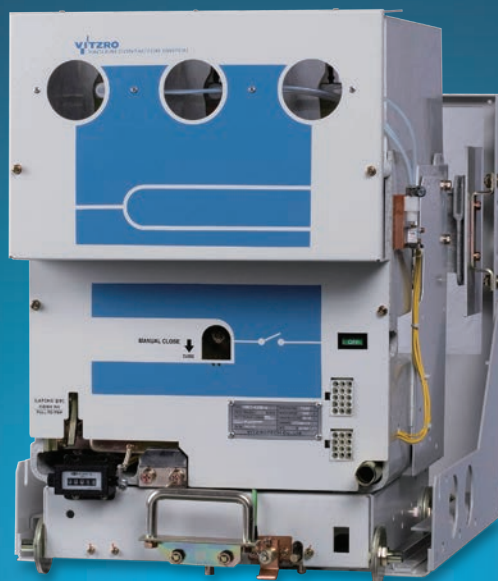


Vacuum Contactor Switch



Safety Cautions

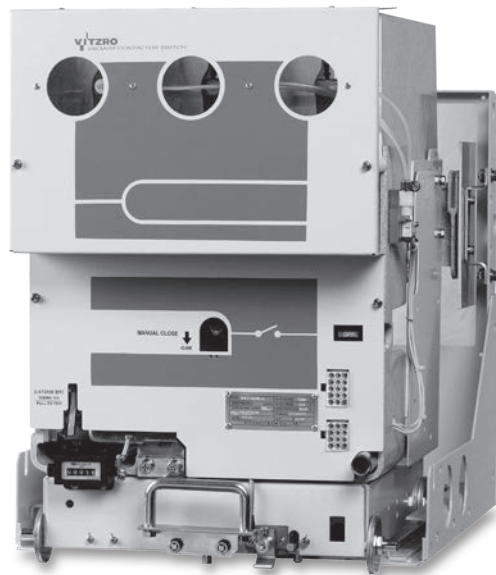
- To ensure safe operation, read and fully understand this instruction manual before using the Vacuum Contactor Switch.
- The product described herein is limited in terms of its intended use, conditions and location. Contact your dealer or our company for routine maintenance before using the product in the correct manner.
- Do not dismantle or repair the product arbitrarily for maintenance and repairs. Contact qualified personnel for maintenance.
- For safety, electrical work and electrical wiring should be performed by a certified professional only.

VITZRO EM

I N S T R U C T I O N M A N U A L

Vacuum Contactor Switch

Instruction Manual



VITZRO EM

Safety Precautions for Vacuum Circuit Breaker

Safety Precautions

Thank you very much for purchasing VITZRO EM's Vacuum Contactor Switch. This instruction manual details important safety information. Before handling the Vacuum Contactor Switch, you must read this instruction manual along with supplementary documents as well as other annexes to use the device properly. Be sure to understand all the information, precautions and safety knowledge pertaining to this product prior to using it. This instruction manual classifies safety precautions according to the degree of risk: [DANGER], [WARNING] and [CAUTION].

 **DANGER** An imminent risk capable of causing death or a critical harm when mishandled


 **WARNING** A potential risk capable of causing death or a critical harm when mishandled

 **CAUTION** A potential risk capable of causing a slight discomfort or injury when mishandled

◆ Precautions during transport


 **DANGER** When lifting with a lifter or a chain-block, do not go underneath the Vacuum Contactor Switch. The Vacuum Contactor Switch is heavy, and can cause loss of life when it falls.

◆ Precautions during installation (mounting, connecting)

 **CAUTION**

- Installation must be performed by the qualified personnel only (an electrical engineer or electrical technician).
- Be sure to open the Vacuum Contactor Switch and related products before installation in order to cut off the power supply. There is the risk of electric shock.
- Tighten each terminal bolt within the standard tightening torque. There is a fire hazard.
- Be sure to mount and anchor fixed contactor and drawout the skeleton on a flat, even surface. There is the risk of contactor conduction during drawout operation.
- Do not install this product in an environment subject to high temperatures high humidity, dust, corrosive gases, vibration, shock, etc. There is the risk of fire, non-trip, and malfunction.
- Prevent foreign objects (such as dust, concrete powder and iron powder) and rainwater from entering the contactor during installation. There is the risk of fire, non-trip, and malfunction.

◆ Precautions in operation


 **DANGER**

- Do not touch components that carry current, including the main circuit, control circuit and terminals. There is the risk of electric shock.
- Do not place the contactor in the drawout position. The Vacuum Contactor Switch is heavy, and can cause considerable risk when it falls.

 **CAUTION**

- In case of automatic contactor tripping, remove the cause first, and then input it. There is a fire hazard.

