Elmo
Motion Control

Setting the wheels of industry in motion

Meticulous management of power. Precision of movement. Flawless performance. These are the essential attributes that form the foundation of reliable, trouble-free machinery for any demanding industrial application. At Elmo Motion Control, it is the benchmark for all of our endeavors in creating the most sophisticated, integrated motion control solutions available in today's market.

For over 15 years, the company has been a pure-play provider of consistently innovative motion control products for machine manufacturers. Elmo designs, produces and markets highly efficient, compact servo amplifiers and advanced motion drives for both brush and brushless motors. Elmo products have been integrated by leading machine manufacturers around the globe, in a wide variety of challenging industries, where performance, precision and consistency of operation are paramount. These include: robotics, semi-conductor production, avionics, machine tools, packaging, wood processing, textiles, medical and pharmaceutical instruments, printing, mail sorting, materials handling and much more.

Highly efficient and compact servo amplifiers and advanced motion drivers for both brush and brushless motors. Elmo products have been integrated by leading manufacturers around the globe.

Stable machinery,
sophisticated performance

Founded in 1988, Elmo Motion Control is a privately owned company. Its operating infrastructure and international marketing activities are further augmented by two, wholly owned subsidiaries: Elmo Motion Control Inc. of Westford Massachusetts and Elmo Motion Control GmbH of Villingen-Schwenningen, Germany.

Moreover, a wide variety of machine component resellers and systems integrators throughout Europe and the Asia-Pacific are active in the marketing and distribution of Elmo products. Elmo has a distinguished customer base that manufactures superior machinery for myriad industrial applications. Our customers are recognized for their rigorous standards. The lion's share of Elmo's sales (approximately 45,000 motion control products per annum) is rooted in its activities in every major market sector.

The art of moving **forward**

At Elmo, finding the right synergy between intelligence and simplicity is at the heart of all our R&D activity. The Company designs and produces motion control products that are as sophisticated in their abilities, as they are simple to integrate and cost-effective to maintain. Elmo's diverse product range addresses all the key parameters in successful motion control: current control, velocity control, position control and advanced position control. Add to that a set of powerful and rich features, accessible and intuitive interfaces and groundbreaking concepts in miniature design that is unparalleled by any other manufacturer in the industry, and you have a winning formula that sets the wheels of industrial machinery in full motion.

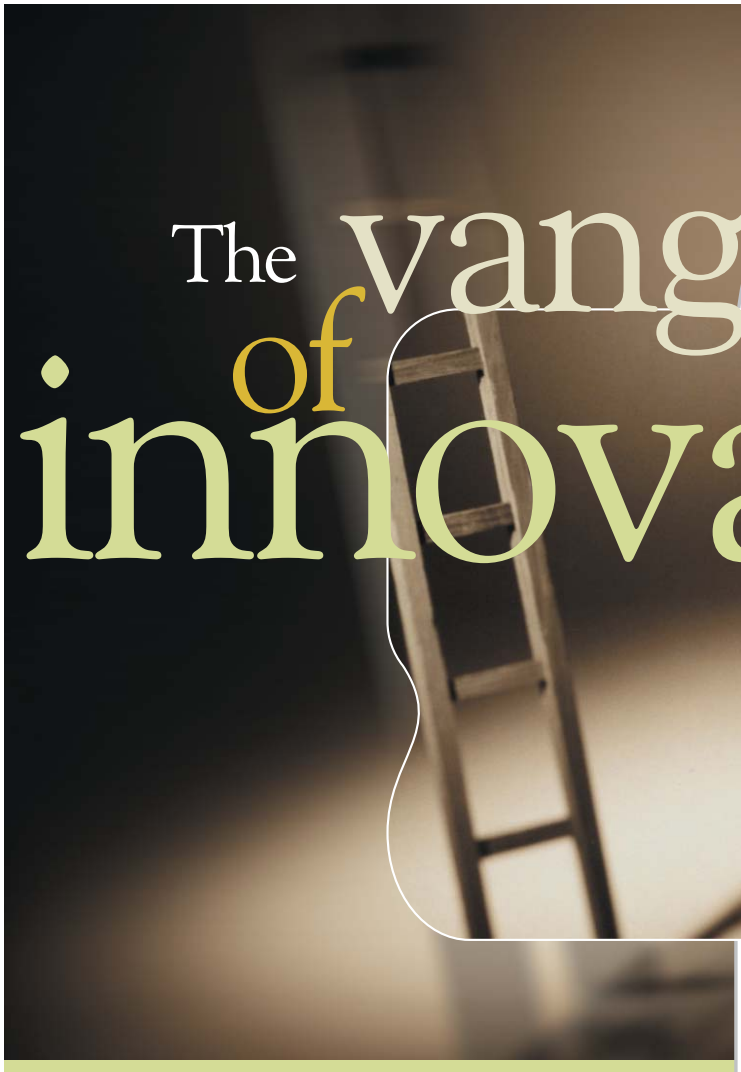
Elmo's commitment to uncompromising high quality is accentuated in its modern R&D and manufacturing facilities, which feature ISO 9001:2000 certification, MRP II controlled operation and a fully automated SMD production line.

