



Explosion proof type direct acting 2 port solenoid valve for dry air (general purpose valve)

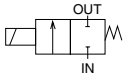
# AB41E4-Z Series

- Pressure and explosion proof structure d2G4 (flame-proof grade 2, ignitability G4)
- NC (normally closed) type
- Port size: Rc1/4, Rc3/8



## JIS symbol

- NC (normally closed) type



## Common specifications

Item	Standard specifications
Working fluid	Dry air (atmospheric dew point -60°C or more), inert gas, low vacuum (1.33 x 10 <sup>5</sup> Pa (abs))
Working pressure differential range MPa	0 to 4 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	5
Withstanding pressure (water) MPa	25
Fluid temperature °C	-10 to 45 (no freezing)
Ambient temperature °C	-10 to 45
Heat proof class	B
Atmosphere	Outdoors/flammable (flame-proof grade 1 to 2, ignitability G1 to G4)
Valve structure	Direct acting poppet structure
Valve seat leakage cm <sup>3</sup> /min. (ANR)	0.2 or less
Mounting attitude	Free

## Individual specifications

Item	Port size	Orifice (mm)	Max. working pressure diff. (MPa)	Rated voltage	Power consumption (W)
Model no.					
<b>AB41E4-02-1-****Z</b>	Rc1/4 Rc3/8	1.5	4.0	100 VAC 50/60 Hz	17
<b>-2-****Z</b>		2.0	2.5	200 VAC 50/60 Hz	
<b>-3-****Z</b>		3.0	0.9	(12 VDC)	
<b>-4-****Z</b>		3.5	0.6	(24 VDC)	
<b>-5-****Z</b>		4.0	0.4	(48 VDC)	
<b>-6-****Z</b>		5.0	0.2	(100 VDC)	
<b>-7-****Z</b>		7.0	0.1		

\*1: The port size symbol is 02 for Rc1/4 (8A) and 03 for Rc3/8 (10A).

\*2: Voltage fluctuation should be within -10 to +5% of the rated voltage.

\*3: Keep the leakage current at the following value or less.

\*4: ( ) shows options.

\*5: When using with a low vacuum, vacuum the OUT port side.

Leakage current	Voltage	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
	Model no.	<b>AB41E4-*.****Z</b>	10 mA or less	5 mA or less	40 mA or less	20 mA or less	10 mA or less

## Flow characteristics

Model no.	Port size	Orifice (mm)	Flow characteristics	
			C [dm <sup>3</sup> /(s·bar)]	b
<b>AB41E4-02-1-****Z</b>	Rc1/4 Rc3/8	1.5	0.29	0.53
<b>-2-****Z</b>		2.0	0.53	0.52
<b>-3-****Z</b>		3.0	1.1	0.52
<b>-4-****Z</b>		3.5	1.7 (1.5)	0.49 (0.47)
<b>-5-****Z</b>		4.0	2.1 (1.9)	0.48 (0.47)
<b>-6-****Z</b>		5.0	3.0 (2.6)	0.42 (0.38)
<b>-7-****Z</b>		7.0	4.8 (4.6)	0.29 (0.37)

\*1: Effective sectional area S and sonic conductance C are converted as S ≈ 5.0 × C.

\*2: Values shown in ( ) are for stainless steel body.

## How to order

**AB41E4** - **02** - **3** - **H** **3** **T** **A** **Z** - **DC24V**

Model no.

**A** Port size  
\*1

**B** Orifice

**C** Body/sealant combination

**D** Type of coil  
\*3

**E** Junction box  
\*4

**F** Other options  
\*2

**G** Voltage  
\*5  
\*6

### <Example of model number>

**AB41E4-02-3-H5TAZ-AC100V**  
Series: AB41E4

- A** Port size : Rc1/4
- B** Orifice :  $\phi$ 3
- C** Body/sealant combination : Body - brass, sealant - nitrile rubber
- D** Type of coil : Heat proof class B diode integrated explosion proof coil d2G4
- E** Junction box : Conduit (G1/2)
- F** Other options : Manual override (locking)
- G** Voltage : 100 VAC 50/60 Hz

### ⚠ Note on model no. selection

- \*1: G and NPT threads are used for piping port. Contact CKD for details.
- \*2: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that the tropicalization is not available when the manual override option A is selected.
- \*3: For the heat proof class B diode integrated coil, the AC power voltage is converted into a DC coil voltage by the diode.
- \*4: A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information. Note that the conduit connection (G3/4) is not available.
- \*5: The heat proof class B explosion proof coil (**D** 3) can be used only with 12 VDC, 24 VDC, 48 VDC or 100 VDC. The heat proof class B diode integrated explosion proof coil (**D** 5) can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
- \*6: Other voltages available are as follows. Contact CKD for more information.  
110, 220 VAC (with diode)

