DIRECT OPERATED SOLENOID VALVES

A Series

Metal Seal, In-line Mounting/Sub-base Mounting

TÜV CERT
ISO 9001
Cert. No. 09 100 5769
ISO 14001
Cert. No. 01 104 010775

Parker KURODA

ENGINEERING YOUR SUCCESS.

LAPPED SPOOL & SLEEVE, DIRECT OPERATED SOLENOID VALVES

A Series

The solenoid-operated air valves of this series are types metal seal and a spool valve. This provides a choice of 3-way (3 ports), 4-way (5 ports), 3-position with single or double solenoid, and 3-position with closed center or exhaust center models, in conformity with customer's requirements.

High Strength

Body, solenoid cover and sub-base are of aluminum alloy castings of high strength.

Simple Construction

Extreme simplification in construction design assures trouble-free valves and easy maintenance.

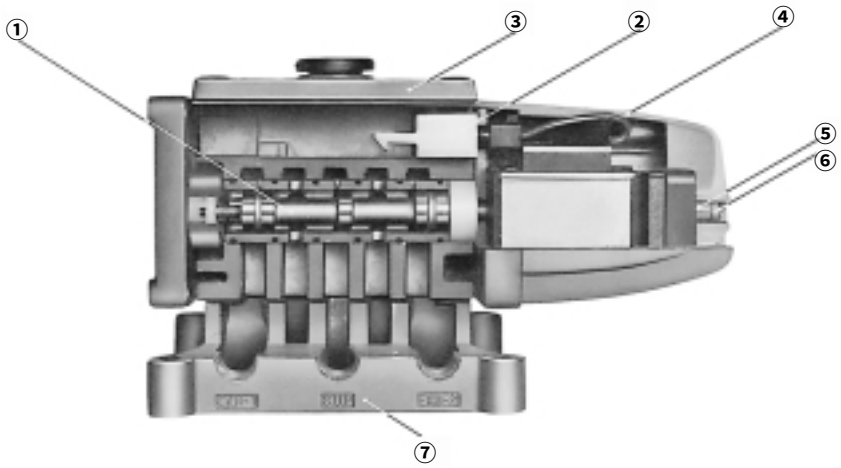
Small Size, light Weight

Light weight and compact type makes installation easy.

Easy Maintenance

KURODA air valves are mounted on base, facilitating parts interchangeability without disturbing mounting or piping connections.

- By plugging the unused ports, these valves can be utilized as normally open or normally closed 3-way or 2-way valves.
- Also usable as dual-pressure, 4-way or 3-way valves by piping two pressures into the exhaust ports, thus rendering the center port as a common exhaust.
  Different pressures have no effect on the operation of this balanced spool valves.



①Precision Lapped Spool and Sleeve

Precision lapped spool and sleeve are made of special heat-treated stainless steel, offering wear-resistance, corrosion-resistance and the longest life guarantee.

②Large-sized Terminal

The terminal with spring washer is large enough to make wiring easier and prevent unsatisfactory contact. The clamping plate moves up and down with the screw movement to speed wiring.

③Indicator Light (Optional)

Indicator light can be incorporated upon request. The light gives visual indication of solenoid energization.

④Easily Replaceable Solenoid Unit

The solenoid and its cover are unified. Easily installed or replaced by loosening four captive screws. The highly dependable solenoid is rated for continuous duty.

⑤Manual Piston Switch

Manual piston switch permits manual operation of the valve with electrical power off.

⑥Locking button (Optional)

Locking button can be mounted

⑦Bottom porting, Manifold Mounting are Available

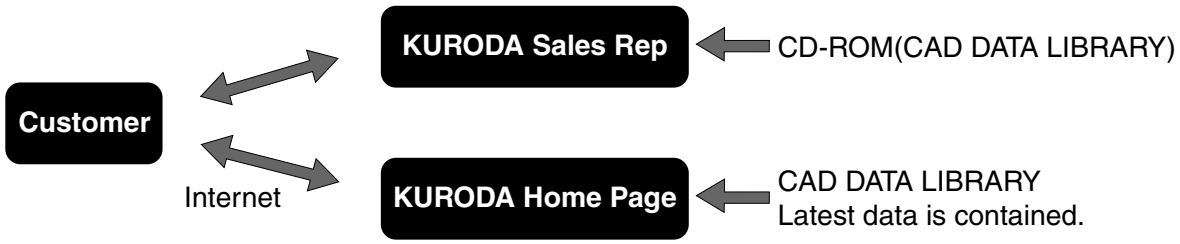
CONTENTS

INTRODUCTION OF KURODA CAD DATA LIBRARY

KURODA CAD DATA LIBRARY contains CAD data of pneumatic equipment, ball screws, support units and single-axis modules.
In addition, various tools for selecting pneumatic equipment and ball screws are listed in it. Please use this library to improve the design performance of your FA related equipment.

How to Obtain CAD Data Library

CAD Data Library is available from CD-ROM supplied by our company or our company's Home Page via Internet. For a CD-ROM, please ask KURODA sales representative in charge of your company.



http://www.kuroda-precision.co.jp/e-top

Kind of CAD data

Type of data		CD-ROM	Home Page
DXF	r12	○	○
DWG(AUTO CAD)＊1	r12	○	○＊2

※1：Name of CAD software is our company's registered trademark.
※2：Some of DWG type product data are not contained

How to Download from Home Page

Access KURODA Home Page
http://www.kuroda-precision.co.jp/e-top
↓
FA Internet Service
↓
Download Service
↓
User Registration
↓
Download

(Note) CAD data is classified by each product and contained in a self-extracting exectable file format (.exe).

CAD Data of Main Pneumatic Equipment

①Pneumatic Actuators
Series of air cylinders and rotary actuators are listed in CAD DATA LIBRARY.

②Pneumatic Grippers/Vacuum Equipment
Series of parallel grippers, rotary opening/closing grippers, vacuum units and pads are listed in it.

③Control Valves
Series of solenoid valves such as ADEX VALVEs are listed in it.

④Other Equipment
Series of speed controllers, joints, etc. are listed in it.

⑤Air Cleaning Equipment
Series of FRL combination QUBE are listed in it.

FOR SAFETY USE

Be sure to read the following instructions before use.
For common and individual instructions, refer to the text of this catalogue.

The following safety precautions are provided to prevent damage and danger to personnel and to provide instructions on the correct usage of this product. These precautions are classified into 3 categories; **"CAUTION"**, **"WARNING"** and **"DANGER"** according to the degree of possible injury or damage and the degree of impendence of such injury or damage.
Be sure to comply with all precautions along with JIS B8370(※1) and ISO 4414(※2), as they include important content regarding safety.

⚠CAUTION	: Indicates a potentially hazardous situation which may arise due to improper handling or operation and could result in personal injury or property-damage-only accidents.
⚠WARNING	: Indicates a potentially hazardous situation which may arise due to improper handling or operation and could result in serious personal injury or death.
⚠DANGER	: Indicates an impending hazardous situation which may arise due to improper handling or operation and could result in serious personal injury or death.

(※1) JIS B8370 : General Rules for Pneumatic Systems
(※2) ISO 4414 : Pneumatic fluid power-General rules relating to systems

⚠WARNING

●The applicability of pneumatic equipment to the intended system should be judged by the pneumatic system designer or the personnel who determined specifications for such system.

As operating conditions for products contained in this catalogue are diversified, the applicability of pneumatic equipment to the intended system should be determined by the pneumatic system designer or the personnel who determined specifications for such system after conducting an analysis or testing as necessary.
The system designer shall be responsible for assuring the intended system performance and safety.
Before making a system, the system designer should thoroughly examine all specifications for such a system and also take into consideration the possibility of any trouble with the equipment.

●The pneumatic equipment should be handled by persons who have sufficient knowledge and rich experience.

Inproper handling of compressed air will result in danger.
Assembling, operation and maintenance of machinery using pneumatic equipment should be performed by persons who have sufficient knowledge and rich experience.

●Never operate machinery nor remove the equipment until safety is assured.

- Before checking or servicing machinery and equipment, be sure to check that steps for prevention of dropping or runaway of the driven component have been completely taken.
- When removing the equipment, make sure that the above-mentioned safety measures have been done beforehand.
  Then turn off air supply and power to the system and purge compressed air in the system.
- When restarting machinery and equipment, check that proper prevention of malfunction has been provided for and then restart carefully.

●When using the pneumatic equipment in the following conditions or environments, take the proper safety measures and consult KURODA beforehand.

- Conditions and environments other than specified and outdoor use.
- Applications to nuclear power equipment, railroads, aircraft, vehicles, medical equipment, equipment connected with food and drink, amusement facilities and safety devices such as emergency interruption devices, clutch/brake circuits for a press and the likes.
- Applications which require extreme safety and will also greatly affect men and property.

SOLENOID VALVES/COMMON INSTRUCTIONS ①

Be sure to read them before use.
Also refer to Par. "For Safety Use" and instructions mentioned for each series of solenoid valves.

DESIGN

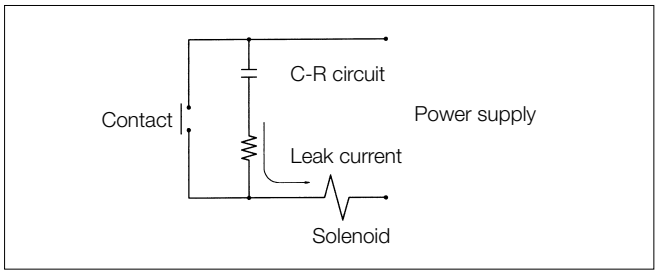
⚠ WARNING

- **Stopping actuator at intermediate position**
  When stopping the actuator at an intermediate position using a solenoid valve listed in this catalogue, it is difficult to stop it accurately because of the compressibility of air, unlike a hydraulic cylinder can dose.
  In addition, as the solenoid valve and air cylinder allow a certain degree of air leak, they cannot stop at the fixed position for a long period of time according to circumstances. When it is required to stop them at the fixed position for a long period of time, contact KURODA.
- **Keeping pressure (including vacuum)**
  As the solenoid valve is designed to allow a certain degree of air leak, it cannot be used to keep pressure (including vacuum) in a pressure vessel etc.
- **Do not use for emergency shutoff valves.**
  Solenoid valves listed in this catalogue are not designed for use in emergency shutoff valves and other safety applications.
  When using the solenoid valve for such applications, provide an independent means to assure safety.
- **Exhausting residual air**
  Provide a residual air exhausting function in due consideration of maintenance and inspection. Doing maintenance and inspection without exhausting residual air may sometimes malfunction the actuator.
  When using a 3-position closed center type solenoid valve, compressed air is shut in between solenoid valve and actuator even if residual air from the air supply side to the solenoid valve is exhausted.
  Therefore, provide a means to exhaust the residual air pressure separately.
- **Use in vacuum**
  When using a solenoid valve for diverting vacuum and other applications, check specifications for the valve and select a proper one that can be used in vacuum.
  In order to prevent sucking foreign matters from the suction pad and exhaust port, provide an inline filter between the suction pad and solenoid valve and at the exhaust port.
- **Applying current continuously for long time**
  When using a solenoid valve while applying current to it continuously for a long period of time, contact KURODA beforehand.
- **Avoid applying current simultaneously.**
  When using a double-solenoid valve while applying current to it continuously for a long period of time, do not apply current to both solenoids simultaneously ; otherwise the coil may be burnt out or the main valve may malfunction.
- **Remodeling the solenoid valve**
  Do not remodel the solenoid valve.

