PILOT OPERATOR FOR USE IN DANGEROUS ATMOSPHERES (ATEX)

SERIES: N

THE FOLLOWING M&M VALVES CAN BE FITTED WITH EXPLOSION-PROOF OPERATOR, CLASS EEX M II 2GD T4, THE OPERATING PRESSURE REMAINING THE SAME THAN THE STANDARD VALVE(1):

- D262 - D263
- D204 - D205 - D222
- D206DVY
- D223 - D224 - D225
- D298 - D299
- D326
- D362 - D363 (w/o manual override)

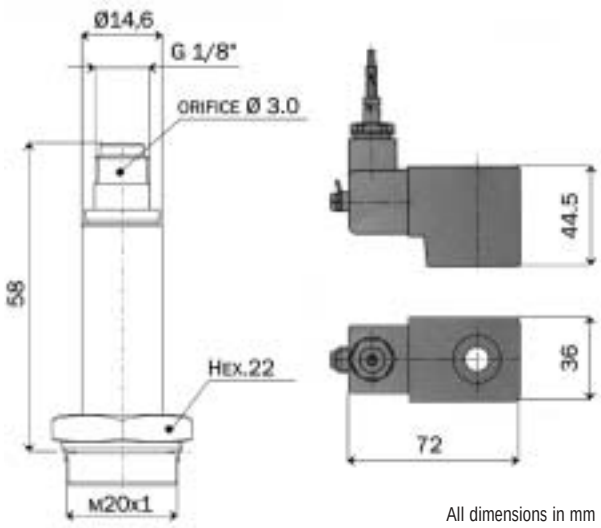
COILS TECHNICAL SPECIFICATIONS

Coils are supplied with 3 mt power cable, wired on a non-removable plug
Cable type : H05V2V2-F 3G1
Degree of protection: IP 65
Insulation class: "F" EN 60730
Voltage tolerance: -10% ÷ +10%
Operation: continuous
Protection class: EEx m II 2GD T4

OPERATOR TECHNICAL SPECIFICATIONS

Operator material: stainless steel
Seal material: FKM
2/2 way NC operator (code N014DVH)
3/2 way NC operator (code N014CVH)

DIMENSIONS



All dimensions in mm

SELECTION TABLE

CODE	Voltage	Power holding	insulation class	room temperature min	room temperature max	medie temperature min	medie temperature max	ED	fuse (1)
N253	24V DC	10,1 W							800
N203	24V 50/60Hz	7,2 VA							800
N403	110V - 50Hz	9,1 VA	F	-20°C	+50°C	-20°C	+80°C	100%	200
NK03	120V - 60Hz	8,6 VA							200
N703	230V - 50Hz	8,5 VA							100

NOTES

(1) Manual override not available for Eex solenoid valves.

SAFETY WARNINGS

(1) A mains fuse or an equivalent means of protection (breaking value shown on table for each coil) shall be installed on the mains supply line. Absence of mains protection is a non conformity to safety standards (EC Directives 94/9/CE and 1999/92/CE) and is a possible cause of explosion.

(2) Valves for potentially explosive atmospheres are available from factory only. **USE OF COIL OR OPERATOR ONLY DOESN'T MAKE THE VALVE EXPLOSION-PROOF.**

SPECIAL VERSIONS AVAILABLE UPON REQUEST. PLEASE CONTACT M&M FOR DETAILS.

COILS FOR M&M INTERNATIONAL SOLENOID VALVES

Coils manufactured by M&M International are designed for continuous duty in conformity to the EN60730 safety standards. They are encapsulated in a self-extinguishing synthetic material and offer high mechanical protection and excellent thermal dissipation. They are fully interchangeable on all M&M International solenoid valves, thereby reducing warehouse inventories.

TECHNICAL DATA

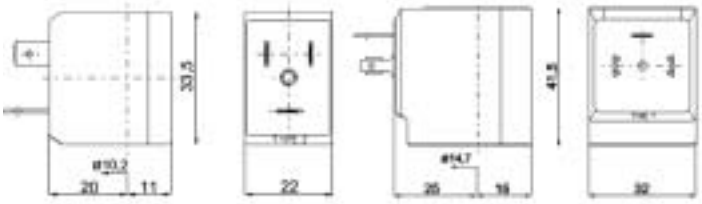
Series 2000: connection to DIN 46244
Electrical connection: fast on connection 6.3x0.8
Series 7000: connection to DIN EN 175301-803 form A (ex DIN 43650-A)
Protection class: IP65 (with connector) - EN 60529
Insulation class: "F" and "H" EN60730
Voltage tolerance: +10% ÷ -15% AC / + 10% ÷ -5% DC
Operation: continuous

Coil power:		Series 2000	Series 7000
	AC	10VA	18VA (holding)
	AC	16VA	36VA (inrush)
	DC	7W	14W

OPTIONS

Series 7000 coils with insulation class "H" (e. g. coil 7251)
UL Approved coils (series 2000 and 7000) (e. g. coil 240R)

DIMENSIONS & WEIGHTS



Series 2000: Kg 0.060

Series 7000: Kg 0.146

SERIES: 2000/7000

VOLTAGE & FREQUENCY

Cod. Series 2000	Cod. Series 7000	[volts/Hz]
2150	7150	12V DC
2250	7250	24V DC
2200	7200	24V 50-60Hz
2400	7400	110V 50Hz - 120V 60Hz
2600	7600	200V 50Hz - 220V 60Hz
2700	7700	230V 50Hz - 240V 60Hz

DIN CONNECTORS FOR SOLENOID VALVES

Coil connectors provide the safest flexible system for connecting M&M International solenoid valves and give a protection class of IP65. They are designed and made of synthetic material offering a high level of electrical insulation.