SimplIQ

For fast and powerful implementation of sophisticated motion control system capabilities, Elmo Motion Control presents *SimplIQ* technology.

The *SimplIQ* line of digital servo drives incorporates superior control technology and industry-leading power density with a wide range of feedback options, programming capabilities and standard communication protocols.

SimplIQ - Intelligence is Simplicity - for optimal performance and rapid integration.



The vanguard of innovation

Elmo prides itself in consistently refining and adapting emerging technologies for use in its analog and digital product offering that empower machinery manufacturers and their customers with improved performance, reduced costs and streamlined operations. One of the premier companies to utilize the MOSFET as a power switch for its servo amplifiers, Elmo was the first industry provider to employ SMD design and manufacturing for servo market applications. In 1996, Elmo introduced its own proprietary "Full Custom" Analog - Digital Integrated Circuits for control management and power conversion that set another level of integration and performance of servo drives. Looking ahead on the horizon, Elmo continues to intensify its R&D efforts in the areas of power conversion and miniature design with advanced digital signal processing technology.

Motion Control Modes

- Current/Torque - up to 14 KHz sampling rate
- Velocity - up to 7 KHz sampling rate
- Position - up to 3.5 KHz sampling rate

Advanced Positioning Motion Control Modes

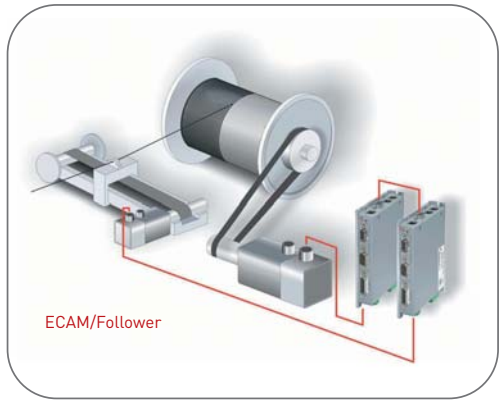
- PTP, PT, PVT, ECAM, Follower, Dual Loop
- Fast event capturing inputs
- Fast output compare (OC)
- Motion Commands: Analog, PWM, SW, Pulse & Direction

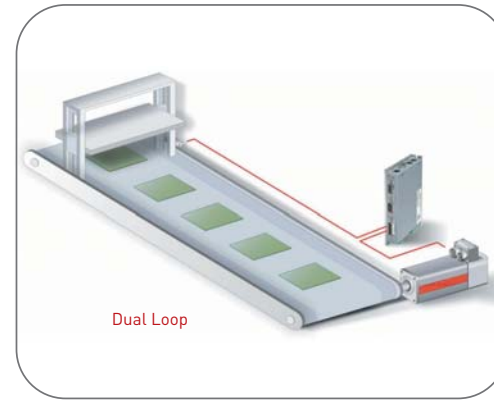
Advanced Filters and Gain Scheduling

- On-the-Fly gain scheduling of current and velocity
- Velocity and position with "1-2-4" PIP controllers.
- Automatic commutation alignment
- Automatic motor phase sequencing

Fully Programmable

- Third generation programming structure with motion commands
- Event capturing interrupts
- Event triggered programming


ECAM/Follower


Dual Loop

Feedback Options

- Incremental Encoder - up to 20 Mega-Counts (5 Mega-Pulse) per second
- Digital Halls - up to 2 KHz
- Incremental Encoder with Digital Halls for commutation - up to 20 Mega-Counts
- Absolute Encoder
- Interpolated Analog Sine/Cosine Encoder-up to 250 KHz
  - Internal Interpolation - up to x4096
  - Automatic correction of:
    - amplitude mismatch
    - phase mismatch
    - signals offset
  - Encoder outputs, buffered, differential
- Resolver
  - Programmable 10~15 bit resolution
  - Up to 512 Revolutions Per Second (RPS)
  - Encoder outputs, buffered, differential
- DC Tachometer for velocity feedback
- Analog Potentiometer for position feedback
- Elmo drives provide supply voltage for all the feedback options

Input/Output:

- Analog Inputs with 14-bit resolution
- Programmable digital inputs, optically isolated
  - Inhibit / Enable motion
  - Software and analog reference stop
  - Motion limit switches
  - Begin on input
  - Abort motion
  - General-purpose
  - Homing
- Fast event capture inputs, optically isolated
- Programmable digital outputs
  - Brake Control
  - Amplifier fault indication
  - General-purpose
  - Servo enable indication
- Buffered output of the main encoder
- Buffered output of the auxiliary encoder
- Emulated output of the resolver or interpolated analog encoder
- Fast output compare (OC), optically isolated

Communications

- RS-232
- CANopen DS 301, DS 402

Auxiliary Power

- 24 VDC external power source (HAR, BAS, COR, TUB)
- 24 VDC external or internal from power bus (CEL)