DESIGN

⚠ CAUTION

- **Applying current momentarily**
  When using a double-solenoid type valve, apply current for the prescribed period of time (0.1 sec.). If current is not applied for the prescribed period of time, the solenoid valve may not perform the diverting action acording to circumstances.
- **Leak current**
  When a C-R element is used in the contact protective circuit (surge voltage protection), leak current will flow through the C-R element.
  If this leak current becomes large, a malfunction will occur. Therefore, reduce leak current to less than 1 mA.



- **Use at low temperature**
  When using a solenoid valve at 5 **℃** or below, provide an air dryer or other proper means to prevent moisture from solidifying or freezing.
- **Use with air blow**
  When using a solenoid valve with air blow, select a direct-operated type or external pilot type solenoid valve.
  When an internal pilot type solenoid valve is used, it may not perform the diverting action due to a pressure drop at the time of air blow.
  When an external pilot type solenoid valve is used, supply compressed air within the specified pressure range to the pilot port.
- **Mounting position and direction**
  A solenoid valve can be mounted in any position and direction as a general.
  However, a metal seal type double-solenoid valve and a 3-position solenoid valve should be mounted so that the spool may be horizontal.
- **Shock and vibration**
  Reduce shocks and vibrations applied to the solenoid valve to less than the prescribed value. (refer to specifications.)
  Applying shocks and vibrations exceeding the prescribed value may result in a malfunction of the solenoid valve.

SOLENOID VALVES/COMMON INSTRUCTIONS ②

Be sure to read them before use.
Also refer to Par. "For Safety Use" and instructions mentiond for each series of solenoid valves.

SELECTION

WARNING

- **Refer to specifications.**
  Solenoid valves listed in this catalogue are designed for compressed air. When using other fluid than compressed air, contact KURODA beforehand.
  Do not use a solenoid valve at pressure and temperature outside the range of specifications, otherwise resulting in a breakdown or malfunction.

MOUNTING

WARNING

- **When mounting the solenoid valve, firmly fix it while using care to prevent the stationary part and joint from loosening.**
  If the solenoid valve is mounted with insufficient strength, it may sometimes come off.
- **Do not start the system until it is ensured that equipment works properly.**
  After mounting the solenoid valve, connect power supply and then perform a functional test and a leak test. Check that it has been correctly mounted and works properly, before starting the system.
- **Coating with paint**
  When coating the resin portion with paint, it may be adversely affected by paint and solvent. For the propriety of painting, contact KURODA beforehand.
  Do not peel off the nameplate affixed on the solenoid valve and do not erase or smear out the letter on it.
- **Provide space for maintenance and inspection.**

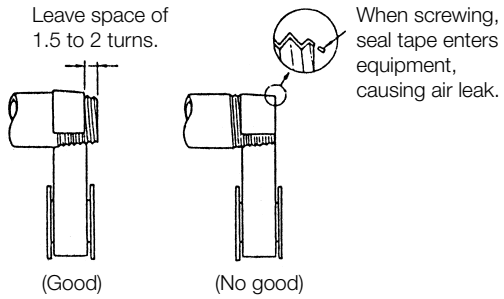
CAUTION

- **Fit an air muffler to the exhaust port (ports 3, 5) of the solenoid valve.**
  Dust or foreign matter that enters it may cause a malfunction of the solenoid valve.
- **Do not wipe off the model name inscribed on a nameplate etc. with organic solvent.**
  The inscribed indication may be erased.

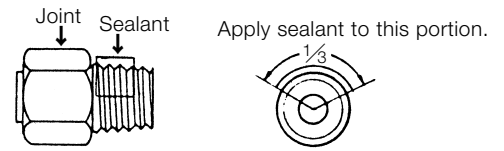
PIPING

CAUTION

- **Before piping**
  Thoroughly flush the inside of each pipe to remove chips, coolant, dust, etc. before piping.
- **How to wind a seal tape**
  When winding a seal tape around the threaded portion, leave space of 1.5 to 2 thread turns.



- **How to apply liquid sealant**
  When applying liquid sealant to the threaded portion, apply a proper amount to about 1/3 of the periphery of the threaded portion and then screw it.



- **Screw of pipe and joint**
  When screwing the pipe and joint, use care to prevent chips and sealant from entering the pipe and joint.
  Tighten them within a proper range of clamping torque.

Port size	Clamping torque (N·m)
M3	0.3〜 0.5
M5	1.5〜 2.0
R, Rc1/8	7.0〜 9.0
R, Rc1/4	12 〜14
R, Rc3/8	2 〜24
R, Rc1/2	28 〜30
R, Rc3/4	28 〜30
R, Rc1	36 〜38
R, Rc1 1/4	40 〜42
R, Rc1 1/2	48 〜50

SOLENOID VALVES/COMMON INSTRUCTIONS ③

Be sure to read them before use.
Also refer to Par. "For Safety Use" and instructions mentioned for each series of solenoid valves.

PIPING

CAUTION

- **Avoid wrong piping.**
  When connecting a pipe to a solenoid valve, be careful not to mistake the supply port by referring to the nameplate affixed to the product or the product catalogue.
- **When using a 3-position closed center type solenoid valve :**
  Thoroughly check the piping between solenoid valve and actuator for air leak.

WIRING

WARNING

- **When doing wiring work, be sure to turn off compressed air and power supplies beforehand.**
  Wiring work without turning off air and power supplies may cause an electric shock or malfunction ; this sometimes results in an injury to the human body or a damage to property.
- **Avoid mis-wiring.**
  Some solenoid valves have polarity : Those operating on DC with built-in indicator light and those equipped with surge protective circuit.
  When wiring to a solenoid valve, check whether or not it has polarity.
  For a solenoid valve having polarity, check the lead wire color and symbol of the polarity by the catalogue or actual article beforehand and then make correct wiring.
  Mis-wiring will result in the following problems :
  (Where no polarity protective diode is incorporated :)
  Wiring to the wrong polarity will burn out the diode in the solenoid valve, the switching element on the control unit side or the power supply unit.
  (Where a polarity protective diode is provided :)
  Wiring to the wrong polarity will not cause the solenoid valve to perform a diverting action.
- **Avoid applying stress and tensile force to lead wire repeatedly.**
  Wiring made in such a manner that stress and tensile force are repeatedly applied to the lead wire will result in the breaking of wire. Provide some degree of margin for wiring.
- **Check that there is no insulation failure.**
  If an insulation failure occurs in the lead wire connection, extension cable and terminal base, an excess flows to the switching element of the solenoid valve or control unit, sometimes resulting in a damage.
- **Do not mistake applied voltage.**
  Mistake in applied voltage in case of wiring to a solenoid valve will cause an operation failure or burn out the coil.
- **After completion of wiring, check for wrong connection before turning on power.**

OPERATING ENVIRONMENTS

DANGER

- **Do not use solenoid valve in a explosive environment.**

WARNING

- **Do not use a solenoid valve in atmospheres containing corrosive gases, chemicals, seawater, water and vapor and in places where a solenoid valve contacts these matters.**
- **Do not use a solenoid valve in a place where vibrations or shocks are directly applied to it.**
- **When a solenoid valve is exposed to the direct sunlight, fit a protective cover to the solenoid valve.**
- **When a solenoid valve is located around a heat source, shut off the radiant heat.**
- **When installing a solenoid valve in the control panel, take proper heat-radiating measures so that the inside temperature may be kept within the specified temperature range.**
- **When using a solenoid valve in a place where it is exposed to welding spatters, provide a protective cover or other proper prevention.**
  Welding spaters may burn out the plastic parts of the solenoid valve, sometimes resulting in a fire.

LUBRICATION

CAUTION

- **Solenoid valves listed in this catalogue are non-lubrication.**
  The non-lubricated solenoid valve can be used without lubrication, but can be used with lubrication.
  When using it with lubrication, do not discontinue supplying oil.
  Otherwise, the applied lubricant may run off, sometimes resulting in an operation failure.
  When using a lubricant, Class 1 turbine oil ISO VG 32 (contaiinning additive) is recommended.

SOLENOID VALVES/COMMON INSTRUCTIONS ④

Be sure to read them before use.
Also refer to Par. "For Safety Use" and instructions mentioned for each series of solenoid valves.

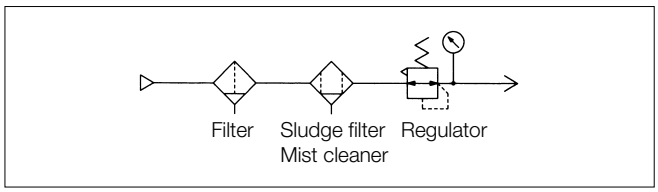
QUALITY OF AIR

⚠ WARNING

- **Use pure air.**
  Compressed air containing corrosive gases, chemicals, salt, etc. causes a breakdown or operation failure. So do not use such air.

⚠ CAUTION

- **Fit an air filter with filtration of 5 μm or fine.**
- **Install an air dryer.**
  Compressed air containing much drainage causes the operation failure of pneumatic equipment. Install an air dryer, lower the temperature and reduce drainage.
- **Take proper countermeasures against sludge.**
  If sludge produced in compressor oil enters pneumatic equipment, it will cause the operation failure of pneumatic equipment. It is recommendable to use compressor oil (NISSEKI FAIRCALL A68, IDEMITSU DAPHUNY SUPER CS68) featuring minimized sludge production or use a sludge filter or mist cleaner to prevent sludge from entering the pneumatic equipment.



MAINTENANCE AND INSPECTION

⚠ WARNING

- **Inspection before maintenance**
  First check that load drop prevention has been provided.
  Then shut off air and power supplies to the system and exhaust residual air in the system beforehand.
  For a 3-position closed center type solenoid valve, compressed air is sealed between solenoid valve and cylinder.
  Exhaust this residual compressed air.
- **Inspection after maintenance**
  When restarting the system, check that preventive measures against flying-out of the actuator have been taken. Then connect compressed air supply to the pneumatic system, and perform a proper functional test and a leak test to check that it works safely without fail, before starting the system.
- **Operation at low frequency**
  To prevent an operation failure, perform the switching action of the solenoid valve once per 30 days. (Be careful of air supply.)
- **Manual operation**
  When the solenoid valve is manually operated, the system connected to it is also operated. Make sure safety before operation.
- **Disassembly of solenoid valve**
  When disassembling the solenoid valve, contact KURODA beforehand.

⚠ CAUTION

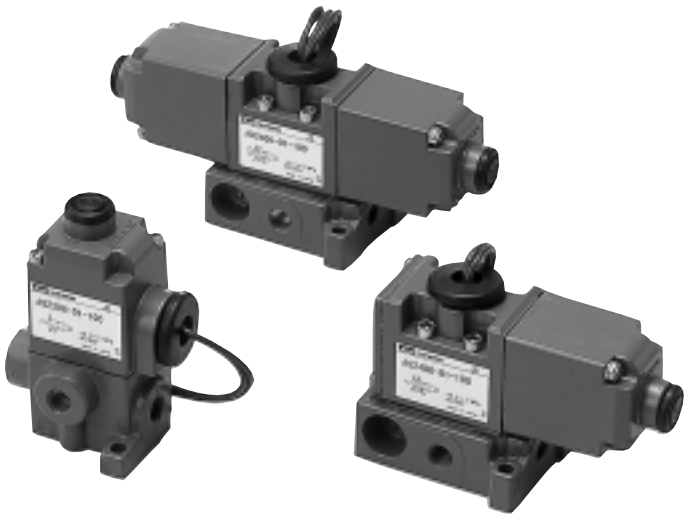
- **Draining**
  To keep the quality of air to a certain level, drain the air filter at periodical intervals.

