FUTURING SMART ENERGY

INSTRUCTION MANUAL

High Voltage Vacuum Contactor

Safety Precautions

- Before using this product read the article of Safety instructions in this complete set of instruction
- Keep it in the place that all actual users always can contact easily

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CONTENTS

Safety Precautions

▶ Please follow this "Safety Precautions" surely so that any failure to observe these precautions could result in severe personal injury, death or equipment damage.

The safety precautions are consist of the following special message may appear throughout this manual to warn of potential hazards and to call attention to additional information which clarifies or simplifies a procedure.

⚠ **DANGER**	Used where there is a hazard of severe bodily injury or death. Failure to follow a "DANGER" instruction ***will*** result in ***severe*** bodily injury or death.
⚠ **WARNING**	Used where there is a hazard of severe bodily injury or death. Failure to follow a "WARNING" instruction may result in bodily injury or death.
⚠ **CAUTION**	Used where there is a hazard of equipment damage. Failure to follow a "CAUTION" instruction may result in damage of equipment.

The meaning of following signal on the products and in this instruction describes as below .

This signal means to call a person's attention for any operation or subjects which makes a hazard of bodily injury or equipment damage. Read it carefully and follow the instruction at this signal.

This signal means to call a person's attention for electric shock under the special environment condition.

⚠ DANGER

1.Do not make any touch to charged parts electrically like conductors, terminals and disconnects etc., under any of energized condition.

Will result in electric shock, severe bodily injury or electrocution.

2.Before performing any maintenance or inspection, all supply voltage sources must be disconnected and then the equipment should be grounded.

Will result in electric shock, severe bodily injury or electrocution.

⚠ WARNING

1. **Only a qualified electrical workers with training and experience high voltage circuits should perform any operation, maintenance and inspection.**
   may result in malfunction, severe bodily injury or electric shock.
2. **When the contactor is in service, do not open the front cover.**
   may result in bodily injury or electric-shock.
3. **When the contactor is in service, do not insert or withdraw the contactor.**
   may result in bodily injury or electric-shock.
4. **Before performing any inspection or maintenance on this device, disconnect all sources of electric power and take every precautions to see that all connections are de-energized and grounded.**
   may result in severe bodily injury or electric shock.
5. **When making bolts and screw assembling, follow the instruction with recommended torque values.**
   may result in over heating or burns.
6. **After performing installation, maintenance, inspection, remove some foreign objects like tools, test leads or bolts, instruments.**
   may result in short circuit or burn.
7. **When performing a maintenance, make a power-off of contactor and maintain it at the test position.**
   may result in electric shock.
8. **Do not move the contactor by handling main circuit bus terminals.**
   may result in an electric accidents by temperature increasing.
9. **When performing a maintenance, do not use unauthorized components and do not make any design alternation.**
   may result in bodily injury or damage to equipment.
10. **When insert or withdraw a contactor into a cradle, make use of handles for moving.**
    may result in electric shock by a charged power of control circuit.
11. **When the trip mechanism has operated, always replace all three uses in a three phase or two phase circuit even though only one or two are open circuited.**
    may result in explosion by the possibility of internal element's damage.

⚠ CAUTION

1. **Do not alter the control circuit at one's discretion.**
   may cause of malfunction or damage to products.

2. **The contactor must be stored in clean, dry, dust and condensation - free environment.**
   may cause a weakness of insulation.

3. **The products must be stored at the place with no corrosive gas.**
   may cause a damage of products. (discoloration)

4. **Apply power source and operate the contactor after checking the rated operating condition.**
   may cause of malfunction or damage to products.

5. **When moving the contactor, take care to avoid collisions with structures, other equipment, or a personnel.**
   may cause of malfunction by a breakage, a deformation and a bend of product.

6. **Do not perform any insulation test of power line.**
   may cause of malfunction or damage to products.
   - Continuous type : Terminal No.1,2,3,4
   - Latch type : Terminal No.2,4,5

Receiving & Unpacking, Service Conditions

Receiving & Unpacking

1. When unpacking the package, take care to handle the main contactor, standard components and accessories and certify standard component described in this manual (Lead wire for user : 1sets)
2. Certify that the instruction manual and a test report of final testing were packed inside each PVC envelop.
3. If damage or breakage of products are founded, immediately notify LSIS' sales office or service representatives.
4. If damage or breakage of products by the carrier are founded, immediately file a claim with the carrier and notify the shipping company.