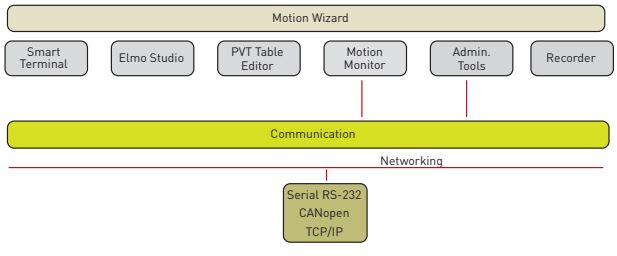
Built-In Protection

- Software error handling
- Abort (hard stops and soft stops)
- Status reporting
- Protection against:
  - Shorts between motor power outputs
  - Shorts between motor power output and power input return
  - Shorts between motor power output and power input
  - Failure of internal power supplies
  - Overheating
  - Over/Under voltage
  - Loss of feedback
  - Following error
  - Current limits

Software Tools: Getting in tune

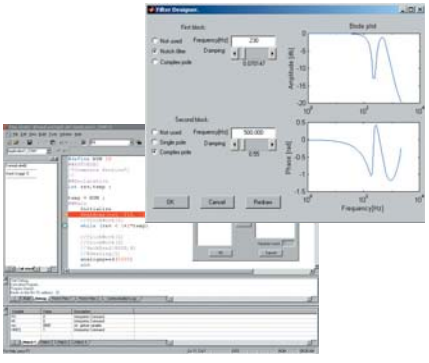
Elmo offers a proprietary, Microsoft Windows-based software application called ***"Composer"*** that quickly and easily configures, tests and precisely tunes any single-axis servo drive. Elmo's ***"Metronome"*** proprietary, third generation, universal programming language is suitable for all our digital drives. It enables fast, straight-forward, trouble-free servo drive installation, flexible and intuitive programming and smooth operation. Communication is achieved via serial RS-232 or CANopen protocol.

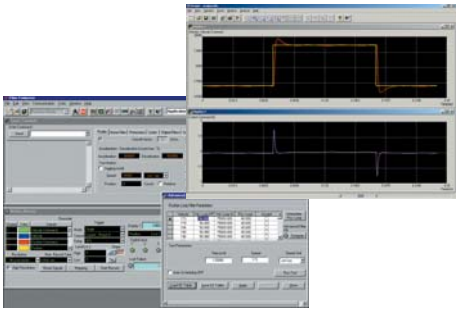
Composer Building Blocks



The *Composer* features:

- Setup, Configuration and Download tools
- Motion Tuner - manual and automatic tuning of current, velocity and position modes
- Motion Monitor and Scope for testing
- Recording - 8 recording channels - smart event triggering modes
- Elmo *Studio* programming environment - includes, compilation and debugging tools *Studio* is an IDE with Editing, Build, Debug, Find & Watch windows
- Table Editor - for PVT (Position, Velocity, Time) tables, and testing tools for real-time synchronized trajectories

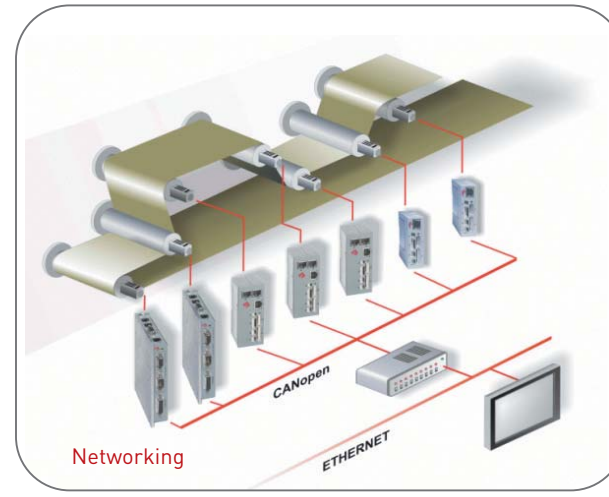




Networking and Communications:

Making music in real time

Elmo Motion Control servo drives are fully integrated in distributed motion control environments via a serial interface and/or industrial, real-time communication protocols. These include **CANopen DS 301** and a **full implementation of DS 402.** By incorporating a binary interpreter, Elmo's implementation of the CANopen protocol in the servo drives enables fast, **simultaneous** communication via CANopen and serial RS-232 lines.

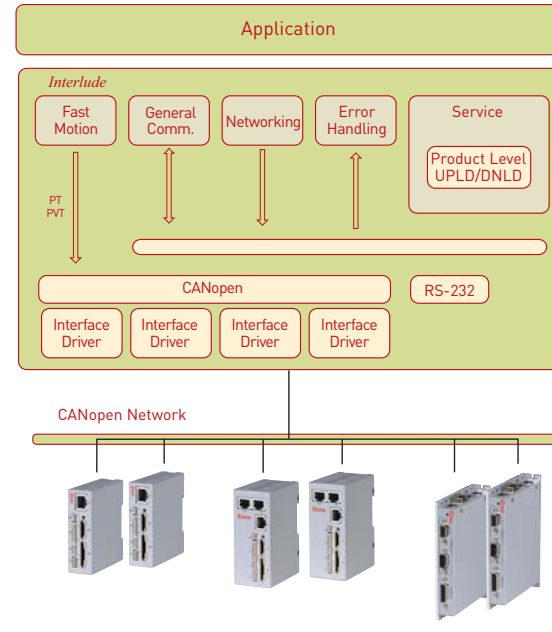


Interlude: Enabling harmonious communications

Elmo's ***"Interlude"*** is an intuitive communication library that provides software developers with a fast and simple way to program applications for motion control systems that integrate Elmo digital servo drives.