3/5-PORT DIRECT OPERATED SOLENOID VALVES

A06 Series

Metal Seal, In-line mounting/Sub-base Mounting type

AS2306	2-position Single solenoid
AS2406	2-position Single solenoid
AD2406	2-position Double solenoid
AD3406	3-position Closed center
ADE3406	3-position Exhaust center



SPECIFICATIONS

Model No.			Unit	AS2306	AS2406	AD2406	AD3406	ADE3406
Fluid				Non-lubricated/lubricated air				
Port size				Rc1/8、1/4				
Effective area			mm²	9	10	10	9	9
Cv value				0.49	0.54	0.54	0.49	0.49
Operating ambient temperature			℃	−5〜60				
Operating pressure range			MPa	−0.1〜1				
Maximum frequency			Cycle/min	600	600	600	360	360
Response time (at 0.5MPa)			s (Average)	0.012	0.013	0.012	0.015	0.015
Rated voltage			V	AC100、200、110、220				
Grade of insulation				JIS grade B				
Permissible voltage fluctuation			%	±10				
Rated frequency			Hz	50/60				
Power consumption	Holding	50Hz	VA	13			13	
		60Hz	VA	8.5			8.5	
	Inlush	50Hz	VA	37			43	
		60Hz	VA	32			39.5	
Mass			kg	0.34	0.47	0.66	0.68	0.68

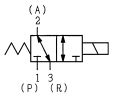
(Note) • When temperature of valve site gose down below 5 ℃, complete dry air shall be supplied to prevent from freezing.
• Effective area shown above is value between ports 1 and 2, 4.
• Response time shown above is in accordance with JIS B 8375.

ORDERING INSTRUCTION

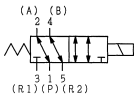
AS2406 – 02 – 100
① ② ③

①Function

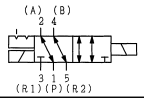
AS2306



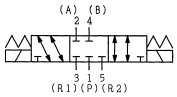
AS2406



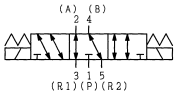
AD2406



AD3406



ADE3406



②Port size

01	Rc1/8
02	Rc1/4

③Voltage

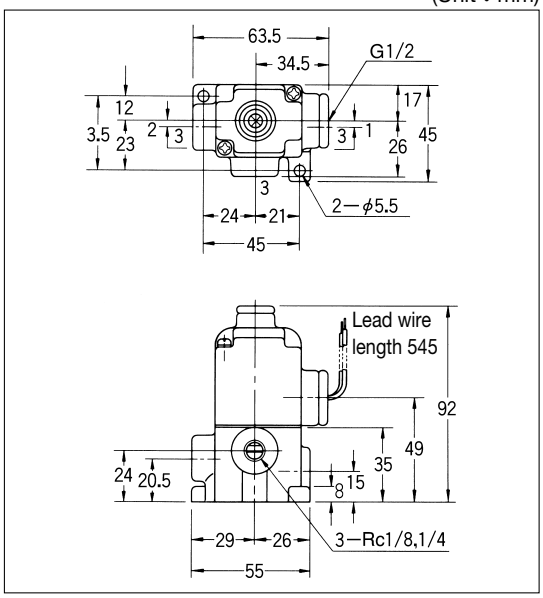
100	AC100V
110	AC110V
200	AC200V
220	AC220V

OPTIONAL PARTS AND SPARE PARTS

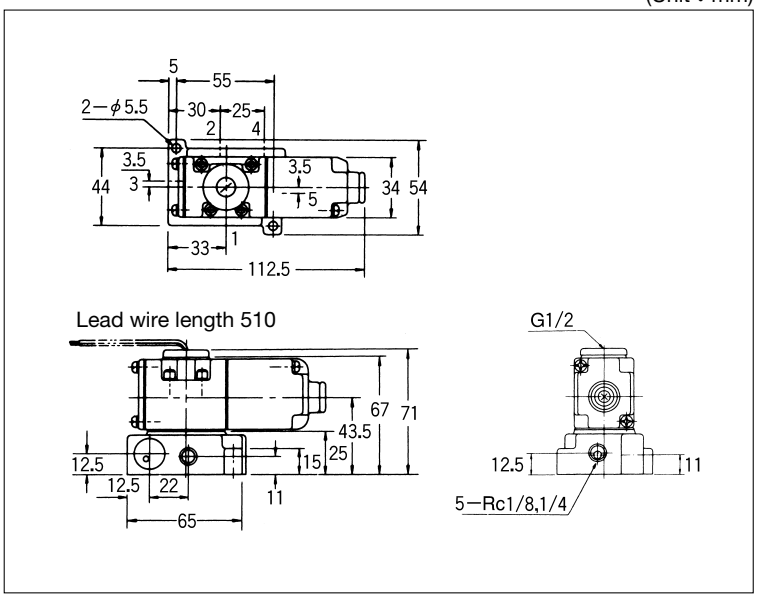
Parts Name		Model No.
Solenoid	AC 100V	A06-103
	AC 110V	A06-10310
	AC 200V	A06-203
	AC 220V	A06-20320
Sub-base	Rc1/8	A06-SB-01
	Rc1/4	A06-SB-02
Base gasket		A06-G
Spring	For 2-position	A06-SS
	For 3-position	A06-3S

DIMENSIONS

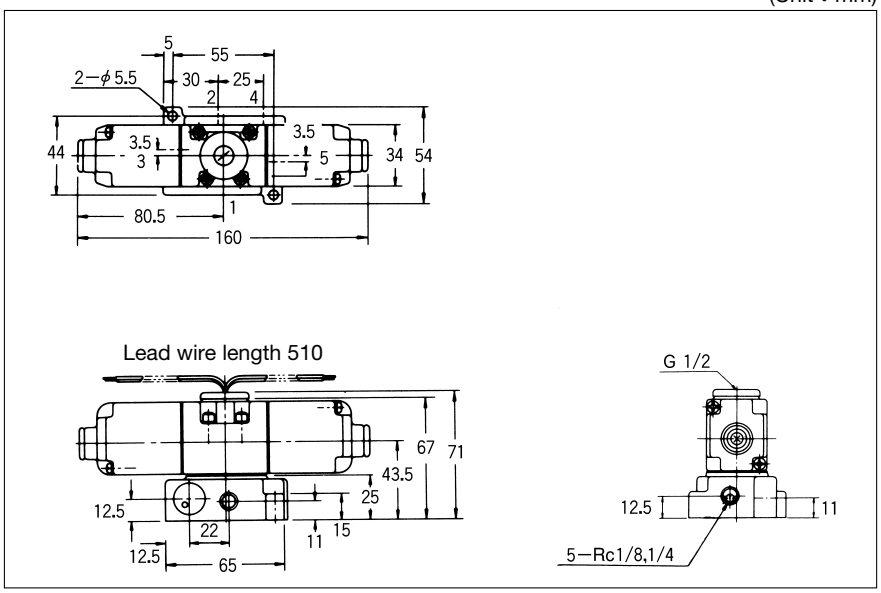
AS2306 (Unit：mm)



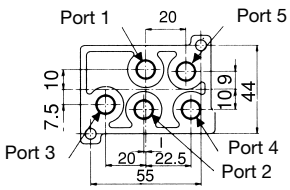
AS2406 (Unit：mm)



AD2406 (Unit：mm)

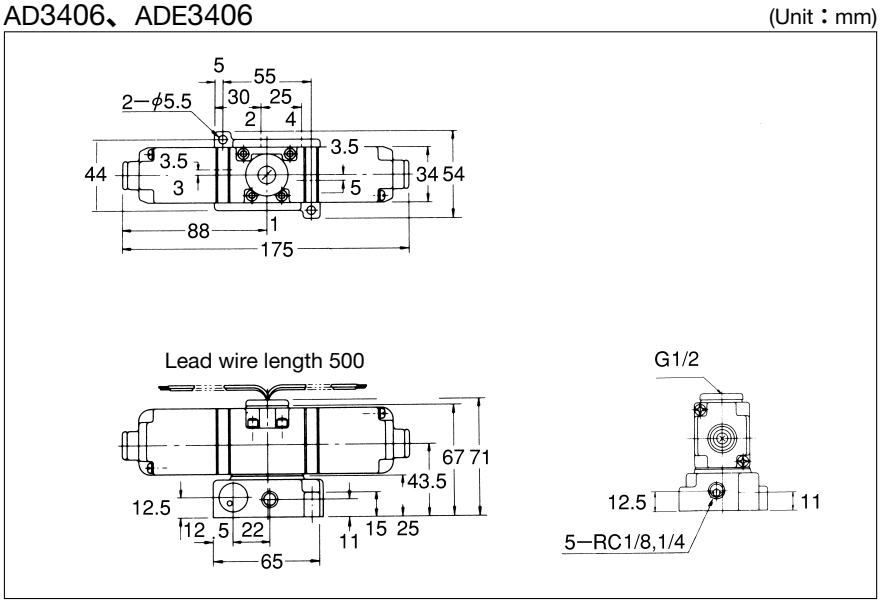


Bottom porting (Unit：mm)



Port size：Rc1/8
Bottom porting is made to order

AD3406、ADE3406 (Unit：mm)



3/5-PORT DIRECT OPERATED SOLENOID VALVES

A08 Series

Metal Seal, In-line mounting/Sub-base Mounting type

AS2308	2-position Single solenoid
AS2408	2-position Single solenoid
AD2408	2-position Double solenoid
AD3408	3-position Closed center
ADE3408	3-position Exhaust center

SPECIFICATIONS

Model No.			Unit	AS2308	AS2408	AD2408	AD3408	ADE3408
Fluid				Non-lubricated/lubricated air				
Port size				Rc1/4、3/8				
Effective area			mm^2	22	30	30	25	25
Cv value				1.19	1.63	1.63	1.36	1.36
Operating ambient temperature			℃	−5〜60				
Operating pressure range			MPa	−0.1〜1				
Maximum frequency			Cycle/min	400	400	400	250	250
Response time (at 0.5MPa)			s (Average)	0.013	0.015	0.01	0.015	0.015
Rated voltage			V	AC100、200、110、220				
Grade of insulation				JIS grade B				
Permissible voltage fluctuation			%	±10				
Rated frequency			Hz	50/60				
Power consumption	Holding	50Hz	VA	25			25	
		60Hz	VA	14			14	
	Inlush	50Hz	VA	130			170	
		60Hz	VA	110			140	
Mass			kg	0.7	1.0	1.4	1.5	1.5

(Note) • When temperature of valve site gose down below 5 ℃, complete dry air shall be supplied to prevent from freezing.
• Effective area shown above is value between ports 1 and 2, 4.
• Response time shown above is in accordance with JIS B 8375.

