INSTRUCTION MANUAL FOR TYPE "M55C(D)" THREE-WAY SOLENOID VALVE

General purpose Type Solenoid

Explosion-proof Type Solenoid

KANEKO SANGYO CO., LTD.

●Please read this manual carefully before installation, operation, maintenance or test of the product. Make sure that you have got enough knowledge about the product and can use it in a safe way by reading the caution and warning information in this manual.

●Please keep this operation manual in an accessible place for daily reference.

Notice:

The contents of this manual may be upgraded into a new version without any notice in the future.

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1. Caution & warning signs on security

1.1 Types and meanings of caution signs.

 WARNING	Applying to those cases which may cause human deaths or serious injuries when operated incorrectly.
 CAUTION	Applying to those cases which may cause damages to things and, in some cases, serious results.
 PROHIBITION	Indicating the prohibited actions.
 ENFORCEMENT	Indicating the actions which must be taken.

1.2 General safety rules for the product

 ENFORCEMENT	Make sure to identify the actual specifications of the products arrived being the same with your ordered specifications.
 ENFORCEMENT	Set the dew point temperature of the product by 5℃ lower than the atmospheric temperature .Freezing inside the valve might be a cause of an error operation.
 PROHIBITION	It is prohibited to use the product at a voltage value beyond the allowable voltage range, Using the product with the voltage value beyond the allowable range may cause the coil burning out.
 ENFORCEMENT	Fix the solenoid valve tightly while mounting. Please make sure to fix the solenoid valve tightly while mounting. Falling down or rolling down may cause injuries to the operators around.
 ENFORCEMENT	Flashing before mounting the valve, make sure to flash inside the pipe to make it clean. Otherwise, it may cause seat leakage, error operation or coil burning out.
 ENFORCEMENT	Use a filter. Please select a filter of about 5 μ m. The dust or trash entered may cause an operation failure or leakage.

 PROHIBITION	Keep the packing material from entering inside the valve. Never let the seal-tape or sealing-bond get entered inside the valve. Or, it may be a cause of leakage or operation failure.
 PROHIBITION	Never load an excessive power to the product. Please do not load an excessive power to the joint pipe of the connection. It may cause the valve transformed and fail to the operation of either open or close.
 PROHIBITION	Please do not make the wires inter-twisted. It may cause an electrical shock or ground fault.
 ENFORCEMENT	Turn off the power. Please make sure that the power is off before operation of the product, because for an example connecting wires with electricity energized may cause an electrical shock, earth leakage or an ignition according to short circuit.
 ENFORCEMENT	Please make sure to execute the wire-connection according to the Explosion-protected Electrical Installations in General Industries. An explosion or a fire is possible according to using at dangerous areas.
 PROHIBITION	Using machine oil or spindle oil is prohibited. Please never use machine oil or spindle oil while lubricating. Using such oils may result an operation failure or leakage caused by swelling or deterioration of the packing.
 ENFORCEMENT	Safety reconfirmation before starting up. Before supplying fluid or turning on the electrical power, please make sure to identify the safety of the product operation area such as that of the cylinders. Human body injury, or electrical shock might be caused by touching the machinery and others.
 PROHIBITION	Never extend your hand to the machinery. Please do not extend your hand to the valve or take a manual operation to the valve while its automatic running.
 ENFORCEMENT	Shut off the main valve and turn off the power. When an abnormality of operation happened, please make sure to shut off the main valve and turn off the power before starting trouble-shooting. Otherwise, a human body injury might be the result.

 ENFORCEMENT	Require for advises from the manufacture. When abnormality is recognized by a daily inspection or periodic inspection, please contact the manufacturer and ask for advise from them. Otherwise, there might be some troubles.
 PROHIBITION	Since the explosion-proof solenoid is a qualified product, do not change and reconstruct the internal wire connection. Explosion-proof performance falls and so there is fear of explosion or fire.

2. Descriptions of the product

Model M55C(D) solenoid valve is a pilot type 3 way 2 position solenoid valve that switches its operating mode by energizing or de-energizing.

The solenoid part is either the general purpose type or the explosion-proof type, and both types can be used outside the room. (But a terminal box is necessary for the general type if used outside.)