◆ Precautions in maintenance, inspection and parts replacement

 **CAUTION**

- Maintenance, inspection and parts replacement must be performed by a certified professional.
- Turn off the contactor, and be sure to check whether the control circuit is not charged before continuing. There is the risk of electric shock.
- Before internal inspection, check if the contractor is open. Fingers or tools may get into the machines and cause injury.
- Periodically increase the torque of mounting terminal bolts according to the standard mounting torque range. A loose connection may cause a fire.

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1. Overview

VITZRO EM's high-voltage Vacuum Contactor Switch (VCS) features outstanding dielectric strength and fast dielectric recovery of the vacuum cleaner, making it the most ideal, innovative contactor as it is smaller and lighter than a conventional contactor, yet performs better and lasts longer. This highly reliable product is well-suited to a switch for 3-phase induction motor of protection system, transformer and electric power condenser.

This contactor uses high voltage and requires special precautions. Above all, do not touch or impact the body because it carries a high-voltage current. It should be kept out of the reach of children and indicated with a danger sign or a restricted area post. To prevent an accident caused by negligence, this instruction manual must be delivered to the end-user who is required to read thoroughly and fully understand the manual prior to using it.

All parts are assembled according to the strict quality control with great care, and the complete product is only shipped after passing impartial inspections, but if any problem is found with parts or there is a defect in the product due to an accident during transportation or otherwise, please contact VITZRO EM or your nearest dealer.

2. Specifications and Ratings

Structure			Stand-alone Type								
			Fixed Type				Drawout Type				
Type	Continuous Excitation		KVP-322E	KVP-342E	KVP-625E	KVP-645E	KVPD-322E	KVPD-342E	KVPD-625E	KVPD-645E	
	Instantaneous Excitation		KVS-322E	KVS-342E	KVS-625Z	KVS-645E	KVSD-322E	KVSD-342E	KVSD-625E	KVSD-645E	
Rated Voltage		kV	3.3 / 3.6		6.6 / 7.2		3.3 / 3.6		6.6 / 7.2		
Rated Current		A	200	400	200	400	200	400	200	400	
Rated Frequency		Hz	50, 60				50, 60				
Short Circuit Breaking Current		kA	4				4				
Short Time Current	2 sec	kA	4				4				
	0.5 cycle	kA	40	50	40	50	40	50	40	50	
Withstand Voltage	Impulse	kV	*45		**60		*45		**60		
	Power Frequency	kV	10		20		10		20		
Life span	Mechanical	Continuous Excitation	10,000 times	250				250			
		Instantaneous Excitation	10,000 times	25				25			
	Electrical	10,000 times	25				25				
10,000 times	Closing Coil	V	DC, 24, 48/50, 100/100, 115/125, 200/220, 230/250, ***AC (Single Phase) 100/110, 200/220								
	Trip Coil (Instantaneous Excitation)	V	DC, 24, 48/50, 100/100, 115/125, 200/220, 230/250, ***AC (Single Phase) 100/110, 200/220								
Auxiliary Contactor			2a2b				2a2b				
Power Fuse	Rated Voltage	kV	-	-	-	-	-	-	-	-	
	Rated Current	A	-	-	-	-	-	-	-	-	
	Rated Breaking Current	kA	-				-				
Load Capacity	Motor	kW	750	1500	1500	3000	750	1500	1500	3000	
	Transformer	kVA	1000	2000	2000	4000	1000	1000	2000	4000	
	Condenser	kVAR	1000	2000		4000	1000	2000	2000	4000	
Weight	Continuous Excitation	kg	18	19	18	19	21	23	21	23	
Applied Drawout Unit Type							UVSDE-3-2	UVSDE-3-4	UVSDE-6-2	UVSDE-6-2	

- NOTE (1) Impulse withstand voltage between phases of in-terminal main circuit marked with * is 30kV.
(2) Impulse withstand voltage between phases of in-terminal main circuit marked with ** is 45kV.
(3) When the operating voltage (single phase AC) and *** are marked, the silicon rectifier can be installed on the VC.
(4) 2 operating and potential transformers can be installed on the drawout type VC and/or VC with power fuse mounted.
(5) The maximum weight refers to the weight of 2 operating transformers combined when the power Fuse is the maximum rated current.