A08 Series

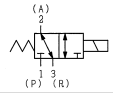
ORDERING INSTRUCTION

AS2408 – 02 – 100 P

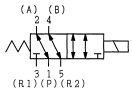
① ② ③ ④

①Function

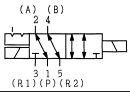
AS2308



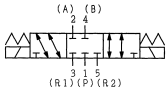
AS2408



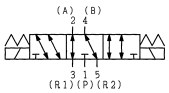
AD2408



AD3408



ADE3408



②Port size

02	Rc1/4
03	Rc3/8

③Voltage

100	AC100V
110	AC110V
200	AC200V
220	AC220V

④Versions

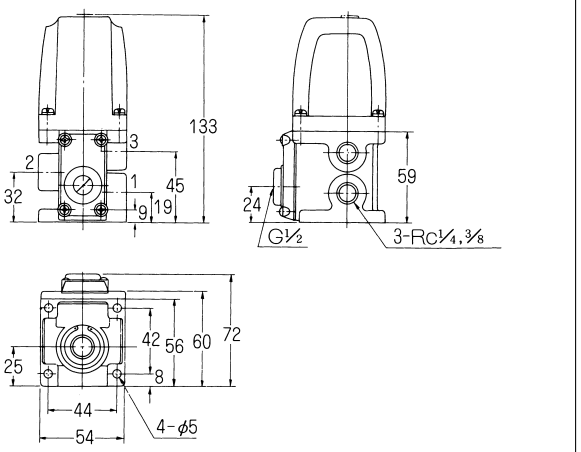
No mark	Standard
I	With indicator light
K	With surge suppressor
P	With indicator light & surge suppressor

OPTIONAL PARTS AND SPARE PARTS

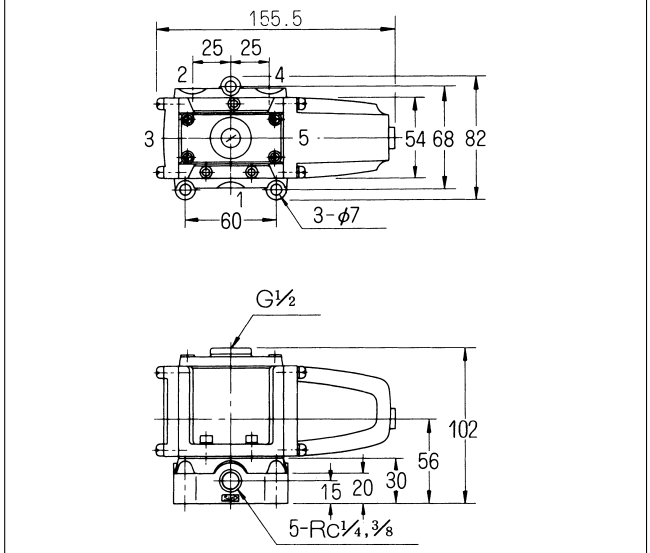
Parts Name		Model No.
Solenoid unit for 2-position	AC 100V	A08-105
	AC 110V	A08-10510
	AC 200V	A08-205
	AC 220V	A08-20520
Solenoid unit for 3-position	AC 100V	A08-109
	AC 110V	A08-10910
	AC 200V	A08-209
	AC 220V	A08-20920
Sub-base	Rc1/4	A08-SB-02
	Rc3/8	A08-SB-03
Base gasket		A08-G
Spring	For 2-position	A08-SS
	For 3-position	A08-3S

DIMENSIONS

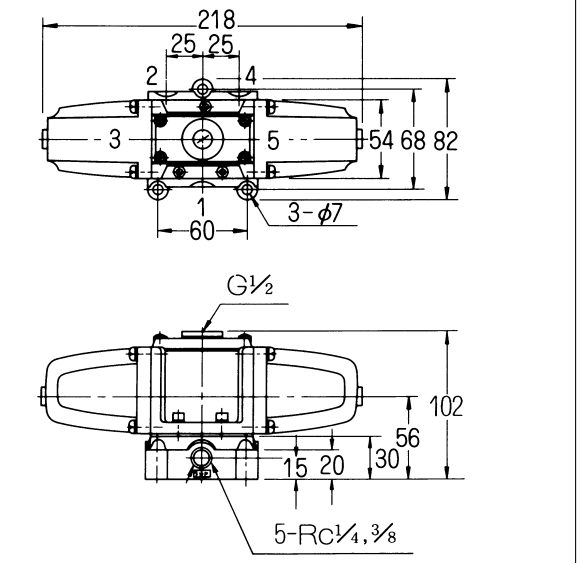
AS2308 (Unit：mm)



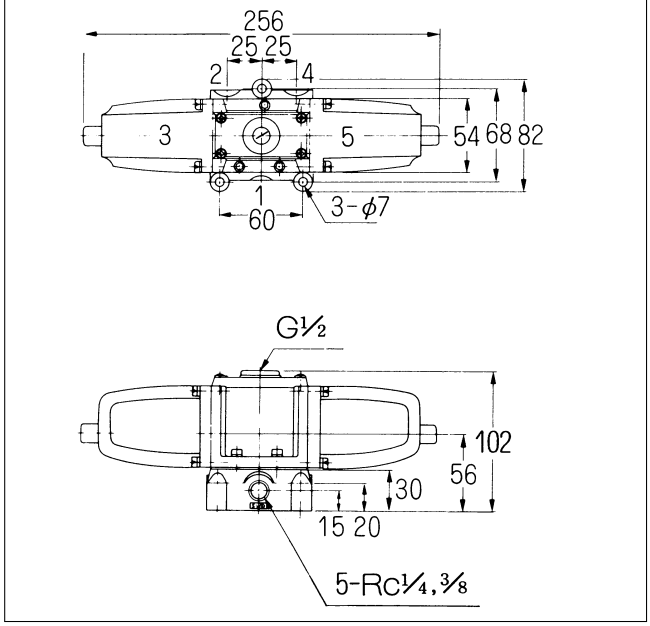
AS2408 (Unit：mm)



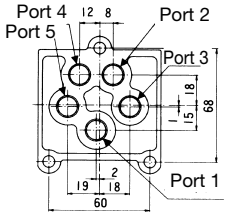
AD2408 (Unit：mm)



AD3408、ADE3408 (Unit：mm)



Bottom porting (Unit：mm)



Port size：**Rc**$^{1}/_{4}$

※Bottom porting is made to order

3/5-PORT DIRECT OPERATED SOLENOID VALVES

A10 Series

Metal Seal, In-line mounting/Sub-base Mounting type

AS2310	2-position Single solenoid
AS2410	2-position Single solenoid
AD2410	2-position Double solenoid
AD3410	3-position Closed center
ADE3410	3-position Exhaust center

SPECIFICATIONS

Model No.			Unit	AS2310	AS2410	AD2410	AD3410	ADE3410
Fluid				Non-lubricated/lubricated air				
Port size				Rc3/8、1/2	Rc1/4、3/8、1/2			
Effective area			mm²	38	50	50	50	50
Cv value				2.06	2.71	2.71	2.71	2.71
Operating ambient temperature			℃	−5〜60				
Operating pressure range			MPa	−0.1〜1				
Maximum frequency			Cycle/min	350	350	350	200	200
Response time (at 0.5MPa)			s (Average)	0.016	0.02	0.015	0.015	0.015
Rated voltage			V	AC100、200、110、220				
Grade of insulation				JIS grade B				
Permissible voltage fluctuation			%	±10				
Rated frequency			Hz	50/60				
Power consumption	Holding	50Hz	VA	36			36	
		60Hz	VA	27			27	
	Inlush	50Hz	VA	290			430	
		60Hz	VA	250			360	
Mass			kg	1.3	1.9	2.7	2.9	2.9

(Note) • When temperature of valve site gose down below 5 ℃, complete dry air shall be supplied to prevent from freezing.
• Effective area shown above is value between ports 1 and 2, 4.
• Response time shown above is in accordance with JIS B 8375.

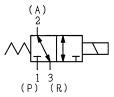
ORDERING INSTRUCTION

AS2410 – 03 – 100 P

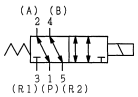
① ② ③ ④

①Function

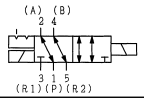
AS2310



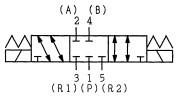
AS2410



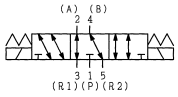
AD2410



AD3410



ADE3410



②Port size

02	Rc1/4
03	Rc3/8
04	Rc1/2

③Voltage

100	AC100V
110	AC110V
200	AC200V
220	AC220V

④Versions

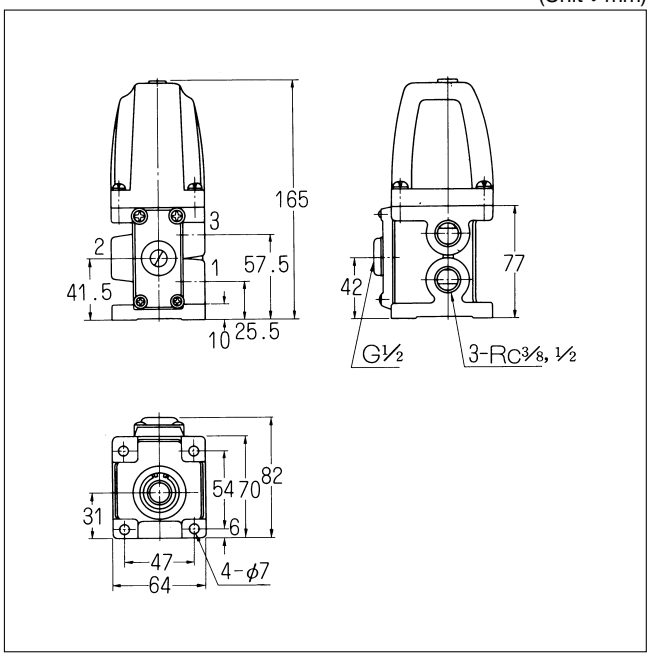
No mark	Standard
I	With indicator light
K	With surge suppressor
P	With indicator light & surge suppressor

OPTIONAL PARTS AND SPARE PARTS

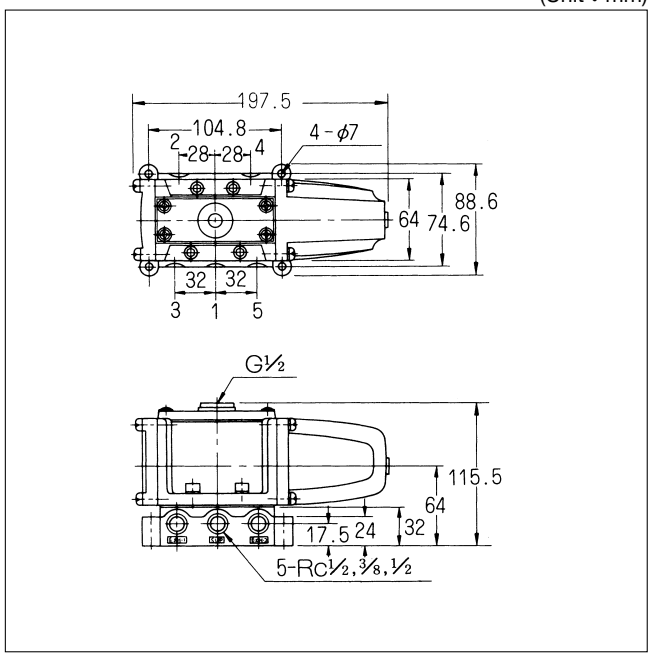
Parts Name		Model No.
Solenoid unit for 2-position	AC 100V	**A**10-106
	AC 110V	**A**10-10610
	AC 200V	**A**10-206
	AC 220V	**A**10-20620
Solenoid unit for 3-position	AC 100V	**A**10-113
	AC 110V	**A**10-11310
	AC 200V	**A**10-213
	AC 220V	**A**10-21320
Sub-base	**Rc1/4**	**A**10-**SB**-02
	Rc3/8	**A**10-**SB**-03
	Rc1/2	**A**10-**SB**-04
Base gasket		**A**10-**G**
Spring	For 2-position	**A**10-**SS**
	For 3-position	**A**10-3**S**