3. Receiving inspection of the product

There must be a identification plate with its specification mentioned on the surface of the product.

There must be a model No., operating pressure range, electrical voltage, frequency (for AC power only), exciting current, indicated on the identification plate.

Please identify whether the items above are exactly the same as the specifications which you have ordered.

 ENFORCEMENT	Make sure to identify the actual specifications of the products arrived being the same with your ordered specifications.

4. Functions and its available applications

4.1. Model No.

Model	Basic code					Special code	Specification
	Function	Nominal Diameter	Solenoid Type	Flame proof packing grand	Terminal box		
M55	·····						3 way pilot type
	C	·····					NORMALLY CLOSED
	D	·····					NORMALLY OPEN
		-8	·····				Rc1/4
		-10	·····				Rc3/8
		-15	·····				Rc1/2
		-20	·····				Rc3/4
		-25	·····				Rc1
		-32	·····				Rc1-1/4
			-D11	·····			General type for DC
			-DE11	·····			Explosion proof type for DC
			-AE55	·····			Explosion proof type for AC
					·····		Conduit connection
				T	·····		With Flame proof packing gland [※1]
							With general lead wire
					-TF	·····	With terminal box “TF-60” type [※2]
					-ST	·····	With terminal box “ST” type [※2]
						-S	With flange (JIS10KFF/JIS10KRF)

