Motion Control Unit

MVG-5168



The MVG-5168 is a programmable **multi-axis motion controller** for precision positioning subsystems used in near-field and far-field measurement systems. Its **Hybrid Distributed Motion Controller (HDMC)** architecture combines centralized real-time control with distributed power-stage placement near the motors.

PRODUCT HIGHLIGHTS

- 7-inch integrated touch-panel GUI
- DC brush, voice-coil, linear/rotary brushless and stepper motor support
- Incremental AqB and absolute EnDat 2.2 / BiSS-C feedback support
- Gantry, dual-loop, gearing, ECAM, FIFO and CNC motion capabilities
- Input shaping, vibration suppression and error-mapping functions
- Dual feedback for optimal robust control
- 3D geometrical error correction

APPLICATIONS

- Near-field and far-field measurement systems
- Encoder-based rotary and linear positioning subsystems
- Light, medium and heavy-duty positioning subsystems
- Multi-axis synchronized and mechanically coupled motion systems

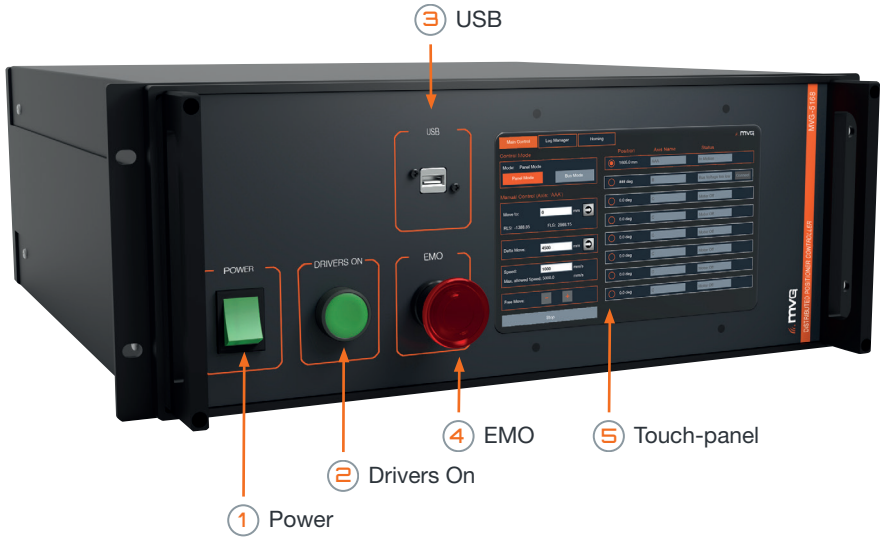
MVG HDMC ARCHITECTURE

- All trajectory generation and position, velocity and current control-loop computations are executed centrally
- Deterministic control cycle: 61 µs
- Synchronous feedback acquisition and PWM command exchange across all active axes
- Distributed power stages and signal interfaces are positioned close to the motors
- Supports up to 8 axes with deterministic multi-axis synchronization

Standard System Components

Local operation is provided through the front-panel touch interface, while the rear panel Contains / holds the power, controller communication, distributed-drive links, safety interfaces, trigger/capture connections and user I/O required for system integration.

FRONT PANEL



Front Panel

1 Power
Switches main power on/off

2 Drivers On
Enables drive power; also used for fault reset

3 USB
Event-log export

4 EMO
Emergency stop; removes driver bus voltage and Safety 24 V

5 Touch-panel
7-inch touch-panel GUI for local control, monitoring, homing and event-log handling

Standard User I/O

Interface	Quantity / Type	Validated Characteristics
Digital inputs	4 isolated	• NPN or PNP depending on common pin • 5–28 VDC • 10 µs propagation delay • 100 kHz max
Digital outputs	4 isolated	• Sink/source; external 5–28 VDC supply • 0.5 A max sink / 0.3 A max source • 10 µs • 100 kHz max
Trigger output	1 × BNC	• Position event / output compare; 5 V TTL
Capture input	1 × BNC	• Position lock / capture; 5 V TTL

Optional Extended I/O

Optional Spare DIO interface: 8 isolated digital inputs, 8 isolated digital outputs, 2 analog inputs (±10 V, 16-bit) and 3 software-configurable bidirectional differential RS-422 I/Os (120 Ω termination, up to 5 MHz).

