

# Motion Control Solutions Ready for the Extreme



**Elmo**  
*Inside*

Motion Control Solutions & Servo Drives  
for Any Application

# ExtrlQ Line

Servo drives that endure any environment, any application.

Extreme durability, meticulous power management, and high precision of movement, are essential attributes for developing high-performance, reliable industrial, commercial or military applications.

Elmo's ExtrlQ is a standard off-the-shelf series of robust motion control products designed, verified, manufactured and tested for applications operating under extreme environmental conditions, such as: extended temperature range, high humidity, extreme altitude, intense vibration and high mechanical shock. In addition to enduring the most extreme environments, ExtrlQ exhibits top servo performance, super compact sizes, high efficiency, negligible EMI, and high reliability to answer any servo requirement. The durability is verified by the most severe environmental, EMC and safety standards.

## Ultra-High Current

**P-Lion**  
Motion  
Controller



**Eagle**  
650A/80A  
550A/100V



**Eagle**  
430A/80V  
360A/100V



**Eagle**  
100A/900V

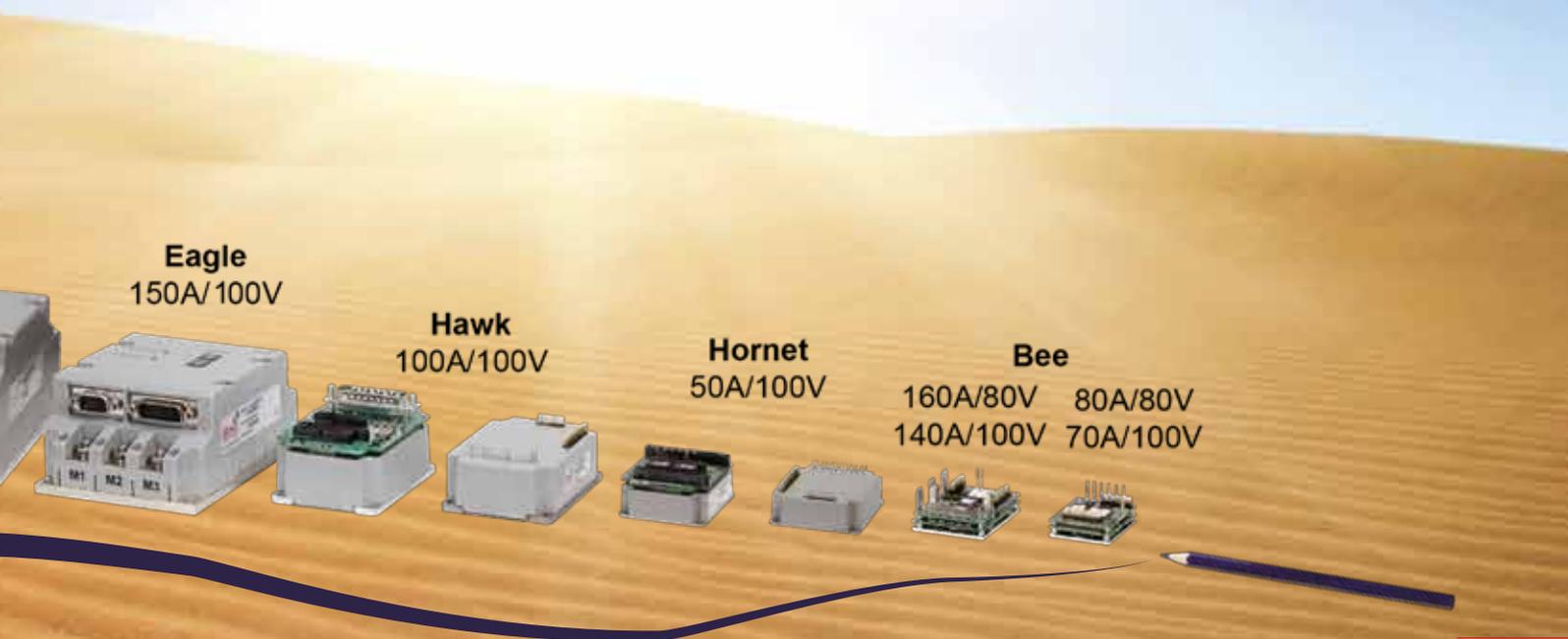


# Environmental Specifications

Our high performance, field-tested solutions withstand the most extreme environmental conditions like heat, freezing cold, humidity, dryness and wind. They comply with the strictest safety, EMC, electrical, reliability and environmental standards, such as 1275, 704, 1399, 810, 461, 217, UL 61800-5-1, IEC 61800-5-2(SIL3), IEC 60068-2, IEC 61800-3, and more.