[※1] For DE11 solenoid only

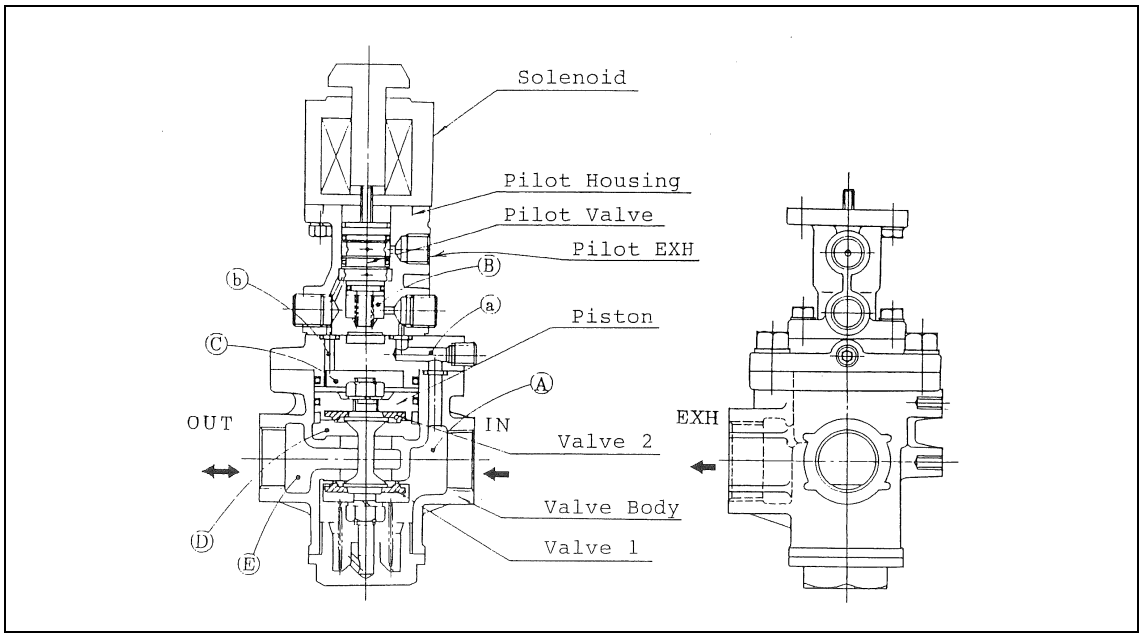
[※2] For D11 solenoid only

4.2. Specification

Specification of model			
Fluid	Clean air		
Operating pressure	0.12 ～ 0.99 MPa		
Fluid temperature	−20 ～ +60 ℃		
Cv value (size)	1.22(1/4"), 3.2(3/8"), 4.3(1/2"), 5.2(3/4"), 14.5(1"), 17.3(1-1/4")		
Seat material	NBR		
Manual operating unit	Standard installation		
Specification of solenoid			
Allowable voltage fluctuation	+10%, −15% (Refer to the standard voltage)		
Rating	Continuous		
Insulation	Class B or H		
General type			
Cable connection	Using lead wire		
	With terminal box		
Cable size	In case of with terminal box JIS F 8801：15(a/b/c), 20(a/b/c)		
Explosion proof type			
Certification	TIIS		
Certificate No.	DE11/B ：T22721	DE11/H ：T59314	AE55/B：13633
Explosion-proof class	d2G4		
Cable connection	Using wiring pipe G1/2		
	Flame proof packing grand type		
Cable size	In case of using wiring pipe Max. 3.5 mm^2		
	In case of flame proof packing grand type 9 ～ 12 mm (Cable outer diameter)		

ENFORCEMENT	Set the dew point temperature of the product by 5℃ lower than the atmospheric temperature .Freezing inside the valve might be a cause of an error operation.
PROHIBITION	It is prohibited to use the product at a voltage value beyond the allowable voltage range, Using the product with the voltage value beyond the allowable range may cause the coil burning out.

5. Operation theory



5.1. Electrical operating

5.1.1. M55C (Normally closed type)

(1)The pressure that has entered through "IN" always exists in chambers Ⓐ and Ⓑ.

(2)When power supply is off, the pressure through "IN" is closed by "valve 1". The "OUT" side chamber Ⓔ communicates with "EXH"(atmosphere) through chamber Ⓓ.

(3)When power supply is on, the pilot valve changes its position by the action of the solenoid and the pressure that has been led to chamber Ⓑ through passage ⓐ passes through the pilot valve and enters chamber Ⓒ, located above the piston, through passage ⓑ, forcing down the piston. As a result, "valve 2" closes and "valve 1" opens. That is, chamber Ⓐ communicates with chamber Ⓔ, so pressure flows from "IN" to "OUT".

(4)When power supply is turned off again, the pilot valve returns to the former position and the pressure in chamber Ⓒ passes through passage ⓑ and then the pilot EXH. The piston is returned to the former position by the combined action of the pressure beneath "valve 1" and the spring force.

5.1.2. M55D (Normally open type)

(1)Same as 5.1.1.(1) above.

(2)When power supply is off : same as 5.1.1.(3) above.

(3)When power supply is on : same as 5.1.1.(2) above ; air is exhausted from the pilot valve.

(4)When power is turned off again, the pilot valve opens and pressure flows from "IN" to "OUT" as in 5.1.1.(3) above.

5.2. Manual operating

Manual button is installed on the top of solenoid.

Manual operation could be used and pushed only when deenergized position.

Manual operation could be pushed and operated the manual button by driver etc., only when deenergized position (remark : it could be not the device to the lock position).

If the manual button is free from the pushing pressure by hand or driver etc., manual button will be back to the original position and the valve will return to the same position as the deenergized position.

6. Mounting

It can be mounted at any dimension.

 ENFORCEMENT	Fix the solenoid valve tightly while mounting. Please make sure to fix the solenoid valve tightly while mounting. Falling down or rolling down may cause injuries to the operators around.

7. Pipe connection

(1) Please connect the pipe correctly according to the port markings on the solenoid valves.

(2) While connecting it to a pipe or screwing a pipe joint to the solenoid valve, please wrap seal tape to the male thread or apply some sealing bond to the female thread at a right amount.

 ENFORCEMENT	Flashing before mounting the valve, make sure to flash inside the pipe to make it clean. Otherwise, it may cause seat leakage, error operation or coil burning out.
 ENFORCEMENT	Use a filter. Please select a filter of about 5 μ m. The dust or trash entered may cause an operation failure or leakage.
 PROHIBITION	Keep the packing material from entering inside the valve. Never let the seal-tape or sealing-bond get entered inside the valve. Or, it may be a cause of leakage or operation failure.
 PROHIBITION	Never load an excessive power to the product. Please do not load an excessive power to the joint pipe of the connection. It may cause the valve transformed and fail to the operation of either open or close.

