Pilot kick type 2 port solenoid valve for dry air
(general purpose valve)

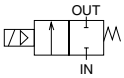
ADK11-Z Series

- NC (normally closed) type
- Port size: Rc1/4 to Rc1
- Diaphragm structure

RoHS CAD

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 10^3 Pa (abs))
Working pressure differential range MPa	0 to 0.7 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	2
Withstanding pressure (water) °C	4
Fluid temperature °C	-10 to 40 (no freezing)
Ambient temperature	-10 to 40
Heat proof class	B
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure cm^3/min. (ANR)	Pilot kick type poppet, diaphragm structure
Valve seat leakage	1 or less (at pressure 0.02 to 0.7 MPa for 8A/10A, and at 0.02 to 0.6 MPa for 15A to 25A)*
Mounting attitude	Free

* When used at a pressure less than 0.02 MPa, the sealant may be unstable. Consult with CKD in this case.

Individual specifications

Item / Model no.	Port size	Orifice (mm)	Min. working pressure diff. (MPa)	Max. working pressure diff. (MPa)	Rated voltage	Power consumption (W) AC	Power consumption (W) DC
ADK11-8A-***Z**	Rc1/4	12	0	0.7	100 VAC 50/60 Hz 200 VAC 50/60 Hz 12 VDC 24 VDC 48 VDC 100 VDC	17	14
-10A-***Z**	Rc3/8	12		0.7			
-15A-***Z**	Rc1/2	16		0.6			
-20A-***Z**	Rc3/4	23		0.6			
-25A-***Z**	Rc1	28		0.6			

*1: The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2: Voltage fluctuation should be within ±10% of the rated voltage.
*3: Keep the leakage current at the following value or less.

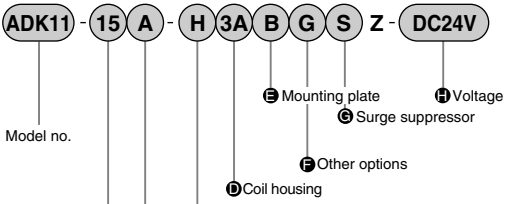
Leakage current: Voltage / Model no.	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
ADK11-8A to 25A-***Z**	10 mA or less	5 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less

Flow characteristics

Model no.	Port size	Orifice (mm)	Flow characteristics		
			C [dm³/(s·bar)]	b	S (mm²)
ADK11-8A-***Z**	Rc1/4	12	9.2	0.36	–
ADK11-10A-***Z**	Rc3/8	12	11	0.46	–
ADK11-15A-***Z**	Rc1/2	16	20	0.31	–
ADK11-20A-***Z**	Rc3/4	23	–	–	162
ADK11-25A-***Z**	Rc1	28	–	–	231

*1: Effective sectional area S and sonic conductance C are converted as $S \approx 5.0 \times C$.

How to order



Symbol	Descriptions
Ⓐ Port size	
8	1 / 4
10	3 / 8
15	1 / 2
20	3 / 4
25	1

Ⓑ Type of thread	
A	Rc
G	G
N	NPT

Ⓒ Body/sealant combination

	Body	Sealant	Treatment	Remarks
H	Bronze	Nitrile rubber	Oil free	–
J		Fluoro rubber		–
L	Stainless steel	Nitrile rubber		–
M		Fluoro rubber		–

Refer to page 36 in the Introduction for details on the material combinations.

Ⓓ to Ⓗ

Refer to the following page for details on the coil housing, other options and voltage, etc.

<Example of model number>

ADK11-15A-H3ABSZ-DC24V
Series: ADK11

- Ⓐ Port size: 1/2
- Ⓑ Type of thread: Rc
- Ⓒ Body/sealant combination
  : Body - bronze, sealant - nitrile rubber
- Ⓓ Coil housing
  : Open frame lead wire for DC voltage
- Ⓔ Mounting plate: Selected
- Ⓕ Other options: Blank
- Ⓖ Surge suppressor: Selected
- Ⓗ Voltage: 24 VDC

For Ⓓ to Ⓗ, the combinations indicated with symbols can be manufactured.
Note that if options Ⓔ to Ⓖ are not required, no symbol is indicated.