The highly accessible library provides an efficient and easy communication channel directly to the connected Elmo drive in order to facilitate integration with the user application. This saves both programming time and effort, and ensures compatibility between the user application and the Elmo drive.

The Interlude API is integrated as a DLL directly into the user application, operating as an embedded component. It fully supports CANopen DS 301 synchronized communications for interpolated motion applications.



CANopen

Orchestrating the graceful movement of machinery

Elmo's digital and analog products come in a range of sizes and power densities, with an assortment of functionalities that meet the needs of machine manufacturers and their demanding customers. As their names indicate, all of our products are finely-tuned, durable instruments that perform reliably and consistently in even the harshest industrial conditions.

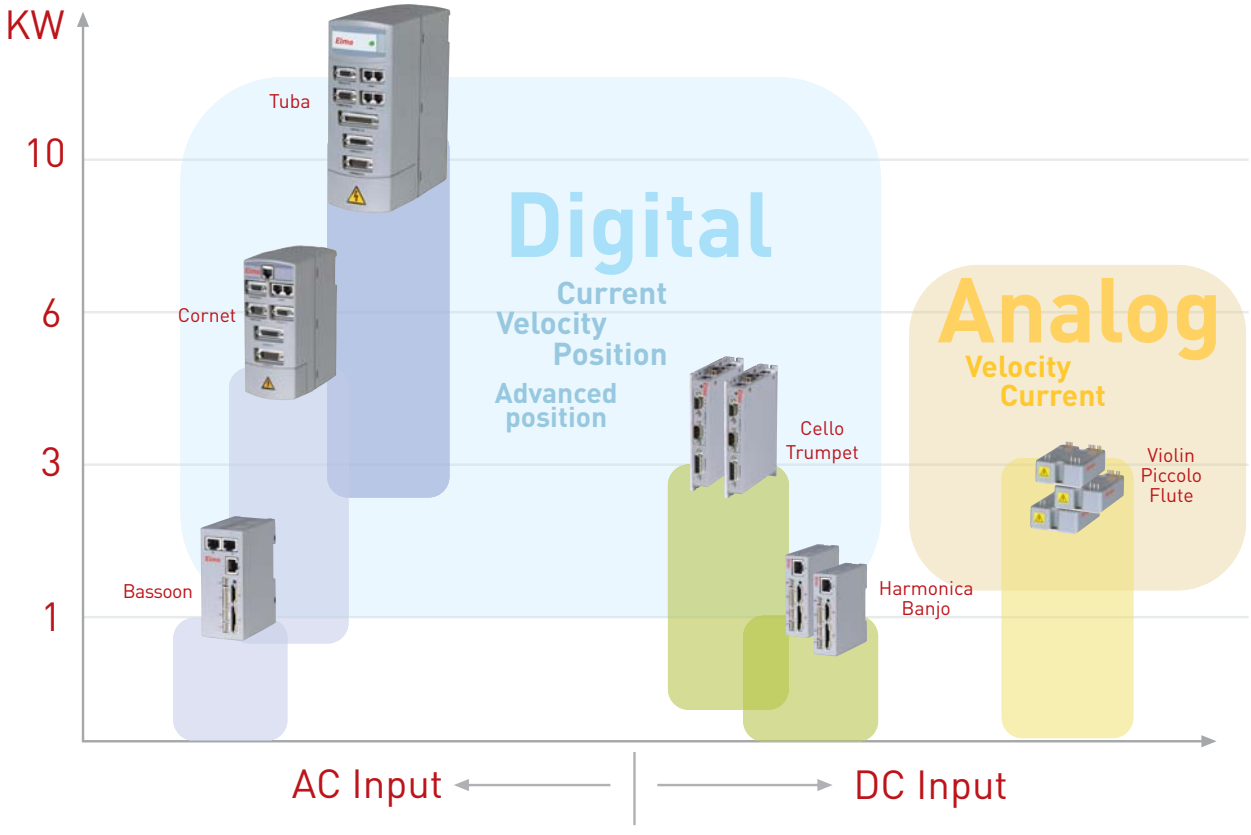
Digital Servo Drives

Elmo's intelligent digital servo drives support DC and AC brushless motors and feature a range of functionalities, including CANopen networking for distributed intelligence.

The Harmonica, Bassoon, Cello, Cornet and Tuba series comprise the core products in Elmo's range of digital servo drives, combining high densities of power, intelligent functionality and space-friendly design. These exceptionally compact drives integrate Elmo's advanced, single core technology, which enables the products' superior control performance, flexibility, efficiency and reliability. All the drives in the series include a fully digital motion controller that features current, velocity and position loops and a selection of commutation types and position feedbacks. The result: higher dynamics and increased precision for a wide variety of industrial implementations.