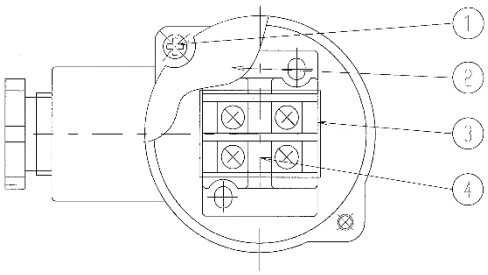
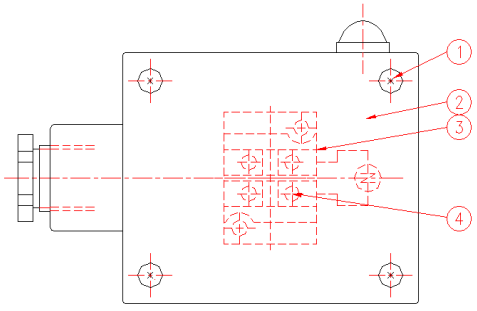
PROHIBITION	Any pipe to be connected to the valve should be of the same nominal diameter as the valve. Do not use a small-capacity reducing valve. Do not use speed controller with EXH port. It may cause malfunction.

8. Electric wire connection

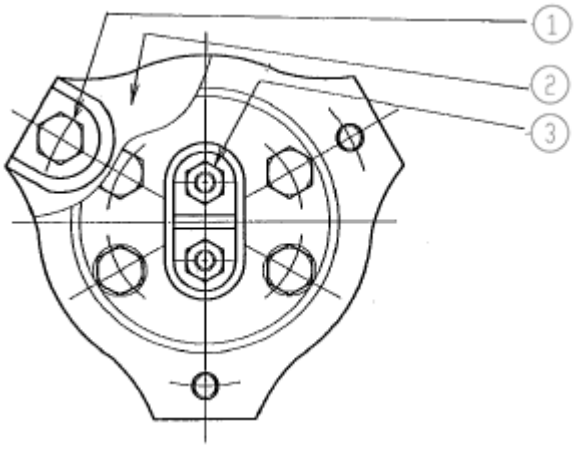
Please connect the electronic wire according to the wiring points written below and remind that in the cases of solenoid valves, there will be no plus polarity (+), or minus polarity(-).

Please execute the wire connection of an explosion-proof type solenoid valve according to the recommended Practice for Explosion-protected Electrical Installations in General Industries.

In the case of general type

TF-60 type	
	① Take two M4 small screws stopping the terminal box cover off ② Take the cover off ③ Take the terminal stand cover (transparent plastic) off. ④ After taking two M3.5 screws off, connect the terminals of the wire with crimped terminals to each screw, and then tighten the screws. ⑤ After finishing the connection, put on the terminal box cover, and then tighten two screws.
ST type	
	① Take Four M4 small screws stopping the terminal box cover off ② Take the cover off ③ Take the terminal stand cover (transparent plastic) off. ④ After taking two M3.5 screws off, connect the terminals of the wire with crimped terminals to each screw, and then tighten the screws. ⑤ After finishing the connection, put on the terminal box cover, and then tighten four screws.

In the case of explosion-proof type

	① Take three M6 bolts stopping the terminal box cover off. ② Take the cover off. ③ After taking two M4 nuts of the terminal stand cover off, connect the terminals of the wire with crimped terminals to each screw, and then tighten the screws. ④ After finishing the connection, please put on the terminal box cover, and then tighten three bolts.

PROHIBITION	Please do not make the wires inter-twisted. It may cause an electrical shock or ground fault.
ENFORCEMENT	Turn off the power. Please make sure that the power is off before operation of the product, because for an example connecting wires with electricity energized may cause an electrical shock, earth leakage or an ignition according to short circuit.
ENFORCEMENT	Please make sure to execute the wire-connection according to the Explosion-protected Electrical Installations in General Industries. An explosion or a fire is possible according to using at dangerous areas.

9. Running

9.1. Preparation of running

① Please make sure that the actual power voltage being compatible with the rated voltage specification of the solenoid valve.

② The actual operation pressure must be at a value beyond the allowable range of the rated pressure.

③ If looseness of the nuts is found out, tighten the loosed nut surely.

④ Identify the pipe connections is compatible with its function.

⑤ Its available to work without lubrication, but when it is needed, please use turbine oil type1(ISO VG32) or its equivalent product.

