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Konan Solenoid Valves for Fluid Control

MAGFLOW series

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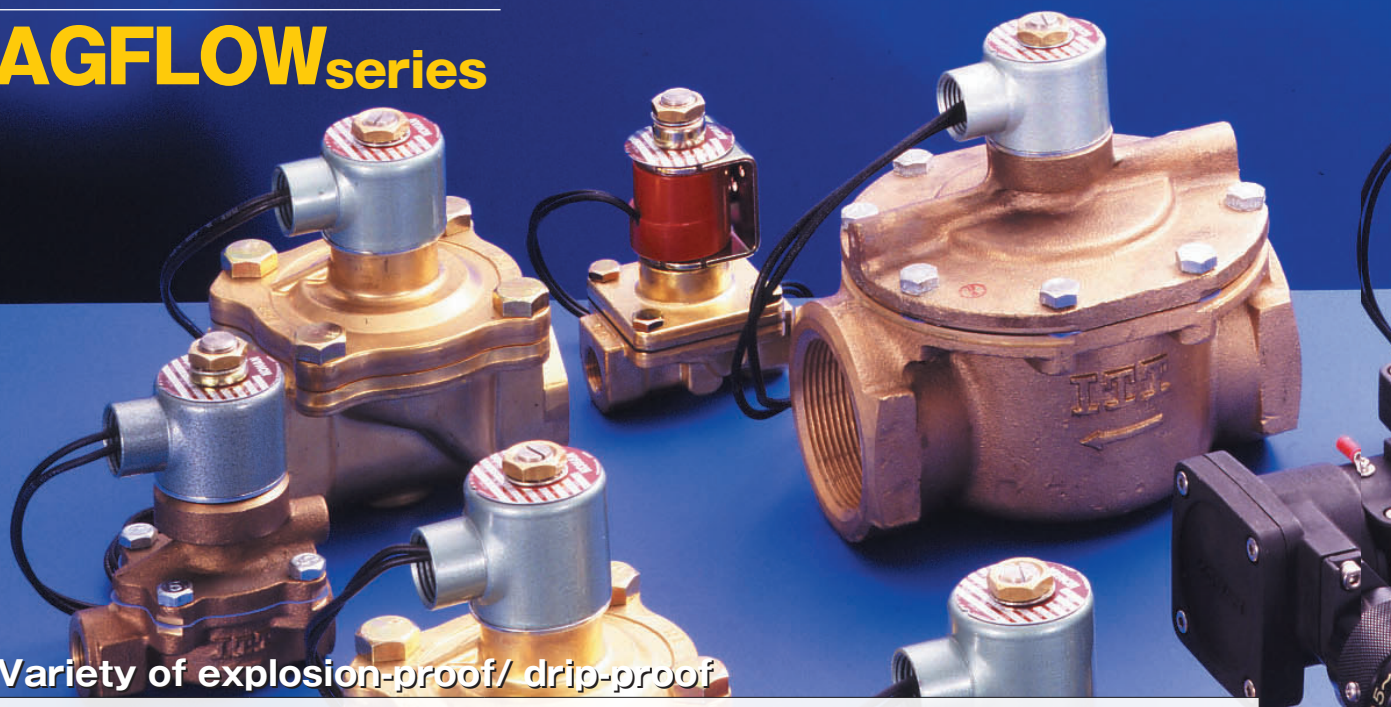
MAGFLOW series

KONAN ELECTRIC CO.,LTD.

For ideal fluid control···

Konan Solenoid Valves for Fluid Control

MAGFLOW series



■ Variety of explosion-proof/ drip-proof

Protection types				
Flame-proof enclosure construction	International standards	IECEx	CSA	Ex db ⅡC T6... T4 Gb
	EU	ATEX guidelines	TÜV Rheinland	Ⅱ 2G Ex d Ⅱ BT4 Gb
			CSA	Ⅱ 2G Ex db ⅡC T6... T4 Gb
	Japan	"Explosion-proof construction standard for electric equipment"	TIIS (Technology Institution of Industrial Safety)	d2G4
				d3aG4 (For hydrogen)
		"Technical standards conforming to the international standards"		Ex d Ⅱ BT4
	Korea		KOSHA (Korean Occupational Safety and Health Agency)	Ex d Ⅱ BT4
	Taiwan. R. O. C.	CNS	ITRI (Industrial Technology Research Institute)	Ex d Ⅱ BT4 Gb
	China	CCC (China Compulsory Product Certification)	SiTiiAs (Shanghai Inspection and Testing Institute of Instruments and Automation Systems)	Ex d ⅡC T4~T6 Gb
	Japan	Class NK	NIPPON KAIJI KYOKAI	d2G4
NEMA4 drip-proof Conforms to JIS C 0920 (protection class:5/jet-proof) and IEC 144 (protection class:IP55)				
NEMA4,7 explosion-proof, drip-proof Conforms to JIS C 0920 (protection class:5/jet-proof) and IEC 144 (protection class:IP65)				

Konan Solenoid Valves for Fluid Control

MAGFLOW

Konan's solenoid valves for fluid control provide reliable interface between fluids and automation systems. A wide variety of products based on safe design are available to meet your own application.

series

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General Handling Instructions and Precautions

Please read the following information on the general handling precautions carefully before placing orders for the products.

Following information is prepared based on a risk assessment for KONAN solenoid valves for general fluids, represented by MAGFLOW series products (hereinafter referred to as MAGFLOW solenoid valves or solenoid valves). Please read through the information carefully, because it describes important matters indispensable to secure safety to human body and safe and trouble-free operations of systems.

Safety Precautions

References:
JIS B9702:
Safety of machinery-principles of risk assessment
JIS B8370:
Pneumatic fluid power-general rules relating to systems

⚠ Warning MAGFLOW solenoid valves are the control valves to increase/decrease fluid pressure, shut down or switch the flow of fluid to the intake or exhaust direction, etc. based on electrical inputs.
These control valves are used widely in general systems that use various kinds of fluid. When using MAGFLOW solenoid valves, take notice particularly on the following items.

① Selecting models of MAGFLOW solenoid valve

1.1 Fluids applicable to MAGFLOW solenoid valve

When kinds of applicable fluid are designated in the specifications of solenoid valve, no other fluids may be used. When selecting a solenoid valve, take note also on the following matters.

1) High pressure gas
Every solenoid valve used at a gas pressure of 1 MPa or higher is subject to the High Pressure Gas Security Law in Japan.
As MAGFLOW solenoid valves do not meet the Law they cannot be used in this range. The Law does not apply when a fluid is supplied from an air or nitrogen gas compressor under the pressure not exceeding 5 MPa.
Note:It is not exempted from the application of the Law when a fluid is supplied from a transportable container.

2) Materials
Materials of solenoid valve vary depending on the kind of fluid.
Select materials of the main body (metal) and the seal from the guide for material selection in the catalogue. When your fluid is not found in the catalogue or if you may have any question, inquire to our Sales Department.
Note:You may not use the solenoid valves without confirming the compatibility with applications.

3) Fluid temperature
Select a solenoid valve of which the insulation class of coil and the maximum fluid temperature relative to the ambient temperature do not exceed the specifications shown in the explanation of terminology in the catalogue.

4) Fluid viscosity
When applicable fluid viscosity is not specified, the solenoid valve may be used when it is less than 65 mm^2/s (cSt).
Depending on the kind of fluid, this value may be exceeded in a low temperature range. In such occasion, it is necessary to maintain temperatures using a heater, or the like.

5) Dangerous fluid
When handling any toxic, flammable or other hazardous fluid, select a solenoid valve of which the leakage (internal, external) falls within the permissible values. Amounts of leakage are found in the catalogue or the instruction manual. If you may have any question, contact our Sales Department.
When using any gas other than air in an enclosed room, even if the gas is not toxic, sufficient care must be taken on the risk of suffocation.

6) Corrosive gas
When the fluid contains gases such as SO_2, H_2S,Cl_2,NO_2, etc. which could corrode metals, it could cause stress corrosion cracks not only on the surface but also internally. The solenoid valve cannot be used for such fluid.

7) Contaminant particles
When solid particles, oil particles of higher viscosity, or the like, are contained in the fluid, it could cause wear, malfunction or leakage on the solenoid valve. The solenoid valve cannot be used for such fluid unless it is filtered sufficiently. When employing a filter, prepare a filter having the nominal filtration rating of less than 150μm, and install it at the inlet side of the solenoid valve.

8) Oil inhibiting treatment and lubrication
When it matters the contamination of fluid by the lubrication oil used on the solenoid valve, the solenoid valves may be processed with the oil inhibiting treatment (oil removal). For further details, contact our Sales Department.
In case when using without lubrication a solenoid valve for gas, which needs lubrication owing to its construction, it may increase the divergence of oil like mist or evaporation of oil in a highly dry gas (highly dry air with the dew point at lower than –40°C, or other), resulting in an early shortage of lubrication. In such occasion, the situation may be improved by using a kind of grease, which is adapted to highly dry applications. Consult our Sales Department for further details.

9) Drain
Solenoid valves for steam or pneumatic pressure may not operate properly where a profuse drain may accumulate within the circuit. The solenoid valves cannot be used at such places. It is recommended to use them at places where there is no accumulation of drain or where drain can be separated or discharged securely by means of a drain trap or auto drain.
In case of solenoid valve for steam, it is desirable to take measures such as the low temperature steam purge, etc. in order to short cut the temperature rising time of solenoid valve. When air is supplied from a compressor, the air is in high temperature so that it is likely to generate drain if air is cooled at a far end. It becomes necessary to provide an after-cooler or air dryer at the exit of compressor in order to remove water or moisture effectively.

10) Water hammer
Where excessive surges of pressure, like the water hammer, occur, the solenoid valve may be damaged or its life could be reduced. The solenoid valve cannot be used where pressure surges occur frequently.
It is necessary to install an accumulator such as a water hammer arrestor, etc. to eliminate the pressure surge.

1.2 Safety of solenoid valve

Sources of risk on a system are found not only on the devices in use but also in the operating conditions or system configuration. When selecting a model of solenoid valve, it is necessary to take into consideration not only the device as a separate unit but also the safety in all circumstances, including the installation, adjustment, regular operation, trouble, disposal, or other.

1) Application as an emergency shut-off valve
Magflow solenoid valve is not designed as a valve to secure safety as required for an emergency shut-off valve, or the like. It cannot be used as an emergency shut-off valve.

2) Sealing of pressure
Since the solenoid valve is designed to allow some leakage in use, it cannot be used to such applications as an installation on a pressure vessel, including vacuum, which needs to maintain the pressure at a constant level for an extended period of time.

1.3 Safety of electrical section

The solenoid valve switches its functions using a solenoid (electromagnet). When selecting a model and electrical options for the solenoid, it is necessary to take into consideration the following matters same as other electrical devices.

1) Dustproof/waterproof – Classes for waterproof, or other,are marked in accordance with JIS C0920.
2) Sudden interruption of power supply (Power failure, emergency stop)
3) Voltage fluctuation on the power supply section and intrusion of electric surge
4) Leakage current at the time of PLC (sequencer) output OFF
MAGFLOW solenoid valves are not adapted to the following conditions, which are peculiar to the installation site. It should be refrained from the use under these conditions or provide a power distribution system provided with safety measures.
1) Influence of external magnetic field
2) Bypassed electric current from related control circuits
3) Induction voltage caused by thunderbolt

1.4 Pilot type solenoid valve

Pilot type solenoid valves on which the main valve is switched with the output pressure from a small pilot solenoid valve are used generally because it can be operated with a small size device

and small power. Since these valves cannot operate unless there is a differential pressure larger than certain level between the entrance and exit ports, it is recommended to select a direct-acting type solenoid valve when it is necessary to control a minute pressure.
In case of 3-port solenoid valve, since it cannot operate unless there is a differential pressure larger than certain level between the entrance and exit ports, the backpressure at the exhaust port affects its operation. Although there is no problem if the backpressure is in the size that could occur at the silencer of exhaust port, it is prohibited to choke the passage of exhaust flow too much or connect a long pipe to the exhaust port. Details on the influence of backpressure are described in individual manuals. If there is any question, consult our Sales Department.

1.5 Reverse flow

Install a solenoid valve in accordance with the direction indicated with arrow at the JIS's graphic symbol in the catalogue or manual. Operations of the solenoid valve cannot be guaranteed when it is used under the condition of backpressure or reverse flow. There is no problem with a slow reverse flow as experienced during maintenance or when the pump or compressor is stopped.
A failure may occur if the valve body stays at an intermediate position when resuming operation after a stop under an abnormal condition. When a reverse flow occurs at the stop or if there is any question concerning the start after an abnormal stop, consult our Sales Department.

1.6 Manual operation

When a solenoid valve allows a manual operation and has a lock for operating position, make sure to release the lock after the manual operation.

② Installing Magflow solenoid valve

Although the solenoid valve is an accurate operating device, there are great varieties in the purpose of use, operating conditions and environment. It makes us difficult to presume all of related risks (causes) at the stage of designing. Depending on situations, the solenoid valve may lose its functions or capacities earlier than the maintenance and inspection intervals as designated by us.
In order to avoid such situations, install the solenoid valves as described below.

2.1 Space

Select a place convenient for installation or maintenance. Since many solenoid valves are retrofitted to the main equipment, consideration for their maintenance is likely sacrificed. Make sure to secure a sufficient space to assure the safety.

2.2 Check method after installation

When driving an actuator like pneumatic cylinder with a solenoid valve, start the actuator with a small load and under slow speed condition, after installing the equipment and pipes, and then bring it gradually to the rated operating condition while checking movements of solenoid valve and actuator to see if there is any abnormality or air leakage.

2.3 Sudden projection of pneumatic cylinder

After the installation or maintenance, confirm that the cylinder is at the same position as the control (target) position of solenoid valve, before recharging air. If they are not matched, the pneumatic cylinder may move suddenly toward the control position.
In order to prevent the risk of unmatched positioning, it is recommended to install a slow start valve at the IN side of solenoid valve.
Note:In relation to the paragraph 2.4 below, when installing a slow start valve at the IN side of pilot solenoid valve, adjust the bypass valve of slow start valve in such a manner that the minimum differential working pressure of solenoid valve is maintained. If the bypass valve is choked too much, the supply pressure to the pilot of solenoid valve becomes smaller than the minimum differential working pressure and, as a result, it could malfunction the solenoid valve.
In the same way, when recharging air by opening the manual valve, open the manual valve at a short period of time observing the pressure gauge, till the lower limit value of the working pressure of pilot solenoid valve is secured, and then inject air slowly by operating the manual valve.

2.4 Securing the pilot pressure

Install the pilot solenoid valve, taking care of the following points.
1) Adjust the inlet pressure of solenoid valve at higher than the lower limit of working pressure. When the allowance at the air source is limited, particularly, it may go below the lower limit value of working pressure owing to the fluctuation of pressure during operation.
2) When a very long pipe is connected to the IN side of solenoid valve or when using a pipe of which diameter is smaller than the port, the inlet pressure drops as a result of pressure drop associated with the flow.

Note:When ending the work after feeding a given volume of air, it is effective to install an auxiliary tank next to the inlet port for the prevention of pressure drop. Install a pressure gauge at the vicinity to confirm that the inlet pressure did not drop.

2.5 Indication

When installing a solenoid valve where it is impossible to see the nameplate, provide a substituting indication where it can be seen easily.

2.6 Using a solenoid valve for extended period of time

After operating the solenoid valve for a long time, the solenoid becomes very hot as much as it cannot be touched by hand as the temperature on the coil rises. This is normal for a solenoid valve. Avoid touching it carelessly after operating for an extended period of time because it could burn the hand.

2.7 Residual pressure

Even after shutting down the power supply to the system or solenoid valve, the fluid pressure or fluid may not be discharged from the system. Since the residual pressure could cause unexpected movements of cylinder, sufficient care must be taken on the risk of bursting residual pressure even during the installation, in addition to other risks.

2.8 Exhaust

When discharging the fluid from the exit or exhaust port of solenoid valve, a jet with the velocity of sound at the maximum could blow out. The jet causes hazard by noise or other physical injuries by the jet itself and fragments or dust dispersed by the jet. Where someone may approach the exit or exhaust port, make sure to install a silencer in order to suppress noise and control the fluid.

2.9 Training

When installing a system or conducting the maintenance services as referred to below, only personnel who have sufficient experience and knowledge must be allowed performing the job. (We provide some training courses for handling pneumatic devices.) If there is any question, consult our Sales Department.

③ Maintenance of Magflow solenoid valve

Maintenance should be performed as described below. If any individual manual is necessary, consult our Sales Department.

3.1 Daily inspection

1) When the fluid is compressed air, the condensed water (drain) in the system could disrupt the operation of solenoid valve because the water contains impurities in the piping. Install a filter at the IN side and drain the water once every day.
2) While the equipment is operating, check visually the solenoid valve for any abnormality or any abnormal operating sound by hearing. If necessary, while the flow of fluid is stopped, inspect screws on the solenoid valve for looseness. If any internal or external leakage is observed from the exit, exhaust port or pipe joints, conduct the periodic inspection and repair as required.
3) With solenoid valves for high temperature fluids like steam,etc., the main body of solenoid valve also becomes extremely hot.If touched carelessly, burns could result. While the equipment is running, observe the solenoid valve for any abnormality in appearance visually or abnormal operating sound by hearing. If necessary, while the flow of fluid is stopped and after confirming that the valve cooled down sufficiently, inspect screws on the solenoid valve for looseness. If any internal or external leakage is observed from the exit, exhaust port or pipe joints, conduct the periodic inspection and repair as required.

3.2 Periodic inspection

Perform the following periodic inspection once every half or full year.
1) After shutting down the power supply and the pressure source, disassemble the solenoid valve. Carefully inspect respective parts, record if any abnormality is discovered and repair them as required.
2) During the periodic inspection at the second year, disassemble and inspect the product. Repair necessary sections. Solenoid assembly, coil, packing and some other parts need to replace periodically. Replace components of which lives have expired. Even if it is less than 2 years, if the solenoid valve has run out the durable operation cycles[1)], which are specified for individual solenoid valves, disassemble, inspect and replace parts as required.

Note1: [Example of the durable operation cycles at laboratory]
YS30, YS33 Series : 2 million cycles
YS20, YS21 Series (20A or under) : 1 million cycles
YS20, YS21 Series (20A or over) : 0.5 million cycles
The cycles listed above are obtained under the test conditions specified by us. For parts like diaphragm, etc., users are encouraged to determine optimum inspection intervals depending

on the materials, environment of actual installation place, maintenance records, or the like.
3) When a solenoid valve has not been operated for an extended period of time, the reliability of restart is deteriorated due to the precipitation/outflow of lubrication film, or other. JIS specifies the minimum operating frequency to be once every 30-day for the solenoid valves. In spite of this regulation, the solenoid valve should be put to the preventive inspection by operating periodically for confirmation even before the term expires.

3.3 Residual energy
Before carrying out any maintenance accompanied with actual work, shut down the pressure source and the power supply to the equipment (or maintenance block) and completely discharge the electric charge and fluid retained in the equipment. Utmost care must be taken especially when discharging any high temperature fluid like steam, etc. Evacuate people from around the equipment and perform the work with sufficient care for safety. Main body of solenoid valve also becomes extremely hot. Confirm that the valve temperature has dropped safely before starting the work. Touching the solenoid valve carelessly could result in burns. Confirm that moveable sections will not start to move during maintenance. Fix them mechanically if necessary. Other than the moveable parts, there are sections, which could drop off during the work or which have sharp edges. Measures to prevent accidents should be taken to assure the safety in all aspects of maintenance work.

3.4 Communication
When conducting any work as a group, every member must be informed clearly at such occasions as the shut down of power supply, completion of residual pressure discharge, resumption of power or air supply.

④ Place to use the solenoid valve

When installing a solenoid valve at any of the following places, some special adaptations are necessary in terms not only of the compliance to the functional specifications but also to laws or regulations. If you have any question, consult our Sales Department at the phase of planning.
1) Special application conditions not referred to in the catalogue
2) When any material risks are foreseen to people, assets, environment, or other
Example:Explosive atmosphere[2], nuclear engineering facilities, vehicle, medical equipment, equipment related to the Occupational Healt and Safety Law or the High Pressure Gas Security Law, etc.
Note2:Various explosion-proof solenoid valves are available from our products line for applications in general gas explosion inflicting atmosphere.

Users Instructions

This section provides general precautions concerning the solenoid valve and equipment on which the solenoid valve is assembled. It is indispensable to observe them as well in order to assure a sufficient safety.

⚠ Caution ① Transportation

1.1 Weight
For the safety of operators, use appropriate tools and machinery positively, without relying solely on the human power, when carrying a heavy large size solenoid valve or solenoid valve unit. Weight of solenoid valve is found in the catalogue and the design documentation. On the contrary, small size solenoid valves are so fragile that they may be damaged by excessive human power if due cares are neglected. It is strictly prohibited to carry a solenoid valve by holding the lead wires.

1.2 Dropping
When loading, unloading or moving around a solenoid valve, take care to hold securely not to drop it.

⚠ Caution ② Storing

2.1 Storage during transport
When installing a solenoid valve at a place exposed to rain or wind or in an inferior atmosphere, deliver it to the site just before the installation. When it is obliged to store for some time at the installation site, do not unpack the contents and cover the package with a sheet, or the like.

2.2 Storing place
Store the solenoid valve as follows to protect it from contamination or deterioration of materials.
1) Avoid a place exposed to high temperatures or humidity, and select a clean place free from dust.
2) When storing a solenoid valve as a spare component for more than a year, store it in the shipping package or after providing equivalent protection.
3) When it has been stored for more than a year, the packings may be stuck due to lack of lubrication. Practice a running in before using it.
4) As the storage period extends, the packings are likely to receive the permanent deform, dimensional change or deterioration. It is necessary to check the operating condition of solenoid valve occasionally and, if any abnormal condition is observed, it should be disassembled, inspected. Replace any deformed or deteriorated parts.

⚠ Warning ③ Installation environment

3.1 Vibration, impacts
1) Install a solenoid valve separated from sections subject to excessive impacts or vibration by hoses or pipes. However, if an unnecessarily long pipe is connected at the exit side, it affects the system's response adversely.
2) When it is forced to install the solenoid valve at a place receiving excessive impacts or vibration, install it by way of a damping pad, or the like. Also apply a locking means to mounting screws to fix/tighten them securely. After starting operations, periodically check the tightened sections to avoid loosening or deform of screws, and retighten as required.

3.2 Handling during installation
Do not stand on the solenoid valve or the piping, or hook the wires on the devices used for the work during installation.

3.3 Atmosphere
Take care of the atmosphere at the installation place. Avoid places where it is exposed to rain, wind, direct sunlight, salt damage, corrosive gas, chemicals, organic solvent, steam, etc. We have some anticorrosion measures for certain kinds of atmosphere. Consult our Sales Department for details.

3.4 Operating temperature
Restrict the ambient temperature and the fluid temperature within the specified operating temperature ranges. Special attention is called for regarding the following cases.
1) Life of coil varies depending on the thermal deterioration of insulation. High temperature environment and continued operations with power on should be avoided as much as possible.
2) Application under low temperatures
Where the temperatures drop to 5°C or under with possible freezing, use insulation materials and a heater. For the details of optimum ranges of ambient and fluid temperatures, refer to the catalogue.
3) When using the pneumatic pressure, air temperatures may rise considerably at the vicinity of air compressor, causing the thermal deterioration on the solenoid valve packing or troubles owing to difference of the thermal expansion between parts.

⚠ Warning ④ Modification

Do not modify in any event the solenoid valve because it could cause risks that cannot be foreseen during designing.

⚠ Caution ⑤ Stop of pneumatic cylinder on the way by the solenoid valve

Since minute leaks are permissible at the sealed sections in the solenoid valve and the cylinder, it is difficult to stop the cylinder on the way for a long time. If it is indispensable, a mechanical retaining device like a brake, lock or latch should be installed.

⚠ Caution ⑥ Spray lubrication by a lubricator

When started to use a solenoid valve with the lubrication specification, continue the lubrication.

6.1 Types of lubricant

1) Use JIS K 2213 Turbine oil VG32 or VG46 as the lubricant for the lubricator.
2) Check the lubrication quantity by the lubricator by the number of oil drops. One drop is about 0.03 cm^3. Standard quantity is 1.5 – 2.5 drops per 1m^3 of air.
3) When solenoid valves of respective specifications have been disassembled and inspected, assemble the parts after applying specified greases. Consult our Sales Department for any questions concerning the type of grease. Solenoid valves, which are fabricated with the oil inhibition specification, cannot be disassembled for inspection. If it is necessary to disassemble, ask for the inspection and service of solenoid valve to our Sales department.

⚠ Reference ⑦ Control of pneumatic system

7.1 Sequence control

Sequence control of an actuator assembled with a solenoid valve that uses compressed air should be performed as follows as much as possible.

1) Move to next step after detecting the position.
2) Apply the interlock on the electric circuit of solenoid valve, which controls any actuator other than the one that is used for the present step.

7.2 Power failure or fault on air source

1) When the solenoid valve has been stopped by the emergency stop on the way of sequence as a result of power failure or interruption of power supply, select the normal (pause) position of solenoid valve in such a way that the cylinder for the present step stops or goes to the safe position.
2) When the solenoid valve has stopped on the way of sequence, if it is dangerous to restart from the position, return it to the start position orderly by operating the actuators individually. Further, indicate the reset procedure clearly.
3) When the solenoid valve has stopped on the way, if air in the piping is bled, the cylinder may drop by the gravity or start to move suddenly when the air supply is resumed, resulting in physical or mechanical damage. Make sure to return to the start position first and then bleed air.
4) Give an allowance to the air tank capacity such that, even if the air source has failed on the way of cycle, remaining work can be completed.

⚠ Warning ⑧ Exhaust of residual pressure

On a circuit incorporating a check valve and a pilot check valve, it may fall in the state that air is charged. When any risk by the residual pressure is suspected, provide a residual pressure relief valve at the corresponding position to release the pressure individually or provide an indicator for warning of residual pressure. On the circuit diagram of such system, indicate that there is a manual valve for the residual pressure exhaust valve.

⚠ Reference ⑨ Circuit and piping

9.1 Pressure drop

If a pneumatic device has a long pipe at the terminal or inlet of factory piping, necessary pressure may not be supplied to the device as a result of pressure drop on the pipe. It is necessary to secure a proper supply pressure to the device by producing a proper design of piping at the phase of planning or providing an auxiliary air tank, if the solenoid valve operates intermittently.

9.2 Air filtering

Remove solid contaminants from the air supplied to the solenoid valve by feeding the air through a filter with the nominal filtration rating of 40μm or under. Cool the air sufficiently to remove drain or oil in the state of liquid through a filter or drain separator. If the packing or other parts are exposed to contaminated and high temperature compressed air, the life of product could be reduced extremely as a result of deterioration.

Steam generated by a boiler contains a lot of drain. Always install a drain trap.

9.3 Piping work

1) Select pipe materials depending on the fluid, and make sure to remove burrs produced by the thread cutting. When using the air pressure, always use white (galvanized) steel pipes.
2) Blow with air (flushing) or cleanse the inside of pipes to remove dust, moisture or oil before connecting them.
3) When wrapping the seal tape around the seal of threaded end of pipe, wrap the tape leaving 1.5 – 2 threads from the end of thread by 2 to 3 turns in the direction opposite to the screwing direction for the air pressure or 4 to 5 turns for the oil pressure.
4) When screwing a pipe or joint in the solenoid valve, tighten it with a wrench of adequate size as much as no fluid will leak from the threaded section. Avoid tightening it forcibly. Otherwise, it may crack the pipe connecting port of solenoid valve or cause a leakage or malfunction by the contamination with torn chips of sealing material.
5) When screwing in a pipe, joint, or other, screw in by 4 to 5 threads for 6A – 25A (Rc1/8 – Rc1). It is recommended to practice the wrapping with the seal tape and screwing in procedure before the actual work.
6) Fix the solenoid valve (large one, particularly) with a special support because it is insufficient to support with the piping only. For a smaller solenoid valve connected to steel pipes may be supported with the piping but the pipes should be supported securely with pipe clamps, or the like, at positions closer to the valve.

⚠ Caution ⑩ Electric circuit and wiring work

1) Confirm that the voltage values and the alternate current (AC)/ direct current (DC) are matched between the power supply and the solenoid valve.
2) When a TRIAC is used at the AC output of PLC (sequencer), the leak current at the time of OFF may influence the operations of solenoid or indicator lamp. In such occasion, contact the PLC maker or our Sales Department by presenting the output specification of PLC to inquire for a method to reduce leak current.
3) Electromagnetic induction surges produced at the cut OFF of power supply to the solenoid extremely reduce the life of contactors, etc. on the electric circuit. For our solenoid valves without the surge absorber, install a surge absorber, or include the surge absorber in your required specifications when placing your order.
4) When lead wires are connected to the solenoid valve, support the lead wires after giving some allowance in the length and connect using appropriate connecting terminals. When using conduit tubes, connect wires with care not to exert an external force to the housing, support the conduit tube at a position close to the valve to protect the threaded section of conduit tube on the housing from external force.

⚠ Caution ⑪ Special solenoid valves

When you need any solenoid valve of special specifications, consult our Sales Department by presenting the operating conditions.

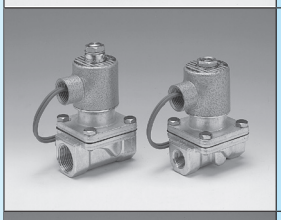
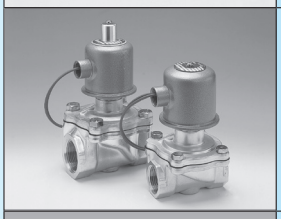
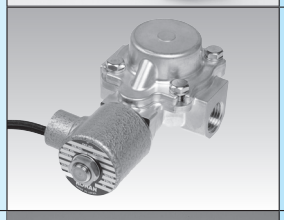
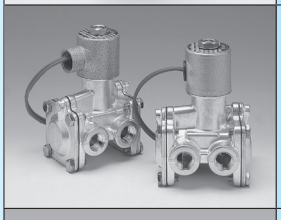
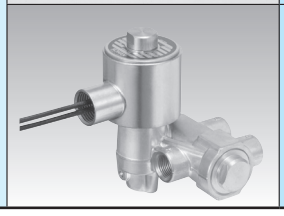
When the fluid does not allow the contamination of flow passage with oil, we can fabricate the inside of solenoid valve with the oil inhibiting specification. If there are any other special requirements on the solenoid valve, consult our Sales Department.

1) Fluid not included in the guide for selection
2) Applications in a high/low temperature environment or high heat radiation environment
3) Applications where there are problems related to ozone or salt damage
4) Explosive atmosphere

⚠ Warning ⑫ Disposal

1) Dispose the solenoid valves without incineration. If they are thrown into fire, they may explode or generate toxic gases.
2) When disposing solenoid valves after sorting, sort the parts based on the materials as listed in the catalogue or instruction manual. The solenoid valve does not contain any materials not classified as general industrial waste.