Ⓓ Coil housing			Ⓔ	Ⓕ Other options					Ⓖ	Ⓗ Rated voltage
Descriptions			Manual override (locking)	Cable gland (Marine cable gland)			Conduit (Conduit pipe)		Surge suppressor	Descriptions
				A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Open frame type	Lead wire	A	D	E	F	G	H	S	12 VCD, 24 VDC, 48 VDC, 100 VDC
3M		HP terminal box (G1/2)								
3N		HP terminal box + light (G1/2)								12 VDC, 24 VDC, 100 VDC
3I		HP terminal box (IP65 or equivalent) (G1/2)								12 VCD, 24 VDC, 48 VDC, 100 VDC
3J		HP terminal box + light (IP65 or equivalent) (G1/2)								12 VDC, 24 VDC, 100 VDC
5A	Open frame type (Diode integrated)	Lead wire	A	D	E	F	G	H		100 VAC, 200 VAC
5M		HP terminal box (G1/2)								
5N		HP terminal box + light (G1/2)								
5I		HP terminal box (IP65 or equivalent) (G1/2)								
5J		HP terminal box + light (IP65 or equivalent) (G1/2)								

⚠ Refer to the following precautions for Ⓓ to Ⓗ.

3A 5A		● Open frame grommet lead wire 300 mm ● 5A (diode integrated)
3M 3N 5M 5N		● Open frame HP terminal box ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

G H		● Conduit ● G (CTC19) ● H (G1/2)

Refer to page 306 for coil selection.

⚠ Note on model no. selection

Note on Ⓓ

* 1: 5A, 5M, 5N, 5I and 5J are coils for which AC power is converted to DC with a diode.
Not compatible with voltages less than 100 VAC.

Note on Ⓔ to Ⓖ

* 2: Select one among D, E, F, G and H for Ⓕ.
* 3: The surge suppressor is an accessory for the lead wire coil. When selecting a coil with terminal box, the surge suppressor is mounted in the terminal box.
* 4: The surge suppressor is incorporated in the coil with diode as standard.
* 5: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.

Note on Ⓗ

* 6: 100 VAC coil is compatible with 100 VAC 50/60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz.
* 7: For voltages other than above, consult with CKD.
* 8: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● ADK11-Z Series

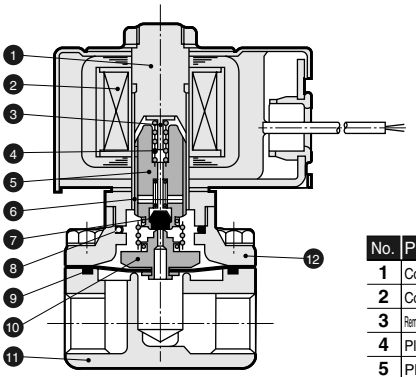


Figure shows ADK11-8A/10A.

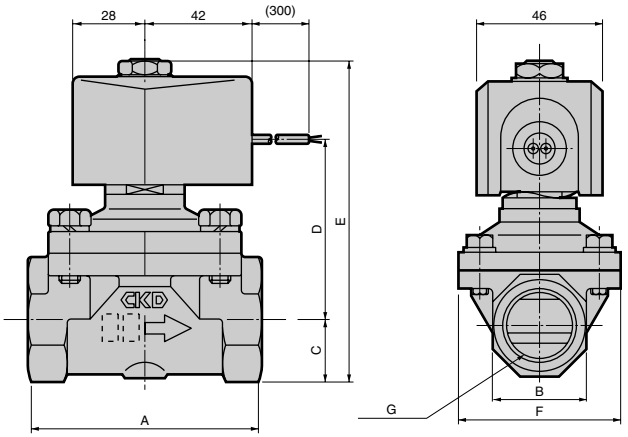
No.	Parts name	Material	
1	Core assembly	SUS405 or equivalent, 316, 403	Stainless steel
2	Coil assembly	–	–
3	Remaining magnetic force eraser	PPS	Polyphenylene sulfide
4	Plunger spring	SUS304	Stainless steel
5	Plunger	SUS405 or equivalent	Stainless steel
6	Wear ring	POM	Acetar resin
7	Valve sealant	NBR (FKM)	NBR: Nitrile rubber (FKM: Fluoro rubber)
8	O ring	NBR (FKM)	
9	O ring	NBR (FKM)	
10	Diaphragm assembly	SUS304, NBR (FKM)	Stainless steel, nitrile rubber (fluoro rubber)
11	Body	CAC408 (SCS13)	Bronze (stainless steel)
12	Stuffing	C3771 (SCS13)	Brass (stainless steel)

