digital (100 mA) 1x 10 A (bleeding resistor)

**Typical applications are a.o.:**

**IMC102**, Mixers, drilling machines, rotation tables, etc., etc.

**MC510**, simple door controllers, positioning of actuators with encoder or potentiometer feedback, synchronous movements, single axe motion controller with PLC functions, mixers, constant speed applications, timing belt applications with input demands, etc., etc.

**MDC2**, sophisticated door controller, special mixers, multi axis motion controller (using CAN), index tables, cutting to length machines, etc., etc.

Request product manual for full specifications.





# BGE-Series

## DC-brushless servo motor drivers



The BGE-series DC-servo motor drivers are designed to drive 3 phase and 4 phase DC-brushless servo motors. These drivers are fully protected against over-current, over-heating and short-circuits across motor. All models interface with digital controllers. They require DC-power supply. Basic parameters are set with onboard potentiometers. Speed control can be obtained with an analog input.

The **BGE2406** is a controller for a small 4 phase brushless motor, to be driven in two directions without dynamic braking.

The **BGE6007** is a controller for a 3 phase brushless motor, to be driven in one direction.

The **BGE4010** is a controller for large 4 phase brushless motors, just for speed control in upper speed range.

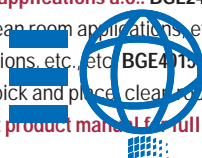
The **BGE4015** is a controller like the BGE4010, however with the option of speed control in low and upper speed range and suitable for positioning systems.

General Specifications		BGE2406	BGE6007	BGE4010	BGE4015
Input voltage	[ VDC ]	14 - 30	10 - 60	20 - 40	24 - 40
Peak Current	[ A ]	20	12	25	25
Cont. Current (RMS)	[ A ]	5,5	7	8	12
Autom. Switch off at overload	[ - ]	yes		no	
Current limiting	[ - ]	yes	no		yes
Switching frequency	[ kHz ]	9,5	16		
Minimum load inductance	[ $\mu$ H ]	NAP ▶			
Feedback possibilities	[ - ]	I x R/Tacho/Encoder	I x R	I x R/Encoder	I x R/Tacho/ Encoder
Speed control by potentiometer	[ - ]	yes	no	yes	
Analog control	[ VDC ]	0 - 10	0 - 24	+/- 10	
Peak current limit adj.	[ - ]	yes ▶			
Nom. current limit adj.	[ - ]	yes ▶			
Soft start/ramping	[ - ]	no		yes	
Under and/or over volt. protection	[ - ]	yes ▶			
Thermal protection	[ - ]	yes	no	yes	
Mal-conn./Short-circuit protection	[ - ]	yes ▶			
Electronic Braking	[ - ]	no		yes	
Start / stop and/or direction input	[ - ]	yes ▶			
Screw terminal	[ - ]	no	Phoenix	no	Phoenix
Plug connector	[ - ]	DIN 41617	Phoenix	DIN 41617	no
Optional communication	[ - ]	no ▶			
Program Language/memory size	[ - ]	- ▶			
Dimensions (l x h x d)	[ mm ]	100 x 160 x 37	45 x 75 x 105	100 x 160 x 30	100 x 160 x 78
Weight	[ kg ]	0,318	0,268	0,41	0,68

Inputs	BGE2406	BGE6007	BGE4010	BGE4015
Analog	Ref. in			
	+/- Tacho	Min current Max current	Peak current	Encoder for level A/B +/- Tacho
Digital	Hall sensor 1, 2 Encoder A, B	Hall sensor 1, 2, 3	Hall sensor 1, 2 Encoder A, B	
	Start/stop			+/- Inhibit, Start/stop, Direction inverse, I-factor on/off
Outputs	Motor outputs A, B, C, D		Motor outputs A, B, C, D	
	5 VDC	Motor outputs A, B, C	5 VDC	15 VDC
Digital	12 VDC		+/- 12 VDC	Bleed resistor
	Power available	Speed = 0 rpm, Power low/high, Overload, Bleed resistor 12T	Status	Speed >120 rpm, Power low/high, Overload, Bleed resistor 12T

**Typical applications a.o.:** BGE2406 and BGE6007, pumps with 100% duty cycle, packaging machinery, clean room applications, etc., etc. BGE4010, farmer equipment, mixers, pumps, clean room applications, etc., etc. BGE4015, packaging machinery, post sorting machines, mixers, pumps, X-Y tables, pick and place, clean room applications, winding machines, index tables etc., etc.