Operating conditions(Indoor use)

1. Normal operating condition

   Design to IEC 62271-1, with the following limits values :

   ■ Ambient temperature

   * Maximum : +40℃ * Maximum 24 hour average : +35℃
   * Minimum : -5℃

   ■ Maximum site altitude : ≤ 1000 m above sea level.

   ■ Humidity

   * 24 hour average value : ≤ 95%
   * One month average value : ≤ 90%

2. Special operating conditions

   Special operating conditions are to be agreed on by the manufacturer and user.

   The manufacturer must be consulted in advance about each special operating conditions using at the following cases or places :

   ■ Higher level of site altitude or ambient temperature exceeding the normal conditions
   ■ At place much influence by sea wind
   ■ At a wet place with high humidity usually
   ■ At places with much water or oil vapors
   ■ At places with an explosive, flammable or noxious gas
   ■ At places with much dust
   ■ At places with abnormal vibration or impact
   ■ at places with much ice and snow
   ■ In case of using at other special conditions besides above cases

Moving, Storage and Disposal

Moving

⚠ WARNING

1. When performing a maintenance, make a power-off of contactor and maintain it at the test position.
may result in electric shock.

1. For lifting or moving the contactor, a specified lifting device should be used.

2. When lifting the withdraw type of contactor with a cradle, it should be raised at the state of running position.

Storage

⚠ CAUTION

1. The fuse must be stored in clean, dry, dust and condensation-free environment.
may cause a weakness of insulation.

2. The products must be stored at the place with no corrosive gas.
may cause a damage of products. (discoloration)

Disposal

⚠ CAUTION

1. When making a disposal, dispose it at a designated place with no affection to environment.
may cause an environmental pollution.

1. According to the ISO 14000, separate all of them as metallic or non-metallic material and dispose them at a designated place after dividing e all of material as renewable materials and other materials which may cause an environmental pollution.
2. In case of being materials whatever you want to remake please contact us.
3. In case of special materials making noxious gas when destroying by fire, be sure to dispose them at an approved place.

Installation

For safe and normal operation of contactor installed in switchgear, a very careful and special installation should be followed.

- When installing a fixed type of contactor into switchgear, fix the contactor with same torque value by passing through mounting holes (4-Ø8.5) after inserting spring washers into head of bolt without high pressure or alteration.
- Take care not to apply pressure or permanent tension by bus bars or others to main bus terminals.
- Remove dust or other foreign substances.
- When bolting, follow the recommended torque value specified in Table 1.

⚠ WARNING

1. **When making bolts and screw assembling, follow the instruction with recommended torque values.**
   may result in over heating or burns.
2. **Do not alter the control circuit at one's discretion.**
   may cause of malfunction or damage to products.

<Table 1> Torque value

Torque / Size of bolt	Steel (kgf • cm)	Brass (kgf • cm)
M 3	7.3 (6.2 - 8.4)	4.3 (3.7 - 4.9)
M 3.5	11.2 (9.5 - 12.9)	6.6 (5.6 -7.6)
M 4	16.8 (14.2 - 19.3)	9.8 (8.4 - 11.3)
M 5	33.0 (28 - 37)	19.1 (16.2 - 22.0)
M 6	56.0 (48 - 65)	33.0 (28 - 38)
M 8	135 (115 - 156)	89 (68 - 91)
M 10	270 (230 - 310)	159 (135 - 182)
M 12	470 (410 - 540)	270 (230 - 310)

Structure and Operation

1. Structure

The following figures describe the structure of LS Vacuum Contactors.
There are no hazards by touch to contactors since the operating device is located at side plate and the control circuit is at lower part, also high voltage parts are located inside and rear side of contactor.

고정형 Vacuum Contactor (Fixed type)

인출형 외형도 Vacuum Contactor (Withdrawal type)

Structure and Operation

2. Switching operation by a electromotion

(1) Operating mechanism

The operating mechanism has simple structure to provide long mechanical and electrical life. The operating magnetic movable core becomes as the operating shaft by a rotation center of cross-bar not using a link mechanism. So it provides a stable switching operation by this operating shaft which can make a switching with a proper pressure.

