

M-D2 Engineering

Electromechanical Valve Series



Electromechanical Valve Design and Development

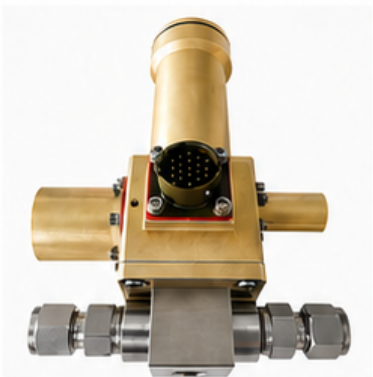
M-D2 develops mission-critical electromechanical valves for defense, aerospace and space applications. Its integrated product development capability brings together mechanical, fluid, electrical/electronic and control engineering.

Core Capabilities

- Custom valve design for high-pressure gas, pneumatic, hydraulic and liquid lines
- Isolation, on/off and motor-driven valve architectures
- Complete electromechanical actuator and drive system design
- BLDC motor, gearbox and power transmission integration
- Custom mechanical locking and solenoid mechanism development
- Open/closed position sensing and feedback systems
- Embedded motor driver electronics and operating algorithms
- High-reliability sealing and fluid compatibility engineering
- Flow, pressure drop and torque analyses
- Structural, pressure, shock and vibration analyses
- Materials, coatings, heat treatment and special process engineering
- Compact, application-specific mechanical and electrical interface design
- Military-grade connector and harness integration
- Engineering from prototype through series production
- Custom functional and performance test system development
- Leakage, pressure, torque and functional verification
- Analysis-test correlation and design optimization
- Requirements-based qualification for demanding defense and space environments



From valve mechanisms and drive systems to electronics, controls, analysis and qualification, M-D2 has the engineering capability to develop high-performance electromechanical valves to mission and application requirements, without the constraints of a standard valve architecture.



High-Pressure Isolation Valve

EV-I-300-12

Designed to safely isolate high-pressure nitrogen lines, this electrically driven electromechanical valve provides reliable isolation in demanding pressure and environmental conditions through open/closed position sensing and mechanical locking.

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Pressure and Flow Performance

Operating Inlet Pressure	1-300 barA
Proof Pressure	413 barA
Max. Internal Leakage	6.3×10^{-4} scc/s He
Max. External Leakage	1×10^{-4} scc/s He
Opening Time	1.5 s
Closing Time	1.5 s



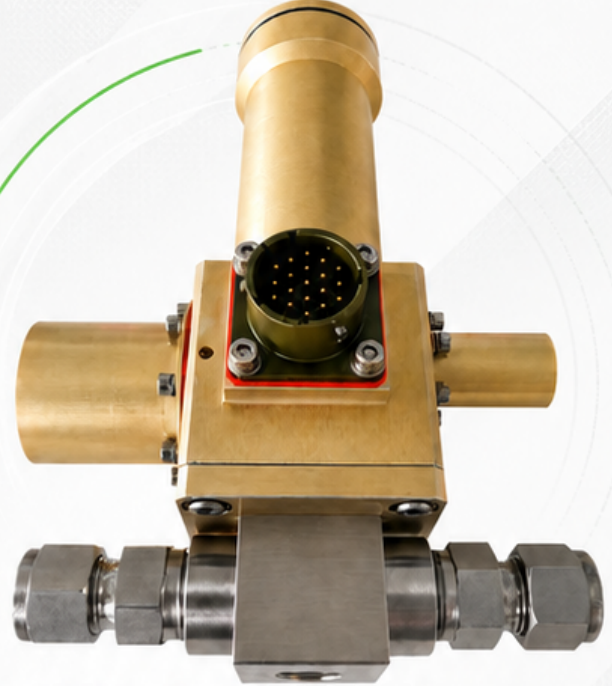
Electrical Specifications

Nominal Operating Voltage	24 VDC
Motor Type	DC
Motor Power	9 W
Max. Motor Current	2.6 A
Control Electronics	Integrated control board
Communication	Position feedback (open/closed)
Position Sensing	Proximity sensors
Electrical Interface	(38999 Series) military connector
Cable	Military-standard cable



Physical Specifications

Mass	1150 ± 20 g
Dimensions	$175.5 \times 117 \times 76.5$ mm



*For detailed technical information, test results and endurance data, please contact us. Custom electromechanical valve design and development solutions are available.



