M&M international

Solenoid Valves

chemical industry

vacuum

general purpose

dry armature

automation

steam

atex

high pressure

aggressive fluids

M&M International means:

- Working with a staff of qualified professionals
- Enjoying the benefits of the most advanced technological research
- Quality at competitive price
- Warranty of a company conforming to the rigorous ISO 9001 - ISO 14001 - OHSAS 18001 requirements
- Reliability of a 30-years experience on international markets
- To partner with a company belonging to a multinational group

GENERAL INDEX

QUALITY STANDARDS:

COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV GL
= ISO 9001 =
= ISO 14001 =
= OHSAS 18001 =

DNV is an independent classification society. Since 1998 it has certified the compliance of **M&M International**'s quality management system , and recently also the compliance to the ambient and safety standards, emphasizing the effort to implement continuous improvement processes aimed at developing the business in a logic of customer satisfaction, sustainability and safety for all its employees.

CERTIFICATIONS AND APPROVALS:

The Ex mark signifies that a product complies with the **ATEX Directive 94/9/EC** (applicable up to 20th April 2016 but already implemented by Directive 2014/34/EU, effective from 18th April 2014).
The ATEX Directive sets the safety requirements of protection equipment and systems to be used in an environment with a potentially explosive atmosphere.
The Ex mark on a product enables its free movement within the European market (EEA). A list of M&M valves available in the ATEX version can be found on page 37 of this catalogue.

Underwriters Laboratories Quality Certificate

The UL Listing mark on a product signifies that the product meets UL's Standards for Safety. The UL Listing mark appears on products and components suitable for factory and field installation. All of the products carrying a UL Listing mark are covered by UL's Follow-up services program to verify that the products continue to be manufactured in compliance with UL's Safety Requirements.
M&M manufactures and resells valve coils and timers complying with UL 429 and 746C.
The cURus Listing mark on the products indicates that the compliance is accepted both in USA and Canada.

RoHS

The Restriction of Hazardous Substances Directive (RoHS) **2011/65/EU** regards the restriction of the use of Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent chromium (Cr6+), Polybrominated biphenyls (PBB) and Polybrominated diphenyl ether (PBDE) in electrical and electronic equipment sold in the European Union.
RoHS is meant to prevent the release of these substances into the environment and protect the human, animal and environmental health, especially during the waste treatment.
The CE mark on a product guarantees the compliance with the RoHS Directive. Since 2006 M&M has been marking the compliance of coils with the RoHS directive with the letter 'R' before the batch number.

European Community Conformity

The CE marking was introduced in 1993 upon establishment of the European Economic Area.
It regulates the entire life cycle of a product: design, manufacturing, placing on the market, disposal and enables its free movement within the European market (EEA).
CE marking signifies that the product conforms with the essential applicable EC requirements, such as safety, public health, consumer protection, and gives the product the presumption of conformity.

By affixing the CE mark on a product, manufacturers and importers are declaring, at their sole responsibility, conformity with all of the legal requirements of the Directive. EC directives that apply to M&M products are listed on page 51.

REACH: Ask M&M Sales Department for your Declaration of compliance to EC Regulation no. **1907/2006**.

MISCELLANEOUS:

Upon request (to be specified at the time of the Purchase Order) M&M can provide the following inspection documents, which are also related to requirements of the **PED Directive 97/23/EC** as additional evidence of the technical requirements of supplies:

- ✓ For metal parts in stainless steel AISI 316L or 304L the **inspection certificate 3.1** according to the standard EN 10204 (this certificate is mandatory only for products in categories above I, see PED 97/23/EC ANNEX I, art. 4.3).
- ✓ For all products the **Test Report 2.2** according to the standard EN 10204, relevant for products in category I or SEP.

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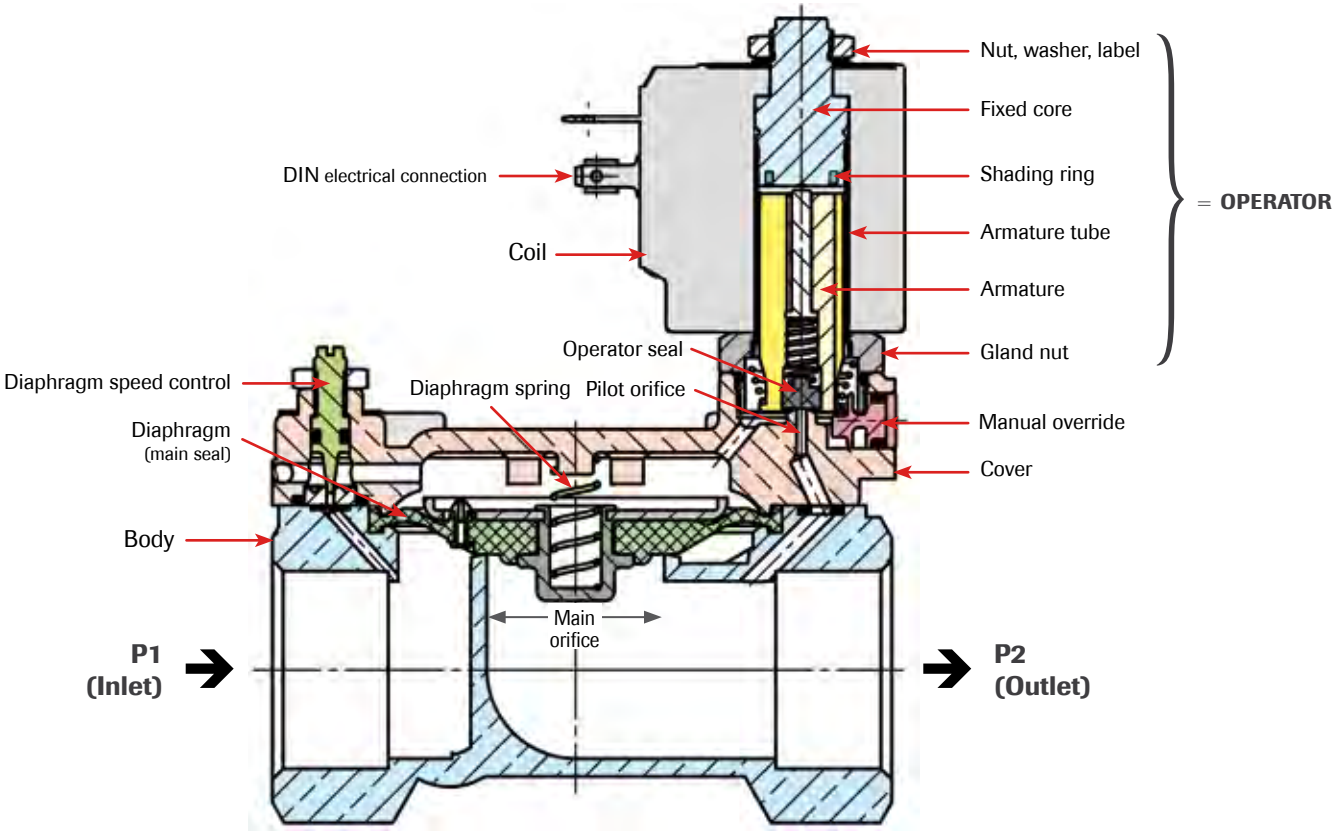
M&M INTERNATIONAL SOLENOID VALVES

Scheme of components of M&M International solenoid valves



Benefits of M&M International solenoid valves

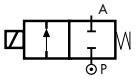
Robust construction for industrial applications Featuring stainless steel orifice on most models	➡	**High reliability Long life**
Stainless steel operators with low residual magnetism according to 1.4105 EN 10088 (AISI 430F)	➡	**Corrosion resistant High performance**
High quality seal materials NBR, FKM, EPDM, PTFE, Sigodur (filled PTFE), Ruby, Kalrez®	➡	**High compatibility with a wide range of media**
Fully interchangeable coils with a wide range of AC and DC voltages	➡	**High flexibility with reduced stock**
Coil orientation possible through 360°	➡	**Simple and quick installation**
Coils tested 100% in compliance with the current EC directives Compliance to RoHS directive and to relevant international standards upon request	➡	CE c UL us Ex
Development and realisation of special projects	➡	**Customer tailored solutions**

2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8"

COMMON FEATURES

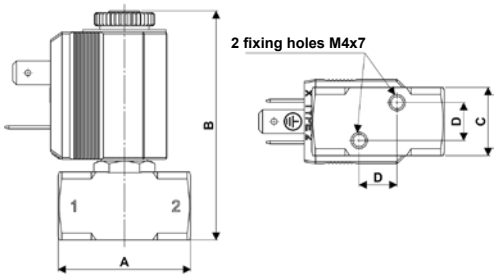
Body material: stainless steel (1.4305 EN 10088/AISI 303)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

TYPE: B298



Normally Closed

DIMENSIONS & WEIGHTS		B298
G connection	[ISO 228]	1/8"
A	[mm]	35
B	[mm]	60.6
C	[mm]	18
D	[mm]	10
weight	[kg]	0.1



Flow direction overseat 1 → 2

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
B298DVC	1.5	1.3	0	22	18
B298DVE	2.0	1.9	0	18	8
B298DVG	2.5	2.7	0	13	2.5
B298DVH	3.0	3.5	0	8	1

COILS	
code	[Volts/Hz]
2250	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

B298 - FKM seal, NC -

Media: water, oil, air and aggressive fluids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: foodgrade FKM
Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W

CHEMICAL INDUSTRY

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
B298DKC	1.5	1.3	0	24	24
B298DKE	2.0	1.9	0	18	15
B298DKG	2.5	2.7	0	15	3

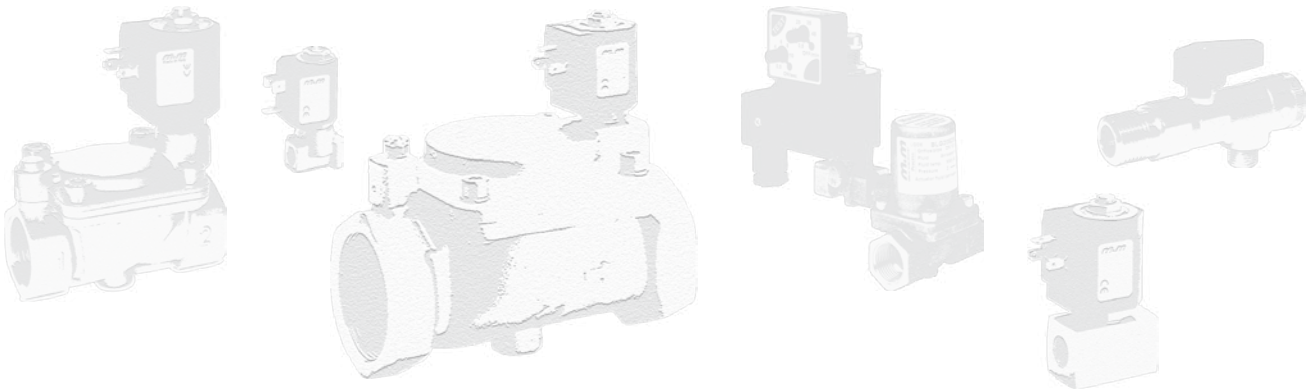
COILS	
code	[Volts/Hz]
2250	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

B298 - KALREZ® seal, NC -

Media: chemicals
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: Kalrez® Spectrum™ 6375
Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W

OPTIONS

Protective treatment (e.g. code B298DKCE)



2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8" - G 1/4"

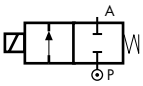
COMMON FEATURES

Body material: stainless steel (1.4305 EN 10088/AISI 303)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

OPTIONS

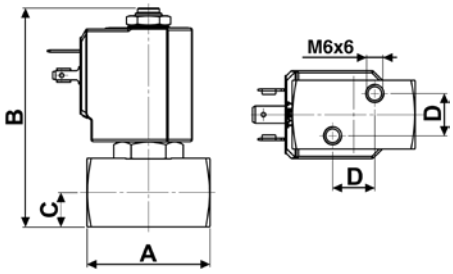
Available with body thread connection 1/8" (e.g. code D298DVC), performance ratings remain the same as D299DVC.
Silver shading ring (e.g. code D299DVCA)
NPT connection on request, minimum batch may be required (e.g. code D299DVCN)

TYPE: D298/299



Normally Closed

DIMENSIONS & WEIGHTS		D298	D299
G connection	[ISO 228]	1/8"	1/4"
A	[mm]	45	45
B	[mm]	80	80
C	[mm]	12.5	12.5
D	[mm]	15.4	15.4
weight	[kg]	0.36	0.36



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D299DVC	1.5	1.2	0	24	24	7250	24v DC
D299DVG	2.5	3.3	0	18	18	7200	24v 50/60Hz
D299DVH	3.0	4.5	0	15	10	7400	110v 50Hz - 120v 60Hz
D299DVL	4.0	6.0	0	10	5.5	7600	200v 50Hz - 220v 60Hz
D299DVN	5.0	7.5	0	5	2.5	7700	230v 50Hz - 240v 60Hz

D298/299 - FKM seal, NC -

Media: water, oil, air and aggressive fluids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: foodgrade FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

EPDM seal, temperature max. 120°C (e.g. code D298DEH)
ATEX version see page 37

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D299DKE	2.0	2.3	0	20	20	7250	24v DC
D299DKG	2.5	3.3	0	18	16	7200	24v 50/60Hz
D299DKH	3.0	4.5	0	15	8	7400	110v 50Hz - 120v 60Hz
						7600	200v 50Hz - 220v 60Hz
						7700	230v 50Hz - 240v 60Hz

D298/299 - KALREZ® seal, NC -

Media: chemicals
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: Kalrez® Spectrum™ 6375
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

Protective treatment (e.g. code D299DKEE)

CHEMICAL INDUSTRY

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS high power - class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D299DRB1	1.2	0.7	0	200	110	72Z1	24v DC
D299DRC1	1.5	1.2	0	200	80	72K1	24v 50/60Hz
D299DRE1	2.0	2.3	0	140	30	74K1	110v 50Hz - 120v 60Hz
D299DRG1	2.5	3.3	0	90	23	77K1	230v 50Hz - 240v 60Hz
D299DRH1	3.0	4.5	0	50	14		

D298/299 - RUBY seal, NC -

Media[1]: water, oil, air and aggressive fluids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: Ruby
Coil power: AC 25VA (holding)
AC 50VA (inrush)
DC 22W

NOTES

Seamless tube as standard
[1] **N**ot 100% leak-proof when used with air/gases.
Approximate leak rate is 1,5 ml/min at max. OPD.

HIGH PRESSURE

ATTENTION: When high pressure valves are supplied without a coil, their nameplates display the max. OPD of the valve when equipped with an AC (25VA) and DC (22W) coil (as shown in the table above). **When using alternative coil power ratings please ensure to request separately the appropriate nameplate at time of order.**

2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8" - G 1/4"

COMMON FEATURES

Body material: stainless steel (1.4305 EN 10088/AISI 303)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

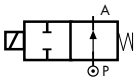
OPTIONS

Available with body thread connection 1/8" (e.g. code RD298DVA), performance ratings remain the same as RD299DVA
Silver shading ring (e.g. code RD299DVCA)
NPT connection on request, minimum batch may be required (e.g. code RD298DVGN)

NOTES

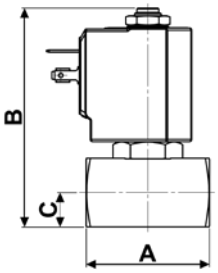
Normally open version not available for orifice > Ø 3 mm
Protective treatment of operators is recommended, minimum batch may be required

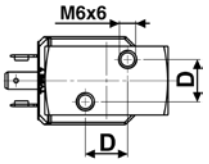
TYPE: RD298/299



Normally Open

DIMENSIONS & WEIGHTS		RD298	RD299
G connection	[ISO 228]	1/8"	1/4"
A	[mm]	45	45
B	[mm]	77.5	77.5
C	[mm]	12.5	12.5
D	[mm]	15.4	15.4
weight	[kg]	0.36	0.36





Flow direction overseat 1 → 2

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RD299DVA	1.0	0.6	0	30	30
RD299DVG	2.5	3.3	0	16	16
RD299DVH	3.0	4.5	0	10	10

COILS class 'H' only	
code	[Volts/Hz]
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

RD298/299 - FKM seal, NO -

Media: water, oil, air and aggressive fluids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: foodgrade FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

EPDM seal, temperature max. 120°C (e.g. code RD299DEG)

HIGH PRESSURE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RD299DRA	1.0	0.6	0	100	100
RD299DRB	1.2	0.7	0	85	85
RD299DRC	1.5	1.2	0	55	55
RD299DRE	2.0	2.3	0	25	25
RD299DRG	2.5	3.3	0	19	19
RD299DRH	3.0	4.5	0	10	10

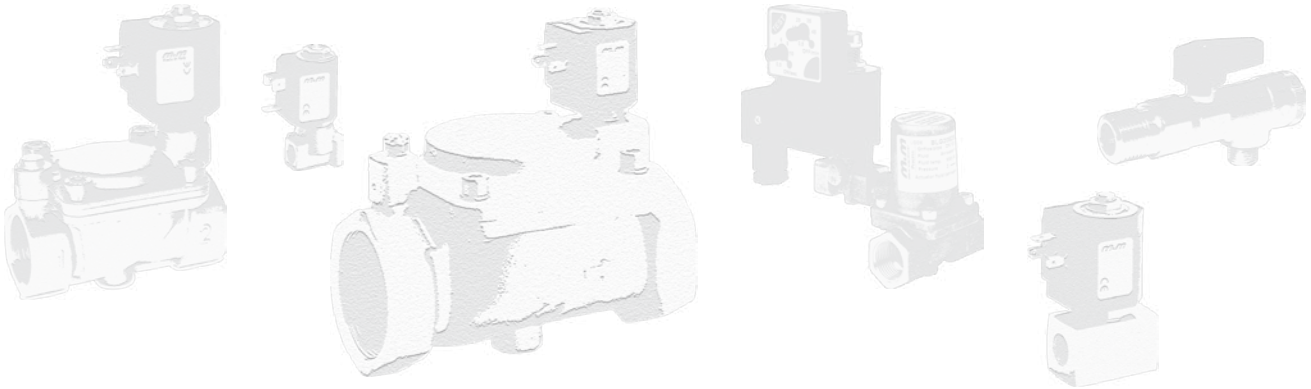
COILS class 'H' only	
code	[Volts/Hz]
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

RD298/299 - RUBY seal, NO -

Media[2]: water and liquids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: Ruby
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

[2] **N**ot 100% leak-proof when used with air/gases.
Approximate leak rate is 1,5 ml/min at max. OPD.



A Spirax-Sarco Engineering plc company

2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8"

COMMON FEATURES

Media[1]: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW719R EN 12165) low lead content
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Seal material: foodgrade FKM
Protection class: IP 65 (with connector and gasket)

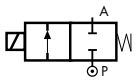
OPTIONS

EPDM seal, temperature max. 120°C (e.g. code RB297DEC)
NPT connection on request, minimum batch may be required (e.g. code RB297DVCN)

NOTES

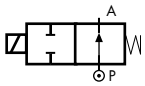
[1] **V**alve suitable for contact with food media as per the EEC Directives and Regulations. For more specific information, please contact M&M Sales Department.

TYPE: B297



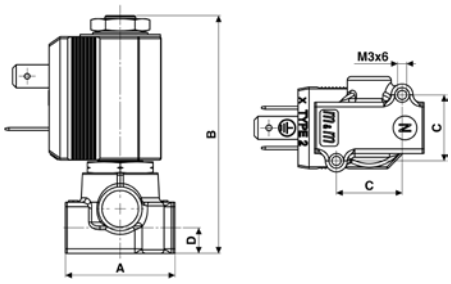
Normally Closed

TYPE: RB297



Normally Open

DIMENSIONS & WEIGHTS		B297	RB297
G connection	[ISO 228]	1/8"	1/8"
A	[mm]	30	30
B	[mm]	65	67.5
C	[mm]	18	18
D	[mm]	7	7
weight	[kg]	0.15	0.15



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
B297DVA	1.0	0.5	0	30	28
B297DVB	1.2	0.7	0	25	22
B297DVC	1.5	1.0	0	22	18
B297DVE	2.0	1.7	0	18	9
B297DVG	2.5	2.3	0	13	3
B297DVH	3.0	3.0	0	8	1

COILS	
code	[Volts/Hz]
2250	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

B297 - FKM seal, NC -

Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W

OPTIONS

Manual override (e.g. code B297DVCM)
Electroless nickel plating treatment (e.g. code B297DVEK)

AUTOMATION

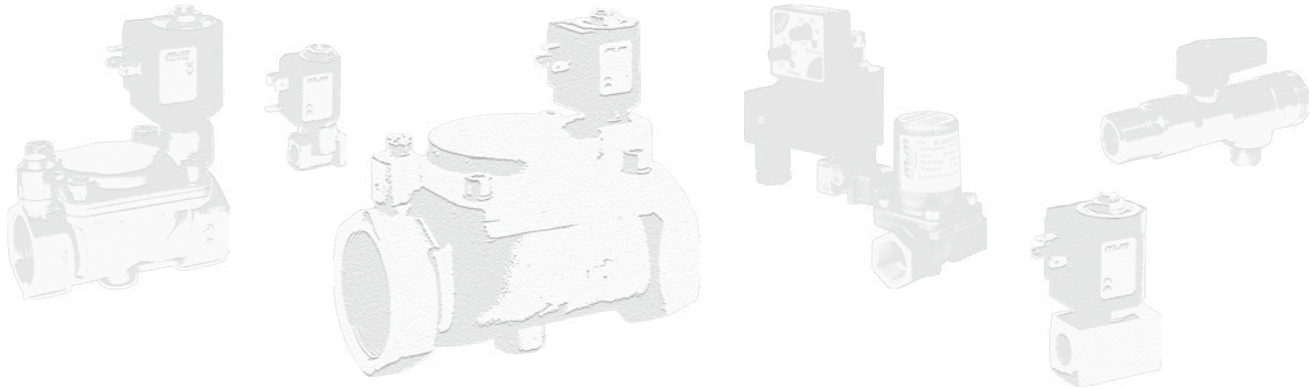
VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RB297DVA	1.0	0.5	0	25	25
RB297DVB	1.2	0.7	0	20	20
RB297DVC	1.5	1.0	0	15	15
RB297DVE	2.0	1.7	0	10	10
RB297DVG	2.5	2.3	0	5	5
RB297DVH	3.0	3.0	0	4.5	4.5

COILS	
code	[Volts/Hz]
2250	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

RB297 - FKM seal, NO -

Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W

AUTOMATION



2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8" - G 1/4"

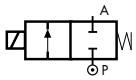
COMMON FEATURES

Body material: brass (CW617N EN 12165)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

OPTIONS

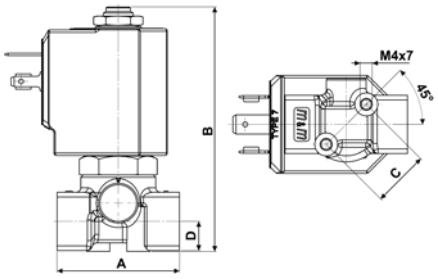
Available with body thread connection 1/8" (e.g. code D262DVH), performance ratings remain the same as D263DVH.
Manual override (e.g. code D262DVCM).