(2) Operating type

1) Continuously energized type
The stationary core pulls the movable core only when the control power is applied and it maintains a closed status of the contactor.
2) Instantaneously energized type(Latch Type)
The mechanical latch holds the armature of contactor closed against the magnet core is energized(closed) and control power is removed.

(3) Operating method

Perform the following procedure at no-load to verify the operation of contactor.

1) The contactor should be at the disconnecting position completely from the cradle.
2) Disconnect a plug of the control power source.
3) Press a manual trip button on the front of contactor and then verify that the contactor is at the open position. (only for the latch type)
4) It can not be operated to close when the contactor is positioned between the run position and the testing position.

a) Prior to the close operation

(1) Connect the plug of control power with the housing of control power on the front of contactor after verifying the contactor is at the disconnecting position.

b) The closing

(1) Apply the close signal.
(2) Verify that the switching indicator indicates "ON".
(3) Verify any change of auxiliary contacts.
(4) Verify any change of "a" of auxiliary switch when closing.

c) The tripping

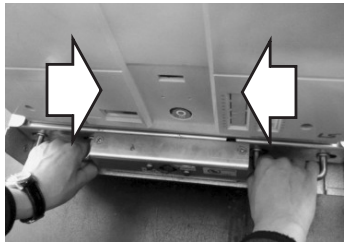
(1) Apply the trip signal.(Only for the latch type)
(2) Verify that the switching indicator indicates "OFF".
(3) Verify that the operating counter indicates one time of operation.
(4) Verify any change of "b" of auxiliary switch when tripping.

Structure and Operation

3. Withdrawal type operation (K/B)

TEST POSITION

Hold both knobs at the bottom of the contactor.



IN MOVING STATE

Pull the knob towards the inside and push them towards the front.

IN MOVING STATE

Mount the handle.

Structure and Operation

IN MOVING STATE

Turn the handle CW and move the contactor forward .(About 11 turns)

SERVICE POSITION

When it reaches the contact point the handle operates in idle and the contactor does not lead in anymore.

⚠ CAUTION

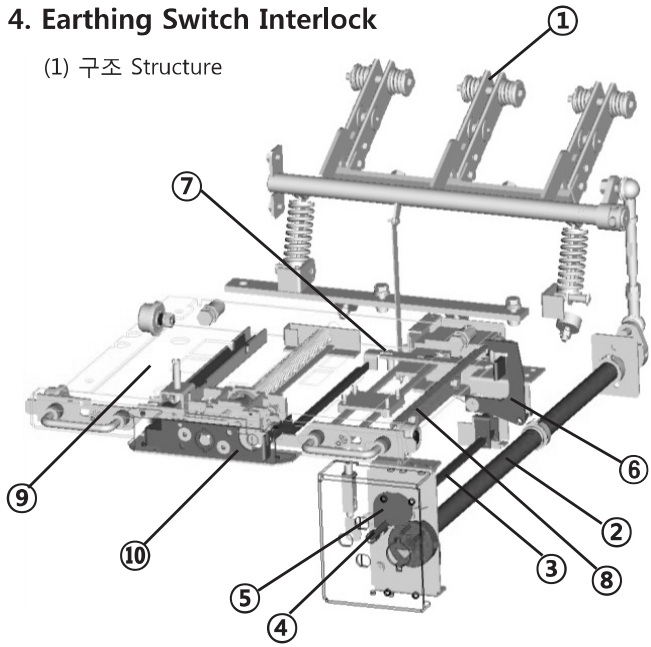
1. The contactor must be in OFF when leading in or out.

otherwise it causes malfunction or product damage.