Table Categorized by Series

		Series	Operation type	Port size									Valve type			Orifice size (㎜)	Cv value	
				6 A	8 A	10 A	15 A	20 A	25 A	32 A	40 A	50 A	Normally open	Normally closed	Universal			
				Rc 1/8	Rc 1/4	Rc 3/8	Rc 1/2	Rc 3/4	Rc 1	Rc 1_1/4	Rc 1_1/2	Rc 2						
2-Port		YS 30	Direct-acting (soft seal)	●	●	●	–	–	–	–	–	–	●	●	–	1.2～9.5	0.05～1.7	
		YS 21	Pilot (diaphragm)	–	–	●	●	●	●	●	●	●	●	●	–	15.9～32.0	3.3～28.0	
		YS 20	Pilot (operates with no differential pressure)	–	–	●	●	●	●	●	●	●	●	●	–	15.9～32.0	3.3～27.0	
		YS 27	Pilot (operates with no differential pressure)	–	–	–	–	–	●	●	●	●	●	●	–	25.0～32.0	13.0～28.0	
		YS 23	Pilot (piston)	–	–	●	●	●	●	●	●	–	–	●	–	21.0～40.0	4.1～25.0	
3-Port		YS 33	Direct-acting (soft seal)	●	●	–	–	–	–	–	–	–	●	●	●	1.6～4.4	0.09～0.38	
		YS 203/204	Pilot (diaphragm)	–	–	●	●	※	※	–	–	–	●	●	–	15.9	3.3・4.4	
		YS 32	Pilot (piston)	–	●	●	–	–	–	–	–	–	●	●	–	Exhaust side : 8.7 Pressure side : 7.1	Exhaust side : 1.2 Pressure side : 0.8	

Notes The above descriptions are for standard or quasi-standard products. Leadtime may be slightly longer for other special products.
Standard types (standard stocks) are described in individual model codes.
Fluid viscosity should be no more than 65㎟/s.
Please consult us "※"model.

	Max. Working pressure (MPa)	Max. Fluid temperature (°C) Temperature varies according to a coil and seat materials. Please refer to page 77 for the details.	Body		Coil/ insulation		Housing						Applicable fluid							Page
			Stainless steel	Bronze or brass	Class F	Class H	Open frame	Grommet	Conduit	NEMA 4,7 explosion- and drip-proof	Explosion-and drip-proof	NEMA 4 drip-proof	Air	Gas	Water	Steam	Vacuum	Kerosene / oil	Drug solution	
	Max. 7.20	Max. 50	●	●	●	●	●	●	●	●	●	–	●	●	●	●	●	●	●	10
	Max. 1.37	Max. 50	●	●	●	●	●	●	●	●	●	–	●	●	●	–	–	●	●	18
	Max. 0.96	Max. 50	●	●	●	●	●	●	●	●	●	–	●	●	●	–	●	●	●	26
	Max. 0.86	Max. 50	●	●	–	●	–	–	●	–	※	●	●	●	●	–	●	●	●	34
	Max. 0.9	Max. 180	–	●	–	●	●	●	●	●	–	–	–	–	–	●	–	–	–	40
	Max. 1.37	Max. 50	●	●	●	●	●	●	●	●	●	–	●	●	●	–	●	●	●	46
	Max. 1.02	Max. 50	–	●	●	●	●	●	●	●	●	–	●	●	–	–	–	–	–	52
	Max. 0.85	Max. 50	–	●	●	●	●	●	●	●	●	–	●	●	–	–	–	●	–	57

YS30

Air / Gas / Water / Kerosene / Steam / Vacuum

2 Port Solenoid Valves

Mini-type Direct-acting

YS301 Normally closed type

YS302 Normally open type

YS30 series 2-port solenoid valves are available in NC or NO type,
with port sizes Rc1/8 to 3/8. The compact design enables space-saving installation.

Standard Specifications

Valve operation type		Normally closed	Valve opens when solenoid is energized.
		Normally open	Valve opens when solenoid is de-energized.
Port size			Rc1/8・1/4・3/8
Orifice size			1.2 ～ 9.5mm
Materials	Body		Brass, stainless steel
	Seal / seat		Nitrile rubber, fluorine rubber, PTFE, ethylene propylene rubber
	Housing	Standard	Conduit type(NEMA1)
		Others	Explosion-proof enclosure (d2G4, Exd Ⅱ BT4), Drip-proof, housing with terminal box, and others. See Selection Guide (p.67-71).
Rated voltage			AC100V50/60Hz、 110V60Hz ¦ DC24V AC110V50Hz、 120V60Hz ¦ DC100V AC200V50/60Hz、 220V60Hz ¦ DC120V AC220V50Hz、 240V60Hz ¦ DC125V
Allowable voltage fluctuation			–15% to 10% of applicable voltages
Insulation class			Continuous rating class F and H
Leadwire length			Min. 450mm
Ambient temperature		Max.	50°C (Temperature may differ depending on coil and fluid temperature. See p.77 for details.)
		Min.	–20°C (Temperature may depending on seat materials. See p.77 for details.)
Installation position			As desired
Applicable standards			(Consult us for details.)
Options, others			Mounting bracket, manual operating system, neon lamp, surge absorber, oil-free

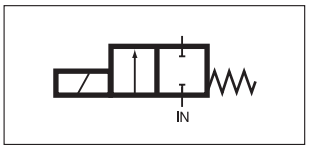
● Please consult us for other specifications.

Valve Selection List

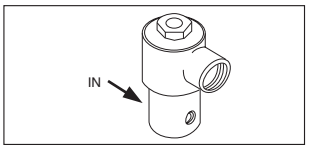
Make sure to confirm the operating pressure differential when selecting a valve.

Port size (Rc)	Orifice size (mm)	Cv value	Operating pressure differential MPa					※Max. fluid temperature ℃	Housing	Power consumption (W)		Insulation class	Voltage (V) 50/60Hz	Model code		
			Min.	Max.												
				Air/gas/ water/ kerosene		Steam										
				AC	DC	AC	DC			AC	DC			Brass body	Stainless steel body (SUS430F)	Stainless steel body (SUS303)

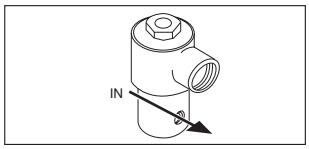
Normally closed type



De-energized

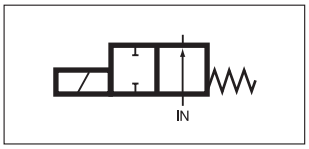


Energized

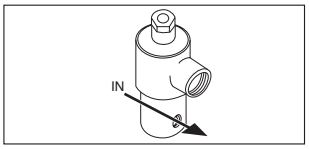


Port size (Rc)	Orifice size (mm)	Cv value	Min.	Air/gas/water/kerosene Max. AC	Air/gas/water/kerosene Max. DC	Steam Max. AC	Steam Max. DC	※Max. fluid temperature ℃	Housing	Power consumption (W) AC	Power consumption (W) DC	Insulation class	Voltage (V) 50/60Hz	Brass body	Stainless steel body (SUS430F)	Stainless steel body (SUS303)	
1/8	1.2	0.05	0	7.20	6.86	–	–	50	A	10	10	F	100	YS301AF88N9AC3	YS301AF88J2AC3		—
	2.4	0.21	0	2.74	1.37	–	–	50	A	10	10	F	100	YS301AF88N9AC9	YS301AF88J2AC9		—
	3.2	0.36	0	1.37	0.96	–	–	50	A	10	10	F	100	YS301AF88N9AD5	YS301AF88J2AD5		—
	4.8	0.49	0	0.68	0.48	–	–	50	A	10	10	F	100	YS301AF88N9AE1	YS301AF88J2AE1		—
	4.8	0.49	0	–	–	0.68	0.48	170	A	10	10	H	100	—	YS301AH88S2AE1		—
1/4	1.2	0.05	0	7.20	6.86	–	–	50	A	10	10	F	100	YS301AF88N9BC3	YS301AF88J3BC3		*
	1.6	0.10	0	4.80	2.05	–	–	50	A	10	10	F	100	YS301AF88N9BC5	YS301AF88J3BC5		*
	2.0	0.14	0	3.43	1.64	–	–	50	A	10	10	F	100	YS301AF88N9BC7	YS301AF88J3BC7		*
	2.4	0.21	0	2.74	1.37	–	–	50	A	10	10	F	100	YS301AF88N9BC9	YS301AF88J3BC9		*
	2.8	0.28	0	2.05	1.16	–	–	50	A	10	10	F	100	YS301AF88N9BD3	YS301AF88J3BD3		*
	3.2	0.36	0	1.37	0.96	–	–	50	A	10	10	F	100	YS301AF88N9BD5	YS301AF88J3BD5		*
	4.0	0.44	0	1.02	0.68	–	–	50	A	10	10	F	100	YS301AF88N9BD7	YS301AF88J3BD7		*
	4.8	0.65	0	0.68	0.48	–	–	50	A	10	10	F	100	YS301AF88N9BE1	YS301AF88J3BE1		*
	4.8	0.65	0	–	–	0.68	0.48	170	A	10	10	H	100	—	YS301AH88S3BE1		—
	6.4	0.85	0	0.24	0.10	–	–	50	A	10	10	F	100	YS301AF88N9BE7	YS301AF88J3BE7		—
3/8	3.2	0.36	0	1.37	0.96	–	–	50	A	10	10	F	100	YS301AF88N9CD5	YS301AF88J3CD5		—
	4.0	0.44	0	1.02	0.68	–	–	50	A	10	10	F	100	YS301AF88N9CD7	YS301AF88J3CD7		—
	4.8	0.65	0	0.68	0.48	–	–	50	A	10	10	F	100	YS301AF88N9CE1	YS301AF88J3CE1		*
	4.8	0.65	0	–	–	0.68	0.48	170	A	10	10	H	100	—	YS301AH88S3CE1		—
	6.4	0.85	0	0.34	0.13	–	–	50	A	10	10	F	100	YS301AF88N9CE7	YS301AF88J3CE7		—
	7.2	1.00	0	0.24	0.10	–	–	50	A	10	10	F	100	YS301AF88N9CF1	YS301AF88J3CF1		—
	9.5	1.70	0	0.13	0.034	–	–	50	A	10	10	F	100	YS301AF88N9CF5	YS301AF88J3CF5		*

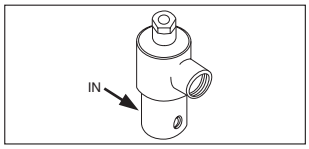
Normally open type



De-energized



Energized



Port size (Rc)	Orifice size (mm)	Cv value	Min.	Air/gas/water/kerosene Max. AC	Air/gas/water/kerosene Max. DC	Steam Max. AC	Steam Max. DC	※Max. fluid temperature ℃	Housing	Power consumption (W) AC	Power consumption (W) DC	Insulation class	Voltage (V) 50/60Hz	Brass body	Stainless steel body (SUS430F)	Stainless steel body (SUS303)	
1/4	1.2	0.05	0	4.11	4.11	–	–	50	A	11	10	F	100	YS302AF88N9BC3	YS302AF88J3BC3		*
	1.6	0.10	0	2.23	2.23	–	–	50	A	11	10	F	100	YS302AF88N9BC5	YS302AF88J3BC5		*
	2.0	0.14	0	1.61	1.61	–	–	50	A	11	10	F	100	YS302AF88N9BC7	YS302AF88J3BC7		*
	2.4	0.21	0	1.02	1.02	–	–	50	A	11	10	F	100	YS302AF88N9BC9	YS302AF88J3BC9		*
	2.8	0.28	0	0.86	0.86	–	–	50	A	11	10	F	100	YS302AF88N9BD3	YS302AF88J3BD3		*
	3.2	0.36	0	0.68	0.68	–	–	50	A	11	10	F	100	YS302AF88N9BD5	YS302AF88J3BD5		*
	4.0	0.44	0	0.41	0.41	–	–	50	A	11	10	F	100	YS302AF88N9BD7	YS302AF88J3BD7		*
	4.8	0.65	0	0.27	0.27	–	–	50	A	11	10	F	100	YS302AF88N9BE1	YS302AF88J3BE1		*

Please consult us " * " model.

※Max. fluid temperature(°C) may differ depending on the type of fluid. See p.77 for details.

YS 30

Model Code

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
Y	S30	1	A	F	88	N	9	A	C3	

① Connection type

Y=Rc

No entry =NPT

② Series

S30

③ Valve type

1= Normally closed

2= Normally open

④ Housing type

A = Conduit
P = Open frame
B = Grommet
T = Conduit with terminal box
X = NEMA 4,7drip-/explosion-proof
G = NEMA 4 drip-proof with terminal box
J = Explosion-proof enclosure (d2G4) (conduit)
K = Explosion-proof enclosure (d2G4) (pressure-resistant packing)
※C = Explosion-proof enclosure (Exd Ⅱ BT4) (conduit)
※E = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)

H = Explosion-proof enclosure (d3aG4) (pressure-resistant packing)
※S = Explosion-proof enclosure (Ex db Ⅱ C T6...T4 Gb) (conduit)
※Y = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)

⑤ Coil insulation

Class F

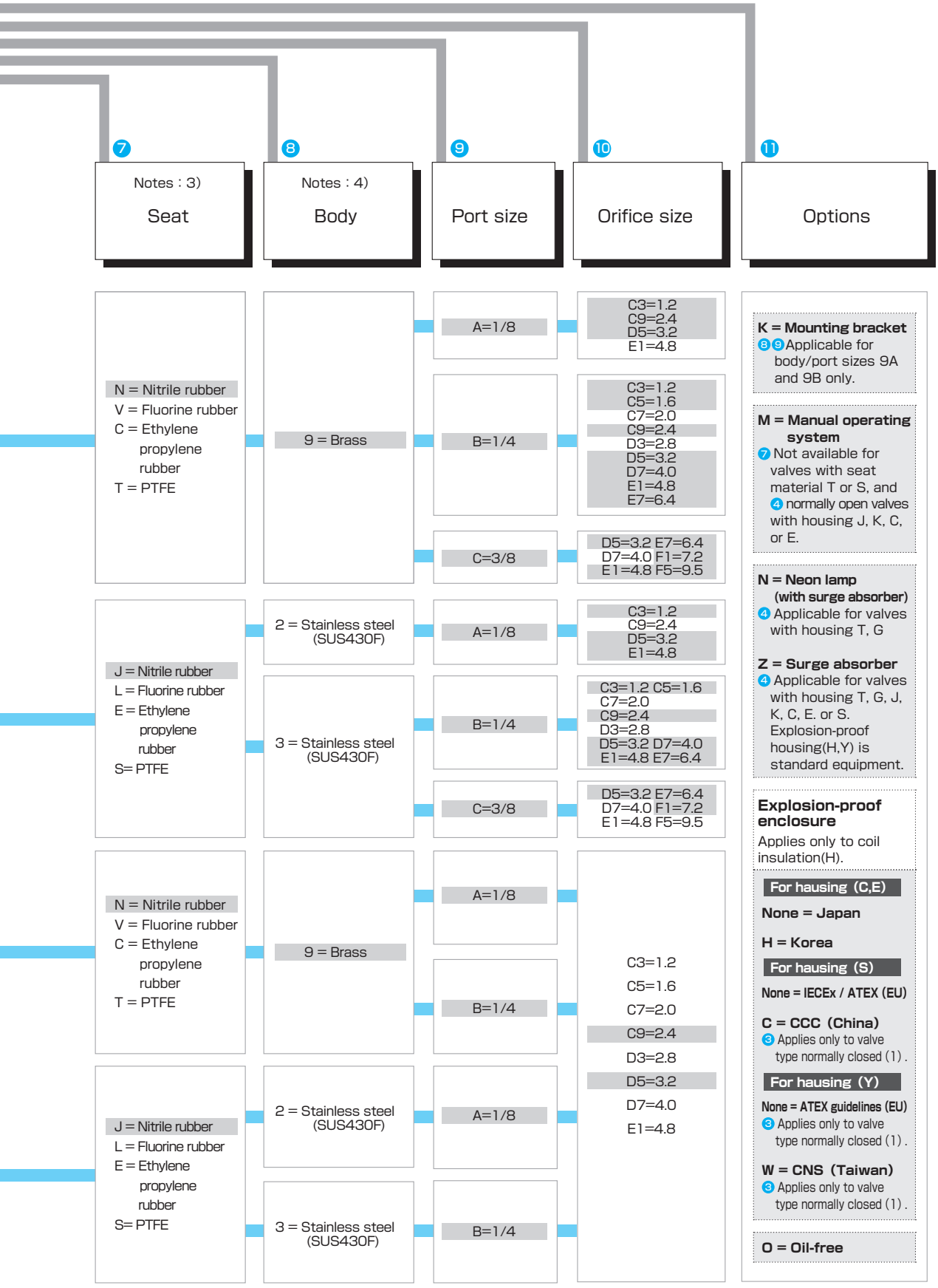
Class H

⑥ Notes : 2) Rated voltage

88=AC100V (50/60Hz) · AC110V (60Hz)
94=AC200V (50/60Hz) · AC220V (60Hz)
02=AC110V (50Hz) · AC120V (60Hz)
04=AC220V (50Hz) · AC240V (60Hz)
16=DC24V
25=DC100V
18=DC120V
97=DC125V

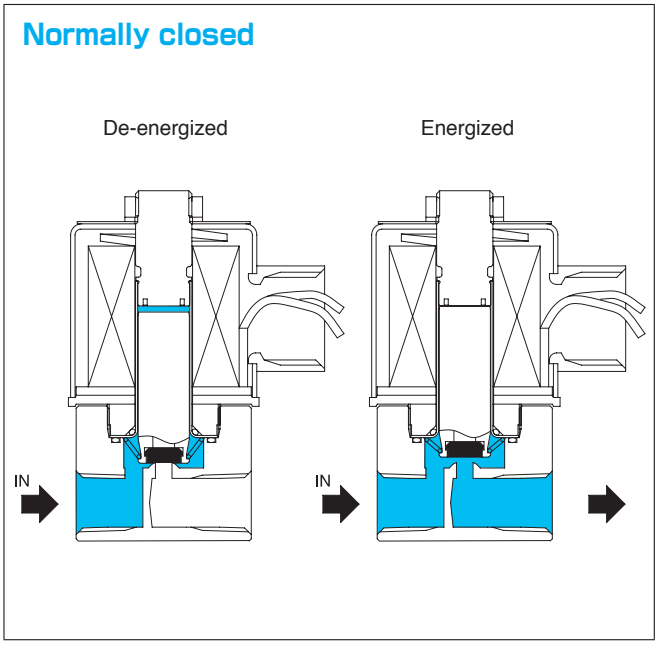
※ See ⑪ Options.

Notes: 1) Gray marked portions are standard specifications.
2) Consult us for other voltage specifications. Note that voltage fluctuation for some DC voltage cases is ±10%.
3) See Selection Guide (p.66) for combination of seat and shading ring.
4) Please consult us for stainless steel (SUS303) .

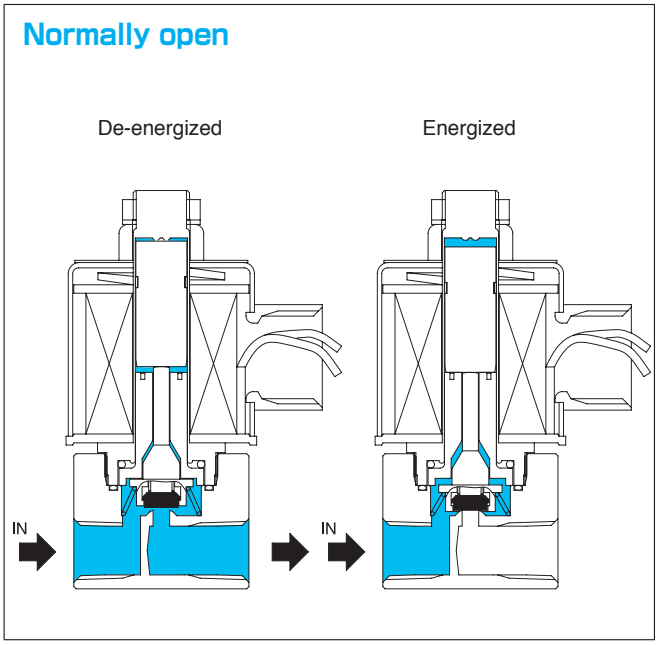


Structure / Operation

Normally closed



Normally open



Coil Data

Model code		YS301		YS302	
Frequency (Hz)		50	60	50	60
Apparent power (VA)	Issuance	37	30	43	37
	Retention	18	13	23	16
Power consumption (W)	AC	10		11	
	DC	10			

Notes: ● AC power consumption is based on the data at 100/200VAC.
● Data may slightly change depending on housing types.

Product Mass

Unit : kg

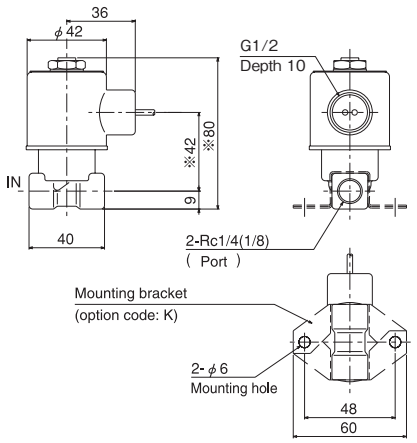
Body	Port size (Rc)	Housing									
		A	P	B	T	X	G	J/C	K/E/H	S	Y
Brass (9)	A(1/8)	0.5	0.5	0.5	0.6	0.7	0.8	1.1	1.2	2.4	1.4
	B(1/4)										
	C(3/8)	0.6	0.5	0.5	0.6	0.8	0.8	1.2	1.3	2.5	1.5
Stainless steel (2,3)	A(1/8)	0.5	0.4	0.4	0.6	0.7	0.8	1.1	1.2	2.4	1.4
	B(1/4)	0.6	0.5	0.6	0.6	0.8	0.9	1.2	1.3	2.5	1.5
	C(3/8)	0.6	0.6	0.6	0.7	0.8	0.9	1.2	1.3	2.5	1.5

External Dimensions

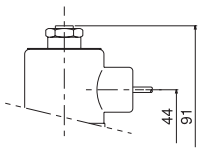
Dimensions for conduit housing (A)

Body: 9 (Brass) Port size : A • B

Normally closed



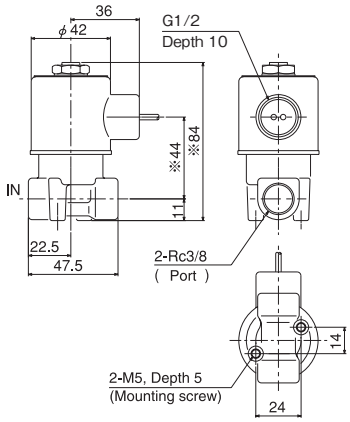
Normally open



● Valves with manual operating system
〔Normally closed〕 Size for valves with manual operating system is 18 mm larger.
〔Normally open〕 See P.72 for manual operating systems.

Body: 9 (Brass) Port size : C

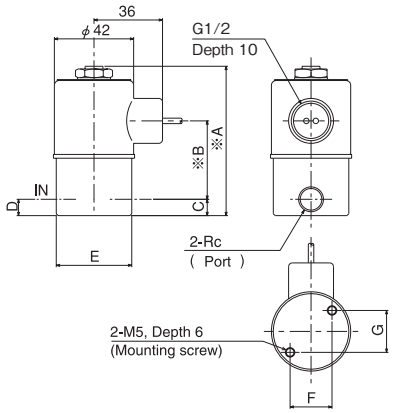
Normally closed



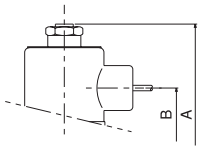
● Size for valves with manual operating system is 18 mm larger.

Body: 2, 3 (Stainless steel) Port size : A • B • C

Normally closed



Normally open



● Valves with manual operating system
〔Normally closed〕 Size for valves with manual operating system is 18 mm larger.
〔Normally open〕 See P.72 for manual operating systems.

Dimensions Unit : mm

Body	Port size (Rc)	A		B		C	D	E	F	G
		NC	NO	NC	NO					
YS30	A(1/8)	77	88	42	44	7	7	30	18	15
	B(1/4)	79	90	42	44	9	9	40	22	22
	C(3/8)	90	–	51	–	11*	24*	40*	22	22

● If orifice size is F5, dimension C is 12 and D is 21.

*See P.72 for manual operating systems.

YS 30

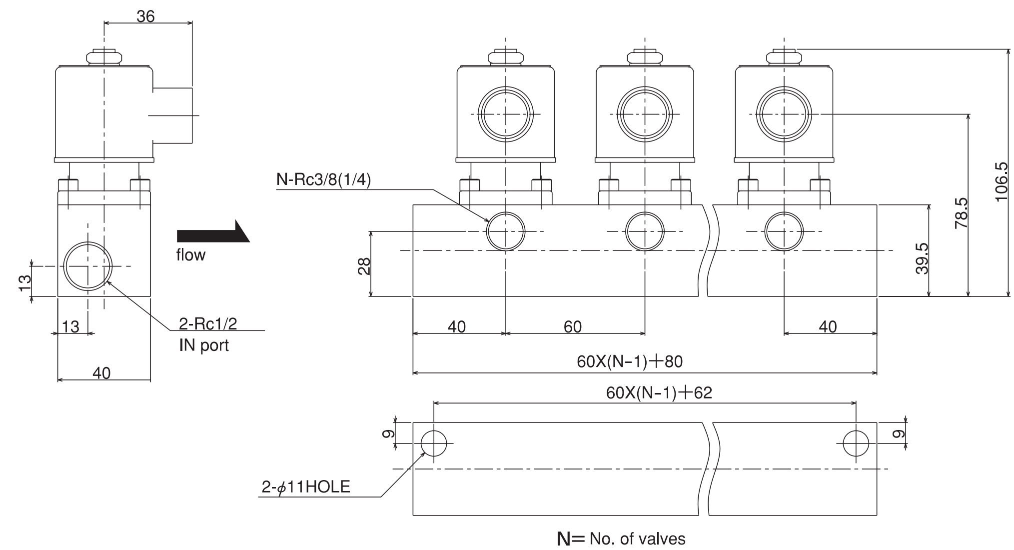
Model Code

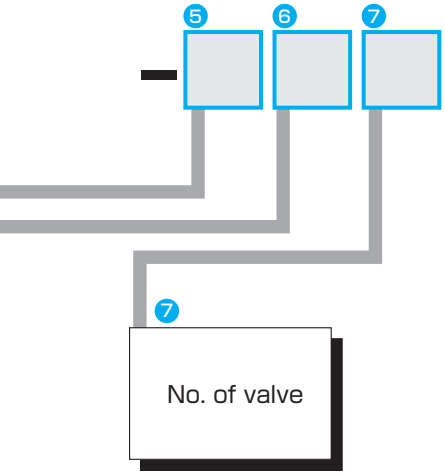
❶ Y ❷ S 3 0 ❸ 1 A F 8 8 N 9 B ❹ C 3 X38

❶ Connection type	❷ Series	❸ Applicable value	❹ Orifice size	❺ Individual port size	❻ Manifold
Y=Rc	S30	See model code (p.12) Applies only to housing (A,P,B,T,X,G)	C3=1.2 C5=1.6 C9=2.4 D5=3.2 D7=4.0 E1=4.8	B=1/4 C=3/8	A= Collective Supply B = Collective exhaust

External Dimensions

Collective supply

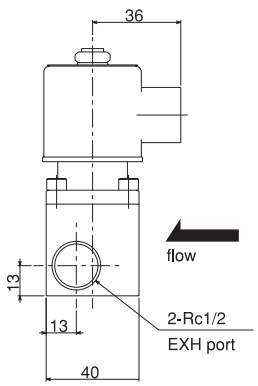




2 = 2
3 = 3
4 = 4
5 = 5
6 = 6
7 = 7

External Dimensions

Collective exhaust



YS21

Air / Inert Gas / Water / Kerosene

2 Port Solenoid Valves

Pilot-acting

YS211 Normally closed type

YS212 Normally open type

YS21 series 2-port solenoid valves are pilot-acting diaphragm valves, available for NC or NO operation. With wide range of port sizes from Rc3/8 to 2, the valves meet diverse applications.

Standard Specifications

Valve operation type		Normally closed	Valve opens when solenoid is energized.
		Normally open	Valve opens when solenoid is de-energized.
Port size			Rc3/8・1/2・3/4・1・1_1/4・1_1/2・2
Orifice size			15.9、19.1、25.0、32.0mm
Materials	Body		Brass, stainless steel, bronze
	Seal / seat		Nitrile rubber, fluorine rubber, ethylene propylene rubber
	Housing	Standard	Conduit type(NEMA1)
		Others	Explosion-proof enclosure (d2G4, Exd Ⅱ BT4), Drip-proof, housing with terminal box, and others. See Selection Guide (p.67-71).
Rated voltage			AC100V50/60Hz、 110V60Hz ¦ DC24V AC110V50Hz、 120V60Hz ¦ DC100V AC200V50/60Hz、 220V60Hz ¦ DC120V AC220V50Hz、 240V60Hz ¦ DC125V
Allowable voltage fluctuation			–15% to 10% of applicable voltages
Insulation class			Continuous rating class F and H
Leadwire length			Min. 450mm
Ambient temperature		Max.	50°C (Temperature may differ depending on coil and fluid temperature. See p.77 for details.)
		Min.	–17°C (Temperature may depending on seat materials. See p.77 for details.)
Installation position			As desired
Applicable standards			(Consult us for details.)
Options, others			Mounting bracket, neon lamp, surge absorber, oil-free Manual operating system (The maximum operating pressure differential is 1.0Mpa, in case of S212/YS212 [Normally open type] ,port size 3/8,1/2,3/4,and rated voltage AC.)

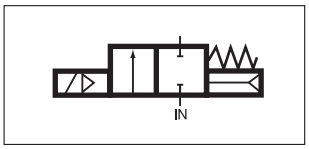
● Please consult us for other specifications.

Valve Selection List

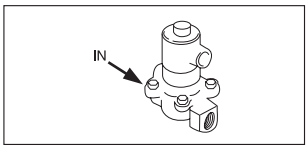
Make sure to confirm the operating pressure differential when selecting a valve.