Motion Control & Feedback Capabilities

Motion & Control

- Centralized position, velocity and current control executed every 61 µs
- PIV position/velocity control with dedicated current-control tuning
- Point-to-point, jog and repetitive point-to-point motion
- Pulse/direction, direct and indirect gearing
- ECAM electronic camming and FIFO motion sequencing
- CNC-style interpolated trajectory planning and path control
- Multi-axis synchronization and begin-on-input capabilities

Advanced Functions

- Gantry configuration and tuning for mechanically coupled axes
- Dual-loop feedback using an auxiliary encoder or a tachometer
- Input Shaping for motion-induced vibration reduction
- Vibration Suppression position filtering
- 1D, 2D and 3D encoder error-mapping support
- Hardware capture / output-compare position-event functions
- Motor-stuck and configurable motion-protection mechanisms
- On-the-fly updates of applicable motion and protection parameters

Motor & Feedback Support

Motor types
DC brush; voice coil; linear DC brushless; rotary DC brushless; stepper open-loop; stepper closed-loop; stepper closed-loop in BL mode

Main encoder
Incremental AqB; absolute EnDat 2.2; absolute BiSS-C. SSI: planned future addition

Additional feedback
Auxiliary encoder and tachometer supported by axis configuration

Dual-loop control
Main encoder for position with auxiliary encoder-derived velocity, or tachometer-based configurations

Motor brake
Static-brake support is configurable by motor/drive configuration

User units
Configurable engineering-unit conversion for deg, rad, mm, inch, cm and m

Configuration
Parameters can be saved to controller flash memory and configuration files

Gain scheduling
Up to 5 control-parameter sets. Scheduling modes include motion/settling/rest, In-Target-based settling, velocity range, position range and quiet-standing