( ) shows options.

Dimensions

CAD

● Open frame lead wire type
ADK11-*-*[3A / 5A]***Z

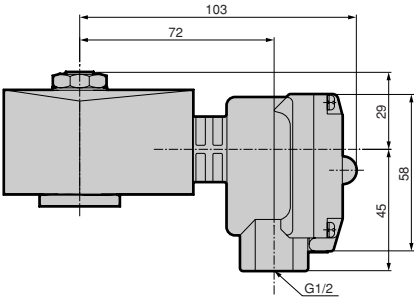


Model no.	A	B	C	D	E	F	G
ADK11-8A-***Z**	50	23	11.5	68.5	92.5	46	Rc1/4
ADK11-10A-***Z**	50	23	11.5	68.5	92.5	46	Rc3/8
ADK11-15A-***Z**	71	29	14.5	75.5	102	50	Rc1/2
ADK11-20A-***Z**	80	35	17.5	79	108.5	60	Rc3/4
ADK11-25A-***Z**	90	45	22.5	84.5	119	71	Rc1

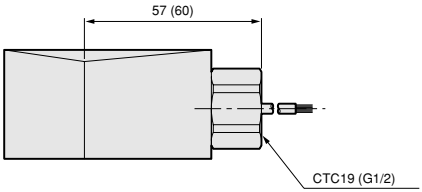
Optional dimensions

* Refer to the open frame lead wire type dimensions on the left page for common dimensions.

● Open frame type + HP terminal box
ADK11-*-* 3 M ***Z
5 N

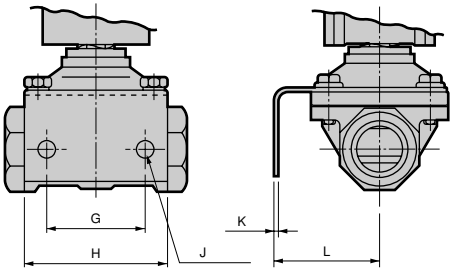


● Open frame type + conduit
ADK11-*-* 3A G
5A H



Dimensions shown in ( ) are for G1/2.

● Mounting plate
ADK11-*-** B **Z



Model no.	G	H	J	K	L
ADK11-8A-B**Z**	30	50	ø7	2	33.5
ADK11-10A-B**Z**	30	50	ø7	2	33.5
ADK11-15A-B**Z**	40	56	ø9	3.2	45
ADK11-20A-B**Z**	45	63	ø9	3.2	50
ADK11-25A-B**Z**	50	75	ø11	3.2	56

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

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.

CONTENTS

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

No. of port	Model		Structure	Actuation	Working fluid							
					Air	Low vacuum (1.33 x 103 Pa [abs])	Water	Kerosene	Oil (50 mm²/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 mm²/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	
	●*3	●*3	●*3	●*3	●*3							228
	●*3	●*3	●*3	●*3	●*3							228
						●	●	●	●	●	●	238
						●	●	●	●	●	●	238
	●*3	●*3	●*3	●*3	●*4							248
			●*3	●*3	●*4							248
						●	●	●	●	●	●	258
						●	●	●	●	●	●	258
	●*3	●*3	●*3	●*3	●*3							268
						●	●	●	●	●	●	276
	●*3	●*3	●*3	●*3	●*3							282
			●*3	●*3	●*3							282
						●	●	●	●	●	●	294

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

Refer to page 222 for details on the coil system.

