AB/AG

(General purpose valve)

General purpose direct acting 2, 3 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, a 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 variations
Including direct acting compact type Rc1/8 (port size) to Rc1.

CONTENTS

⚠ Always read the precautions in the Introduction and page 124 before starting use.

Series variation

General purpose direct acting 2, 3 port solenoid valve

No. of port	Model		Structure	Actuation		Air	Low vacuum (1.33×10^2 Pa (abs))	
2 port		AB21	Discrete	NC (normally closed) type		●		
		AB31				●	●	
		AB41				●	●	
		AB42		NO (normally open) type		●	●	
		AB71		NC (normally closed) type		●		
		GAB312	Manifold	NC (normally closed) type	Common supply	●	●	
		GAB352			Individual supply	●	●	
		GAB412			Common supply	●	●	
		GAB452			Individual supply	●	●	
		GAB422		NO (normally open) type	Common supply	●	●	
3 port		AG31	Discrete	Universal type		●	●	
		AG41				●	●	
		AG33		NC pressurization type		●	●	
		AG43				●	●	
		AG34		NO pressurization type		●	●	
		AG44				●	●	
	Manifold 	GAG31	Manifold	Universal type	Common supply / individual exhaust	●	●	
		GAG35			Common supply / separate flow	●	●	
		GAG41			Common supply / individual exhaust	●	●	
		GAG45			Common supply / separate flow	●	●	
	Actuator 	GAG33		NC pressurization type	Common supply / individual exhaust	●	●	
		GAG43				●	●	
		GAG34	Actuator	NO pressurization type		●	●	
		GAG44				●	●	

Working fluid					Port size						Page
Water	Kerosene	Oil (50 mm²/s or less)	Hot water	Steam	Rc1/8	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1	
●		●			●	●					126
●	●	●	●	●	●*4	●*4					130
●	●	●	●	●		●*4	●*4	●*4			130
●	●	●	●	●		●*4	●*4				130
●	●	●*1						●	●	●	144
●	●	●	●	●		●*2	●*2				148
●	●	●	●	●		●*2	●*2				148
●	●	●	●	●		●*2	●*2				148
●	●	●	●	●		●*2	●*2				148
●	●	●	●	●		●*2	●*2				158
●	●	●	●	●	●*4	●*4					166
●	●	●	●	●		●*4	●*4				166
●	●	●	●	●	●*4	●*4					184
●	●	●	●	●		●*4	●*4				184
●	●	●	●		●*4	●*4					202
●	●	●	●			●*4	●*4				202
●	●	●	●	●	●*2 *3	●*2 *3					174
●	●	●	●	●	●*2 *3	●*2 *3					174
●	●	●	●	●		●*2 *3	●*2 *3				174
●	●	●	●	●		●*2 *3	●*2 *3				174
●	●	●	●	●	●*2 *3	●*2 *3					192
●	●	●	●	●		●*2 *3	●*2 *3				192
●	●	●	●		●*2 *3	●*2 *3					210
●	●	●	●			●*2 *3	●*2 *3				210

* Refer to page 122 for details on the coil system.

*1: 20 mm²/s for AB71 Series.

*2: Port A: Rc1/4, port C: Rc3/8

*3: ● indicates the NO port.

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

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.

Direct acting 2, 3 port solenoid valve (AB/GAB/AG/GAG)

Coil variation

Open frame type

			Appearance
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	Grommet lead wire	● Lead wire length 300 mm		Blank 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 and 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 and 24/100 VDC only)		3I 3J
Heat proof class H taped	● AC dedicated (50/60 Hz common) ● High temperature fluid and high ambient temperature available ● Heat proof temperature 180˚C ● Protection property symbols: IP00 ● Outdoor use not available	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) ● Perfect for places where beat can be a problem ● AC dedicated (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		5A
Heat proof class B mold with diode	● A diode is mounted on the coil section for direct-current conversion (AC-DC conversion) ● Perfect for places where beat can be a problem ● AC dedicated (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 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) ● Perfect for places where beat can be a problem ● AC dedicated (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 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 blank	AC	○	○	○	○
6C *2, *3	DC	—	—	—	○
2E 2G 2H	AC	○	○	○	○
2E 2G 2H	DC	○	○	○	○
6E 6G 6H *2, *3	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.
*3: It is available only for AB41.

Safety precautions

Always read this section before starting use.

Direct acting 2, 3 port solenoid valve (AB/GAB/AG/GAG)

Design & Selection

⚠ WARNING

1 Working fluid

(1) Consult with CKD before using this valve for active gas (combustion gas, acetylene gas, etc.).

(2) Valves for LPG (propane gas, butane gas) are available as custom order, so consult with CKD.

(3) 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.

(4) This valve cannot be used for maintaining the vacuum. Consult with CKD when the vacuum needs to be maintained.

⚠ Caution

1 Continuous energizing

Use the NO pressurization type when using the 3 port valve in a continuously energized state with the NO port pressurized. When continuously energizing the universal or NC pressurization type, use a fluoro rubber seal.

2 Suction sound

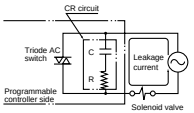
With the AC voltage specifications, a large suction sound may be heard momentarily after energizing. To avoid the suction sound, select the coil with diode or the DC voltage. The suction sound will drop.

3 Fluid viscosity

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

4 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.
Failure to observe this could lead to malfunctions.



Voltage / Model no.	AC		AC diode		DC	
	100 V	200 V	100 V	200 V	12 V	24 V
AB, AG	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 Piping

(1) Always hold the socket with a spanner, etc., if the NO side is a socket.

(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.

2 Wiring

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

When Using

⚠ CAUTION

1 Manual operation

Always observe the following points when using a manual override.

<For NC (normally closed) type>

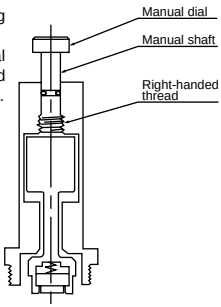
Opening: Insert a flat-tip screwdriver into the slit on the manual shaft, and turn it approx. 120° to the right or left. The plunger will rise up and the valve will open. (For the 3 port valve, the NC side valve seat will open and the NO side valve seat will close.)
The open state is held even when the 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. (For the 3 port valve, the NC side valve seat will close and the NO side valve seat will open.) (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 When disassembling or assembling, tighten the core assembly and socket with the following tightening torques.

Model no.	Core assembly tightening torque	Socket tightening torque	Nut tightening torque
AB	30 to 45 N·m	-	8 to 16 N·m
AG	30 to 45 N·m	8 to 16 N·m	8 to 16 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 could directly contact 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))

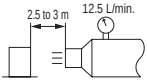
IP-**

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^2 of test sample (exterior) surface area from all directions, for a total of 3 minutes or more.  Spray nozzle inner diameter: ø6.3 mm