Feature	Operating Conditions	Range
Ambient Temperature Range	Non-operating conditions	-50 °C to 100 °C (-58 °F to 212 °F)
	Operating conditions	-40 °C to 70 °C (-40 °F to 160 °F)
Temperature Shock	Non-operating conditions	-40 °C to 70 °C (-40 °F to 160 °F) within 3 minutes
Altitude	Non-operating conditions	Unlimited
	Operating conditions	-400 m to 12,000 m (-1,312 to 39,370 feet) Models for higher altitudes are available upon request
Relative Humidity	Non-operating conditions	Up to 95% relative humidity non-condensing at 35 °C (95 °F)
	Operating conditions	Up to 95% relative humidity non-condensing at 25 °C (77 °F) Up to 90% relative humidity non-condensing at 42 °C (108 °F)
Vibration	Operating conditions	20 Hz to 2 kHz, 14.6 g
Mechanical Shock	Non-operating conditions	±40 g; Half sine, 11 msec
	Operating conditions	±20 g; Half sine, 11 msec

# ent Servo Drives



**Eagle**  
150A/100V

**Hawk**  
100A/100V

**Hornet**  
50A/100V

**Bee**  
160A/80V 80A/80V  
140A/100V 70A/100V

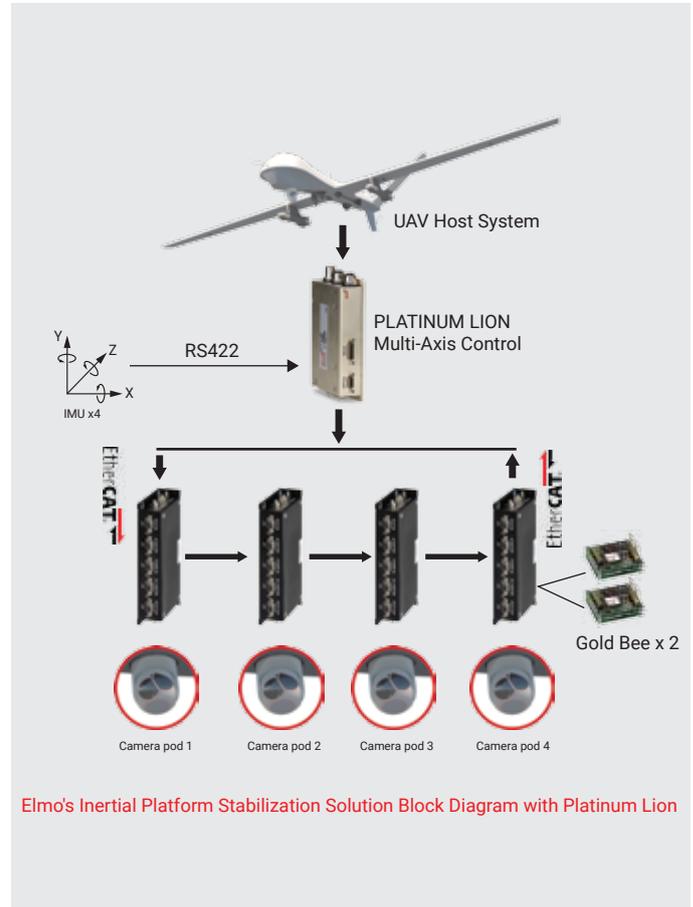
# READY TO USE

## Complete Motion Solutions for Inertial Platform Stabilization

Elmo offers a generic, completely ready-to-use motion control solution for inertial platform stabilization, whether on ground, in air, or by sea. The solution consists of Elmo's standard off-the-shelf motion control products. Starting from controller level gyro signal input, to high precision, high dynamics, high bandwidth servo, and the ability to control any number of motion axis, the Elmo solution is a light and robust motion solution that is ready to stabilize any platform whatever the environment may be.

Elmo's advanced multi-axis control capabilities, in conjunction with intelligent servo drive technology, guarantee ultimate stabilization performance, saving platform manufacturers the need to develop any dedicated hardware or software. With advanced control features such as SIL (Software In the Loop) customers can use their own control algorithms and thus streamline the design process or protect any of their sensitive IP.

The solution is composed of a Platinum Lion motion controller, a dual G-Bee drive module, and flexible programming tools, which allow for simple implementation of gyro-specific user code. The solution is compact, light-weight, with high bandwidth and efficient networking, making it ideal for extreme airborne inertial platform stabilization.