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*

Coil variations

Open frame type

			Appearance
Heat proof class B mold	● AC dedicated (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP61 or equivalent ● Outdoor use not available	Grommet lead wire	● Lead wire length 300 mm	 2C 6C
Heat proof class B mold	● DC and AC (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP61 or equivalent ● Outdoor use not available	DIN terminal box	● Easy wiring and maintenance ● Reliable electric protection (ground terminal) ● Light available (optional - 100, 200 VAC and 24 VDC only)	 2E 2G 2H 6E 6G 6H
Heat proof class B mold	● DC and AC (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP65 or equivalent ● Outdoor use not available	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct conduit wiring can be mounted	 3A
Heat proof class B mold	● DC and AC (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP21 or equivalent ● Outdoor use not available	HP terminal box	● Easy wiring ● Light available (optional - 100, 200 VAC / 24, 100 VDC only)	 3M 3N
Heat proof class B mold	● DC and AC (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP65 or equivalent ● Outdoor use not available	HP terminal box	● Easy wiring ● Light available (optional - 100, 200 VAC / 24, 100 VDC only)	 3I 3J
Heat proof class H taped	● AC dedicated (50/60 Hz common) ● Heat proof temperature 180˚C ● High temperature fluid and high ambient temperature available ● Outdoor use not available ● Protection property symbols: IP00	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct conduit wiring can be mounted	 4A
		HP terminal box	● Easy wiring ● Light available (optional - 100, 200 VAC only)	 4M 4N
Heat proof class B mold with diode	● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion) ● AC dedicated (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP65 or equivalent ● Perfect for places where beat can be a problem ● Outdoor use not available	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct conduit wiring can be mounted	 5A
Heat proof class B mold with diode	● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion) ● AC dedicated (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP21 or equivalent ● Perfect for places where beat can be a problem ● Outdoor use not available	HP terminal box	● Easy wiring ● Light available (optional - 100, 200 VAC only)	 5M 5N
Heat proof class B mold with diode	● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion) ● AC dedicated (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP65 or equivalent ● Perfect for places where beat can be a problem ● Outdoor use not available	HP terminal box	● Easy wiring ● Light available (optional - 100, 200 VAC only)	 5I 5J
		Conduit	● Use a conduit (CTC19 or G1/2) when using direct conduit wiring for the open frame lead wire.	 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.

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*

Coil variations				Appearance
	Heat proof class B mold	● AC dedicated (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP61 or equivalent ● Outdoor use not available	Grommet lead wire: ● Lead wire length 300 mm	2C
	Heat proof class B mold	● DC and AC (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP61 or equivalent ● Outdoor use not available	DIN terminal box: ● Easy wiring and maintenance ● Reliable electric protection (ground terminal) ● Light available (optional - 100, 200 VAC and 24 VDC only)	2E 2G 2H
	Heat proof class B mold	● DC and AC (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP65 or equivalent ● Outdoor use not available	Lead wire: ● Lead wire length 300 mm ● Conduit (CTC19) for direct conduit wiring can be mounted	3A
	Heat proof class B mold	● DC and AC (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP21 or equivalent ● Outdoor use not available	HP terminal box: ● Easy wiring ● Light available (optional - 100, 200 VAC / 24, 100 VDC only)	3M 3N
	Heat proof class B mold	● DC and AC (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP65 or equivalent ● Outdoor use not available	HP terminal box: ● Easy wiring ● Light available (optional - 100, 200 VAC / 24, 100 VDC only)	3I 3J *1
Open frame type	Heat proof class H taped	● AC dedicated (50/60 Hz common) ● Heat proof temperature 180˚C ● High temperature fluid and high ambient temperature available ● Outdoor use not available ● Protection property symbols: IP00	Lead wire: ● Lead wire length 300 mm ● Conduit (CTC19) for direct conduit wiring can be mounted	4A
			HP terminal box: ● Easy wiring ● Light available (optional - 100, 200 VAC only)	4M 4N
	Heat proof class B mold with diode	● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion) ● AC dedicated (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP65 or equivalent ● Perfect for places where beat can be a problem ● Outdoor use not available	Lead wire: ● Lead wire length 300 mm ● Conduit (CTC19) for direct conduit wiring can be mounted	5A
	Heat proof class B mold with diode	● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion) ● AC dedicated (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP21 or equivalent ● Perfect for places where beat can be a problem ● Outdoor use not available	HP terminal box: ● Easy wiring ● Light available (optional - 100, 200 VAC only)	5M 5N
	Heat proof class B mold with diode	● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion) ● AC dedicated (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols: IP65 or equivalent ● Perfect for places where beat can be a problem ● Outdoor use not available	HP terminal box: ● Easy wiring ● Light available (optional - 100, 200 VAC only)	5I 5J *1
			Conduit: ● Use a conduit (CTC19 or G1/2) when using direct conduit wiring for the open frame lead wire.	G H