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## Programmable DC-brushless servo motor controllers

The BGE9010 consists out of a logic controller and a driver and is newly designed to control 4-phase DC-brushless servomotors.

The controller is fully protected against, over-current, over-heating and short-circuits across motor. The BGE9010 interfaces with digital peripherals. It requires a DC-power supply.

The controller can run (repeated) programmed profiles. With the option of programmable I/O's it is possible to control most machine functions.



General Specifications		BGE9010
Input voltage	[ VDC ]	24 - 100
Peak Current	[ A ]	25
Cont. Current (RMS)	[ A ]	8
Autom. Switch off at overload	[ - ]	no
Current limiting	[ - ]	yes
Switching frequency	[ kHz ]	15,625
Minimum load inductance	[ µH ]	NAP
Feedback possibilities	[ - ]	1 x R / Tacho / Encoder
Speed control by potentiometer	[ - ]	yes
Analog control	[ VDC ]	+/- 10
Peak current limit adj.	[ - ]	yes
Nom. current limit adj.	[ - ]	yes
Soft start/ramping	[ - ]	yes
Under and/or over volt. protection	[ - ]	yes
Thermal protection	[ - ]	yes
Mal-conn./Short-circuit protection	[ - ]	yes
Electronic Braking	[ - ]	yes
Start /stop and/or direction input	[ - ]	yes
Screw terminal	[ - ]	Phoenix
Plug connector	[ - ]	Phoenix
Communication (serial/parallel)	[ - ]	RS232
Program Language/memory size	[ - ]	Basic like/NAP
Dimensions (l x h x d)	[ mm ]	170 x66 x170
Weight	[ kg ]	1,139

Inputs		BGE9010
Analog		Supply, Ref. in 1 and 2, 24 VDC
Digital		Encoder A1, A2, B1, B2, C1, C2, Hall sensor 1, 2, Direction, Start/stop, Inhibit, Enable, 4x Programmable, Speed control external or software, Software ramping or winding shortening, Hall sensor/encoder selector, 4x Programmable
Outputs		BGE9010
Analog		Motor outputs A, B, C, D, 5VDC, 15VDC, +/- 10VDC 4x Programmable,
Digital		Power available, Overload, Speed >50 rpm, Fault, 2x Limit switch is active.

### Typical applications a.o.:

Labeling machines, packaging machinery, semiconductor production machines, constant speed applications, applications in combination with PLC's, timing belt applications, synchronous movements, safety screens, etc., etc.

Request product manual for full specifications.



# SCE90X-series

## AC-brushless servo motor drivers



The fully digital SCE90X-series AC-servo motor drivers are designed to drive AC-servo brushless motors with inaudible, high frequency, digital PWM sine wave current control.

The drivers are fully protected against over-current, over-heating and short-circuits across motor. All models interface with digital controllers and peripherals. For the internal logic they require 240 VAC. For the power stages they require 1 phase 240 VAC or 3 phase 400 VAC. High dynamic applications, due to the 62.5µs control time and 1500 Hz bandwidth, are typically working areas for this type of drivers.

With option cards like the OCE930, OCE940 or OCE950 it is possible to do single or multi axis high dynamic applications. See next page "OCE9X0"

General Specifications		SCE903	SCE904	SCE905	SCE906
Input voltage	[ VAC ]	230 + 10% - 55% 50/60 Hz (1 phase) or 400 +32% -55% 50/60Hz (3 phase)			
Peak Current	[ A ]	7,5	15	22,5	33,7
Cont. Current (RMS)	[ A ]	3,75	7,5	11,25	22,5
Autom. Switch off at overload	[ - ]	yes ▶			
Current limiting	[ - ]	yes ▶			
Switching frequency	[ kHz ]	20 ▶			
Minimum load inductance	[ µH ]	4000	2000	1400	1000
Feedback possibilities	[ - ]	Resolver ▶			
Speed control by potentiometer	[ - ]	yes ▶			
Analog control	[ VDC ]	+/- 10 ▶			
Peak current limit adj.	[ - ]	yes ▶			
Nom. current limit adj.	[ - ]	software ▶			
Soft start/ramping	[ - ]	software ▶			
Under and/or over volt. protection	[ - ]	yes ▶			
Thermal protection	[ - ]	yes ▶			
Mal-conn./Short-circuit protection	[ - ]	yes ▶			
Electronic Braking	[ - ]	yes ▶			
Start /stop and/or direction input	[ - ]	yes ▶			
Screw terminal	[ - ]	yes ▶			
Plug connector	[ - ]	25 pins SUBD ▶			
Optional communication	[ - ]	RS-232/485/SERCOS ▶			
Program Language/memory size	[ - ]	- ▶			
Dimensions ( l x h x d )	[ mm ]	116,5x309,4x228,8		159,5x309,4x228,8	
Weight	[ kg ]	6,5		9,5	
				13,5	