Symbol	Descriptions			
<b>A</b> Port size				
<b>02</b>	Rc	1 / 4		
<b>03</b>	Rc	3 / 8		
<b>B</b> Orifice				
<b>1</b>	$\phi$	1.5		
<b>2</b>	$\phi$	2		
<b>3</b>	$\phi$	3		
<b>4</b>	$\phi$	3.5		
<b>5</b>	$\phi$	4		
<b>6</b>	$\phi$	5		
<b>7</b>	$\phi$	7		
<b>C</b> Body/sealant combination				
	Body	Sealant	Treatment	Remarks
<b>H</b>	Brass	Nitrile rubber	Oil free	—
<b>J</b>		Fluoro rubber		—
<b>P</b>	Ethylene propylene diene rubber	—		
<b>L</b>	Stainless steel	Nitrile rubber		—
<b>M</b>		Fluoro rubber		—
<b>R</b>		Ethylene propylene diene rubber		—
Refer to page 36 in the Introduction for details on the material combinations.				
<b>D</b> Type of coil				
<b>3</b>	Heat proof class B explosion proof coil	d2G4		
<b>5</b>	Heat proof class B diode integrated explosion proof coil	d2G4		
<b>E</b> Junction box				
<b>T</b>	Conduit (G1/2)			
<b>L</b>	Pressure proof packing seal (G1/2) connection, cable OD $\phi$ 7.5 to 8.4			
<b>M</b>	Pressure proof packing seal (G1/2) connection, cable OD $\phi$ 8.5 to 9.4			
<b>F</b> Other options				
<b>Blank</b>	No options			
<b>A</b>	Manual override (locking)			
<b>B</b>	Mounting plate			
<b>AB</b>	Manual override and mounting plate			
<b>G</b> Voltage				
<b>AC100V</b>	VAC	50/60	Hz	
<b>AC200V</b>				200
<b>DC12V</b>	VDC			12
<b>DC24V</b>				24
<b>DC48V</b>				48
<b>DC100V</b>	Option			100

HNB/G

USB/G

FAB/G

FGB/G

FVB

FWB/G

FHB

FLB

AB

AG

AP/AD

APK/ADK

For dry air

Explosion proof

HVB/HVL

SAB/SVB

NP/NAP/NVP

CHB/G

MXB/G

Other G.P. systems

PD/FAD/PJ

CVE/CVSE

CPE/CPD

Medical analysis

Custom order

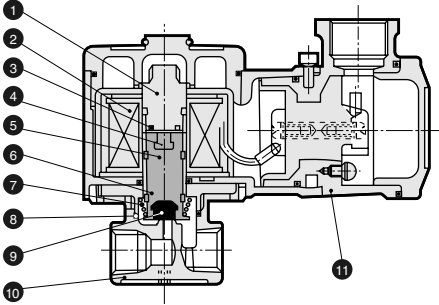
General purpose valve for dry air

E: Explosion proof direct acting 2 port solenoid valve (d2G4)

# AB41E4-Z Series

## Internal structure and parts list

● AB41E4-Z Series



No.	Parts name	Material	
1	Core assembly	SUS405 or equivalent, 316, 403	Stainless steel
2	Coil assembly	-	-
3	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
4	Plunger cushion	PFA	Tetrafluoroethylene resin
5	Plunger	SUS405 or equivalent	Stainless steel
6	Wear ring	POM	Acetal resin
7	Plunger spring	SUS304	Stainless steel
8	O ring	NBR (FKM, EPDM)	NBR: Nitrile rubber (FKM: Fluoro rubber)
9	Valve sealant	NBR (FKM, EPDM)	(EPDM: Ethylene propylene diene rubber)
10	Body	C3771 (SUS303)	Brass (stainless steel)
11	Coil case	ADC12	Aluminum die casting

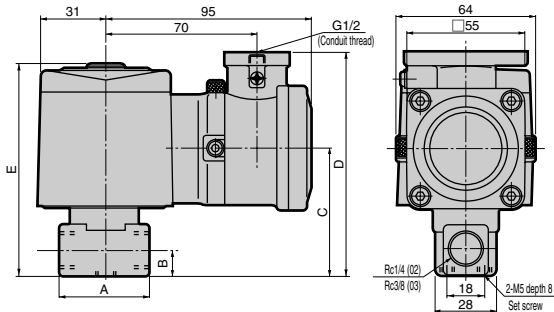
( ) shows options.