Structure and Operation

4. Earthing Switch Interlock

(1) 구조 Structure



① Earthing S/W
② Operating shaft
③ Interlock shaft
④ Interlock lever
⑤ Blocking plate
⑥ Lock Plate
⑦ Earthing lever
⑧ Earthing interlock
⑨ Truck
⑩ Push Block Plate

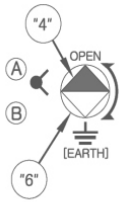
<Figure 11> Interlock structure for Earthing switch and Racking-in/out

1) Prevention of Racking-in/out operation in the closing state of the earthing switch
In order to close the earthing switch, the rotation of Interlock lever(Figure 11, No.4) in counter clockwise direction move Blocking plate(No.5). At that time, the insertion of the handle of earthing switch at the operating shaft(No. 2) can be possible.
After the handle is inserted into the operating shaft, if the handle in clockwise direction is rotated for closing of earthing switch, the Pin assembled in the operating shaft prevent the Interlock lever(No. 4) from returning. In the rotated state of the interlock lever, Lock plate(No. 6) pushes Earthing lever(No. 7) assembled in Truck(No. 9). At that time, the pushed Earthing lever prevents the racking-in/out handle from inserting the insertion hole. Therefore, Racking-in/out operation at the closing state of earthing switch cannot be carried out because the insertion of the handle is impossible.

2) Impossible of earthing switch's closing while Racking-in/out or at SERVICE position
During Racking-in/out operation or at the SERVICE Position, the handle of earthing switch can not be inserted at the insertion hole because Interlock lever and Blocking plate close the insertion hole of the earthing switch handle.

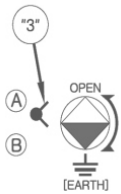
Structure and Operation

5. Instruction guide of Earthing switch and Keylocks



1) Earthing Switch

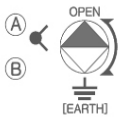
a. Earthing
When the VCS is either in the isolated or withdrawn position, rotate the lever("3") from CLOSE to OPEN position counter-clockwise.
Look at the indicator("4") that is located either OPEN or EARTH position
When the indicator("4") is the OPEN position, Insert the OP shaft("5") in the insertion("6"). Swing the OP shaft("5") to EARTH position clockwise then remove the OP shaft. The lever("3") can't be return to CLOSE position
When the Earthing switch is Earthed. Must not rack VCS in



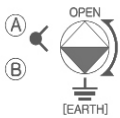
b. Opening
Look at the indicator("4") that is located either OPEN or EARTH position.
When the indicator("4") is the EARTH position, Insert the OP shaft("5") in the insertion("6"). Swing the OP shaft("5") to OPEN position counter-clockwise then remove the OP shaft. The lever("3") can be returned to CLOSE position.

2) Keylocks

a. LOCK with Earthing Switch OPEN
If you want to hold the Earthing switch is in the OPEN position, at first, rotate the lever("3") from OPEN to CLOSE position. Then rotate A-Key from UNLOCK to LOCK position clockwise and remove A-Key. You can't insert OP shaft("5") in the insertion("6")



b. LOCK with Earthing Switch EARTH
If you want to hold the Earthing switch is in the EARTH position, rotate B-Key from UNLOCK to LOCK position counter-clockwise and remove B-key. You can't insert OP shaft("5") in the insertion("6")



* Instruction of equipping with Locking Magnet
When the Earthing switch is equipped with Locking magnet, make sure the electric power is connected and active before operating the "OPENING" or "EARTHING"

Structure and Operation

6. Switching operation by manual

(1) Operating method

Perform the following procedure at no-load to verify the operation of contactor.

1) The contactor should be at the disconnecting position completely from the cradle.
2) Disconnect a plug of the control power source.
3) Press a manual trip button on the front of contactor and then verify that the contactor is at the open position (only for the latch type)
4) In case of magnetically held type, the contactor will be transferred to the trip status without an additional trip operation.
5) It can not be operated to close when the contactor is positioned between the run position and the testing position.
   (Mechanical and electrical interlocking status)

a) The closing

It can not be operated by manual because of a solenoid operating type.

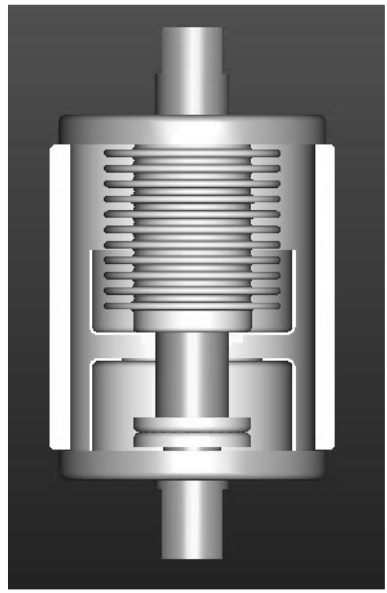
1) Continuously energized type
   The stationary core pulls the movable core only when the control power is applied and it maintains a closed status of the contactor.
2) Instantaneously energized type(Latch Type)
   The mechanical latch holds the armature of contactor closed against the magnet core is energized(closed) and control power is removed.

b) The triping

1) Apply the trip signal.(Only for the latch type)
2) Verify that the switching indicator indicates "OFF".
3) Verify that the operating counter indicates one time of operation.
4) Verify any change of "b" of auxiliary switch when tripping.