Feature	Standard	Advanced
CANopen interface (DS 301 & DS 402)	Yes	Yes
Current mode	Yes	Yes
Velocity mode, follower	Yes	Yes
Position jog, follower, point-to-point	Yes	Yes
Pulse and direction input	Yes	Yes
Dual loop, velocity and position	No	Yes
PT position versus time modes	Yes	Yes
PVT position and velocity versus time	Yes	Yes
ECAM/Follower	No	Yes
User program size	2 KB	32 KB

Product Range



Elmo manufactures a wide range of analog and digital servo drives. Our digital servo drives can provide up to 10 KW of power, while our analog servo amplifiers can provide up to 3.6 KW. Elmo's digital servo drives are available in AC input and DC input models. The pages that follow describe our drives and amplifiers in more detail.

Harmonica/Banjo*

Feature**	Unit	5/60	8/60	12/60	2/100	4/100	8/100	12/100	1/200	2/200	4/200	6/200
Minimum Supply Voltage	VDC	10			20				40			
Nominal Supply Voltage	VDC	50			85				180			
Maximum Supply Voltage (over voltage trip)	VDC	59			95				195			
Maximum Output Power from the drive	W	250	410	670	210	320	660	1080	210	330	660	1110
Efficiency at Rated Power	%	> 97										
Auxiliary Supply Voltage (ext.)	VDC	24 ±20%										
Auxiliary Supply Power (ext.)	VA	8										
DC and Trapezoidal Commutation Continuous Current Limit (Ic)	A	5	8	13.3	2.5	4	8	13.3	1.25	2	4	6.6
Sinusoidal Commutation Continuous RMS Current Limit (Ic)	A	3.5	5.7	9.4	1.8	2.8	5.7	9.4	0.9	1.4	2.8	4.7
Peak Current Limit (RMS)	A	2 x Ic										
Output Power without Additional Heat Sink	%	100	50	20	100	50	20	20	100	50	20	20
Weight	g (oz)	150 (5.3)										
Dimensions	mm (in)	82 x 25.4 x 75 (3.2 x 1.0 x 3.0)										
Digital In / Digital Out / Analog In		6 / 2 / 1										

* The Banjo is a Current/Torque mode version of the Harmonica.
** Depending on the servo cycle, a heat sink may be needed.

Cello/Trumpet*

Feature	Unit	5/60	10/60	15/60	15RMS/60	30/60	3/100	10/100	15/100	15RMS/100	2/200	6/200	10/200	15/200	15RMS/200
Minimum Supply Voltage	VDC	10					20				40				
Nominal Supply Voltage	VDC	50					85				180				
Maximum Supply Voltage (over voltage trip)	VDC	59					95				195				
Maximum Output Power from the drive	W	250	510	760	1070	1530	270	820	1220	1730	380	990	1680	2510	3550
Efficiency at Rated Power	%	> 97													
Auxiliary Supply Voltage (ext.)	VDC	24 ±20%													
Auxiliary Supply Power (ext.)	VA	12													
DC and Trapezoidal Commutation Continuous Current Limit (Ic)	A	5	10	15	15	30	3.3	10	15	15	2.25	6	10	15	15
Sinusoidal Commutation Continuous RMS Current Limit (Ic)	A	3.5	7.1	10.6	15	21.2	2.3	7.1	10.6	15	1.6	4.2	7.1	10.6	15
Peak Current Limit (RMS)	A	2 x Ic													
Output Power without Additional Heat Sink	%	100				75	100				100			75	50
Weight	g (oz)	640 (22.6)													
Dimensions	mm (in)	150 x 25.4 x 105 (5.9 x 1 x 4.1)													
Digital In / Digital Out / Analog In		10 / 5 / 2													

* The Trumpet is a Current/Torque mode version of the Cello.

Bassoon

Feature*	Unit	1/230	3/230	5/230	6/230
Minimum Supply Voltage	VAC	30			
Nominal Supply Voltage	VAC	230			
Maximum Supply Voltage	VAC	270			
Max. Output Power from the Drive	W	240	710	1190	1420
Efficiency at Rated Power	%	> 97			
Auxiliary Supply Voltage (ext.)	VDC	24 ±20%			
Auxiliary Supply Power (ext.)	VA	8			
DC and Trapezoidal Commutation Continuous Current Limit (Ic)	A	1	3.3	5	6
Sinusoidal Commutation Continuous RMS Current Limit (Ic)	A	0.7	2.3	3.5	4.2
Peak Current Limit (RMS)	A	2xIc			
Output Power as Supplied	%	80	100	100	100
Supplied with Heat Sink		No	#2 (fins)	#4 (fins and fan)	
Built-in Shunt (peak power)	W	400			
Weight	g (oz)	350 (12.3)			
Dimensions	mm(in)	105 x 76 x 44 (4.1 x 3.0 x 1.7)			
Digital In / Digital Out / Analog In		6 /2 /1			

* Depending on the servo cycle, a heat sink may be needed.