Port size (Rc)	Orifice size (mm)	Cv value	Operating pressure differential MPa								Max. fluid temperature ℃ ※	Housing	Power consumption (W)		Insulation class	Voltage (V) 50/60Hz	Model code	
			Min.	Max.														
				Air/ inert gas		Water		Kerosene									Brass or bronze (Rc 2) body	Stainless steel body
				AC	DC	AC	DC	AC	DC				AC	DC				

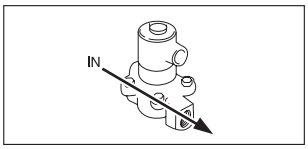
Normally closed type



De-energized

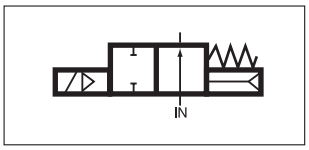


Energized

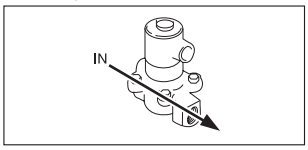


3/8	15.9	3.3	0.02	1.37	1.02	1.02	0.68	1.02	0.68	50	A	10	10	F	100	YS211AF88N6CG4	YS211AF88J8CG4
1/2	15.9	4.1	0.02	1.37	1.02	1.02	0.68	1.02	0.68	50	A	10	10	F	100	YS211AF88N6DG4	YS211AF88J8DG4
3/4	19.1	5.5	0.02	1.37	1.02	1.02	0.68	1.02	0.68	50	A	10	10	F	100	YS211AF88N6EG5	YS211AF88J8EG5
1	25	13	0.03	1.37	1.02	1.02	1.02	0.68	0.68	50	A	10	10	F	100	YS211AF88N6FG9	YS211AF88J8FG9
1_1/4	32	19	0.03	1.37	1.02	1.02	1.02	0.58	0.58	50	A	10	10	F	100	YS211AF88N6GJ2	YS211AF88J8GJ2
1_1/2	32	25	0.03	1.37	1.02	1.02	1.02	0.58	0.58	50	A	10	10	F	100	YS211AF88N6HJ2	YS211AF88J8HJ2
2	32	28	0.03	1.37	1.02	1.02	1.02	0.58	0.58	50	A	10	10	F	100	YS211AF88N6JJ2	YS211AF88J8JJ2

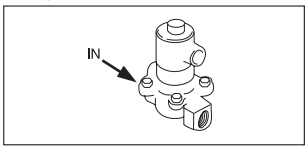
Normally open type



De-energized



Energized

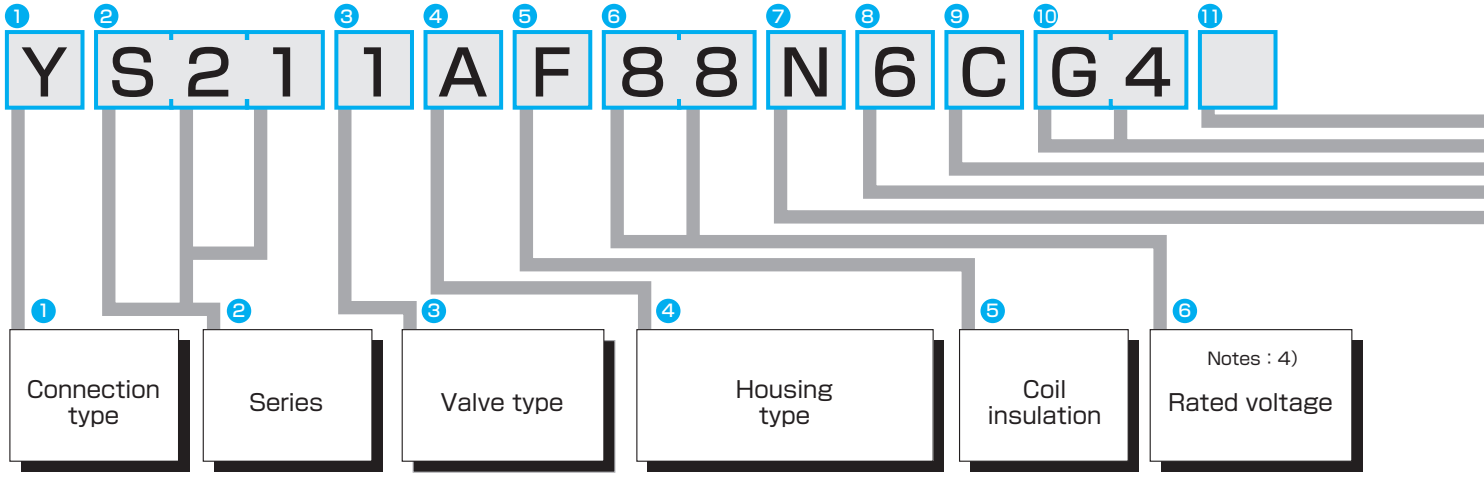


3/8	15.9	3.3	0.02	1.37 *	0.96	1.37 *	0.86	1.37 *	0.86	50	A	11	10	F	100	YS212AF88N6CG4	YS212AF88J8CG4
1/2	15.9	4.1	0.02	1.37 *	0.96	1.37 *	0.86	1.37 *	0.86	50	A	11	10	F	100	YS212AF88N6DG4	YS212AF88J8DG4
3/4	19.1	5.5	0.02	1.37 *	0.96	1.37 *	0.86	1.37 *	0.86	50	A	11	10	F	100	YS212AF88N6EG5	YS212AF88J8EG5
1	25	13	0.03	0.72	0.72	0.72	0.72	0.68	0.68	50	A	11	10	F	100	YS212AF88N6FG9	YS212AF88J8FG9
1_1/4	32	19	0.03	0.72	0.72	0.72	0.72	0.58	0.58	50	A	11	10	F	100	YS212AF88N6GJ2	YS212AF88J8GJ2
1_1/2	32	25	0.03	0.72	0.72	0.72	0.72	0.58	0.58	50	A	11	10	F	100	YS212AF88N6HJ2	YS212AF88J8HJ2
2	32	28	0.03	0.72	0.72	0.72	0.72	0.58	0.58	50	A	11	10	F	100	YS212AF88N6JJ2	YS212AF88J8JJ2

※Max. fluid temperature(°C) may differ depending on the type of fluid. See p.77 for details.

＊Mark：The maximum operational pressure difference is 1.0MPa, in case of operating system of a manual.

Model Code

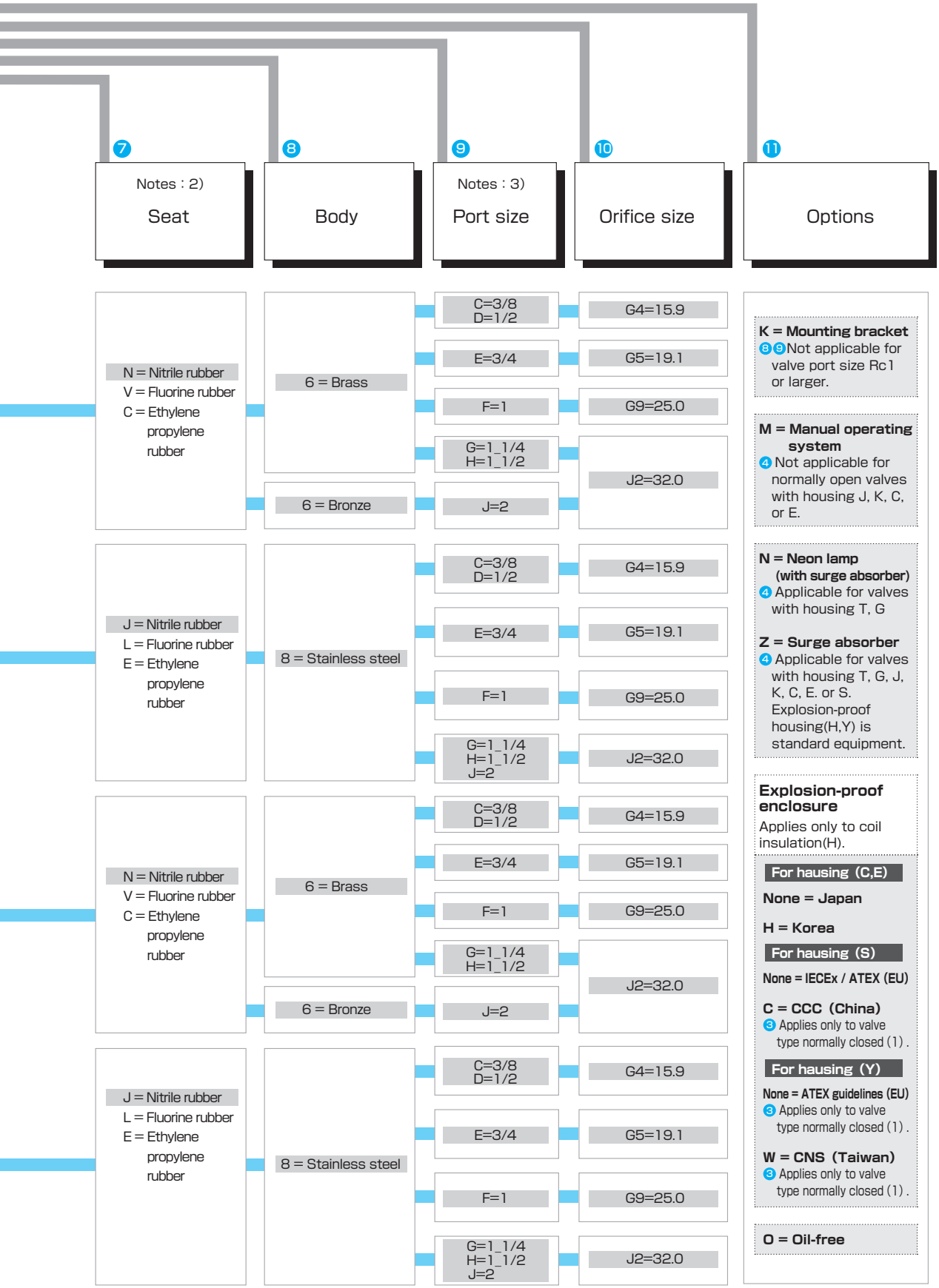


① Connection type	② Series	③ Valve type	④ Housing type	⑤ Coil insulation	⑥ Notes : 4) Rated voltage
Y=Rc No entry =NPT	S21	1= Normally closed	A = Conduit P = Open frame B = Grommet T = Conduit with terminal box X = NEMA 4,7drip-/explosion-proof G = NEMA 4 drip-proof with terminal box J = Explosion-proof enclosure (d2G4) (conduit) K = Explosion-proof enclosure (d2G4) (pressure-resistant packing) ※C = Explosion-proof enclosure (Exd Ⅱ BT4) (conduit) ※E = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)	Class F ClassH	88=AC100V (50/60Hz) ・ AC110V (60Hz) 94=AC200V (50/60Hz) ・ AC220V (60Hz) 02=AC110V (50Hz) ・ AC120V (60Hz) 04=AC220V (50Hz) ・ AC240V (60Hz) 16=DC24V 25=DC100V 18=DC120V 97=DC125V
			H = Explosion-proof enclosure (d3aG4) (pressure-resistant packing) ※S = Explosion-proof enclosure (Ex db Ⅱ C T6...T4 Gb) (conduit) ※Y = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)	Class H	
		2=Normally open	A = Conduit P = Open frame B = Grommet T = Conduit with terminal box X = NEMA 4,7drip-/explosion-proof G = NEMA 4 drip-proof with terminal box J = Explosion-proof enclosure (d2G4) (conduit) K = Explosion-proof enclosure (d2G4) (pressure-resistant packing) ※C = Explosion-proof enclosure (Exd Ⅱ BT4) (conduit) ※E = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)	Class F ClassH	88=AC100V (50/60Hz) ・ AC110V (60Hz) 94=AC200V (50/60Hz) ・ AC220V (60Hz) 02=AC110V (50Hz) ・ AC120V (60Hz) 04=AC220V (50Hz) ・ AC240V (60Hz) 16=DC24V 25=DC100V 18=DC120V 97=DC125V

※ See ⑪ Options.

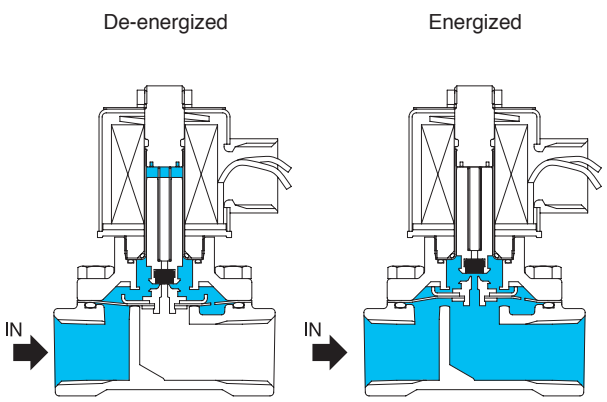
YS 21

Notes: 1) Gray marked portions are standard specifications.
2) See Selection Guide (p.66) for combination of seat and shading ring.
3) If port size is Rc2, body code 6 (= bronze) applies.
4) Consult us for other voltage specifications. Note that voltage fluctuation for some DC voltage cases is ±10%.

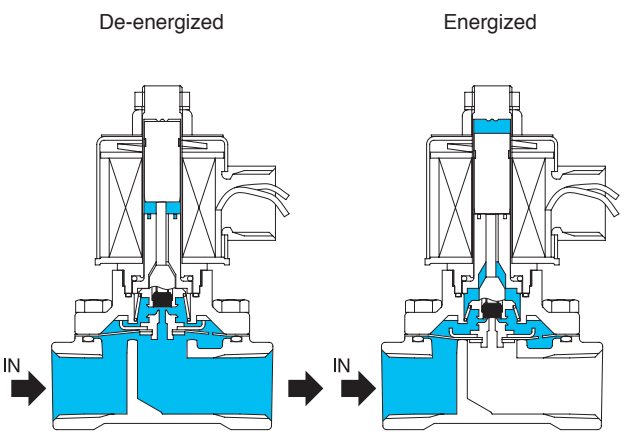


Structure / Operation

Normally closed



Normally open



YS 21

Coil Data

Model code		YS211		YS212	
Frequency (Hz)		50	60	50	60
Apparent power (VA)	Issuance	37	30	56	51
	Retention	18	13	23	16
Power consumption (W)	AC	10		11	
	DC	10		10	

Notes: ● AC power consumption is based on the data at 100/200VAC.
● Data may slightly change depending on housing types.

Product Mass

Unit: kg

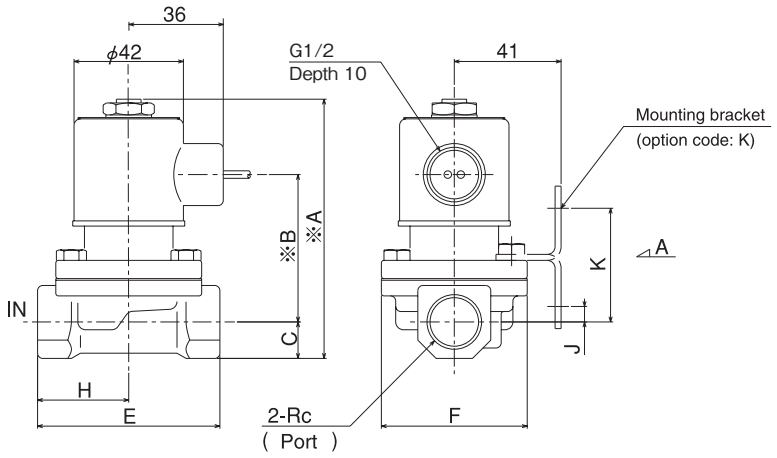
Body	Port size (Rc)	Housing									
		A	P	B	T	X	G	J/C	K/E/H	S	Y
Brass (6)	C(3/8)	1.0	0.9	0.9	1.0	1.2	1.2	1.6	1.7	2.9	1.9
	D(1/2)										
	E(3/4)	1.0	0.9	0.9	1.0	1.2	1.2	1.5	1.7	2.9	1.8
	F(1)	1.9	1.8	1.8	1.9	2.1	2.1	2.5	2.6	3.8	2.8
	G(1_1/4)	2.7	2.7	2.7	2.8	2.9	3.0	3.3	3.4	4.6	3.6
	H(1_1/2)										
Bronze (6)	J(2)	4.2	4.1	4.1	4.2	4.4	4.4	4.8	4.9	6.1	5.1
Stainless steel (8)	C(3/8)	0.8	0.8	0.8	0.9	1.0	1.1	1.4	1.5	2.7	1.7
	D(1/2)										
	E(3/4)	1.0	0.9	0.9	1.0	1.2	1.2	1.6	1.7	2.9	1.9
	F(1)	1.9	1.8	1.9	1.9	2.1	2.2	2.5	2.6	3.8	2.8
	G(1_1/4)	2.9	2.9	2.9	3.0	3.1	3.2	3.5	3.6	4.8	3.8
	H(1_1/2)										
	J(2)	3.4	3.3	3.4	3.5	3.6	3.7	4.0	4.1	5.3	4.3

External Dimensions

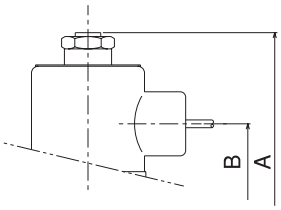
Dimensions for conduit housing (A)

Body: 6 (Brass) Port size : C • D • E

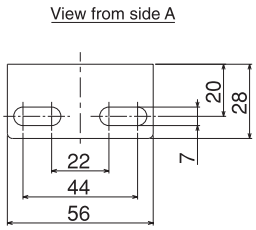
Normally closed



Normally open



Mounting bracket (option code : K)



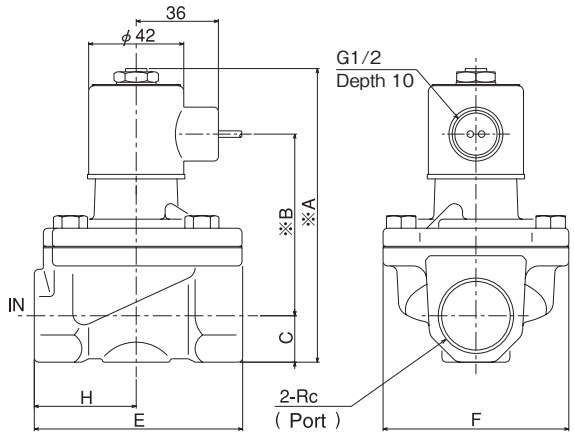
Dimensions Unit : mm

Body	Port size (Rc)	A		B		C	J	K	E	F	H
		NC	NO	NC	NO						
6 (Brass)	C、D (3/8・1/2)	99	110	57	59	14	6	44	70	56	35
	E(3/4)	104	115	60	62	16	9	47	70	56	35

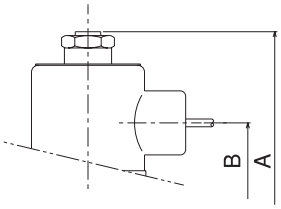
● Valves with manual operating system
〔Normally closed〕 Size for valves with manual operating system is 18 mm larger.
〔Normally open〕 See P.72 for manual operating systems.

Body: 6 (Brass) Port size : F • G • H
Body: 6 (Bronze) Port size : J

Normally closed



Normally open



Dimensions Unit : mm

Body	Port size (Rc)	A		B		C	E	F	H
		NC	NO	NC	NO				
6 (Brass)	F(1)	130	141	80	82	21	92	82	45
	G、H(1_1/4、1_1/2)	146	157	89	91	28	110	92	55
6 (Bronze)	J(2)	160	171	92	94	38	140	92	65

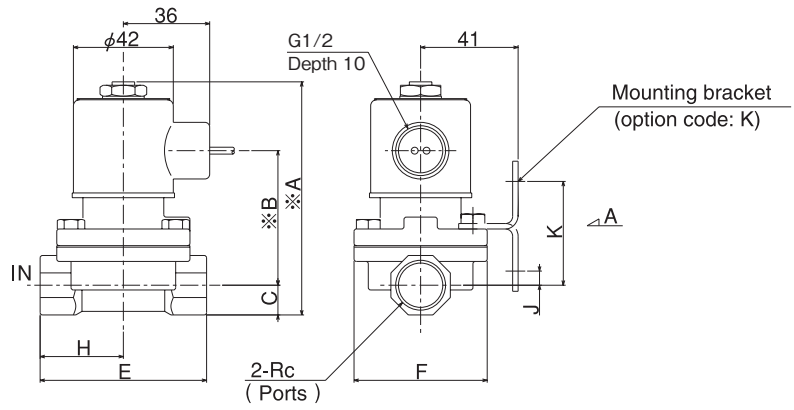
● Valves with manual operating system
〔Normally closed〕 Size for valves with manual operating system is 18 mm larger.
〔Normally open〕 See P.72 for manual operating systems.

*See P.72 for manual operating systems.

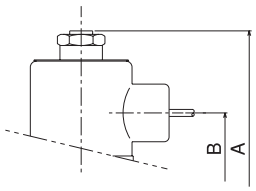
External Dimensions

Body: 8 (Stainless steel) Port size : C • D • E

Normally closed

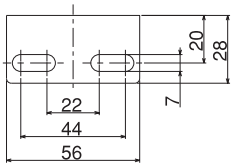


Normally open



Mounting bracket (option code : K)

View from side A



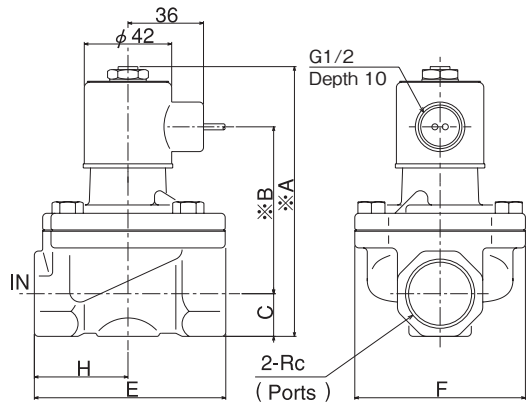
Dimensions Unit : mm

Body	Port size (Rc)	A		B		C	J	K	E	F	H
		NC	NO	NC	NO						
8(Stainless steel)	C、D (3/8・1/2)	98	109	57	59	13	6	44	70	56	35
	E(3/4)	107	118	60	62	19	9	47	70	56	35

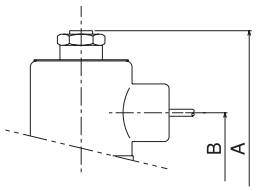
● Valves with manual operating system
〔Normally closed〕 Size for valves with manual operating system is 18 mm larger.
〔Normally open〕 See P.72 for manual operating systems.

Body: 8 (Stainless steel) Port size : F • G • H • J

Normally closed



Normally open



Dimensions Unit : mm

Body	Port size (Rc)	A		B		C	E	F	H
		NC	NO	NC	NO				
8(Stainless steel)	F(1)	130	141	80	82	21	92	82	45
	G, H(1_1/4, 1_1/2)	146	157	89	91	31	110	92	55
	J(2)	160	171	92	94	39	140	92	65

● Valves with manual operating system
〔Normally closed〕 Size for valves with manual operating system is 18 mm larger.
〔Normally open〕 See P.72 for manual operating systems.

*See P.72 for manual operating systems.

YS20

Air / Inert Gas / Water / Kerosene/ Vacuum

2 Port Solenoid Valves

Zero-differential Pressure Pilot-acting

YS201 Normally closed type

YS202 Normally open type

YS20 series 2-port solenoid valves are hanging diaphragm valve that start operation with zero differential pressure. The valves are applicable for pressures from –100 kPa to 0.96 MPa.

Standard Specifications

Valve operation type		Normally closed	Valve opens when solenoid is energized.
		Normally open	Valve opens when solenoid is de-energized.
Port size			Rc3/8・1/2・3/4・1・1_1/4・1_1/2・2
Orifice size			15.9、19.1、25.0、32.0mm
Materials	Body		Brass, stainless steel
	Seal / seat		Nitrile rubber, ethylene propylene rubber, fluorine rubber
	Housing	Standard	Conduit type(NEMA1)
		Others	Explosion-proof enclosure (d2G4, Exd Ⅱ BT4), Drip-proof, housing with terminal box, and others. See Selection Guide (p.67-71).
Rated voltage			AC100V50/60Hz、 110V60Hz ¦ DC24V AC110V50Hz、 120V60Hz ¦ DC100V AC200V50/60Hz、 220V60Hz ¦ DC120V AC220V50Hz、 240V60Hz ¦ DC125V
Allowable voltage fluctuation			–15% to 10% of applicable voltages
Insulation class			Continuous rating class F and H
Leadwire length			Min. 450mm
Ambient temperature		Max.	50°C (Temperature may differ depending on coil and fluid temperature. See p.77 for details.)
		Min.	–17°C (Temperature may depending on seat materials. See p.77 for details.)
Installation position			As desired
Applicable standards			(Consult us for details.)
Options, others			Mounting bracket, neon lamp, surge absorber, oil-free Manual operating system (The maximum operating pressure differential is 1.0Mpa, in case of S202/YS202 [Normally open type] ,port size 3/8,1/2,3/4,and rated voltage AC.)

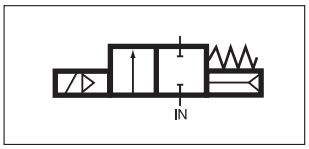
● Please consult us for other specifications.
● In some cases the valve may not fully open/close with slight supply-pressure.

Valve Selection List

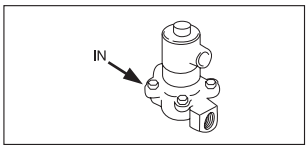
Make sure to confirm the operating pressure differential when selecting a valve.

Port size (Rc)	Orifice size (mm)	Cv value	Operating pressure differential MPa							Max. fluid temperature ℃ ※	Housing	Power consumption (W)		Insulation class	Voltage (V) 50/60Hz	Model code	
			Min.	Max.													
				Air/ inert gas		Water		Kerosene								Brass or bronze (Rc 2) body	Stainless steel body
				AC	DC	AC	DC	AC	DC			AC	DC				

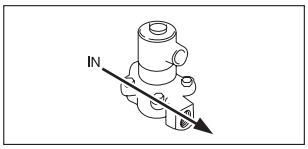
Normally closed type



De-energized



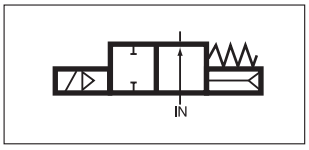
Energized



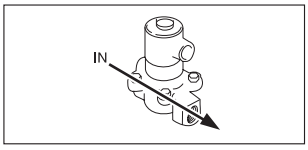
3/8	15.9	3.3	0	0.96	0.61	0.96	0.61	0.61	0.48	50	A	10	10	F	100	YS201AF88N5CG4	YS201AF88J7CG4
1/2	15.9	4.1	0	0.96	0.61	0.96	0.61	0.61	0.48	50	A	10	10	F	100	YS201AF88N5DG4	YS201AF88J7DG4
3/4	19.1	5.5	0	0.96	0.61	0.96	0.61	0.61	0.48	50	A	10	10	F	100	YS201AF88N5EG5	YS201AF88J7EG5
1	25	11	0	0.68	–	0.34	–	–	–	50	A	10	–	F	100	YS201AF88N5FG9	YS201AF88J7FG9
1_1/4	32	18	0	0.34	–	–	–	–	–	50	A	10	–	F	100	YS201AF88N5GJ2	YS201AF88J7GJ2
1_1/2	32	23	0	0.34	–	–	–	–	–	50	A	10	–	F	100	YS201AF88N5HJ2	YS201AF88J7HJ2
2	32	27	0	0.34	–	–	–	–	–	50	A	10	–	F	100	YS201AF88N5JJ2	YS201AF88J7JJ2

YS 20

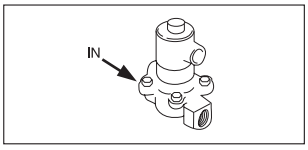
Normally open type



De-energized



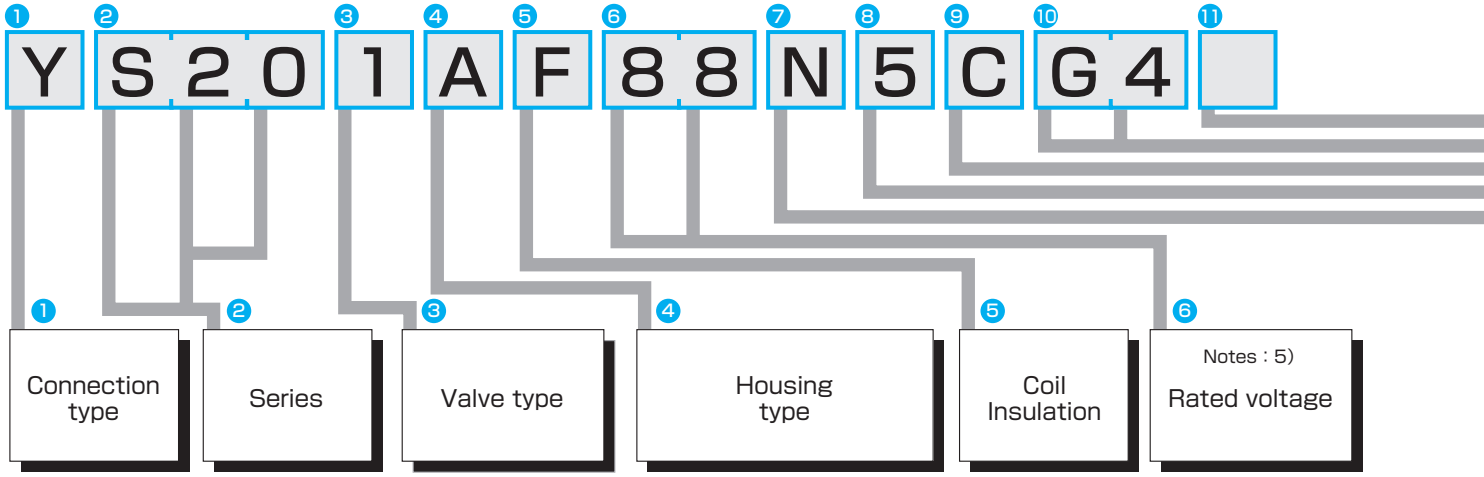
Energized



3/8	15.9	3.3	0	1.37 *	0.86	1.37 *	0.86	1.37 *	0.86	50	A	11	10	F	100	YS202AF88N5CG4	YS202AF88J7CG4
1/2	15.9	4.1	0	1.37 *	0.86	1.37 *	0.86	1.37 *	0.86	50	A	11	10	F	100	YS202AF88N5DG4	YS202AF88J7DG4
3/4	19.1	5.5	0	1.37 *	0.86	1.37 *	0.86	1.37 *	0.86	50	A	11	10	F	100	YS202AF88N5EG5	YS202AF88J7EG5

※Max. fluid temperature(°C) may differ depending on the type of fluid. See p.77 for details.
＊Mark：The maximum operational pressure difference is 1.0MPa, in case of operating system of a manual.

Model Code

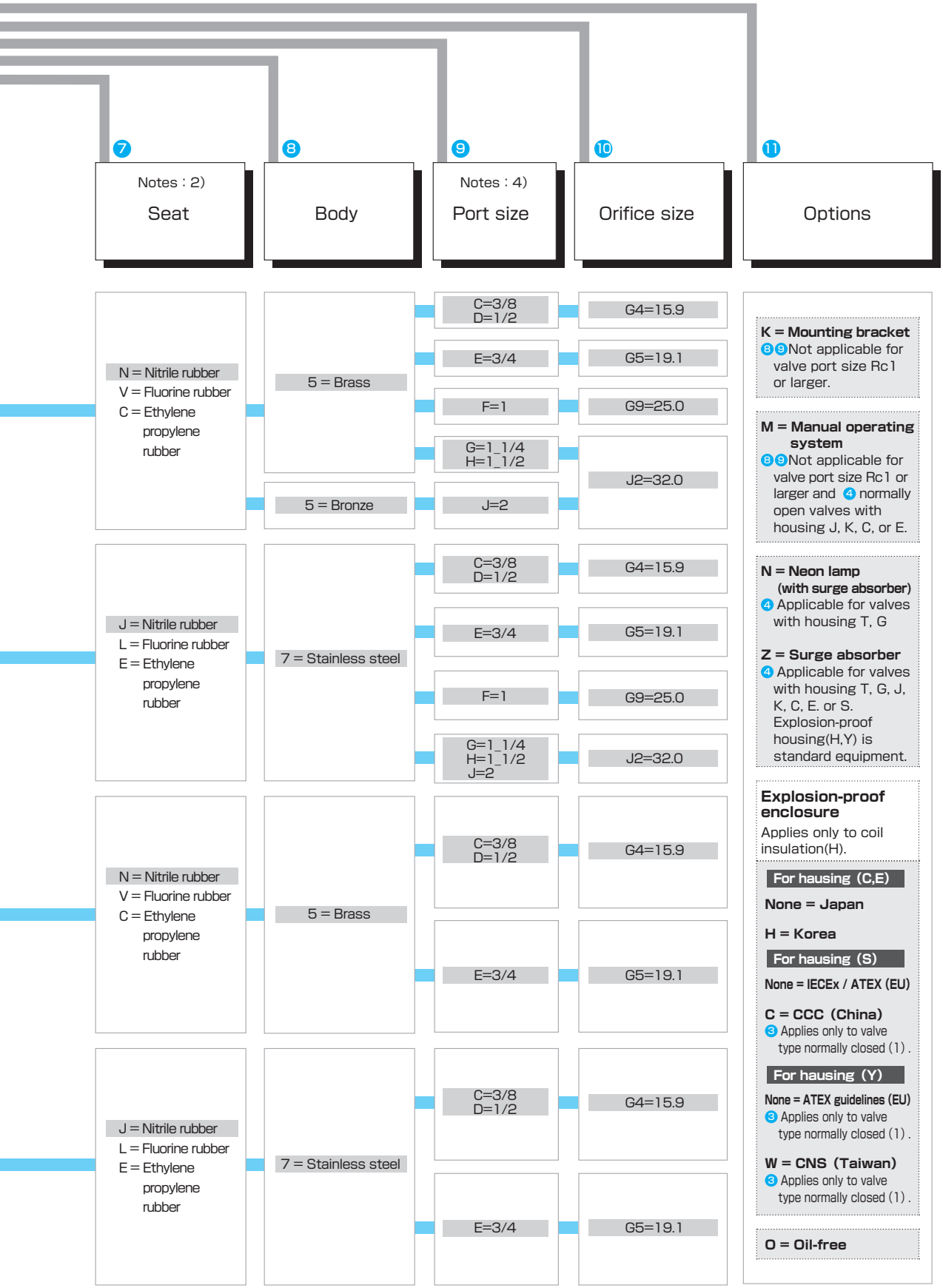


① Connection type	② Series	③ Valve type	④ Housing type	⑤ Coil Insulation	⑥ Notes : 5) Rated voltage
Y=Rc No entry =NPT	S20	1= Normally closed	A = Conduit P = Open frame B = Grommet T = Conduit with terminal box X = NEMA 4,7drip-/explosion-proof G = NEMA 4 drip-proof with terminal box J = Explosion-proof enclosure (d2G4) (conduit) K = Explosion-proof enclosure (d2G4) (pressure-resistant packing) ※C = Explosion-proof enclosure (Exd Ⅱ BT4) (conduit) ※E = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)	Class F ClassH	88=AC100V (50/60Hz) ・ AC110V (60Hz) 94=AC200V (50/60Hz) ・ AC220V (60Hz) 02=AC110V (50Hz) ・ AC120V (60Hz) 04=AC220V (50Hz) ・ AC240V (60Hz) 16=DC24V 25=DC100V 18=DC120V 97=DC125V 注) 3
			H = Explosion-proof enclosure (d3aG4) (pressure-resistant packing) ※S = Explosion-proof enclosure (Ex db ⅡC T6...T4 Gb) (conduit) ※Y = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)	Class H	
		2= Normally open	A = Conduit P = Open frame B = Grommet T = Conduit with terminal box X = NEMA 4,7drip-/explosion-proof G = NEMA 4 drip-proof with terminal box J = Explosion-proof enclosure (d2G4) (conduit) K = Explosion-proof enclosure (d2G4) (pressure-resistant packing) ※C = Explosion-proof enclosure (Exd Ⅱ BT4) (conduit) ※E = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)	Class F ClassH	88=AC100V (50/60Hz) ・ AC110V (60Hz) 94=AC200V (50/60Hz) ・ AC220V (60Hz) 02=AC110V (50Hz) ・ AC120V (60Hz) 04=AC220V (50Hz) ・ AC240V (60Hz) 16=DC24V 25=DC100V 18=DC120V 97=DC125V

※ See ⑪ Options.