Structure and Operation

7. Vacuum Interrupter



V.I.

■ The vacuum interrupters has high insulation level with high vacuum integrity (approx. $5x10^{-5}$Torr) and the gaps of between a stationary contact and moving moving contact are 5~20mm according to the rated voltage.
Both contacts are designed to eliminate the arc easily and are made of special alloy in order to reduce the contact wearing by short circuit interruption and overload, or arc energy when switching.
And the complete insulation of internal part prevents from the deterioration of vacuum integrity.

Maintenance and Inspection

⚠ DANGER

1. **Do not make any touch to charged parts electrically like conductors, terminals and disconnects etc., under any of energized condition.**
   Will result in electric shock, severe bodily injury or electrocution.
2. **Before performing any maintenance or inspection, all supply voltage sources must be disconnected and then the equipment should be grounded.**
   Will result in electric shock, severe bodily injury or electrocution.

⚠ WARNING

1. **Only a qualified electrical workers with training and experience high voltage circuits should perform any operation, maintenance and inspection.**
   may result in malfunction, severe bodily injury or electric shock.
2. **When the contactor is in service, do not open the front cover.**
   may result in bodily injury or electric-shock.
3. **When the contactor is in service, do not insert or withdraw the contactor.**
   may result in bodily injury or electric-shock.
4. **Before performing any inspection or maintenance on this device, disconnect all sources of electric power and take every precautions to see that all connections are de-energized and grounded.**
   may result in severe bodily injury or electric shock.
5. **When making bolts and screw assembling, follow the instruction with recommended torque values**
   may result in over heating or burns.
6. **After performing installation, maintenance, inspection, remove some foreign objects like tools, test leads or bolts, instruments.**
   may result in short circuit or burn.
7. **When performing a maintenance, make a power-off of contactor and maintain it at the test position.**
   may result in electric shock.
8. **Do not move the contactor by handling main circuit bus terminals.**
   may result in an electric accidents by temperature increasing.

Maintenance and Inspection

⚠ DANGER

1. Do not alter the control circuit at one's discretion

may cause of malfunction or damage to products.

<Table 2> Period of maintenance and inspection

Item	Maintenance and inspection interval	
	Normal condition	Abnormal condition (dusty and wet places)
Usual inspection	6 months	1 month
Periodic inspection	6 months after an installation Once 1~2 years after that Once every 20000 switching operations	A periodic inspection
Special inspection	If necessary	If necessary

Maintenance and Inspection

1. Usual inspection

Make an inspection for the contactor on service between the periodic inspection. Be careful for not getting in touch with any energized parts when opening the door of switchgear.

<Table 3> Items of usual inspection

Inspection item	Inspection	Method	Corrective action
Switching indicator	Verifying a normal operation	Visual	Investigating the cause and repair
Control circuit	Verifying a connection of connectors	Visual	Investigating the cause and repair
Operating counter	Verifying a time of operation	Visual	Replace the contactor if exceeding 500,000 operations
Others	Verifying abnormal noise,smell	Visual	After disconnecting the main power, investigating and repair

2. Periodic inspection

<Table 4> Items of periodic inspection (1)

Inspection item		Inspection	Method	Corrective action	Interval
Operation and Equipment parts		Check abnormal assembling parts	Verify a smooth operation by visual or manual	Clean and grease Replace if necessary	Every a periodic inspection, Every 20000 operations
		Check parts to be lubricated			
		Check dust and foreign material			
		Check whether C-Rings, spring pins and divider pins are wrinkled or missed			
Control circuit	Wiring	Poor connection and/or loose wirings	Visual	Retighten any loose parts Replace if necessary	Every periodic inspection
	Closing, tripping device	Check component of movable parts. Check a discoloration of coil			
	Aux. Switch	Check links and contacts			