Environmental Limits

Operating Temperature	-10 to +30 °C
Max. Ambient Temperature	-10 to +70 °C
Fluid	Nitrogen
Max. Relative Humidity	95%
Storage Life	≥ 2 years @ -10 to +70 °C, $\leq 70\%$ RH

"Across several projects, six different products—an on/off valve; HP12-L, HP12-R and HP12-A hydraulic/pneumatic (12 mm) valves; a P10 pneumatic (10 mm) valve; and an isolation valve—were designed and manufactured by M-D2 Engineering to the supplied technical requirements. Used in flight tests conducted by a defense company on different dates, they achieved the desired results."

Thank you for your contributions to the development, production and demonstrated performance of these products.

— ROKETSAN A.Ş.

On/Off Valve

EV-O/O-40-12

Developed for fast, reliable flow control in high-pressure liquid lines, this electromechanical ball valve integrates a BLDC drive, open/closed position feedback and RS-422 communication. It offers precise flow control and reliable operation in harsh environments.



Pressure and Flow Performance

Operating Inlet Pressure	40 barA
Proof Pressure	≥ 50 bar @ 40 °C
Cv	≥ 5
Leakage	$< 1 \times 10^{-5}$ scc/s
Opening Time (adjustable)	100–400 ms
Closing Time (adjustable)	100–400 ms



Electrical Specifications

Nominal Operating Voltage	28 VDC
Motor Type	BLDC
Motor Power	70 W
Max. Motor Current	5 A
Control Electronics	Integrated control board
Communication	RS-422
Position Sensing	Proximity sensors
Electrical Interface	(38999 Series) military connector
Cable	Military-standard cable



Physical Specifications

Mass	1960 $\pm$ 20 g
Dimensions	218.8 $\times$ 117.6 $\times$ 76.6 mm
Flow Connection	12 mm

Opening/closing speed and flow limit can be adjusted by the user within a specified range.



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Environmental Limits

Operating Temperature	–10 to +70 °C
Fluid	Nitric acid
Max. Relative Humidity	95%
Storage Life	≥ 2 years @ –10 to +70 °C, $\leq 70\%$ RH

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HP12 High-Pressure Valve

EV-HP12-30-12-A, EV-HP12-30-12-L, EV-HP12-30-12-R

HP12 motor valves are 12 mm electromechanical valves designed for fast, reliable opening, closing and line isolation in high-pressure liquid or gas lines. They include open/closed position sensing, mechanical locking and RS-422 status feedback. HP12-L, HP12-R and HP12-A differ only in connector placement.



Pressure and Flow Performance

Operating Inlet Pressure	30 barA
Proof Pressure	60 barA
Flow Range	—
Cv	≥5
Max. Pressure Drop	—
Opening Time	—
Closing Time	—



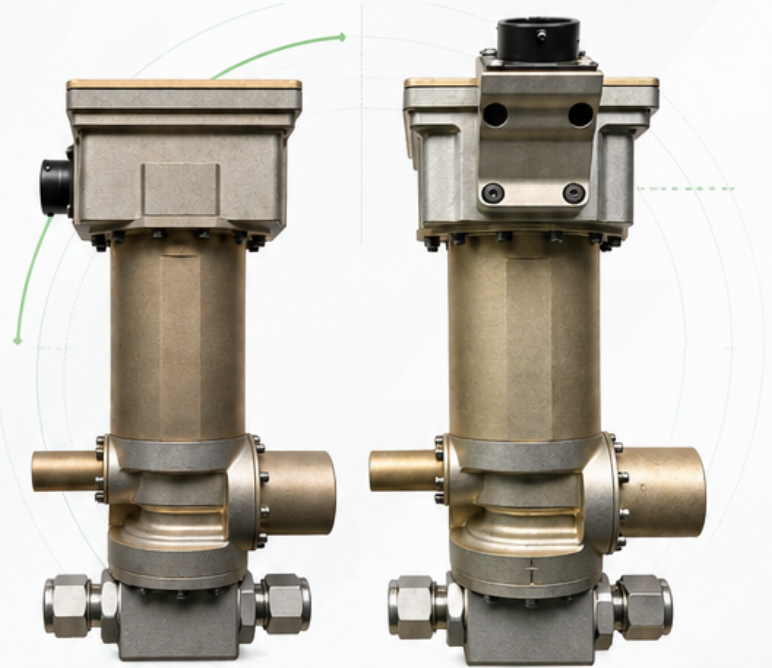
Electrical Specifications

Nominal Operating Voltage	28 VDC
Motor Type	BLDC
Motor Power	30 W
Max. Motor Current	2.6 A
Control Electronics	Integrated control board
Communication	RS-422
Position Sensing	Proximity sensors
Electrical Interface	(38999 Series) military connector
Cable	Military-standard cable