1: Only ADK1 is supported.

APK21/ADK21

Open frame type

			Appearance
Heat proof class B mold	● DC and AC ● Heat proof temperature 130˚C ● Protection property symbols: IP65 or equivalent ● Outdoor use not available	Lead wire	● Lead wire length 300 mm ● Direct conduit wiring thread CTC19 integrated	3A 
Heat proof class B mold	● DC and AC ● Heat proof temperature 130˚C ● Protection property symbols: IP21 or equivalent ● Outdoor use not available	HP terminal box	● Easy wiring ● Light available (optional - 100, 200 VAC / 24, 100 VDC only)	3M 3N 
Heat proof class H taped	● AC dedicated ● Heat proof temperature 180˚C ● High temperature fluid and high ambient temperature available ● Protection property symbols: IP00 ● Outdoor use not available	Lead wire	● Lead wire length 300 mm ● Direct conduit wiring thread CTC19 integrated	4A 
		HP terminal box	● Easy wiring ● Light available (optional - 100, 200 VAC only)	4M 4N 
Heat proof class B mold with diode	● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion) ● AC dedicated (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols:IP65 or equivalent ● Perfect for places where beat can be a problem ● Outdoor use not available	Lead wire	● Lead wire length 300 mm ● Direct conduit wiring thread CTC19 integrated	5A 
Heat proof class B mold with diode	● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion) ● AC dedicated (50/60 Hz common) ● Heat proof temperature 130˚C ● Protection property symbols:IP21 or equivalent ● Perfect for places where beat can be a problem ● Outdoor use not available	HP terminal box	● Easy wiring ● Light available (optional - 100, 200 VAC only)	5M 5N 
		Conduit	● Use a conduit (G1/2) when using direct conduit wiring for the open frame lead wire.	H 

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.

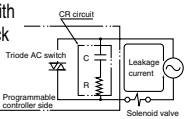
⚠ CAUTION

1 Fluid viscosity

The fluid viscosity must be 50 mm²/s or less. Malfunctions could occur if the viscosity is higher than 50 mm²/s. (This value is 20 mm²/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.



Voltage / Series no.	AC		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>

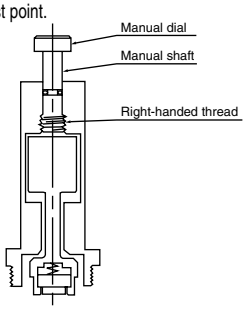
Opening: Insert a flat-tip screwdriver into the slit on the manual shaft, and turn it approx. 120° to the right or left. The plunger will rise up, and the valve will open.
The open state is held even when the screwdriver is removed. Always return the valve to the original position after use.

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.)

<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$^{11}_{12}$ AD$^{11}_{12}$	8A 10A	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
APK11 ADK$^{11}_{12}$	15A 20A	5 to 7 N·m		
	25A	9 to 12 N·m		
AP$^{21}_{22}$ AD$^{21}_{22}$	32 A/F 40 A/F 50 A/F	18 to 28 N·m		
APK21 ADK21	32 A/F 40 A/F 50 A/F		80 to 120 N·m	

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))

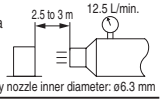
IP-**□ □

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 m² of test sample (exterior) surface area from all directions, for a total of 3 minutes or more.  Spray nozzle inner diameter: ø6.3 mm