# Platinum Lion

## The Platinum-Lion

The Platinum-Lion (P-Lion), Elmo's ExtriQ version of the Platinum-Maestro is the world's most advanced, ruggedized multi-axis network motion-controller. It is suitable for operation in any environment, whether in extreme temperatures, ranging from -40 to 70°C (-40 to 158°F), high altitudes (up to 40,000ft), high mechanical shocks or intensive vibrations (up to 2000Hz). Based on the world's most advanced motion controller - the Platinum Maestro, the P-Lion with its immense processing power (quad-core), state-of-the-art design and advanced motion algorithms, pushes the boundaries of any machine, optimizing overall accuracy, speed, and throughput of any system.

The P-Lion is a fast EtherCAT networking controller, with minimum cycling time of 100µs (for 8 synchronized axes), and cycle jitter below 5µs, resulting in a precise, reliable and deterministic motion. P-Lion has also been fitted with rich I/O connectivity, allowing direct controller-level support for digital and analog I/O, accelerometers, encoders, serial interfaces, and IMUs. Such extended connectivity makes the P-Lion ideal for applications such as Inertial Platform Stabilization, requiring high speed, high responsiveness IMU/gyro support.

The P-Lion provides full flexibility for either IEC 61131-3 or C/C++ programming, along with an industry-standard IEC programming environment and intuitive visualization capabilities. With countless multi-axis motion algorithms and features such as 3D high resolution error mapping, high-order polynomial motion segments and trajectory buildup, smart gearing, dynamic PVT and more, the P-Lion is the ultimate controller for extreme, precise, and reliable motion.



**Actual  
Size**

**P-LION**

(Rugged Package)

Software-in-the-Loop (SIL) - Simplifies motion implementation by allowing user design and code to run in real-time core of the Platinum Lion. Insert your own MATLAB/SIMULINK code easily and run your application efficiently without converting or rewriting any code.

# EASII 2.3

## Elmo Application Studio II Software

### Motion Without Programming Only with Elmo's advanced tools

System implementation using innovative EASII (Elmo Application Studio) software including Elmo Motion Function Blocks (EMBLs), ushers in the "Intelligence by Simplicity" revolution. Motion programming was once the domain of hard to find motion "wizards", demanding both the highest level of machine motion skills with expertise in motion programming. Enter our new advanced EMBLs for continuous system telemetry during regular operation of the system. Now using EASII with EMBLs you can get the best performance from your machine, quickly learn how, easy to implement by non-wizards, significantly shortens "Time to Market" while enormously saving engineering resources.

### Walking You Through the Entire Motion implementation

EASII, Elmo Motion Control's leading motion control software, offers an intuitive interface to simplify complex motion programming. EASII configures, programs, maintains, monitors and analyzes every feature and capability of Elmo's servo drives and Maestro motion controllers. It brings your machine to peak performance in the shortest time, makes drive setup simpler and puts powerful, intuitive software tools for motion control at your fingertips, regardless of the complexity of the application.

EASII includes intelligent, simple to use Elmo Motion Block Libraries (EMBLs), machine templates, functions and capabilities which operate in a wide variety of high-level, multi-axis programming environments such as Microsoft .NET, IEC 61131-3 PLCopen, Native C/C++ and programming using the PLCopen for Motion and Win32 C/C++.

The EASII with EMBLs is indeed a "One Tool That Does it All" providing Configuration, Set-Up, Networking, Programming, Tuning, Load Identification, Multi-dimensional Control Optimization, Synchronization, Simulation, Motion Blending and Transitions, Error mapping, ECAM, Gain Scheduling, Testing, Monitoring, and Recording.

- Innovative software tools enable motion control in every field - any application!
- Automated identification, move and settle
- Path editor for single and multi-axes motion simulations
- User unit support, error mapping and correction, drive feedback emulation
- Advanced error policies handling tool
- Maestro controller and servo drive ECAM configuration, with simplified external reference input processing, Bode & Nichols tuning graphical analysis
- Management (upload/download) of numerous servo drive configurations
- Automated recording live scope and gauge displays
- Comprehensive inline help system