	SCE903	SCE904	SCE905	SCE906
<b>Inputs</b>				
Analog	Supply, Ref. in 1 and 2, 24 VDC, Resolver S1, S2, S3, S4			
Digital	Enable, +/- Inhibit, Master encoder A1, A2, B1,B2, C1, C2, Step direction			
<b>Outputs</b>				
Analog	Current monitor, 2x Programmable DAC, 5 VDC, Motor U, V, W, + resolver R1, R2			
Digital	Fault, Encoder simulation channel A1, A2, B1, B2, C1, C2			

**Typical applications a.o.:**

Labeling machines, packaging machinery, semiconductor production machines, constant speed applications, applications in combination with PLC's, timing belt applications, synchronous movements, coating machines, positioning, printing machines, etc., etc.

## Optional cards for SCE90X drivers

The basic driver series SCE90X become general purpose controllers with the additional OCE9X0 cards. There are 3 models.

The OCE930 is an interface card to tune the driver to a specific motor and it's application. This card can be used to tune more then one driver. After the parameters are stored into the memory of the driver, the card can be removed.

The OCE940 is a SERCOS interface, which can be used for high speed multi axes applications.

The OCE950 is an indexer card, which can be used if a stand-alone application is required. This card has onboard memory to store programs in a BASIC alike language.

Complete axis control can be executed under programmed conditions and can be monitored with an optional terminal or PC.



General Specifications	OCE930	OCE940	OCE950
Input voltage [ VAC ]	-	on request	-
Peak Current [ A ]	software		software
Cont. Current [ A ]	software		software
Autom. Switch off at overload [ - ]	-		software
Current limiting [ - ]	software		software
Switching frequency [ kHz ]	-		-
Minimum load inductance [ µH ]	-		-
Feedback possibilities [ - ]	software		software
Speed control by potentiometer [ - ]	software		software
Output frequency range (max) [ kHz ]	software		software
Micro stepping (max) [ steps/rev ]	software		software
Speed lin., zero to full load (max) [ % ]	software		software
Soft start/ramping [ - ]	software		software
Under and/or over volt. protection [ - ]	-		-
Thermal protection [ - ]	-		-
Mal-conn./Short-circuit protection [ - ]	-		-
Electronic Braking [ - ]	software		software
Start /stop and/or direction input [ - ]	see SCE90x		see inputs/outputs
Screw terminal [ - ]	-		-
Plug connector [ - ]	25 pins SUBD		25 pins SUBD
Communication (serial/parallel) [ - ]	RS-232/485	SERCOS	RS-232/485/PacLAN
Program Language/memory size [ - ]	RS-232/485	SERCOS	RS-232/485/PacLAN
Dimensions (l x h x d) [ mm ]	32,4 x 142,7 x 126,5	▶	
Weight [ kg ]	0,18	▶	

Inputs	OCE930	OCE940	OCE950
Analog	See SCE90x	-	See SCE90x
Digital	RS 232/485	SERCOS (optical)	RS 232/485 PacLAN 20x programmable I or O
Outputs			
Analog	5 VDC	-	5 VDC
Digital	RS 232/485		RS 232/485 PacLAN 20x programmable I or O

Typical applications,  
see SCE90X-amplifiers.

Request product manual for full specifications.



# Half/full stepper drivers

Step/direction/start/stop



The half/full stepper drivers are economic solutions to drive stepper motors in a variety of applications. All models interface with digital controllers.

The drivers need at least step, direction and start/stop commands. All drivers only require a single unregulated DC power. IDLE current reduction can be set in the driver. The IDLE current reduction capability is to save energy and to avoid unnecessary heat dissipation in the stepper motor.

Because of the use of MOSFET and SMD technology the drivers are very small and reliable. Selection is mainly based on power output and size.