DIMENSIONS

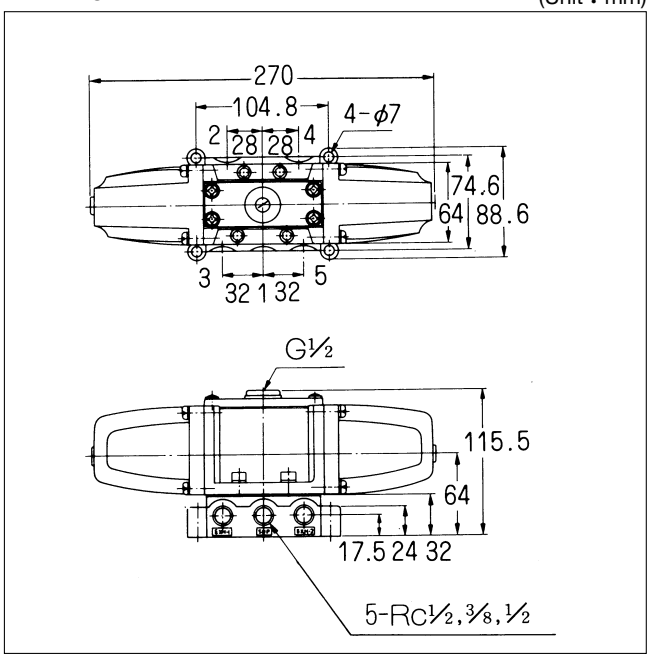
AS2310 (Unit：mm)



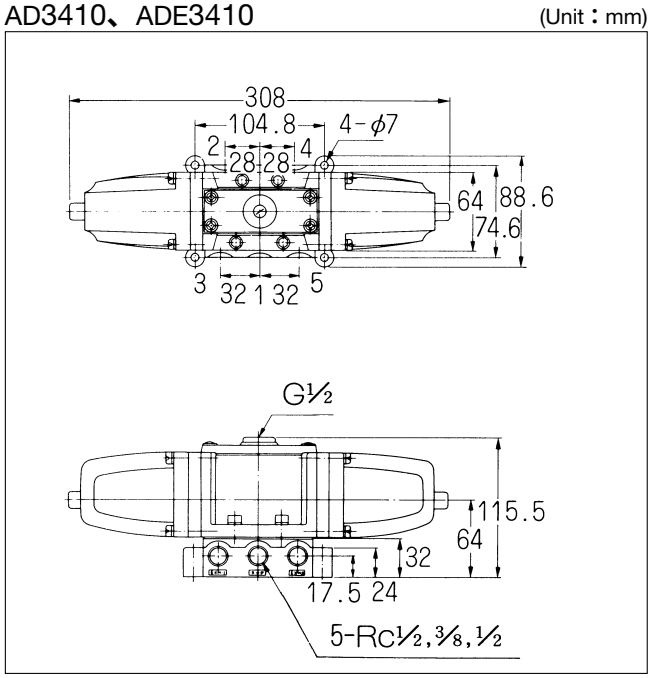
AS2410 (Unit：mm)



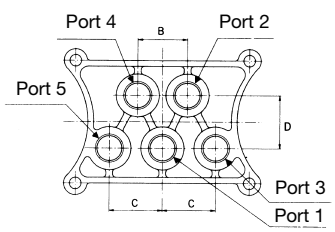
AD2410 (Unit：mm)



AD3410、ADE3410 (Unit：mm)



Bottom porting (Unit：mm)



Port size：**Rc**$\frac{1}{4}$、$\frac{3}{8}$

※Bottom porting is made to order

3/5-PORT DIRECT OPERATED SOLENOID VALVES

A15 Series

Metal Seal, In-line mounting/Sub-base Mounting type

AS2315	2-position Single solenoid
AS2415	2-position Single solenoid
AD2415	2-position Double solenoid
AD3415	3-position Closed center
ADE3415	3-position Exhaust center

SPECIFICATIONS

Model No.			Unit	AS2315	AS2415	AD2415	AD3415	ADE3415
Fluid				Non-lubricated/lubricated air				
Port size				Rc1/2、3/4				
Effective area			mm²	80	75	75	75	75
Cv value				4.34	4.07	4.07	4.07	4.07
Operating ambient temperature			℃	−5〜60				
Operating pressure range			MPa	−0.1〜1				
Maximum frequency			Cycle/min	150	150	150	150	150
Response time (at 0.5MPa)			s (Average)	0.018	0.035	0.025	0.020	0.020
Rated voltage			V	AC100、200、110、220				
Grade of insulation				JIS grade B				
Permissible voltage fluctuation			%	±10				
Rated frequency			Hz	50/60				
Power consumption	Holding	50Hz	VA	38			38	
		60Hz	VA	28			28	
	Inlush	50Hz	VA	370			520	
		60Hz	VA	320			480	
Mass			kg	1.8	2.8（3.2）	3.6（4.0）	3.8（4.2）	3.8（4.2）

(Note) • When temperature of valve site gose down below 5 ℃, complete dry air shall be supplied to prevent from freezing.
• Effective area shown above is value between ports 1 and 2, 4.
• Response time shown above is in accordance with JIS B 8375.
• Mass in bracket（ ）shown with Rc3/4 ported sub-base.

A15 Series

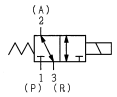
ORDERING INSTRUCTION

AS2415 – 04 – 100 P

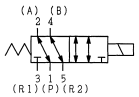
① ② ③ ④

①Function

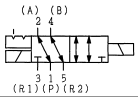
AS2315



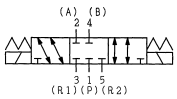
AS2415



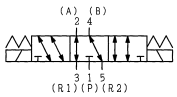
AD2415



AD3415



ADE3415



②Port size

04	Rc1/2
06	Rc3/4

③Voltage

100	AC100V
110	AC110V
200	AC200V
220	AC220V

④Versions

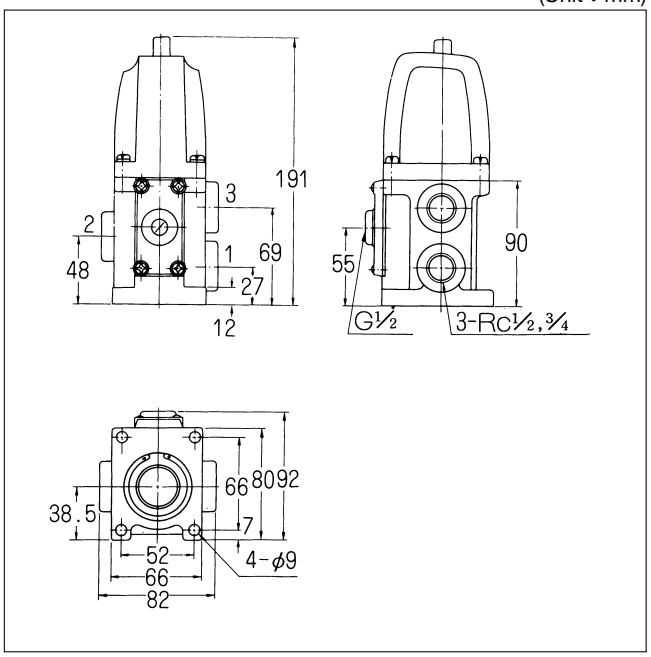
No mark	Standard
I	With indicator light
K	With surge suppressor
P	With indicator light & surge suppressor

OPTIONAL PARTS AND SPARE PARTS

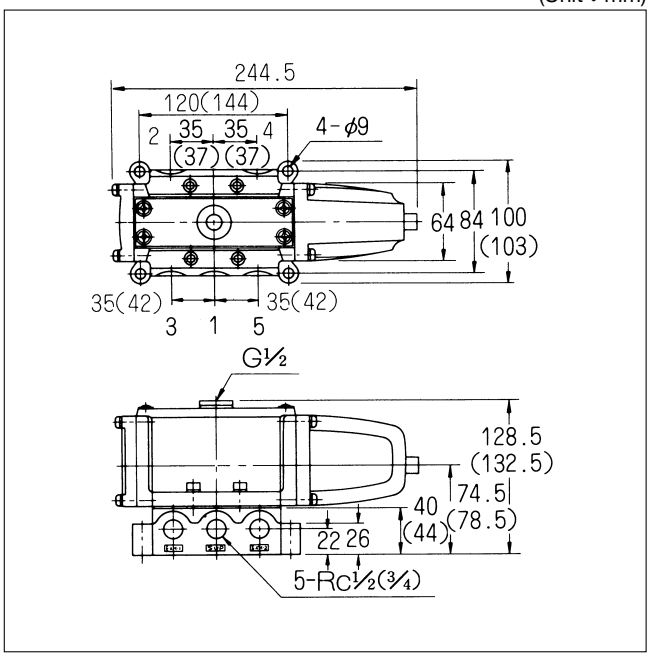
Parts Name		Model No.
Solenoid unit for 2-position	AC 100V	**A15-107**
	AC 110V	**A15-10710**
	AC 200V	**A15-207**
	AC 220V	**A15-20720**
Solenoid unit for 3-position	AC 100V	**A15-115**
	AC 110V	**A15-11510**
	AC 200V	**A15-215**
	AC 220V	**A15-21520**
Sub-base	Rc1/2	**A15-SB-04**
	Rc3/4	**A15-SB-06**
Base gasket		**A15-G**
Spring	For 2-position	**A15-SS**
	For 3-position	**A15-3S**

DIMENSIONS

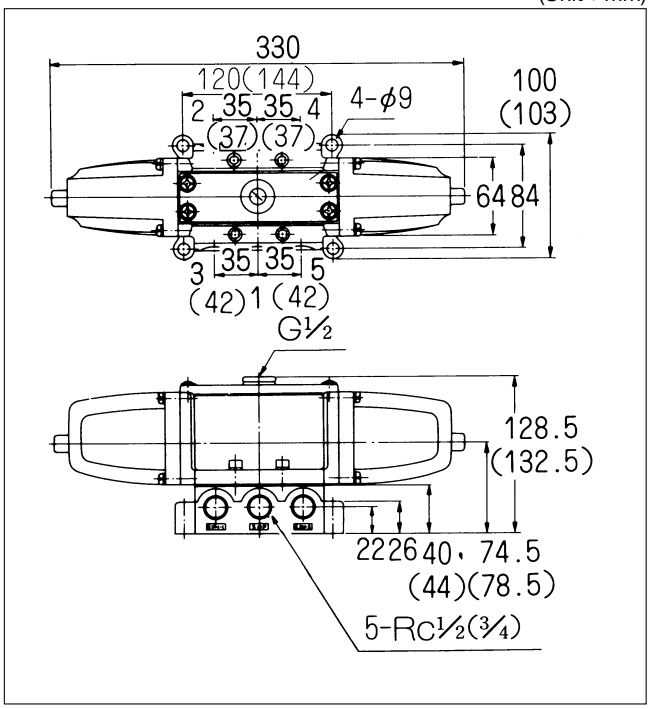
AS2315 (Unit：mm)



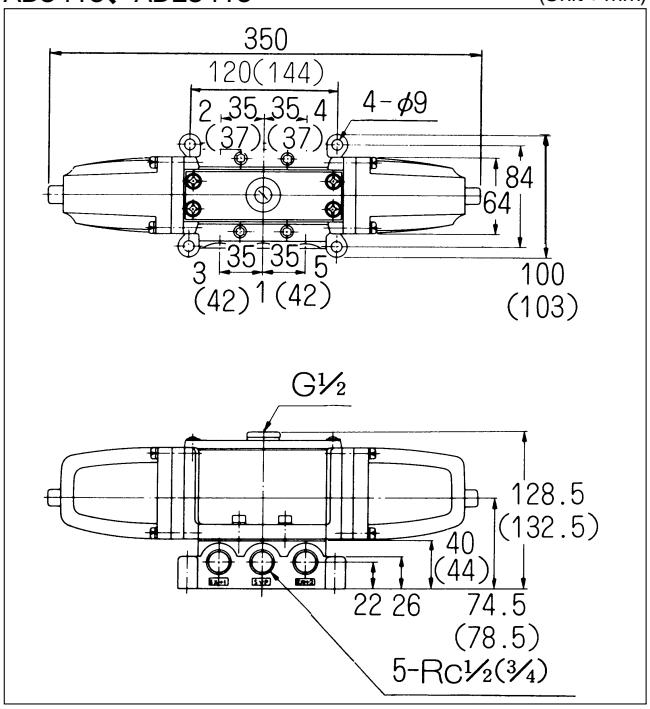
AS2415 (Unit：mm)



AD2415 (Unit：mm)

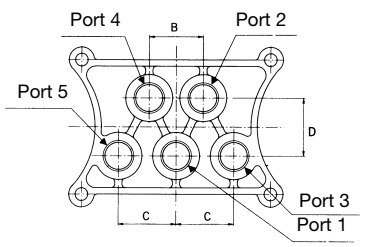


AD3415、ADE3415 (Unit：mm)



(Note) Dimensions in bracket （ ） shown with Rc¾ ported sub-base.