## Dimensions



● Conduit (G1/2) type  
AB41E4-\*\*-\*\*H\*\*T\*Z

H  
J  
P



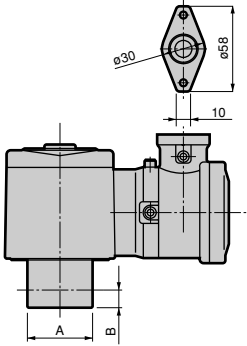
Model no.	A	B	C	D	E
AB41E4-02-1 to 6-****Z	36	11	54	97	92
AB41E4-03-1 to 7-****Z	40	12	57	100	95

## Optional dimensions

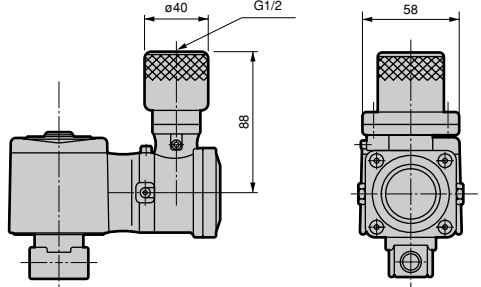


\* Refer to the conduit (G1/2) type dimensions on the left page for common dimensions.

- Stainless steel body  
AB41E4-\*.\*\*\*[L/M/R]\*\*\*Z

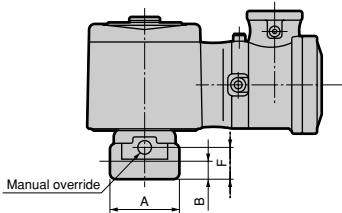


- Pressure proof packing seal (G1/2) connection type  
AB41E4-\*.\*\*\*[L/M/N/P]\*\*\*Z

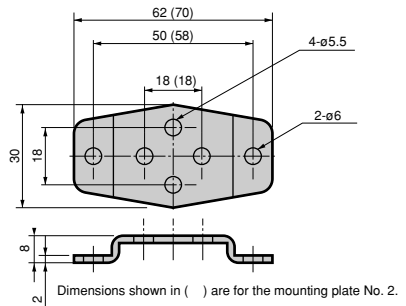


Model no.	A	B
AB41E4-02-1 to 6-***Z	$\phi 37.5$	11
AB41E4-02-7-03-1 to 7-***Z	$\phi 45$	12

- Manual override (locking)  
AB41E4-\*.\*\*\*[A]Z



- Mounting plate  
AB41E4-\*.\*\*\*[B]Z



Model no.	A	B	F
AB41E4-02-1 to 7-***AZ	36	11	19.5
AB41E4-03-1 to 7-***AZ	40	12	22.5

Model no.	Applicable model
Mounting plate No. 1 GE-100106	● Brass body AB41E4-02-03-1 to 7- [H/J/P]
	● Stainless steel body AB41E4-02-1 to 6- [L/M/R]
Mounting plate No. 2 GE-100159	● Stainless steel body AB41E4-02-7- [L/M/R]
	AB41E4-03-1 to 7- [L/M/R]

HNB/G  
USB/G  
FAB/G  
FGB/G  
FVB  
FWB/G  
FHB  
FLB  
AB  
AG  
AP/  
AD  
APK/  
ADK  
For  
dry air  
Explosion  
proof  
HVB/  
HVL  
SAB/  
SVB  
NP/NAP/  
NVP  
CHB/G  
MXB/G  
Other G.P.  
systems  
PD/FAD/  
PJ  
CVE/  
CVSE  
CPE/  
CPD  
Medical  
analysis  
Custom  
order

General purpose valve for dry air  
Explosion proof direct acting 2 port solenoid valve (d2G4)

# AP/APK/AD/ADK

(General purpose valve)

## General purpose pilot operated 2 port solenoid valve

■ For air, vacuum, water, oil

### Overview

The general purpose valve series enables control of various types of fluids including water, air, oil and vacuums. In addition to the high reliability and high quality of the valve, the variety of options and variations are available.

### Features

#### Various working fluids control

Various types of fluids can be handled by selecting the proper body material and sealant.

#### Wide option range

Including open frame, coil with diode, and terminal boxes.

#### A great variety of series and variation

A wide selection is available from the Rc1/4 to large 50 flanges with series such as pilot operated diaphragm and piston valves, and pilot kick type diaphragm and piston valves.



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⚠ Always read the precautions in the Introduction and page 226 before starting use.