General Specifications		IB462	IB462	IB104	IB104	IB1010
Input voltage	[ VDC ]	12 – 40		24 - 80		
Peak Current	[ A ]	2	3,5	4	6	9
Cont. Current (RMS)	[ A ]	0 - 2	0 - 3,5	0 - 4	0 - 6	0 - 9
Autom. Switch off at overload	[ - ]	no ▶				
Idle current reduction	[ - ]	no ▶				
Switching frequency	[ kHz ]	20 ▶				
Feedback possibilities	[ - ]	no ▶				
Speed control by pot. Meter	[ - ]	no ▶				
Analog control	[ VDC ]	no ▶				
Step input frequency range (max)	[ MHz ]	0,04		0,250		
Micros stepping (max)	[ steps/rev ]	400 (1/2step) ▶				
Peak current limit adj.	[ - ]	- ▶				
Nom. current limit adj.	[ - ]	- ▶				
Soft start/ramping	[ - ]	- ▶				
Under and/or over volt. protection	[ - ]	no		yes		
Thermal protection	[ - ]	no ▶				
Mal-conn./Short-circuit protection	[ - ]	yes ▶				
Electronic Braking	[ - ]	yes ▶				
Start / stop and direction input	[ - ]	yes ▶				
Screw terminal	[ - ]	no ▶				
Plug connector	[ - ]	no ▶				
Program Language/memory size	[ - ]	- ▶				
Dimensions (l x h x d)	[ mm ]	60,5 x 73,7 x 31,8	75,2 x 73,7 x 31,8	126,0 x 73,7 x 31,8		
Weight	[ kg ]	0.18	0.20	0.35		

Inputs	IB462	IB462	IB104	IB104	IB1010
Analog	Supply				
	Current adjust				
	Step				
	Direction				
	Enable				
Digital	Half/Full steps				
<b>Outputs</b>					
Analog	Motor phase A (2x)				
	Motor phase B (2x)				
Digital					



**Typical applications a.o.:**

Labeling machines, packaging machinery, semiconductor production machines, constant speed applications, applications in combination with PLC's, synchronous movements, ticket feeders, barcode machines, plotters, printer, etc., etc..



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# Micro stepper drivers

Step/direction/start/stop/analog

The drivers mentioned below are meant to drive stepper motors in micro step mode. They only require a single unregulated DC power supply. Micro step, and IDLE current reduction can be set in the controller. The micro step mode gives a much smoother run in the low speed range.

The IDLE current reduction capability is to save energy and to avoid unnecessary heat dissipation into the stepper motor. Some models are equipped with filters to avoid resonance's. All models interface with digital controllers. Because of the use of MOSFET and SMD technology the drivers are very small and reliable. The choice of the right controller is made mainly on power output and size.

The 6415 distinguishes with the rest of this series stepper drivers because it has a VCO (Voltage Controlled Oscillator) onboard. Herewith it is possible to control the speed of the stepper motor by an analog input signal. The 6415 also provide pulse output to drive (a) slave driver(s).



General Specifications	IM481H	IM483	IM804	6410	6415	IM1007
Input voltage [ VDC ]	12 - 48	12 - 48	24 - 75	24 - 75	24 - 75	24 - 80
Peak Current [ A ]	1,6	4	6	7,1	7,1	10
Cont. Current (RMS) [ A ]	0,14 - 1	0,4 - 3	4	0,625 ... 5	0,625 ... 5	7
Autom. Switch off at overload [ - ]	no ▶					
Idle current reduction [ - ]	yes ▶					
Switching frequency [ kHz ]	20 ▶					
Feedback possibilities [ - ]	no ▶					
Speed control by potentiometer [ - ]	no				yes	no
Analog control [ VDC ]	no				+/- 10	no
Step frequency (max) [ MHz ]	10	10	2-10	20	0,5	10
Micro stepping (max) [ steps/rev ]	51200 ▶					
Peak current limit adj. [ - ]	yes ▶					
Nom. current limit adj. [ - ]	yes ▶					
Soft start/ramping [ - ]	no				yes	no
Under and/or over volt. protection [ - ]	no ▶					
Thermal protection [ - ]	yes ▶					
Mal-conn./Short-circuit protection [ - ]	no ▶					
Electronic Braking [ - ]	yes ▶					
Start / stop and direction input [ - ]	yes ▶					
Screw terminal [ - ]	optional	yes				
Plug connector [ - ]	no			9 pins SUBD	9 & 25pins SUBD	no
Communication (serial/parallel) [ - ]	no ▶					
Program Language/memory size [ - ]	- ▶					
Dimensions ( l x h x d ) [ mm ]	27,9x68,6 x4,4	69,9x76,2x30,5	69,9x76,2x33,5	38,1x120,7x109,2	149,2x76,2x28,6	
Dim. with heat sink (>2A RMS) (lxhwx) [ mm ]				63,5x120,7x109,2		
Weight with/without heat sink [ kg ]	0,03	0,2		0,45 / 0,73-		0,45