Bottom porting (Unit：mm)



Port size：**Rc**½

※Bottom porting is made to order

INDIVIDUAL WIRING TYPE MANIFOLD

MF○-C

Separate type

MF□-CC	Common SUP, Common EXH Ports 2 & 4 on side
MF□-CI	Common SUP, Individual EXH Ports 2 & 4 on side

MANIFOLD SPECIFICATIONS

Type of manifold		MF□-CC06	MF□-CC08	MF□-CC10	MF□-CC15
		Common SUP, common EXH	Common SUP, common EXH	Common SUP, common EXH	Common SUP, common EXH
Port size	Port 1	Rc1/4	Rc3/8	Rc1/2	Rc3/4
	Port 3, 5	Rc1/4	Rc3/8	Rc1/2	Rc3/4
	Port 2, 4	Rc1/8、1/4	Rc1/4、3/8	Rc3/8、1/2	Rc1/2
Number of stations		2～20	2～20	2～20	2～20
Mountable solenoid valve		AS2406-NB AD2406-NB AD3406-NB ADE3406-NB	AS2408-NB AD2408-NB AD3408-NB ADE3408-NB	AS2410-NB AD2410-NB AD3410-NB ADE3410-NB	AS2415-NB AD2415-NB AD3415-NB ADE3415-NB
Blank plate		CC06-BP	CC08-BP	CC10-BP	CC15-BP

Type of manifold		MF□-CI06	MF□-CI08	MF□-CI10	MF□-CI15
		Common SUP, individual EXH	Common SUP, individual EXH	Common SUP, individual EXH	Common SUP, cindividual EXH
Port size	Port 1	Rc1/4	Rc3/8	Rc1/2	Rc3/4
	Port 3, 5	Rc1/8	Rc1/4、3/8	Rc3/8、1/2	Rc1/2
	Port 2, 4	Rc1/8、1/4	Rc1/4、3/8	Rc3/8、1/2	Rc1/2
Number of stations		2～20	2～20	2～20	2～20
Mountable solenoid valve		AS2406-NB AD2406-NB AD3406-NB ADE3406-NB	AS2408-NB AD2408-NB AD3408-NB ADE3408-NB	AS2410-NB AD2410-NB AD3410-NB ADE3410-NB	AS2415-NB AD2415-NB AD3415-NB ADE3415-NB
Blank plate		CC06-BP	CC08-BP	CC10-BP	CC15-BP

ORDERING INSTRUCTION

Manifold

MF 5 – CC 08 – 02
① ② ③ ④

①Number of stations

2	2 station
:	:
20	20station

②Type of manifold

CC	Common SUP, common EXH
CI	Common SUP, individual EXH

③Mountable solenoid valve

06	A06 series
08	A08 series
10	A10 series
15	A15 series

④Size of ports 2 and 4

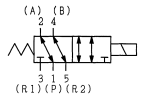
01	Rc 1/8
02	Rc 1/4
03	Rc 3/8
04	Rc 1/2

Mountable solenoid valve (For details refer to Pages 9 to 20.)

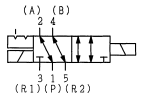
AS2408 – NB – 100 P
① ② ③ ④

①Function

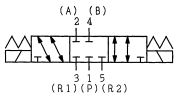
AS24



AD24



AD34



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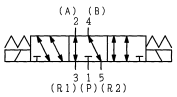


②Port size

NB	Without sub-base

③Voltage

100	AC100V
110	AC110V
200	AC200V
220	AC220V

④Versions

No mark	Standard
I	With indicator light
K	With surge suppressor
P	With indicator light & surge suppressor

HOW TO ORDER

- List solenoid valves to be mounted.
- When mounting solenoid valves of different type, specify the type and quantity of solenoid valves from port 1 side.
- When ordering a solenoid valve of special specifications, refer to "Specification for Manifold" which is separately available.

(Example)

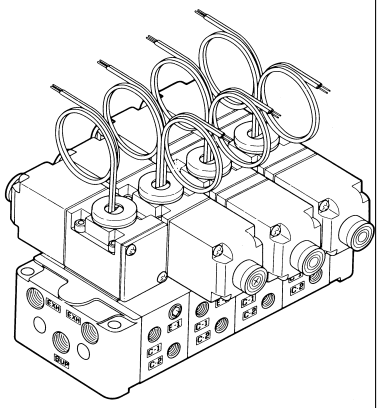
MF5-CC08-02	1 pc.
AS2408-NB-100	2 pcs.
AD2408-NB-100	2 pcs.
CC08-BP	1 pc.

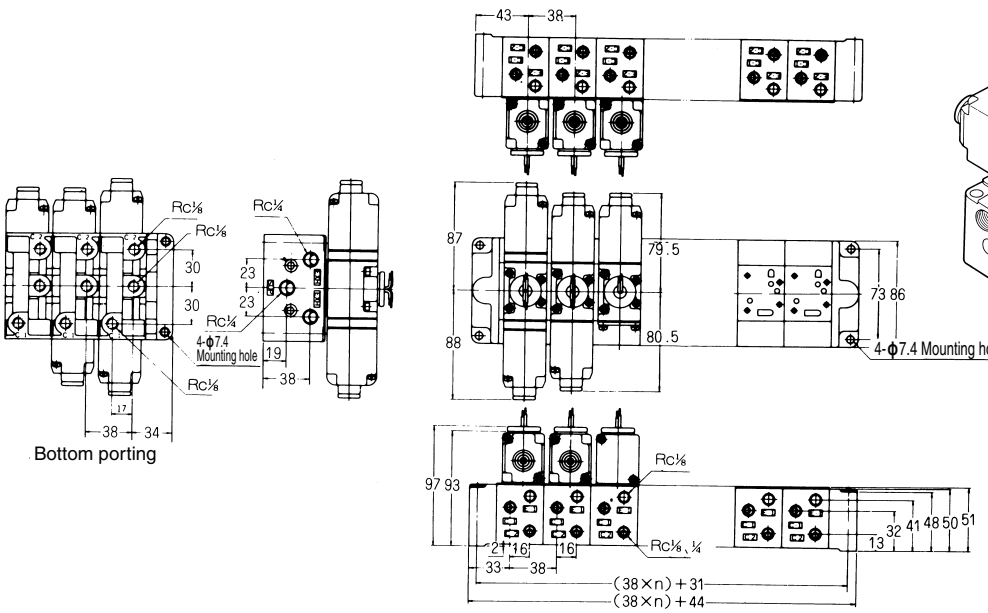
DIMENSIONS

MF □-CC06

(Unit : mm)

Specifications for connection

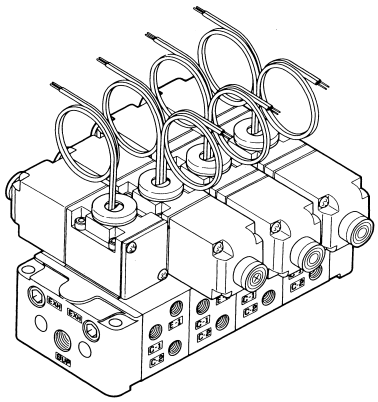


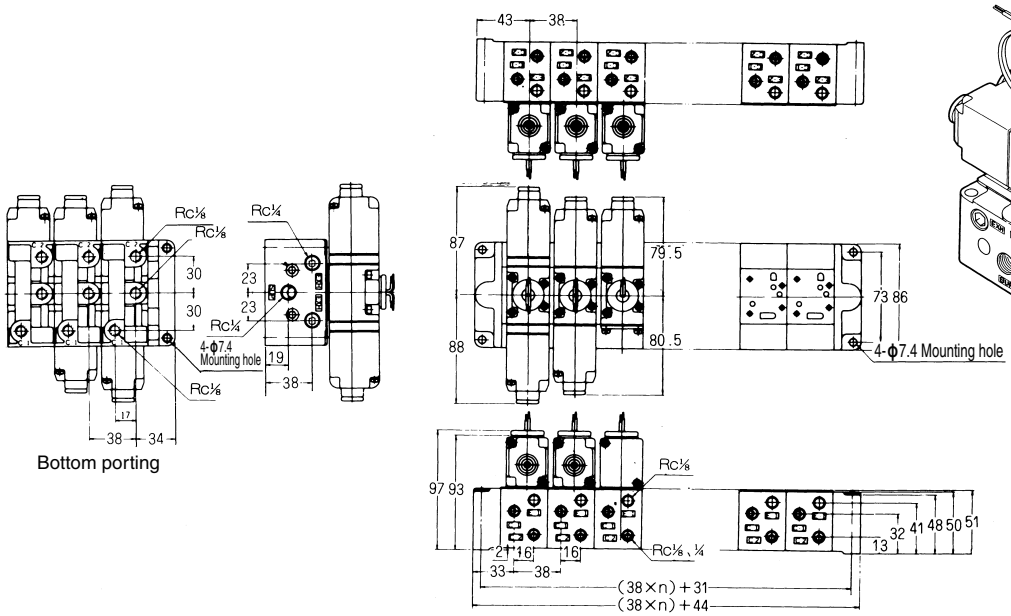


MF □-CI06

(Unit : mm)