Standard								Fixed Type with Mechanical Interlock Mounted			
Power Fuse not installed				Power Fuse installed							
KVN-322E	KVN-342E	KVN-625E	KVN-645E	KVN-322E-2	KVN-342E-2	KVN-625E-2	KVN-645E-2	KVPM-322E	KVPM-342E	KVPM-625E	KVPM-645E
KVR-322E	KVR-342E	KVR-625E	KVR-645E	KVR-322E-2	KVR-342E-2	KVR-625E-2	KVR-645E-2	KVSM-322E	KVSM-342E	KVSM-625E	KVSM-645E
3.3 / 3.6		6.6 / 7.2		3.3 / 3.6		6.6 / 7.2		3.3		6.6	
200	400	200	400	200	400	200	400	200	400	200	400
50, 60				50, 60				50, 60			
4				4				4			
4				4				4			
40	50	40	50	40	50	40	50	40	50	40	50
*45		**60		*45		**60		*45		**60	
10		20		10		20		10		20	
250				250				250			
25				25				25			
25				25				25			
DC, 24, 48/50, 100/100, 115/125, 200/220, 230/250, ***AC (Single Phase) 100/110, 200/220											
DC, 24, 48/50, 100/100, 115/125, 200/220, 230/250, ***AC (Single Phase) 100/110, 200/220											
2a2b				2a2b				2a2b			
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-				-				-			
750	1500	1500	3000	750	1500	1500	3000	750	1500	1500	3000
1000	2000	2000	4000	2000	1000	2000	4000	1000	2000	2000	4000
1000	2000	2000	4000	1000	2000	2000	4000	1000	2000	2000	4000
Max.44	Max.47	Max.52	Max.55	Max.56	Max.74	Max.68	Max.86	37	39	37	39
UVSE3-2	UVSE3-4	UVSE6-2	UVSE3-4	UVSE3-2	UVSE6-4	UVSE6-2	UVSE6-4	-			

- NOTE (1) Impulse withstand voltage between phases of in-terminal main circuit marked with * is 30kV.
(2) Impulse withstand voltage between phases of in-terminal main circuit marked with ** is 45kV.
(3) When the operating voltage (single phase AC) and *** are marked, the silicon rectifier can be installed on the VC.
(4) 2 operating and potential transformers can be installed on the drawout type VC and/or VC with power fuse mounted.
(5) The maximum weight refers to the weight of 2 operating transformers combined when the power Fuse is the maximum rated current.

3. Working Conditions



CAUTION

- Operate the contactor under normal working conditions. to do this will result in life shortening, failure, and malfunction.

The Vacuum Contactor Switch must be used in a location that meets the guidelines given below:

Normal working conditions		
Altitude	Less than 1,000m	
Ambient temperature	Highest	40°C
	Lowest	-25°C
Relative humidity	Less than 90%	

If the Vacuum Contactor Switch is not kept or operated under the normal conditions specified above, it may shorten its lifespan or result in a malfunction.

4. Standard Parts

• Fixed Type

- Manual charging handle: 1
- Fixed fitting: 2
- Control lead wire: 1 set (standard 1.5M)

• Drawout type

- Manual charging handle: 1
- Control lead wire: 1 set (standard 1.5M)

5. Transportation, Installation and Storage



DANGER

- When transporting the contactor, hand the rope on the frame of the contactor (hanger holes on both sides). Do not hang the rope on a barrier or interrupter. Use of an altered product can result in loss of life or a serious accident.
- Do not expose the product to water or rainwater during transportation.

5-1. Transportation

When unloading the Vacuum Contactor Switch from a cargo truck, be careful not to impact the contactor, and unload it slowly using a crane or forklift.

5-2. Moving




DANGER

- Check if the connection is firmly fixed using the lift when loading into one or two columns before installation. If the product falls, it can result in loss of life.

- 1) Lead the wire rope through the hanger holes on the upper part of the contactor when moving the Vacuum Contactor Switch and move it using a crane.
- 2) Be careful not to place a load on the barrier and conductor when moving the Vacuum Contactor Switch (in terms of rope positioning, etc).
- 3) Avoid steps or obstacles and use a flat road when moving the Vacuum Contactor Switch.

5-3. Storage

 CAUTION	<ul style="list-style-type: none"> - Keep the contactor in a flat, clean place with low humidity (indoor). - Avoid any place exposed to corrosive gas, dust, dampness, water and cement powder. - Cover the Vacuum Contactor Switch with a plastic sheet to help prevent dust from entering the contactor. - Do not use the contactor as a footrest or stool. - Do not place a heavy object on the product to avoid the interrupter from becoming bent.
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Once the contactor is delivered, install and operate it as soon as possible. If doing so is not possible, then keep the contactor by following the cautions stated above.

(Failure to do so can result in the risk of insulation performance degradation and discoloration of the conductor.)

5-4. Checkup Before/After Transportation

 CAUTION	<ul style="list-style-type: none"> - Check if the contactor complies with the given specifications and ratings, and there is any defect on exterior. There is the risk of failure, malfunction and loss of life.
--	--

- 1) Check if the contactor complies with the specifications and ratings specified herein.
- 2) Check if there is any defect, damage or bent part on the outside of the contactor, and check for loosening or missing bolts on the conductor and ground contact part.
- 3) Check the quantity of spare parts and whether they have defects.
- 4) Remove dust and foreign substances with a clean, dry cloth.

