

Pneumatic and explosion protection



The directive 2014/34/EU (ATEX)

ATEX derives its name from ATMosphere EXposable and stands for the Directive 2014/34/EU of the European Parliament. The Directive concerns electrical and non-electrical equipment and protection systems for use in potential explosive atmospheres.

Since 1st of July 2003, devices and protection systems for use in potentially explosive areas must satisfy the new Directive 94/9/EC. This directive has been replaced by 2014/34/EU since 20th of April 2016.

Compared with the previous directives, it must be noted that the specification refers not only to electrical but also to mechanical equipment.

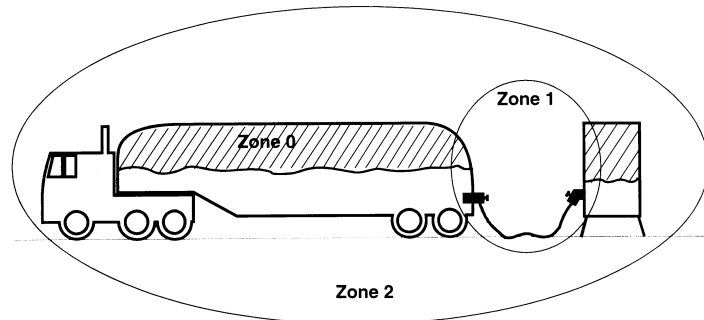
ATEX classifies explosive atmospheres and associates equipment

explosion protection document from plant manufacture	AIRTEC
Plant evaluation acc. to ATEX directive 99/92/EC  <ul style="list-style-type: none"> - Zone classification - Temperature class - Explosion group - Ambient temperature 	Equipment evaluation according (acc.) to ATEX directive 2014/34/EU  <ul style="list-style-type: none"> - Equipment group - Temperature class - Explosion group - Ambient temperature

General information

Category

The categories define which zones the devices may be used in. The classification states how frequently and in what concentration the ignitable mixture occurs. Furthermore, differentiation is made as to whether the hazard is due to gases, vapors and mists or due to dust.



Example of zone classification in gas Ex area.

Category 1

For devices, which guarantee a **very high level** of safety.
Intended for the case where an atmosphere at risk of explosion is to be expected frequently or continuously.
Devices in this category can also be used in Category 2 and 3.

Inflammable gases, vapors or mists

Zone 0 equivalent to Category 1G

Area in which an atmosphere at risk of explosion as a mixture of air and inflammable gases, vapors or mists is continuously or frequently present or present for long periods.

Inflammable dusts

Zone 20 equivalent to Category 1D

Area in which an atmosphere at risk of explosion in the form of a cloud of inflammable dust contained in the air is continuously or frequently present or present for long periods.

Category 2

For devices, which guarantee a **high level** of safety.
Intended for the case where an atmosphere at risk of explosion is to be expected.
Devices in this category can also be used in Category 3.

Inflammable gases, vapors or mists

Zone 1 equivalent to Category 2G

Area in which an atmosphere at risk of explosion as a mixture of air and inflammable gases, vapors or mists can form occasionally during normal operation.

Inflammable dusts

Zone 21 equivalent to Category 2D

Area in which an atmosphere at risk of explosion in the form of a cloud of inflammable dust contained in the air can form occasionally during normal operation.

Category 3

For devices, which guarantee a **normal level** of safety.
Intended for the case where an atmosphere at risk of explosion is to be expected rather infrequently and, if so, for only short periods.

Inflammable gases, vapors or mists

Zone 2 equivalent to Category 3G

Area in which an atmosphere at risk of explosion as a mixture of air and inflammable gases, vapors or mists does not normally occur at all or only for short periods during normal operation.

Inflammable dusts

Zone 22 equivalent to Category 3D

Area in which an atmosphere at risk of explosion in the form of a cloud of inflammable dust contained in the air does not normally occur at all or only for short periods during normal operation.

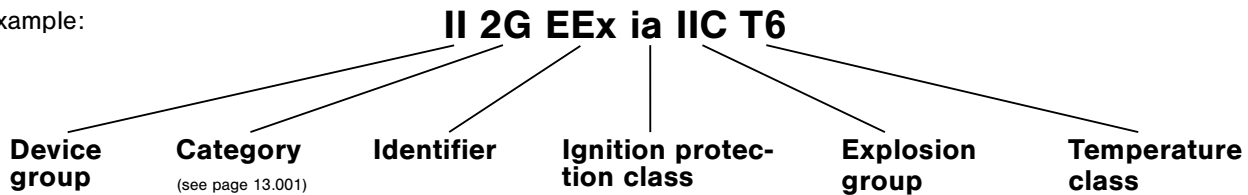
General information

According to 2014/34/EU, a device that is to be used in an environment at risk of explosion may only be brought into the market if it satisfies the standards specified in the norm.