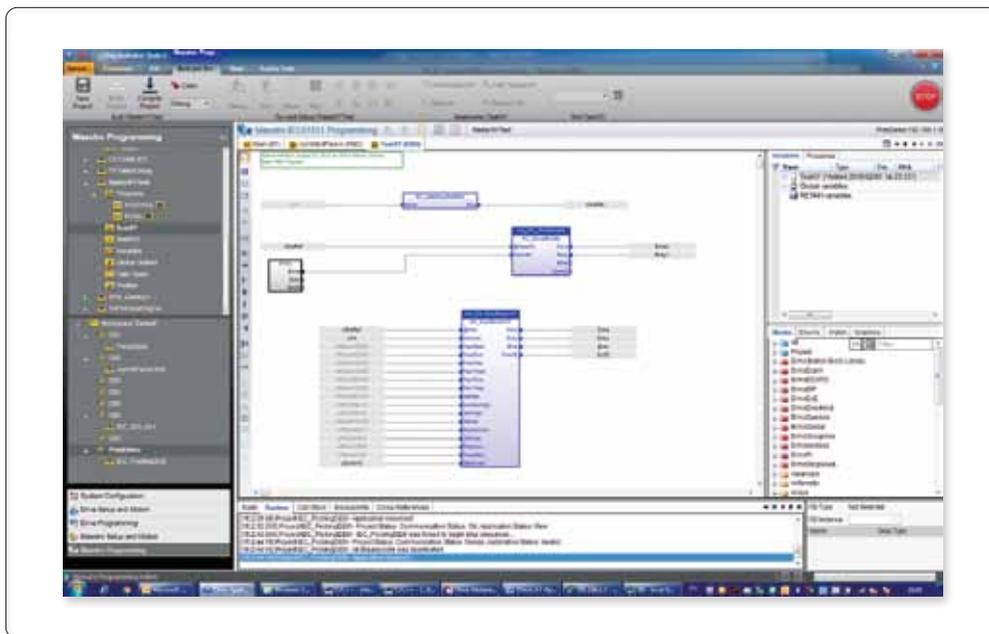
**EASII**  
Elmo Application Studio



The advanced wizard-based  
Application Studio II

# Elmo Motion Building Blocks (EMBLs) Faster, Simpler Implementation

EASII's ready-to-use motion function blocks, EMBLs, significantly simplify and speed up the development process of the application. Elmo has developed numerous EMBLs that simplify the development process of the machine, for example Homing: (all DS-402 methods and more), Output Compare (PEGS), Emulation, ECAM, PVT, Splines, Joystick, Position-To-Force, Raster Scan, Group Motion & Kinematics, system monitoring and more.



Drag and drop an EMBL on to the project from the library. Define inputs and outputs, then execute. As easy as that!

**Saving you time by**  
keeping it simple

# ExtriQ Gold Servo Capabilities

Reliable and robust high-performance servo drives with a high bandwidth for top results with any servo load. The ExtriQ Gold drives are suited for the most demanding, non-linear mechanic type of applications.

- Best results with any servo mechanism, whether high resonance, high inertia, wide bandwidth, low speed or non - linear
- Advanced tuning tools, accomplishing top performance “Fast & Easy”
- Down to 50µs sampling rate
- “1:1:1” technology, same sample time for current, velocity and position loops resulting in very fast and wide bandwidths
- High servo loop bandwidth, as high as 4.5kHz current loop bandwidth
- Very high linearity, current dynamic range of 2000:1 (100A drive runs smoothly 0.05A load)
- Supports any “known” feedback sensor and any combination of dual-loop sensors
- Mastering Gantry by only 2 Gold Drives, No need for an additional bulky controller
- “By The Book” Standard EtherCAT and CANopen networking
- Abundance of control features:
  - Perfect Servo & Motion Control
  - Uncompromised “By The Book” Safety
  - Smallest & Lightest
  - Ultra Efficient Power Conversion
  - Highest Power & Intelligence Density
  - Ruggedness
  - Negligible EMI (Electro Magnetic Interference)
  - Utmost Reliability
  - Easy to Integrate, Simple to Operate
  - Precise & Efficient Networking (EtherCAT, CANOpen)
- Utmost efficiency - 99%
- Ultra High Current Technology
- Certified STO (Safety Torque Off), IEC 61800-5-2 SIL 3, EN ISO 13849-1 Cat 3, PL e
- Proven reliability of MTBF > 1,000,000 Hours

# Gold Bee

The NANO servo drive that delivers over 5,000 and 10,000 "qualitative" Watts

- Ready for the extreme, -40 °C to +70 °C, vibrations up to 14 GRMS
- Suitable to endure any environment
- Ultra high current , up to 160A continuous
- Advanced servo capabilities for top results with any load