HNB/G

USB/G

FAB/G

FGB/G

FVB

FWB/G

FHB

FLB

AB

AG

AP/  
AD

APK/  
ADK

For  
dry air

Explosion  
proof

HVB/  
HVL

SAB/  
SVB

NP/NAP/  
NVP

CHB/G

MXB/G

Other G.P.  
systems

PD/FAD/  
PJ

CVB/  
CVSE

CPE/  
CPD





Medical  
analysis

Custom  
order

General purpose valve  
Pilot operated/Pilot kick type 2 port solenoid valve

# Series variation

General purpose pilot operated 2 port solenoid valve

No. of port	Model	Structure	Actuation	Working fluid							
				Air	Low vacuum (1.33 x 10 <sup>3</sup> Pa (abs))	Water	Kerosene	Oil (50 mm <sup>2</sup> /s or less)	Hot water	Steam	
2 port		AP11 *1	Pilot operated (Piston structure)	NC (normally closed) type	●		●	●	●		●
		AP12 *1		NO (normally open) type	●		●	●	●		●
		AP21		NC (normally closed) type	●		●	●	●		●
		AP22		NO (normally open) type	●		●	●	●		●
		AD11 *1	Pilot operated (Diaphragm structure)	NC (normally closed) type	●		●	●	●		
		AD12 *1		NO (normally open) type	●		●	●	●		
		AD21		NC (normally closed) type	●		●	●	●		
		AD22		NO (normally open) type	●		●	●	●		
		APK11	Pilot kick type (Piston kick drive)	NC (normally closed) type	●	●	●	●	●*2		●
		APK21		NC (normally closed) type	●	●	●	●	●*2		●
		ADK11	Pilot kick type (Diaphragm structure)	NC (normally closed) type	●	●	●	●	●	●	
		ADK12		NO (normally open) type	●	●	●	●	●	●	
ADK21		NC (normally closed) type		●	●	●	●	●			

\*2: 20 mm<sup>2</sup>/s or less for APK11/12 Series.

	Port size											Page
	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/4	32 flange	Rc1 1/2	40 flange	Rc2	50 flange	
	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>							228
	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>							228
						●	●	●	●	●	●	238
						●	●	●	●	●	●	238
	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*4</sup>							248
			● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*4</sup>							248
						●	●	●	●	●	●	258
						●	●	●	●	●	●	258
	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>							268
						●	●	●	●	●	●	276
	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>							282
			● <sup>*3</sup>	● <sup>*3</sup>	● <sup>*3</sup>							282
						●	●	●	●	●	●	294

\*3: Refer to each How to order column for the thread types.

Refer to page 222 for details on the coil system.

HNB/G  
 USB/G  
 FAB/G  
 FGB/G  
 FVB  
 FWB/G  
 FHB  
 FLB  
 AB  
 AG  
 AP/  
 AD  
 APK/  
 ADK  
 For  
 dry air  
 Explosion  
 proof  
 HVB/  
 HVL  
 SAB/  
 SVB  
 NP/NAP/  
 NVP  
 CHB/G  
 MXB/G  
 Other G.P.  
 systems  
 PD/FAD/  
 PJ  
 CVE/  
 CVSE  
 CPE/  
 CPD  
 Medical  
 analysis  
 Custom  
 order












General purpose valve  
 Pilot operated/Pilot kick type 2 port solenoid valve

# Coil selection guide

## ● Coil housing types and selection guide

A wide variety is available to match applications.

Refer to the structure and features to select the optimum model.

AP/AD*		Appearance				
Coil variations	Heat proof class B mold	<ul style="list-style-type: none"> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP61 or equivalent</li> <li>● Outdoor use not available</li> </ul>	Grommet lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> </ul>		2C 6C	
		<ul style="list-style-type: none"> <li>● DC and AC (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP61 or equivalent</li> <li>● Outdoor use not available</li> </ul>	DIN terminal box <ul style="list-style-type: none"> <li>● Easy wiring and maintenance</li> <li>● Reliable electric protection (ground terminal)</li> <li>● Light available (optional - 100, 200 VAC and 24 VDC only)</li> </ul>		2E 2G 2H 6E 6G 6H	
		<ul style="list-style-type: none"> <li>● DC and AC (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Outdoor use not available</li> </ul>	Lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> <li>● Conduit (CTC19) for direct conduit wiring can be mounted</li> </ul>		3A	
		<ul style="list-style-type: none"> <li>● DC and AC (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP21 or equivalent</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC / 24, 100 VDC only)</li> </ul>		3M 3N	
		<ul style="list-style-type: none"> <li>● DC and AC (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC / 24, 100 VDC only)</li> </ul>		3I 3J	
		<ul style="list-style-type: none"> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● High temperature fluid and high ambient temperature available</li> <li>● Outdoor use not available</li> <li>● Protection property symbols: IP00</li> </ul>	Lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> <li>● Conduit (CTC19) for direct conduit wiring can be mounted</li> </ul>		4A	
	Heat proof class H taped	Heat proof class B mold	<ul style="list-style-type: none"> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC only)</li> </ul>		4M 4N
			<ul style="list-style-type: none"> <li>● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion)</li> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Perfect for places where beat can be a problem</li> <li>● Outdoor use not available</li> </ul>	Lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> <li>● Conduit (CTC19) for direct conduit wiring can be mounted</li> </ul>		5A
			<ul style="list-style-type: none"> <li>● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion)</li> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP21 or equivalent</li> <li>● Perfect for places where beat can be a problem</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC only)</li> </ul>		5M 5N
		Heat proof class B mold with diode	<ul style="list-style-type: none"> <li>● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion)</li> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Perfect for places where beat can be a problem</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC only)</li> </ul>		5I 5J
			<ul style="list-style-type: none"> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Perfect for places where beat can be a problem</li> <li>● Outdoor use not available</li> </ul>	Conduit <ul style="list-style-type: none"> <li>● Use a conduit (CTC19 or G1/2) when using direct conduit wiring for the open frame lead wire.</li> </ul>		G H