Cornet

Feature	Unit	1/230	3/230	5/230	7/230	9/230	1/460	3/460	6/460
Minimum AC SupplyVoltage	VAC	60					140		
Rated AC Supply Voltage	VAC	1 x 115, 1 x 230, 3 x 230					3 x 400, 3 x 460		
Maximum Supply Voltage	VAC	1 x 270 or 3 x 270					3 x 505		
Max.Output Power from the Drive	W	440	1430	2170	3040	3900	1130	2840	4870
Efficiency at Rated Power	%	> 93							
Auxiliary Supply Voltage (ext.)	VDC	24 ±15%							
Auxiliary Supply Power (ext.)	VA	20							
DC and Trapezoidal Commutation Continuous Current Limit (Ic)	A	1.41	3.5	5	7	9	1.41	3.5	6
Sinusoidal Commutation Continuous RMS Current Limit (Ic)	A	1	2.5	3.5	5	6.4	1	2.5	4.3
Peak Current Limit (RMS)	A	2 x Ic							
Built-in Shunt (peak power)	KW	2.4					1.1	3.4	3.4
Weight	kg (lb)	1.1 (2.4)							
Dimensions	mm (in)	180 x 123 x 75 (7.1 x 4.8 x 3.0)							
Digital In / Digital Out / Analog In		10 / 6 / 2							

Tuba

Feature	Unit	12/230	15/230	20/230	12/460	15/460	20/460
Minimum AC Supply Voltage	VAC	60			140		
Nominal AC Supply Voltage	VAC	1 x 115, 1 X 230 or 3 x 230			3 x 400, 3 x 460		
Maximum Supply Voltage	VAC	1 X 270 or 3 x 270			3 x 505		
Max. Output Power from the Drive	W	3320	4110	5470	6070	7500	10,000
Efficiency at Rated Power	%	> 93					
Auxiliary Supply Voltage (ext.)	VDC	24 ±15%					
Auxiliary Supply Power (ext)	VA	20					
DC and Trapezoidal Commutation Continuous Current Limit (Ic)	A	12	15	20	12	15	20
Sinusoidal Commutation Continuous RMS Current Limit (Ic)	A	8.5	10.5	14	8.5	10.5	14
Peak Current Limit (RMS)	A	2 x Ic					
Built-In Shunt (peak power)	KW	6	6	6	11	11	11
Weight	kg (lb)	2.7 (5.9)					
Dimensions	mm (in)	247 x 118 x 92 (9.7 x 7.4 x 3.6)					
Digital In / Digital Out / Analog In		10 / 6 / 2					

General table for
Harmonica , Cello , Bassoon , Cornet , Tuba

Feature	Unit	Harmonica, Cello Bassoon, Cornet, Tuba	
Output Voltage	%	> 97 Vin	
PWM Switching Frequency	KHz	22 ±5% default on the Motor	
Switching Method		Advanced Unipolar PWM	
Current Loop		Bandwidth > 2.5 KHz	Sampling Rate > 14 KHz
Velocity Loop		Bandwidth > 350 Hz	Sampling Rate > 7 KHz
Position Loop		Bandwidth > 80 Hz	Sampling Rate > 3.5 KHz
Maximum Heat Sink Temperature	°C (°F)	80°C (176°F) ±4°C	
Ambient Operating Temperature	°C (°F)	0° ~ 40°C (32° ~ 104°F)	
		models for extended environmental conditions are available	
Storage Temperature	°C (°F)	-20° ~ 85°C (-4° ~ 185°F)	
Maximum Humidity	%	90% non-condensing	
Maximum Operating Altitude	m (ft)	up to 10,000 m (30,000 ft)	
Protection Level		IP20	

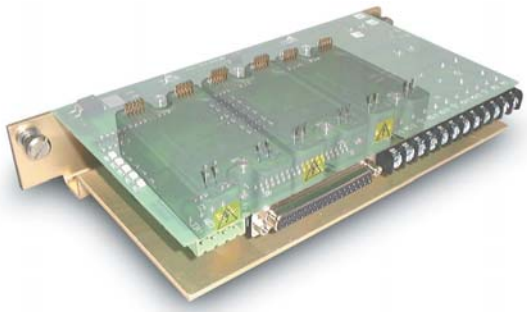
Integration options:

A melodic fusion of analog and digital

Custom Designs

At Elmo, we have years of experience designing and manufacturing custom Multi-Axis power blocks based on our products.

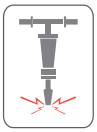
Elmo expertise has been used, among other things, to design hardware for very confined spaces, to minimize wiring and to increase reliability.



Custom-Built Multi-Axis Power

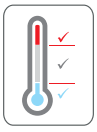
Extended Environmental Versions

Elmo offers extended environmental versions of most products. Etended temperature and high humidity versions, high G-force resistant versions, and high vibration resistant versions are available. These models have been used in a wide variety of avionics, aerospace and laboratory applications. The symbols below are used to indicate the availability of each type.