TYPE: D262/263



Normally Closed

DIMENSIONS & WEIGHTS		D262	D263
G connection	[ISO 228]	1/8"	1/4"
A	[mm]	40	40
B	[mm]	77.5	77.5
C	[mm]	18.5	18.5
D	[mm]	9.5	9.5
weight	[kg]	0.26	0.26



Flow direction overseat 1 → 2

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D263DVA	1.0	0.5	0	30	30	7250	24v DC
D263DVC	1.5	1.3	0	24	24	7200	24v 50/60Hz
D263DVG	2.5	3.4	0	18	16	7400	110v 50Hz - 120v 60Hz
D263DVH	3.0	4.5	0	15	10	7600	200v 50Hz - 220v 60Hz
D263DVL[1]	4.0	6.0	0	10	5	7700	230v 50Hz - 240v 60Hz
D263DVN[1]	5.0	7.5	0	5	2,5		
D263DVP[1]	6.0	8.0	0	3	1		

[1] Manual override not available for orifice > Ø 3 mm

D262/263 - FKM seal, NC -

Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: foodgrade FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

EPDM seal, temperature max. 120°C (e.g. code D262DEH)
For vacuum see page 36
ATEX version see page 37

STEAM

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D263DLA	1.0	0.5	0	9	9	7251	24v DC
D263DLC	1.5	1.3	0	9	9	7201	24v 50/60Hz
D263DLG	2.5	3.4	0	9	8	7401	110v 50Hz - 120v 60Hz
D263DLH	3.0	4.5	0	9	5	7601	200v 50Hz - 220v 60Hz
						7701	230v 50Hz - 240v 60Hz

D262/263 - FILLED PTFE seal, NC -

Media: steam
Media temperature: -10°C ÷ +180°C
Ambient temperature: -10°C ÷ +70°C
Seal material: Sigodur (filled PTFE)
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

Seamless tube as standard

HIGH PRESSURE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS high power - class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D263DRB1	1.2	0.7	0	200	60	72Z1	24v DC
D263DRC1	1.5	1.3	0	200	35	72K1	24v 50/60Hz
D263DRE1	2.0	2.2	0	120	25	74K1	110v 50Hz - 120v 60Hz
D263DRH1	3.0	4.5	0	50	11	77K1	230v 50Hz - 240v 60Hz

D262/263 - RUBY seal, NC -

Media[2]: water, oil, liquids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: Ruby
Coil power: AC 25VA (holding)
AC 50VA (inrush)
DC 22W

NOTES

Seamless tube as standard
[2] **N**ot 100% leak-proof when used with air/gases. Approximate leak rate is 1,5 ml/min at max. OPD.

ATTENTION: When high pressure valves are supplied without a coil, their nameplates display the max. OPD of the valve when equipped with an AC (25VA) and DC (22W) coil (as shown in the table above).
When using alternative coil power ratings please ensure to request separately the appropriate nameplate at time of order.

2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8" - G 1/4"

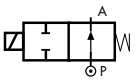
COMMON FEATURES

Body material: brass (CW617N EN 12165)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

OPTIONS

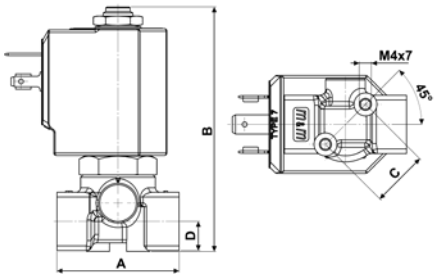
Available with body thread connection 1/8" (e.g. code RD262DVA), performance ratings remain the same as RD263DVA.
For steam version with filled PTFE seal (Sigodur) see valve model **RD236DL-** on page 17
For high pressure version with Ruby seal see valve model **RD236DR-1** on page 17

TYPE: RD262/263



Normally Open

DIMENSIONS & WEIGHTS		RD262	RD263
G connection	[ISO 228]	1/8"	1/4"
A	[mm]	40	40
B	[mm]	77.7	77.7
C	[mm]	18.5	18.5
D	[mm]	9.5	9.5
weight	[kg]	0.26	0.26



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RD263DVA	1.0	0.5	0	30	30
RD263DVC	1.5	1.3	0	24	24
RD263DVG	2.5	3.4	0	16	16
RD263DVH	3.0	4.5	0	10	10

COILS class 'H' only	
code	[Volts/Hz]
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

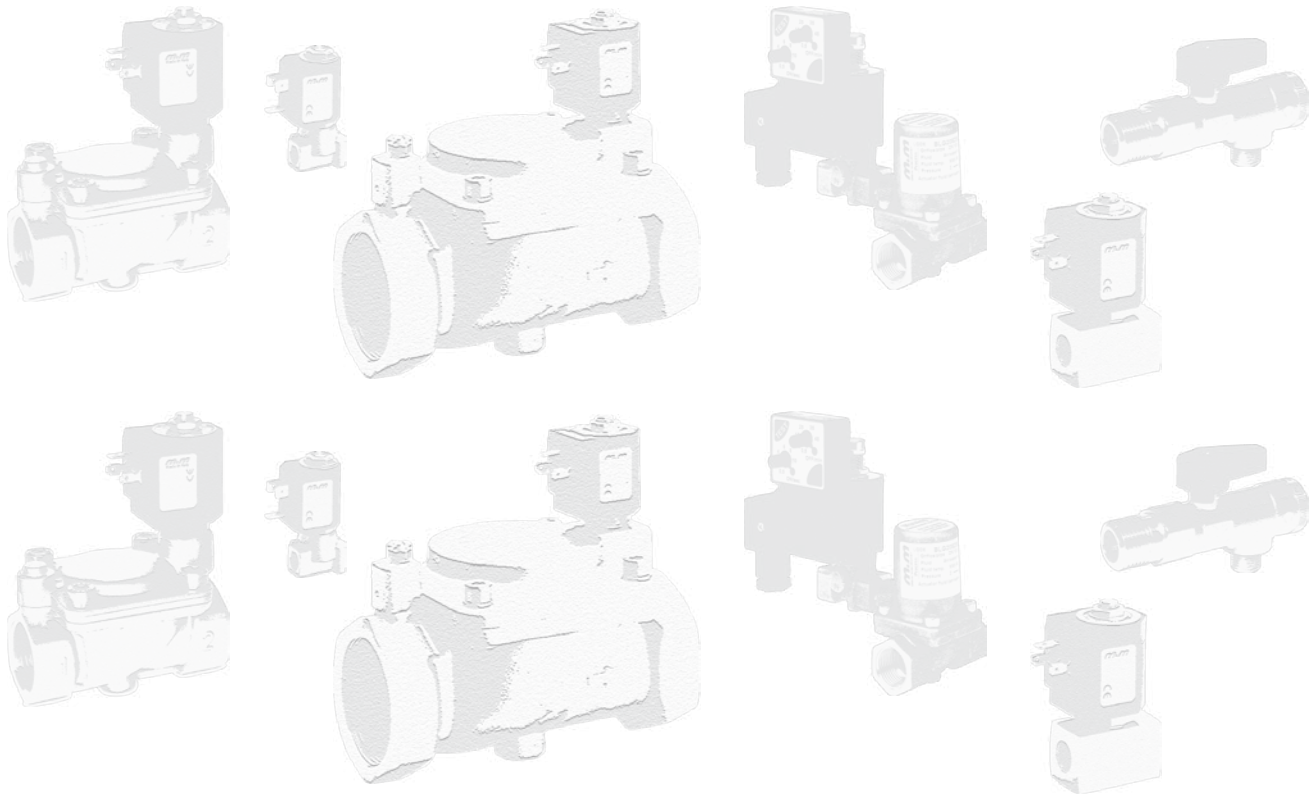
RD262/263 - FKM seal, NO -

Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: foodgrade FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

EPDM seal, temperature max. 120°C (e.g. code RD262DEH)

GENERAL PURPOSE

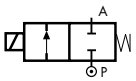


2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/4"

COMMON FEATURES

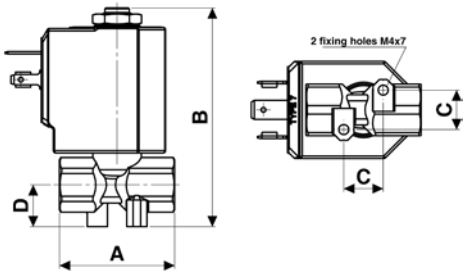
Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

TYPE: D249



Normally Closed

DIMENSIONS & WEIGHTS		D249
G connection	[ISO 228]	1/4"
A	[mm]	38
B	[mm]	72.1
C	[mm]	13
D	[mm]	13.8
weight	[kg]	0.18



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D249DVD	1.7	1.5	0	25	24
D249DVF	2.2	2.4	0	18	16
D249DVH *	3.0	4.5	0	10	6

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

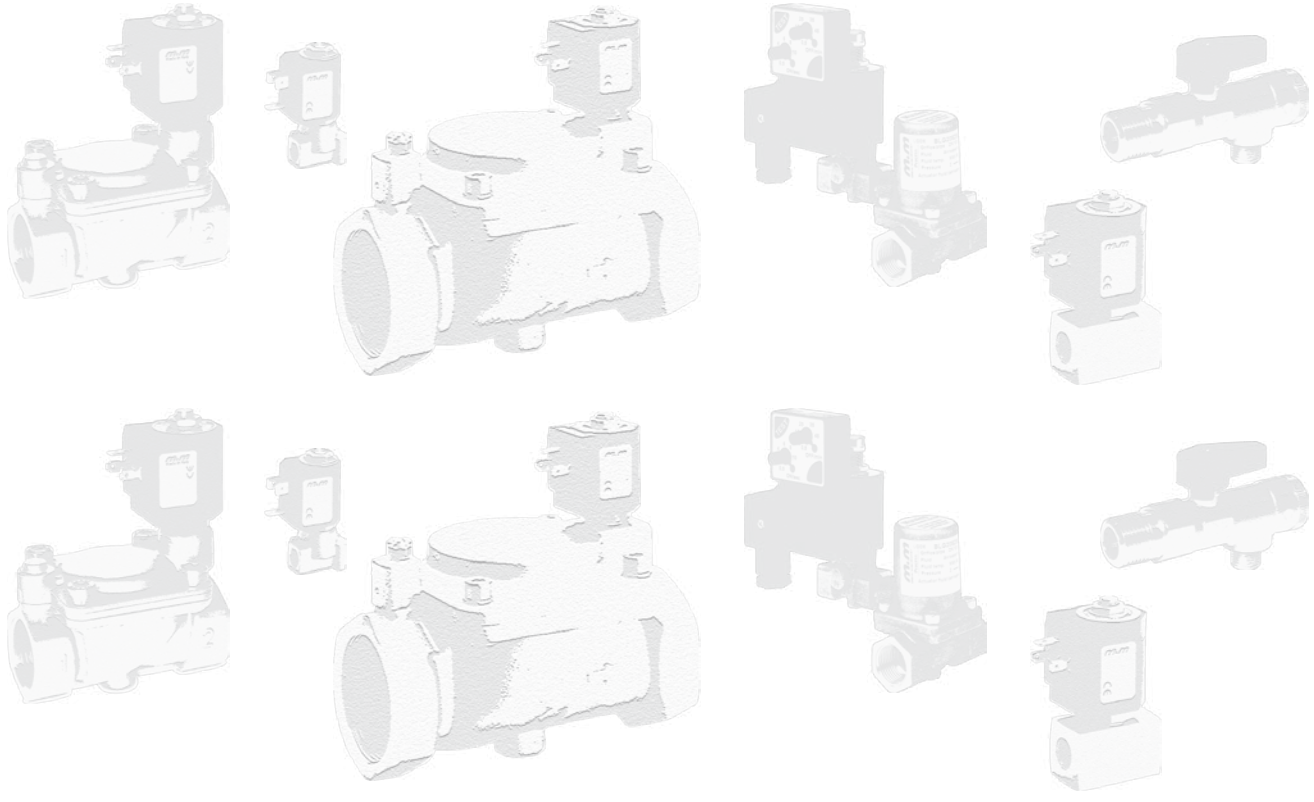
* **Minimum batch may be required**

D249 - FKM seal, NC -

Seal material: FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

EPDM seal, temperature max. 120°C (e.g. code D249DEF)

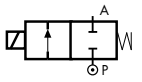


2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/4" ÷ G 1/2"

COMMON FEATURES

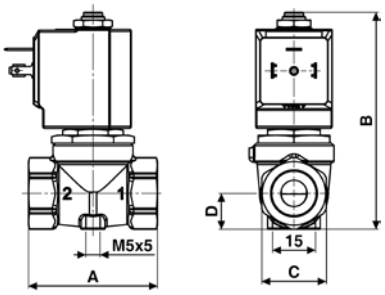
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

TYPE: D237/238/239



Normally Closed

DIMENSIONS & WEIGHTS		D237	D238	D239
G connection	[ISO 228]	1/4"	3/8"	1/2"
A	[mm]	54	54	54
B	[mm]	89	89	89
C	[mm]	HEX 27	HEX 27	HEX 27
D	[mm]	15	15	15
weight	[kg]	0.45	0.4	0.4



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D237DVU	10.5	21	0	0.4	0.2
D238DVU	10.5	25	0	0.4	0.2
D239DVU	10.5	25	0	0.4	0.2

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

D237/238/239DVU - FKM seal, NC -

Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

NBR seal, temperature max. 90°C (e.g. code D237DBU)
EPDM seal, temperature max. 120°C (e.g. code D239DEU)

AUTOMATION

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D238DVL	4.0	6	0	8	5
D238DVN	5.0	7.5	0	5	2
D238DVP	6.0	8.5	0	3.5	1.1
D239DVH	3.0	4.5	0	17	12
D239DVL	4.0	6	0	8	5
D239DVN	5.0	7.5	0	5	2
D239DVP	6.0	8.5	0	3.5	1.1

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

D238/239 - FKM seal, NC -

Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Seal material: FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

NBR seal, temperature max. 90°C (e.g. code D239DBP)
EPDM seal, temperature max. 120°C (e.g. code D238DEP)

NOTES

Same operator as D262/263DV-

AUTOMATION

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D238DLH	3.0	4.5	0	9	8
D238DLN	5.0	7.5	0	5	2
D239DLI	3.5	5.0	0	9	5

COILS class 'H' only	
code	[Volts/Hz]
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

D238/239 - FILLED PTFE seal, NC -

Media: steam
Media temperature: -10°C ÷ +180°C
Ambient temperature: -10°C ÷ +70°C
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Seal material: Sigodur (filled PTFE)
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

Seamless tube as standard
Same operator as D262/263DL-

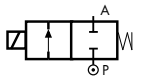
STEAM

2/2 WAY DIRECT ACTING SOLENOID VALVE, FLANGE 32x32

COMMON FEATURES

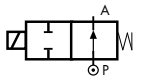
Body material: brass (CW617N EN 12165)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

TYPE: D201



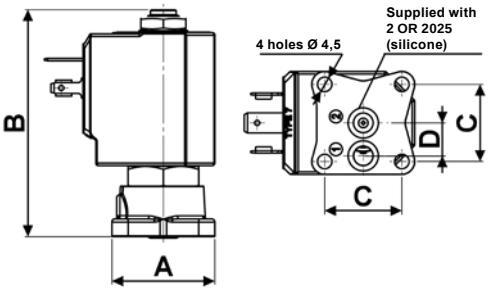
Normally Closed

TYPE: RD201



Normally Open

DIMENSIONS & WEIGHTS		D201	RD201
G connection	[ISO 228G]	/	/
A	[mm]	☐ 32	☐ 32
B	[mm]	70.6	68.4
C	[mm]	24	24
D	[mm]	10.25	10.25
weight	[kg]	0.25	0.3



Flow direction overseat 1 → 2

AUTOMATION

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D201DVC	1.5	1.3	0	24	24	7250	24v DC
D201DVE	2.0	2.2	0	20	20	7200	24v 50/60Hz
D201DVG	2.5	3.4	0	18	18	7400	110v 50Hz - 120v 60Hz
D201DVH	3.0	4.5	0	15	10	7600	200v 50Hz - 220v 60Hz
						7700	230v 50Hz - 240v 60Hz

D201 - FKM seal, NC -

Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: foodgrade FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

EPDM seal, temperature max. 120°C (e.g. code D201DEC)
Manual override (e.g. code D201DVGM)

AUTOMATION

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
RD201DVC	1.5	1.3	0	24	24	7251	24v DC
RD201DVG	2.5	3.4	0	16	16	7201	24v 50/60Hz
RD201DVH	3.0	4.5	0	10	10	7401	110v 50Hz - 120v 60Hz
						7601	200v 50Hz - 220v 60Hz
						7701	230v 50Hz - 240v 60Hz

RD201 - FKM seal, NO -

Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: foodgrade FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

EPDM seal, temperature max. 120°C (e.g. code RD201DEG)

HIGH PRESSURE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
RD201DRC	1.5	1.3	0	55	55	7251	24v DC
RD201DRE	2.0	2.2	0	25	25	7201	24v 50/60Hz
RD201DRH	3.0	4.5	0	10	10	7401	110v 50Hz - 120v 60Hz
						7601	200v 50Hz - 220v 60Hz
						7701	230v 50Hz - 240v 60Hz

RD201 - RUBY seal, NO -

Media❶: water, oil, liquids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: Ruby
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

❶ **N**ot 100% leak-proof when used with air/gases. Approximate leak rate is 1,5 ml/min at max. OPD

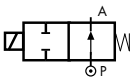
A Spirax-Sarco Engineering plc company

2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8"

COMMON FEATURES

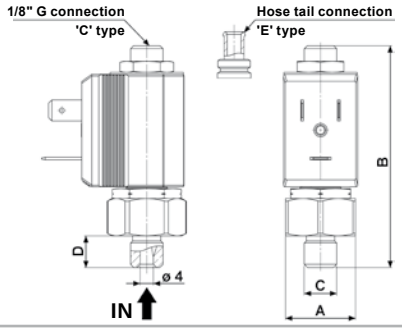
Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

TYPE: RB214



Normally Open

DIMENSIONS & WEIGHTS		RB214
G connection	[ISO 228]	1/8"
A	[mm]	21
B	[mm]	66.5
C	[mm]	1/8"
D	[mm]	9.5
weight	[kg]	0.06



VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RB214CVD	1.7	1.2	0	14	14

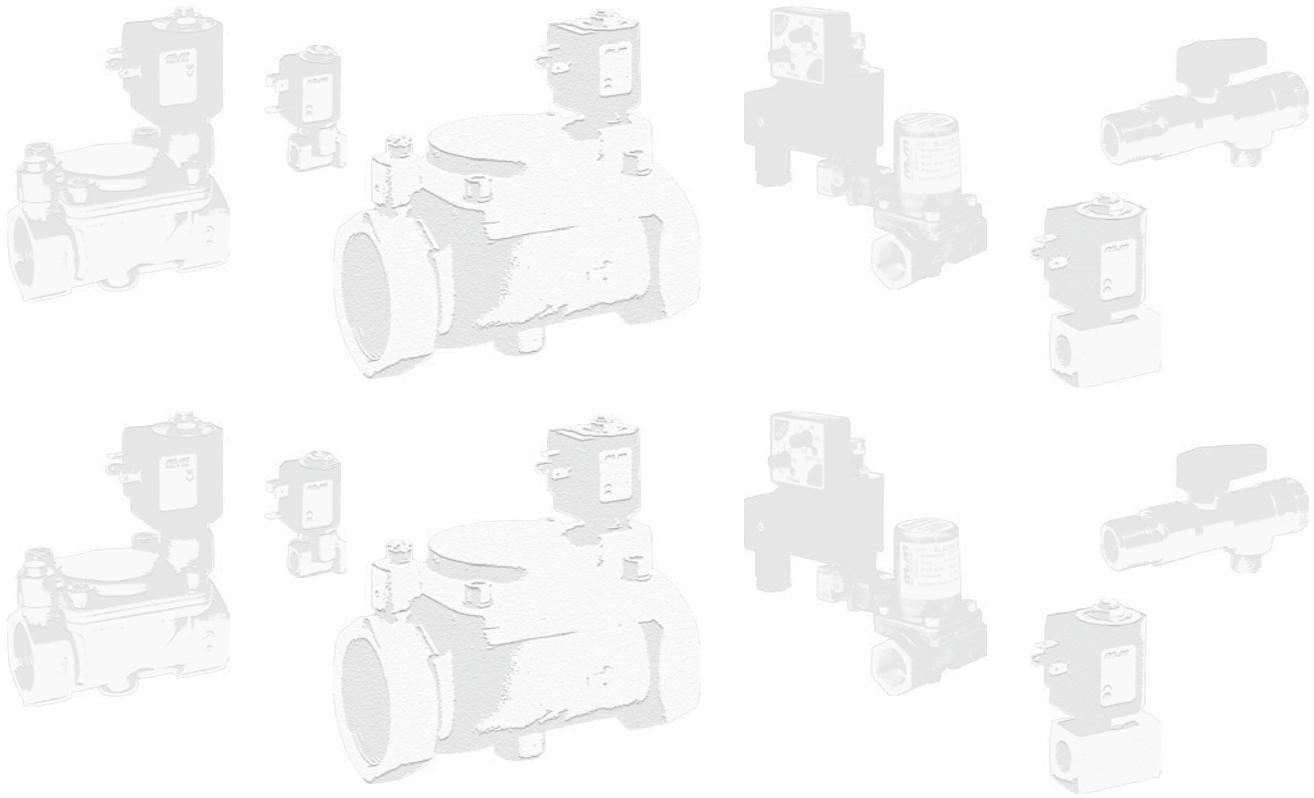
COILS	
code	[Volts/Hz]
2250	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

RB214 - FKM seal, NO -

Seal material: foodgrade FKM
Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W

OPTIONS

Armature tube with hose tail Ø 6 mm (e.g. code RB214EVD)
EPDM seal, temperature max. 120°C (e.g. code RB214CED)

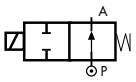


2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8"

COMMON FEATURES

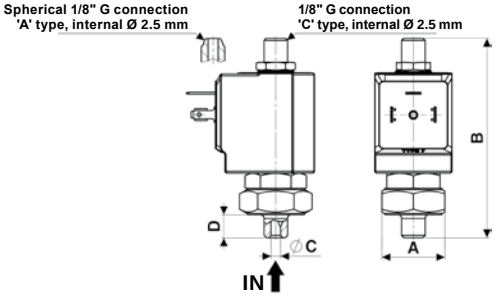
Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

TYPE: RD213



Normally Open

DIMENSIONS & WEIGHTS		RD213
G connection	[ISO 228]	1/8"
A	[mm]	Hex 26
B	[mm]	82.5
C	[mm]	4
D	[mm]	9.5
weight	[kg]	0.1



Flow direction underseat 2 → 1

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RD213CVG	2.5	2.4	0	16	16

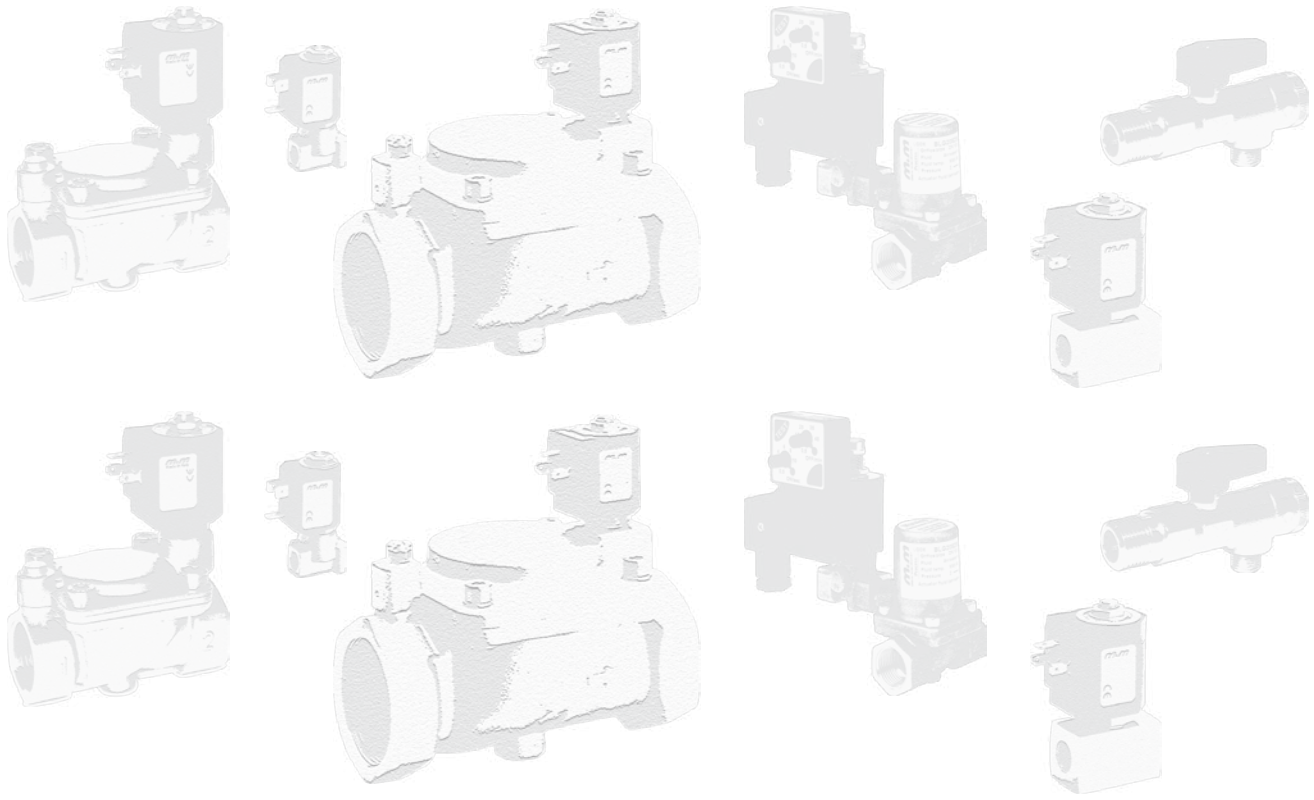
COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

RD213 - FKM seal, NO -

Seal material: foodgrade FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

EPDM seal, temperature max. 120°C (e.g. code RD213CEG)
Armature tube with spherical 1/8" G connection (e.g. code RD213AVG)

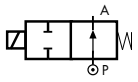


2/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/4"

COMMON FEATURES

Body material: brass (CW617N EN 12165)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

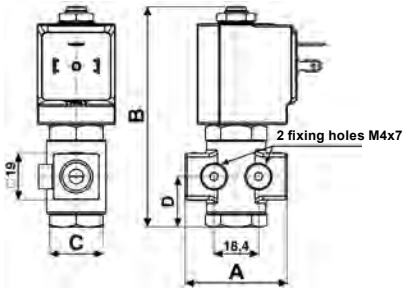
TYPE: RD236



Normally Open

DIMENSIONS & WEIGHTS		RD236
G connection	[ISO 228]	1/4"
A	[mm]	47 ✳
B	[mm]	91
C	[mm]	HEX 22
D	[mm]	20.75
weight	[kg]	0.25

✳ Since July 2014



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
RD236DVA	1.0	0.5	0	25	25	7250	24v DC
RD236DVC	1.5	1.3	0	20	20	7200	24v 50/60Hz
RD236DVE	2.0	2.0	0	18	18	7400	110v 50Hz - 120v 60Hz
RD236DVG	2.5	2.8	0	15	15	7600	200v 50Hz - 220v 60Hz
RD236DVH	3.0	3.5	0	12	12	7700	230v 50Hz - 240v 60Hz
RD236DVM	4.5	5.5	0	5	5		
RD236DVP	6.0	7.5	0	2	2		

RD236 - FKM seal, NO -

Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: foodgrade FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
RD236DLA	1.0	0.5	0	9	9	7251	24v DC
RD236DLC	1.5	1.3	0	9	9	7201	24v 50/60Hz
RD236DLE	2.0	2.0	0	9	9	7401	110v 50Hz - 120v 60Hz
RD236DLH	3.0	3.5	0	9	9	7601	200v 50Hz - 220v 60Hz
						7701	230v 50Hz - 240v 60Hz

RD236 - FILLED PTFE seal, NO -

Media: steam
Media temperature: -10°C ÷ +180°C
Ambient temperature: -10°C ÷ +70°C
Seal material: Sigodur (filled PTFE)
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

Seamless tube as standard

STEAM

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS high power - class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
RD236DRA1	1.0	0.5	0	180	180	72Z1	24v DC
RD236DRC1	1.5	1.3	0	150	150	72K1	24v 50/60Hz
RD236DRE1	2.0	2.0	0	60	60	74K1	110v 50Hz - 120v 60Hz
RD236DRG1	2.5	2.8	0	37	37	77K1	230v 50Hz - 240v 60Hz
RD236DRH1	3.0	3.5	0	28	28		

RD236 - RUBY seal, NO -

Media[1]: water, oil, liquids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: Ruby
Coil power: AC 25VA (holding)
AC 50VA (inrush)
DC 22W

NOTES

Seamless tube as standard
[1] **N**ot 100% leak-proof when used with air/gases. Approximate leak rate is 1,5 ml/min at max. OPD.

HIGH PRESSURE

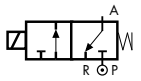
A Spirax-Sarco Engineering plc company

3/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8"

COMMON FEATURES

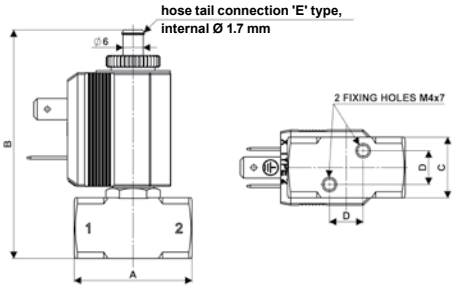
Media: water, oil, air and aggressive fluids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: stainless steel (1.4305 EN 10088/AISI 303)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Seal material: foodgrade FKM
Protection class: IP 65 (with connector and gasket)

TYPE: B398



Normally Closed

DIMENSIONS & WEIGHTS		B398
G connection	[ISO 228]	1/8"
A	[mm]	35
B	[mm]	68
C	[mm]	18
D	[mm]	10
weight	[kg]	0.1



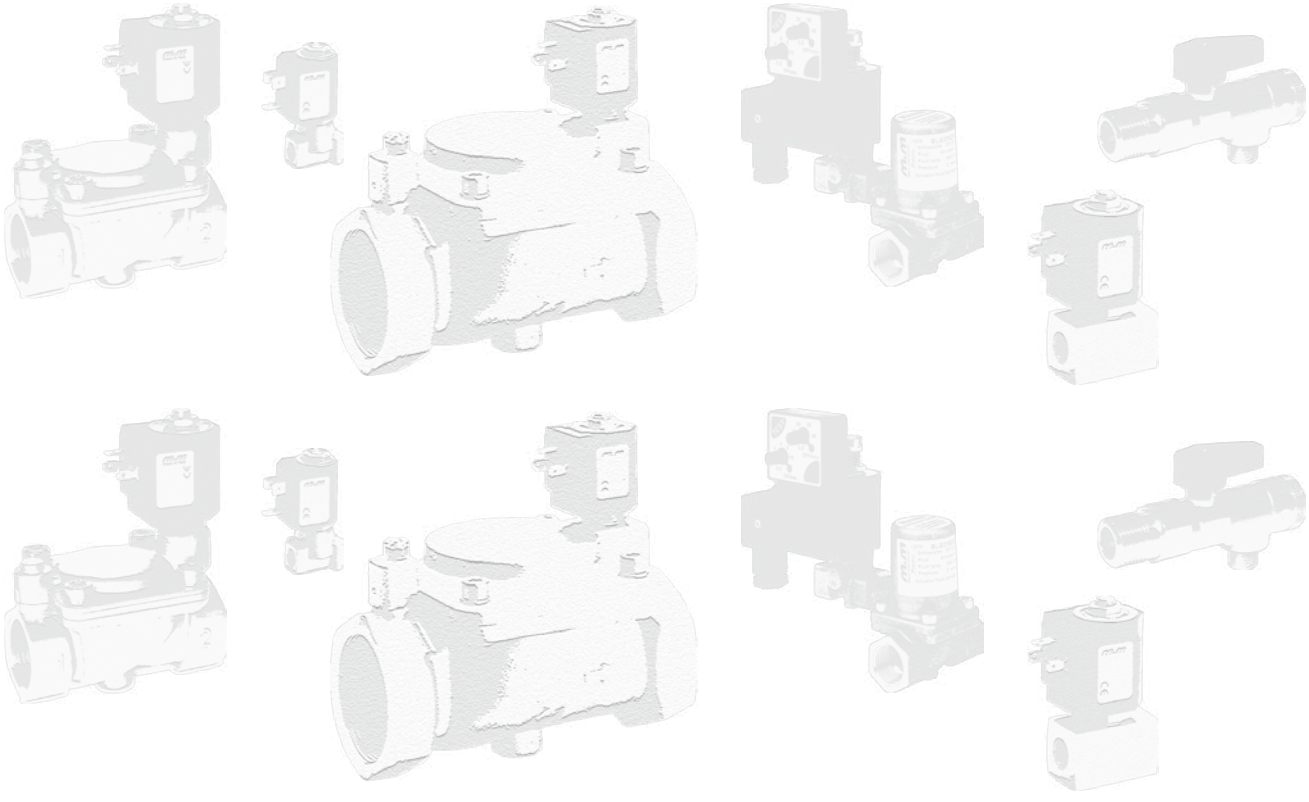
Flow direction underseat 2 → 1

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
B398EVB	1.2	0.7	0	15	15
B398EVC	1.5	1.0	0	10	10
B398EVE	2.0	1.9	0	5	5
B398EVG	2.5	2.7	0	3	3

COILS	
code	[Volts/Hz]
2250	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

B398 - FKM seal, NC -

Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W



3/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8" - G 1/4"

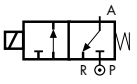
COMMON FEATURES

Body material: stainless steel (1.4305 EN 10088/AISI 303)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

OPTIONS

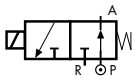
Available with body thread connection 1/8" (e.g. code D398DVC), performance ratings remain the same as D399DVC.
NPT connection on request, minimum batch may be required (e.g. code RD399CVGN)

TYPE: D398/399



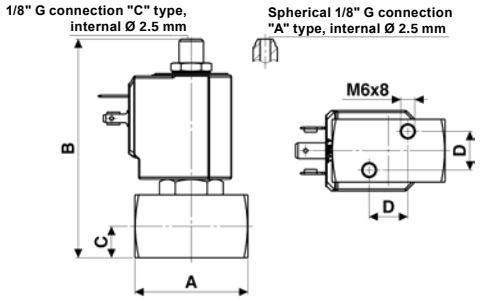
Normally Closed

TYPE: RD398/399



Normally Open

DIMENSIONS & WEIGHTS		D398	D399
G connection	[ISO 228]	1/8"	1/4"
A	[mm]	45	45
B	[mm]	87	87
C	[mm]	12.5	12.5
D	[mm]	15.4	15.4
weight	[kg]	0.35	0.35



Flow direction underseat 2 → 1

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D399CVC	1.5	1.3	0	18	18
D399CVE	2.0	2.2	0	10	10
D399CVG	2.5	3.4	0	7	7
D399CVH	3.0	4.5	0	5	5

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

D398/399 - FKM seal, NC -

Media: water, oil, air and aggressive fluids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: foodgrade FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

Armature tube with spherical 1/8" G connection (e.g. code D398AVC)
Silver shading ring (e.g. code D398CVGA)
UL approved coils (e.g. code 770R)

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D399CLC	1.5	1.3	0	9	9
D399CLE	2.0	2.2	0	9	9
D399CLH	3.0	4.5	0	5	5

COILS class 'H' only	
code	[Volts/Hz]
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

D398/399 - Sigodur seal, NC -

Media: steam
Media temperature: -10°C ÷ +180°C
Ambient temperature: -10°C ÷ +70°C
Seal material: Sigodur (filled PTFE)
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

Silver shading ring (e.g. code D398CLCA)

NOTES

Seamless tube as standard

STEAM

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RD399CVC	1.5	1.3	0	15	15
RD399CVE	2.0	2.2	0	10	10
RD399CVH	3.0	4.5	0	4	4

COILS class 'H' only	
code	[Volts/Hz]
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

RD398/399 - FKM seal, NO -

Media: water, oil, air and aggressive fluids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: foodgrade FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

Protective treatment of operators is recommended, minimum batch may be required.

GENERAL PURPOSE

A Spirax-Sarco Engineering plc company

3/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8"

COMMON FEATURES

Media[1]: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW719R EN 12165) low lead content
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Seal material: foodgrade FKM
Protection class: IP 65 (with connector and gasket)

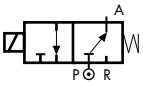
OPTIONS

EPDM seal, temperature max. 120°C (e.g. code RB397CEC)
Electroless nickel plating treatment (e.g. code B397CVCK)

NOTES

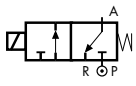
[1] **V**alve suitable for contact with food media as per the EEC Directives and Regulations. For more specific information, please contact M&M Sales Department.

TYPE: SB397



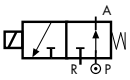
Normally Open

TYPE: B397



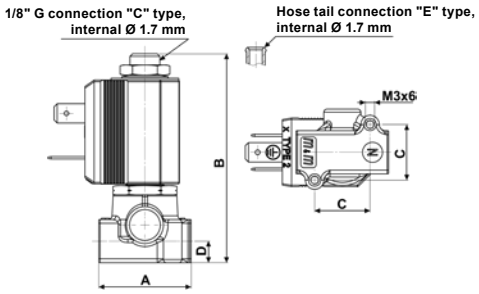
Normally Closed

TYPE: RB397



Normally Open

DIMENSIONS & WEIGHTS		B397	RB397	SB397
G connection	[ISO 228]	1/8"	1/8"	1/8"
A	[mm]	30	30	30
B	[mm]	67.8	72.5	67.8
C	[mm]	18	18	18
D	[mm]	7	7	7
weight	[kg]	0.15	0.16	0.15



Flow direction underseat 2 → 1

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
B397CVA	1.0	0.5	0	18	18
B397CVB	1.2	0.7	0	15	15
B397CVC	1.5	1.0	0	10	10
B397CVE	2.0	1.9	0	5	5
B397CVH	3.0	3.5	0	2	2

COILS	
code	[Volts/Hz]
2250	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

B397 - FKM seal, NC

Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W

OPTIONS

Manual override (e.g. code B397CVBM)
Armature tube with hose tail Ø 6 mm (e.g. code B397EVE)
UL approved coils (e.g. code 270R)

AUTOMATION

VALVE	nominal Ø 1 → 2	nominal Ø 1 → 3	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[mm]	[l/min]	[barg]	[barg]	[barg]
SB397CVB	1.2	1.7	0.7	0	6	3
SB397CVC	1.5	1.7	1.0	0	4.5	2

COILS	
code	[Volts/Hz]
2250	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

SB397 - FKM seal, 2nd SERVICE -

Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W

OPTIONS

Manual override (e.g. code SB397CVCM).