Maintenance and Inspection

Inspection item		Inspection	Method	Corrective action	Interval
Main circuit terminals		Check all connections Check the corrosion, discoloration	Visual	Check the torque, Replace if necessary	Every a periodic inspection
V.I	Vacuum interrupter	Check the vacuum density	Vacuum integrity Testing method. Check the withstand test	Replace V.I. if necessary	Every periodic inspection,
Aux. Dev ice	Switching Indictor	Check the normal operation	Visual	Check fixed bolts. Replace if necessary	Every 5000 operations
Insulation Resistance		Main circuit (Over 2000MΩ by 1000 Megger)	Megger	Clean it after finding the cause.	Every periodic inspection
		Control circuit(Over50MΩ by 500 Megger)	Megger	Replace if necessary	
Withstand voltage test		42kV/1min (Main circuit)	Test and check with a withstand voltage tester	Clean and replace if necessary	Every periodic inspection, every 20000 operations
Operating Characteristics test		Testing for trip/close Testing for trip-free Check the minimum of operating voltage	Perform the electrical testing after a manual operation test	Inspect and repair if finding a matter. Replace if necessary	Every periodic inspection, Every 1~2 years
Fuse clip parts		Check the over heating or looseness of connection	Visual	Replace fuse clips Retighten it after disjointing	Every periodic inspection,

<Table 5> Items of periodic inspection (2)

	Inspection item	Inspection	Method	Corrective action
Common components of the contactor	Insulated frame Insulated tube Heat shrinkable tube	Check condensation, humidity, stain, discoloration and damage	Visual Clean it, then measure the insulation resistance	Wipe it clearly with a dry cloth

Maintenance and Inspection

3. Special inspection

When finding a strange symptom during the operation or after short circuit interruption, make a special inspection as described in Table 6

<Table 6> Special inspection

NO	Inspection item	Method	Corrective action
1	Contact wearing of interrupters	Check the status of contact wearing guide line	Adjustment
2	When finding a strange symptom	Inspect damaged parts	Disjoint damaged parts and replace them
3	Replacement of terminals or internal parts	Check discoloration, fuse blown or a damage by arc	If finding any damaged parts, disjoint and replace them.
4	Fuse Clip	Check a damage, over heating, poor function, twist or looseness	If finding any damaged parts, disjoint and replace them

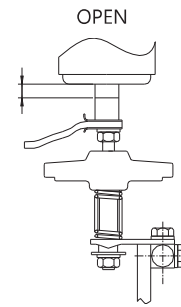
4. Measuring method of main contact wear

The guide Line of contact wearing can be verified easily at rear side of the contactor.

Method 1) Measuring a movable contact of vacuum interrupter
(CLOSE-OPEN STROKE : 6.0±0.25mm)

☞ Mark an indication line on a movable contact after closing the contactor, then measure it after opening the contactor

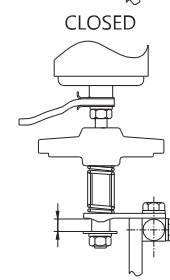
Standard : Within 5.75~6.25mm
(a method by using a GO-NO GUAGE)



Method 2) Measure the amount of wipe gap at closing position
(A wipe gap at closing : 2.75±0.25mm)

☞ A method of measuring after closing the contactor by inserting a GO-NO GUAGE

Standard : within 2.5~3.0mm
(If a GO-NO GUAGE can not be inserted, it should be replaced with new vacuum interrupters)



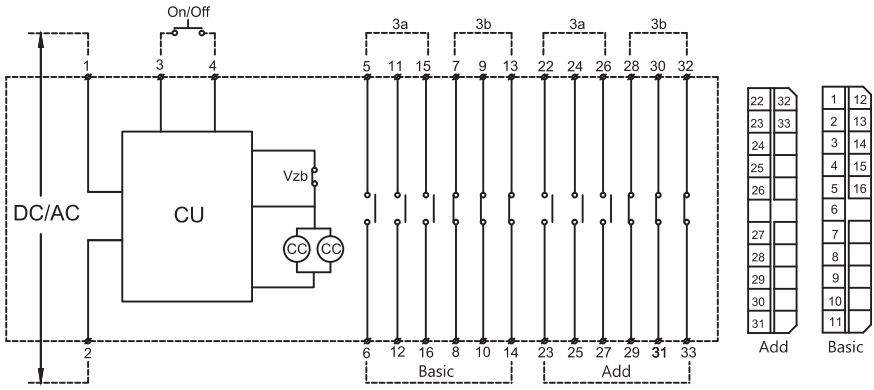
Ratings

The standard ratings and specification is as follows.(: IEC 62271-106)