Actual Size

# Gold Solo Bee

Ultra Small, 5000 and 10,000 W "Ready To Use"

- Fast & Simple implementation
- Up to 50A with wire & connector kit
- I/O and EtherCAT connectors



Actual Size

Feature	Units	3/100	6/100	15/100	25/100	3/200	6/200	10/200
Minimum supply voltage	VDC			10				20
Nominal supply voltage	VDC			85				170
Maximum supply voltage	VDC			95				195
Ic, Amplitude sinusoidal/	A	3	6	15	25	3	6	10

# Gold Bee 160A/80V

Feature	Units	R80/80	R160/80	R50/100	R140/100	R15/200
Minimum supply voltage	VDC	10		10		20
Nominal supply voltage	VDC	65		85		170
Maximum supply voltage	VDC	75		95		195
Ic, Amplitude sinusoidal/	A	80	160	50	140	15



Actual Size

# Gold Hornet

## Ultra Miniature Servo Drive

-40 °C to +70 °C, Vibrations up to 14 GRMS



Gold Hornet

Gold Solo Hornet

Gold Hornet & Gold Solo Hornet 100V Rating								
Feature	Units	1/100	2.5/100	5/100	10/100	15/100	20/100	25/100
Minimum supply voltage	VDC				12			
Nominal supply voltage	VDC				85			
Maximum supply voltage	VDC				95			
Amplitude sinusoidal/DC continuous current	A	1.0	2.5	5	10	15	20	25

Gold Hornet & Gold Solo Hornet 200V Rating				
Feature	Units	3/200	6/200	9/200
Minimum supply voltage	VDC		12	
Nominal supply voltage	VDC		170	
Maximum supply voltage	VDC		195	
Amplitude sinusoidal/DC continuous current	A	3	6	9

# Gold Hawk

## Super Compact, High Current Servo Drive

-40 °C to +70 °C, Vibrations up to 14 GRMS



Gold Hawk



Gold Solo Hawk

Gold Hawk							
Feature	Units	20/100	35/100	50/100	10/200	17/200	20/200
Minimum supply voltage	VDC	14			23		
Nominal supply voltage	VDC	85			170		
Maximum supply voltage	VDC	95			195		
Continuous current limit (Ic) amplitude of sinusoidal current	A	20	35	50	10	17	20

# Gold Panther

## Super Compact, High Voltage Servo Drive

-40 °C to +70 °C, Vibrations up to 14 GRMS

Actual Size



Gold Panther & Gold Tiger Rating

Feature	Units	6/400	16/400	R22/400	8/800	12/800	R16/800	8/900	12/900	R16/900
Minimum supply voltage	VDC		50			95			95	
Nominal supply voltage	VDC		325			560- 680			620	
Nominal supply voltage	VDC		400			780			840	
Continuous current limit (Ic) Amplitude sinusoidal/DC trapezoidal commutation	A	6	16	22	8	12	16	8	12	16
Control supply voltage (option)	VDC	18 V to 30 V Up to 7VA								



Actual  
Size

## Gold Tiger

Super Compact, High Voltage,  
Metal Housed Servo Drive

-40 °C to +70 °C, Vibrations up to 14 GRMS

# Gold Eagle

## Ultra High Current, Super Compact Servo Drive

-40 °C to +70 °C, Vibrations up to 14 GRMS

Actual  
Size



Gold Eagle					
Feature	Units	70/60	50/100	100/100	R150/100
Minimum supply voltage	VDC	14			
Nominal supply voltage	VDC	50	85		
Maximum supply voltage	VDC	59	95		
VL Logic supply input voltage	VDC	14 to 72, up to 6VA			
Amplitude sinusoidal/DC continuous current	A	70	50	100	150

Feature	Units	35/200	R60/200	18/400	R26/400
Minimum supply voltage	VDC	46		92	
Nominal supply voltage	VDC	170		340	
Maximum supply voltage	VDC	195		390	
VL Logic supply input voltage	VDC	14 to 72, up to 6VA			
Amplitude sinusoidal/DC continuous current	A	35	60	18	26

# Gold Eagle HV

## Super Compact, High Voltage Servo Drive

-40 °C to +70 °C, Vibrations up to 14 GRMS



**Actual  
Size**



Gold Eagle HV										
Feature	Units	50/400	R100/400	35/800	50/800	R70/800	R100/800	35/900	70/900	100/900
Minimum supply voltage	VDC	*For S, T, or A option = 50 For 0 or 1 option = 100					95		95	
For 0 or 1 option = 100	VDC		325				560- 680		620	
Nominal supply voltage	VDC		400				780		840	
Maximum supply voltage	A	400	780	840	50	70	100	35	70	100
Auxiliary supply voltage option	A	18 to 30 VDC, <7VA								