NOTES

Flow direction: **OFF 3 → 1 - ON 1 → 2**

AUTOMATION

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RB397CVA	1.0	0.5	0	15	12
RB397CVB	1.2	0.7	0	15	12
RB397CVC	1.5	1.0	0	10	8
RB397CVE	2.0	1.9	0	8	6
RB397CVG	2.5	2.5	0	4	4
RB397CVH	3.0	3.5	0	3.5	3.5

COILS	
code	[Volts/Hz]
2250	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

RB397 - FKM seal, NO

Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W

A Spirax-Sarco Engineering plc company

3/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8" - G 1/4"

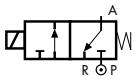
COMMON FEATURES

Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Seal material: foodgrade FKM
Protection class: IP 65 (with connector and gasket)

OPTIONS

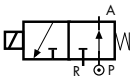
Available with body thread connection 1/8" (e.g. code D362CVA), performance ratings remain the same as D363CVA.
NPT connection on request, minimum batch may be required (e.g. code RD363CVCN)

TYPE: D362/363



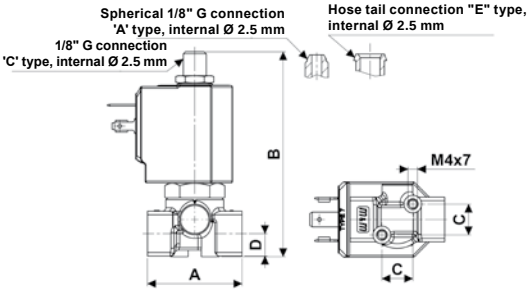
Normally Closed

TYPE: RD362/363



Normally Open

DIMENSIONS & WEIGHTS		D362	D363	RD362	RD363
G connection	[ISO 228]	1/8"	1/4"	1/8"	1/4"
A	[mm]	40	40	40	40
B	[mm]	87	87	87	87
C	[mm]	13	13	13	13
D	[mm]	9.5	9.5	9.5	9.5
weight	[kg]	0.26	0.26	0.26	0.26



Flow direction underseat 2 → 1

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D363CVC	1.5	1.3	0	18	18
D363CVE	2.0	2.2	0	10	10
D363CVG	2.5	3.4	0	7	7
D363CVH	3.0	4.5	0	5	5
D363CVL❶	4.0	6.0	0	3.5	3.5
D363CVN❶	5.0	7.5	0	2.5	2.5
D363CVP❶	6.0	8.0	0	1.5	1.5

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

❶ Manual override not available for orifice > Ø 3 mm

D362/363 - FKM seal, NC -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

EPDM seal, temperature max. 120°C (e.g. code D363CEC)
Manual override (e.g. code D362CVGM)
Armature tube with hose tail connection (e.g. code D362EVG)
Armature tube with spherical 1/8" G connection (e.g. code D362AVC)
ATEX version see page 37
For vacuum see page 36
UL approved coils (e.g. code 770R)

GENERAL PURPOSE

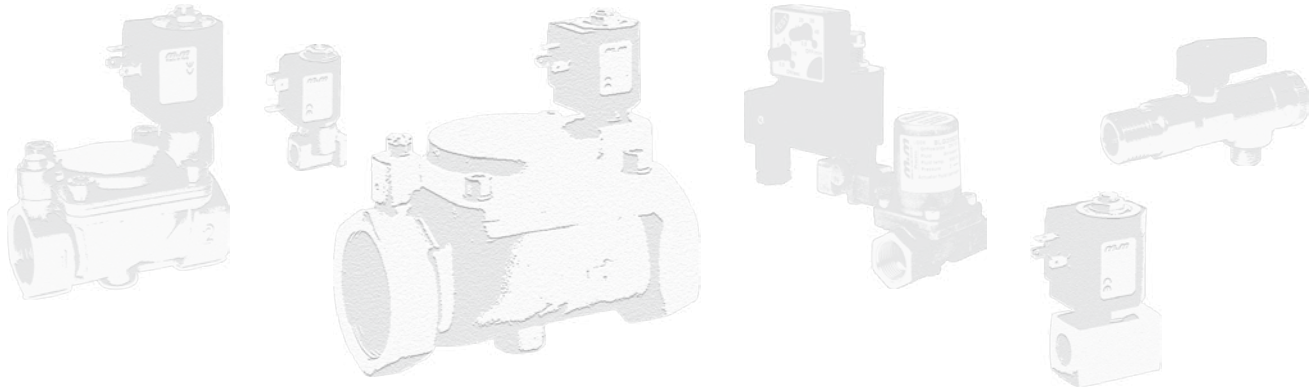
VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RD363CVC	1.5	1.3	0	16	13
RD363CVE	2.0	2.2	0	10	10
RD363CVG	2.5	3.4	0	7	7
RD363CVH	3.0	4.5	0	4	4

COILS class 'H' only	
code	[Volts/Hz]
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

RD362/363 - FKM seal, NO -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

GENERAL PURPOSE



3/2 WAY DIRECT ACTING SOLENOID VALVE, G 1/8" - G 1/4"

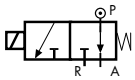
COMMON FEATURES

Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Seal material: foodgrade FKM
Protection class: IP 65 (with connector and gasket)

OPTIONS

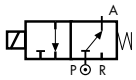
Available with body thread connection 1/8" (e.g. code SD362CVC), performance ratings remain the same as SD363CVC.
Armature tube with spherical 1/8" G connection (e.g. code SD362AVC)

TYPE: DD362/363



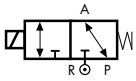
Normally Open - Diverting

TYPE: SD362/363



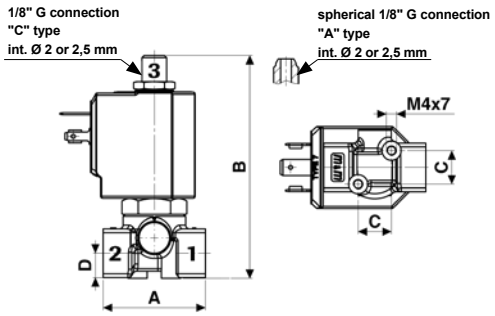
Normally Open - 2nd Service

TYPE: GD362/363



Universal Service

DIMENSIONS & WEIGHTS		SD362	SD363	DD362	DD363	GD362	GD363
G connection	[ISO 228]	1/8"	1/4"	1/8"	1/4"	1/8"	1/4"
A	[mm]	40	40	40	40	40	40
B	[mm]	87	87	87	87	87	87
C	[mm]	13	13	13	13	13	13
D	[mm]	9.5	9.5	9.5	9.5	9.5	9.5
weight	[kg]	0.26	0.26	0.26	0.26	0.26	0.26



AUTOMATION

VALVE	nominal Ø 1 → 2	nominal Ø 1 → 3	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[mm]	[l/min]	[barg]	[barg]	[barg]
SD363CVC	1.5	1.5	1.3	0	15	15
SD363CVE	2.0	2.0	2.2	0	15	15
SD363CVG	2.5	2.5	3.4	0	13	13

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

SD362/363 - FKM seal, 2nd SERVICE -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

Flow direction: **OFF 3 → 1 - ON 1 → 2**

AUTOMATION

VALVE	nominal Ø 1 → 2	nominal Ø 1 → 3	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[mm]	[l/min]	[barg]	[barg]	[barg]
DD363CVC	1.5	2.5	1.3	0	20	20
DD363CVE	2.0	2.5	2.2	0	20	20

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

DD362/363 - FKM seal, DIVERTING -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

Flow direction: **OFF 1 → 3 - ON 1 → 2**

AUTOMATION

VALVE	nominal Ø 1 → 2	nominal Ø 1 → 3	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[mm]	[l/min]	[barg]	[barg]	[barg]
GD363CVE	2.0	2.0	2.2	0	8	7

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

GD362/363 - FKM seal, UNIVERSAL SERVICE -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

Pressure can be connected to all ports:
- from **2** like D362,
- from **1** like DD362,
- from **3** like SD362.

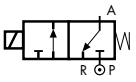
A Spirax-Sarco Engineering plc company

3/2 WAY DIRECT ACTING SOLENOID VALVE, FLANGE 32x32

COMMON FEATURES

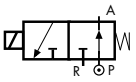
Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Seal material: foodgrade FKM
Protection class: IP 65 (with connector and gasket)

TYPE: D301



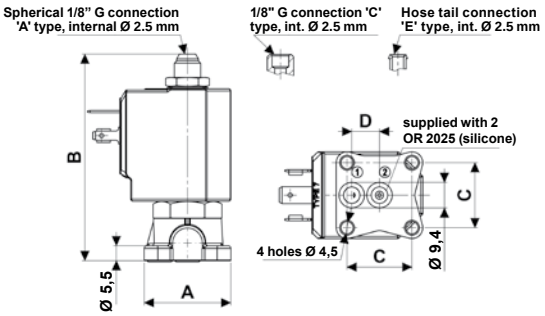
Normally Closed

TYPE: RD301



Normally Open

DIMENSIONS & WEIGHTS		D301	RD301
G connection	[ISO 228]	/	/
A	[mm]	⍁ 32	⍁ 32
B	[mm]	77	77.7
C	[mm]	24	24
D	[mm]	10.25	10.25
weight	[kg]	0.25	0.26



Flow direction underseat 2 → 1

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D301CVC	1.5	1.3	0	18	18
D301CVE	2.0	2.2	0	10	10
D301CVG	2.5	3.4	0	7	7
D301CVH	3.0	4.5	0	5	5

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

D301 - FKM seal, NC -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

Armature tube with spherical 1/8" G connection (e.g. code D301AVE)
Armature tube with hose tail connection (e.g. code D301EVC)
Ruby seal for increased chemical resistance (e.g. code D301ARC)

AUTOMATION

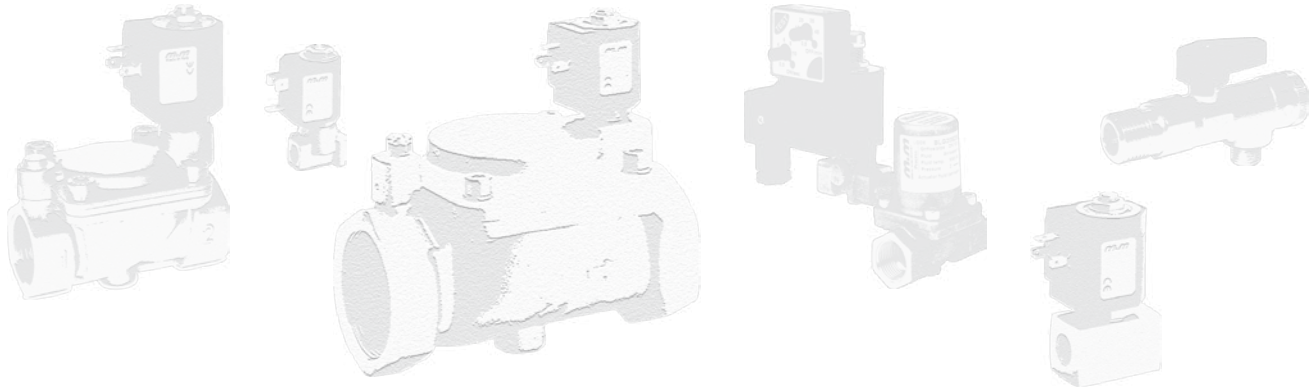
VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RD301CVC	1.5	1.3	0	15	15
RD301CVE	2.0	2.2	0	10	10
RD301CVH	3.0	4.5	0	4	4

COILS class 'H' only	
code	[Volts/Hz]
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

RD301 - FKM seal, NO -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

AUTOMATION

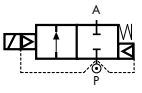


2/2 WAY PILOT OPERATED SOLENOID VALVE WITH ASSISTED LIFT, G 1/4" ÷ G 1/2"

COMMON FEATURES

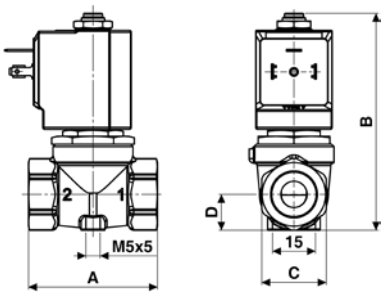
Media: water, oil, air
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Operator seal material: FKM
Main seal and diaphragm material: FKM
Protection class: IP 65 (with connector and gasket)

TYPE: D884/885/886



Normally Closed

DIMENSIONS & WEIGHTS		D884	D885	D886
G connection	[ISO 228]	1/4"	3/8"	1/2"
A	[mm]	54	54	54
B	[mm]	89	89	89
C	[mm]	HEX 27	HEX 27	HEX 27
D	[mm]	15	15	15
weight	[kg]	0.45	0.4	0.4



Flow direction overseat 1 → 2

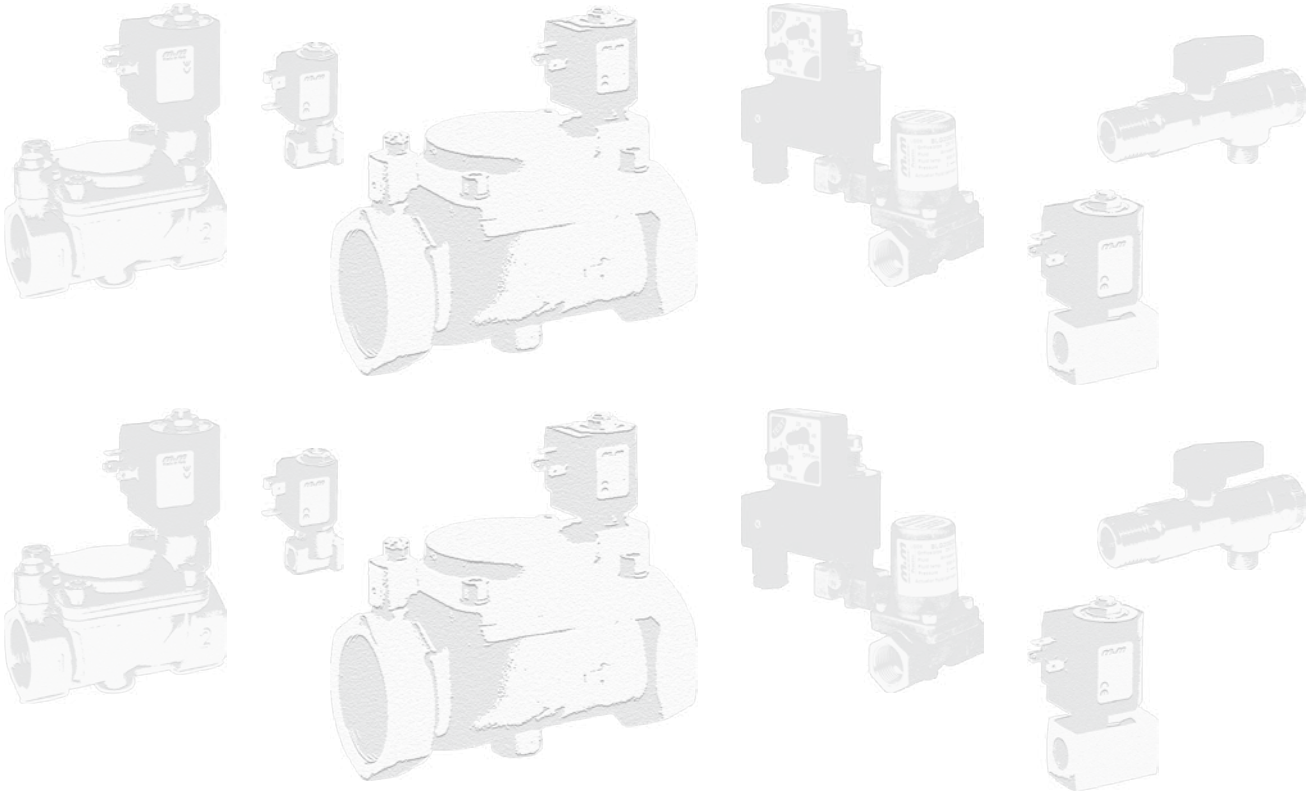
VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D884DVU	10.5	21	0	16	6
D885DVU	10.5	24	0	16	6
D886DVU	10.5	25	0	16	6

COILS	
code	[Volts/Hz]
7250	24V DC
7200	24V 50/60Hz
7400	110V 50Hz - 120V 60Hz
7600	200V 50Hz - 220V 60Hz
7700	230V 50Hz - 240V 60Hz

D884/885/886 - FKM seal, NC -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

GENERAL PURPOSE



2/2 WAY PILOT OPERATED SOLENOIDVALVE WITH ASSISTED LIFT, G 1/4" ÷ G 1"

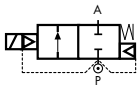
COMMON FEATURES

Media: water, oil, air
Media temperature: -10°C ÷ +90°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Operator seal material: FKM
Main seal and diaphragm material: NBR
Protection class: IP 65 (with connector and gasket)

OPTIONS

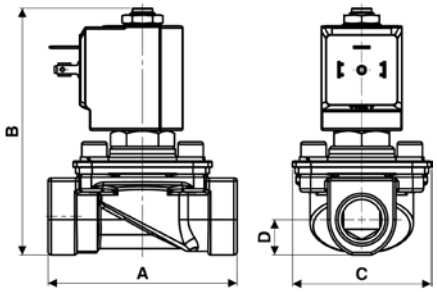
EPDM seal, temperature max. 120°C (e.g. code D188DEW)
FKM seal, temperature max. 130°C (e.g. code C D189DVW)
Electroless nickel plating treatment (e.g. code D190DBWK)
NPT connection on request, minimum batch may be required (e.g. code D192DBWN)

TYPE: D187 ÷ D192/293



Normally Closed

DIMENSIONS & WEIGHTS		D187 C D187	D188 C D188	D189 C D189	D190 C D190	D192 C D192 compact	D293 C D293
G connection	[ISO 228]	1/4"	3/8"	1/2"	3/4"	1"	1"
A	[mm]	75	75	75	85	85	100
B	[mm]	108	108	108	108	108	113
C	[mm]	55	55	55	55	55	70
D	[mm]	14	14	14	21.5	21.5	21.5
weight	[kg]	0.5	0.5	0.5	0.8	0.7	1.2



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS AC only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D187DBW	15	50	0	16	–	7200	24v 50/60Hz
D188DBW	15	60	0	16	–	7400	110v 50Hz - 120v 60Hz
D189DBW	15	65	0	16	–	7600	200v 50Hz - 220v 60Hz
D190DBW	15	80	0	16	–	7700	230v 50Hz - 240v 60Hz
D192DBW compact	15	85	0	16	–		
D293DBY	25	140	0	16	–		

D187 ÷ 192/293 - NBR seal, NC -

Coil power: AC 18VA (holding)
AC 36VA (inrush)

OPTIONS

For vacuum see page 36

NOTES

Speed control screw as standard for type D293

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS DC only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
C D187DBW	15	50	0	–	6	7150	12v DC
C D188DBW	15	60	0	–	6	7250	24v DC
C D189DBW	15	65	0	–	6	7450	110v DC
C D190DBW	15	80	0	–	6	7750	230v DC
C D192DBW compact	15	85	0	–	6		
C D293DBY	25	140	0	–	3.5		

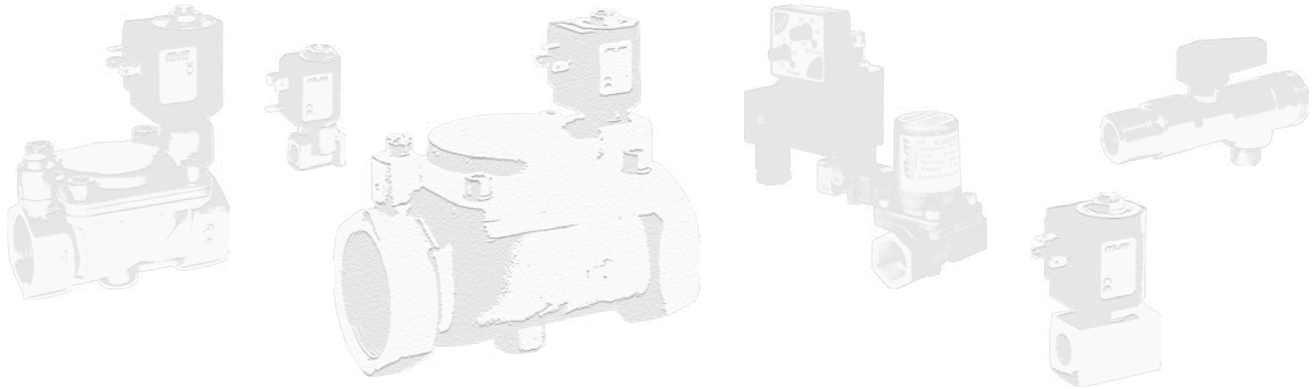
C D187 ÷ 192/293 - NBR seal, NC -

Coil power: DC 14W

NOTES

Speed control screw as standard for type C D293

GENERAL PURPOSE



2/2 WAY PILOT OPERATED SOLENOID VALVE, G 3/8″ ÷ G 1″

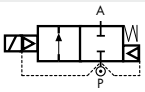
COMMON FEATURES

Media: water, oil, air and aggressive fluids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: AISI 316L (ASME SA351/351M GRADE CF3M)
Operator material: stainless steel
Operator seal and diaphragm material: FKM
Silver shading ring as standard
Protection class: IP 65 (with connector and gasket)

OPTIONS

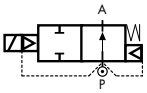
EPDM seal, temperature max. 120°C (e.g. code D204DEZI)
NBR seal, temperature max. 90°C (e.g. code D206DBYI)
NPT connection on request, minimum batch may be required (e.g. code D204DVZIN)

TYPE: D204÷D222



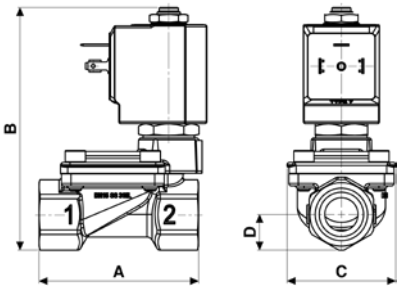
Normally Closed

TYPE: RD204÷RD222



Normally Open

DIMENSIONS & WEIGHTS		D204	D205	D206	D222	RD204	RD205	RD206	RD222
G connection	[ISO 228]	3/8"	1/2"	3/4"	1"	3/8"	1/2"	3/4"	1"
A	[mm]	67	67	96	96	67	67	96	96
B	[mm]	102	102	125	125	100	100	123	123
C	[mm]	45.6	45.6	72	72	45.6	45.6	72	72
D	[mm]	15	15	24	24	15	15	24	24
weight	[kg]	0.49	0.49	1.1	1.1	0.49	0.49	1.1	1.1