Compared with the previous directives. It must be noted that the specification refers not only to electrical but also to mechanical equipment (e.g. cylinders).

Devices are divided into categories and groups to accurately define the conditions of use. This definition is marked on the device and may appear as follows:

Example:



Device group

There are 2 groups of devices.

Devices of Group I, Category M are for use in underground mines and their above ground equipment, which are at risk from firedamp and/or inflammable dusts. (This is not given further coverage in this document).

All other areas at risk of explosion are combined in Device Group II.

Identifier

EEx defines that this is an electrical device.

Ignition protection class

This defines which measures are used to ensure explosion protection.

The following ignition protection classes are used by AIRTEC:

m = Encapsulation, **ia** = Intrinsic safety, **c** = Safe by design

Other ignition protection classes are defined in EN 50014: 1997. The abbreviations are currently under review discussion. It should be noted that devices in ignition protection class ia may only be supplied from circuits that are certified to be intrinsically safe.

Explosion group

Device group II is sub-divided into Explosion Groups A, B or C.

This classification is dependent on the typical material properties of the gases and vapors that occur.

The hazard level of materials increases from Explosion Group IIA to IIC. The requirements for the devices increase accordingly. If a device is approved for IIC, it can be used for all other explosion groups. Alternatively, the chemical formula or the name of the material can be stated here.

Temperature class

It must be ensured that the ignition temperature of an inflammable material is not reached during operation. For this purpose, the maximum surface temperature of a device must be less than the minimum ignition temperature. For this reason, the maximum surface temperature of equipment for use with inflammable gases, vapors or mists is specified in temperature classes. For dusty environments, the maximum surface temperature is specified in °C.

Temperature class	Maximum permissible surface temperature of the equipment (°C)
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

The following AIRTEC products are available in explosion-proof design for Device Group II in accordance with 2014/34/EU.

The following list is intended to provide an overview. Attention must be paid to the Operating Instructions and Declaration of Conformity before commissioning. These can be provided on request.

Electrically operated valves

Series	Functions	Classification	Special features	Catalogue page
MS-18	310	II 2GD c T5 T 100° C	Valves are equipped with special actuators. Dimensional changes and technical data can be seen in the following pages. Compressed air in accordance with ISO 8573-1: 2010 Class 7:2:4 - and free of aggressive additives. T _{Medium} – 10° C ... + 50° C T _{amb} – 10° C ... + 50° C	4.040
M-04	310, 311, 320, 510, 511, 520, 530, 533, 534			4.080
ME-04	311, 511			
M-05	310, 311, 320, 510, 511, 520, 530, 533, 534			4.110
ME-05	311, 320, 511, 520			4.110
MO-05	311			4.110
M-07	310, 311, 320, 510, 511, 520, 530, 533, 534			4.151
MO-07	311			4.151
ME-07	311, 320, 511, 520, 530			4.151
MG-07	510, 520, 530, 533, 534			–
MN-06	310, 311, 320, 510, 511, 520, 530, 533			5.020
M-22	310, 311, 320, 510, 511, 520, 530, 533, 534			4.181
ME-22	311, 520			
MO-22	310, 311			
KN-05	310, 311, 510, 511, 520, 530, 533, 534			5.040
KNE-05	511			
KM-09	510, 511, 520, 530, 533, 534			4.120
KM-10	510, 511, 520, 530, 533, 534			4.161
KME-10	520, 530, 533			–
MI-01	510, 511, 520, 530, 533			5.061
MI-02	510, 520, 530, 533	5.081		
MI-03	510, 511, 520, 530, 533	5.101		

Pneumatically operated valves

Series	Functions	Classification	Special features	Example order number	Catalogue page
P-04	311, 511, 530, 533, 534	II 2GD c T5 T 100° C	Compressed air in accordance with ISO 8573-1: 2010 Class 7:2:4- and free of aggressive additives. T _{Medium} – 10° C ... + 50° C T _{amb} – 10° C ... + 50° C	P-04-311-ATEX	–
P-05	310, 311/2, 320, 510, 511, 520, 530, 533, 534			P-05-310-ATEX	3.060
P-07	310, 311/2, 320, 510, 511, 520, 530, 533, 534			P-07-310-ATEX	3.080
PG-07	510, 520, 530, 533, 534			–	–
P-12	310, 311, 320, 510, 511, 520, 534			P-12-310-ATEX	3.100
L-25	310, 311, 320, 510, 520			L-25-310-ATEX	3.020
L-28	310, 311, 320, 510, 511, 520			L-28-310-ATEX	3.040
PI-01	510, 511, 520			PI-01-510-ATEX	–
PI-02	510, 520, 530, 533, 534			PI-02-510-ATEX	–
PI-03	510, 520, 530, 533, 534			PI-03-510-ATEX	–

Other series can be provided on request.