● Repair parts table per coil option

Coil option symbol	Voltage	Repair parts			
		Plunger assembly	Core assembly	Coil assembly	Actuator assembly *1
0 or 2C	AC	○	○	○	○
6C *2	DC	—	—	—	○
2E 2G 2H	AC	○	○	○	○
2E 2G 2H	DC	○	○	○	○
6E 6G 6H *2	DC	—	—	—	○
3A	AC	○	○	○	○
	DC		○	○	○
3M 3N	AC	○	○	○	○
	DC		○	○	○
3I 3J	AC	○	○	○	○
	DC		○	○	○
4A	AC	○	○	○	○
4M 4N	AC	○	○	○	○
5A	AC	○	○	○	○
5M 5N	AC	○	○	○	○
5I 5J	AC	○	○	○	○

\*1: The actuator assembly includes the coil assembly, core assembly and plunger assembly.

\*2: As 6C, 6E, 6G and 6H are dedicated parts, they are provided as part of the actuator assembly.

HNB/G  
USB/G  
FAB/G  
FGB/G  
FVB  
FWB/G  
FHB  
FLB  
AB  
AG  
AP/  
AD  
APK/  
ADK  
For  
dry air  
Explosion  
proof  
HVB/  
HVL  
SAB/  
SVB  
NP/NAP/  
NVP  
CHB/G  
MXB/G  
Other G.P.  
systems  
PD/FAD/  
PJ  
CVE/  
CVSE  
CPE/  
CPD  
Medical  
analysis  
Custom  
order












General purpose valve  
Pilot operated/Pilot kick type 2 port solenoid valve

# Coil selection guide

## ● Coil housing types and selection guide








Wide coil variation is available.

Refer to the structure and features to select the optimum model.

APK11/ADK1*		Appearance			
Coil variations	Heat proof class B mold	<ul style="list-style-type: none"> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP61 or equivalent</li> <li>● Outdoor use not available</li> </ul>	Grommet lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> </ul>	 <b>2C</b>	
	Heat proof class B mold	<ul style="list-style-type: none"> <li>● DC and AC (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP61 or equivalent</li> <li>● Outdoor use not available</li> </ul>	DIN terminal box <ul style="list-style-type: none"> <li>● Easy wiring and maintenance</li> <li>● Reliable electric protection (ground terminal)</li> <li>● Light available (optional - 100, 200 VAC and 24 VDC only)</li> </ul>	 <b>2E</b> <b>2G</b> <b>2H</b>	
	Heat proof class B mold	<ul style="list-style-type: none"> <li>● DC and AC (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Outdoor use not available</li> </ul>	Lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> <li>● Conduit (CTC19) for direct conduit wiring can be mounted</li> </ul>	 <b>3A</b>	
	Heat proof class B mold	<ul style="list-style-type: none"> <li>● DC and AC (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP21 or equivalent</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC / 24, 100 VDC only)</li> </ul>	 <b>3M</b> <b>3N</b>	
	Heat proof class B mold	<ul style="list-style-type: none"> <li>● DC and AC (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC / 24, 100 VDC only)</li> </ul>	 <b>3J</b> <b>3I</b> *1	
	Open frame type	Heat proof class H tapped	<ul style="list-style-type: none"> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 180°C</li> <li>● High temperature fluid and high ambient temperature available</li> <li>● Outdoor use not available</li> <li>● Protection property symbols: IP00</li> </ul>	Lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> <li>● Conduit (CTC19) for direct conduit wiring can be mounted</li> </ul>	 <b>4A</b>
		Heat proof class B mold with diode	<ul style="list-style-type: none"> <li>● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion)</li> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Perfect for places where heat can be a problem</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC only)</li> </ul>	 <b>4M</b> <b>4N</b>
		Heat proof class B mold with diode	<ul style="list-style-type: none"> <li>● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion)</li> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP21 or equivalent</li> <li>● Perfect for places where heat can be a problem</li> <li>● Outdoor use not available</li> </ul>	Lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> <li>● Conduit (CTC19) for direct conduit wiring can be mounted</li> </ul>	 <b>5A</b>
		Heat proof class B mold with diode	<ul style="list-style-type: none"> <li>● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion)</li> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP21 or equivalent</li> <li>● Perfect for places where heat can be a problem</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC only)</li> </ul>	 <b>5M</b> <b>5N</b>
		Heat proof class B mold with diode	<ul style="list-style-type: none"> <li>● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion)</li> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Perfect for places where heat can be a problem</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC only)</li> </ul>	 <b>5I</b> <b>5J</b> *1
Conduit		<ul style="list-style-type: none"> <li>● Use a conduit (CTC19 or G1/2) when using direct conduit wiring for the open frame lead wire.</li> </ul>	 <b>G</b> <b>H</b>		

\*1: Only ADK1\* is supported.