High Vibration

5 Hz to 2000 Hz with up to 12 G



Extended Temperature Range

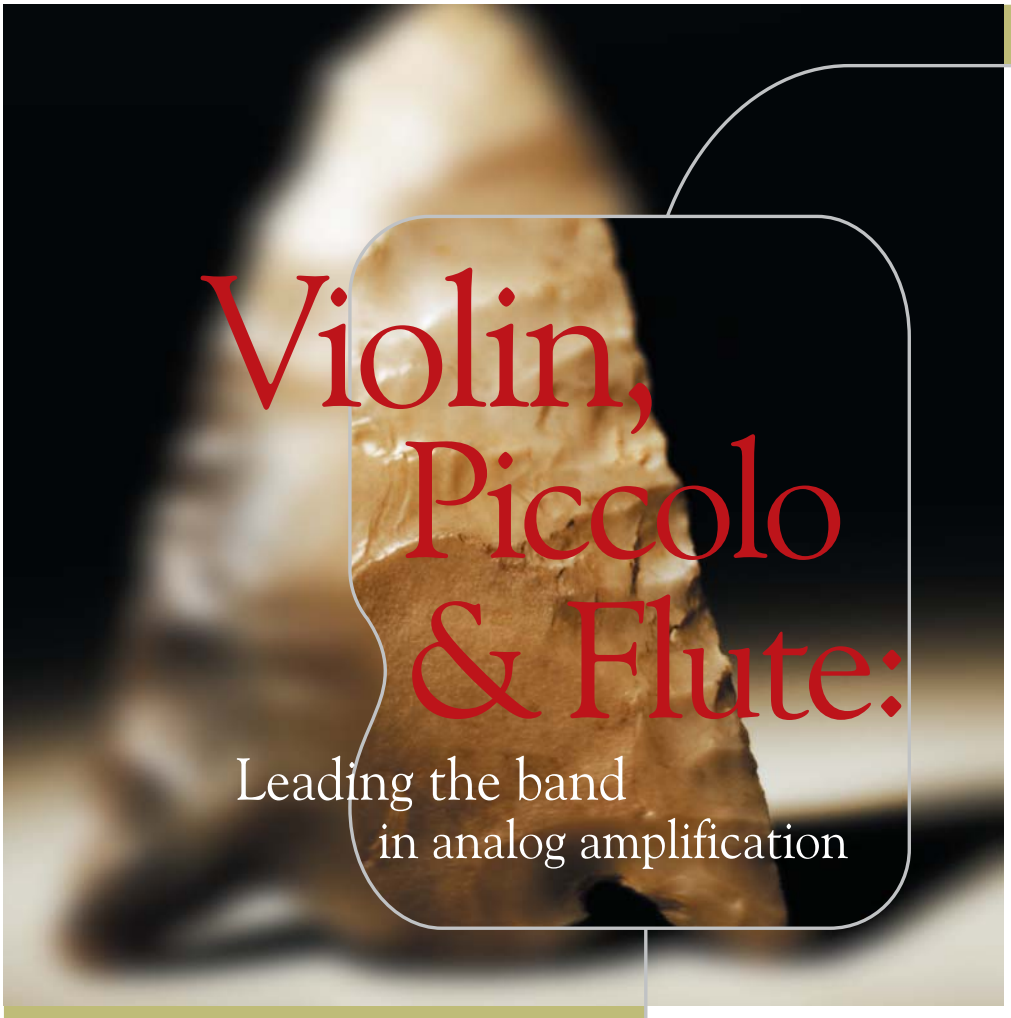
down to -40°C (-40°F)
up to 80°C (176°F)

High G-force

as high as 25 G

High Humidity

up to 90% non-condensing



Violin, Piccolo & Flute:

Leading the band in analog amplification

Elmo's analog servo amplifier family -including the Violin, Piccolo and Flute - addresses the needs of brush and brushless DC motors. Each amplifier series exhibits excellent servo performance, top efficiency, high quality and reliability - all in sleek and compact, high-density power packages. Outstanding motion control is achieved through the implementation of Elmo's proprietary switching and control methods enabled by fully customized, dedicated ICs and advanced heat transfer and dissipation methods.

Elmo's miniature current mode amplifiers include the:

- Violin- for DC brush motors, incorporating mixed analog and digital ICs
- Piccolo - for brushless DC motors in which trapezoidal commutation is performed by the amplifier
- Flute - for brushless DC motors in which sinusoidal commutation is performed by the motion controller

Standard Features

- Operation in current mode
- Internal DC-to-DC converter for single supply operation
- Zero deadband
- Excellent linearity
- External continuous and peak current limit adjustments
- Current feedback multiplier for low-current motors
- Remote current gain control
- Ultra compact size
- Copper base plate with plastic housing
- High reliability with field-proven MTBF of over 500,000 working hours

Built-In Protection

- Shorts between motor power outputs
- Shorts between motor power outputs and power input returns
- Excess temperature
- Under/Over voltage
- Failure of internal power supplies
- Latch mode for each protective feature

Control Connections for:

- Current command input
- External continuous current limit
- External peak current limit
- Current monitor
- Current gain control

Motor Output

- Motor output phases
- Nominal output continuous current: up to 25A
- Peak output current: up to 50A

Velocity versions of the Piccolo and Violin are available by adding a velocity loop card. The Velocity Kit enables operation in velocity mode when the Picollo uses either an encoder or Hall sensor for feedback, or when the Violin uses a tachometer or armature for feedback.