Items \ Type		Fixed type (Z type)		Withdrawal type (K type)		Fused combination type (B type)	
Type Name		VC-12Z-44□ E		VC-12K-44□ E		VC-12B-44□ E	
Rated operating voltage (kV)		11		11		11	
Rated insulation voltage (kV)		12		12		12	
Rated current (A)		400					
Interrupting capacity(kA)		4					
Switching category		AC-4					
Rated short-time capacity (kA)	30 sec	2.4					
	4 sec	6.3					
Electrical life cycle		300,000					
Lightning & Switching Impulse Withstand Voltage(kV/1.2×50μs)		75kV					
Power Frequency Withstand Voltage(kV)		42kV-1min.					
Rated frequency(Hz)		50/60					
Operating type		E	L	E	L	E	L
Mechanical life expectancy(x10,000)		100	30	100	30	100	30
Control voltage(V)		Continuous : DC/AC 110V, 125V, 220V Instantaneous : DC 110V, 125V, 220V					
No. of Aux. Switch		3a3b	2a2b	2a2b		2a2b	
Max. Applicable Capacity	Motors (kW)	6,000					
	Transformers (kVA)	8,000					
	Capacitors (kVA)	4,000					
Weight (kg)		30		60		60	

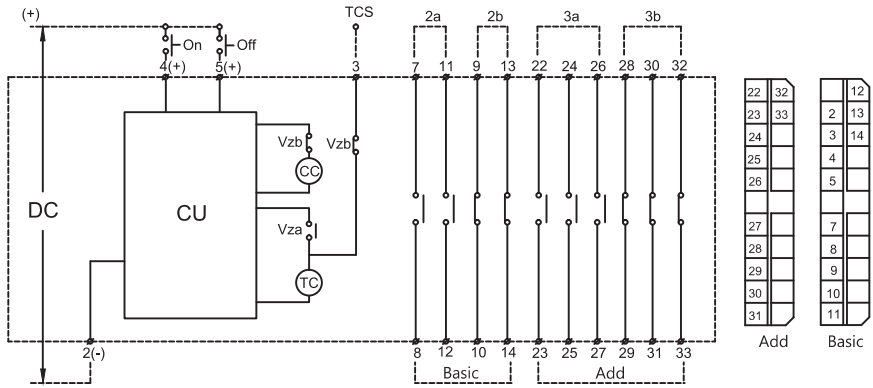
Control circuit

1-1. Fixed (3a3b) Continuously energized type DC/AC operation



Apply the power source at terminals of 1-2
Switch it using contacts of No.3-4 terminal
***Do not perform any insulation test of power line(Terminal No.1,2,3,4)**

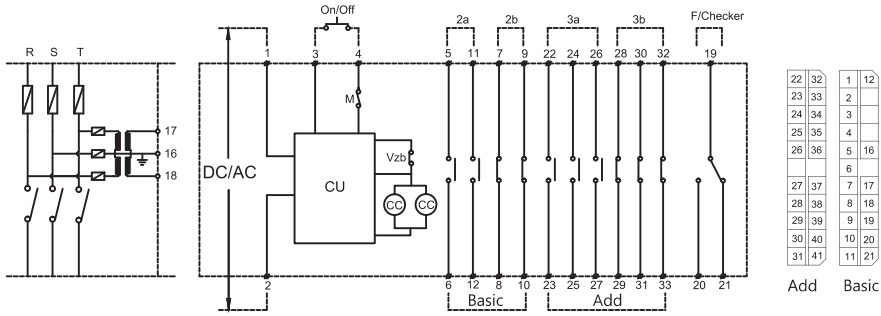
1-2. Fixed (2a2b) Latch type DC operation