TECHNICAL DATA

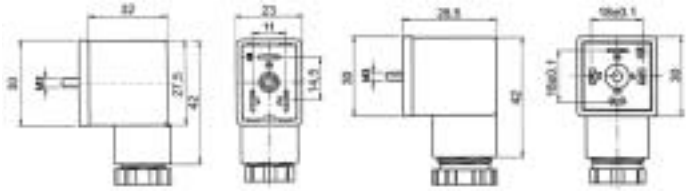
Rated voltage (Max.): 250V AC-300V DC
Nominal current: 10 A (Rated)/16A (Max.)
Wire cross-section: 1.5 mm2 (Max.)
Cable diameter: 6-8 mm (PG9)
Protection class: IP65 - EN 60529
Insulation class: group C - VDE 0110
Colour: black
Supplied with screw and NBR gasket

OPTIONS

Connectors with protection circuits
Connectors with LED

SERIES: 600 001 000/011 000

DIMENSIONS & WEIGHTS



For coil series 2000 - Series 600 001 000: kg 0.019

For coil series 7000 - Series 600 011 000: kg 0.020

All dimensions are in millimetres

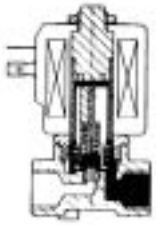
VALVE SELECTION

A solenoid valve should be chosen whenever the following conditions are met:

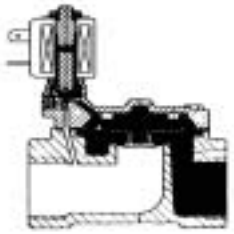
- ✔ Media with few dirt particles
- ✔ Moderate flow volumes
- ✔ Average differential pressures
- ✔ High speed in operation

VALVE TYPES

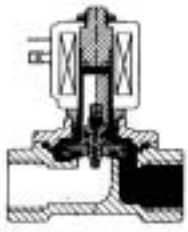
✔ **Direct acting solenoid valves 2/2 and 3/2 way NC or NO**
The supply coil electrically generates a magnetic force that attracts the armature, which contains the seat that acts upon a passage orifice. The armature, rising, lets the fluid pass. The range of operating pressures depends directly on the attraction force of the coil. Average response time 5 ÷ 25 ms.



✔ **Pilot operated solenoid valves 2/2 way NC or NO**
This solenoid valve uses the force of the fluid to operate the valve via a suitable integral pilot valve. The inlet pressure must always be at least the same as the minimum ΔP figure shown on the data sheets. Using the same coils as direct acting valves much higher fluid volumes and pressures can be controlled with this solenoid valve. Average response time 50 ÷ 500 ms.



✔ **Pilot operated solenoid valves with assisted lift 2/2 way NC**
These solenoid valves are a combination of the pilot operated valves and the direct acting valves. The armature is mechanically connected to the diaphragm onwhich there is a pilot office. With minimal pressures the solenoid valve acts like a direct acting valve. Total opening as well as full flow do not occur at low pressures. With higher pressures it works as a pilot operated valve with full opening. Average response time 50 ÷ 500 ms.



FUNCTION TYPES

2/2 way function indicates valves with inlet and outlet connections, whilst valves with 3/2 way functions have 3 connections and 2 flow passages. One orifice always remains open and one closed. Connections and flow direction are shown in the symbols on each technical data sheet (DIN-ISO 1219).

At rest valves can be either normally closed (NC) or normally open (NO):

- Normally closed (NC): the valve opens when the coil is energised.
- Normally open (NO): the valve closes when the coil is energised.

OPTIONAL FEATURES

✔ **Manual Override (M)**
Normally closed direct acting and pilot operated solenoid valves can be supplied with a manual override which allows the valve to be opened independently of electrical current.

✔ **Waterhammer Control (V)**
Pilot operated solenoid valves (only versions specified in each datasheet) can be supplied with a system that regulates the closing speed of the diaphragm in order to control waterhammer.

TECHNICAL INFORMATION

The following points should be considered to ensure a correct choice of valve:

✔ **Connections and Nominal Diameters**
Threaded connections are either "G"- inches (ISO 228) or metric. Nominal diameters (DN) are expressed in millimetres and correspond to the diameter of the valve's main orifice.

✔ **Operating Pressure Differential (OPD)**
Pressure values shown in this catalogue are maximum pressures expressed in bar with zero pressure at outlet. For 3/2 way solenoid valves the pressure range can vary when used in other functions or systems. The maximum working pressure (PN) that the valve can bear is generally equal to 1.5 times the maximum value of the operating pressure differential (OPD).