YS 20

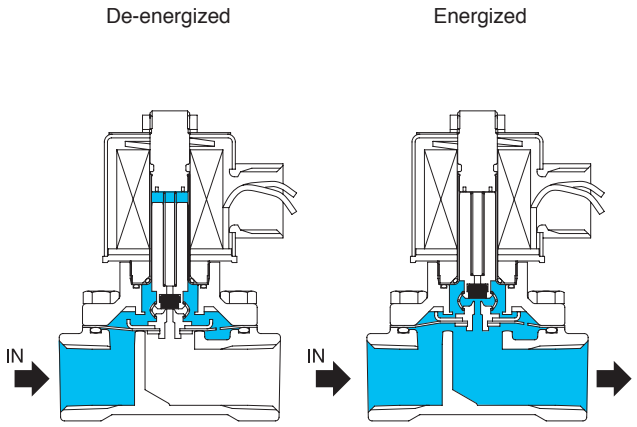
Notes: 1) Gray marked portions are standard specifications.
2) See Selection Guide (p. 66) for combination of seat and shading ring.
3) Normally closed valves with port size Rc1 or larger are not applicable for DC voltage specifications.
For such specifications select YS27 series valves.
4) If port size is Rc2, body code 5 (= bronze) applies.
5) Consult us for other voltage specifications. Note that voltage fluctuation for some DC voltage cases is ±10%.



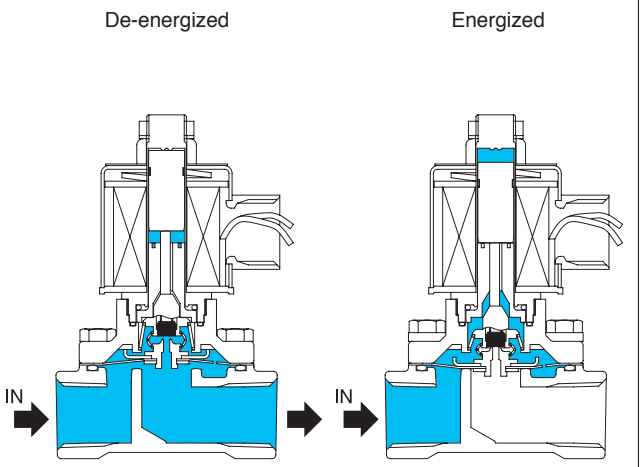
YS 20

Structure / Operation

Normally closed



Normally open



YS 20

Coil Data

Model code		YS201		YS202	
Frequency (Hz)		50	60	50	60
Apparent power (VA)	Issuance	37	30	43	37
	Retention	22	15	24	18
Power consumption (W)	AC	10		11	
	DC	10			

Notes: ● AC power consumption is based on the data at 100/200VAC.
● Data may slightly change depending on housing types.

Product Mass

Unit : kg

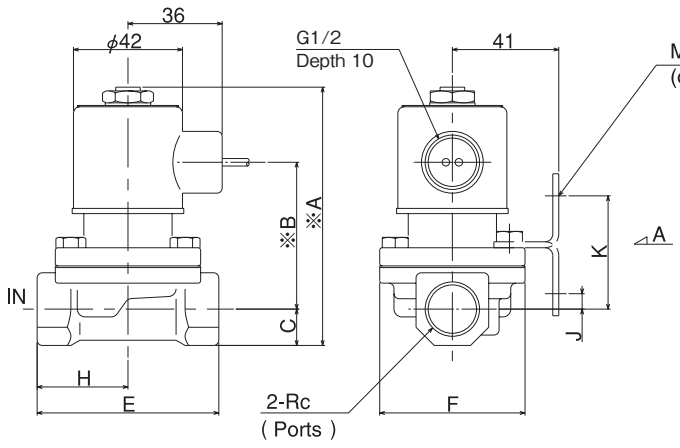
Body	Port size (Rc)	Housing									
		A	P	B	T	X	G	J/C	K/E/H	S	Y
Brass (5)	C(3/8)	1.0	0.9	0.9	1.0	1.2	1.2	1.6	1.7	2.9	1.9
	D(1/2)										
	E(3/4)	1.0	0.9	0.9	1.0	1.2	1.2	1.6	1.7	2.9	1.9
	F(1)	1.8	1.8	1.8	1.9	2.0	2.1	2.4	2.5	3.7	2.7
	G(1_1/4)	2.7	2.7	2.7	2.8	2.9	3.0	3.3	3.4	4.6	3.6
	H(1_1/2)										
Bronze (5)	J(2)	4.1	4.1	4.1	4.2	4.3	4.4	4.7	4.8	6.0	5.0
Stainless steel (7)	C(3/8)	0.8	0.8	0.8	0.9	1.0	1.1	1.4	1.5	2.7	1.7
	D(1/2)										
	E(3/4)	1.0	0.9	0.9	1.0	1.2	1.2	1.6	1.7	2.9	1.9
	F(1)	1.8	1.8	1.8	1.9	2.0	2.1	2.4	2.5	3.7	2.7
	G(1_1/4)	2.9	2.8	2.9	3.0	3.1	3.2	3.5	3.6	4.8	3.8
	H(1_1/2)										
	J(2)	3.4	3.3	3.3	3.4	3.6	3.6	4.0	4.1	5.3	4.3

外形寸法図 External Dimensions

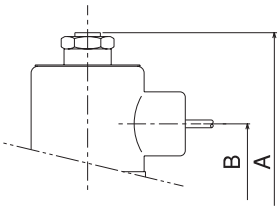
Dimensions for conduit housing（A）

Body: 5 (Brass) Port size : C • D • E

Normally closed

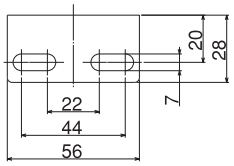


Normally open



Mounting bracket (option code : K)

View from side A



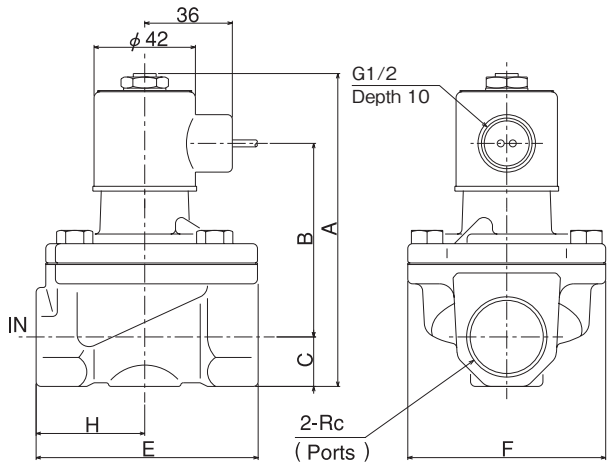
Dimensions Unit : mm

Body	Port size（Rc）	A		B		C	J	K	E	F	H
		NC	NO	NC	NO						
5(Brass)	C、D (3/8・1/2)	99	110	57	59	14	6	44	70	56	35
	E(3/4)	104	115	60	62	16	9	47	70	56	35

● Valves with manual operating system
〔Normally closed〕 Size for valves with manual operating system is 18 mm larger.
〔Normally open〕 See P.72 for manual operating systems.

Body: 5 (Brass) Port size : F • G • H
Body: 5 (Bronze) Port size : J

Normally closed



Dimensions Unit : mm

Body	Port size（Rc）	A		B		C	E	F	H
		NC	NO	NC	NO				
5 (Brass)	F(1)	130	–	80	–	21	92	82	45
	G. H(1_1/4. 1_1/2)	146	–	89	–	28	110	92	55
5 (Bronze)	J(2)	160	–	93	–	38	140	92	65

*See P.72 for manual operating systems.

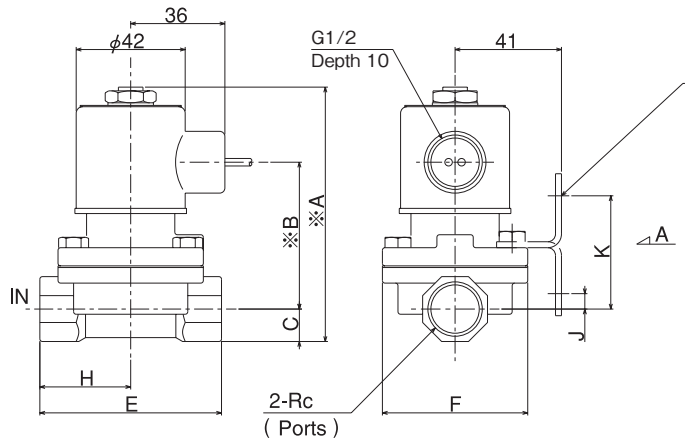
YS 20

External Dimensions

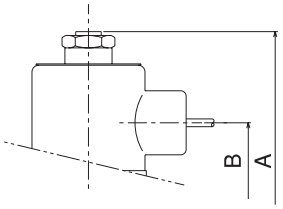
Dimensions for conduit housing (A)

Body: 7 (Stainless steel)　Port size : C • D • E

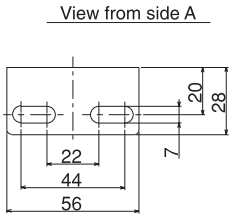
Normally closed



Normally open



Mounting bracket (option code : K)



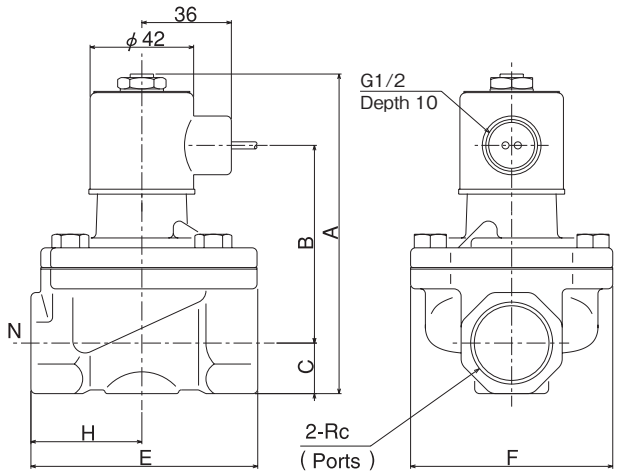
Dimensions　Unit : mm

Body	Port size (Rc)	A		B		C	J	K	E	F	H
		NC	NO	NC	NO						
7 (Stainless steel)	C、D (3/8・1/2)	98	109	57	59	13	6	44	70	56	35
	E(3/4)	107	118	60	62	19	9	47	70	56	35

● Valves with manual operating system
〔Normally closed〕 Size for valves with manual operating system is 18 mm larger.
〔Normally open〕 See P.72 for manual operating systems.

Body: 7 (Stainless steel)　Port size : F • G • H • J

Normally closed



Dimensions　Unit : mm

Body	Port size (Rc)	A		B		C	E	F	H
		NC	NO	NC	NO				
7 (Stainless steel)	F(1)	130	–	80	–	21	92	82	45
	G, H(1_1/4, 1_1/2)	149	–	89	–	31	110	92	55
	J(2)	160	–	93	–	39	140	92	65

*See P.72 for manual operating systems.

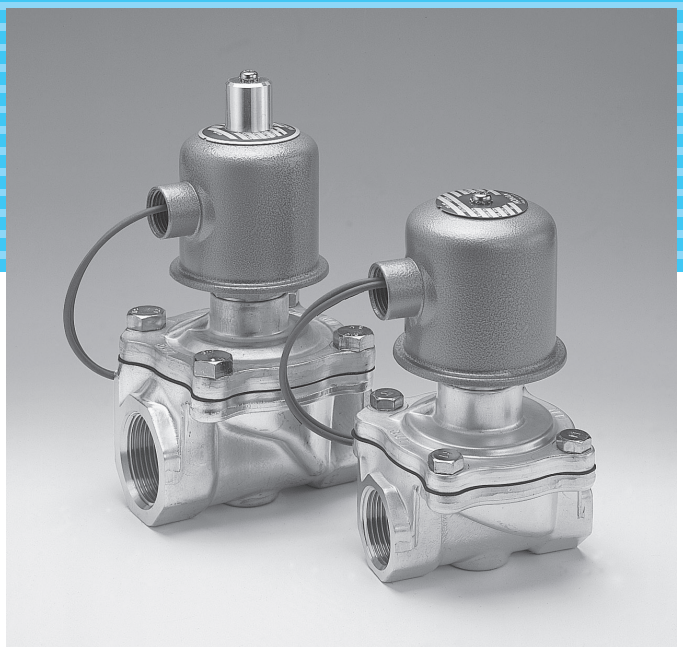
YS 20

YS27

Air / Inert Gas / Water / Kerosene / Vacuum

2 Port Solenoid Valves

Zero-differential Pressure Pilot-acting



YS271 Normally closed type

YS272 Normally open type

YS27 series 2-port solenoid valves are hanging diaphragm valve that start operation with zero differential pressure. The valves are applicable for wide range of pressures, from –100 kPa to 0.86 MPa.

Standard Specifications

Valve operation type		Normally closed	Valve opens when solenoid is energized.
		Normally open	Valve opens when solenoid is de-energized.
Port size			Rc1・1_1/4・1_1/2・2
Orifice size			25.0、32.0mm
Materials	Body		Brass, stainless steel, bonze
	Seal / seat		Nitrile rubber, ethylene propylene rubber, fluorine rubber
	Housing	Standard	Conduit type(NEMA1)
		Others	Drip-proof, housing with terminal box, and others. See Selection Guide (p.67-71).
Rated voltage			AC100V50/60Hz、 110V60Hz ¦ DC24V AC110V50Hz、 120V60Hz ¦ DC100V AC200V50/60Hz、 220V60Hz ¦ DC120V AC220V50Hz、 240V60Hz ¦ DC125V
Allowable voltage fluctuation			–15% to 10% of applicable voltages
Insulation class			Continuous rating class H
Leadwire length			Min. 450mm
Ambient temperature		Max.	50°C (Temperature may differ depending on coil and fluid temperature. See p.77 for details.)
		Min.	–17°C (Temperature may depending on seat materials. See p.77 for details.)
Installation position			Place the valve with solenoid standing upright.
Applicable standards			(Consult us for details.)
Options, others			Neon lamp, surge absorber, oil-free

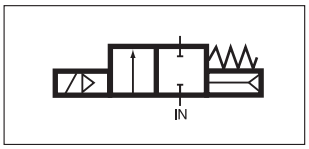
- Please consult us for other specifications.
- In some cases the valve may not fully open / close with slight supply-pressure.

Valve Selection List

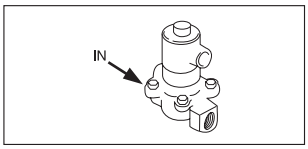
Make sure to confirm the operating pressure differential when selecting a valve.

Port size (Rc)	Orifice size (mm)	Cv value	Operating pressure differential MPa							Max. fluid temperature ※ ℃	Housing	Power consumption (W)		Insulation class	Voltage (V) 50/60Hz	Model code	
			Min.	Max.													
				Air/ inert gas		Water		Kerosene								Brass or bronze (Rc 2) body	Stainless steel body
				AC	DC	AC	DC	AC	DC			AC	DC				

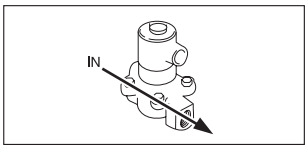
Normally closed type



De-energized



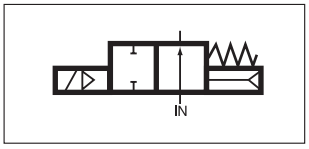
Energized



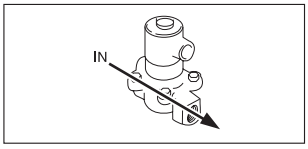
1	25	13	0	0.86	0.86	0.68	0.68	0.49	0.49	50	A	17.5	22.5	H	100	**YS271AH88N5FG9**	**YS271AH88J7FG9**
1_1/4	32	19	0	0.86	0.86	0.34	0.34	0.49	0.49	50	A	17.5	22.5	H	100	**YS271AH88N5GJ2**	**YS271AH88J7GJ2**
1_1/2	32	25	0	0.86	0.86	0.34	0.34	0.49	0.49	50	A	17.5	22.5	H	100	**YS271AH88N5HJ2**	**YS271AH88J7HJ2**
2	32	28	0	0.86	0.86	0.34	0.34	0.49	0.49	50	A	17.5	22.5	H	100	**YS271AH88N5JJ2**	**YS271AH88J7JJ2**

YS 27

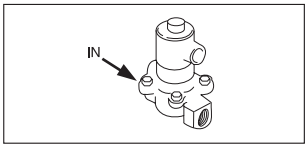
Normally open type



De-energized



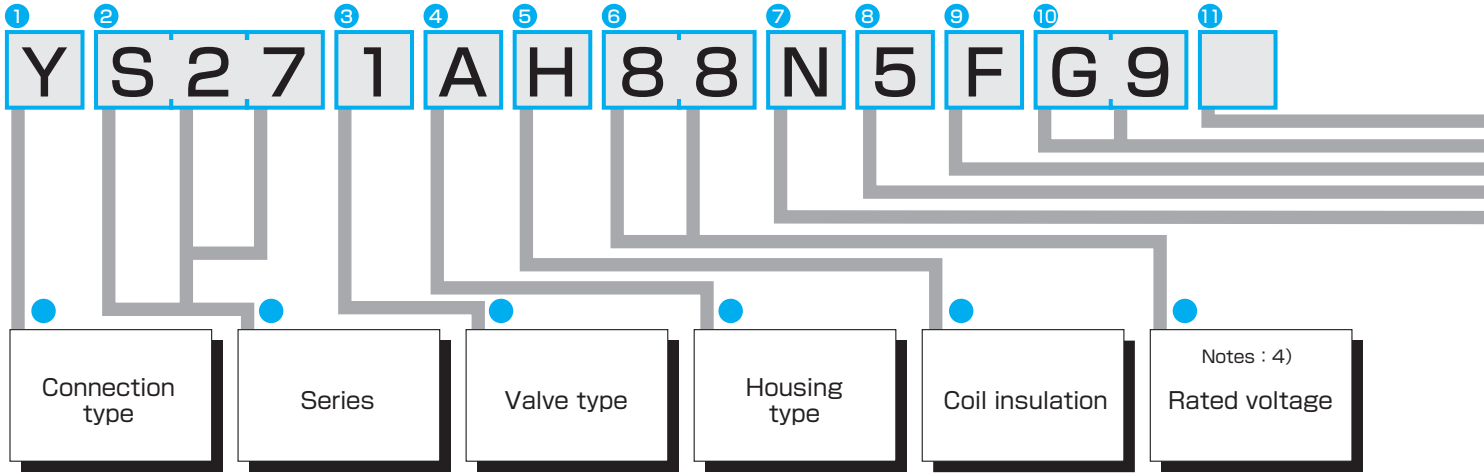
Energized



1	25	13	0	0.86	–	0.86	–	0.49	–	50	A	18.5	–	H	100	**YS272AH88N5FG9**	**YS272AH88J7FG9**
1_1/4	32	18	0	0.86	–	0.86	–	0.49	–	50	A	18.5	–	H	100	**YS272AH88N5GJ2**	**YS272AH88J7GJ2**
1_1/2	32	23	0	0.86	–	0.86	–	0.49	–	50	A	18.5	–	H	100	**YS272AH88N5HJ2**	**YS272AH88J7HJ2**
2	32	27	0	0.86	–	0.86	–	0.49	–	50	A	18.5	–	H	100	**YS272AH88N5JJ2**	**YS272AH88J7JJ2**

※Max. fluid temperature(°C) may differ depending on the type of fluid. See p.77 for details.

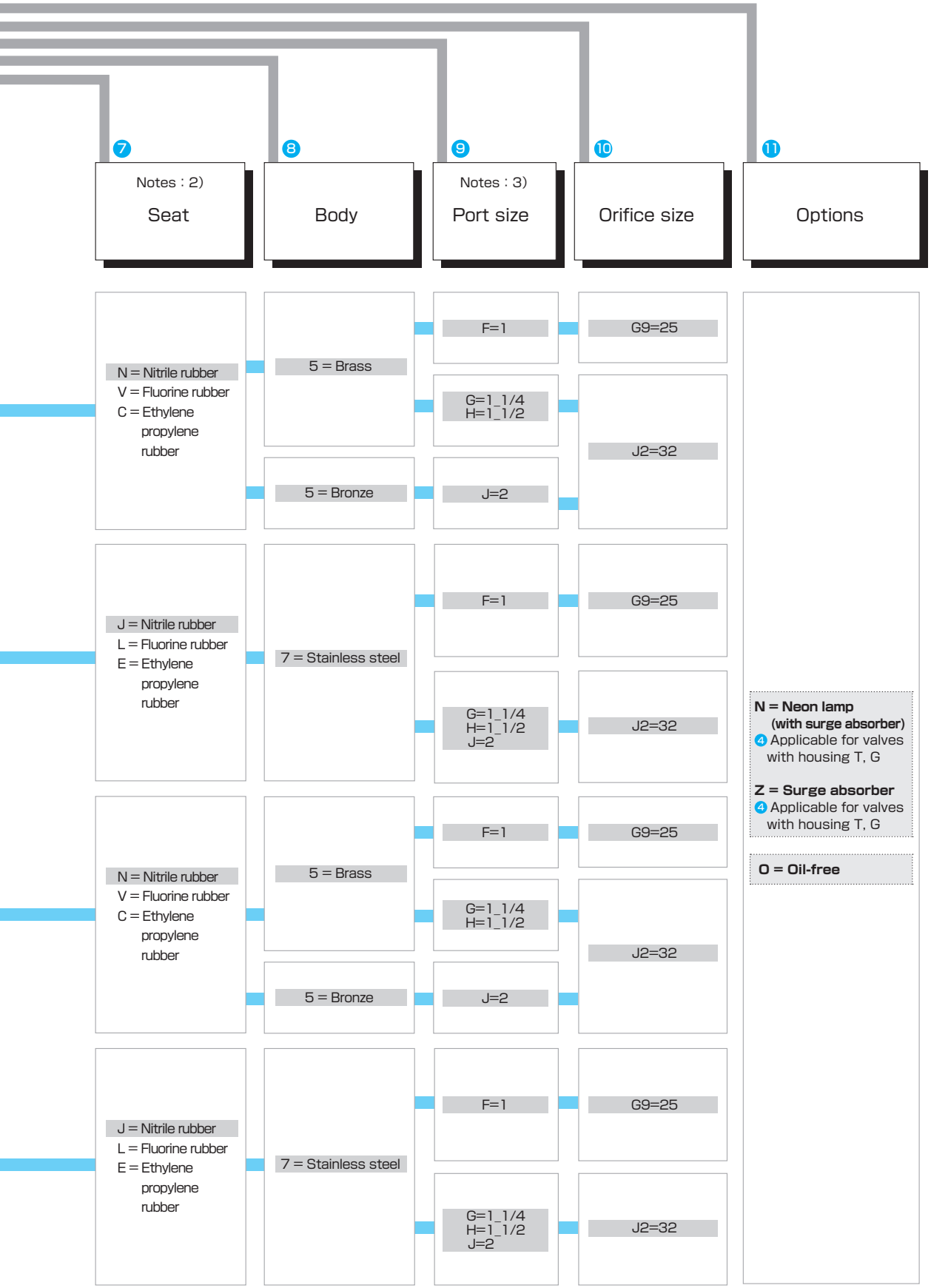
Model Code



① Connection type	② Series	③ Valve type	④ Housing type	⑤ Coil insulation	⑥ Notes : 4) Rated voltage
Y=Rc No entry =NPT	S27	1= Normally closed	A = Conduit T = Conduit with terminal box W = NEMA 4 drip-proof G =NEMA 4 drip-proof with terminal box	ClassH	88=AC100V (50/60Hz) · AC110V (60Hz) 94=AC200V (50/60Hz) · AC220V (60Hz) 02=AC110V (50Hz) · AC120V (60Hz) 04=AC220V (50Hz) · AC240V (60Hz) 16=DC24V 25=DC100V 18=DC120V 97=DC125V
		2= Normally open	A = Conduit T = Conduit with terminal box W = NEMA 4 drip-proof G = NEMA 4 drip-proof with terminal box	ClassH	88=AC100V (50/60Hz) · AC110V (60Hz) 94=AC200V (50/60Hz) · AC220V (60Hz) 02=AC110V (50Hz) · AC120V (60Hz) 04=AC220V (50Hz) · AC240V (60Hz)

YS 27

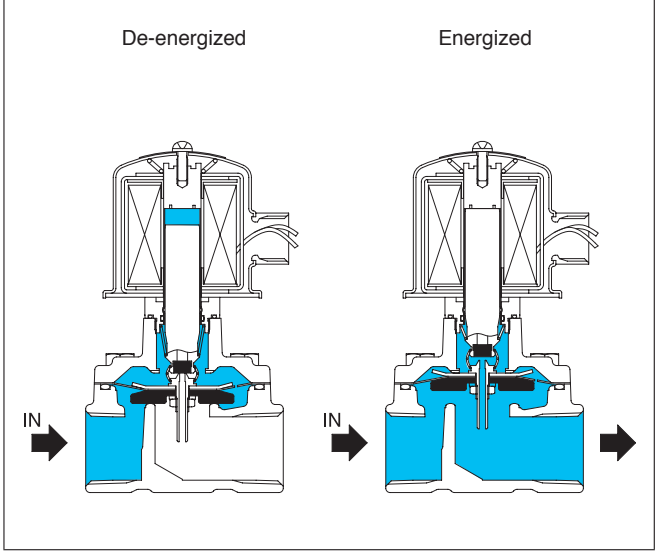
Notes: 1) Gray marked portions are standard specifications.
2) See Selection Guide (p. 65) for combination of seat and shading ring.
3) If port size is Rc2, body code 5 (= bronze) applies.
4) Consult us for other voltage specifications. Note that voltage fluctuation for some DC voltage cases is ±10%.



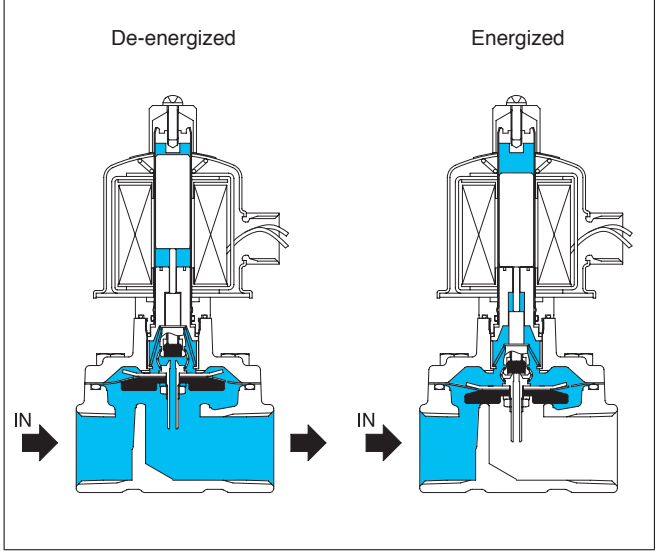
YS 27

Structure / Operation

Normally closed



Normally open



YS 27

Coil Data

Model code		YS271		YS272	
Frequency (Hz)		50	60	50	60
Apparent power (VA)	Issuance	150	130	160	130
	Retention	32	25	40	30
Power consumption (W)	AC	17.5		18.5	
	DC	22.5		–	

Notes: ● AC power consumption is based on the data at 100/200VAC.
● Data may slightly change depending on housing types.