Manually operated valves

Series	Functions	Classification of the pneumatic valves	Special features	Example order number	Catalogue page
HF-12	310	II 2GD c T6 T 85° C	Compressed air in accordance with ISO 8573-1:2010 Class 7:2:4- and free of aggressive additives. T_{Medium} – 10° C ... + 50° C T_{amb} – 10° C ... + 60° C	HF-12-310-ATEX	2.101
HF-14	310, 510			HF-14-310-ATEX	2.101
HF-18	310, 533			HF-18-310-ATEX	2.101
HR-12	on request			HR-12-...-ATEX	2.102
HR-14	320, 530			HR-14-320-ATEX	2.102
HR-18	520			HR-18-520-ATEX	2.102
T-28	311			T-28-311-ATEX	2.123
T-30	310			T-30-310-ATEX	2.125

Quick exhaust valves

Series	Functions	Classification of the pneumatic valves	Special features	Example order number	Catalogue page
SE-12	–	II 2GD c T6 T 85° C	Compressed air in accordance with ISO 8573-1:2010 Class 7:2:4- and free of aggressive additives. T_{Medium} – 10° C ... + 50° C T_{amb} – 10° C ... + 50° C	SE-12-ATEX	8.160
SE-14	–			SE-14-ATEX	8.160
SE-18	–			SE-18-ATEX	8.160
SE-98	–			SE-98-ATEX	8.160

Speed regulation plates for valves acc. to NAMUR

Series	Classification	Special features	Example order number	Catalogue page
KN-063-DRH KN-063-DRS KN-065-DRH KN-065-DRS	II 2GD c T5 T 100° C – 10° C ≤ T_{amb} ≤ 50° C	Compressed air in accordance with ISO 8573-1:2010 Class 7:2:4- and free of aggressive additives. T_{Medium} – 10° C ... + 50° C T_{amb} – 10° C ... + 50° C	KN-063-DRH-ATEX	5.042

The following accessories are approved for the valves:

Manifolds: R-281/n, R-283/n, R-181/n, R-183/n, R-141/n, R-143/n, RF-05, RF-07

Hollow bolt: H-281, H-283, H-183, H-143, HI-143, HI-183

Blind plates: R-281-V, R-283-V, R-181-V, R-183-V, RF-09-V, RF-10-V, R-141-V, RF-04-V, RF-C-07-V, R-143-V, MG-07-V

Brackets: R-281-W, R-181-W, R-141-W

Modular manifolds: RF-09/n, RF-10/n, RF-19-E, RF-09-E1, RF-10-E1, RF-09-E2, RF-10-E2, RF-09-Z1, RF-10-Z1, RF-09-Z4, RF-10-Z4, RF-24, RF-C/n

Seal plate: RF-19-01

Cylinders

Series	Classification	Special features	Example order number	Catalogue page
XL	II 2GD c T5 T 100° C - 20° C ≤ T _{amb} ≤ 80° C	Compressed air in accordance with ISO 8573-1:2010 Class 7:2:4- At V > 1 m/s Class 7:4:4 and free of aggressive additives. T _{Medium} - 20° C ... + 50° C T _{amb} - 20° C ... + 80° C Max permissible energy in the end positions: ∅ 32 - 0,1 J, ∅ 40 and 50 - 0,2 J, ∅ 63 - 0,5 J, ∅ 80 - 0,9 J, ∅ 100 - 1,2 J, ∅ 125 - 5 J	XL-040-0320-000-ATEX	9.009
XG	II 2GD c T5 T 100° C - 20° C ≤ T _{amb} + 80° C	Compressed air in accordance with ISO 8573-1:2010 Class 7:2:4- At V > 1 m/s Class 7:4:4 and free of aggressive additives.	XG-160-0250-000-ATEX	9.030
CX		T _{Medium} - 20° C ... + 50° C T _{amb} - 20° C ... + 80° C	CX-032-0250-000-ATEX	9.180
HM			HM-016-025-ATEX	9.081
CM			CM-16-025-ATEX	9.170

The following accessories are approved for the cylinders:

Flexible coupling	FK	Cylinder fixings	XLB-∅-01, XLB-∅-02, XLB-∅-03, XLB-∅-04, XLB-∅-05, XLB-∅-06, XLB-∅-07, XLB-∅-08, XLB-∅-09, XLB-∅-10, XLB-∅-12
Rod eye	FO and RO up to V _{max} 1 m/s		
Rod clevis	FD and RD		
Piston rod nut	FE and RL		

Rodless cylinders

Series	Classification	Special features	Example order number	Catalogue page
ZX	II 2G T6 T 85° C, - 20° C ≤ T _{amb} ≤ 60° C	Compressed air in accordance with ISO 8573-1:2010 Class 7:2:4- and free of aggressive additives. V _{max} 1 m/s T _{Medium} - 10° C ... + 50° C T _{amb} - 10° C ... + 60° C	ZX-25-S-0500-01ATEX	10.140

The following accessories are approved for the cylinders:

Head mount	ZXB-∅-01	Trunnion mount	ZXB-∅-10
Head mount tall	ZXB-∅-02		

Proximity Sensors

Series	Classification	Order number	Catalogue page
ZS	II 3G Ex nA T4 II 3D Ex tD A22 IP67 T 125° C EX II 3D Ex tc IIIC T125° C Dc X	ZS-7300 ZS-7302	9.221

Electrically operated valves

in -proof design



Valves from the (e.g. **MS-18**, **M-05**, others see table page 13.003) ranges can be provided in explosion proof design in accordance with 2014/34/EU (ATEX) for device group II.

For this purpose, special valves are equipped with alternative electrical equipment. The dimensional changes of these components, which are mounted on the valve housing, can be seen on the following pages.

The valves are supplied in an assembled state, complete with valve, as the approval relates both to the electrical and the mechanical components. Individual parts may only be supplied for replacement purposes.

When ordering, the number of the required design must be added to the valve order number, or the required version must be noted in the item text.



Example 1: M-05-510-HN-Ex037-24V=

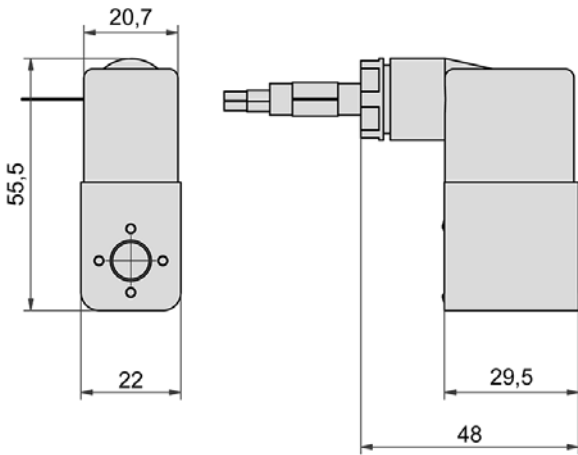
Example 2: M-05-510-HN
Solenoid valve 5/2-way G 1/8,
explosion proof design Ex037
Control voltage 24V=.

The specified technical boundary conditions are to enable the user to make a selection. The operating instructions for the valve and the electrical equipment must be taken into account before putting into operation. These are included with each valve and we would be pleased to send them to you on request by quoting Order No. 54-ATEX-01.