✔ **Flow**
The flow is the quantity of fluid that passes through the valve's main orifice which has the nominal diameter (DN) shown in the tables. The flow is given with a constant Kv value (according to VDI/VDE 2173) that shows how many litres of water, at a temperature of 20°C, flow through the valve in one minute with a pressure difference of one bar across the valve. To determine the flow at higher pressures, multiply the Kv value by the square root of the differential pressure. Flow values shown in the selection tables are subject to a tolerance of ± 15%.

✔ **Seal materials**
Consideration of the media should be made when selecting seal and body types.
NBR should be used for air, water, neutral gases, diesel and in general it is resistant to oils and grease from -10°C to +90°C.
EPDM for hot water and steam. It is resistant to bases and acids in weak concentrations from -40°C to +140°C. EPDM seals should not be used for media containing oil.
FKM combines most of the characteristics of NBR and EPDM and is particularly suitable for hot water and hydrocarbons from -10°C to +140°C.
PTFE is practically resistant to all media. It is rigid and is used from -20°C to +180°C.
SIGODUR (filled PTFE) and RUBY are stiff materials particularly suitable for heavy duty applications.
All the data shown in the selection tables refer to media with a viscosity not higher than 21 cST (3°E) (1 centistoke=1 mm^2/s).

✔ **Coil power supply**
It is important that the exact voltage and frequency of the coil is used for the valve to operate correctly. Provided the coil is fitted correctly on the operator and that the armature is not obstructed, the valve can be operated for an indefinite time within the temperature limitations indicated. All solenoid valves have a copper shading ring to reduce vibrations caused by alternating currents.

✔ **Media and Ambient Temperatures**
Temperature limits for the media are shown and should be used as a guide to valve selection. Normally the maximum ambient temperature can reach +50°C for solenoid valves with coils in class "F", +70°C for class "H". For applications outside these limits please contact our technical office.

✔ **General purpose solenoid valves**
Solenoid valves shown in this catalogue, either normally open or normally closed, are intended to control the flow of fluids and cannot be used as safety valves.

VALVE INSTALLATION

To ensure trouble-free operation please observe the following:

✔ **Safety**

Always connect the coil's earth terminal to ground to ensure the safety of the user and installation.

✔ **Installation**

Keep the valve operator in a vertical position, facing upwards. This prevents limescale or dirt particles in the operator tube which could restrict the armature or create excessive noise whilst operating.

✔ **Connections**

To ensure that the solenoid valve works properly, do not connect to pipework with an internal diameter less than the nominal diameter (DN) of the valve. Clean all pipework before connection to the solenoid valve.

The recommended tightening torque of the coil nut to avoid damage of the valve components is 0,5 Nm.

✔ **Flow Direction**

Respect the direction of flow across the valve, shown with an arrow or by numbers on the valve body, depending on the model type.

✔ **Filtration**

If the fluid contains dirt particles it is necessary to install a filter upstream of the solenoid valve. Dirt is the most frequent cause of malfunction.

✔ **Environment**

Coils fitted with suitable connectors have a protection class of IP65. However, it is advisable not to use the solenoid valve outside or in very damp conditions without adequate protection. Provide sufficient ventilation for the solenoid valve. **During continuous service the coil of the solenoid valve becomes hot and should not be touched.**

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TECHNICAL DATA

Electrical connection : faston connection 6.3x0.8 (DIN 46340)			
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series 7000: connection to DIN 43650A			
Protection class: IP65 (with connector) - EN 60529			
Insulation class: “F” and “H” EN60730			
Voltage tolerance: +10% ÷ -15% AC / ± 5% DC			
Operation: continuous			
Coil power:		SERIES 2000	SERIES 7000
	AC	10VA	18VA (holding)
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SERIES: 2000/7000

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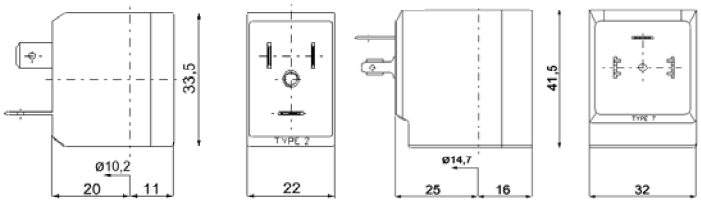

Series 2000: Kg 0.060

Series 7000: Kg 0.146

VOLTAGE & FREQUENCY

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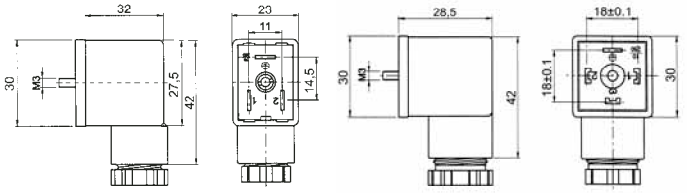

For coil series 2000 - Series 600 001 000: 0.019 kg

For coil series 7000 - Series 600 011 000: 0.020 kg