Product Mass

Unit : kg

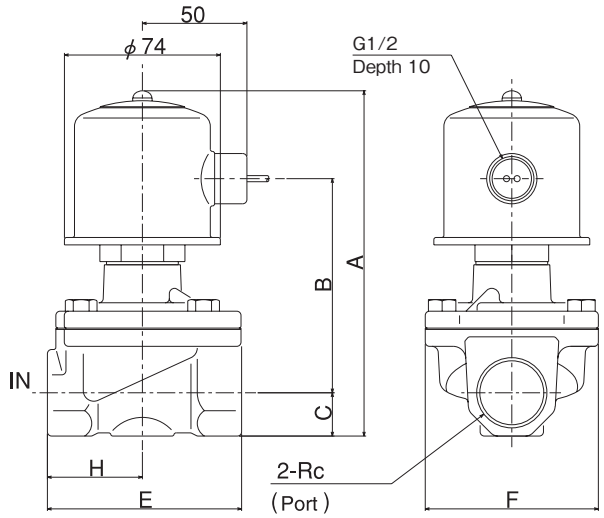
Body	Port size (Rc)	Housing			
		A	T	W	G
Brass (5)	F(1)	2.4	2.5	2.4	2.5
	G(1_1/4)	3.3	3.4	3.3	3.4
	H(1_1/2)				
Bronze (5)	J(2)	4.7	4.8	4.7	4.8
Stainless steel (7)	F(1)	2.4	2.5	2.4	2.5
	G(1_1/4)	3.5	3.5	3.5	3.5
	H(1_1/2)				
	J(2)	4.0	4.0	4.0	4.0

External Dimensions

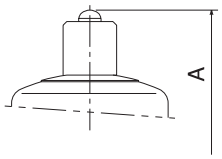
Dimensions for conduit housing (A)

Body: 5 (Brass) Port size : F • G • H
Body: 5 (Bronze) Port size : J

Normally closed



Normally open



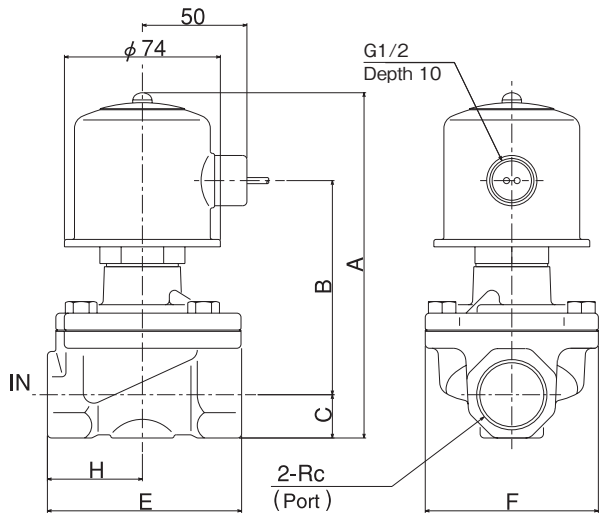
Dimensions Unit : mm

Body	Port size (Rc)	A		B	C	E	F	H
		NC	NO					
5 (Brass) 5 (Bronze)	F(1)	164	185	103	21	92	82	45
	G. H(1_1/4. 1_1/2)	180	201	112	28	110	92	55
	J(2)	194	215	116	38	140	92	65

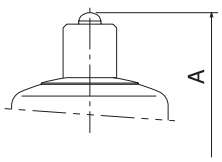
YS 27

Body:7 (Stainless steel) Port size : F • G • H • J

Normally closed



Normally open



Dimensions Unit : mm

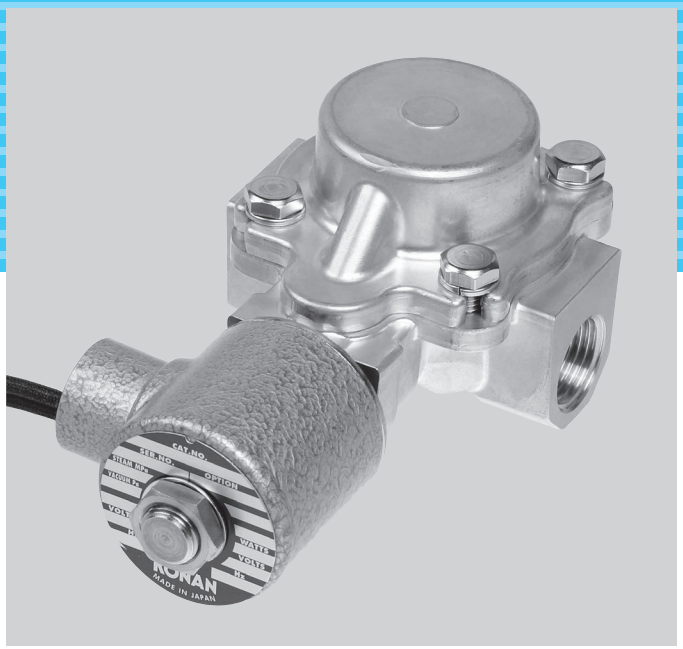
Body	Port size (Rc)	A		B	C	E	F	H
		NC	NO					
7 (Stainless steel)	F(1)	164	185	103	21	92	82	45
	G. H(1_1/4. 1_1/2)	183	204	112	31	110	92	55
	J(2)	194	215	116	39	140	92	65

YS23

Steam

2 Port Solenoid Valves

Pilot-acting



YS23 Normally closed type

By original piston structure,realized high durability.

Standard Specifications

Valve operation type		Normally closed	Valve opens when solenoid is energized.
Port size			Rc3/8・1/2・3/4・1・1_1/4・1_1/2
Orifice size			21.0、30.0、40.0mm
Materials	Body		Brass
	Seal / seat		PTFE
	Housing	Standard	Conduit type(NEMA1)
		Others	NEMA4 drip-proof See Selection Guide (p.66-70).
Rated voltage			AC100V50/60Hz、 110V60Hz AC110V50Hz、 120V60Hz AC200V50/60Hz、 220V60Hz AC220V50Hz、 240V60Hz
Allowable voltage fluctuation			–10% to 10% of applicable voltages
Insulation class			Continuous rating class H
Leadwire length			Min. 450mm
Ambient temperature		Max.	60°C
		Min.	5°C
Installation position			Installation of the valve with its head up is recommended.
Applicable standards			(Consult us for details.)

● Please consult us for other specifications.

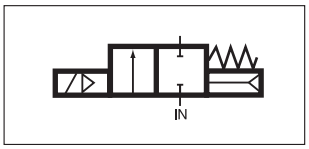
Valve Selection List

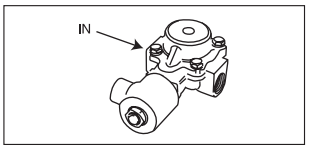
Make sure to confirm the operating pressure differential when selecting a valve.

Port size (Rc)	Orifice size (mm)	Cv value	Operating pressure differential MPa			※ Max. fluid temperature ℃	Housing	Power consumption (W)		Insulation class	Voltage (V) 50/60Hz	Model code
			Min.	Max.								
				Steam								
				AC	DC			AC	DC			Brass body

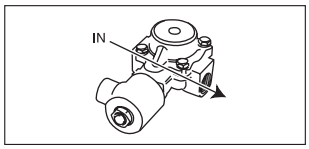
Normally closed type

De-energized





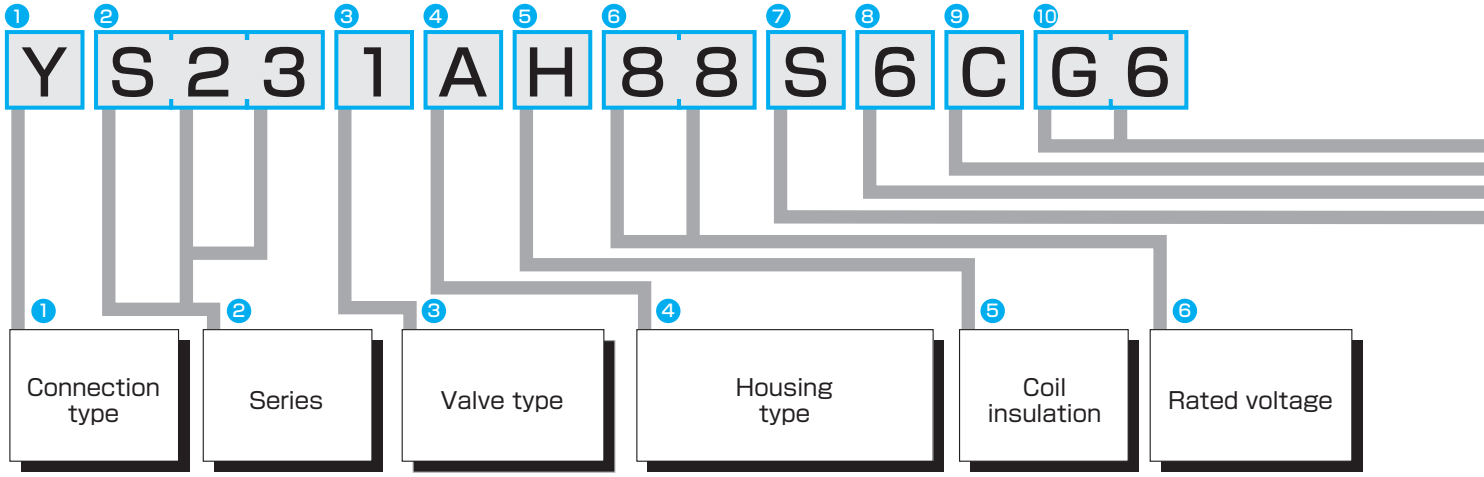
Energized



3/8	21	4.1	0.1	0.9	–	180	A	10	–	H	100	**YS231AH88S6CG6**
1/2	21	5.5	0.1	0.9	–	180	A	10	–	H	100	**YS231AH88S6DG6**
3/4	30	10	0.1	0.9	–	180	A	10	–	H	100	**YS231AH88S6EJ1**
1	30	12	0.1	0.9	–	180	A	10	–	H	100	**YS231AH88S6FJ1**
1_1/4	40	19	0.1	0.9	–	180	A	10	–	H	100	**YS231AH88S6GJ6**
1_1/2	40	25	0.1	0.9	–	180	A	10	–	H	100	**YS231AH88S6HJ6**

YS 23

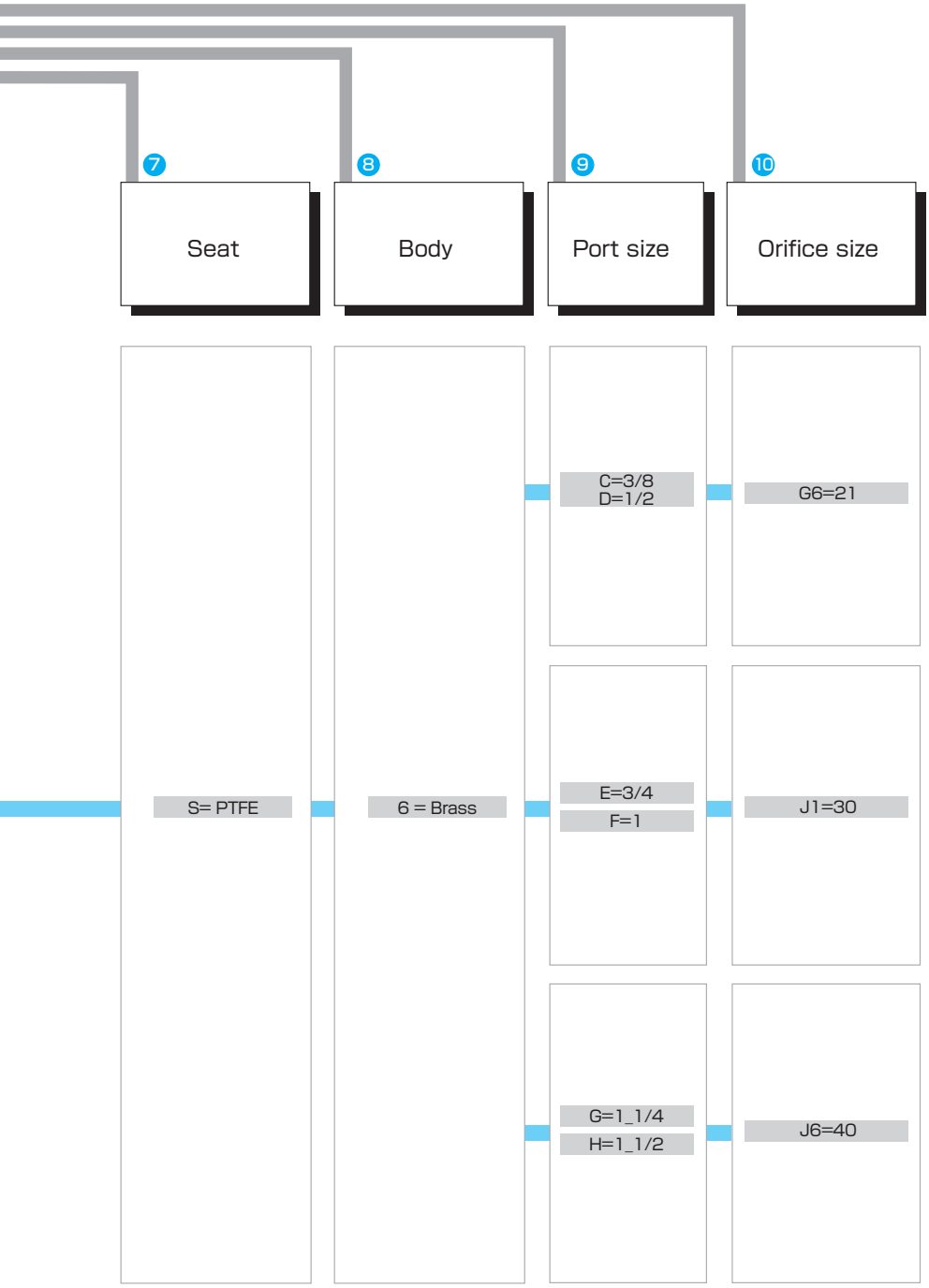
Model Code



1 Connection type	2 Series	3 Valve type	4 Housing type	5 Coil insulation	6 Rated voltage
Y=Rc	S23	1= Normally closed	A = Conduit	Class H	88=AC100V (50/60Hz) · AC110V (60Hz)
No entry =NPT			P = Open frame		94=AC200V (50/60Hz) · AC220V (60Hz)
			B = Grommet		02=AC110V (50Hz) · AC120V (60Hz)
			X = NEMA 4 drip-proof		04=AC220V (50Hz) · AC240V (60Hz)

YS 23

Notes: 1) Gray marked portions are standard specifications.

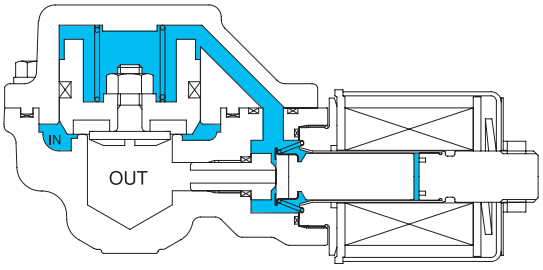


YS 23

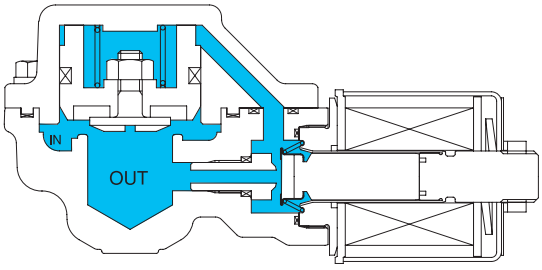
Structure / Operation

Normally closed

De-energized



Energized



Coil Data

YS 23

Model code		YS231	
Frequency (Hz)		50	60
Apparent power (VA)	Issuance	37	30
	Retention	18	13
Power consumption (W)	AC	10	

Notes: ● AC power consumption is based on the data at 100/200VAC.
● Data may slightly change depending on housing types.

Product Mass

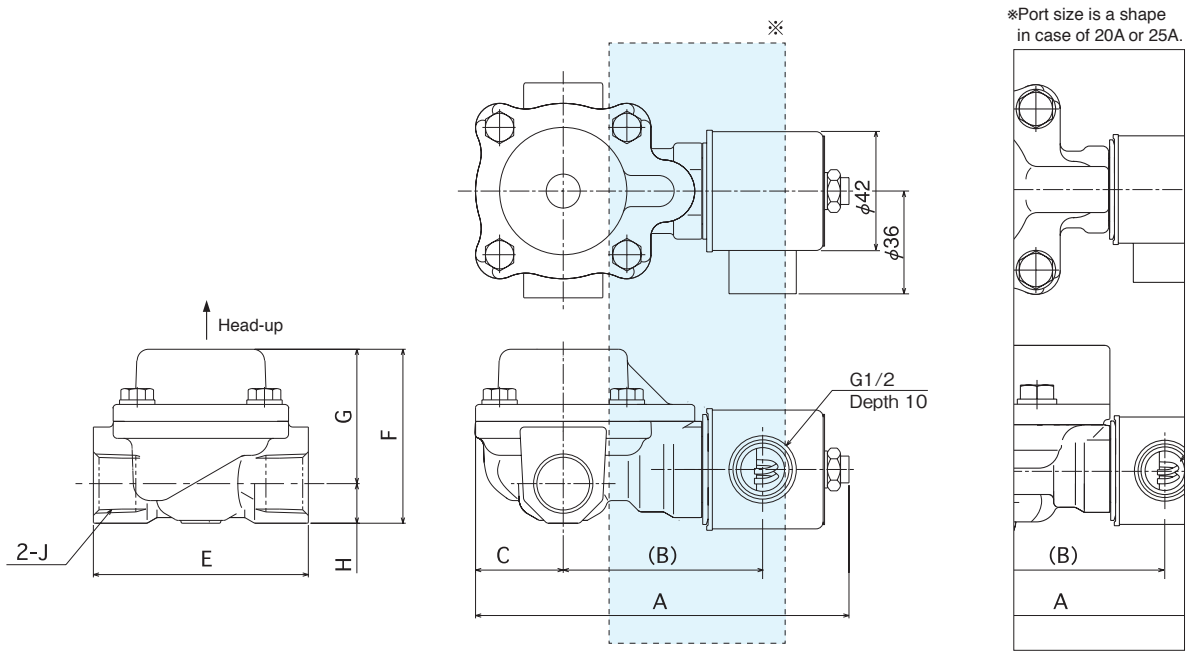
Unit : kg

Body	Port size (Rc)	Housing			
		A	P	B	X
Brass (6)	C(3/8)	1.5	1.4	1.5	1.7
	D(1/2)				
	E(3/4)	2.8	2.7	2.8	3.0
	F(1)				
	G(1_1/4)	6.2	6.1	6.2	6.4
	H(1_1/2)				

External Dimensions

Dimensions for conduit housing (A)

Body: 6 (Brass) Port size : C • D • E • F • G • H



Port size (Rc)	A	B	C	E	F	G	H	J
10A	135	104	31	76	61.5	47.5	14	Rc3/8
15A								Rc1/2
20A	155	115	41	102	81.5	61	20.5	Rc3/4
25A								Rc1
32A	181	125	56	130	112.5	82.5	30	Rc1_1/4
40A								Rc1_1/2

YS 23

YS33

Air / Inert Gas / Water / Kerosene / Vacuum

3 Port Solenoid Valves

Mini-type Direct-acting

YS333 Normally closed type

YS334 Normally open type

YS336 Universal type

YS33 series mini-type 3-port solenoid valves are available in NC, NO, and universal types with port size Rc 1/8 or 1/4. With the compact design, the valves are also suitable for use as pilot valves.

Standard Specifications

Valve operation type		Normally closed	Pressure is supplied to secondary port when solenoid is energized.
		Normally open	Pressure is exhausted from secondary port when solenoid is energized.
		Universal type	Valve can be used for NC or NO operation by switching pressure ports.
Port size			Rc1/8・1/4
Orifice size			1.6 ～ 4.4mm
Materials	Body		Brass, stainless steel
	Seal / seat		Nitrile rubberr, fluorine rubber, ethylene propylene rubbe
	Poppet fork		Polyacetal, stainless steel
	Housing	Standard	Conduit type(NEMA1)
		Others	Explosion-proof enclosure (d2G4, Exd Ⅱ BT4), Drip-proof, housing with terminal box, and others. See Selection Guide (p.67-71).
Rated voltage			AC100V50/60Hz、 110V60Hz ⋮ DC24V AC110V50Hz、 120V60Hz ⋮ DC100V AC200V50/60Hz、 220V60Hz ⋮ DC120V AC220V50Hz、 240V60Hz ⋮ DC125V
Allowable voltage fluctuation			–15% to 10% of applicable voltages
Insulation class			Continuous rating class F and H
Leadwire length			Min. 450mm
Ambient temperature		Max.	50°C (Temperature may differ depending on coil and fluid temperature. See p.77 for details.)
		Min.	–20°C (Temperature may depending on seat materials. See p.77 for details.)
Installation position			As desired
Applicable standards			(Consult us for details.)
Options, others			Mounting bracket, manual operating system, neon lamp, surge absorber, oil-free

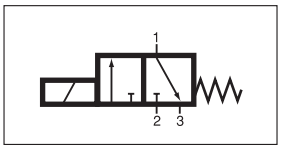
● Please consult us for other specifications.

Valve Selection List

Make sure to confirm the operating pressure differential when selecting a valve.

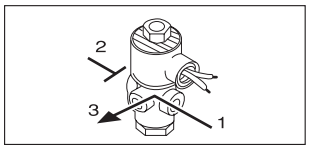
Port size (Rc)	Orifice size (mm)	Cv value	Operating pressure differential MPa			※Max. fluid temperature ℃	Seat	Housing	Power consumption (W)		Insulation class	Voltage (V) 50/60Hz	Model code	
			Min.	Max.					AC	DC			Brass body	Stainless steel body
				Air/inert gas/ Kerosene/water										
				AC	DC									

Normally closed type

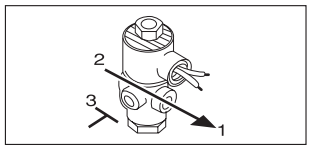


Supply = Port 2

De-energized

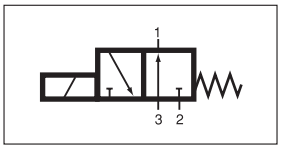


Energized



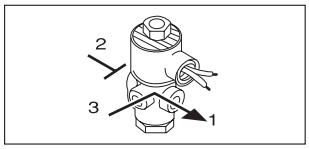
1/8	1.6	0.09	0	1.37	1.09	50	N	A	10	10	F	100	YS333AF88N4AC5	—
	2.4	0.15	0	1.02	0.78	50	N	A	10	10	F	100	YS333AF88N4AC9	—
	3.2	0.26	0	0.57	0.41	50	N	A	10	10	F	100	YS333AF88N4AD5	—
1/4	1.6	0.09	0	1.37	1.09	50	N	A	10	10	F	100	YS333AF88N4BC5	YS333AF88J8BC5
	2.4	0.15	0	1.02	0.78	50	N	A	10	10	F	100	YS333AF88N4BC9	YS333AF88J8BC9
	3.2	0.31	0	0.57	0.41	50	N	A	10	10	F	100	YS333AF88N4BD5	YS333AF88J8BD5
	4.4	0.38	0	0.31	0.16	50	N	A	10	10	F	100	YS333AF88N4BD8	—

Normally open type

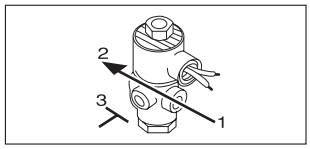


Supply = Port 3

De-energized

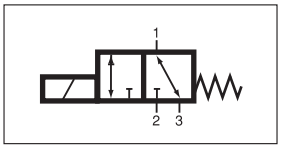


Energized



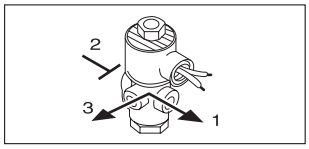
1/8	1.6	0.09	0	1.37	1.09	50	N	A	10	10	F	100	YS334AF88N4AC5	—
	2.4	0.15	0	1.02	0.78	50	N	A	10	10	F	100	YS334AF88N4AC9	—
	3.2	0.26	0	0.57	0.41	50	N	A	10	10	F	100	YS334AF88N4AD5	—
1/4	1.6	0.09	0	1.37	1.09	50	N	A	10	10	F	100	YS334AF88N4BC5	YS334AF88J8BC5
	2.4	0.15	0	1.02	0.78	50	N	A	10	10	F	100	YS334AF88N4BC9	YS334AF88J8BC9
	3.2	0.31	0	0.57	0.41	50	N	A	10	10	F	100	YS334AF88N4BD5	YS334AF88J8BD5
	4.4	0.38	0	0.31	0.16	50	N	A	10	10	F	100	YS334AF88N4BD8	—

Universal type

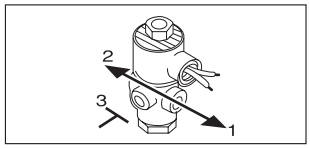


Supply = All Ports

De-energized



Energized

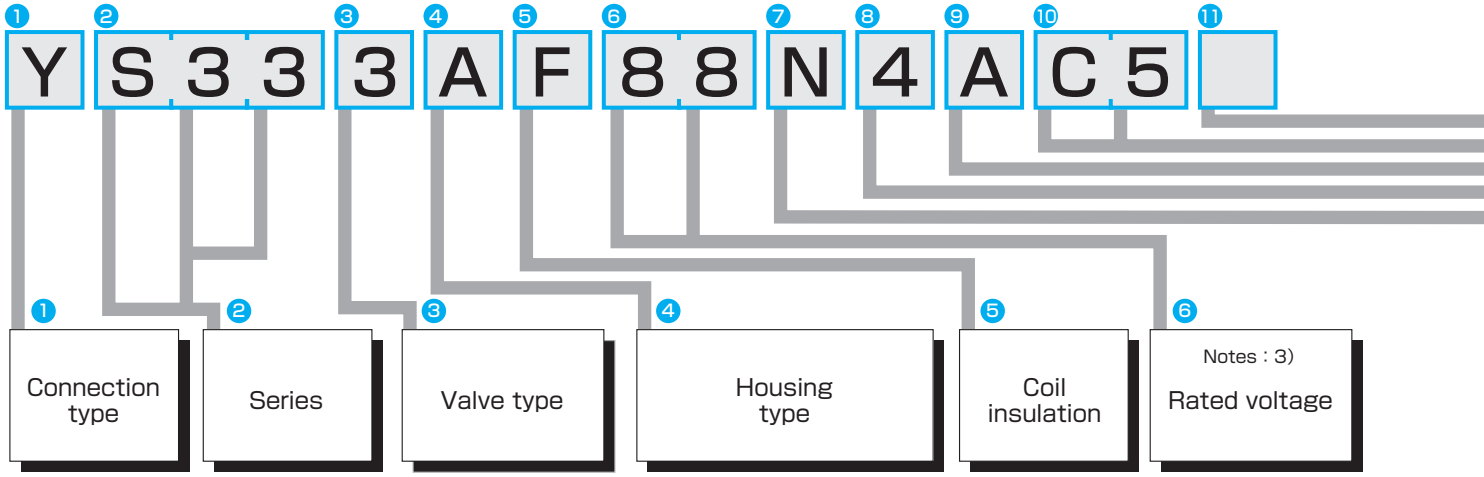


1/8	1.6	0.09	0	0.68	0.54	50	N	A	10	10	F	100	YS336AF88N4AC5	—
	2.4	0.15	0	0.41	0.34	50	N	A	10	10	F	100	YS336AF88N4AC9	—
	3.2	0.26	0	0.23	0.20	50	N	A	10	10	F	100	YS336AF88N4AD5	—
1/4	1.6	0.09	0	0.68	0.54	50	N	A	10	10	F	100	YS336AF88N4BC5	YS336AF88J8BC5
	2.4	0.15	0	0.41	0.34	50	N	A	10	10	F	100	YS336AF88N4BC9	YS336AF88J8BC9
	3.2	0.31	0	0.23	0.20	50	N	A	10	10	F	100	YS336AF88N4BD5	YS336AF88J8BD5
	4.4	0.38	0	0.15	0.078	50	N	A	10	10	F	100	YS336AF88N4BD8	—

※Max. fluid temperature(°C) may differ depending on the type of fluid. See p.77 for details.

YS 33

Model Code

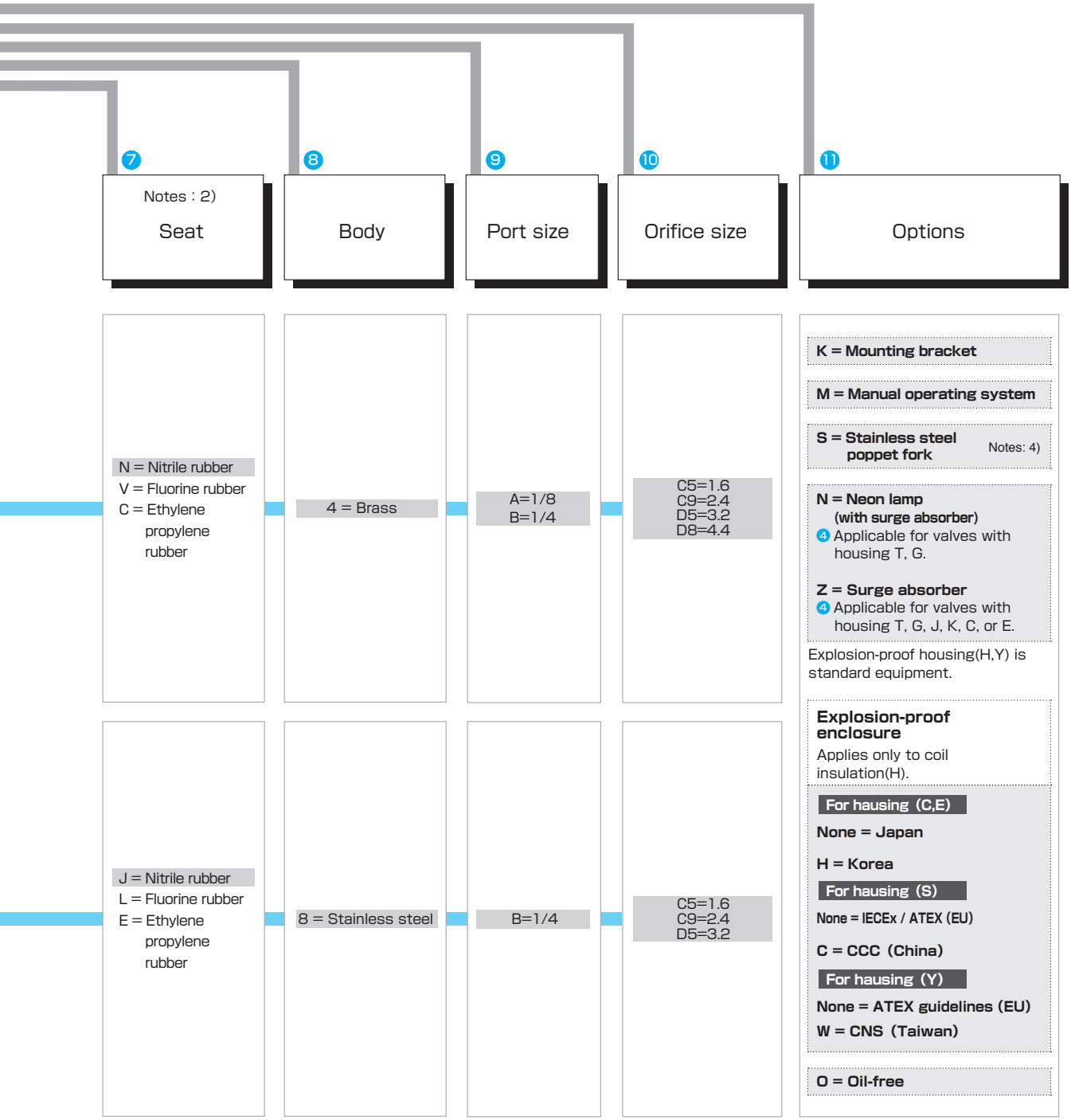


① Connection type	② Series	③ Valve type	④ Housing type	⑤ Coil insulation	⑥ Notes : 3) Rated voltage
Y=Rc No entry =NPT	S33	3= Normally closed 4= Normally open 6= Universal	A = Conduit P = Open frame B = Grommet T = Conduit with terminal box X = NEMA 4,7drip-/explosion-proof G = NEMA 4 drip-proof with terminal box J = Explosion-proof enclosure (d2G4) (conduit) K = Explosion-proof enclosure (d2G4) (pressure-resistant packing) ※C = Explosion-proof enclosure (Exd Ⅱ BT4) (conduit) ※E = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)	Class F Class H	88=AC100V (50/60Hz) · AC110V (60Hz) 94=AC200V (50/60Hz) · AC220V (60Hz) 02=AC110V (50Hz) · AC120V (60Hz) 04=AC220V (50Hz) · AC240V (60Hz) 16=DC24V 25=DC100V 18=DC120V 97=DC125V
			H = Explosion-proof enclosure (d3aG4) (pressure-resistant packing) ※S = Explosion-proof enclosure (Ex db Ⅱ C T6...T4 Gb) (conduit) ※Y = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)	Class H	

※ See ⑪ Options.