General Table for Violin, Piccolo and Flute

PWM Switching Frequency	KHz	32 ±5% (on the motor)
Switching Method		Advanced unipolar PWM
Current Loop Bandwidth	KHz	> 4
Output Voltage	%Vin	100
Ambient Temperature	°C (°F)	0° ~ 60°C (32° ~ 140°F) models for extended environmental conditions are available
Max. Case Temperature	°C (°F)	87°C (188°F)
Storage Temperature	°C (°F)	-40° ~ 100°C (-40° ~ 212°F)

Violin

Feature	Unit	5/60	10/60	15/60	25/60	10/100	15/100	20/100	6/200	10/200	15/200
Minimum Supply Voltage	VDC	10	10	10	10	20	20	20	40	40	40
Maximum Supply Voltage	VDC	56	56	56	56	96	96	96	196	196	196
Continuous Output Current	A	5	10	15	25	10	15	20	6	10	15
Peak Output Current	A	10	20	30	50	20	30	40	12	20	30
Max. Output Power from the Drive	W	300	600	900	1500	960	1440	1920	1180	1960	2940
Efficiency at Rated Power	%	>97									
Overall Dimensions	mm (in)	82 x 47 x 25.4 (3.3 x 1.9 x 1.0)									
Weight	g (oz)	180 (6.4)									

Current
Velocity

Piccolo

Feature	Unit	5/60	10/60	15/60	25/60	3/100	10/100	15/100	20/100	2/200	6/200	10/200	15/200
Minimum Supply Voltage	VDC	10	10	10	10	20	20	20	20	40	40	40	40
Maximum Supply Voltage	VDC	56	56	56	56	96	96	96	96	196	196	196	196
Continuous Output Current	A	5	10	15	25	3.3	10	15	20	2.25	6	10	15
Peak Output Current	A	10	20	30	50	6.6	20	30	40	4.5	12	20	30
Max. Output Power from the Drive	W	300	600	900	1500	320	960	1440	1920	440	1180	1960	2940
Efficiency at Rated Power	%	>97											
Overall Dimensions	mm(in)	82 x 62 x 25.4 (3.2 x 2.4 x 1.0)											
Weight	g (oz)	230 (8.1)											

Current
Velocity

Flute

Feature	Unit	5/60	10/60	15/60	25/60	3/100	10/100	15/100	20/100	2/200	6/200	10/200	15/200
Minimum Supply Voltage	VDC	10	10	10	10	20	20	20	20	40	40	40	40
Maximum Supply Voltage	VDC	56	56	56	56	96	96	96	96	196	196	196	196
Continuous Output Current	A	5	10	15	25	3.3	10	15	20	2.25	6	10	15
Peak Output Current	A	10	20	30	50	6.6	20	30	40	4.5	12	20	30
Max. Output Power from the Drive	W	360	720	1090	1820	380	1170	1750	2330	540	1430	2380	3570
Efficiency at Rated Power	%	>97											
Overall Dimensions	mm (in)	82 x 62 x 25.4 (3.2 x 2.4 x 1.0)											
Weight	g(oz)	250 (8.8)											

Current

Intelligent Digital Servo Drives

	DC		AC		
	Harmonica / Banjo* 	Cello / Trumpet* 	Bassoon 	Cornet 	Tuba 
Page	10	10	11	11	12
Motor	Brush, Brushless and Linear				
Operating Modes	Current, Velocity, Position & Adv. Pos.				
Supply Voltage Range (VDC)	10 ~ 195	10 ~ 195			
Supply Voltage Range (VAC)			30 ~ 270	1 x 60 ~ 3 x 505	1 x 60 ~ 3 x 505
Continuous Output Current (A)	1.25 ~ 13.3	2.25 ~ 30	1 ~ 6	1 ~ 9	12 ~ 20
Output Power Range (KW)	0.2 ~ 1.1	0.3 ~ 3.6	0.2 ~ 1.4	0.4 ~ 4.9	3.3 ~ 10
Digital In, Out, Analog In	6 / 2 / 1	10 / 5 / 2	6 / 2 / 1	10 / 6 / 2	10 / 6 / 2
Communications	RS-232, CANopen DS 301 and DS 402				
Software	Composer, Interlude, Studio				
Memory	Up to 32 KB				

* The Banjo and Trumpet are Current/Torque mode versions of the Harmonica and Cello

COR-AXX/YYYIC

Product Code
BAN - Banjo
BAS - Bassoon
CEL - Cello
COR - Cornet
HAR - Harmonica
TRU - Trumpet
TUB - Tuba

Type
_ = Standard
A = Advanced

Current

Maximum Operating Voltage

Communication
_ = RS-232
C = CANopen (HAR/BAN only)

Feedback
_ = Incremental Encoder
R = Resolver
I = Interpolated Analog Encoder
T = Tachometer & Potentiometer

Analog Servo Amplifiers

	DC		
	Violin 	Piccolo 	Flute 
Page	15	15	15
Motor	Brush	Brush, Brushless, Linear	Brushless, Linear
Operating Modes	Current & Optional Velocity		Current
Supply Voltage (VDC)	10 ~ 196	10 ~ 196	10 ~ 196
Continuous Output Current (A)	5 ~ 25	2.25 ~ 25	2.25 ~ 25
Output Power (KW)	0.3 ~ 2.9	0.3 ~ 2.9	0.4 ~ 3.6

VIO-XX/YYY V

Product
FLU - Flute
PIC - Piccolo
VIO - Violin

Current

Maximum Operating Voltage

Mode
_ = Current
V = Velocity

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