Inputs	IM481H	IM483	IM804	6410	6415	IM1007	
Supply							
Analog	5 VDC				Speed command	5 VDC, Current ad-	
	Current adjustm.				+/- Step, +/- Direction, +/- Enable	+/- 10 V, Speed com-	justm., Reduce cur-
	Reduce current adjustm.					mand 0 - 8 V	rent adjustm.
Digital	Step, Direction, 4x step selector, reset				+/- run, +/- stop,	Step, Direction,	
	Fault				+/- Low speed	4x step selector, reset	
Outputs							
Motor phase A (2x), Motor phase B (2x)							
Analog					Speed monitor		
Digital	Fault				8 VDC		
	Full step				+/- Step	Fault	
					+/- Direction	Full step	

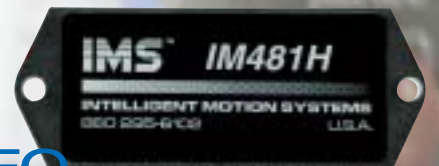
**Typical applications a.o.:**

Labeling machines, packaging machinery, semiconductor production machines, constant speed applications, applications in combination with PLC's, synchronous movements, etc., etc..

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# Programmable micro stepper drivers

Programmable indexer and I/O



These stepper motor drivers can be programmed to perform a cycle or movement profile stand alone. No external step and direction signals are necessary to rotate the motor shaft.

Motion profiles and cycles can be selected by programming the inputs. Home, jog, absolute and increment moves, constant speed, are some examples of program commands. The driver can also be controlled by direct commands from a PC. All models are fully protected against, over-current, over-heating and short-circuits across motor and ground. They only require a single unregulated DC power supply. Micro steps, and IDLE current reduction can be set in the controller with dip-switches and/or by software. The IDLE current reduction capability is to save energy and to avoid unnecessary heat dissipation into the stepper motor.

The 6420 has extra outputs to control a second stepper driver. In this configuration electronic gearing or independent axis control is possible. The IM48212 and IM100712 optionally have inputs for encoder feed back, to achieve a close loop system.

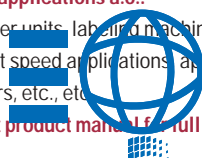
General Specifications		IM48312	6420	IM100712
Input voltage	[ VDC ]	12 - 48	24 - 75	24 - 80
Peak Current	[ A ]	4	7,1	10
Cont. Current (RMS)	[ A ]	0,4 - 3	5	2 - 7
Autom. Switch off at overload	[ - ]	no ▶		
Idle current reduction	[ - ]	yes ▶		
Switching frequency	[ MHz ]	0,02 ▶		
Minimum load inductance	[ µH ]	- ▶		
Feedback possibilities	[ - ]	no		optional encoder
Speed control by potentiometer	[ - ]	no ▶		
Analog control	[ VDC ]	no ▶		
Step input frequency range (max)	[ kHz ]	100	20	
Micro stepping (max)	[ steps/rev ]	51200 ▶		
Peak current limit adj.	[ - ]	yes	no	yes
Nom. current limit adj.	[ - ]	yes ▶		
Soft start/ramping	[ - ]	yes ▶		
Under and/or over volt. protection	[ - ]	no ▶		
Thermal protection	[ - ]	yes ▶		
Mal-conn./Short-circuit protection	[ - ]	no ▶		
Electronic Braking	[ - ]	yes ▶		
Start / stop and direction input	[ - ]	yes ▶		
Screw terminal	[ - ]	optional	yes	
Plug connector	[ - ]	no	9 & 25 pins SUBD	no
Communication (serial/parallel)	[ - ]	RS-232	RS-232/422/485	RS-232
Program Language/memory size	[ - ]	Mnemonics/2 kb	Mnemonics/1792 bytes	Mnemonics/2 kb
Dimensions ( l x h x d )	[ mm ]	27,9 x 68,6 x 4,4	38,1 x 120,7 x 109,2	149,2 x 76,2 x 28,6
Dim. with heat s. (>2A RMS) (lxhxw)	[ mm ]	optional	63,5 x 120,7 x 109,2	optional
Weight with/without heat sink	[ kg ]	-	0,45 / 0,73	

Inputs		IM48312	6420	IM100712
Analog		Supply		
Digital		3x user inputs, -/+ limit, -/+ jog, Home, Start/Stop, Soft stop	8x Discrete I/O, -/+ limit, -/+ jog, Home, Start/Stop, Enable	3x user inputs, -/+ limit, -/+ jog, Home, Start/Stop, soft stop, Optional (enc. A1, A2, B1, B2, C1, C2)
Outputs		Motor phase A (2x), Motor phase B (2x)		
Analog		5 VDC	5.7 VDC, Current monitor, Current reference	5 VDC
Digital		3x user output full step	8x Discrete I/O, Fault, Moving Step for slave driver, Direction step for slave 6410 driver	3x user output full step Moving

### Typical applications a.o.:

Dispenser units, lab and machines, packaging machinery, semiconductor production machines, constant speed applications, applications in combination with PLC's, synchronous movements, analyzers, etc., etc.