# APK21/ADK21

Open frame type		Appearance		
Open frame type	Heat proof class B mold	<ul style="list-style-type: none"> <li>● DC and AC</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Outdoor use not available</li> </ul>	Lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> <li>● Direct conduit wiring thread CTC19 integrated</li> </ul>	 <b>3A</b>
	Heat proof class B mold	<ul style="list-style-type: none"> <li>● DC and AC</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP21 or equivalent</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC / 24, 100 VDC only)</li> </ul>	 <b>3M</b> <b>3N</b>
	Heat proof class H taped	<ul style="list-style-type: none"> <li>● AC dedicated</li> <li>● Heat proof temperature 180°C</li> <li>● High temperature fluid and high ambient temperature available</li> <li>● Protection property symbols: IP00</li> <li>● Outdoor use not available</li> </ul>	Lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> <li>● Direct conduit wiring thread CTC19 integrated</li> </ul>	 <b>4A</b>
			HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC only)</li> </ul>	 <b>4M</b> <b>4N</b>
	Heat proof class B mold with diode	<ul style="list-style-type: none"> <li>● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion)</li> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP65 or equivalent</li> <li>● Perfect for places where heat can be a problem</li> <li>● Outdoor use not available</li> </ul>	Lead wire <ul style="list-style-type: none"> <li>● Lead wire length 300 mm</li> <li>● Direct conduit wiring thread CTC19 integrated</li> </ul>	 <b>5A</b>
	Heat proof class B mold with diode	<ul style="list-style-type: none"> <li>● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion)</li> <li>● AC dedicated (50/60 Hz common)</li> <li>● Heat proof temperature 130°C</li> <li>● Protection property symbols: IP21 or equivalent</li> <li>● Perfect for places where heat can be a problem</li> <li>● Outdoor use not available</li> </ul>	HP terminal box <ul style="list-style-type: none"> <li>● Easy wiring</li> <li>● Light available (optional - 100, 200 VAC only)</li> </ul>	 <b>5M</b> <b>5N</b>
			Conduit <ul style="list-style-type: none"> <li>● Use a conduit (G1/2) when using direct conduit wiring for the open frame lead wire.</li> </ul>	 <b>H</b>

- HNB/G
- USB/G
- FAB/G
- FGB/G
- FVB
- FWB/G
- FHB
- FLB
- AB
- AG
- AP/AD
- APK/ADK
- For dry air
- Explosion proof
- HVB/HVL
- SAB/SVB
- NP/NAP/NVP
- CHB/G
- MXB/G
- Other G.P. systems
- PD/FAD/PJ
- CVE/CVSE
- CPE/CPD
- Medical analysis
- Custom order

General purpose valve  
Pilot operated/Pilot kick type 2 port solenoid valve



## Safety precautions

Always read this section before starting use.

### Pilot operated 2 port solenoid valve (AP/AD) and pilot kick type 2 port solenoid valve (APK/ADK)

#### Design & Selection

#### WARNING

##### 1 Working fluid

- (1) When using this valve for dry air or inert gas, the life can be shortened considerably due to wear. Use a valve for dry air.
- (2) This valve cannot be used for maintaining the vacuum.

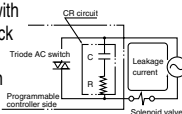
#### CAUTION

##### 1 Fluid viscosity

The fluid viscosity must be 50 mm<sup>2</sup>/s or less. Malfunctions could occur if the viscosity is higher than 50 mm<sup>2</sup>/s. (This value is 20 mm<sup>2</sup>/s or less for the APK Series.)

##### 2 Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications.



Series no.	Voltage		AC diode		DC	
	100 V	200 V	100 V	200 V	12 V	24 V
AP, AD	6 mA or less	3 mA or less	2 mA or less	1 mA or less	2 mA or less	1 mA or less
APK, ADK	6 mA or less	3 mA or less	2 mA or less	1 mA or less	2 mA or less	1 mA or less

#### Installation, Piping & Wiring

#### CAUTION

##### 1 Installation

- (1) As a general rule, the valve must be installed vertically with the coil facing upward.

##### 2 Piping

- (1) If the pipe vibrates when the solenoid valve is opened and closed, securely fix the piping.
- (2) When passing steam, steam generated from a boiler will contain a large amount of drainage. Always install a drain trap.
- (3) When passing steam, water replenished to the boiler will contain matters such as "calcium salt" and "magnesium salt". These matters will react with oxygen and carbon oxide causing scales and sludge, so always install a "water softener" and a filter for steam.
- (4) When the regulator and solenoid valve are directly coupled, the parts could mutually vibrate causing resonance and chattering.
- (5) If the piping cross-section area on the fluid inlet is reduced, the operation may become unstable due to a differential pressure fault during valve operation. The piping on the fluid inlet must have a size that matches the valve port size.