 PROHIBITION	Using machine oil or spindle oil is prohibited. Please never use machine oil or spindle oil while lubricating. Using such oils may result an operation failure or leakage caused by swelling or deterioration of the packing.
 ENFORCEMENT	Safety reconfirmation before starting up. Before supplying fluid or turning on the electrical power, please make sure to identify the safety of the product operation area such as that of the cylinders. Human body injury, or electrical shock might be caused by touching the machinery and others.

9.2. Normal running

Working such as adjustment is unnecessary during operation.

 PROHIBITION	Never extend your hand to the machinery. Please do not extend your hand to the valve or take a manual operation to the valve while its automatic running.

10. Remedies for troubles

In case of a trouble, contact and ask for instructions from the manufacturer.

 ENFORCEMENT	Shut off the main valve and turn off the power. When an abnormality of operation happened, please make sure to shut off the main valve and turn off the power before starting trouble-shooting. Otherwise, a human body injury might be the result.

11. Maintenance & daily inspection

11.1. contents of daily inspection

① Identify the normal operation of the solenoid valve by inspecting the operations of the cylinder.

② Identify whether there is a fluid leakage out from the solenoid valve by identify the sounds.

③ Identify whether there is looseness of bolts or bolt falling off by a visual inspection.

④ Identify whether there is undulation sound from solenoid valve by hearing check.

⑤ Use a surface thermometer to check that the surface temperature of the solenoid is below the surface temperature specified by the explosion-proof

certification standard.

11.2. Contents of the Periodic inspection and the period

(1) Period

Please set the period as either 2 years after receiving the product or as 1 year after beginning to use it.

(2) Inspection items

① Identify the insulation resistance by using an insulation resistance indicator. The normal value must be more than 100MΩ in normal temperature. If the resistance value is out of that range, then changing for a new coil or maintenance is necessary.

② Identify the outward appearance of the product whether being clean by a visual inspection. If its` getting polluted, then a cleaning is necessary.

③ After supplying pressure air to the valve through port IN, please identify whether there will be air leakage from the port EXH or pilot EXH, by using test fluid. (in both energized and de-energized condition) When a leakage is confirmed, either a disassembly and maintenance or changing the whole solenoid valve to new one is necessary.

 ENFORCEMENT	Require for advises from the manufacture. When abnormality is recognized by a daily inspection or periodic inspection, please contact the manufacturer and ask for advise from them. Otherwise, there might be some troubles.

12. Assembly & the disassembly of the product

12.1. Disassembly

(1) Turn off the electrical power and make the pressure leak out.

(2) After identifying the complete leakage of the pressure, take off the joint pipes or pipes away from each from each connection.

(3) After identifying the electrical power turning off, take the cables away from terminal boxes according to the 8 items mentioned above.

(4) It is available to separate the solenoid head and the valve head just by taking off the four bolts (M6) which connected the two parts.

 PROHIBITION	Since the explosion-proof solenoid is a qualified product, do not change and reconstruct the internal wire connection. Explosion-proof performance falls and so there is fear of explosion or fire.

12.2. Assembly

(1) Assembly is operated in a inverse process f the disassembly operation.

(2) When wound or deterioration were recognized to the O-ring or the packing, please change it for a new article.

(3) While installing an O-ring or packing, please use such as silicon grease to get it painted (L210L made by NOK Klueber is suggested to be used).

(4) Please operate the pipe connection according to the 7 items mentioned above.

(5) Please operate the wire connection according to the 8 items mentioned above while connecting the cables and terminals.

12.3. Commissioning

After preparing for operation as described in item 9.1 above, supply pressure to the valve and check that the operation is normal without leakage in both electricity and manual operation.

13. Transportation & preservation

(1) While transporting the product, please keep it from excessive shock or falling down from somewhere, take it carefully just as taking a precise machinery.

(2) While preserve the product, please give it a package to rid it of invasion of dust or trash, and take care not to load heavy things on it. Please take it carefully to keep it in good status.

14. Term of a guarantee

Within 2 years after delivery or within 1 year after starting use whichever is short.
In the event of failure due to reasons attributable to our company's responsibility.

15. Sales representatives

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