When closing : Switch it using a contact of No. 4(+),2(-) terminal
When tripping: Switch it using a contact of No. 5(+),2(-) terminal
☞Contactor does not operate when reverse connected
***Do not perform any insulation test of power line(Terminal No.2,4,5)**

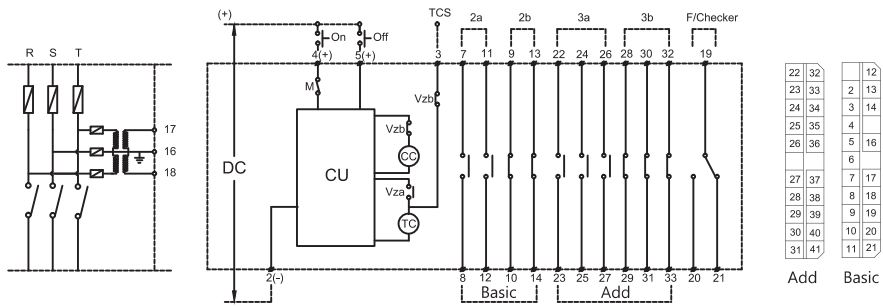
Control circuit

2-1. Withdrawal(2a2b)Continuously energized type DC/AC operation



Apply the power source at terminals of 1-2
Switch it using contacts of No.3-4 terminal
***Do not perform any insulation test of power line(Terminal No.1,2,3,4)**

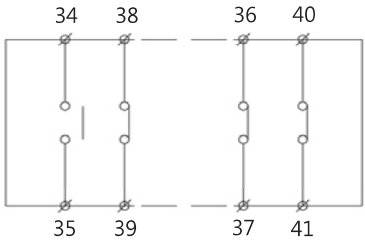
2-2. Withdrawal(2a2b) Latch type DC operation

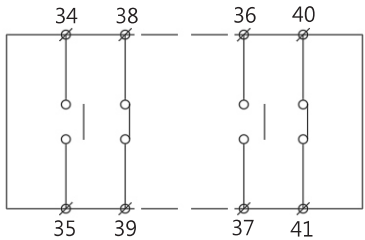


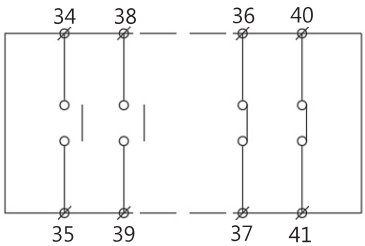
When closing : Switch it using a contact of No. 4(+),2(-) terminal
When tripping: Switch it using a contact of No. 5(+),2(-) terminal
☞Contactor does not operate when reverse connected
***Do not perform any insulation test of power line(Terminal No.2,4,5)**

Control circuit

2-3. Position Switch







Control circuit

3. Operating time and current of standard circuit

Type	Operating type	Control Voltage(V)	Closing current(A)/ Time(ms)	Trip current(A)/ Time(ms)	Holding Current(A)/ Time(ms)
VC-12-44-E/L	Continuously energized type「E」	DC/AC 110V	6/145	-	1.2/40
		DC/AC 125V	6/145	-	1.2/40
		DC/ AC 220V	6/145	-	1.2/40
	Latch type「L」	DC 110V	6/160	3/40	-
		DC 125V	6/160	3/40	-
		DC 220V	6/160	6/40	-

Warranty

Model Name			Buying Date	
Serial No.			Warranty Period	1years
Customer Information	Name			
	Address			
	Tel.			
Sales Office (Distributor)	Name			
	Address			
	Tel.			

- Product quality is strictly controlled and inspected.
- If he defective part is identified to have been properly used under the guarantee term, it will be repaired at our expense.
- The problems occur out of warranty term will be repaired at your expense.
- When applying for repair, please present this warranty.

■ **In-Warranty Repair – Under Guarantee Term**

■ **Out-of-Warranty Repair**

The guarantee will not be applied to any of the below listed conditions even if the term of guarantee is still valid.

- Defect caused by misusage or improper maintenance of customer
- Defect caused by improper repair or modification by unauthorized distributors or service center
- Damage caused by natural phenomenon such as earthquake, fire, flooding and lightning
- Claim guarantee without presented warranty form.

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Vacuum Circuit Breaker
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