##### 3 Wiring

- (1) Refer to page 53 in the Introduction for details on connecting the terminal box.

#### When Using

#### CAUTION

##### 1 Instantaneous leakage

With the pilot operated type or pilot kick type 2 port valve, if sudden pressure is applied when the pump starts while the valve is closed, the valve may open for an instant causing fluid to leak. Caution is required during use.

##### 2 Operation

Do not apply back pressure. The valve could malfunction.

##### 3 Water hammer

If water hammering occurs causing a problem, consider using the CKD "WHL type" or "RSV type" solenoid valve or a motor valve.

##### 4 Manual operation

Always observe the following points when using a manual override.

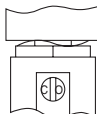
<For NO (normally open) type>

Opening: Insert a flat-tip screwdriver into the slit on the manual shaft, and turn it approx. 120° to the right or left. The plunger will rise up, and the valve will open.

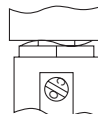
The open state is held even when the screwdriver is removed.

Always return the valve to the original position after use.

Closing: Turn the manual shaft from the open position to the vertical position. The plunger will lower and the valve will close. (Refer to the following drawings.)



Valve closed



Valve opened



Valve opened

<For NO (normally open) type>

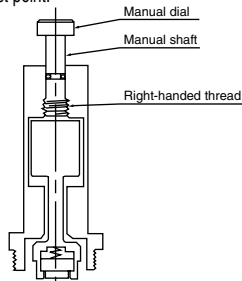
##### (1) Closing the valve with manual operations

The manual shaft is threaded, so hold the manual dial and rotate the shaft clockwise.

When the manual dial has been rotated downward 5 to 6 mm and no longer rotates, the solenoid valve will switch to closing operation.

##### (2) Resetting (when not using manual override)

Always rotate the manual dial counterclockwise and return it to the highest point.



# Maintenance

## CAUTION

### 1 Thermal insulation cover

When piping for steam or hot water, etc., use an insulating cover structure that can be disassembled for maintenance purposes. Avoid placing an insulating cover on the entire solenoid valve or on the coil section. The coil could burn.

### 2 Tightening torque

When disassembling or assembling, tighten the body bolt, core assembly and nut with the following tightening torques.

		Body bolt tightening torque	Core assembly tightening torque	Nut tightening torque
AP <sup>11</sup> <sub>12</sub>	8A	3 to 4 N·m	30 to 45 N·m  ( 45 to 60 N·m for (APK11-15A to 25A) )	8 to 16 N·m
AD <sup>11</sup> <sub>12</sub>	10A			
APK11	15A	5 to 7 N·m		
ADK <sup>11</sup> <sub>12</sub>	20A			
	25A	9 to 12 N·m		
AP <sup>21</sup> <sub>22</sub>	32 <sup>A</sup> <sub>F</sub>		18 to 28 N·m	
AD <sup>21</sup> <sub>22</sub>	40 <sup>A</sup> <sub>F</sub>			
	50 <sup>A</sup> <sub>F</sub>			
APK21	32 <sup>A</sup> <sub>F</sub>	80 to 120 N·m		
ADK21	40 <sup>A</sup> <sub>F</sub>			
	50 <sup>A</sup> <sub>F</sub>			

# Working Environment

## CAUTION

IP65 (IEC60529 (IEC529:1989-11)) standards are applied to the test. Avoid use in conditions where water or cutting oil directly contacts the valve.

### Explanation of protection property symbols and examination method of IP65

#### ●Protective structure

Note: IP-65 is a standard as followings.

#### ■IEC (International Electrotechnical Commission) standards


(IEC60529 (IEC529:1989-11))

IP- \* \* □ □

Protection property symbols (International Protection)

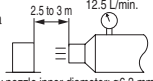
#### 1st characteristic number (protection grade for foreign solid)

Grade	Degree of protection
6	Dust proof type Powder and dust do not enter inside.



#### 2nd characteristic number (protection grade for entry of water)

Grade	Degree of protection	Overview of test method (fresh water is used)
5	Protection for jet No harmful effects occur even when water is sprayed with nozzles from all directions.	Using the following test device, spray water for 1 minute per 1 m <sup>2</sup> of test sample (exterior) surface area from all directions, for a total of 3 minutes or more. 2.5 to 3 m 12.5 L/min. Spray nozzle inner diameter: φ6.3 mm



HNB/G

USB/G

FAB/G

FGB/G

FVB

FWB/G

FHB

FLB

AB

AG

AP/  
AD

APK/  
ADK

For  
dry air

Explosion  
proof

HVB/  
HVL

SAB/  
SVB

NP/NAP/  
NVP

CHB/G

MXB/G

Other G.P.  
systems

PD/FAD/  
PJ

CVE/  
CVSE

CPE/  
CPD

Medical  
analysis

Custom  
order

General purpose valve  
Photo operated/Pilot kick type 2 port solenoid valve

# 2, 3 port solenoid valve for dry air (general purpose valve)

## Electronic Catalog file list

### 2, 3 port solenoid valve for dry air (general purpose valve)

Direct acting 2 port AB\_Z (pages 316 to 317)

Electronic Catalog file list is applied to "CAD DATA 2006".