Flow direction overseat 1 → 2

AGGRESSIVE FLUIDS

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D204DVZI	13	55	0.3	16	16	7250	24v DC
D205DVZI	13	63	0.3	16	16	7200	24v 50/60Hz
D206DVYI	25	140	0.3	16	16	7400	110v 50Hz - 120v 60Hz
D222DVYI	25	160	0.3	16	16	7600	200v 50Hz - 220v 60Hz
						7700	230v 50Hz - 240v 60Hz

D204 ÷ D222 - FKM seal, NC -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

Manual override (e.g. code D205DBZIM)
UL approved coil (e.g. code 770R)
ATEX version see page 37

NOTES

Seamless tube as standard

AGGRESSIVE FLUIDS

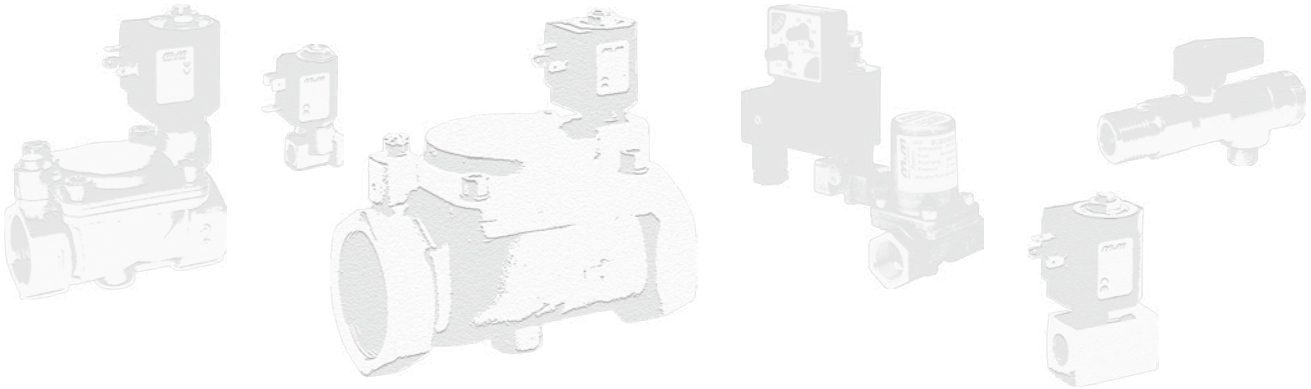
VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
RD204DVZI	13	55	0.3	16	16	7251	24v DC
RD205DVZI	13	63	0.3	16	16	7201	24v 50/60Hz
RD206DVYI	25	140	0.3	16	16	7401	110v 50Hz - 120v 60Hz
RD222DVYI	25	160	0.3	16	16	7601	200v 50Hz - 220v 60Hz
						7701	230v 50Hz - 240v 60Hz

RD204 ÷ RD222 - FKM seal, NO -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

Protective treatment of operators is recommended, minimum batch may be required (e.g. code RD204DVZIF)



2/2 WAY PILOT OPERATED SOLENOID VALVE, G 1/4" ÷ G 1"

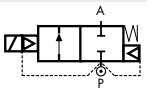
COMMON FEATURES

Media: water, oil, air
Media temperature: -10°C ÷ +90°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Operator seal and diaphragm material: NBR
Protection class: IP 65 (with connector and gasket)

OPTIONS

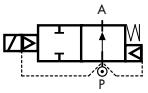
FKM seal, temperature max. 130°C (e.g. code B205DVZ)
EPDM seal, temperature max. 120°C (e.g. code B204DEZ)
Electroless nickel plating treatment (e.g. code B205DBZK)
NPT connection on request, minimum batch may be required (e.g. code RB205DBZN)
UL approved coils (e.g. code 220R)
Speed control screw only for type B206-, B222-, RB206- and RB222- (e.g. code B206DBYV / RB222DBYV)

TYPE: B203÷B222



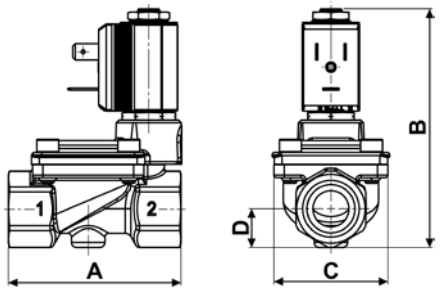
Normally Closed

TYPE: RB203÷RB222



Normally Open

DIMENSIONS & WEIGHTS		B203 B204	B205	B206 compact	B206	B222	RB203 RB204	RB205	RB206 compact	RB206	RB222
G connection	[ISO 228]	1/4" 3/8"	1/2"	3/4"	3/4"	1"	1/4" 3/8"	1/2"	3/4"	3/4"	1"
A	[mm]	67	67	82	96	96	67	67	82	96	96
B	[mm]	90	90	105	115	115	92.5	92.5	107.5	117.5	117.5
C	[mm]	45.6	45.6	51.6	72	72	45.6	45.6	51.6	72	72
D	[mm]	15	15	20.25	23	23	15	15	20.25	23	23
weight	[kg]	0.4	0.4	0.6	1.2	1.2	0.4	0.4	0.6	1.2	1.2



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
B203DBZ	13	26	0.3	16	16	2250	24v DC
B204DBZ	13	55	0.3	16	16	2200	24v 50/60Hz
B205DBZ	13	63	0.3	16	16	2400	110v 50Hz - 120v 60Hz
B206DBX comp.	21	100	0.3	16	16	2600	200v 50Hz - 220v 60Hz
B206DBY ❶	25	140	0.3	16	16	2700	230v 50Hz - 240v 60Hz
B222DBY	25	160	0.3	16	16		

B203 ÷ B222 - NBR seal, NC -

Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W

OPTIONS

Manual override (e.g. code B204DBZM)

GENERAL PURPOSE

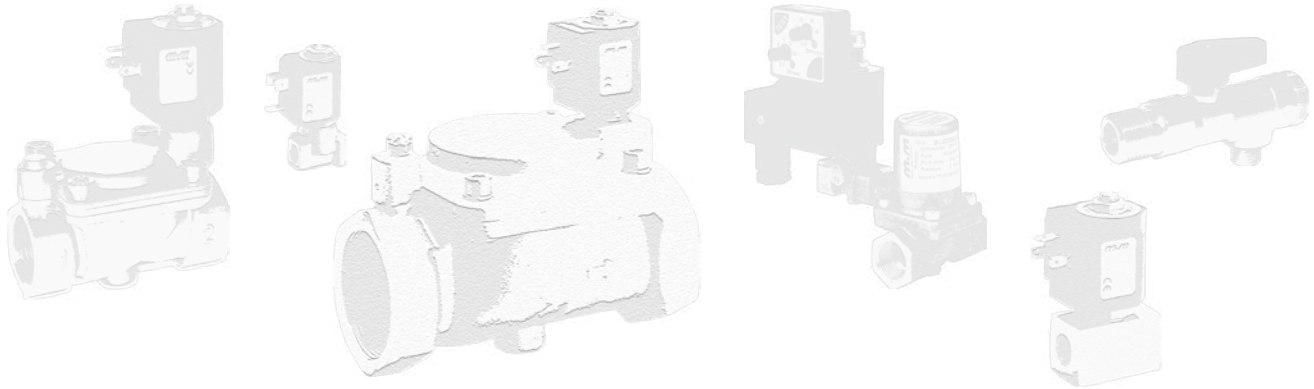
VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
RB203DBZ	13	26	0.3	16	16	2250	24v DC
RB204DBZ	13	55	0.3	16	16	2200	24v 50/60Hz
RB205DBZ	13	63	0.3	16	16	2400	110v 50Hz - 120v 60Hz
RB206DBX comp.	21	100	0.3	16	16	2600	200v 50Hz - 220v 60Hz
RB206DBY ❶	25	140	0.3	16	16	2700	230v 50Hz - 240v 60Hz
RB222DBY	25	160	0.3	16	16		

RB203 ÷ RB222 - NBR seal, NO -

Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 7W

GENERAL PURPOSE

❶ **Product subject to phase-out, please contact M&M Sales Department for availability**



2/2 WAY PILOT OPERATED SOLENOID VALVE, G 1 1/4" ÷ G 2"

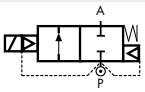
COMMON FEATURES

Media: water, oil, air
Media temperature: -10°C ÷ +90°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Operator seal and diaphragm material: NBR
Silver shading ring as standard
Protection class: IP 65 (with connector and gasket)
Speed control screw as standard

OPTIONS

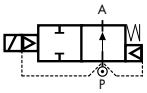
FKM seal, temperature max. 130°C (e.g. code D223DVK)
EPDM seal, temperature max. 120°C (e.g. code RD223DEK)
Electroless nickel plating treatment (e.g. code D222DVYK)
NPT connection on request, minimum batch may be required (e.g. code D223DBKN)

TYPE: D223÷D225



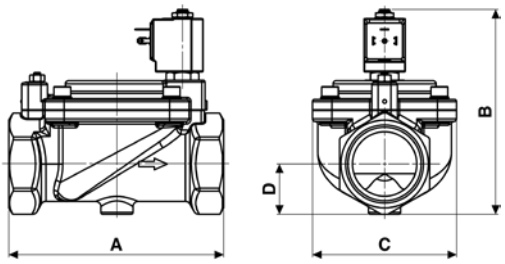
Normally Closed

TYPE: RD223÷RD225



Normally Open

DIMENSIONS & WEIGHTS		D223	D224	D225	RD223	RD224	RD225
G connection	[ISO 228]	1 1/4"	1 1/2"	2"	1 1/4"	1 1/2"	2"
A	[mm]	140	140	168	140	140	168
B	[mm]	140	140	158	140	140	158
C	[mm]	96	96	112	96	96	112
D	[mm]	31	31	39	31	31	39
weight	[kg]	2.8	2.8	3.9	2.8	2.8	3.9



Flow direction overseat 1 → 2

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D223DBK	40	370	0.5	16	16	7250	24v DC
D224DBK	40	400	0.5	16	16	7200	24v 50/60Hz
D225DBJ	50	540	0.5	16	16	7400	110v 50Hz - 120v 60Hz
						7600	200v 50Hz - 220v 60Hz
						7700	230v 50Hz - 240v 60Hz

D223/224/225 - NBR seal, NC -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

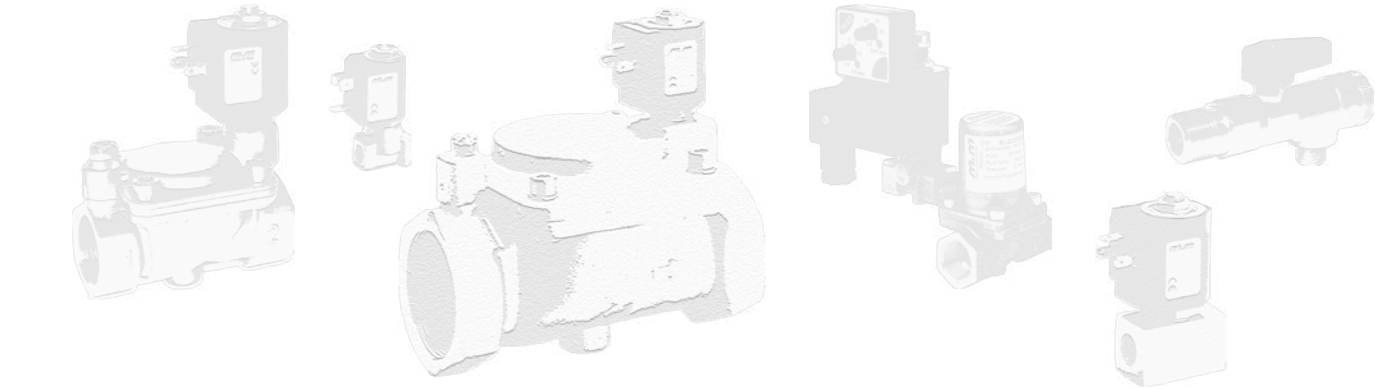
Manual override (e.g. code D223DBKM)
For vacuum see page 36
UL approved coils (e.g. code 725R)

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
RD223DBK	40	370	0.5	16	16	7251	24v DC
RD224DBK	40	400	0.5	16	16	7201	24v 50/60Hz
RD225DBJ	50	540	0.5	16	16	7401	110v 50Hz - 120v 60Hz
						7601	200v 50Hz - 220v 60Hz
						7701	230v 50Hz - 240v 60Hz

D223/224/225 - NBR seal, NO -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W



2/2 WAY PILOT OPERATED SOLENOID VALVE, G 1/4" ÷ G 1/2"

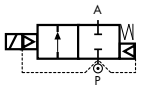
COMMON FEATURES

Media: water, oil, air
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

OPTIONS

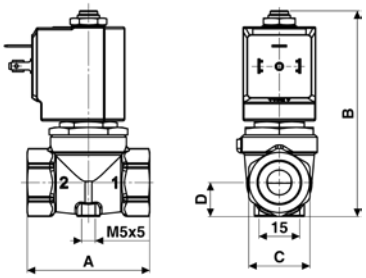
EPDM seal, temperature max. 120°C (e.g. code D266DEU)
NPT connection on request, minimum batch may be required (e.g. code D264DBUN)

TYPE: D264/265/266



Normally Closed

DIMENSIONS & WEIGHTS		D264	D265	D266
G connection	[ISO 228]	1/4"	3/8"	1/2"
A	[mm]	54	54	54
B	[mm]	89	89	89
C	[mm]	HEX 27	HEX 27	HEX 27
D	[mm]	15	15	15
weight	[kg]	0.45	0.4	0.4



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D264DBU	10.5	21	0.1	16	7
D265DBU	10.5	24	0.1	16	7
D266DBU	10.5	25	0.1	16	7

COILS	
code	[Volts/Hz]
7250	24V DC
7200	24V 50/60Hz
7400	110V 50Hz - 120V 60Hz
7600	200V 50Hz - 220V 60Hz
7700	230V 50Hz - 240V 60Hz

D264/265/266 - NBR seal, NC -

Media temperature: -10°C ÷ +90°C
Operator seal and diaphragm material: NBR
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

COMPRESSED AIR

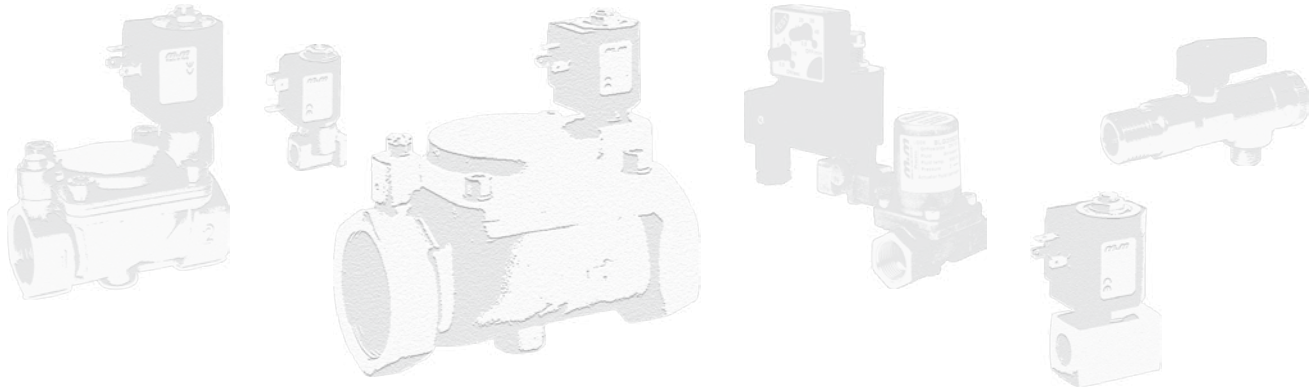
VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D264DVU	10.5	21	0.1	16	7
D265DVU	10.5	24	0.1	16	7
D266DVU	10.5	25	0.1	16	7

COILS	
code	[Volts/Hz]
7250	24V DC
7200	24V 50/60Hz
7400	110V 50Hz - 120V 60Hz
7600	200V 50Hz - 220V 60Hz
7700	230V 50Hz - 240V 60Hz

D264/265/266 - FKM seal, NC -

Media temperature: -10°C ÷ +130°C
Operator seal and diaphragm material: FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

GENERAL PURPOSE



2/2 WAY PILOT OPERATED SOLENOID VALVE, G 1/4" ÷ G 1/2"

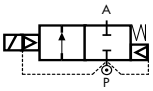
COMMON FEATURES

Body material: brass (CW617N EN 12165)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Seal material: PTFE
Protection class: IP 65 (with connector and gasket)

NOTES

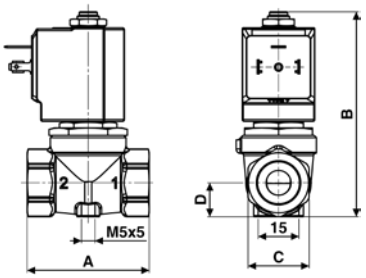
Seamless tube as standard

TYPE: D634÷D636



Normally Closed

DIMENSIONS & WEIGHTS		D634	D635	D636
G connection	[ISO 228]	1/4"	3/8"	1/2"
A	[mm]	54	54	54
B	[mm]	100	100	100
C	[mm]	HEX 27	HEX 27	HEX 27
D	[mm]	15	15	15
weight	[kg]	0.5	0.45	0.45



Flow direction overseat 1 → 2

HIGH PRESSURE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS high power - class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D634DTT1	10	21	0.3	140	35	72Z1	24V DC
D635DTT1	10	24	0.3	140	35	72K1	24V 50/60Hz
D636DTT1	10	25	0.3	140	35	74K1	110V 50Hz - 120V 60Hz
						77K1	230V 50Hz - 240V 60Hz

ATTENTION: When high pressure valves are supplied without a coil, their nameplates display the max. OPD of the valve when equipped with an AC (25VA) and DC (22W) coil (as shown in the table above).
When using alternative coil power ratings please ensure to request separately the appropriate nameplate at time of order.

D634÷636DTT1 - PTFE seal, NC -

Media❶: water, oil, liquids
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Coil power: AC 25VA (holding)
AC 50VA (inrush)
DC 22W

NOTES

❶ **N**ot 100% leak-proof when used with air/gases. Approximate leak rate is 1,5 ml/min at max. OPD

STEAM

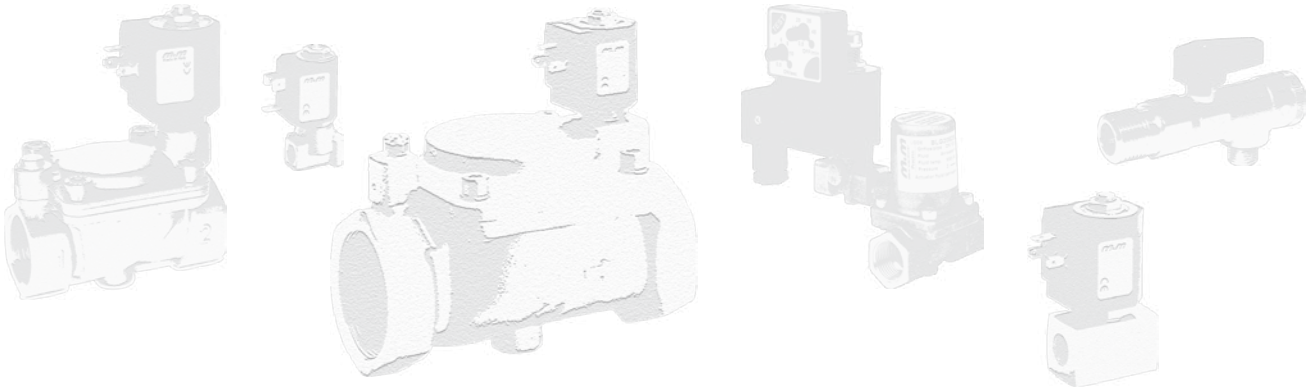
VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS class 'H' only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
D634DTT	10	21	0.3	9	9	72Z1	24V DC
D635DTT	10	24	0.3	9	9	7201	24V 50/60Hz
D636DTT	10	25	0.3	9	9	7401	110V 50Hz - 120V 60Hz
						7601	200V 50Hz - 220V 60Hz
						7701	230V 50Hz - 240V 60Hz

D634÷636DTT - PTFE seal, NC -

Media: steam
Media temperature: +80°C ❷ ÷ +180°C
Ambient temperature: -10°C ÷ +70°C
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 22W

NOTES

❷ **F**or a correct functioning, the minimum working temperature of the solenoid valve cannot be below 80°C



A Spirax-Sarco Engineering plc company

2/2 WAY PILOT OPERATED SOLENOID VALVE, G 3/8" ÷ G 3/4"

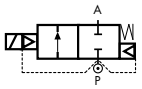
COMMON FEATURES

Media: water ❶, oil, air ❷
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Protection class: IP 65 (with connector and gasket)

NOTES

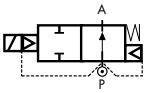
❶ **W**hen using liquid fluids waterhammer and pressures higher than 20 barg can cause the diaphragm to tear
❷ **N**ot 100% leak-proof when used with air/gases. Approximate leak rate is 1,5 ml/min at max. OPD

TYPE: D232÷D234



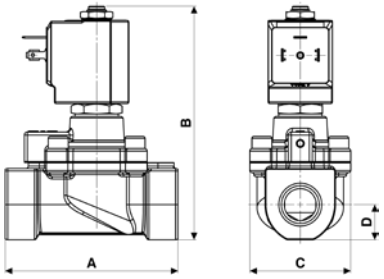
Normally Closed

TYPE: RD232÷RD234



Normally Open

DIMENSIONS & WEIGHTS		D232	D233	D234	RD232	RD233	RD234
G connection	[ISO 228]	3/8"	1/2"	3/4"	3/8"	1/2"	3/4"
A	[mm]	86	86	86	86	86	86
B	[mm]	116.5	116.5	116.5	114	114	114
C	[mm]	50.2	50.2	50.2	50.2	50.2	50.2
D	[mm]	17.5	17.5	17.5	17.5	17.5	17.5
weight	[kg]	1	0.9	0.9	1	0.9	0.9



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D232DTW	16.5	42	1	50	50
D233DTW	16.5	46	1	50	50
D234DTW	16.5	48	1	50	50

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

D232/233/234 - PTFE seal, NC -

Operator seal material: Ruby
Diaphragm material: FKM
Main seal material: PTFE
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

Seamless tube as standard

HIGH PRESSURE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RD232DTW	16.5	42	1	50	50
RD233DTW	16.5	46	1	50	50
RD234DTW	16.5	48	1	50	50

COILS class 'H' only	
code	[Volts/Hz]
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

RD232/233/234 - PTFE seal, NO -

Operator seal material: Ruby
Diaphragm material: FKM
Main seal material: PTFE
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

FKM seal version (e.g. code RD232DVW). Temperature max. 130°C - OPD max.: 25 barg AC/DC. Minimum batch may be required

HIGH PRESSURE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D232DVW	16.5	42	1	25	25
D233DVW	16.5	46	1	25	25
D234DVW	16.5	48	1	25	25

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

D232/233/234 - FKM seal, NC -

Operator seal material: foodgrade FKM
Diaphragm material: FKM
Main seal material: FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

COMPRESSED AIR

2/2 WAY PILOT OPERATED SOLENOID VALVE, G 3/4" - G 1"

COMMON FEATURES

Media[1]: steam
Media temperature: +80°C [2] ÷ +180°C
Ambient temperature: -10°C ÷ +70°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator seal material: PTFE
Main seal and diaphragm material: PTFE
Protection class: IP 65 (with connector and gasket)

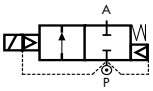
OPTIONS

NPT connection on request, minimum batch may be required (e.g. code D622DTYN)

NOTES

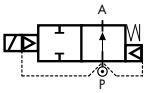
[1] Water & high content of condensate can damage the diaphragm.
[2] For a correct functioning, the minimum working temperature of the solenoid valve cannot be below 80°C.