YS 33

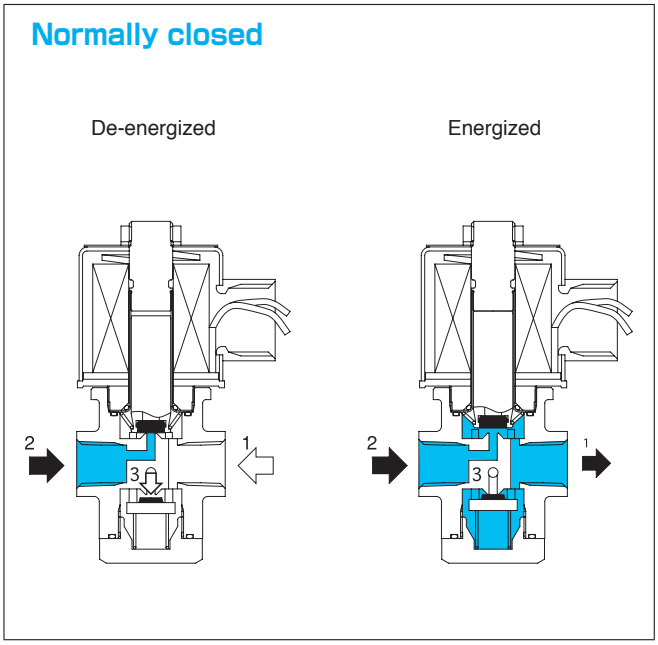
Notes: 1) Gray marked portions are standard specifications.
2) See Selection Guide (p. 66) for combination of seat and shading ring.
3) Consult us for other voltage specifications. Note that voltage fluctuation for some DC voltage cases is ±10%.
4) When heat resistance is necessary,please choose it.



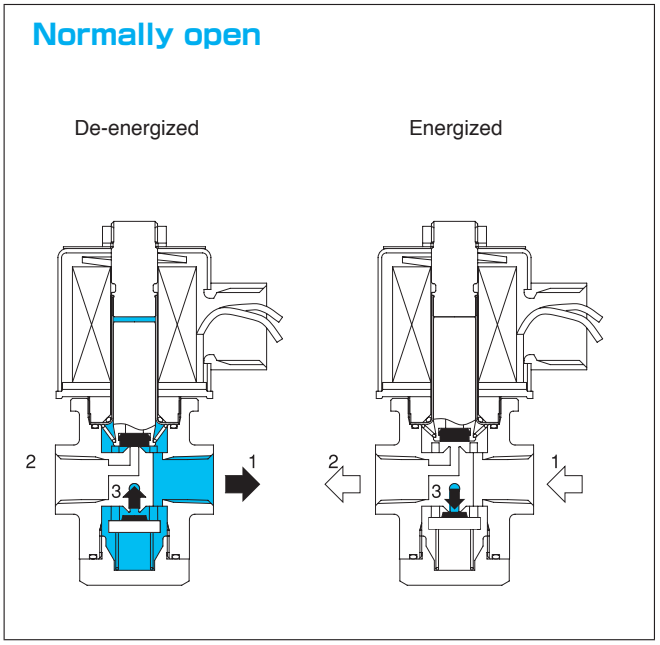
YS 33

Structure / Operation

Normally closed



Normally open



Coil Data

Frequency (Hz)		50	60
Apparent power (VA)	Issuance	37	30
	Retention	18	13
Power consumption (W)	AC	10	
	DC	10	

Notes: ●AC power consumption is based on the data at 100/200VAC.
●Data may slightly change depending on housing types.

Product Mass

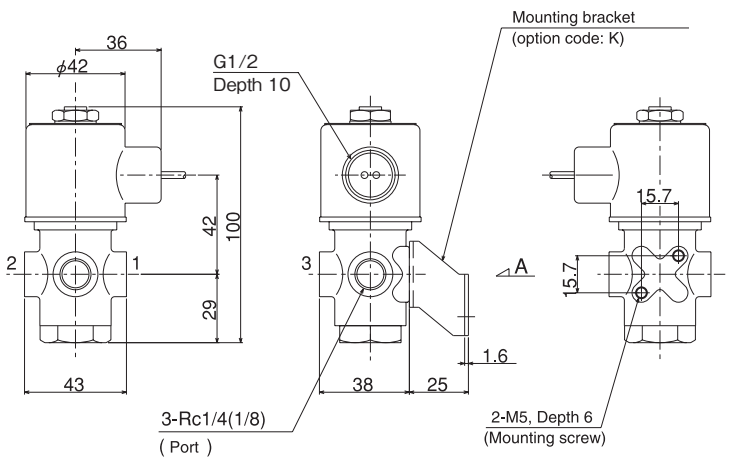
Unit : kg

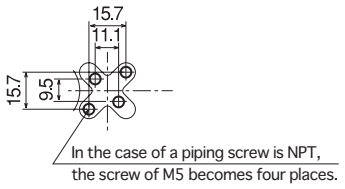
Body	Port size (Rc)	Housing									
		A	P	B	T	X	G	J/C	K/E/H	S	Y
Brass (4)	A(1/8)	0.6	0.6	0.6	0.7	0.8	0.9	1.2	1.3	2.5	1.5
	B(1/4)										
Stainless steel (8)	B(1/4)										

External Dimensions

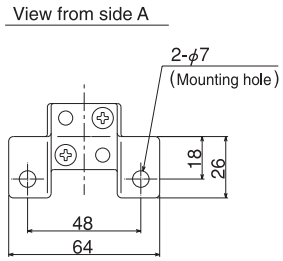
Dimensions for conduit housing (A)

Body: 4 (Brass) Port size : A • B

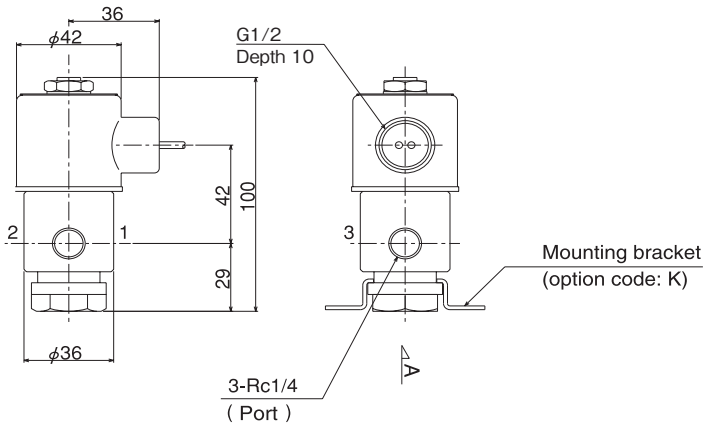




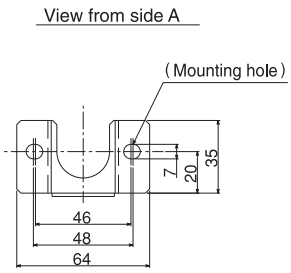
Mounting bracket (option code : K)



Body: 8(Stainless steel) Port size : B



Mounting bracket (option code : K)



*See P.72 for manual operating systems.

YS 33

YS203 YS204

Air / Inert Gas

3 Port Solenoid Valves

Pilot-acting

YS203 Normally closed type

YS204 Normally open type

YS203/204 series pilot-operated diaphragm style 3-port solenoid valves show distinguished performance in high flow rate applications. The valves have no sliding parts, thus free from damage by contaminated fluids. The valves function with high reliability.

Standard Specifications

Valve operation type		Normally closed	Pressure is supplied to secondary port when solenoid is energized.
		Normally open	Pressure is exhausted from secondary port when solenoid is energized.
Port size			Rc3/8・1/2（Please consult us for Rc 3/4・1）
Orifice size			15.9mm
Materials	Body		Brass
	Seal / seat		Nitrile rubberr, fluorine rubber, ethylene propylene rubbe
	Poppet fork		Polyacetal, stainless steel
	Housing	Standard	Conduit type(NEMA1)
		Others	Explosion-proof enclosure (d2G4, Exd Ⅱ BT4), Drip-proof, housing with terminal box, and others. See Selection Guide (p.67-71).
Rated voltage			AC100V50/60Hz、 110V60Hz ⋮ DC24V AC110V50Hz、 120V60Hz ⋮ DC100V AC200V50/60Hz、 220V60Hz ⋮ DC120V AC220V50Hz、 240V60Hz ⋮ DC125V
Allowable voltage fluctuation			–15% to 10% of applicable voltages
Insulation class			Continuous rating class F and H
Leadwire length			Min. 450mm
Ambient temperature		Max.	50°C (Temperature may differ depending on coil and fluid temperature. See p.77 for details.)
		Min.	–17°C (Temperature may depending on seat materials. See p.77 for details.)
Installation position			As desired
Applicable standards			(Consult us for details.)
Options, others			Mounting bracket, manual operating system, neon lamp, surge absorber, oil-free

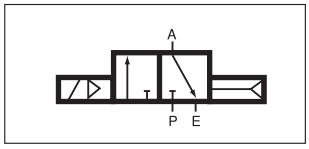
● Please consult us for other specifications.

Valve Selection List

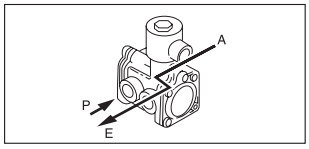
Make sure to confirm the operating pressure differential when selecting a valve.

Port size (Rc)	Orifice size (mm)	Cv value	Operating pressure differential MPa			※Max. fluid temperature ℃	Seat	Housing	Power consumption (W)		Insulation class	Voltage (V) 50/60Hz	Model code
			Min.	Max.									
				Air/inert gas									
				AC	DC				AC	DC			

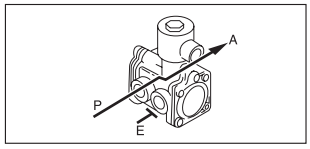
Normally closed type



De-energized

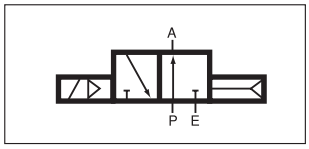


Energized

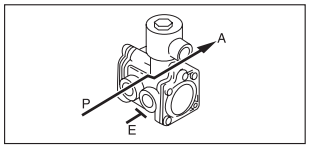


3/8	15.9	3.3	0.05	1.02	1.02	50	N	A	10	10	F	100	**YS203AF88N5CG4**
1/2	15.9	4.4	0.05	1.02	1.02	50	N	A	10	10	F	100	**YS203AF88N5DG4**

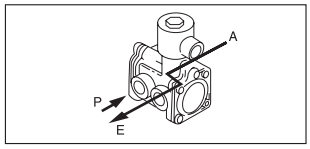
Normally open type



De-energized



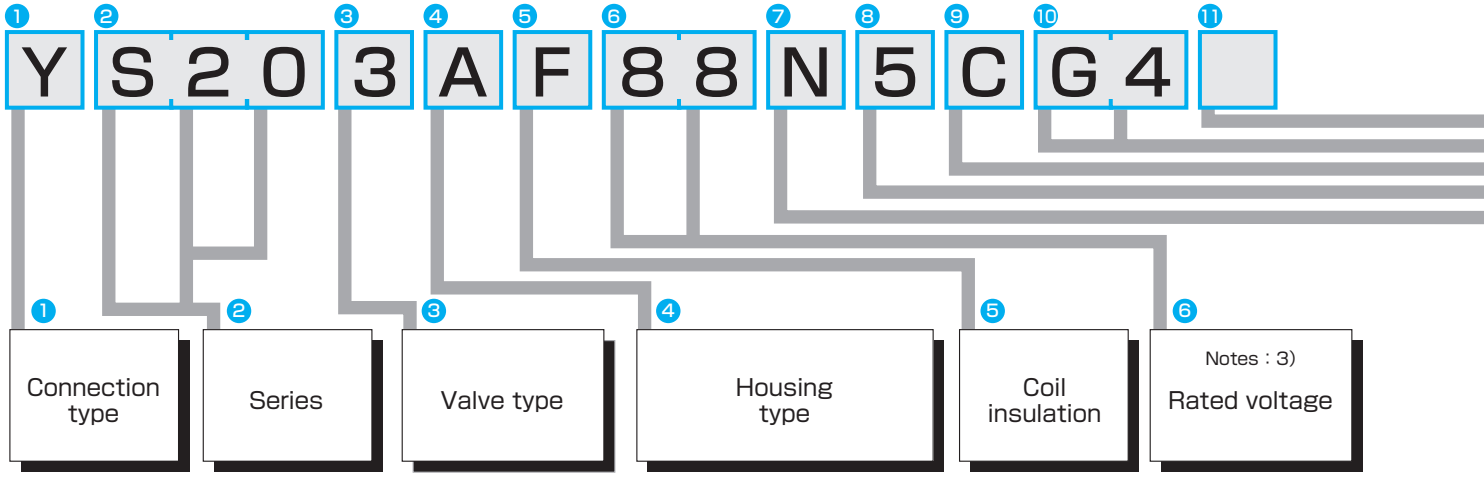
Energized



3/8	15.9	3.3	0.05	1.02	1.02	50	N	A	10	10	F	100	**YS204AF88N5CG4**
1/2	15.9	4.4	0.05	1.02	1.02	50	N	A	10	10	F	100	**YS204AF88N5DG4**

※Max. fluid temperature(°C) may differ depending on the type of fluid. See p. 77 for details.
※Please consult us port size “3/4”or“1”

Model Code

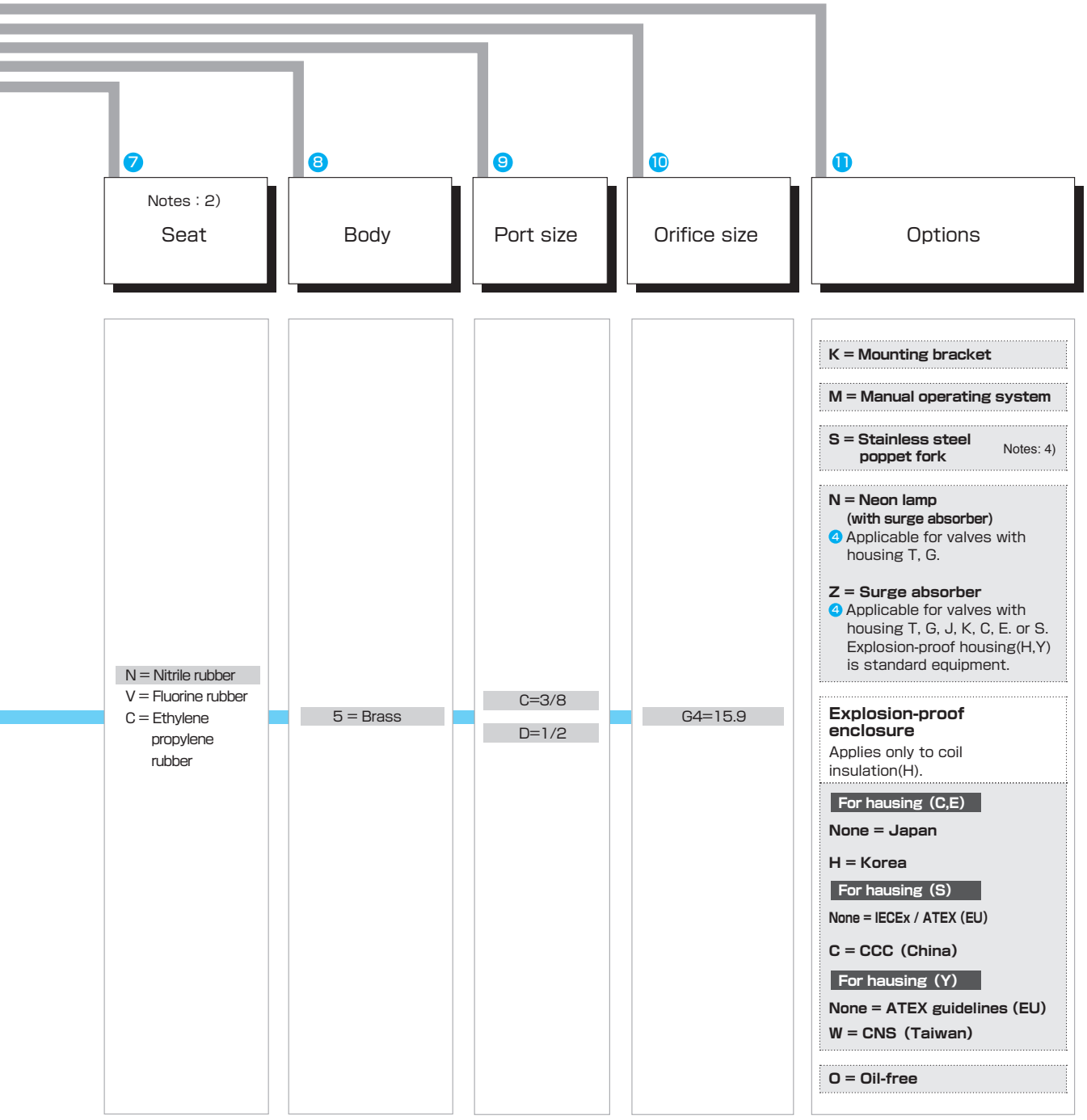


① Connection type	② Series	③ Valve type	④ Housing type	⑤ Coil insulation	⑥ Notes : 3) Rated voltage
Y=Rc	S20	3= Normally closed	A = Conduit	Class F	88=AC100V (50/60Hz) · AC110V (60Hz)
No entry =NPT		4= Normally open	P = Open frame	Class H	94=AC200V (50/60Hz) · AC220V (60Hz)
			B = Grommet		02=AC110V (50Hz) · AC120V (60Hz)
			T = Conduit with terminal box		04=AC220V (50Hz) · AC240V (60Hz)
			X = NEMA 4,7drip-/explosion-proof		16=DC24V
			G = NEMA 4 drip-proof with terminal box		25=DC100V
			J = Explosion-proof enclosure (d2G4) (conduit)		18=DC120V
			K = Explosion-proof enclosure (d2G4) (pressure-resistant packing)		97=DC125V
			※C = Explosion-proof enclosure (Exd Ⅱ BT4) (conduit)		
			※E = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)		
			H = Explosion-proof enclosure (d3aG4) (pressure-resistant packing)	Class H	
			※S = Explosion-proof enclosure (Ex db Ⅱ C T6...T4 Gb) (conduit)		
			※Y = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)		

※ See ⑪ Options.

YS 203 204

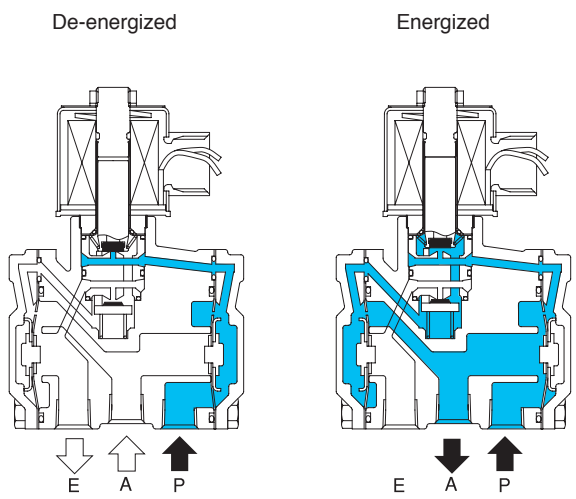
Notes: 1) Gray marked portions are standard specifications.
2) See Selection Guide (p. 66) for combination of seat and shading ring.
3) Consult us for other voltage specifications. Note that voltage fluctuation for some DC voltage cases is ±10%.
4) When heat resistance is necessary,please choose it.



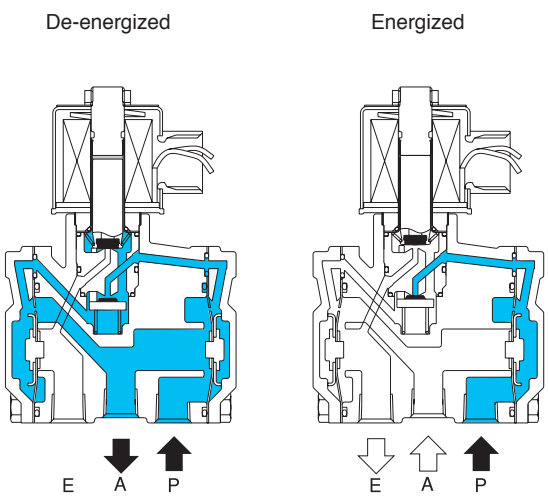
YS 203 204

Structure / Operation

Normally closed



Normally open



Coil Data

Frequency (Hz)		50	60
Apparent power (VA)	Issuance	37	30
	Retention	18	13
Power consumption (W)	AC	10	
	DC	10	

Notes: ●AC power consumption is based on the data at 100/200VAC.
●Data may slightly change depending on housing types.

Product Mass

Unit : kg

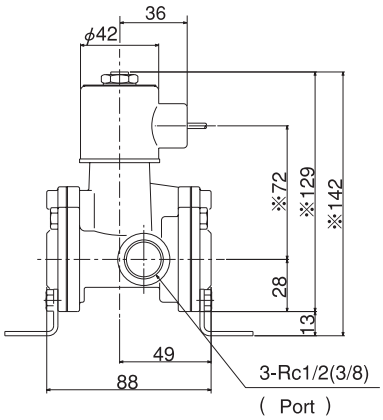
Body	Port size (Rc)	Housing									
		A	P	B	T	X	G	J/C	K/E/H	S	Y
Brass (5)	C(3/8)	1.6	1.6	1.6	1.7	1.8	1.9	2.2	2.3	3.5	2.5
	D(1/2)										

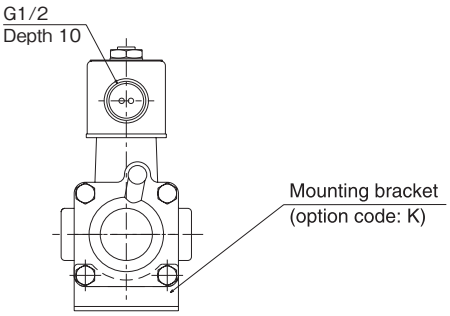
YS 203 204

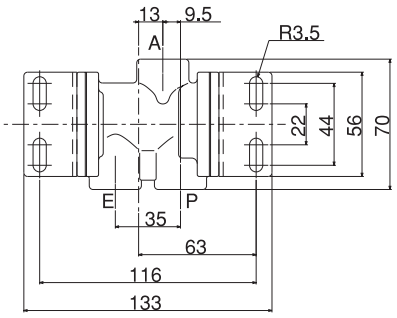
External Dimensions

Dimensions for conduit housing (A)

Body: 5 (Brass) Port size : C • D







● Size for valves with manual operating system is 18 mm larger.

*See P.72 for manual operating systems.

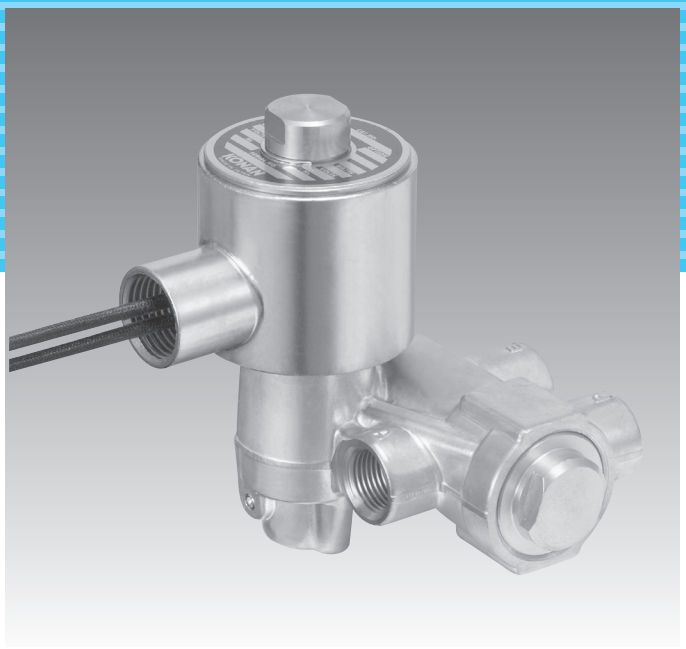
YS 203 204

YS32

Air / Inert Gas/ Kerosene

3 Port Solenoid Valves

Pilot-acting



YS321 Normally closed type

YS322 Normally open type

YS32 series pilot-operated piston style 3-port solenoid valves show distinguished performance in high flow rate applications.
The valves have large orifice.
The valves have high reliability as quick exhaust valve.

Standard Specifications

Valve operation type		Normally closed	Pressure is supplied to secondary port when solenoid is energized.
		Normally open	Pressure is exhausted from secondary port when solenoid is energized.
Port size			Rc1/4・3/8
Orifice size			Pressure side：7.1mm　Exhaust side：8.7mm
Materials	Body		Brass
	Seal / seat		Nitrile rubberr, fluorine rubber
	Poppet fork		Polyacetal, stainless steel
	Housing	Standard	Conduit type(NEMA1)
		Others	Explosion-proof enclosure (d2G4, Exd Ⅱ BT4), Drip-proof, housing with terminal box, and others. See Selection Guide (p.67-71).
Rated voltage			AC100V50/60Hz、 110V60Hz ⋮ DC24V AC110V50Hz、 120V60Hz ⋮ DC100V AC200V50/60Hz、 220V60Hz ⋮ DC120V AC220V50Hz、 240V60Hz ⋮ DC125V
Allowable voltage fluctuation			–15% to 10% of applicable voltages
Insulation class			Continuous rating class F and H
Leadwire length			Min.　450mm
Ambient temperature		Max.	50°C (Temperature may differ depending on coil and fluid temperature. See p.77 for details.)
		Min.	–17°C (Temperature may depending on seat materials. See p.77 for details.)
Installation position			As desired
Applicable standards			(Consult us for details.)
Options, others			Manual operating system,neon lamp, surge absorber

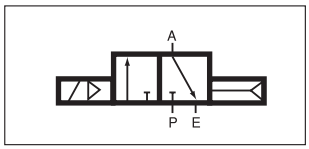
● Please consult us for other specifications.

Valve Selection List

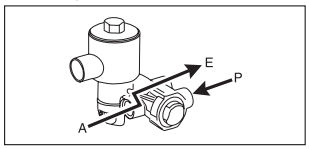
Make sure to confirm the operating pressure differential when selecting a valve.

Port size (Rc)	Orifice size (mm)	Cv value	Operating pressure differential MPa			※Max. fluid temperature ℃	Seat	Housing	Power consumption (W)		Insulation class	Voltage (V) 50/60Hz	Model code
			Min.	Max.					AC	DC			
				Air/inert gas/ Kerosene									
				AC	DC								

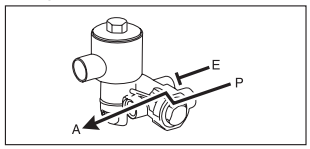
Normally closed type



De-energized

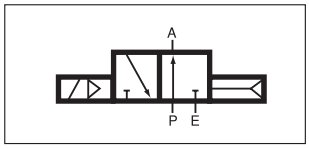


Energized

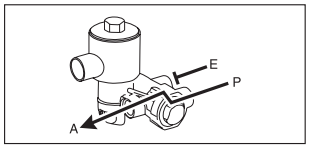


1/4	P : 7.1 E : 8.7	P : 0.8 E : 1.2	0.07	0.85	0.85	50	N	A	10	10	F	100	**YS321AF88N5BF1**
3/8	P : 7.1 E : 8.7	P : 0.8 E : 1.2	0.07	0.85	0.85	50	N	A	10	10	F	100	**YS321AF88N5CF1**

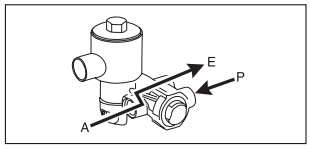
Normally open type



De-energized



Energized

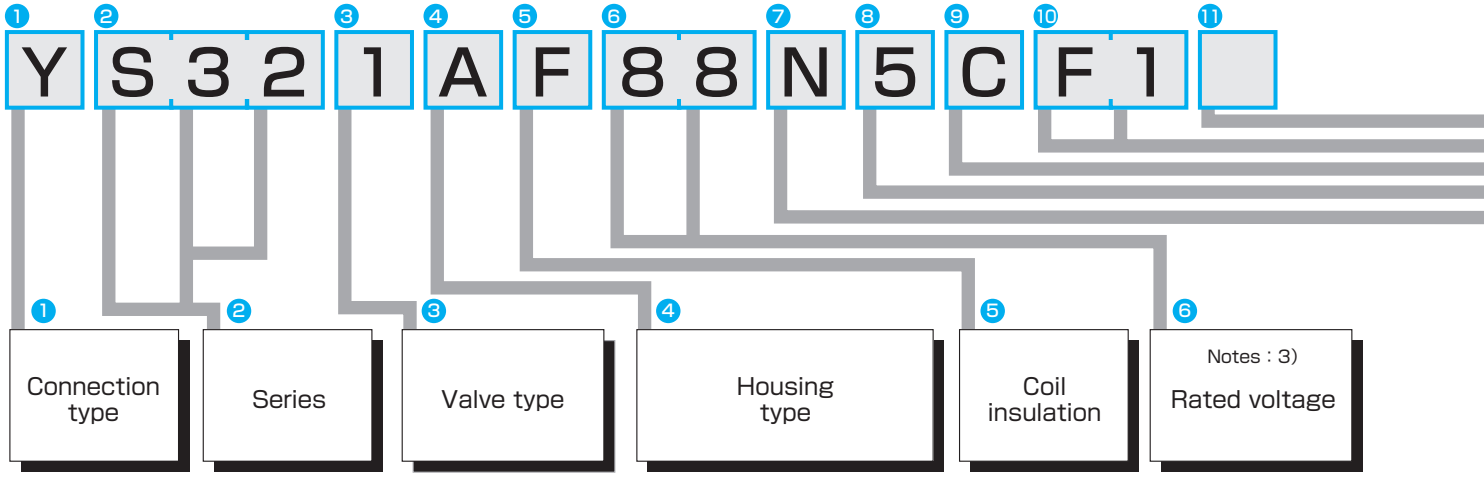


1/4	P : 7.1 E : 8.7	P : 0.8 E : 1.2	0.07	0.85	0.85	50	N	A	10	10	F	100	**YS322AF88N5BF1**
3/8	P : 7.1 E : 8.7	P : 0.8 E : 1.2	0.07	0.85	0.85	50	N	A	10	10	F	100	**YS322AF88N5CF1**

※Max. fluid temperature(°C) may differ depending on the material of sheet. See p. 77 for details.