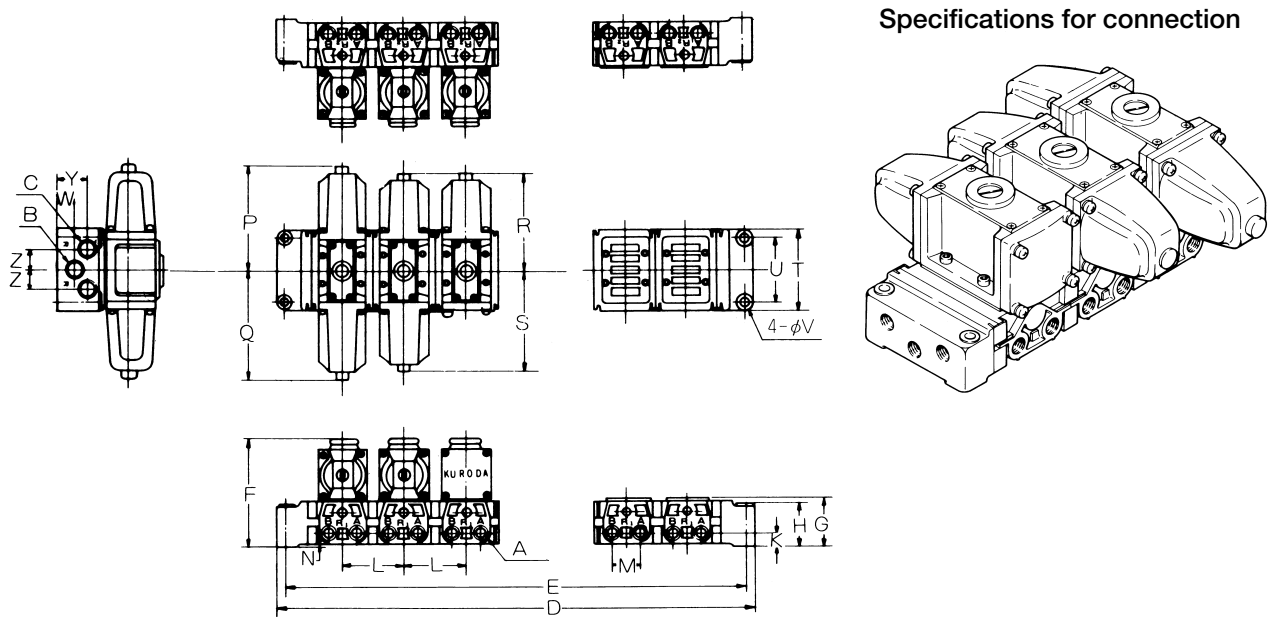
Specifications for connection



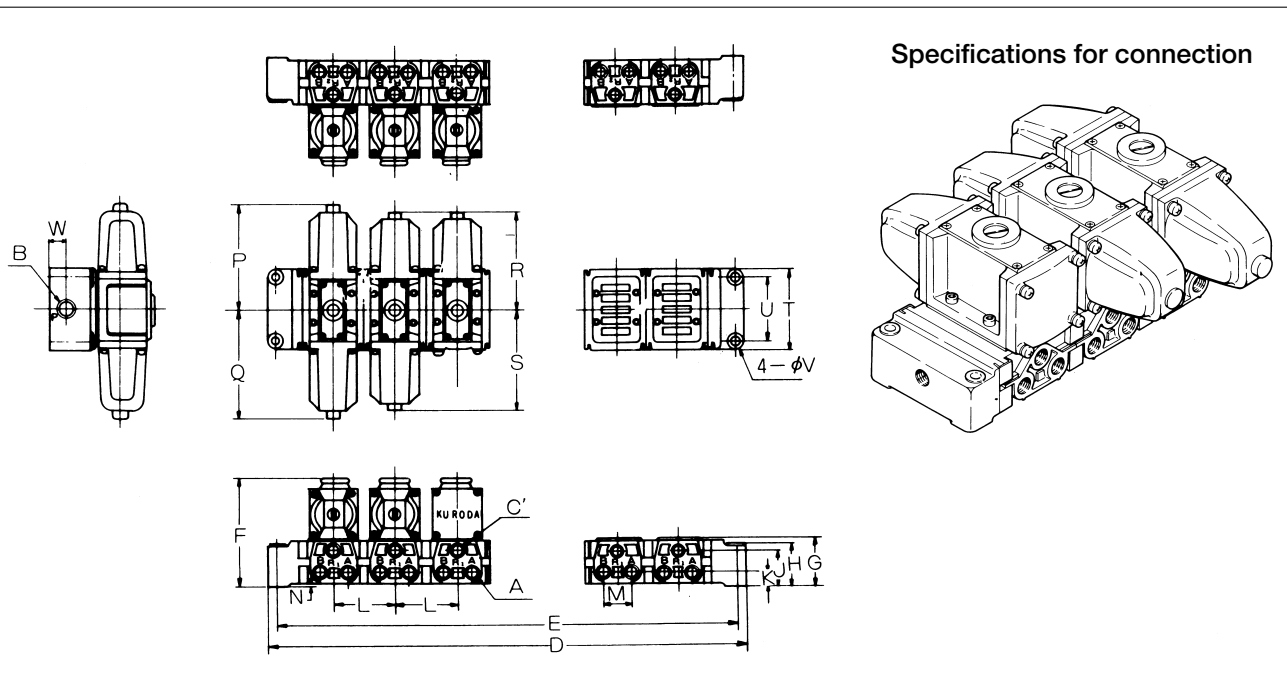


DIMENSIONS

MF□-CC08～15



MF□-CI08～15

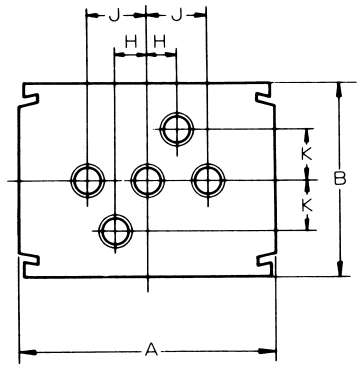


(Unit：mm)

Model No.	A(Rc)	B(Rc)	C(Rc)	C'(Rc)	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	Y	Z
MF-CC08	1/4	3/8	3/8	—	(70×n)	(70×n)	124.5	52	51	—	16.5	70	32	4	126	130	107	111	90	74	8.5	19	35	22
MF- CI 08	(3/8)		—	1/4(3/8)	+80	+64				39.5													—	—
MF-CC10	3/8	1/2	1/2	—	(90×n)	(90×n)	137.4	54	48	—	18.5	90	43	4	154	154	135	135	120	100	10.5	30	30	32
MF- CI 10	(1/2)		—	3/8(1/2)	+90	+60				39.5													—	—
MF-CC15	1/2	3/4	3/4	—	(110×n)	(110×n)	157.5	69	60	—	23	110	52	4	175	175	165	165	144	120	12.5	35	35	37
MF- CI 15			—	1/2	+110	+80				49													—	—

(Note) • " n " in Table means the number of stations of manifold.
• Port size in parentheses is made to order.

BOTTOM OF MANIFOLD PORTED (Custom-made)

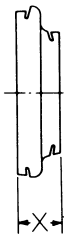


(Unit : mm)

Model No.	Port size	A	B	K	J	H
MF□-CC/C I08	Rc1/4、3/8	90	70	20	28	12
MF□-CC/C I10	Rc3/8、1/2	120	90	25	34	17
MF□-CC/C I15	Rc1/2、3/4	144	110	30	45	22.5

ADAPTOR

Used to connect a manifold of different size.



(Unit : mm)

Model No.	MFA-C0608	MFA-C0810	MFA-C1015
Applicable manifold	MF-C□06 MF-C□08	MF-C□08 MF-C□10	MF-C□10 MF-C□15
X	24	30	40

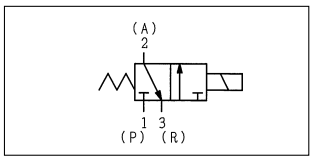
3-PORT DIRECT OPERATED SOLENOID VALVES

SS231

Poppet Seal/Sub-base Mounting type

SS231	2-position Single solenoid

JIS Symbol



ORDERING INSTRUCTION

SS231 – M5 – 100 | G | L

① ② ③ ④

①Port size

NB	Without sub-base
M5	M5×**0.8**
01	Rc1/8

②Voltage

100	AC100V/110V
200	AC200V/220V
D24	DC24V

③Wiring

L	Lead wire
G	Grommet with terminal
C	Conduit with terminal
*GK	Grommet with surge suppressor
*CK	Conduit with surge suppressor
D	DIN connector

*：Made to order

④Option

No mark	Without option (Standard)
L	With locking button

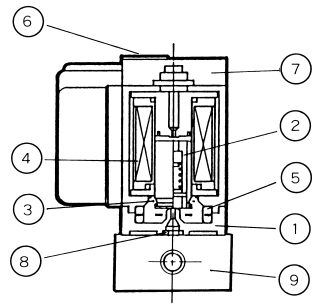
SPECIFICATIONS

Model No.			Unit	SS231
Fluid				Non-lubricated/lubricated air
Port size				M5、Rc1/8
Effective area			mm²	0.6
Cv value				0.03
Operating ambient temperature			℃	−5〜60
Operating pressure range			MPa	0〜1
Maximum frequency			Cycle/min	1200
Response time（at 0.5MPa）			s	ON 0.006、OFF0.008
Rated voltage			V	AC100/110、200/220、DC24
Grade of insulation				JIS grade B
Permissible voltage fluctuation			%	±10（DC +10 −15）
Rated frequency			Hz	50/60
Power consumption	AC	Holding	50Hz	VA	3.2
			60Hz	VA	2.6
		Inlush	50Hz	VA	5
			60Hz	VA	4.5
Power consumption DC			W	2
Mass			kg	0.08

(Note) • When temperature of valve site gose down below 5 ℃, complete dry air shall be supplied to prevent from freezing.
• Effective area shown above is value between ports 1 and 2.
• Response time shown above is in accordance with JIS B 8375.

SS231

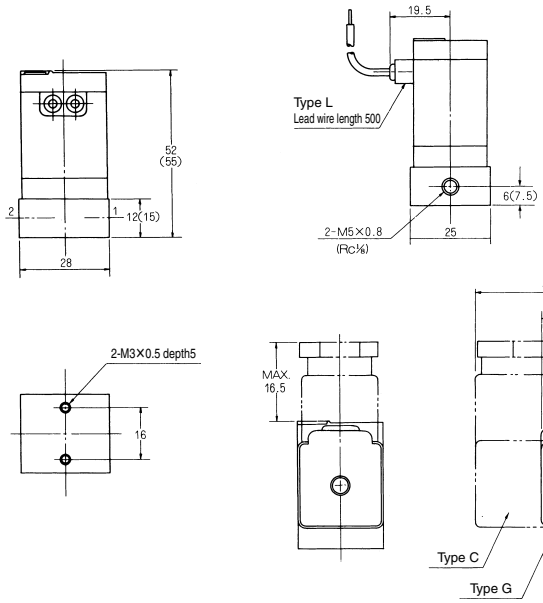
CONSTRUCTION AND MAIN PARTS



No.	Description
①	Body
②	Plunger
③	Spring
④	Coil
⑤	Manual ring
⑥	Manual override
⑦	Cover
⑧	O-ring
⑨	Sub-base

DIMENSIONS

(Unit : mm)



INDIVIDUAL WIRING TYPE MANIFOLD

MF○-TI/TC 1

Bar type

MF□-TI1	Common SUP, Indvidual EXH Port 2 on side
MF□-TC1	Common SUP, Common EXH Port 2 on side

MANIFOLD SPECIFICATIONS

Type of manifold		MF□-TI1-M5	MF□-TI1-01	MF□-TC1-M5	MF□-TC1-01
		Common SUP, Indvidual EXH	Common SUP, Indvidual EXH	Common SUP, Common EXH	Common SUP, Common EXH
Port size	Port 1	M5	Rc1/8	M5	Rc1/8
	Port 3	—	—	M5	Rc1/8
	Port 2	M5	Rc1/8	M5	Rc1/8
Number of stations		2～10	2～10	2～10	2～10
Mountable solenoid valve		SS231-NB		SS231-MF	

ORDERING INSTRUCTIONS

Manifold

MF 5 – TI 1 – M5

① ② ③

①Number of stations

2	2 station
:	:
10	10 station

②Type of manifold

TI	Common SUP, Indvidual EXH
TC	Common SUP, Common EXH

③Size of port 2

M5	M5×0.8
01	Rc1/8

Mountable solenoid valve

SS231 – MF – 100 G – L

① ② ③ ④

①Type of solenoid valve

NB	For TI
MF	For TC

②Voltage

100	AC100V/110V
200	AC200V/220V
D24	DC24V

③Wiring

L	Lead wire
G	Grommet with terminal
C	Conduit with terminal
*GK	Grommet with surge suppressor
*CK	Conduit with surge suppressor
D	DIN connector

*：Made to order

④Option

No mark	Without option (Standard)
L	With locking button

HOW TO ORDER

List solenoid valves to be mounted.