# Gold Eagle 360 A/430 A

## Ultra High Current Super Compact

Actual  
Size



Feature	Units	430/80	650/80	360/100	550/100
Minimum supply voltage	VDC	11		11	
Nominal supply voltage	VDC	65		85	
Maximum supply voltage	VDC	75		95	
Continuous current limit (Ic) amplitude of sinusoidal current	A	430	650	330	550

Actual Size



# Gold Eagle 550 A/650 A

Ultra High Current, Rugged, Servo Drive

-40 °C to +70 °C, Vibrations up to 14 GRMS

# ExtrlQ, SimplIQ Servo Drives

Leading since 2004 with field proven lasting reliability and top servo performance.

ExtrlQ SimplIQ drives combine high power density, intelligent functionality and extreme environment durability. The drives integrate Elmo's advanced SimplIQ motion control core technology, which enables superior control performance.

## ExtrlQ SimplIQ Servo Highlights

SimplIQ core servo drives exhibit a rich set of capabilities and features, supporting a wide variety of applications operating in harsh environmental conditions.

- Field proven performance, quality and reliability since 2004
- High performance servo control
- Down to 50µs sampling rate
- High servo loop bandwidth, as high as 2kHz current loop bandwidth
- Supports large variety of feedback sensors
- "By The Book" Standard CANopen networking (DS402, DS303)
- RS232 communication
- Abundance of control features:
  - ECAM
  - Smart position follower
  - Pulse and Direction
  - Output Compare
  - Master-Slave Follower
  - PT and PVT position and velocity operating modes
  - Modulo
  - Dynamic Braking
  - Dual Loop
- Utmost efficiency of 99%
- Ultra High Current Technology
- Proven reliability of MTBF > 1,000,000 Hours

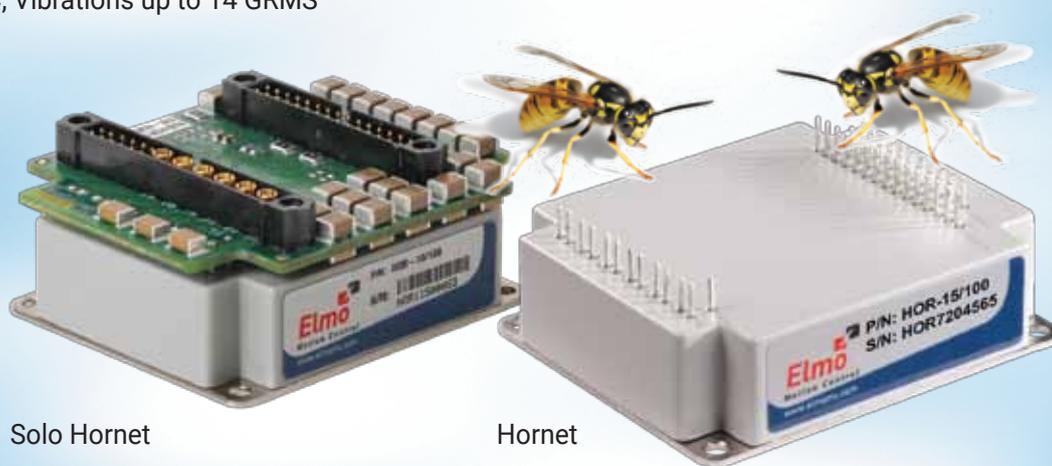


## ExtriQ, SimpliQ Servo Drives

## Hornet

### Ultra Compact Servo Drive

-40 °C to +70 °C, Vibrations up to 14 GRMS



Solo Hornet

Hornet

Actual Size

Hornet								
Feature	Units	1/100	2.5/100	5/100	10/100	15/100	20/100	25/100
Minimum supply voltage	VDC				12			
Nominal supply voltage	VDC				85			
Maximum supply voltage	VDC				95			
Amplitude sinusoidal/DC continuous current (Ic)	A	1.0	2.5	5	10	15	20	25

Solo Hornet				
Feature	Units	3/200	6/200	9/200
Minimum supply voltage	VDC		12	
Nominal supply voltage	VDC		170	
Maximum supply voltage	VDC		195	
Amplitude sinusoidal/DC continuous current	A	3	6	9