TYPE: D606/622



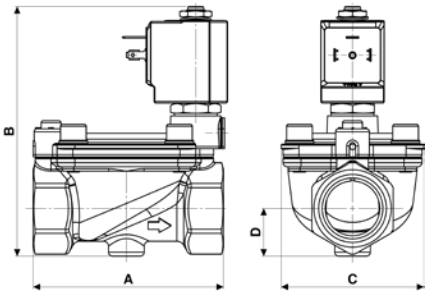
Normally Closed

TYPE: RD606/622



Normally Open

DIMENSIONS & WEIGHTS		D606 RD606	D622 RD622
G connection	[ISO 228]	3/4"	1"
A	[mm]	96	96
B	[mm]	126	126
C	[mm]	72	72
D	[mm]	24	24
weight	[kg]	1.3	1.3



Flow direction overseat 1 → 2

STEAM

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D606DTY	24	120	1	9	9
D622DTY	24	120	1	9	9

COILS class 'H' only	
code	[Volts/Hz]
7151	12v DC
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

D606/D622 - PTFE seal, NC -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

NOTES

Seamless tube as standard

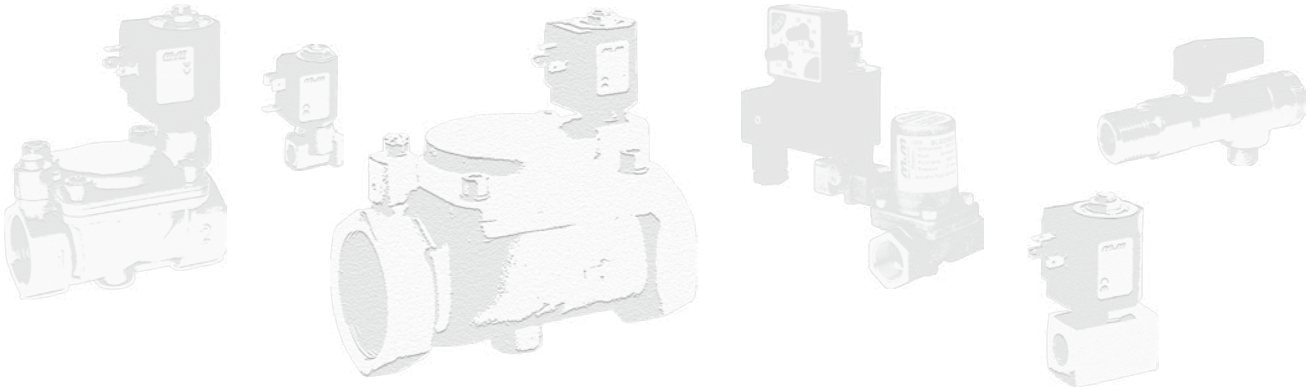
STEAM

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
RD606DTY	24	120	1	9	9
RD622DTY	24	120	1	9	9

COILS class 'H' only	
code	[Volts/Hz]
7151	12v DC
7251	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

RD606/RD622 - PTFE seal, NO -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W



2/2 WAY PILOT OPERATED SOLENOID VALVE, G 1/4" ÷ G 1"

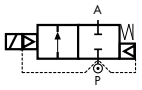
COMMON FEATURES

Media: hot water and steam
Media temperature: +10°C ÷ +150°C
Ambient temperature: -10°C ÷ +70°C
Body material: brass (CW617N EN 12165)
Orifice material: stainless steel (1.4305 EN 10088/AISI 303)
Operator material: stainless steel
Operator seal material: EPM PX 70/80
Diaphragm material: PTFE
Main seal material: EPM PX 70/80
Protection class: IP 65 (with connector and gasket)

NOTES

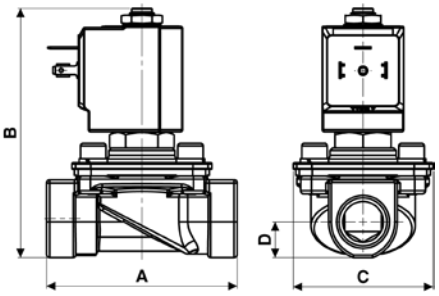
Seamless tube as standard

TYPE: D887÷D892



Normally Closed

DIMENSIONS & WEIGHTS		D887	D888	D889	D890	D892
G connection	[ISO 228]	1/4"	3/8"	1/2"	3/4"	1"
A	[mm]	75	75	75	85	82
B	[mm]	108	108	108	108	108
C	[mm]	55	55	55	55	55
D	[mm]	14	14	14	21.5	21.5
weight	[kg]	0.55	0.5	0.5	0.8	0.8



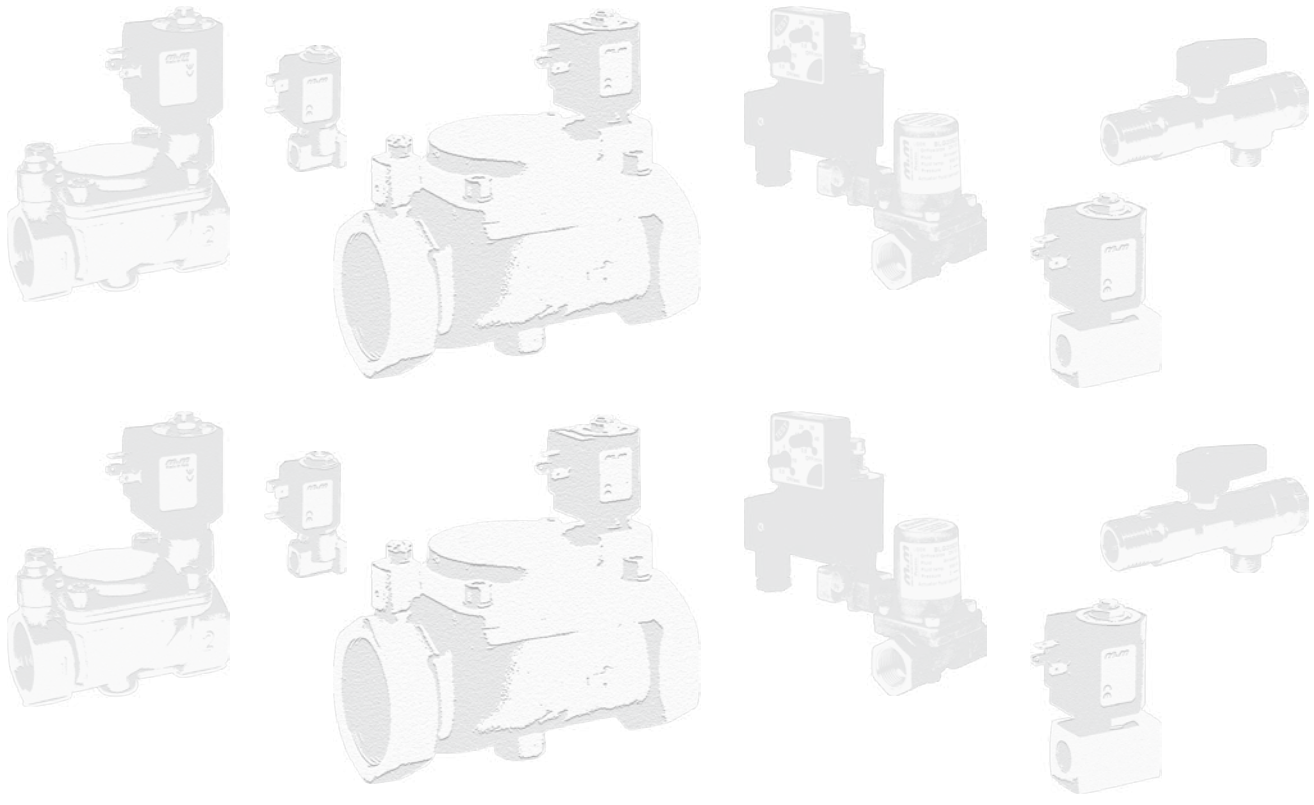
Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D887DPV	11.5	35	0.3	4.5	4.5
D888DPV	11.5	50	0.3	4.5	4.5
D889DPV	11.5	55	0.3	4.5	4.5
D890DPV	11.5	70	0.3	4.5	4.5
D892DPV	11.5	75	0.3	4.5	4.5

COILS class 'H' only	
code	[Volts/Hz]
72Z1	24v DC
7201	24v 50/60Hz
7401	110v 50Hz - 120v 60Hz
7601	200v 50Hz - 220v 60Hz
7701	230v 50Hz - 240v 60Hz

D887÷D892 - PTFE seal, NC -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 22W



2/2 WAY LATCHING SOLENOID VALVE (PILOT OPERATED), G 1/2"

COMMON FEATURES

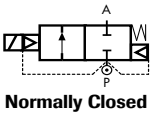
Media: water, oil, air
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel tube, brass plunger
Protection class: IP 65 (with connector and gasket)

NOTES

The valve has been tested with supply set of 8 batteries type AA obtaining the following performances:

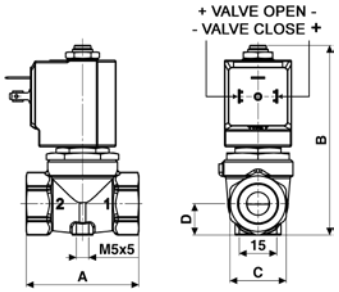
- 28.000 cycles (refer to batteries life time, after that batteries need to be replaced)
- pulse time 20 ÷ 50 ms

TYPE: LD266-



Normally Closed

DIMENSIONS & WEIGHTS		LD266
G connection	[ISO 228]	1/2"
A	[mm]	54
B	[mm]	89
C	[mm]	HEX 27
D	[mm]	15
weight	[kg]	0.4



Flow direction overseat 1 → 2

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COIL class 'H'	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
LD266DBU	10.5	25	0.1	–	5	70T1	6v DC

LD266DBU - NBR seal -

Media temperature: -10°C ÷+90°C
Operator seal material: foodgrade FKM
Diaphragm material: NBR
Coil power: DC 6w

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COIL class 'H'	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
LD266DVU	10.5	25	0.1	–	5	70T1	6v DC

LD266DVU - FKM seal -

Media temperature: -10°C ÷+130°C
Operator seal material: foodgrade FKM
Diaphragm material: FKM
Coil power: DC 6w

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COIL class 'H'	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
LD266DEU	10.5	25	0.1	–	5	70T1	6v DC

LD266DVU - EPDM seal -

Media temperature: -10°C ÷+120°C
Operator seal material: EPDM
Diaphragm material: EPDM
Coil power: DC 6w

A Spirax-Sarco Engineering plc company

2/2 WAY LATCHING SOLENOID VALVE (PILOT OPERATED), G 1/4" ÷ G 1/2"

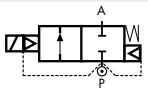
COMMON FEATURES

Media: water, oil, air
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel tube, brass plunger
Protection class: IP 65 (with connector and gasket)

NOTES

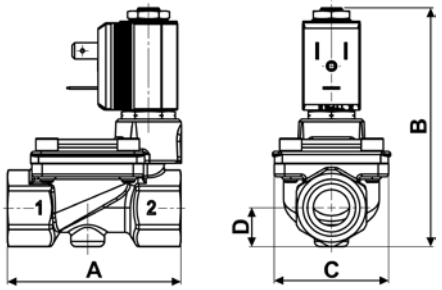
Special operator with reduced stroke for low power coils

TYPE: LC203÷LC205



Normally Closed

DIMENSIONS & WEIGHTS		LC203	LC204	LC205
G connection	[ISO 228]	1/4"	3/8"	1/2"
A	[mm]	67	67	67
B	[mm]	90	90	90
C	[mm]	45.6	45.6	45.6
D	[mm]	15	15	15
weight	[kg]	0.4	0.4	0.4



Flow direction overseat 1 → 2

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS low power only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
LC203DBZ	13	26	0.3	–	5	20Q0	6v DC
LC204DBZ	13	55	0.3	–	5	21Q0	12v DC
LC205DBZ	13	63	0.3	–	5	22Q0	24v DC

LC203 ÷ LC205 - NBR seal -

Media temperature: -10°C ÷+90°C
Operator seal and diaphragm material: NBR
Coil power: DC 3w
Absorbition (20°C): 500mA for **20Q0**
250mA for **21Q0**
125mA for **22Q0**

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS low power only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
LC203DVZ	13	26	0.3	–	5	20Q0	6v DC
LC204DVZ	13	55	0.3	–	5	21Q0	12v DC
LC205DVZ	13	63	0.3	–	5	22Q0	24v DC

LC203 ÷ LC205 - FKM seal -

Media temperature: -10°C ÷+130°C
Operator seal and diaphragm material: FKM
Coil power: DC 3w
Absorbition (20°C): 500mA for **20Q0**
250mA for **21Q0**
125mA for **22Q0**

GENERAL PURPOSE

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	COILS low power only	
code	[mm]	[l/min]	[barg]	[barg]	[barg]	code	[Volts/Hz]
LC203DEZ	13	26	0.3	–	5	20Q0	6v DC
LC204DEZ	13	55	0.3	–	5	21Q0	12v DC
LC205DEZ	13	63	0.3	–	5	22Q0	24v DC

LC203 ÷ LC205 - EPDM seal -

Media temperature: -10°C ÷+120°C
Operator seal and diaphragm material: EPDM
Coil power: DC 3w
Absorbition (20°C): 500mA for **20Q0**
250mA for **21Q0**
125mA for **22Q0**

GENERAL PURPOSE

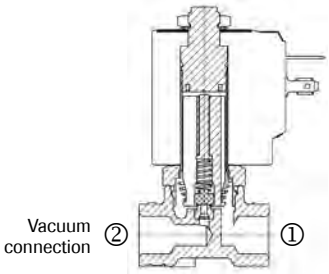
SOLENOID VALVES FOR VACUUM

The following solenoid valves are also available with a configuration suitable for vacuum (the general technical features are listed on the individual single pages of solenoid valves):

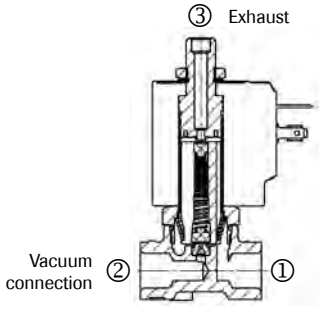
D262/D263 ⇨ see page 10
D237/238/239 ⇨ see page 13
C D237/238/239 ⇨ see page 13
D362/D363 ⇨ see page 21
D187 ÷ 293 ⇨ see page 25
D223 ÷ 225 ⇨ see page 28
D203 ÷ D222 ⇨ individual datasheet on request

CONNECTION SCHEME ACCORDING TO VALVE TYPES:

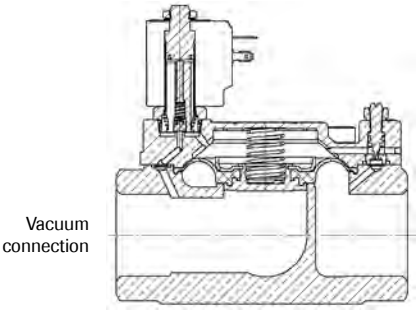
2/2 way - NC direct acting



3/2 way - NC direct acting



2/2 way - NC pilot operated or assisted lift



VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D189DBWL	15	50	0	-0.95	-0.95
D190DBWL	15	80	0	-0.95	-0.95
D203DBZL	13	26	-0.2	-0.95	-0.95
D205DBZL	13	63	-0.2	-0.95	-0.95
D205DEZL	13	63	-0.2	-0.95	-0.95
D225DBJL	50	540	-0.5	-0.95	-0.95
D263DBPL	6	8	-0.9	1	1
D362CVGL	2.5	3.4	0	-0.95	-0.95
D363CVGL	2.5	3.4	0	-0.95	-0.95
D363CVHL	3	4.5	0	-0.95	-0.95

COILS	
code	[Volts/Hz]
7250	24v DC
7200	24v 50/60Hz
7400	110v 50Hz - 120v 60Hz
7600	200v 50Hz - 220v 60Hz
7700	230v 50Hz - 240v 60Hz

Various part numbers

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

Class 'H' insulation coils (e.g. code 7701)

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D237DBU1	10.5	21	0	-0.95	–
D238DBU1	10.5	24	0	-0.95	–
D239DBU1	10.5	25	0	-0.95	–

COILS high power - class 'H' only	
code	[Volts/Hz]
72K1	24v 50/60Hz
74K1	110v 50Hz - 120v 60Hz
77K1	230v 50Hz - 240v 60Hz

D237 ÷ 239DBU1 - NBR seal, AC -

Seal material: NBR 60 shore
Coil power: AC 25VA (holding)
AC 50VA (inrush)

NOTES

Minimum batch may be required

VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
C D237DBU1	10.5	21	0	–	-0.95
C D238DBU1	10.5	24	0	–	-0.95
C D239DBU1	10.5	25	0	–	-0.95

COILS high power - class 'H' only	
code	[Volts/Hz]
72Z1	24v DC

C D237 ÷ 239DBU1 - NBR seal, DC -

Seal material: NBR 60 shore
Coil power: DC 22W

NOTES

Minimum batch may be required

SOLENOID VALVE FOR USE IN HAZARDOUS LOCATIONS (ATEX)

The following M&M valves can be fitted with explosion-proof operators, class EEX m II 2GD T4:

SERIES: N

D223 - D224 - D225 ⇨ see page 28
D262/D263 ⇨ see page 10
D362/D363 ⇨ see page 21
D298/D299 ⇨ see page 07
D204÷D222 (SS or brass) ⇨ see page 26
D326 ⇨ see M&M Piston Valves Catalogue

OPERATORS FEATURES

Operator material: stainless steel
Seal material: FKM

COILS FEATURES

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

NOTES

The ATEX operator performance is restricted to a maximum of 12 barg. E.g. code D262DVC 24v DC (OPD 24 bar maximum) with ATEX operator ⇨ N262DVC N253 (OPD 12 bar maximum)
Assisted lift, manual override and normally open version not available
Maximum orifice available up to Ø 3 mm

COILS	voltage	power	room temperature		media temperature		ED	fuse [1]
code	–	holding	min.	max.	min.	max.	–	
N253	24v DC	10,1 W	-20°C	+50°C	-20°C	+80°C	100%	800
N203	24v 50/60Hz	7,2 VA						800
N403	110v - 50Hz	9,1 VA						200
NK03	120v - 60Hz	8,6 VA						200
N703	230v - 50Hz	8,5 VA						100

ATEX

SAFETY WARNING

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

The Ex approval is only valid for complete solenoid valves supplied ex factory.
Repairs may be performed by the manufacturer only (a valve is a closed system according to Directive 94/9/EC).