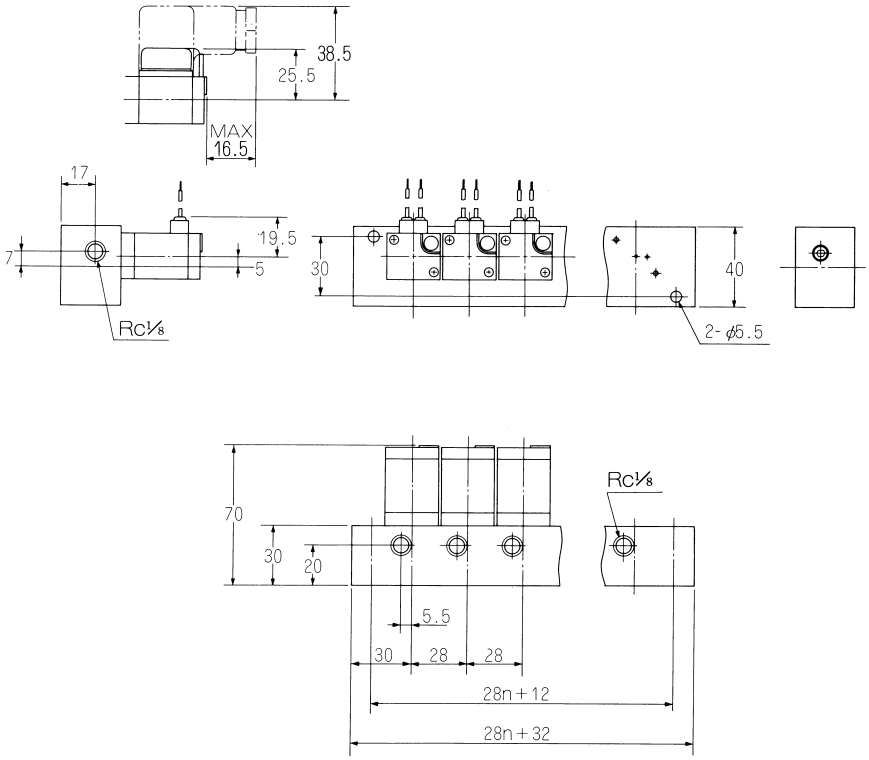
(Example)

MF5-TC1-M5 1 pc.
SS231-MF-100G 5 pcs.

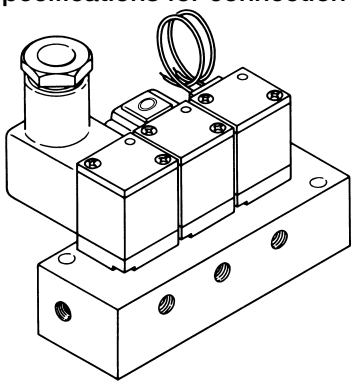
DMENSIONS

MF□-TI1-01

(Unit：mm)



Specifications for connection



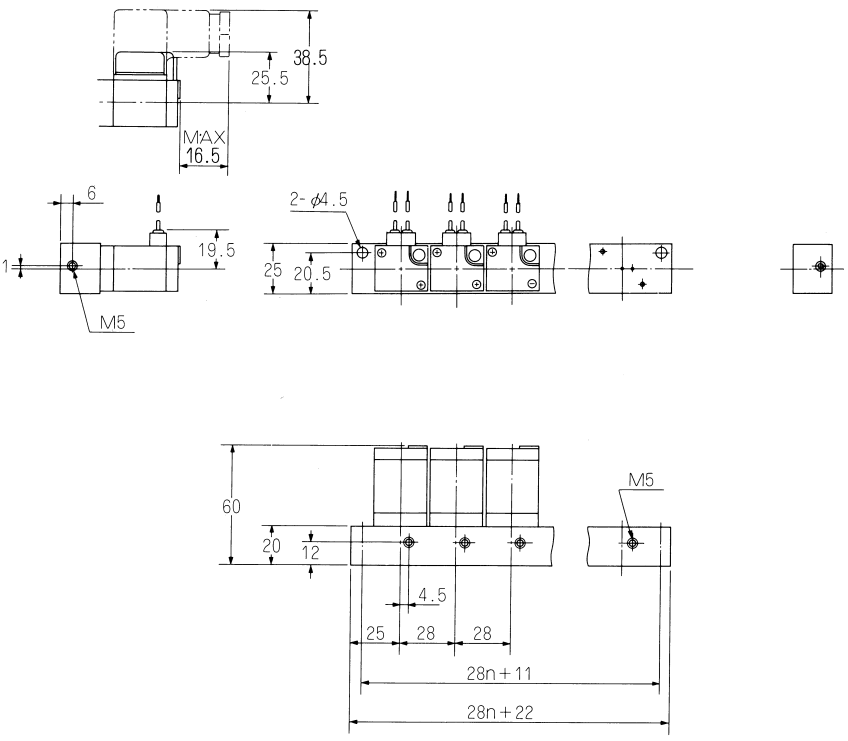
●Port 1：Left side on dimensional drawing
Port size Rc1/8

●Port 2：Front side on dimensional drawing
Port size Rc1/8

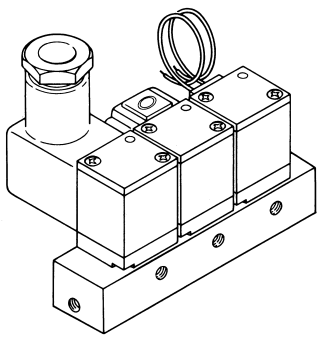
n：Number of stations

MF□-TI1-M5

(Unit：mm)



Specifications for connection



●Port 1：Left side on dimensional drawing
Port size M5

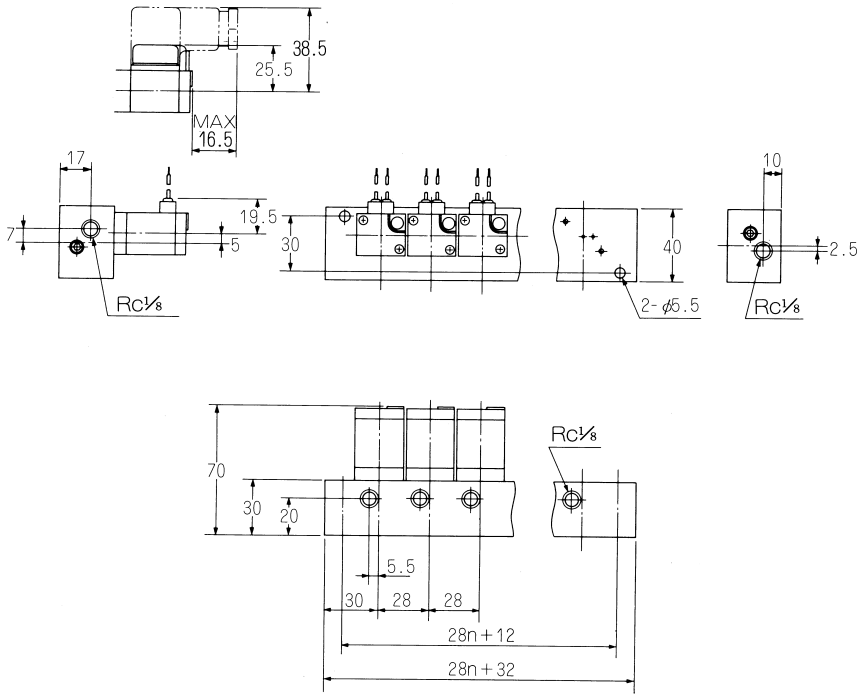
●Port 2：Front side on dimensional drawing
Port size M5

n：Number of stations

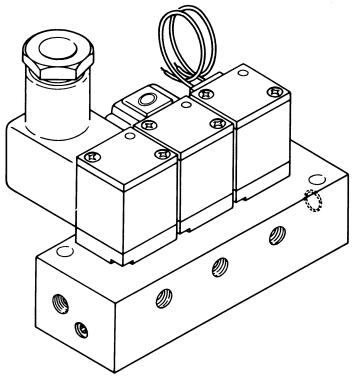
DMENSIONS

MF□-TC1-01 (Made to order)

(Unit : mm)



Specifications for connection

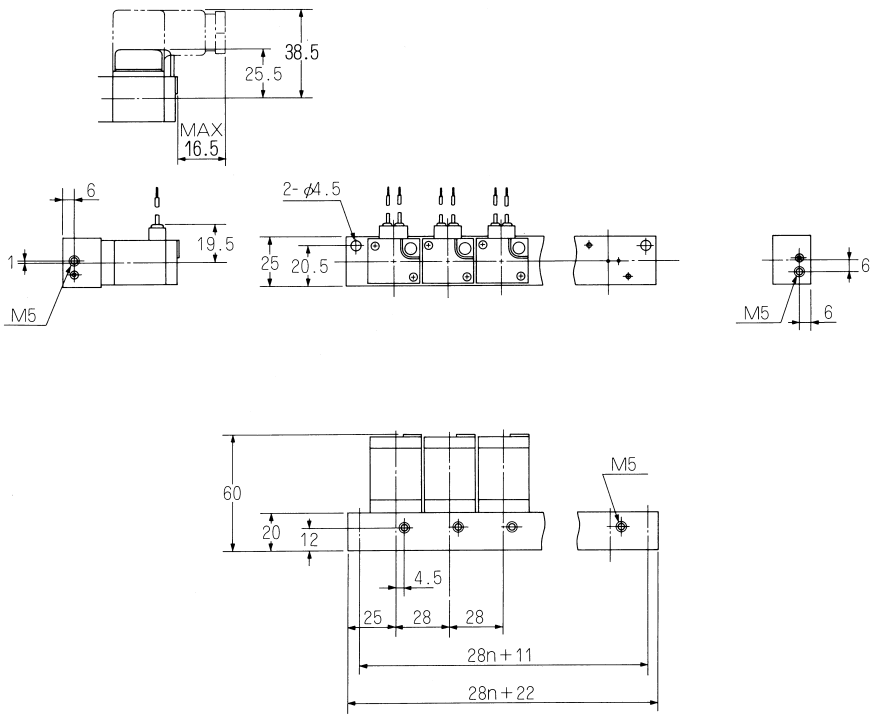


●Port 1 : Left side on dimensional drawing
Port size Rc1/8
●Port 2 : Front side on dimensional drawing
Port size Rc1/8
●Port 3 : Right side on dimensional drawing
Port size Rc1/8

n : Number of stations

MF□-TC1-M5 (Made to order)

(Unit : mm)



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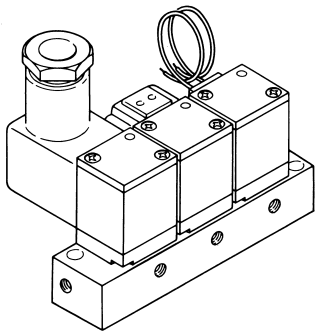

●Port 1 : Left side on dimensional drawing
Port size M5
●Port 2 : Front side on dimensional drawing
Port size M5
●Port 3 : Right side on dimensional drawing
Port size M5

n : Number of stations

⚠ WARNING

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KURODA PRECISION INDUSTRIES LTD.

Head Office: 239, Shimohirama, Saiwai-ku, Kawasaki, Kanagawa 212-8560, Japan
Telephone:044-555-3805
Fax:044-555-1479
http://www.kuroda-precision.co.jp/e-top

Chicago Office: 9400 West Foster Avenue, Suite 108, Chicago, Illinois 60656 U.S.A.
Telephone:773-992-2178
Fax:773-625-8781

CAT. No. KPL1003-ⓐ

Distributors:

Printed in Japan 2004.7.SK