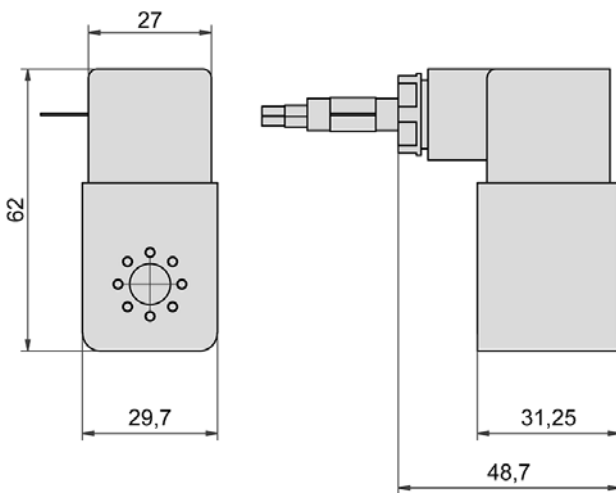
Version	23-SP-037-012-xx	23-SP-037-025-xx	23-SP-037-027-xx	23-SP-038-01-912	23-SP-040-B12	23-SP-040-B27
Width	30 mm					
Ignition protection class	Encapsulated with casting compound mb (gases) mb tb (dust)			Intrinsically safe ia (gases) t (dust)	Non-sparking device nA (gases) tc (dust)	
Classification	II 2G Ex mb IIC T5 II 2D Ex mb tb IIIC T95°C IP65			II 2G Ex ia IIC T6 Ga (≤ 28VDC) II 2G Ex ia IIB T6 Ga (≤ 32VDC) II 2D Ex t IIIC T80°C Db IP65	II 3G Ex nA IIC T5 Gc II 3D Ex tc IIIC T95°C Dc IP65	
Rated voltage	24 VDC	110...120 VAC	230 VAC	U ≤ 28VDC / U ≤ 32VDC	24 VDC	230 VAC
Rated current	136 mA	27 mA	14 mA	I ≤ 115 mA / I ≤ 195 mA	112 mA	15 mA...18 mA
Rated power	3,3 W	3 VA	3,1 VA	-	2,7 W	4 VA
Cable length	xx: 03 = 3 m (standard) xx: 05 = 5 m xx: 10 = 10 m			- incl. connector		
Medium	Compressed air in accordance with ISO-8573-1 : 2010, Class 7:2:4 - and free of aggressive additives.					
Temperature range	- 20 °C...+ 50 °C			- 40 °C...+ 50 °C	- 20 °C...+ 50 °C	
Ambient Battery fitted	- 20 °C...+ 40 °C			-	-	
Temperature range Medium	- 10 °C ... + 50 °C (Mounting on manifold -10°C...+40°C)					
Pressure range	depending on armature					

Version	23-SP-036-012-03	23-SP-036-011-03	23-SP-045-B12	23-SP-045-B27
Width	22 mm		36 mm	
Ignition protection class	Encapsulated with casting compound mb (gases) mb tb (dust)		Flame proof enclosures/ Encapsulated with casting compound d mb (gases) tb (dust)	
Classification	II 2G Ex mb IIC T4 II 2D Ex mb tb IIIC T130°C IP65		II 2G Ex d mb IIC T5 Gb II 2D Ex tb IIIC T95°C Db IP66	
Rated voltage	24 VDC	12 VDC	24 VDC	230 VAC
Rated current	207 mA	375 mA	125 mA	14 mA
Rated power	5 W	4,5 W	3 W	3,8 VA
Cable length	3 m		Terminal box	
Medium	Compressed air in accordance with ISO-8573-1 : 2010, Class 7:2:4 - and free of aggressive additives.			
Temperature range	- 20 °C...+ 50 °C		- 50 °C...+ 50 °C	
Ambient Battery fitted	-		-	
Temperature range Medium	- 10 °C ... + 50 °C (Mounting on manifold -10°C...+40°C)			
Pressure range	depending on armature			

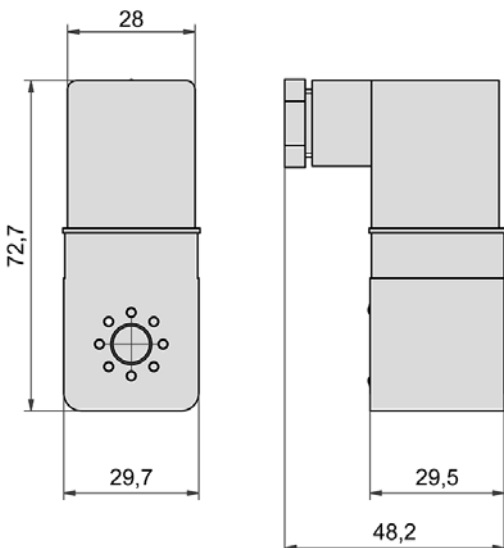
23-SP-036, Dimensions



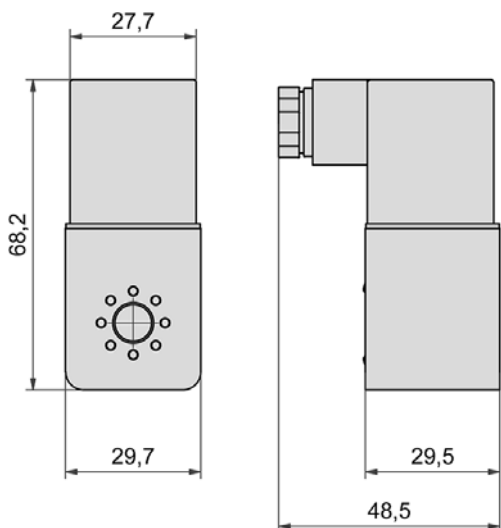
23-SP-037, Dimensions



23-SP-038, Dimensions



23-SP-040, Dimensions



23-SP-045, Dimensions