## Hawk

### Highly Compact and Intelligent Digital Servo Drive

-40 °C to +70 °C, Vibrations up to 14 GRMS

Actual Size



Hawk							
Feature	Units	20/100	35/100	50/100	10/200	17/200	20/200
Minimum supply voltage	VDC	14			23		
Nominal supply voltage	VDC	85			170		
Maximum supply voltage	VDC	95			195		
Continuous current limit (Ic) amplitude of sinusoidal current	A	20	35	50	10	17	20

## Panther

### DC Offline Servo Drive for Extreme Environmental Conditions

-40 °C to +70 °C, Vibrations up to 14 GRMS

**Actual Size**



Panther							
Feature	Units	12/400	16/400	R22/400	8/800	12/800	R16/800
Minimum supply voltage	VDC	50			95		
Nominal supply voltage	VDC	325			560- 680		
Nominal supply voltage	VDC	400			780		
Continuous current limit (I <sub>c</sub> ) Amplitude sinusoidal/DC trapezoidal commutation	A	12	16	22	8	12	16
Control supply voltage (option)	VDC	18 V to 30 V					

# SimplIQ

## Falcon

### Harsh Environment

-40 °C to +70 °C, Vibrations up to 14 GRMS

Actual  
Size



Falcon						
Feature	Units	15/60	30/60	15/100	30/100	15/200
Minimum supply voltage	VDC	10		20		40
Nominal supply voltage	VDC	50		85		170
Maximum supply voltage	VDC	59		95		195
Auxiliary supply voltage	VDC	24 ± 20%				
Auxiliary power supply	VA	12				
Amplitude sinusoidal/ DC continuous current	A	15	30	15	30	15

# SimpliIQ

## Eagle HV

Eagle HV (High Voltage) Digital Servo Drive up to 65 kW

-40 °C to +70 °C, Vibrations up to 14 GRMS

**Actual  
Size**



Eagle HV						
Feature	Units	50/400	R100/400	35/800	R70/800	R100/800
Minimum supply voltage	VDC	*For S, T, or A option = 50 For 0 or 1 option = 100		95		
For 0 or 1 option = 100	VDC	325		560 - 680		
Nominal supply voltage	VDC	400		780		
Maximum supply voltage	A	400	780	840	70	100
Auxiliary supply voltage option	A	18 to 30 VDC				