Special versions available upon request. Please contact the M&M Sales Department for more detailed information.

2/2 WAY DIRECT ACTING "DRY ARMATURE" SOLENOID VALVE, G 3/8"

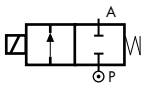
COMMON FEATURES

Media: water and beverages
Media temperature: -10°C ÷ +95°C
Ambient temperature: -10°C ÷ +50°C
Body material: brass (CW617N EN 12165)
Operator material: stainless steel
Seal material: silicone FDA compliant
Protection class: IP 65 (with connector and gasket)

NOTES

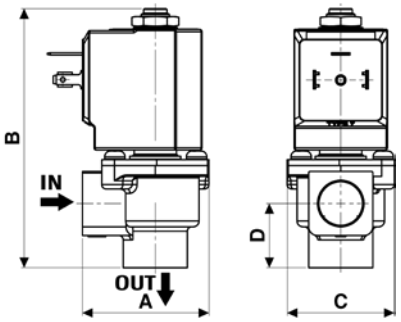
TOTAL SEPARATION BETWEEN INTERNAL PARTS AND MEDIUM

TYPE: 211

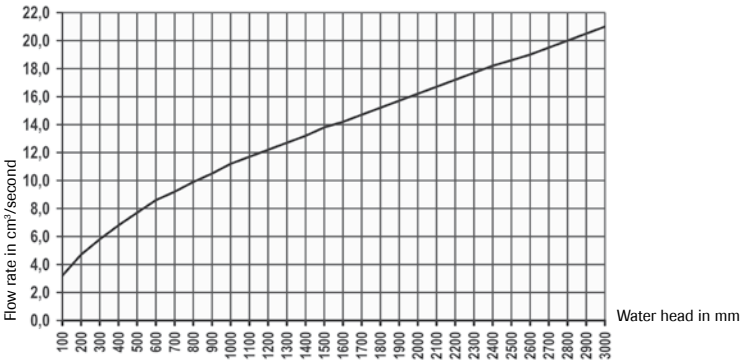


Normally Closed

DIMENSIONS & WEIGHTS		D211	C D211
G connection	[ISO 228]	3/8"	3/8"
A	[mm]	43.4	43.4
B	[mm]	88.8	88.8
C	[mm]	36	36
D	[mm]	22	22
weight	[kg]	0.34	0.34



FLOW RATE CHART



VALVE	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[l/min]	[barg]	[barg]	[barg]
D211DSU	11	see flow chart	0	0.3	–
C D211DSU	11	see flow chart	0	–	0.2

COILS	
code	[Volts/Hz]
7250	24V DC
7200	24V 50/60Hz
7400	110V 50Hz - 120V 60Hz
7600	200V 50Hz - 220V 60Hz
7700	230V 50Hz - 240V 60Hz

D211 - Silicone FDA seal, NC -

Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W

OPTIONS

Electroless nickel plating treatment (e.g. code D211DSUK)

DRY ARMATURE

2/2 WAY DIRECT ACTING "DRY ARMATURE" SOLENOID VALVE

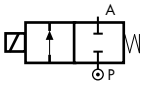
COMMON FEATURES

Media: water, food and beverages
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Operator material: stainless steel
Seal material: silicone FDA compliant
Length of the vent pipe: standard 85 mm
Protection class: IP 65 (with connector and gasket)
Flow regulation screw as standard

NOTES

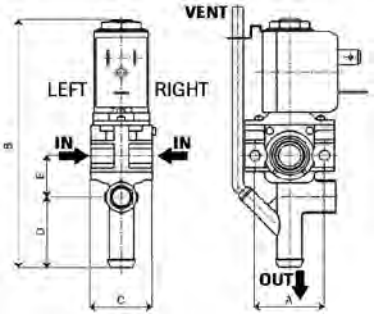
TOTAL SEPARATION BETWEEN INTERNAL PARTS AND MEDIUM

TYPE: 246 ❶

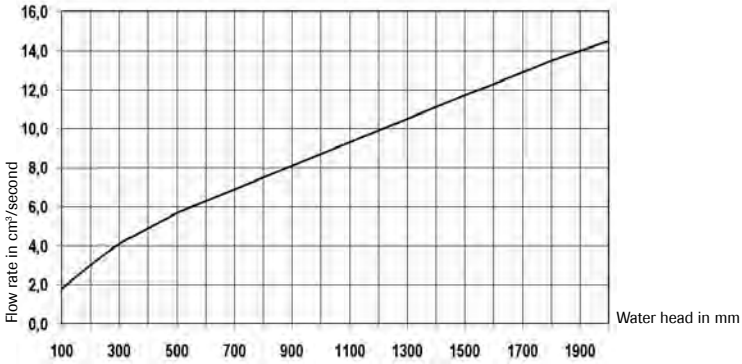


Normally Closed

DIMENSIONS & WEIGHTS		246DSR	246DSQ
A	[mm]	28	28
B	[mm]	101	101
C	[mm]	25	25
D	[mm]	29	29
E	[mm]	17	17
weight	[kg]	0.2	0.125



FLOW RATE CHART



❶ **Product subject to phase-out, please contact M&M Sales Department for availability**

VALVE	left hole	right hole	OPD min.	OPD max. AC	OPD max. DC
code	-	-	[barg]	[barg]	[barg]
246DSRDE	fast conn.	cap	0	0.2	0.1
246DSRED	cap	fast conn.	0	0.2	0.1
246DSREP	cap	hose tail	0	0.2	0.1
246DSRE0	cap	1/4" G	0	0.2	0.1
246DSR0E	1/4" G	cap	0	0.2	0.1
246DSR00	1/4" G	1/4" G	0	0.2	0.1
246DSRPE	hose tail	cap	0	0.2	0.1

COILS	
code	[Volts/Hz]
22V0	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

246DSR - brass body -

Body material: brass (CW617N EN 12165)
Nominal diameter: 8 mm
Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 10W

DRY ARMATURE

VALVE	left hole	right hole	OPD min.	OPD max. AC	OPD max. DC
code	-	-	[barg]	[barg]	[barg]
246DSQAA	open w/o threads	open w/o threads	0	0.2	0.1
246DSQG0	closed	1/4" G	0	0.2	0.1
246DSQ0G	1/4" G	closed	0	0.2	0.1
246DSQ00	1/4" G	1/4" G	0	0.2	0.1

COILS	
code	[Volts/Hz]
22V0	24v DC
2200	24v 50/60Hz
2400	110v 50Hz - 120v 60Hz
2600	200v 50Hz - 220v 60Hz
2700	230v 50Hz - 240v 60Hz

246DSQ - hostaform body -

Body material: natural hostaform (C13021)
Nominal diameter: 7.5 mm
Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 10W

DRY ARMATURE

A Spirax-Sarco Engineering plc company

2/2 WAY DIRECT ACTING "DRY ARMATURE" SOLENOID VALVE

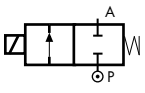
COMMON FEATURES

Media: water and beverages
Media temperature: -10°C ÷ +95°C
Ambient temperature: -10°C ÷ +50°C
Body material: Natural Polysulphone FDA compliant (PSU)
Nominal diameter: 9 mm
Operator material: stainless steel
Seal material: silicone FDA compliant
Protection class: IP 65 (with connector and gasket)
Flow regulation screw as standard

NOTES

TOTAL SEPARATION BETWEEN INTERNAL PARTS AND MEDIUM
Flat gasket included (see drawing)

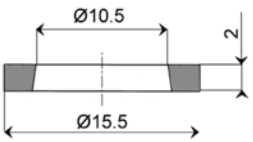
TYPE: WB251 ❶

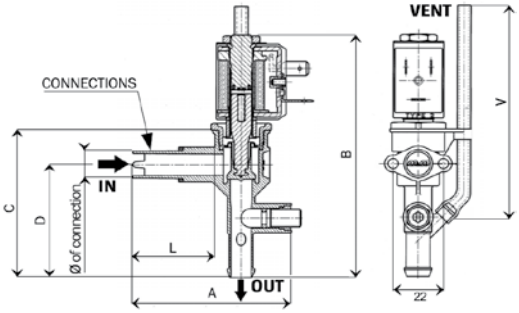


Normally Closed

DIMENSIONS & WEIGHTS		WB251DSS	WB251DSS1
A	[mm]	70	70
B	[mm]	108	108
C	[mm]	65.5	65.5
D	[mm]	50.2	50.2
V	[mm]	95	235
weight	[kg]	0.175	0.175

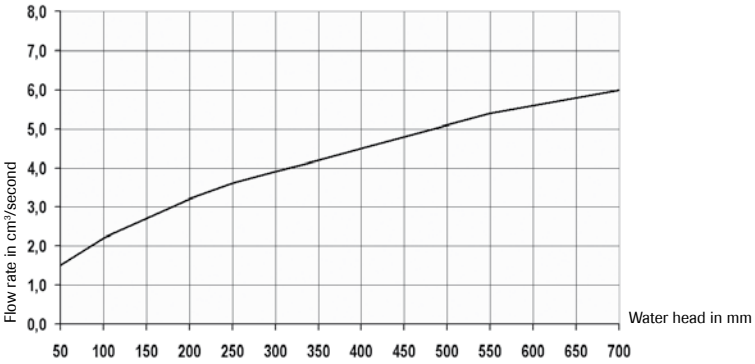
Gasket:





❶ **Product subject to phase-out, please contact M&M Sales Department for availability**

FLOW RATE CHART



VALVE	type of connection	OPD min.	OPD max. AC	OPD max. DC
code	[mm]	[barg]	[barg]	[barg]
WB251DSS	Ø 12 x L=35	0	0.07	0.05
WB251DSS1	Ø 12 x L=35	0	0.07	0.05

COIL	
code	[Volts/Hz]
22V0	24V DC
2200	24V 50/60Hz
2400	110V 50Hz - 120V 60Hz
2600	200V 50Hz - 220V 60Hz
2700	230V 50Hz - 240V 60Hz

WB251 - Silicone FDA seal, NC -

Coil power: AC 10VA (holding)
AC 16VA (inrush)
DC 10W

DRY ARMATURE

AUTOMATIC DRAIN VALVE SYSTEMS WITH SOLENOID VALVES

Preassembled systems consisting of solenoid valve, timer and connector for time adjusted condensate discharge of tanks with compressed air, separators, mains drainage, dryers and filters.

COMMON FEATURES

Media: water, oil, air and inert gases
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Seal material: FKM
Coil power: AC 18VA (holding)
AC 36VA (inrush)
DC 14W
Protection class: IP 65 (with connector and gasket)
Discharge time: 0,5 to 10 seconds
Interval time: 30 seconds to 45 minutes
Test switch: manual

OPTIONS

UL approved coils
Valve with NPT connection upon request, minimum batch may be required (e.g. code D249DVFN)
Available with analog timer (see page 41)

NOTES

For more detailed information about the various components (solenoid valve/timer/connector), please refer to individual datasheet

USERS BENEFITS:

- **adjustable to suit your system requirements**
- **indoor / outdoor installations**
- **reliable, long life**
- **cost effective**
- **visual indication of operation**
- **manual override - test button**

ADV	Timer	Connector	Valve	G connection	nominal Ø	flow rate Kvs	OPD min.	OPD max. AC	OPD max. DC	Voltage
WITH DIRECT ACTING SOLENOID VALVES										**SERIE 7000 COILS**
code	code	code	code	[ISO 228]	[mm]	[l/min]	[barg]	[barg]	[barg]	[Volts/Hz]
888 120 00-	AT2000C02I	600011-	D249DVF	1/4"	2.2	2.4	0	18	–	110v 50Hz - 120v 60Hz
888 121 00-							0	18	–	230v 50Hz - 240v 60Hz
888 122 00-							0	–	16	24v DC
WITH PILOT OPERATED SOLENOID VALVES										**SERIE 7000 COILS**
888 123 00-	AT2000C02I	600011-	D264DVU	1/4"	10.5	21	0.1	16	–	110v 50Hz - 120v 60Hz
888 124 00-							0.1	16	–	230v 50Hz - 240v 60Hz
888 125 00-							0.1	–	7	24v DC
888 126 00-			D265DVU	3/8"	10.5	24	0.1	16	–	110v 50Hz - 120v 60Hz
888 127 00-							0.1	16	–	230v 50Hz - 240v 60Hz
888 128 00-							0.1	–	7	24v DC
888 129 00-			D266DVU	1/2"	10.5	25	0.1	16	–	110v 50Hz - 120v 60Hz
888 130 00-							0.1	16	–	230v 50Hz - 240v 60Hz
888 131 00-							0.1	–	7	24v DC

AUTOMATIC DRAIN VALVE SYSTEMS WITH PISTON ACTUATED VALVES

Compressed air systems must be engineered to allow condensate to collect at low points, where automatic drainage should be provided.
Condensate is a mixture of: water, oil and dirt, its viscosity increasing with low temperatures.
Normal operation of drain valves manually is time consuming and costly, and the required positions often get forgotten. The ADV overcomes all these problems allowing you to "tune" its operation, through the variable timers, to suit specific system conditions.

USERS BENEFITS:

- **little maintenance!**
- **suitable for use in severe conditions**
- **reliable, long life**
- **no pressure differential required to operate**

STRAINER FOR CONDENSATE DRAIN

Strainer consisting of a ball valve with filter to be used together with the automatic drain valve.
In order to clean and check the filter it is enough to close the valve to isolate it and then unscrew the plug.

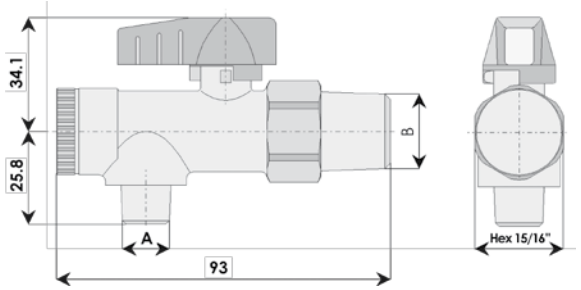
COMMON FEATURES

Media: water, oil, air and inert gases
Media temperature: -10°C ÷ +130°C
Ambient temperature: -10°C ÷ +50°C
Strainer material: brass (CW617N EN 12165)
Ball valve material: chromed brass (EN 5705-65)
Filter material: stainless steel (1.4305 EN 10088/AISI 304)
Seal material: PTFE
Strainer MAX. working pressure: 50 barg

BENEFITS

Cap for inspection and cleaning

DIMENSIONS & WEIGHTS		887057-	887059-
A	[thread]	1/2" BSP	1/4" BSP
B	[thread]	1/2" BSP	1/2" BSP
weight	[kg]	0.23	0.23



Minimum batch may be required

ANALOG ELECTRONIC TIMER

Ideal for: Automatic Drain Valves - Sampling Valves - Lubrication System - Air Dryers.

TYPE: AT2000

FEATURES

Supply voltage: **UL** 120 ÷ 240V AC/DC - 50/60Hz (Code **AT2000C02I**)
CE 24 ÷ 240V AC/DC - 50/60Hz
Absorption: 4 mA max.
Operation temperature: -10° C ÷ +50° C
Protection class: IP 65 (according to EN60529) with connector and gasket
Switch holding voltage: 400V max.
Switch capacity: 1A
Inrush current: 10A for 10 ms
Duty cycle: 100% ED
Switch life: $3 \cdot 10^8$
Repeat accuracy: ± 1%
Timing temperature coefficient: ± 0.005% - C°
Time ON: ■ from 0.5 to 10 seconds
Time OFF: ■ from 30 seconds to 45 minutes
Set/Reset/Test: membrane key
Circuit: UL 94 V0
Indicators: GREEN LED for 'power ON'
RED LED for 'valve open'
Manual override: Test
Colour: Black

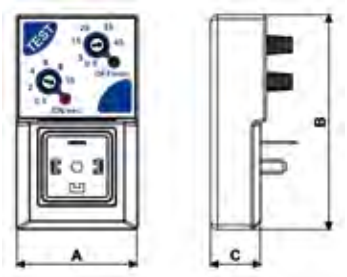
c UL us
UL file number
E200580

CE

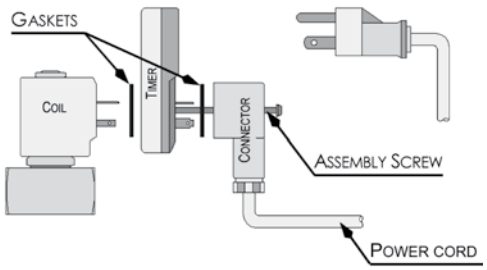
NOTES

In case of DC supply, polarity should be reversed: left fast-on positive (+), right fast-on negative (-). Please refer to product instructions for use
Timers are supplied in single boxes with two squared gaskets and M3x50 fixing screw (see assembling scheme)

DIMENSIONS & WEIGHTS		AT2000
A	[mm]	44
B	[mm]	77
C	[mm]	20
weight	[kg]	0.077



ASSEMBLING SCHEME



COILS FOR M&M INTERNATIONAL SOLENOID VALVES

Coils manufactured by M&M International are designed for continuous duty in conformity to the EN 60730 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.

COMMON FEATURES

Electrical connection: fast on connection 6,3x0,8
Protection class: IP 65 (according to EN60529) - NEMA 4 (UL 50) with connector and gasket
Operation: continuous (ED 100%)
Voltage tolerance: AC +10% ÷ -15%
DC +10% ÷ -5%

NOTES

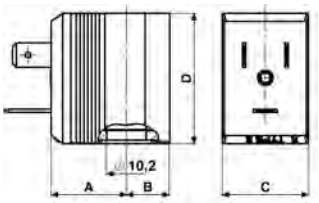
All coils manufactured by M&M International comply with the RoHS Directive (2011/65/EU)
Insulation class according to EN 60730-1 see the below table
All windings are realised with class 'H' wires (180°C)
Custom voltages and low power consumption available: please contact M&M Sales Department
Minimum batch quantity required for some voltage ratings

SERIES: 2000

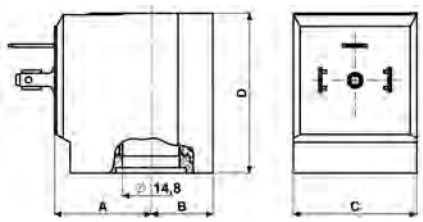
SERIES: 7000

DIMENSIONS & WEIGHTS		Series 2000	Series 7000
A	[mm]	19.5	25
B	[mm]	11.2	16
C	[mm]	22.3	32
D	[mm]	33.7	41.4
weight	[kg]	0.060	0.146

Series 2000:



Series 7000:



COILS	voltage	power		class	ambient temperature		media temperature ❶	
code	–	holding	inrush	–	min.	max.	min.	max.
2150	12v DC	7W	–	F 155°C	-10°C	+50°C	-10°C	+130°C
2250	24v DC	7W	–					
2750	230v DC	7W	–					
2100	12v 50/60Hz	10VA	16VA					
2200	24v 50/60Hz	10VA	16VA					
2300	48v 50/60Hz	10VA	16VA					
2400	110v 50Hz - 120v 60Hz	10VA	16VA					
2600	200v 50Hz - 220v 60Hz	10VA	16VA					
2700	230v 50Hz - 240v 60Hz	10VA	16VA					
215R	12v DC	6W	–	F 155°C	-10°C	+60°C	-10°C	+130°C
225R	24v DC	6W	–					
220R	24v 50Hz	9VA	14VA					
226R	24v 60Hz	9VA	14VA					
240R	110v 50Hz - 120v 60Hz	9VA	14VA					
270R	230v 50Hz - 240v 60Hz	9VA	14VA					
B150	12v DC	7W	–	F 155°C	-10°C	+50°C	-10°C	+130°C
B250	24v DC	7W	–					
B200	24v 50/60Hz	10VA	16VA					
B400	110v 50Hz - 120v 60Hz	10VA	16VA					
B700	230v 50Hz - 240v 60Hz	10VA	16VA					
21V1	12v DC	10W	–	H 180°C	-10°C	+70°C	-10°C	+130°C
22V1	24v DC	10W	–					

❶ Some valve configurations allow a max. fluid temperature up to 180°C, please check valve datasheets

SERIES 2000 - Standard

Connection: to DIN 46244

SERIES 200R - UL approved

UL approved coils recognized component, file number E193928

SERIES B000 - Impregnated

Impregnated coils for humid environments (e.g. code B400)

SERIES 2001 - Class 'H'

A Spirax-Sarco Engineering plc company

COILS	voltage	power		class	ambient temperature		media temperature [1]	
code	–	holding	inrush	–	min.	max.	min.	max.
7150	12v DC	14W	–	F 155°C	-10°C	+50°C	-10°C	+130°C
7250	24v DC	14W	–					
7750	230v DC	14W	–					
7100	12v 50/60Hz	18VA	36VA					
7200	24v 50/60Hz	18VA	36VA					
7300	48v 50/60Hz	18VA	36VA					
7400	110v 50Hz - 120v 60Hz	18VA	36VA					
7600	200v 50Hz - 220v 60Hz	18VA	36VA					
7700	230v 50Hz - 240v 60Hz	18VA	36VA					
725R	24v DC	10W	–	F 155°C	-10°C	+60°C	-10°C	+130°C
720R	24v 50Hz	15VA	30VA					
740R	110v 50Hz - 120v 60Hz	15VA	30VA					
770R	230v 50Hz - 240v 60Hz	15VA	30VA					
7251	24v DC	14W	–	H 180°C	-10°C	+70°C	-10°C	+130°C
7201	24v 50/60Hz	18VA	36VA					
7401	110v 50Hz - 120v 60Hz	18VA	36VA					
7701	230v 50Hz - 240v 60Hz	18VA	36VA					
71Z1	12v DC	22W	–	H 180°C	-10°C	+70°C	-10°C	+130°C
72Z1	24v DC	22W	–					
72K1	24v 50/60Hz	25VA	50VA					
74K1	110v 50Hz - 120v 60Hz	25VA	50VA					
77K1	230v 50Hz - 240v 60Hz	25VA	50VA					

[1] Some valve configurations allow a max. fluid temperature up to 180°C, please check valve datasheets

SERIES 7000 - Standard

Connection: to DIN EN 175301-803 form A (ex DIN 43650-A)

OPTIONS

Impregnated coils for humid environments (e.g. code D400)

SERIES 700R - UL approved

UL approved coils recognized component, file number E193928

SERIES 7001 - Class 'H'

OPTIONS

Impregnated coils for humid environments (e.g. code D701)

SERIES 7000 - High power

OPTIONS

Impregnated coils for humid environments (e.g. code D7K1)

DIN CONNECTORS FOR M&M INTERNATIONAL 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. Compliance with UL 1977 and VDE Regulations.