YS 32

Model Code

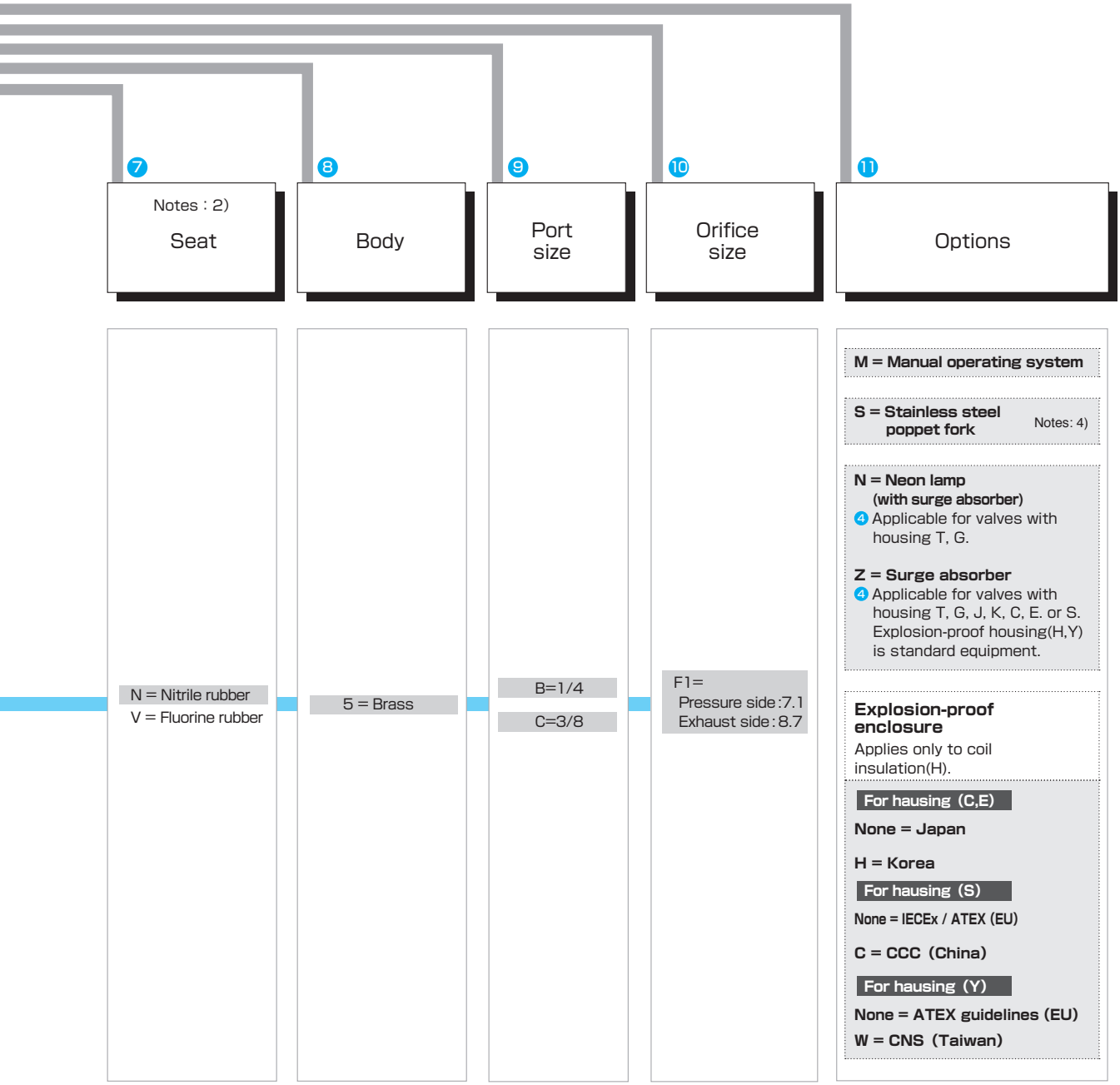


① Connection type	② Series	③ Valve type	④ Housing type	⑤ Coil insulation	⑥ Notes : 3) Rated voltage
Y=Rc No entry =NPT	S32	1= Normally closed 2= Normally open	A = Conduit P = Open frame B = Grommet T = Conduit with terminal box X = NEMA 4,7drip-/explosion-proof G = NEMA 4 drip-proof with terminal box J = Explosion-proof enclosure (d2G4) (conduit) K = Explosion-proof enclosure (d2G4) (pressure-resistant packing) ※ C = Explosion-proof enclosure (Exd Ⅱ BT4) (conduit) ※ E = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)	Class F Class H	88=AC100V (50/60Hz) · AC110V (60Hz) 94=AC200V (50/60Hz) · AC220V (60Hz) 02=AC110V (50Hz) · AC120V (60Hz) 04=AC220V (50Hz) · AC240V (60Hz) 16=DC24V 25=DC100V 18=DC120V 97=DC125V
			H = Explosion-proof enclosure (d3aG4) (pressure-resistant packing) ※ S = Explosion-proof enclosure (Ex db Ⅱ C T6...T4 Gb) (conduit) ※ Y = Explosion-proof enclosure (Exd Ⅱ BT4) (pressure-resistant packing)	Class H	

※ See ⑪ Options.

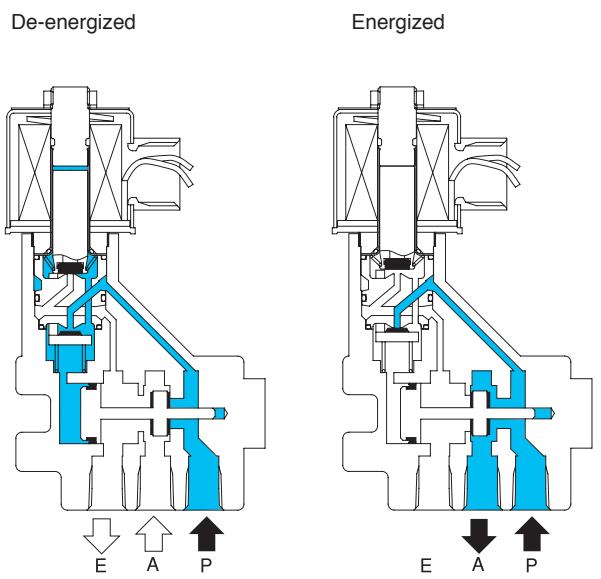
YS 32

Notes: 1) Gray marked portions are standard specifications.
2) See Selection Guide (p. 66) for combination of seat and shading ring.
3) Consult us for other voltage specifications. Note that voltage fluctuation for some DC voltage cases is ±10%.
4) When heat resistance is necessary,please choose it.

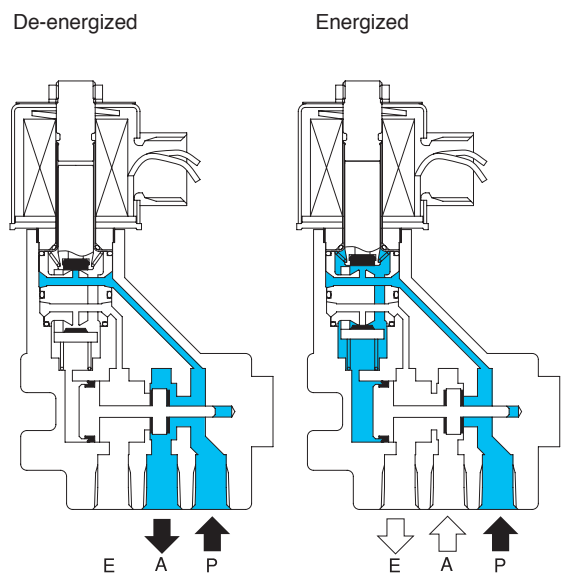


Structure / Operation

Normally closed



Normally open



Coil Data

Frequency (Hz)		50	60
Apparent power (VA)	Issuance	37	30
	Retention	18	13
Power consumption (W)	AC	10	
	DC	10	

Notes: ●AC power consumption is based on the data at 100/200VAC.
●Data may slightly change depending on housing types.

Product Mass

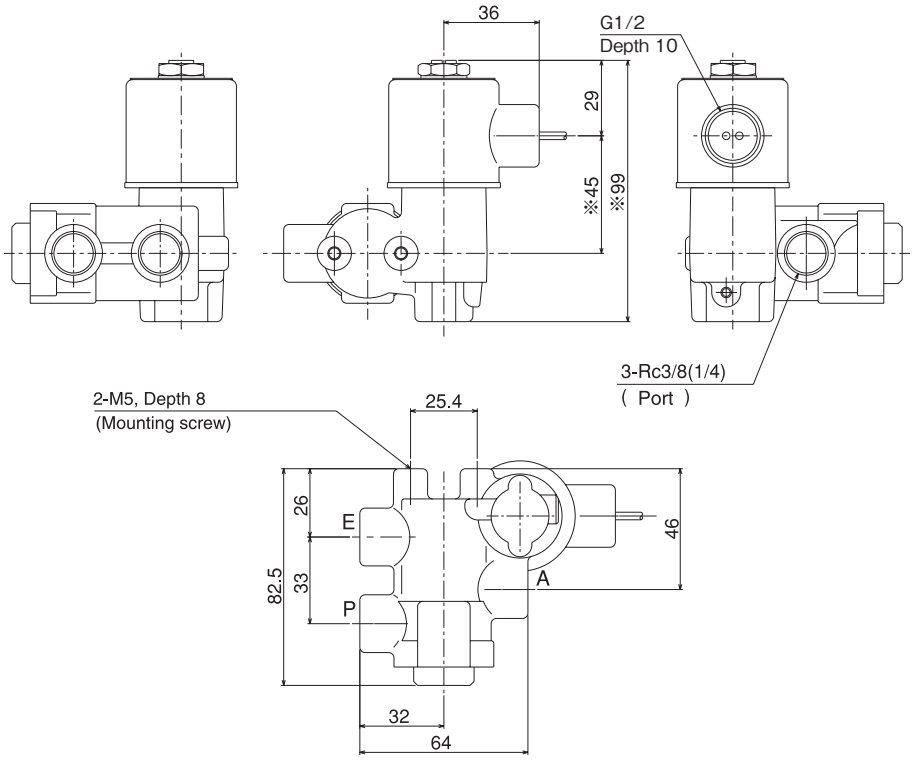
Unit : kg

Body	Port size (Rc)	Housing									
		A	P	B	T	X	G	J/C	K/E/H	S	Y
Brass (5)	B(1/4)	1.1	1.1	1.1	1.2	1.3	1.4	1.7	1.8	3.0	2.0
	C(3/8)										

YS 32

External Dimensions

Dimensions for conduit housing (A)



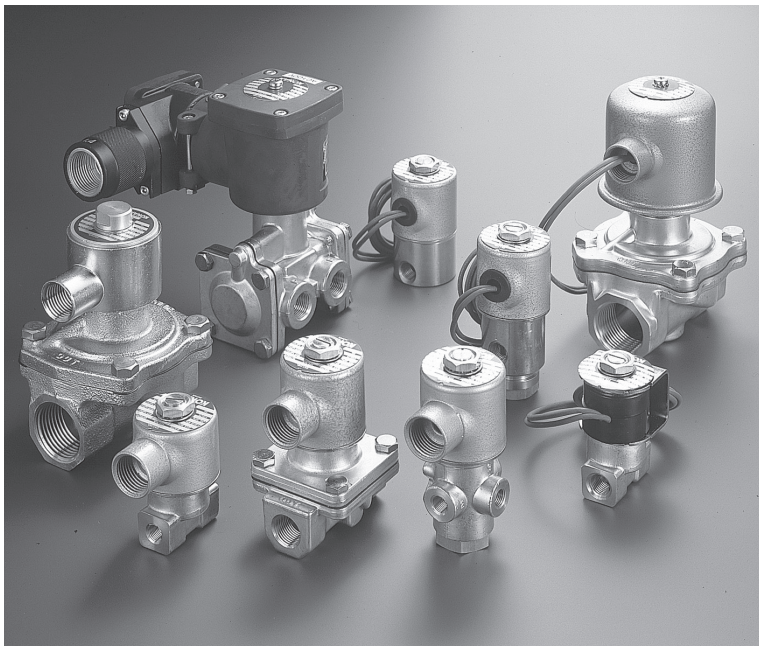
● Size(※marked portions) for valves with manual operating system is 18 mm larger.

*See P.72 for manual operating systems.

YS 32

Valve Selection Guide

This valve selection guide can be used for various application requirements. Please read carefully and select the valve that best suits your application.



Selection Guide

INFOMATION

1 General Handling Precautions

Handling precautions for selection of MAGFLOW series solenoid valves.

4 Page

2 Selection Guide by Fluid / Material

General guide for use in selecting materials suitable for the fluid used

65 Page

3 Seal / Seat and Shading Ring

Guide to determine combination of seal/seat and shading ring for a valve.

66 Page

4 Coil / Housing

Detailed description of coil types and characteristics, application, and appearance of various housings to select coils and housings suitable for desired applications/specifications.

67 Page

5 Determination of Flow Rate

Guide to determine flow rate of the applicable fluid, including flow rate graphs by 3 fluid types (liquid, gas, steam), correction coefficient graphs, and exercises.

73 Page

6 Glossary

Explanation of terms used in this catalogue, i.e., basic function and performance of solenoid valves.

77 Page

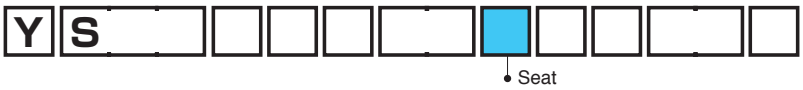
1 Selection Guide by Fluid / Material

Fluid / Material	Specific gravity	Seat/seal					Shading ring			Body					
		Nitrile rubber (NBR)	Ethylene propylene rubber (EPDM)	※Chloropylene rubber (CR)	Fluorine rubber rubber (FKM)	PTFE (PTFE)	Copper	Silver	※Aluminum	Stainless steel SUS 303・304	Stainless steel ※SUS 316	Stainless steel SUS 430F	Bronze	Brass	※Aluminum
Acetone	0.79	×	◎	×	×	◎	◎	◎	○	○	○	○	◎	◎	○
Acetylene	0.91	◎	◎	△	◎	◎	×	×	◎	◎	◎	◎	×	×	◎
Argon	1.38	○		◎						◎	◎	◎	×	×	×
Ammonia (liquid/gas)	0.6	△		◎	×	◎	×	×	○	◎	◎	◎	×	×	○
Ink (non-alkaline)		○		△	◎	◎		△		×	◎	◎			△
Ethanol	0.79	◎	◎	○	◎	◎	○	◎	○	○	○	○	○	○	○
Chlorine gas	2.49	×	×	×	○	○	△	○	△	×	○	×	△	×	△
Gasoline	0.75	△	×	×	◎	◎	△	◎	△	◎	◎	◎	◎	◎	△
Seawater	1.05	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Hydrogen peroxide water (bleach)	1.44	△	△	×	◎	◎	×	×	○	△	○	△	×	×	○
Oxygen	1.11	△		◎	◎	△	◎	○	◎	◎	◎	◎	◎	◎	◎
Carbon tetrachloride	1.59	×	×	×	◎	◎	△	○	×	○	○	○	○	△	×
Pure acetic acid	1.06	△	×	△	×	◎	×	◎	◎	○	◎	○	×	×	◎
Pure water	1.0	○	◎		◎	◎	◎	◎		◎	◎	◎			
Edible oil			×		◎		◎			◎	◎	◎		◎	
Sodium hydroxide (<30%)		○	○	×	×	○	×	○	×	○	○	○	×	×	×
Acetic acid 10%				◎			×	○	○	◎	◎	○	×	×	○
Deionized water	1.0	○	◎		◎	◎	◎	◎		◎	◎	◎			
Hydrocarbon		△	×	×	○	◎	◎	○	◎	○	○	○	◎	◎	◎
Carbon dioxide	1.57	△	△	△	△	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Aerated water		◎		◎	◎	◎	○		○		◎	◎	○	○	○
Turpentine oil	0.87	◎	×	△	○	◎	○	◎	○	○	○	○	○	○	○
Toluene	0.87	○	×	×	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Kerosene	0.8	◎	×	○	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Naphtha	0.76	◎	×	×	○	◎	○	◎	◎	◎	◎	◎	○	○	◎
Light oil	0.8	△	×	○	◎	◎	△	◎	◎	◎	◎	◎	◎	◎	◎
Perchloro ethylene		×	×	×	◎	◎	○	◎	△	○	○	○	○	○	△
Butane	2.07	△	×	○	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎
Brake fluid		×	○	×	×	○	×	○	×	○	○	○	×	×	×
Freon R11		○	×	○	×	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Freon R12		◎	×	◎	×	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Freon R13		◎	△	◎	×	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Condensed water	1.0	◎	◎	△	△	◎	○	◎	○	◎	◎	◎	○	△	○
Benzine	0.88	×	×	×	○	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
Boiler feed water	1.0	◎		△	△	◎	○	◎	○	◎	◎	◎	○	△	○
Methanol	0.81	◎	◎	◎	×	◎	◎	◎	○	◎	◎	◎	◎	◎	○
Methyl ethyl ketone		×	○	×	×	◎	◎	○	◎	○	○	○	◎	◎	◎
Turbine oil	0.91	◎	×	◎	◎	◎	◎	◎	◎	◎		◎		◎	◎
Phosphoric acid		△	○	△	◎	◎	△	○	×	△	○	×	△	○	×
Sulfuric acid	1.83	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Anhydrous chloric acid		×		×	◎	◎	△			×	×	○	△	×	

● ※Please consult us for details about products using aluminum materials.
Note) This table is a general selection guide and does not guarantee the performance of products. Sufficient tests should be performed and results confirmed before use.
◎ : Suitable ○ : Can be used △ : Can be used in certain conditions × : Cannot be used

2 Seal / Seat and Shading Ring

Combination of seal/seat and shading ring



Code No.	Seal/seat	Shading ring
N	Nitrile rubber	Copper
V	Fluorine rubber	Copper
C	Ethylene propylene rubber	Copper
T	PTFE	Copper

Code No.	Seal/seat	Shading ring
J	Nitrile rubber	Silver
L	Fluorine rubber	Silver
E	Ethylene propylene rubber	Silver
S	PTFE	Silver

Code No.	Seal/seat	Shading ring
A	Nitrile rubber	Aluminum
B	Fluorine rubber	Aluminum
P	Ethylene propylene rubber	Aluminum
Q	PTFE	Aluminum

Code No. T,Q is only for YS30 series.
Code No. S is only for YS30 or YS23 series.

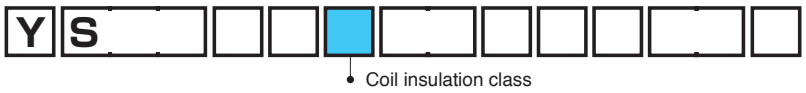
Cord for exclusive use of the special use.

Code No.	Purpose	Seal/ seat	Shading ring	The seriese to apply		Special specifications
H	High vacuum use	Fluorine rubber	Copper	YS30、YS20、YS27		Working pressure 1.3×10^{-4} Pa (abs) ～Atmosphere
M	Middle vacuum use	Nitrile rubber	Copper	YS30、YS20、YS27、YS33		Working pressure 0.13Pa (abs) ～Maximum working pressure differential
O	Oxygenuse	Fluorine rubber	Copper	All Series		Use the grease with applied to oxygen
D	Warm water use	Fluorine rubber	Copper	Body : Brass	YS30 YS21 YS20 YS27	Fluid temperature 5～99℃ ※
		Fluorine rubber	Silver	Body : Stainless Steel		

● (abs) : Absolute pressure
※: In the case of explosion-proof housing,please refer to P.76 table.
Coil : Class H

3 Coil / Housing

Coil



■d2G4 (2-port solenoid valves)

		Certification No.
Class F	Normally closed	T56437
	Normally open	T38166
Class H	Normally closed	T56438
	Normally open	T38168

(3-port solenoid valves)

Certification No.
T56437
T56438

■d3G4 (2-port solenoid valves)

Class H	Normally closed	T6ØØ99

(3-port solenoid valves)

Class H	T6ØØ99

■Exd Ⅱ BT4 (2-port solenoid valves)

Class F	Normally closed	TC16743
	Normally open	TC16745
Class H	Normally closed	TC16744
	Normally open	TC16746

(3-port solenoid valves)

Class F	TC16743
Class H	TC16744

■Ⅱ 2G Exd Ⅱ BT4 Gb (EU) (2-port solenoid valves)

Class H	Normally closed	TÜV 11 ATEX7945X

(3-port solenoid valves)

Class H	TÜV 11 ATEX7945X

■Explosion-proof for Korea Exd Ⅱ BT4 (2-port solenoid valves)

Class H	Normally closed	11 – AV4BO – Ø196
	Normally open	13 – AV4BO – Ø492

(3-port solenoid valves)

Class H	11 – AV4BO – Ø196

■Ex db ⅡC T6...T4 Gb (IEC Ex) (2-port solenoid valves)

Class H	Normally closed	IECEx SIR 19.0053X

(3-port solenoid valves)

Class H	IECEx SIR 19.0053X

■Ex db ⅡC T6...T4 Gb (EU) (2-port solenoid valves)

Class H	Normally closed	CSANe 20ATEX1044X

(3-port solenoid valves)

Class H	CSANe 20ATEX1044X

■Ex d ⅡC T4 ~ T6 Gb (CCC China) (2-port solenoid valves)

Class H	Normally closed	A number changes at every official approval.

(3-port solenoid valves)

Class H	A number changes at every official approval.

■Exd Ⅱ BT4 Gb X (Taiwan) (2-port solenoid valves)

Class H	Normally closed	A number changes at every official approval.

(3-port solenoid valves)

33.5	A number changes at every official approval.

■d2G4・Class NK (Nippon kaiji kyokai) (2-port solenoid valves)

Class F	Normally closed	Ø2T6Ø1
Class H	Normally closed	Ø2T6Ø1

(3-port solenoid valves)

Class F	Ø2T6Ø1
Class H	Ø2T6Ø1

■Cable size (pressure-resistant packing type) d2G4 Exd Ⅱ BT4

Specified size	Applicable cable size
φ 8	φ 7.5 ~ 8.4
φ 9	φ 8.5 ~ 9.4
φ 10	φ 9.5 ~ 10.4
φ 11	φ 10.5 ~ 11.4
φ 12	φ 11.5 ~ 12.4
φ 13	φ 12.5 ~ 13.4

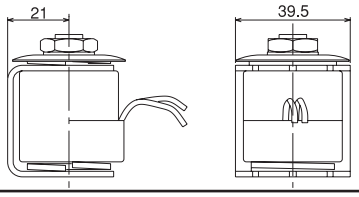
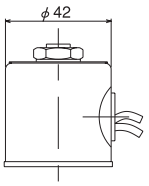
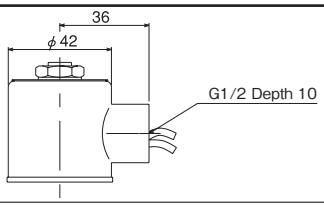
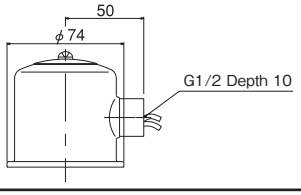
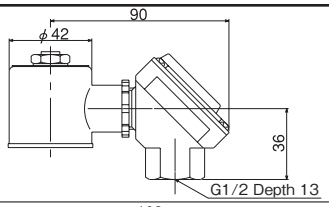
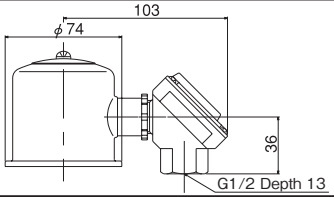
Note) Unless otherwise specified, φ 11 size packings are applied.

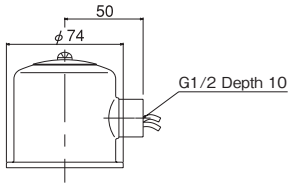
3 Coil / Housing

Housing • 1

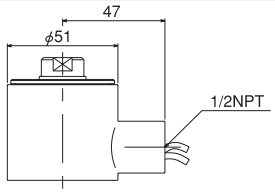
YS □ ■ □ □ □ □ □ □ □ □

Housing types

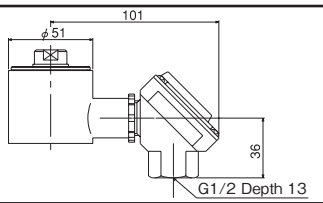
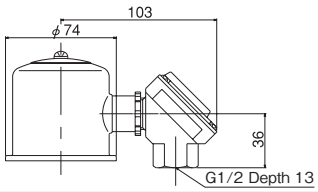
Open frame Code No. : P	Economical housing without coil cover			Applicable valve **YS30** **YS21** **YS20** **YS23** **YS33** **YS203/204** **YS32**
Grommet Code No. : B	Economical solenoid cover.			Applicable valve **YS30** **YS21** **YS20** **YS23** **YS33** **YS203/204** **YS32**
Conduit Code No. : A	Housing with G1/2 size conduit connecting port.			Applicable valve **YS30** **YS21** **YS20** **YS23** **YS33** **YS203/204** **YS32**
				Applicable valve **YS27**
With terminal box Code No. : T	Conduit housing with terminal box. Neon lamp and surge absorber are optionally available.			Applicable valve **YS30** **YS21** **YS20** **YS33** **YS203/204** **YS32**
				Applicable valve **YS27**

NEMA4 drip-proof Code No. : W	NEMA4 type Drip-proof housing.			Applicable valve **YS27**

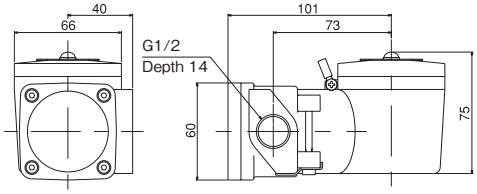
※ Conforms to JIS C 0920（IEC 60529）protection class: IP 55.

NEMA4,7 explosion-proof, drip-proof Code No. : X	NEMA4, 7 type Explosion-proof, Drip-proof housing.			Applicable valve **YS30** **YS21** **YS20** **YS23** **YS33** **YS203/204** **YS32**

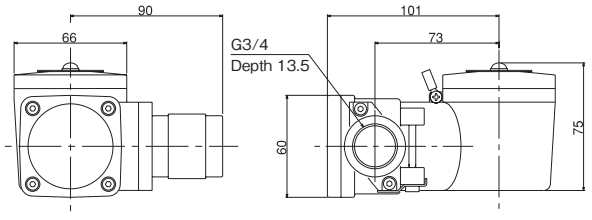
※ Conforms to JIS C 0920（IEC 60529）protection class: IP 65.

NEMA4 drip-proof with terminal box Code No. : G	NEMA4 Drip-proof housing with terminal box. Neon lamp and surge absorber are optionally available.			Applicable valve **YS30** **YS21** **YS20** **YS33** **YS203/204** **YS32**
				Applicable valve **YS27**

※ Only for indoor use conforming to JIS C 0920（IEC 60529）protection class: IP 55.

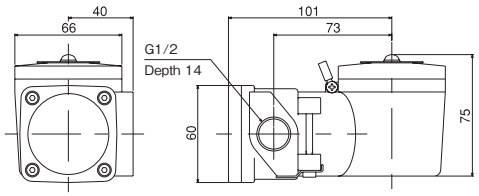
d2G4 **Explosion-proof enclosure, conduit** Code No. : J	Flame-proof enclosure construction（"Explosion-proof construction standard for electric equipment"）Explosion-proof housing. Can be used indoor and outdoor.			Applicable valve **YS30** **YS21** **YS20** **YS33** **YS203/204** **YS32**

※ Conforms to JIS C 0920（IEC 60529）protection class: IP 66.

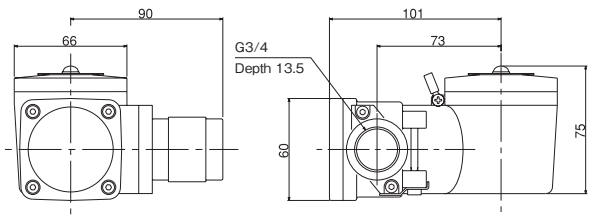
d2G4 **Explosion-proof enclosure, pressure-resistant packing** Code No. : K	Flame-proof enclosure construction（"Explosion-proof construction standard for electric equipment"）Explosion-proof housing. Can be used indoor and outdoor.			Applicable valve **YS30** **YS21** **YS20** **YS33** **YS203/204** **YS32**

※ Conforms to JIS C 0920（IEC 60529）protection class: IP 66.

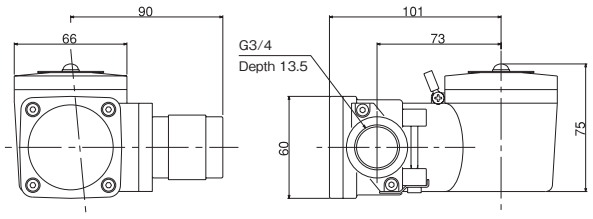
3 Coil / Housing

Exd Ⅱ BT4 **Explosion-proof enclosure, conduit** Code No. : C	Flame-proof enclosure construction (Explosion-proof) Explosion-proof housing. Can be used indoor and outdoor.			Applicable valve **YS30** **YS21** **YS20** **YS33** **YS203/204** **YS32**

※ Conforms to JIS C 0920（IEC 60529）protection class: IP 66.

Exd Ⅱ BT4 **Explosion-proof enclosure, pressure-resistant packing** Code No. : E	Flame-proof enclosure construction (Explosion-proof) Explosion-proof housing. Can be used indoor and outdoor.			Applicable valve **YS30** **YS21** **YS20** **YS33** **YS203/204** **YS32**

※ Conforms to JIS C 0920（IEC 60529）protection class: IP 66.

d3aG4 **Explosion-proof enclosure, pressure-resistant packing** Code No. : H	For hydrogen (Explosion-proof) housing. Can be used indoor and outdoor.			Applicable valve **YS301** **YS211** **YS201** **YS33** **YS203/204** **YS32**

※ Conforms to JIS C 0920（IEC 60529）protection class: IP 66.

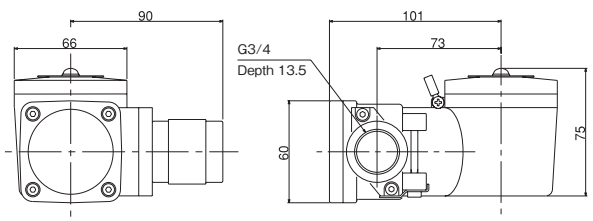
Housing • 2

(For overseas)

Y	S			E	H						

• Housing types

• Option（Certification body）
H : Korea

Exd Ⅱ BT4 **Explosion-proof enclosure, pressure-resistant packing** Code No. : E	Flame-proof enclosure construction (Explosion-proof) Explosion-proof housing. Can be used indoor and outdoor.			Applicable valve **YS30** **YS21** **YS20** **YS33** **YS203/204** **YS32**

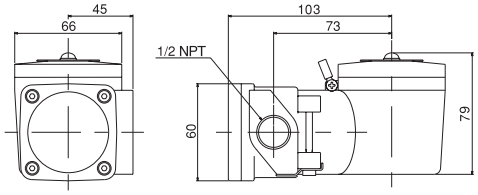
※ Conforms to JIS C 0920（IEC 60529）protection class: IP 66.

Housing・3

(For overseas)

Y S [ ] [ ] S H [ ] [ ] [ ] [ ] [ ] [ ]

- Housing types: S H
- Option (Certification body): None : EU / C : China

【EU , IEC/ATEX】 Ex db Ⅱ C T6...T4 Gb Explosion-proof enclosure, conduit (Separately, a certified cable gland must be used.) Code No. : S 【China , CCC】 Exd Ⅱ C T4～T6 Gb Explosion-proof enclosure, conduit (Separately, a certified cable gland must be used.) Code No. : S	Flame-proof enclosure construction (Explosion-proof) Explosion-proof housing. Can be used indoor and outdoor. Made of stainless steel.			Applicable valve YS301 YS211 YS201 YS33 YS203/204 YS32

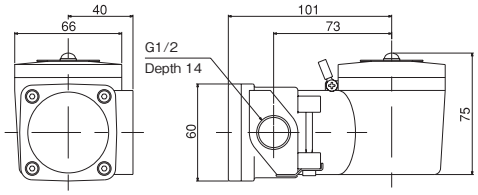
※ Conforms to JIS C 0920 (IEC 60529) protection class: IP 66.

Housing・4

(For overseas)

Y S [ ] [ ] C H [ ] [ ] [ ] [ ] [ ] [ ]

- Housing types: C H
- Option (Certification body): H : Korea

【Korea】 Exd Ⅱ BT4 Explosion-proof enclosure, conduit Code No. : C	Flame-proof enclosure construction (Explosion-proof) Explosion-proof housing. Can be used indoor and outdoor.			Applicable valve YS30 YS21 YS20 YS33 YS203/204 YS32

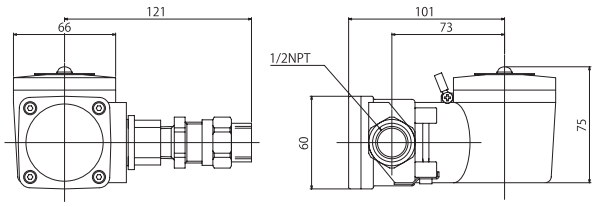
※ Conforms to JIS C 0920 (IEC 60529) protection class: IP 66.