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
AB31-Z	AB_Z	ab31_z	CKD-AB31-Z
AB31-Z-K/H		ab31_z_k_h	CKD-AB31-Z-K/H
AB31-Z-A		ab31_z_a	CKD-AB31-Z-A
AB31-Z-SUS		ab31_z_sus	CKD-AB31-Z-SUS
AB41-02-Z		ab41_02_z	CKD-AB41-02-Z
AB41-02-7-Z		ab41_02_7_z	CKD-AB41-02-7-Z
AB41-03/04-Z		ab41_03_04_z	CKD-AB41-03/04-Z
AB41-Z-K/H		ab41_z_k_h	CKD-AB41-Z-K/H
AB41-02-Z-A		ab41_02_z_a	CKD-AB41-02-Z-A
AB41-02-7-Z-A		ab41_02_7_z_a	CKD-AB41-02-7-Z-A
AB41-02-Z-SUS		ab41_02_z_sus	CKD-AB41-02-Z-SUS
AB41-02-7-Z-SUS		ab41_02_7_z_sus	CKD-AB41-02-7-Z-SUS
AB41-03/04-Z-SUS		ab41_03_04_z_sus	CKD-AB41-03/04-Z-SUS
GAB3-Z		gab3_z	CKD-GAB3-Z
GAB3-Z-A		gab3_z_a	CKD-GAB3-Z-A
Mounting plate, cable gland, conduit		ab_ag_z_op	CKD-AB/AG-Z-OP

Direct acting 3 port AG\_Z (pages 326 to 327)

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
AG3-Z	AG_Z	ag3_z	CKD-AG3-Z
AG3-Z-K/H		ag3_z_k_h	CKD-AG3-Z-K/H
AG3-Z-A		ag3_z_a	CKD-AG3-Z-A
AG3-Z-SUS		ag3_z_sus	CKD-AG3-Z-SUS
AG4-02-Z		ag4_02_z	CKD-AG4-02-Z
AG4-03-Z		ag4_03_z	CKD-AG4-03-Z
AG4-Z-K/H		ag4_z_k_h	CKD-AG4-Z-K/H
AG4-02-Z-A		ag4_02_z_a	CKD-AG4-02-Z-A
AG4-03-Z-A		ag4_03_z_a	CKD-AG4-03-Z-A
AG4-02-Z-SUS		ag4_02_z_sus	CKD-AG4-02-Z-SUS
AG4-03-Z-SUS		ag4_03_z_sus	CKD-AG4-03-Z-SUS
GAG3-Z		gag3_z	CKD-GAG3-Z
GAG3-Z-A		gag3_z_a	CKD-GAG3-Z-A
Mounting plate, cable gland, conduit		ab_ag_z_op	CKD-AB/AG-Z-OP

Explosion proof direct acting 2 port AB\*E-Z (pages 342 to 343)

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
AB41E-02-Z	AB_E_Z	ab41e_02_z	CKD-AB41E-02-Z
AB41E-02-7-Z		ab41e_02_7_z	CKD-AB41E-02-7-Z
AB41E-02-Z-A		ab41e_02_z_a	CKD-AB41E-02-Z-A
AB41E-03-Z-A		ab41e_03_z_a	CKD-AB41E-03-Z-A
Accessory (mounting plate, manual mounting plate)		a_e_f	CKD-A*E-F

Explosion proof direct acting 3 port AG4\*E-Z (pages 346 to 347)

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
AG4E-02-Z	AG_E_Z	ag4e_02_z	CKD-AG4E-02-Z
AG4E-03-Z		ag4e_03_z	CKD-AG4E-03-Z
AG4E-02-Z-A		ag4e_02_zva	CKD-AG4E-02-Z-A
AG4E-03-Z-A		ag4e_03_z_a	CKD-AG4E-03-Z-A
Accessory (mounting plate, manual mounting plate)		a_e_f	CKD-A*E-F

Pilot kick type 2 port ADK\_Z (page 352)

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
ADK11-8/10-Z	ADK_Z	adk11_8_10_z	CKD-ADK11-8/10-Z
ADK11-15-Z		adk11_15_z	CKD-ADK11-15-Z
ADK11-20-Z		adk11_20_z	CKD-ADK11-20-Z
ADK11-25-Z		adk11_25_z	CKD-ADK11-25-Z