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## 19" Elmeq Motion Control System

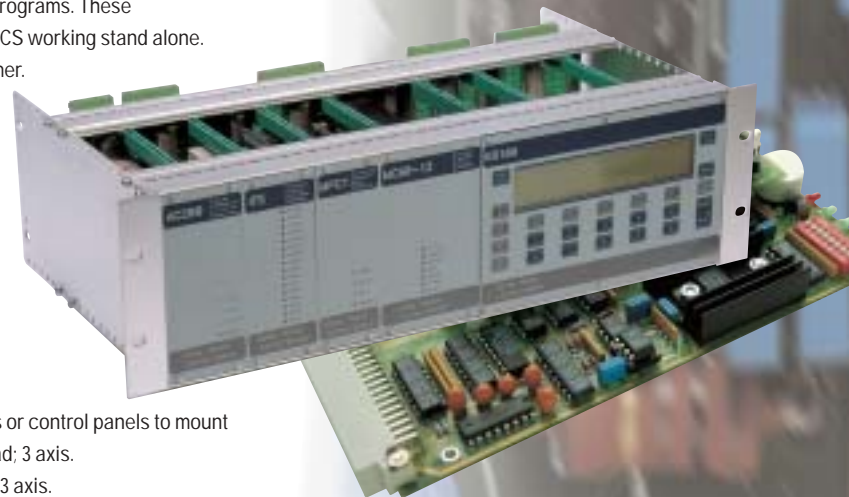
EMCS is a universal and 19" modular system to control single or multi-axis servo drive applications. All existing electronic circuits like processor card, amplifiers, interface cards etc. are exchangeable and combinable. EMCS can control applications with 1,2,3 or more axis with brush-, brushless or stepper motors.

In an easy and flexible way the system can be customised to match the application. ECL (Elmeq Command Language) is a pascal based specially developed software program for EMCS. It is ideal for easy motor control. ELC (Elmeq Line Command) gives the possibility to control the motor and I/O with single line commands. EMCS offers economic solutions for simple to complex automation problems, also for small and medium quantities. The reason of it is modularity, flexibility, excellent software programs and availability of all required systems components.

**Systems components**

- The basic components are:**
- **MPC1**, motioncontroller and it's backpanel for one or two axis motor controller. For axis combine more MPC1's. MPC1 has 32 kB memory and can be extended to 64kB.
  - **Amplifiers**: MC844 (dual motor amplifier) and it's backpanel, 20-58VDC,  $I_{nom}=4A/I_{peak}=8A$ .  
A-series, see page 5  
SCE90X-series, see page 10 (not integral with 19" rack).  
6415, see page 13.
  - **Powersupply**: RAC 100 which consists of separate components and are meant to built within the 19"-rack.  
Range: Input 220VAC/50Hz. Output 12-80VDC/1-15A.
  - **Extended I/O**: IF5 and it's back panel, 8 Inputs and 8 Outputs.  
For more I/O combine more IF5's.
  - **Signal converter**: BPAM24 is a back panel to convert all encoder signals from 24VDC to 5VDC. It can do so for 1 or 2 encoders.
  - **Terminals**: KB100, is a keyboard with LCD. KB200 is a keyboard with LED-display. Both terminals can either be mounted in a 19"-rack or in a separate control panel.
  - **19"-rack**: dimensions depend on configuration.

- Software:**
- ELC (Elmeq Line Command)**, can be used to send direct executable commands by PC or PLC, via RS232.
- ECL (Elmeq Command Lanuage)**, can be used to write programs. These programs can be stored into the MPC1, to make the EMCS working stand alone. These can be offered by Elmeq or written by the customer.