Physical Specifications

Mass	1475 ± 15 g
Dimensions	218.8 × 117.6 × 76.6 mm
Flow Connection	12 mm



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Environmental Limits

Operating Temperature	−10 to +70 °C
Max. Relative Humidity	95%
Storage Life	≥2 years @ −10 to +70 °C, ≤70% RH

"Across several projects, six different products—an on/off valve; HP12-L, HP12-R and HP12-A hydraulic/pneumatic (12 mm) valves; a P10 pneumatic (10 mm) valve; and an isolation valve—were designed and manufactured by M-D2 Engineering to the supplied technical requirements. Used in flight tests conducted by a defense company on different dates, they achieved the desired results."

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P10 High-Pressure Valve

EV-P10-414-10

The P10 motor valve is a 10 mm electromechanical valve developed for reliable opening, closing and isolation of flow in high-pressure pneumatic lines. It includes open/closed position sensing, mechanical locking and RS-422 status feedback.



Pressure and Flow Performance

Operating Inlet Pressure	414 barA
Opening Time	360-400 ms
Closing Time	360-400 ms



Electrical Specifications

Nominal Operating Voltage	28 VDC
Motor Type	BLDC
Motor Power	30 W
Max. Motor Current	2.6 A
Control Electronics	Integrated control board
Communication	RS-422
Position Sensing	Proximity sensors
Electrical Interface	(38999 Series) military connector
Cable	Military-standard cable



Physical Specifications

Mass	1475 ± 15 g
Dimensions	218.8 × 117.6 × 76.6 mm
Flow Connection	10 mm



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Environmental Limits

Operating Temperature	-10 to +70 °C
Max. Relative Humidity	95%
Storage Life	≥2 years @ -10 to +70 °C, ≤70% RH

"Across several projects, six different products—an on/off valve; HP12-L, HP12-R and HP12-A hydraulic/pneumatic (12 mm) valves; a P10 pneumatic (10 mm) valve; and an isolation valve—were designed and manufactured by M-D2 Engineering to the supplied technical requirements. Used in flight tests conducted by a defense company on different dates, they achieved the desired results."

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High-Pressure Isolation Valve

EV-I-320-1/2

Designed for reliable opening, closing and line isolation in high-pressure gas lines, this ½-inch electromechanical ball valve includes an integrated BLDC drive, position feedback and RS-422 communications for dependable operation in demanding environments.

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Pressure and Flow Performance

Operating Inlet Pressure	1-320 barA
Proof Pressure	≥400 barA
Burst Pressure	≥480 barA
Flow Range	0-0.1 kg/s
Kv	≥5 m³/h/bar
Max. Pressure Drop	≤0.2 bar @ max. flow
Max. Internal Leakage	1 × 10 ⁻⁴ scc/s He
Max. External Leakage	1 × 10 ⁻⁶ scc/s He
Opening Time	1000 ms ±5%
Closing Time	1000 ms ±5%



Electrical Specifications

Nominal Operating Voltage	28 VDC
Motor Type	BLDC
Motor Power	70 W
Max. Motor Current	8.5 A
Control Electronics	Integrated control board
Communication	RS-422
Position Sensing	Proximity sensors
Electrical Interface	(38999 Series) military connector
Cable	Military-standard cable



Physical Specifications

Mass	2060 ± 20 g
Dimensions	218.8 × 117.6 × 76.6 mm
Flow Connection	½ in



Environmental Limits

Operating Temperature	-30 to +50 °C
Max. Ambient Temperature	+120 °C
Fluid Temperature	190-323 K
Max. Relative Humidity	95%
Storage Life	≥17 years @ +10 to +30 °C, ≤50% RH

Opening/closing speed and flow limit can be adjusted by the user within a specified range.



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M-D2 Solenoid Valve Series

High-Pressure Pulse Valve

SV-P-80/120



Pressure and Flow Performance

Operating Inlet Pressure	80-120 barA
Proof Pressure	140 barA
Burst Pressure	250 barA
Cv	2.16
Opening Time	5 ms



Electrical Specifications

Nominal Operating Voltage	Min. 12 VDC
Solenoid Activation Time	300 ms
Max. Solenoid Current	2.7 A
Control Electronics	DC input



Physical Specifications

Mass	700 ± 20 g
Dimensions	172 × 77 × 80.5 mm
Flow Connection	7 mm



Environmental Limits

Operating Temperature	-10 to +50 °C
Fluid	Nitrogen, dry air
Storage Life	≥2 years @ -10 to +70 °C, ≤70% RH



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