Housing・5

(For overseas)

Y S [ ] [ ] Y H [ ] [ ] [ ] [ ] [ ] [ ]

- Housing types: Y H
- Option (Certification body): None : EU / W : Taiwan

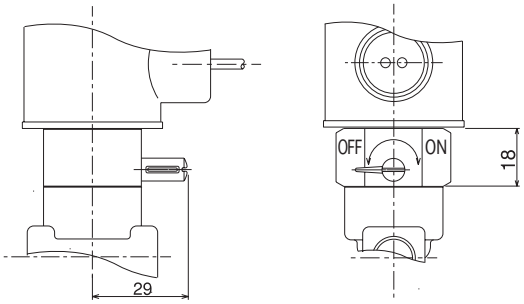
【EU】 Ⅱ 2G Exd Ⅱ BT4 Gb Explosion-proof enclosure, pressure-resistant packing Code No. : Y 【Taiwan】 Exd Ⅱ BT4 Gb X Explosion-proof enclosure, pressure-resistant packing Code No. : Y	Flame-proof enclosure construction (Explosion-proof) Explosion-proof housing. Can be used indoor and outdoor.			Applicable valve YS301 YS211 YS201 YS33 YS203/204 YS32

※ Conforms to JIS C 0920 (IEC 60529) protection class: IP 66.

4 Manual Operating System (Option Code : M)

■YS30

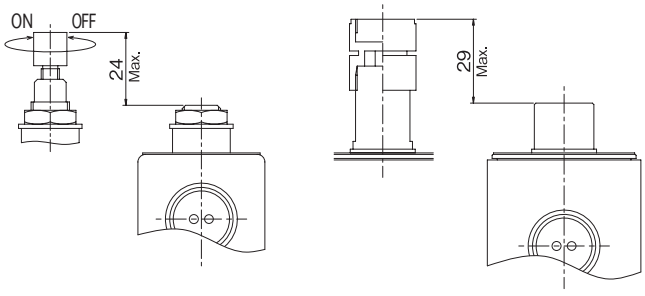
For NC valves



● The position of the lever is not one-way.
● Manual operating system is not applicable for valves with seat PTFE(T).

For NO valves

【Housing code is A／P／B／T】 【Housing code is X,G】

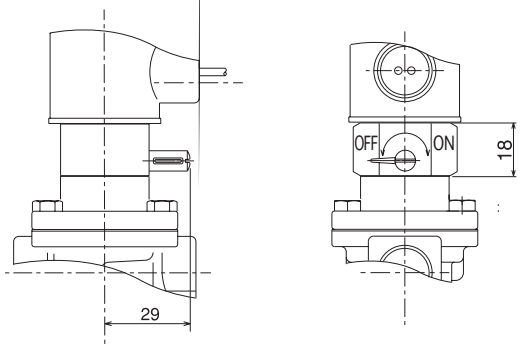


● Screw in the cover screw of the other side to close.

● Manual operating system is not applicable for valves with housing J , K, C or E

■YS21 ／ YS20

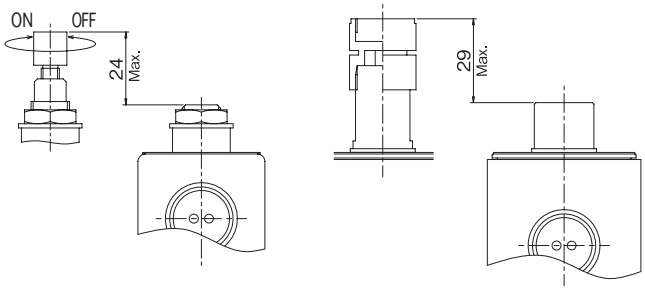
For NC valves



● The position of the lever is not one-way.

For NO valves

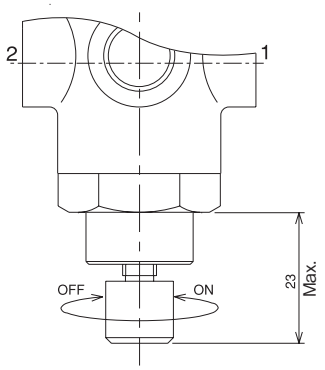
【Housing code is A／P／B／T】 【Housing code is X,G】



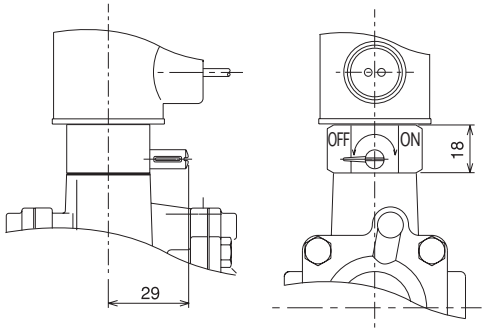
● Screw in the cover screw of the other side to close.

● Manual operating system is not applicable for valves with housing J , K, C or E

■YS33



■YS32・YS 203 204



● The position of the lever is not one-way.

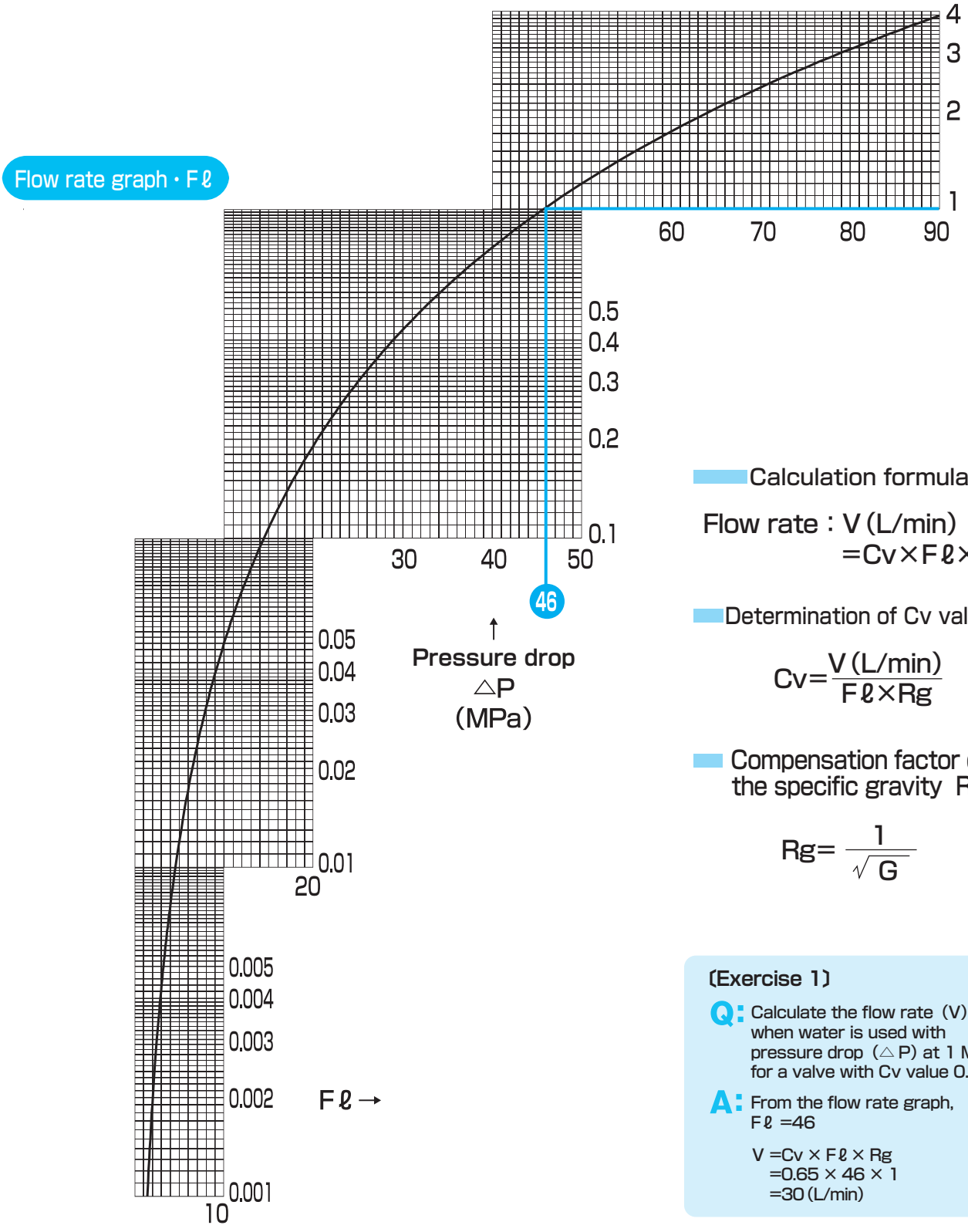
5 Determination of Flow Rate

Flow media : Liquid

Note

- Fluid viscosity should be more than 65mm^2/s.

Flow rate graph・Fℓ



Calculation formula

Flow rate : V (L/min)
$=Cv \times F\ell \times Rg$

Determination of Cv value

$$Cv = \frac{V\ (L/min)}{F\ell \times Rg}$$

Compensation factor of the specific gravity Rg

$$Rg = \frac{1}{\sqrt{G}}$$

〔Exercise 1〕

Q: Calculate the flow rate (V) when water is used with pressure drop (△P) at 1 MPa for a valve with Cv value 0.65.

A: From the flow rate graph,
Fℓ =46

V =Cv × Fℓ × Rg
=0.65 × 46 × 1
=30 (L/min)

5 Determination of Flow Rate

Flow media : Gas

Calculation formula

Flow rate : $Q\,(m^3/h)$

$$=Cv\times Fg\times Rg\times Rt$$

Determination of Cv value

$$Cv=\frac{Q\,(m^3/h)}{Fg\times Rg\times Rt}$$

Compensation factor of the specific gravity · Rg

Specific gravity · G

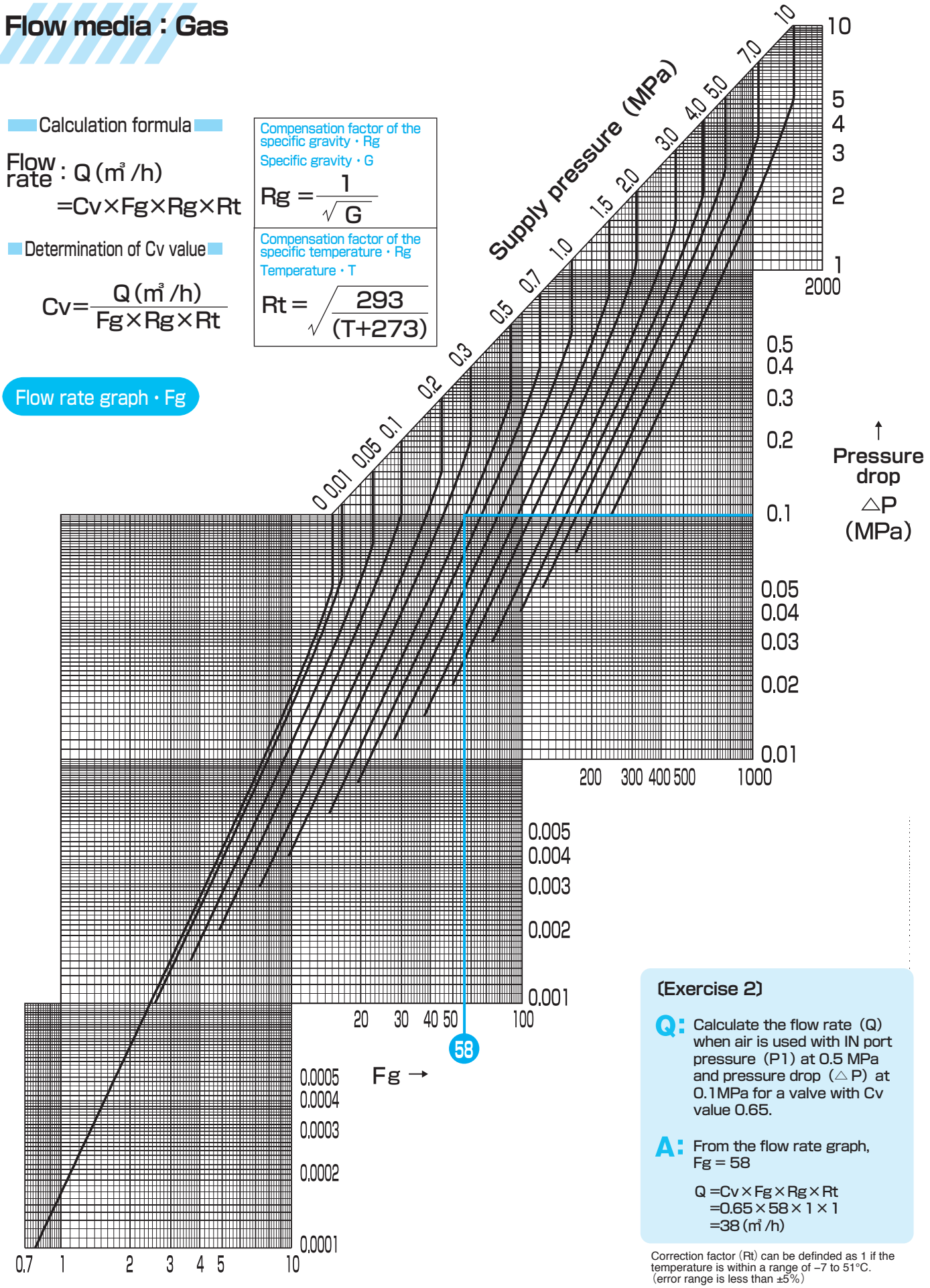
$$Rg=\frac{1}{\sqrt{G}}$$

Compensation factor of the specific temperature · Rg

Temperature · T

$$Rt=\sqrt{\frac{293}{(T+273)}}$$

Flow rate graph · Fg



(Exercise 2)

Q: Calculate the flow rate (Q) when air is used with IN port pressure (P1) at 0.5 MPa and pressure drop (△P) at 0.1MPa for a valve with Cv value 0.65.

A: From the flow rate graph, Fg = 58

$Q=Cv\times Fg\times Rg\times Rt$

$=0.65\times 58\times 1\times 1$

$=38\,(m^3/h)$

Correction factor (Rt) can be defined as 1 if the temperature is within a range of −7 to 51°C. (error range is less than ±5%)

Flow media : Steam

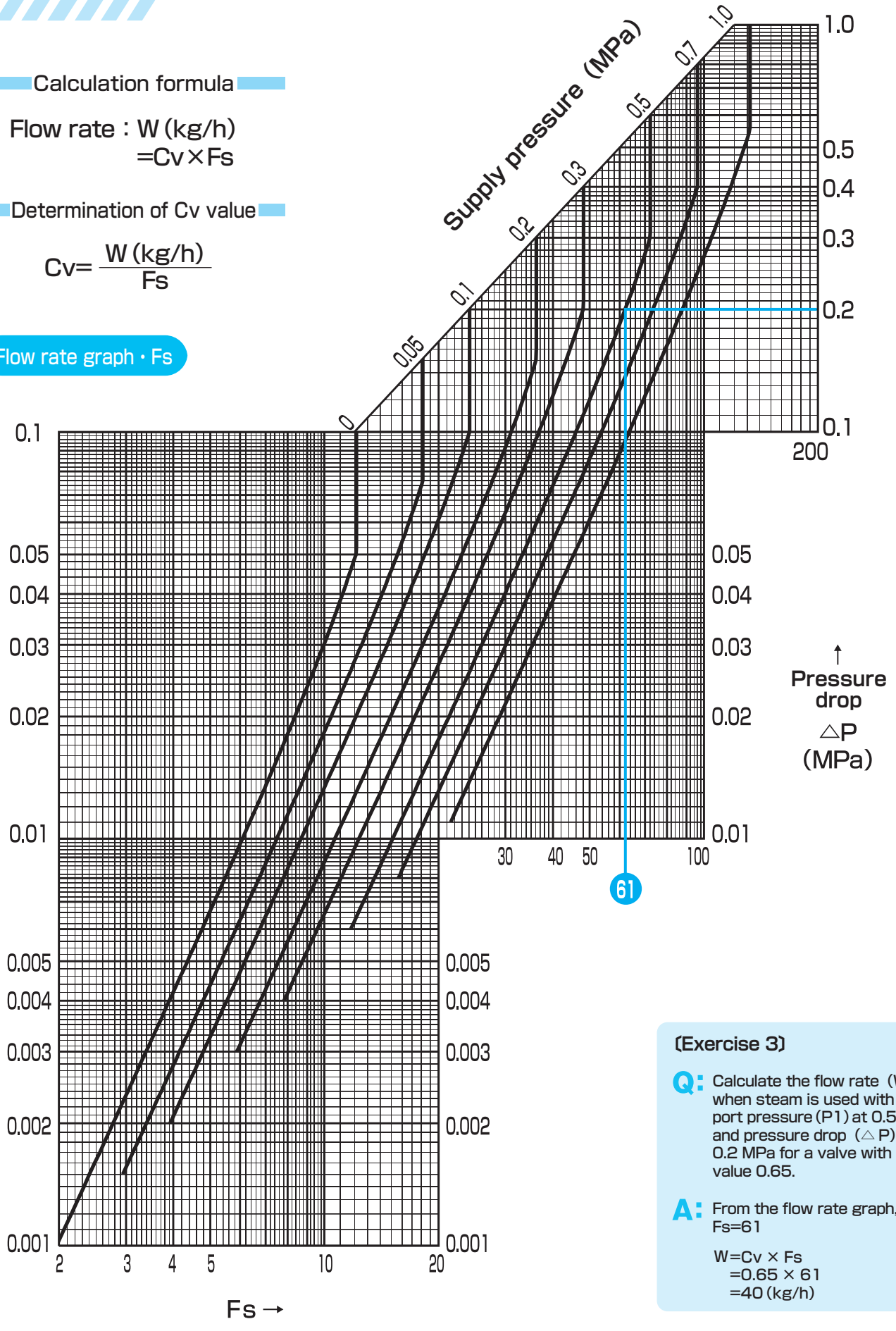
Calculation formula

Flow rate : W (kg/h)
=Cv×Fs

Determination of Cv value

$$Cv = \frac{W\ (kg/h)}{Fs}$$

Flow rate graph・Fs



(Exercise 3)

Q: Calculate the flow rate (W) when steam is used with IN port pressure (P1) at 0.5MPa and pressure drop (△P) at 0.2 MPa for a valve with Cv value 0.65.

A: From the flow rate graph, Fs=61

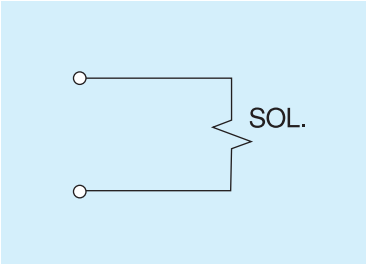
W=Cv × Fs
=0.65 × 61
=40 (kg/h)

6 Electric circuit

Leadwire type

Housing code : A,P,B,X,W

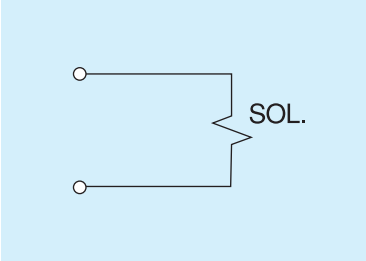
None option



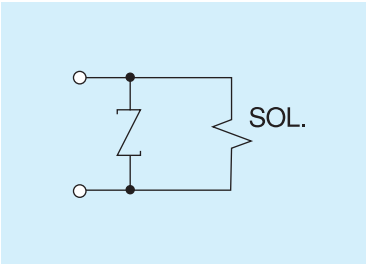
With terminal box

Housing code : T,G

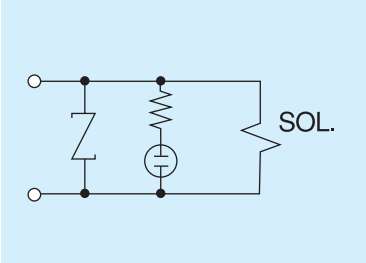
None option



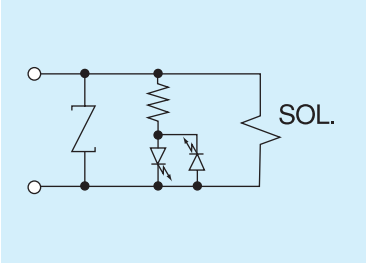
w/ surge absorber



Indicator w/ surge absorber
(AC circuit、DC100V、DC120V)



Indicator w/ surge absorber
(DC24V)

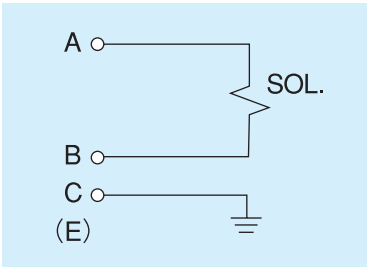


※ DC solenoid valves have no polarity.

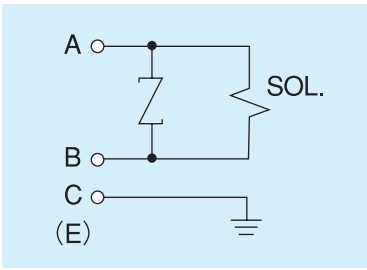
d2G4、Exd Ⅱ BT4

Housing code : J,K,C,E

None option



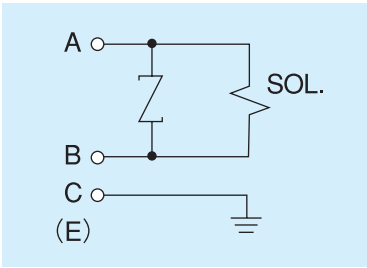
w/ surge absorber



d3aG4

Housing code : H

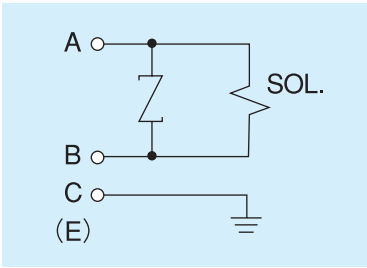
w/ surge absorber



Exd Ⅱ BT4 , Exd Ⅱ CT

Housing code : S,Y

w/ surge absorber



7 Glossary

1. Orifice size

Internal diameter of main valve seat, expressed in millimeter (mm).

2. Cv value

Volume of water that passes through a valve with a pressure drop of 0.007 MPa (approx. 1psi), expressed in GPM (3.785 L/min ≒ 1 GPM)

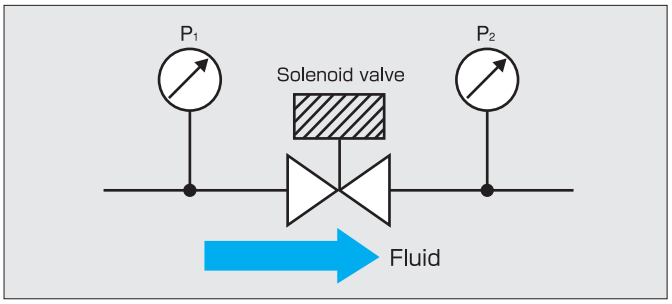
3. Operating pressure differential

●Maximum operating pressure differential:

Upper limit of pressure differential for a solenoid valve to be operated accurately; or maximum operating pressure at IN port of a solenoid valve.

●Minimum pressure differential:

Lower limit of pressure differential for a solenoid valve to be operated accurately. For a pilot valve, at least minimum operating pressure described in the catalogue is needed.



P1 = IN port pressure (primary pressure)
P2 = OUT port pressure (secondary pressure)
△P = P1 − P2 (pressure drop)

4. Consumption power

Consumption power of a solenoid valve is expressed in watt (W). If AC power is used, it is also expressed in volt/ampere (VA) at issuance and retention.
Making current is a momentary current that occurs when AC coil is energized, while holding current is a current returned to normal after excessive making current disappears. Each current value is determined by dividing VA by voltage.

AC

$$\text{Making current (A)} = \frac{\text{VA (issuance)}}{\text{voltage (V)}}$$

AC

$$\text{Holding current (A)} = \frac{\text{VA (retention)}}{\text{voltage (V)}}$$

For a solenoid valve using DC power, making current does not appear. Therefore rated current is determined by dividing consumption power by voltage.

DC

$$\text{DC (A)} = \frac{\text{DC consumption power (W)}}{\text{voltage (V)}}$$

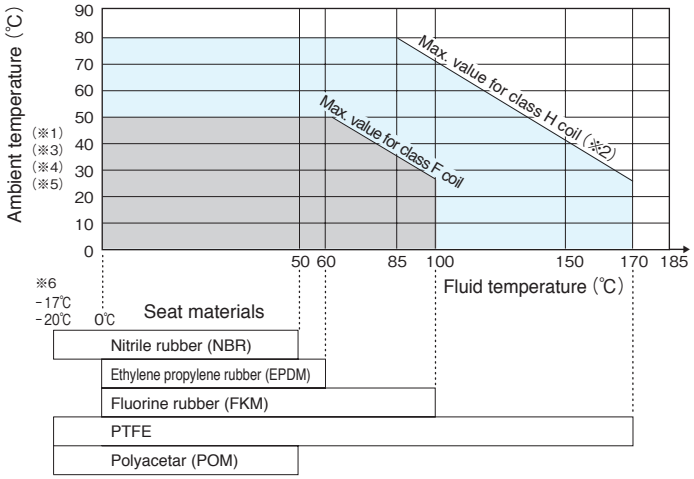
Refer to the Coil Data for consumption power and apparent power of each valve.

5. Fluid temperature / ambient temperature

Fluid temperature is the temperature of fluid applied to a solenoid valve, while ambient temperature is the temperature surrounding the valve. These temperature values are determined based on the valve component materials, seal/seat materials, allowable temperature limit according to coil insulation class, etc.
Especially coil insulation class is an important factor for determining ambient and fluid temperature.
Max. ambient temperature = (temperature of an insulation class)− (coil temperature rise)

Effect of fluid temperature should also be considered as one of the main factors.
A solenoid valve consists of materials that are sensitive to heat, including rubber/plastic seals or seats.
For MAGFLOW series solenoid valve, data are based on ambient temperature at 50°C for class F and 80°C for class H coils. General temperature range is shown below.

Fluid temperature range/ Ambient temperature range



※1: For the fluid temperature range and ambient temperature range, the limit of the heat resistance class (H or F) of the coil and the lower value of the seal and sheet material are applied.
※2: For DC type, max. ambient temperature should be 50°C and the valve should be used within the temperature range shown in the above graph.
※3: Some materials are available for higher temperature depending on the fluid used. Consult us for details.
※4: Terminal box with housing (T, G) is made of resin and ambient temperature should be max. 50°C.
※5: Ambient temperature for YS27 series should be max. 60°C for class H coil.
※6: In the case of explosion-proof housing,please refer to next table.
※7: See standard specification for min. fluid temperature and ambient temperature.
※8: In operating temperatures of 5°C or less, provide adequate measures against freezing.

Refer to the Valve Selection List for maximum fluid temperature based on the above graph.
Please contact us if you wish to use it at a higher temperature.

2-port solenoid valves Explosion-proof

Housing	Coil	Flow path	Ambient temperature	fluid temperature
J,K,H	F	Normally closed	55℃	60℃
		Normally open	55℃	55℃
	H	Normally closed	60℃	60℃
		Normally open	55℃	55℃
C,E	F	Normally closed	55℃	55℃
		Normally open	40℃	40℃
	H	Normally closed	60℃	60℃
		Normally open	60℃	60℃
Y	H	Normally closed	60℃	60℃

Housing	Coil	Flow path	power consumption	Temperature class	Ambient temperature	fluid temperature
S	H	Normally closed	AC	T6	35℃	35℃
				T5	50℃	50℃
				T4	60℃	60℃
			DC	T6	50℃	50℃
				T5	60℃	60℃
				T4	60℃	60℃

3-port solenoid valves Explosion-proof

Housing	Coil	Flow path	Ambient temperature	fluid temperature
J,K,H	F		55℃	60℃
	H		60℃	60℃
C,E	F		55℃	55℃
	H		60℃	60℃
Y	H		60℃	60℃

Housing	Coil	Flow path	power consumption	Temperature class	Ambient temperature	fluid temperature
S	H	Normally closed	AC	T6	35℃	35℃
				T5	50℃	50℃
				T4	60℃	60℃
			DC	T6	50℃	50℃
				T5	60℃	60℃
				T4	60℃	60℃

What's d2G4 / Exd Ⅱ BT4?

For explosion-proof construction of electric equipment, the construction standards and technical standards, specifying 6 explosion-proof constructions each, are established according to the application, type of explosive gas used, or location of the equipment. Such specifications are expressed in codes such as "d2G4" and "Exd Ⅱ BT4." Each of the codes has the following meanings.

d2G4

Explosion-proof construction standard for electric equipment

d

d	Flame-proof enclosure construction	Type of explosion-proof construction
o	Oil-immersion construction	
f	Pressurized apparatus construction	
e	Increasedn safety construction	
i	Intrinsic safety construction	
s	Special type of protection construction	

2

1	Propane etc.	Explosive class
2	Ethylene etc.	
3a	Water gas / Hydrogen	
3b	Carbon disulfide	
3c	Acetylene	
3n	All	

G4

G1	Over 450℃	Ignition degree (ignition temperature
G2	300 to 450℃	
G3	200 to 300℃	
G4	135 to 200℃	
G5	100 to 135℃	

Exd Ⅱ BT4

Technical standards conforming to the international standards (Ex explosion-proof type)

Ex

d	Flame-proof enclosure construction	Type of explosion-proof construction
o	Oil-immersion construction	
p	Pressurized apparatus construction	
e	Increasedn safety construction	
ia	Intrinsic safety construction	
ib		
s	Special type of protection construction	
n	Type n construction	

d

ⅡA	Propane etc.	Gas or steam type
ⅡB	Ethylene etc.	
ⅡC	All	

ⅡB

T4

T1	450℃	Temperature class (surface max.temperature)
T2	300℃	
T3	200℃	
T4	135℃	
T5	100℃	
T6	85℃	

Explosive gas classification according to explosive class and ignition degree (construction standard)

Explosion class \ Ignition degree	G1	G2	G3	G4	G5
1	Acrylonitrile, Acetone, Ammonia, Carbon monoxide, Ethane, Acetic acid, Ethyl acetate, Toluene, Propane, Benzene, Methanol, Methane	Ethanol, Isopentyl acetate, 1-Butanol, Butane	Gasoline, Dimethyl ether, Hexane	Acetaldehyde, Diethyl ether	
2		Ethylene, Ethylene oxide			
3a	Water gas, Hydrogen				
3b					Carbon disulfide
3c		Acetylene			
3n	Water gas /Hydrogen/Acetylene/Carbon disulfide				

Note) ▭ gray marked are applicable range of d2G4.

Explosive gas classification according to gas or steam type and temperature class (Ex explosion-proof type)

Gas or steam type \ Temperature class	T1	T2	T3	T4	T5	T6
ⅡA	Acetone, Ammonia, Ethane, Acetic acid, Ethyl acetate, Toluene, Benzene, Methane	1-Butanol, Butane, Propane, Methanol	Hexane	Acetaldehyde, Trimethylamine		
ⅡB	Acrylonitrile, Carbon monoxide	Ethanol, Ethylene, Ethylene oxide	Dimethyl ether	Diethyl ether		
ⅡC	Water gas, Hydrogen	Acetylene				Carbon disulfide

Note) ▭ gray marked are applicable range of Exd Ⅱ BT4.

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