**Some projects realised with EMCS:**

- Semi automatic punching and cutting machines, making holes in doors or control panels to mount switches, signal lamps, electric meters etc. Direct control from Autocad; 3 axis.
- Automatic bakery machines for production of cookies. ECL controlled; 3 axis.
- Automatic woodcutting machines to prepare doors in order to mount hinges, locks etc. Graphic software, program for optimal friendly human/machine interfacing, enabling designing and fully automatic machine adjustments; 11 axis.
- Automatic machine for winding and gathering rope of various thickness and length directly from the reel; 4 axis.
- Cut to length machine for textiles. Adjustable length and quantity; 2 axis.
- Automatic sewing machine; 3 axis.
- Semi automatic machines for tension free winding of fabrics. Medical application; 2 axis.
- Dosing equipment for chemicals in agriculture industry; 6 axis.

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# Accessories

## Additional equipment and services



To make a system complete, Elmeq can supply additional equipment that fit to the drivers and controls. Keyboards, power supplies, encoders heat sinks, terminals and software are available in different configurations.

### Power Supply

**AC100-serie**, consist out of a PCB with a maximum of 180VA.

**RAC100-series**, consist out of separate components and are meant for control cabinets.

Input	Output	Dimensions
220VAC / 50Hz	12 - 48 VDC 1 - 7,5 A	170mm x 110mm x 61mm (max)
220VAC / 50Hz	12 - 80 VDC 1 - 15 A	-

### Keyboards/terminals

**KB100**, is a keyboard with LCD-display, meant for building in a 19"-rack or control panel and fits on MPC1. **KB200**, is a keyboard with LED display, meant for building in a 19"-rack or control panel and fits on MPC1.

**KB300**, is a low cost keyboard with LCD-display, which fits on **MDC2** and on every controller with a RS232 output. The foil is printed with symbols that are common in the door automation sector.

**T10**, is a keyboard and LCD display for the **SCE90X-serie** controller.

### Encoders

Elmeq can deliver a.o. HP encoders. Standard is a 5VDC encoder with 500 ppr with A and B channel. Standard is a 5 VDC encoder with 500 ppr with a A and B channel.

Other types with index channel, 24VDC encoder signal drivers or different pulses per revolution are possible.

### Heat sinks

Heat sinks may be necessary for controllers and drivers if the ambient temperature is high or when the controllers or drivers are not mounted against a metal frame, which can conduct the heat. Heat sinks are available for: **6410, 6415, 6420, IM481H, IM804, IM483(I2), IM1007**.

### Interface carts

Interface carts are convenient in connecting the drivers and controllers to motors, power supplies and there in- and outputs. Specially for single pieces and for prototyping.

Interface carts are available for **IB462, IB463, IB104, IB106, IB1010M IM481H, IM483(I2) and IM1007(I2)**.

### Cables

Motor, power, encoder, or serial cables can be supplied with or without connector.

It is a must to have good cables. Also shielded cables are important to keep the noise level to a minimum.

### Software

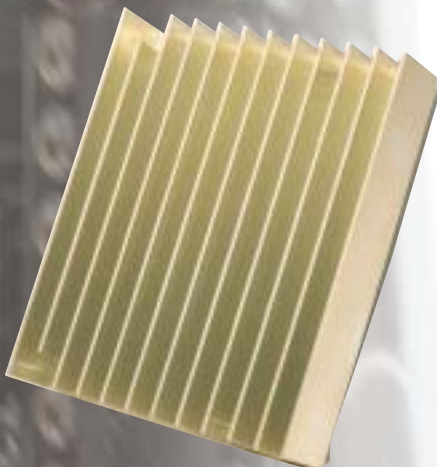
Elmeq can make complete application software on customer specifications. Of course the customer can be supported by Elmeq in generating those specifications using it's expertise on application know-how.

### EMC

Elmeq can give the customer advice how to build the complete motion control system. This is done according to the latest EMC-directives. The final CE-test, must be conducted by the customer himself, on the complete machine. Most important is cabling, connecting, filtering, eventually shielding and routing the cables.

### Installation

Elmeq cansupport the customer by checking the system before putting it into operation. Testing and adjusting the installation and it's parameters can be done according to the list of specifications.



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# Design guide

## For motors and amplifiers/controllers

It will only take a minute to fill in this simple worksheet, and when completed, simply FAX, mail or E-mail us a copy and we will have enough information to accurately configure the motor and the controller that meets your application needs. To help you we have sketched basic application set-ups with the required parameters.

Company name	:	.....	Contactperson	:	.....
Phone	:	.....	Fax	:	.....

Application description: .....

.....

.....

**Environment:** Temperature [°C]: ..... RH: .....

Duty Cycle: ..... One cycle period: ..... s. Hrs/day: .....