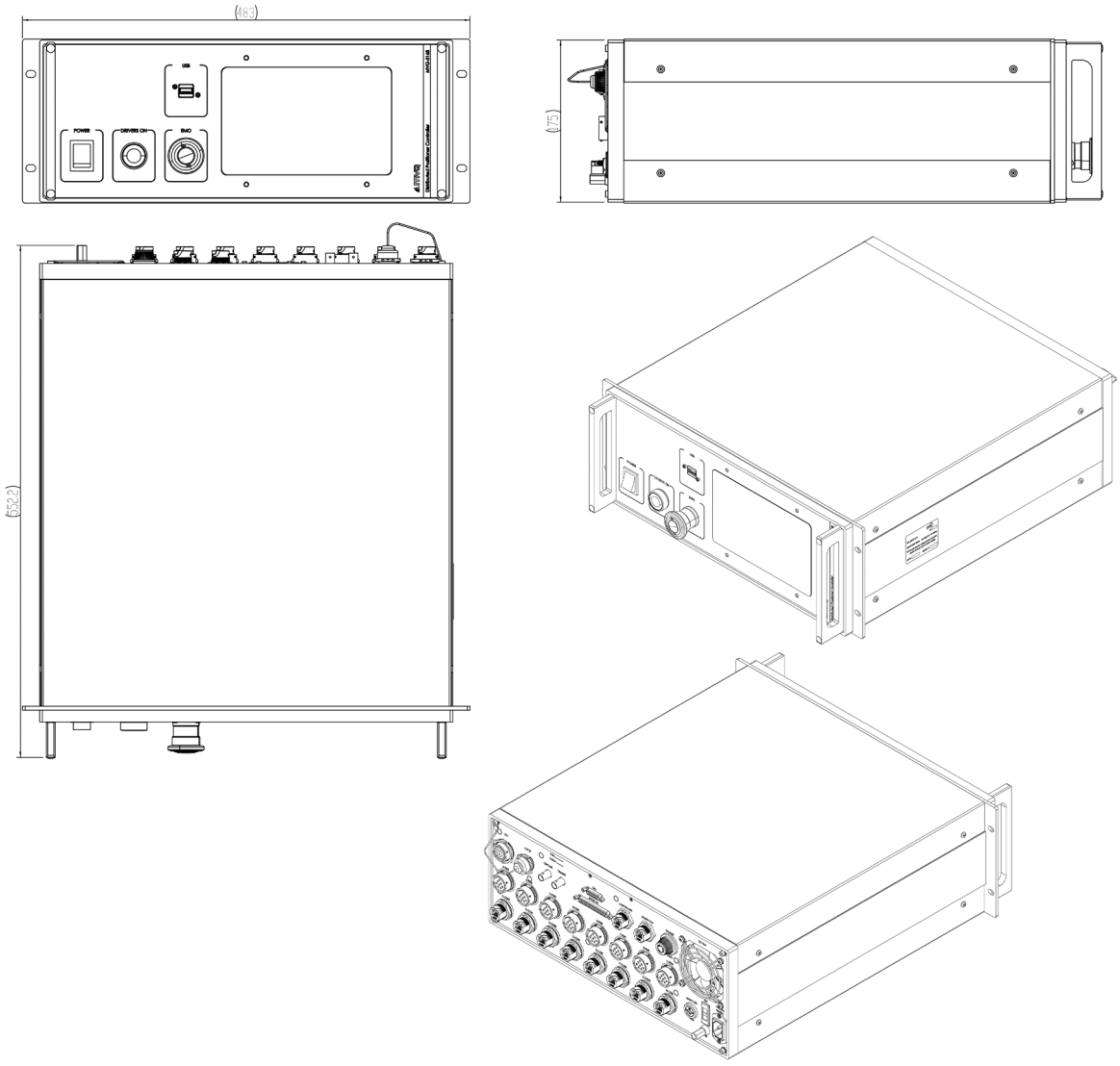
Data recording
Recording and graphic-viewing tools with configurable duration, sampling gap and trigger. Typical limits: up to 16,500 recorded points, 16,384 Hz sampling and 8 simultaneous variables

Position correction
1D, 2D and 3D encoder error mapping (up to 200.000 points per axis). Correction is applied every control sample; linear interpolation is used between map points.
Mapping may use main or auxiliary encoder feedback.

Technical Specifications

PARAMETER	MODEL
	Motion Control Unit
CORE MOTION	
Controlled axes	Up to 8 axes
Control cycle	61 µs deterministic cycle
Architecture	Centralized real-time control with distributed power-stage placement (HDMC)
Host communication	Ethernet TCP/IP
Local interface	7-inch touch-panel GUI
ELECTRICAL/ MECHANICAL	
Input voltage	115 or 230 VAC; 50-60 Hz
Voltage selection	Rear-panel voltage selector switch
Power consumption	Up to 2.2 kVA max.
Cooling	Forced-air cooling via internal fan
Rack mounting	Standard 19-inch rack, 4U
Dimensions (H × W × D)	7 × 19 × 19.5 in (178 × 483 × 494 mm)
Weight	Approximately 40 kg
Dielectric strength (Hi-Pot)	1500 VAC
Insulation resistance	500 VDC
Protective earth continuity	25 A DC
ENVIRONMENTAL	
Operating temperature	0°C to 45°C
Storage temperature	–20°C to 75°C
Relative humidity	< 90%, non-condensing
SAFETY & EMC COMPLIANCE	
Electrical / safety	IEC 61010-1/A1; EN 61010-1/A1; UL / CSA 61010-1
EMC	EN 61326-1:2021; FCC Part 15B; ICES-003
DC POWER DISTRIBUTION	
Driver power outputs	8 × PWR ports; each distributes VBUS and logic power to the corresponding distributed motion-driver module
DC-bus protection	20 A Class CC time-delay DC BUS fuse; minimum fuse voltage rating 500 VDC
VBUS range	Configuration-dependent according to the selected power stage / motion-driver module
Emergency stop action	EMO removes driver VBUS and Safety 24 V supply

Mechanical Envelope



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