TYPE: 600 001-

TYPE: 600 011-

COMMON FEATURES

Rated voltage (max.): 250V AC / 300V DC

Nominal current: 10 A (Rated) / 16A (max.)

Wire cross-section: 1.5 mm² (max.)

Cable entry: PG9 (6 ÷ 8 mm)

Protection class: IP 65 (only with gasket)

Insulation class: group C - VDE 0110

Housing colour: black

OPTIONS

Connectors with protection circuits

Connectors with LED

Connectors with flying leads

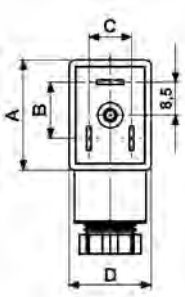
Other versions available upon request and depending on quantity: please contact M&M Sales Department.

NOTES

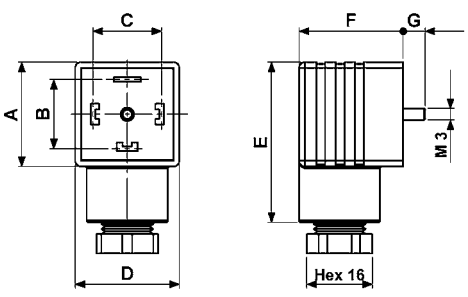
Connectors are supplied with thermoplastic rubber bordered gasket, fixing screw and preinstalled position with ground H 12 (the connector can be spinned when connected)

DIMENSIONS & WEIGHTS		600001-	600011-
A	[mm]	28.5	27.7
B	[mm]	14.5	18
C	[mm]	11	18
D	[mm]	21.5	27.7
E	[mm]	41.2	41
F	[mm]	28.8	26.8
G	[mm]	5.5	5.5
weight	[kg]	0.019	0.020

TYPE: 600 001-



TYPE: 600 011-



CUSTOMIZED PRODUCTS

M&M is constantly evolving and developing new products, enabling us to remain competitive in an ever changing market and keeping at the forefront of technological advances. For many years M&M has operated in the most diverse industrial sectors and therefore acquired vast experience with a multitude of specialist applications.
Our experience enables us to understand, design and manufacture to our customers' specific requirements.
M&M can develop new customised solenoid valve solutions according to the customers' technical requirements and needs, concentrating on increasing functionality, optimising space and reducing costs of existing systems.

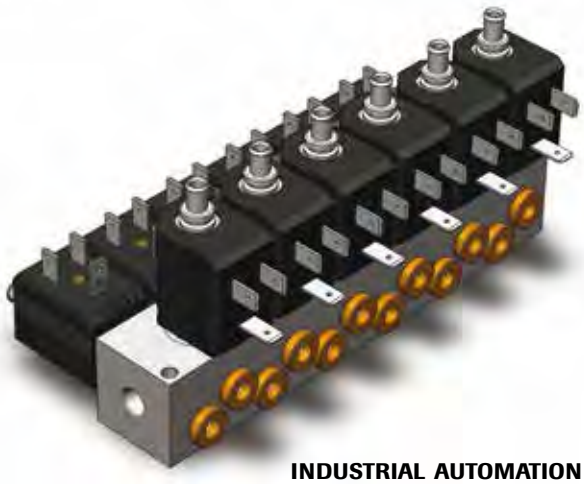
Please find below some examples:

CAR AIR CONDITIONING REFILLER

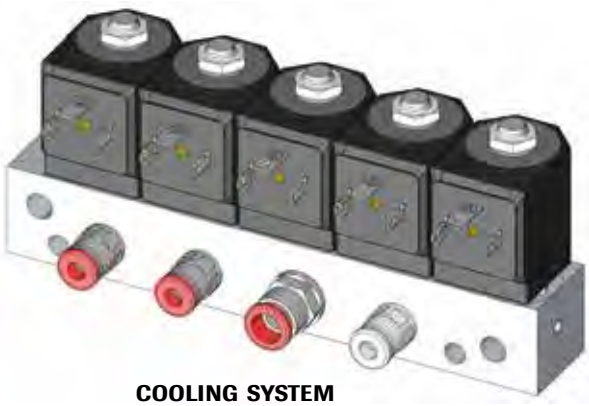
COMPRESSED AIR TREATMENT

STERILIZERS

PACKAGING WITH
VACUUM SYSTEMS FOR INDUSTRY



INDUSTRIAL AUTOMATION



COOLING SYSTEM

FIREFIGHTING SYSTEMS

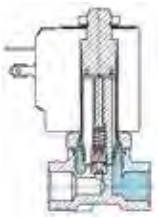
VALVE SELECTION

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

- ✓ **Media without dirt particles**
- ✓ **Moderate flow volumes**
- ✓ **Average differential pressures**
- ✓ **High speed in operation**
- ✓ **Media with a viscosity not higher than 21 cST (3°E)**

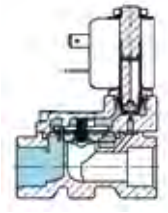
VALVE TYPES

✓ **Direct acting solenoid valves 2/2 and 3/2 way NC or NO**



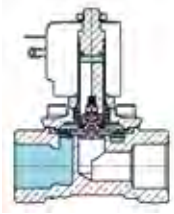
When energized the coil electrically generates a magnetic force attracting the armature towards the fixed core. Inside the armature is a seal that acts upon the main orifice, either when the coil is de-energised (normally closed) or when the coil is energised (normally open). By revealing the orifice allows the fluid to pass. 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 datasheets. 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 on which 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 datasheet (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.
The seal closing speed is operated by the adjusting screw: by screwing it clockwise (in the "+" direction) when using liquid, the valve will close slower reducing any waterhammer effect that may occur in the solenoid valve and the upstream pipes.

In the case of larger valves (1 1/4", 1 1/2" and 2"), please adjust the anti-waterhammer screw to ensure that that valve closes as slowly as possible in order to avoid causing any damage that may affect the functioning of the equipment and valve due to the waterhammer effect.

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.

✓ **Performances (OPD)**

Pressure values shown in this catalogue are the max values expressed in relative bar with no pressure at outlet.
For 3/2 way solenoid valves the pressure range can vary when used in other functions or systems.
The maximum pressure (PN) that the valve can bear is generally equal to 1.5 times the maximum value of the operating pressure differential (OPD).

✓ **Pressure (units of measurement)**

The SI unit of pressure is the pascal (Pa), defined as 1 newton of force per square metre (1 N/m^2).
As Pa is such a small unit, the kPa (1 kilonewton/m^2) or MPa (1 Meganewton/ m^2) tend to be more appropriate to fluid engineering.
However, the most popular metric unit used to measure the pressure in fluid engineering field is the bar, which is equal to 10^5 N/ m^2, and approximates to 1 atmosphere. This unit is used throughout this publication.
Other units often used include lb/in^2 (PSI), kg/cm^2, atm in H_2O (atmosphere) and mm Hg. Conversion factors are readily available from many sources.

Absolute pressure (bar a)

This is the pressure measured from the datum of a perfect vacuum: i.e. a perfect vacuum has a pressure of 0 bar a.

Gauge pressure (bar g)

This is the pressure measured from the datum of the atmospheric pressure. Although in reality the atmospheric pressure will depend upon the climate and the height above sea level, a generally accepted value of 1.013 bar a (1 atm) is often used.
This is the average pressure exerted by the air of the earth's atmosphere at sea level.

Gauge pressure = Absolute pressure - Atmospheric pressure

Pressure above atmospheric will always yield a positive gauge pressure. Conversely a vacuum or negative pressure is the pressure below that of the atmosphere. A pressure of -1 bar g corresponds closely to a perfect vacuum.

✓ **Differential pressure**

This is simply the difference between two pressures. When specifying a differential pressure, it is not necessary to use the suffixes 'g' or 'a' to denote either gauge pressure or absolute pressure respectively, as the pressure datum point becomes irrelevant. Therefore the difference between two pressures will have the same value whether these pressures are measured in gauge pressure or absolute pressure, as long as the two pressures are measured from the same datum.

✓ **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%.

✓ **Viscosity**

Viscosity of a fluid (liquid or gas) is its resistance to flow freely in a duct.
This phenomenon is also called internal friction and depends on existing cohesion forces among the fluid molecules.
The viscosity of liquids decreases as the temperature rises; the viscosity of gases grows if the volume does not change.
According to the International System of Units (SI), the physical quantities are: force **F** ⇨ in newton **N**, distance **h** ⇨ in meters **m**, area **A** ⇨ in square meters **m²**, speed **u** ⇨ in meters per second **m/s**, the unit of measurement of the **dynamic viscosity** ris Pascal per second (Pa•s) or Newton multiplied by second per square meter ($N \cdot s/m^2$).
Dividing the dynamic viscosity of the liquid by its density, you can obtain the **kinematic viscosity**. Its unit of measurement is expressed in square meter per second (m^2/s).
Since the given numerical values are too small, the most common used unit is 10.000 times smaller: the stokes (stox) **St**,

$$1\ St = 1 \cdot 10^{-4}\ m^2/s \text{ or } 10.000\ St = 1\ m^2/s$$

as well as the additional unit centistokes **cSt**

$$1\ cSt = 1 \cdot 10^{-2}\ St$$

✓ **General Information on frequently used 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 (not for steam).
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.
KALREZ® Spectrum ™ 6375 is a compound specifically designed for the chemical process industry. This compound has excellent broad chemical resistance, good mechanical properties, and outstanding hot-air aging properties. Kalrez® 6375 is well suited for use in mixed process streams because of its excellent resistance to acids, bases and amines. It is also recommended for use in hot water, steam pure ethylene oxide and propylene oxide.

✓ **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. **Remark: The same valve fitted with coils of different power may have different pressure ratings then standard combinations indicated in this catalogue (e.g. UL coils or high power coils).**

✓ **Media and Ambient Temperatures**

Temperature limits for the media in the datasheets 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 Department.

✓ **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 proper valve function please observe following instructions:

✓ **Water hammer or fluid hammer**

Water hammer (or, more generally, fluid hammer) is a pressure surge or wave resulting when a fluid (usually a liquid but sometimes also a gas) in motion is forced to stop or change direction suddenly (momentum change).

Water hammer commonly occurs when a valve is closed suddenly at an end of a pipeline system, and a pressure wave propagates in the pipe. It may also be known as hydraulic shock.
When using liquid fluids water-hammer can occur at pressure of 6 relative bar or higher.
This pressure wave can cause major problems, from noise and vibration to pipe collapse. It is possible to reduce the effects of the water hammer pulses with accumulators and other features.
Mitigating measures:

- **Air vessels** typically have an air cushion above the fluid level, which may be regulated or separated by a bladder. Sizes of air vessels may be up to hundreds of cubic meters on large pipelines.
  They come in many shapes, sizes and configurations. Such vessels often are called accumulators or expansion tanks.
- **Water Hammer Arrestors** are hydropneumatic devices similar to shock absorbers that can be installed between the water pipe and the machine to absorb the shock and stop the banging.

✓ **Safety**

This product is not a safety device and must not be used as sole device to prevent the over-pressure of some parts of the plant or the containment of dangerous fluids.
Always connect the coil's earth terminal to ground to ensure the safety of the user and installation. The coil provides the basic insulation only. Install the product in a protected place to prevent electric shocks.
The coil should not be energized if it is not fitted onto a valve or without a plunger inside the valve, as it would overheat and get damaged. Do not touch the energized coil: risk of high temperature.
Do not use the tubes for conveying fluid to ground electrical devices.
Before disconnecting or disassembling the valve, make sure that there is no pressure inside the tubing or the valve itself.
Accidental shocks due to fall or collision may damage the operator and/or the integrity of the coil encapsulation thus causing malfunctions such as loss of insulation, seizure of the moving parts and overheating.

✓ **Installation**

Check for the operating conditions on product label and on the technical documents.
Check for compatibility between medium and valve materials. In case of doubt, please contact the manufacturer.
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.
Whilst tightening or unscrewing the valve must be held or revolved only and exclusively by the hexagon or the frame set (in order to avoid damage to its components such as coil, armature tube, etc.).
The recommended **tightening torque of the coil nut is 0,5 Nm maximum**, a higher torque may cause damage to the valve armature tube.
The recommended **tightening torque of the connector screw is 0,5 Nm maximum**, a higher torque may cause an excessive yield stress with consequent damages to the coil rivet and/or plastic encapsulation.

✓ **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: care should be taken to prevent foreign bodies – dirt or material chips – from entering the valve during the assembly phase.
Use suitable seal material on the valve threads. Where liquid sealants are used, it is important to prevent them from entering the valve and block the movement.

✓ **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.**

CE MARKING

The CE mark indicates that the product satisfies all the regulations governing safety laid down by the European Community. Products displaying this mark can be freely distributed within the markets of the European Community.

✓ **EC Directives**

EC directives for product safety were issued to unify regulations and working practices in force in the countries of the community prior to the constitution of the European Union. The following three directives concern electrical appliances and machines in general:

Machinery Directive
EMC Directive
Low Voltage Directive (2006/95/EC)

The directive 97/23/EC concerns safety of pressure bearing equipment.
The directive 2011/65/EU (RoHS) limits the use of dangerous substances in electrical and electronic equipment.

✓ **M&M International products conforming to the EC directives**

Products subject to the Low Voltage Directive are given a certification by the European Community.
M&M International issues declarations of conformity such as in the attached form "Declaration of conformity to EC".

We believe that our products are components and as such do not form a part of the range of products subject to the EMC directive. However, conformity of M&M International products to the EMC directive could change depending on the function of the product's use, of the configuration (for example the use of connectors with passive electronic components, LED etc.), or the conditions of the electrical connection. For this reason it is recommended that you check the compliance of the final product with the EMC Directive.

DECLARATION OF CONFORMITY TO CE

M&M international
A Spirax-Sarco Engineering plc company

DECLARATION OF CONFORMITY CE

We, M&M International S.r.l. registered office via A. Appiani 12 – 20121 Milano - Italy, declare under our sole responsibility that the products:

2/2 WAY AND 3/2 WAY DIRECT ACTING AND PILOT OPERATED SOLENOID VALVES FOR GENERAL PURPOSES

equipped with encapsulated coils identified by M&M series "2", "7", "8", "9", "B" and "D"

to which this declaration relates are in conformity with the following harmonized standards

EN 60730-1

EN 60529

The above-referenced products comply with the essential requirements of the Directive:

2006/95/EC (ex 73/23/EC) **and amendment 93/68/EC**

The above-referenced products are developed and constructed in compliance with the requirements of the Pressure Equipment Directive

97/23/EC, Art. 3.3 Pressure Equipment Directive

Orio al Serio, Italy, April 2012

The General Manager
Maurizio Farno

ATTENTION!

The attention of the purchaser, installer or user is drawn to special measures and limitations to use that must be observed when the product is used, installed or taken into service. Details of these special measures and limitations to use are available on request and are also contained in the product label and in the Installation, Maintenance and User Instructions provided together with the product.

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Società soggetta all'attività di direzione e coordinamento di Spirax-Sarco Engineering plc

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TECHNICAL ENQUIRY FORM

For additional technical information please fill in this page and send it to M&M Sales Department by fax at +39 035 531763 or by e-mail at mm@mminternational.net.

✓ **Company** ----------

✓ **Address** ----------

✓ **Name and position** ----------

✓ **Telephone number** ----------

✓ **Fax number** ----------

✓ **E-mail address** ----------

✓ **Actuator** ❑ Solenoid ❑ Pneumatic

✓ **Operation** ❑ Direct acting ❑ Pilot operated ❑ Assisted lift

✓ **Type** ❑ 2/2 ❑ 3/2

✓ **Connections** ----------

✓ **Function** ❑ NO ❑ NC ----------

✓ **Media temperature** ----------

✓ **Controlled media** ----------

✓ **Media pressure**
nominal ---------- min.---------- max. ----------

✓ **Pilot media/Pilot media pressure**
(only for pneumatic valves) ----------

✓ **Ambient temperature** ----------

✓ **Flow** ----------

✓ **Application** ----------

✓ **Electrical supply** ❑ AC ❑ DC
Volts ---------- Frequency ----------

Max. power consumption ----------

✓ **Sketches or Drawings**

✓ **Valve presently in use** (brand / type) ----------

✓ **Annual quantity** ----------

✓ **Date** ----------

✓ **Signature** ----------

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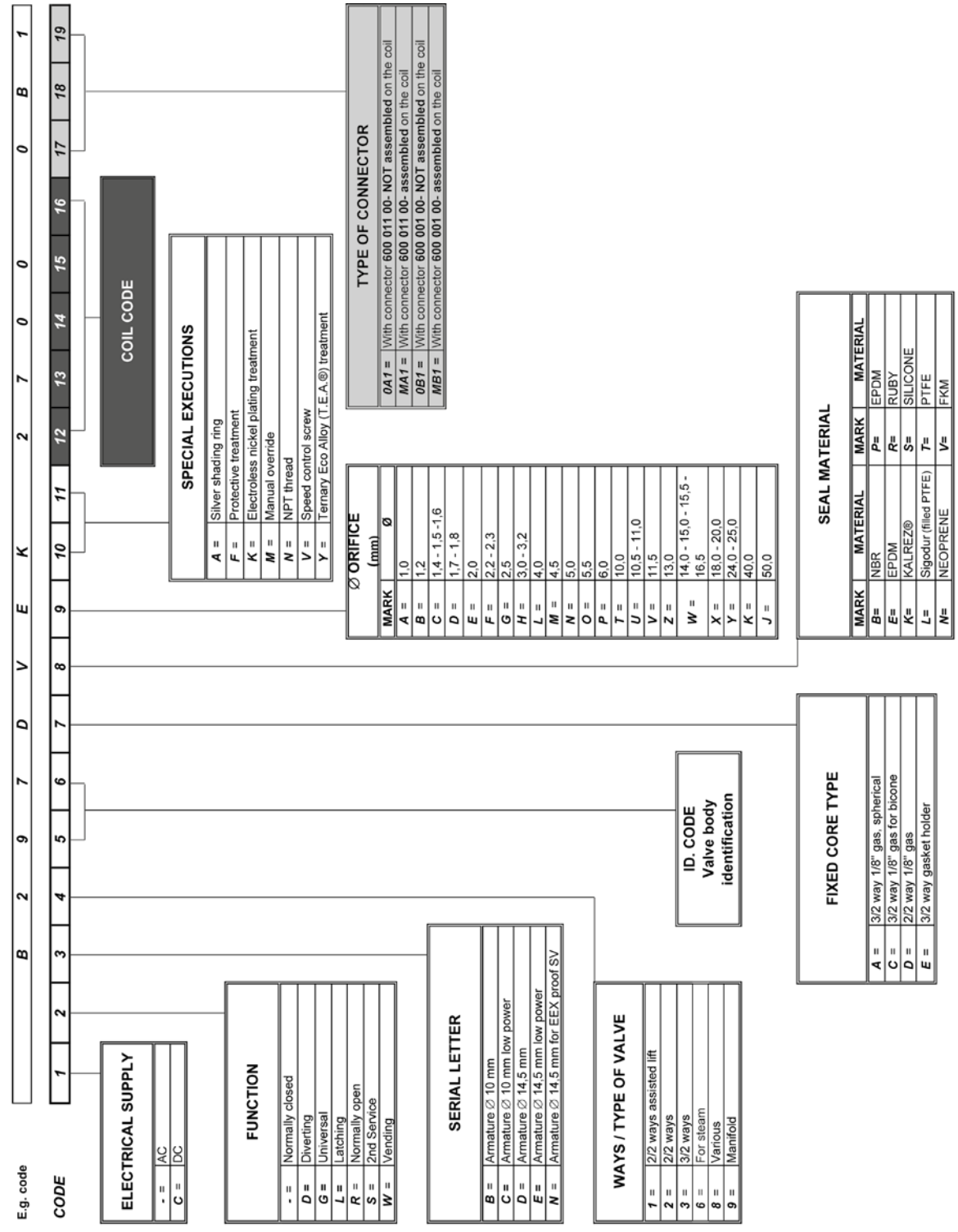
CODING CHART



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