# SimplIQ

## Eagle

Powerful Digital Servo Drive  
up to 9.6 kW of Continuous Power

-40 °C to +70 °C, Vibrations up to 14 GRMS



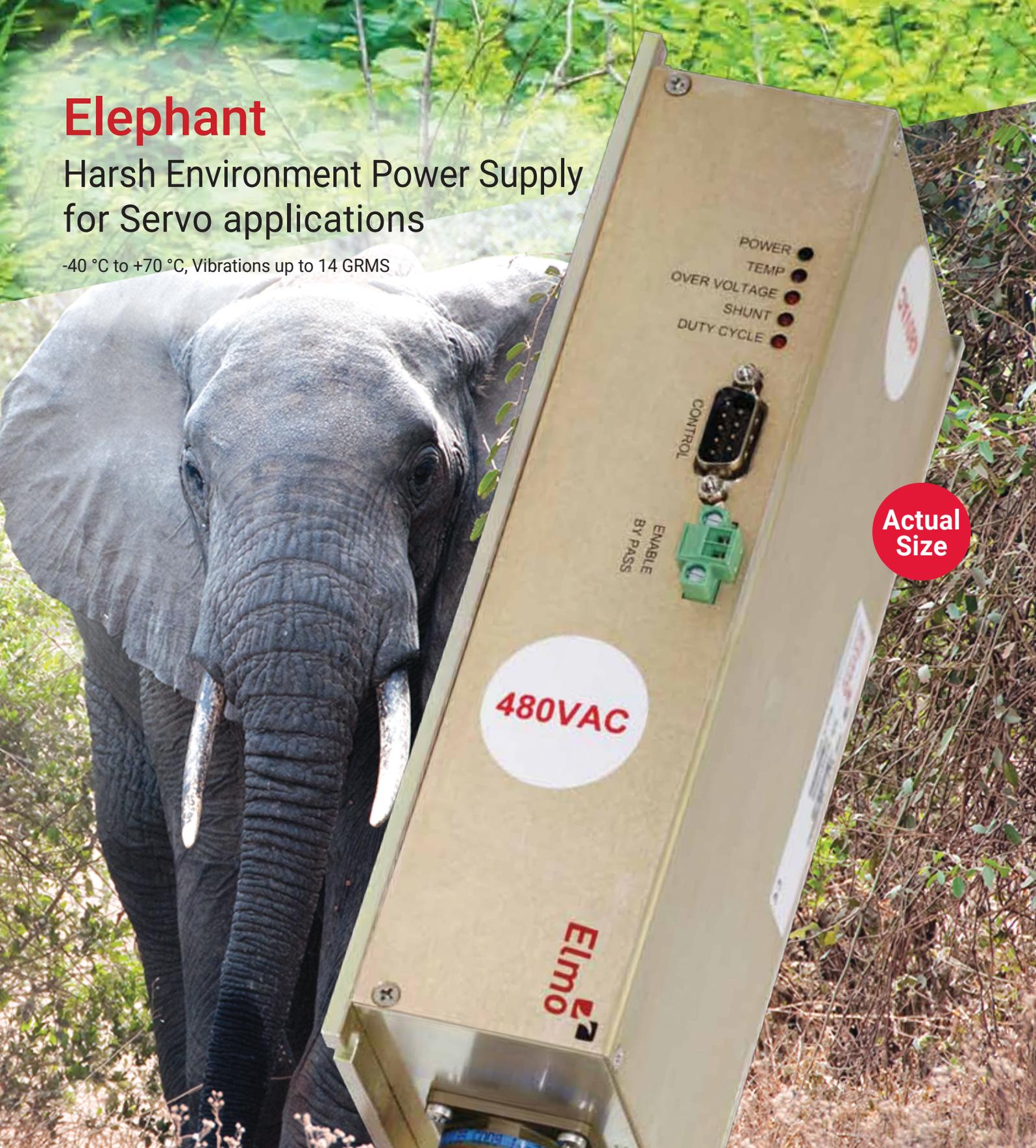
Actual  
Size

Eagle											
Feature	Units	70/48	70/60	R90/60	100/60	50/100	R75/100	100/100	35/200	R60/200	18/400
Minimum supply voltage	VDC	11		14			23		46		92
Nominal supply voltage	VDC	42		50			85		170		340
Maximum supply voltage	VDC	48		59			95		195		390
Amplitude sinusoidal/DC continuous current (Ic)	A	70	70	90	100	50	75	100	35	60	18

# Elephant

## Harsh Environment Power Supply for Servo applications

-40 °C to +70 °C, Vibrations up to 14 GRMS



Actual Size

Elephant								
Power Supply (VAC)	Unit	ELP-30/36	ELP-30/60	ELP-30/120	ELP-30/230	ELP-30/480	ELP-30/480	
Nominal Input AC Voltage	VAC	36	60	120	230	3X480	3X500	
Max Input AC Voltage	VAC	38	61	131	270	3X528	3X600	
Max Output Power Cont.	W	1650	2700	5700	11400	21000	25000	
Max Output Power Peak	W	3300	5400	11400	22800	42000	50000	
Nominal DC bus Output (at nominal AC Voltage)	VDC	50	85	170	325	678	705	
Shunt Power (Peak) 1	kW	1.8	4.5	5.5	6	6.7	8.8	
DC Output Cont. Current	A	30	30	30	30	30	30	
DC Output Peak Current	A	60	60	60	60	60	60	
Mating Drives XXX-YY/_ _ _ (voltage rating)		/60	/100	/200	/400	/800	/900	
Weight	gr							1155



## About Us

Elmo Motion Control (Elmo) designs, produces and implements comprehensive, field-proven motion control solutions that make clients' data-driven, smart machines smarter. Inspired by future needs, the company's R&D department combines intelligent motion control technologies, real-time programming and control algorithms, with advanced digital hardware, to enable leaner, more flexible machines. Controlled by the Elmo Application Studio (EAS)—a software environment that cuts integration time and maintenance costs, Elmo's servo drives and multi-axis motion controllers minimize a machine's footprint and cabling, improve throughput, and give original equipment manufacturers (OEMs) a competitive edge. Founded in 1988, the company is headquartered in Israel, employs more than 350 staff worldwide, and has a dedicated presence in the United States, China, Germany, Italy, Korea, Poland and the United Kingdom. For more information, visit [www.elmomc.com](http://www.elmomc.com).

## About Elmo Quick Facts

- Established in 1988
- Elmo global presence: China, Germany, Israel, Italy, Korea, Poland, USA, UK
- Over 3,500,000 servo drives installed and operating globally
- Worldwide sales and support network

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**Elmo**  
*Inside*