Commercial or Industrial or Military application? .....

**Environment:** .....

### Driver Electronics:

What power supply is available : ..... (VAC / VDC)

Are there in- or outputs required : Yes / no How many? Inputs: ..... Outputs: .....

Must the controller work stand alone? : Yes / no

Can it be programmed by PLC or PC? : Yes / no

Accuracy (position/ speed /torque) : .....

**Special requirements:** .....

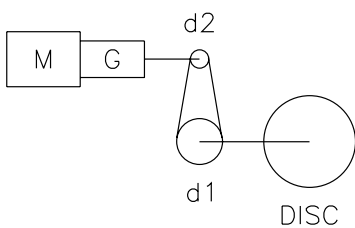
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### Basic Application 1

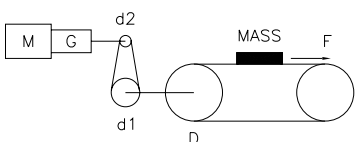
This is a basic application for example index table or turn table.



<b>Disc:</b>	Diameter	mm
	Thickness	mm
	Material	-
	Speed	rpm
	Acceleration	rad/s <sup>2</sup>
	Friction or external torque	Nm
<b>Timing belt:</b>	d1	mm
	d2	mm

### Basic Application 2

This is a basic application for example conveyer belt.



<b>Load:</b>	Mass	kg
	Speed	m/s
	Acceleration	m/s <sup>2</sup>
	Friction or external force	N
<b>Conveyor belt:</b>	D	mm
<b>Timing belt:</b>	d1	mm
	d2	mm
<b>Position:</b>	horizontal or vertical	



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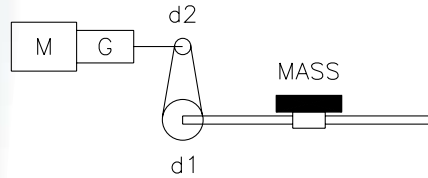
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# Design guide

For motors and amplifiers/controllers

## Basic Application 3

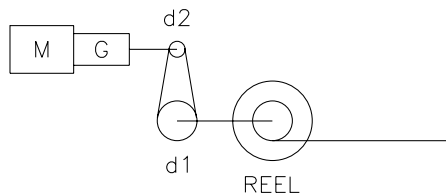
This is a basic application for example lead screws.



<b>Load:</b>	Mass	kg.
	Speed	m/s
	Acceleration	m/s <sup>2</sup>
	Friction or external force	N
<b>Lead screws:</b>	Pitch	mm
	Diameter	mm
	Length	mm
	No-load torque	mm
	Efficiency	%
<b>Timing belt:</b>	d1	mm
	d2	mm
<b>Position:</b>	horizontal or vertical	

## Basic Application 4

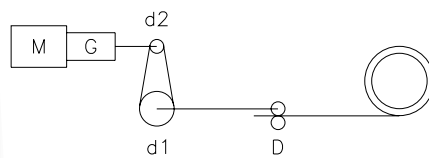
This is a basic application for example a reel feeder.



<b>Material:</b>	Max speed	m/s
	Acceleration	m/s <sup>2</sup>
	Tension	N
	Density	kg/m <sup>3</sup>
<b>Reel:</b>	Min. diameter	mm
	Max. diameter	mm
	Length	mm
<b>Timing belt:</b>	d1	mm
	d2	mm

## Basic Application 5

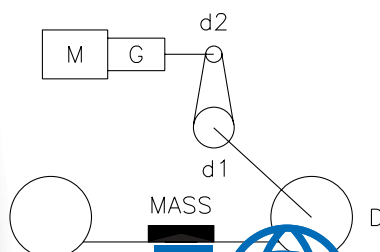
This is a basic application for example a sheet feeder.



<b>Material:</b>	Max speed	m/s
	Acceleration	m/s <sup>2</sup>
	Tension	N
	Density	kg/m <sup>3</sup>
<b>Reel:</b>	Min. diameter	mm
	Max. diameter	mm
	Length	mm
<b>Transp. whiles:</b>	Diameter	mm
<b>Timing belt:</b>	d1	mm
	d2	mm

## Basic Application 6

This is a basic application for example a transporter.



<b>Trolley:</b>	Max mass	kg
	Speed	m/s
	Acceleration	m/s <sup>2</sup>
	Pulling force	N
<b>Wheels:</b>	Diameter	mm
	Thickness	mm
	Density	kg/m <sup>3</sup>
	Friction coeff.	-
<b>Timing belt:</b>	d1	mm
	d2	mm



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