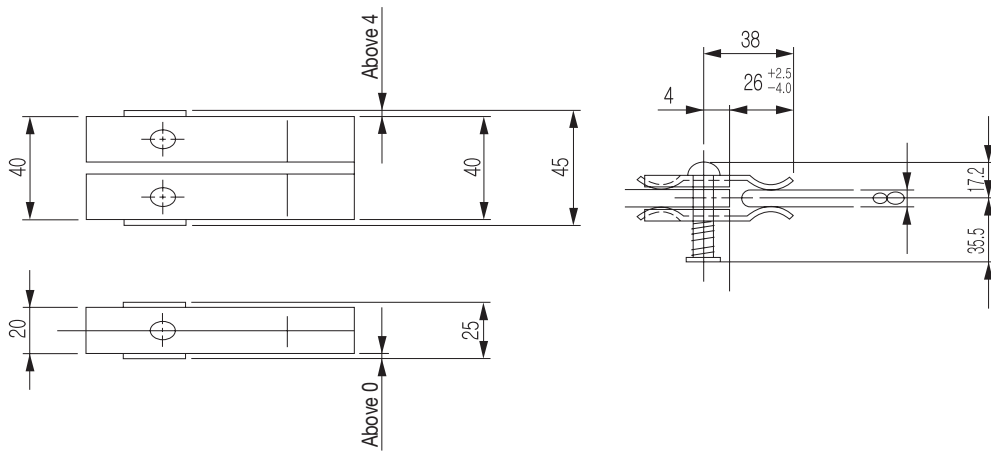
6. Installation

6-1. Fixed Type

- 1) Keep the surface levelled and, if needed, put a liner to adjust the tilt to less than 1.0mm.
(Tilt on the surface causes malfunction in VCS.)
- 2) Install in a place away from dust, dampness, vibe and impact, and in a place where maintenance can be performed easily.

6-2. Drawout Type

- 1) Mount the drawout unit in a horizontal position. If it is not level, put liner to adjust the tilt to less than 1.0mm.
- 2) When installing the rail at the bottom of the switchboard, keep the distance between the wheel and the rail to $\pm 0.5\text{mm}$.
- 3) Check whether the electrical/mechanical interlock works smoothly when inserting and drawing out the contactor.
- 4) Check the connection of the main circuit breaker.



[Figure 1]

7. Wiring

- 1) Be cautious about the current capacity of the main circuit wire and use a wire that can tolerate a rise in temperature when continuously sending a rated current.
- 2) Install the cable supporter in such a way as to minimize the pressure applied to the terminal on the contactor when wiring the main circuit T.B terminal. Also, check bolts and other connection parts.
- 3) See the internal connection diagram of the control circuit to avoid a mistake when connecting the terminals.
- 4) Be sure to connect the body of the contactor to the ground.

8. Preparation for Operation

Once the Vacuum Contactor Switch is installed and wired, check the following:



CAUTION

- Check whether the contactor is properly wired and installed before operating it. There is the risk of failure and malfunction.

8-1. Checkup Before Operation

- 1) Move the moving core of the electromagnet slowly and check that it works smoothly.
(Use the wrench on the main shaft, and the manual closing handle for the latch mechanism to facilitate moving.)
- 2) Check for any defect by operating the contactor manually and electrically several times.
- 3) Check insulation resistance. As insulation resistance changes depending on the weather or ambient conditions, dry the main circuit and control circuit in such a way that the coil does not get damaged when the main circuit is less than $5M\Omega$ with 1000V mega and the control circuit is less than $1MM\Omega$ with 500 V mega.
- 4) Check that the proactive cover is attached on the front because the contactor is of a very small size, and the charging part is placed close to the operator.
- 5) Check whether the wiring is completed correctly and whether any part has become disconnected.
- 6) Check whether the Vacuum Contactor Switch is installed in a horizontal position.
- 7) Check the active state of the interlock of Vacuum Contactor Switch as well as connection of the main circuit terminal and the ground terminal.
- 8) Check if Vacuum Contactor Switch is tripped.

9. Structure and Operation



- Do not put your hands or head into the control box when turning the contactor on and off. There is the risk of loss of life.
- Do not touch the contactor because there is the risk of electric shock when electrically opening/closing the contactor.

The Vacuum Contactor Switch is classified into continuous excitation with closing/holding solenoid and latch type with closing/trip solenoid, and otherwise into AC and DC depending on the operating power. Overall, it is built on an insulated frame with operating and control units and other accessories mounted. The fixed type has a high-voltage main circuit with the interrupter on the lower part whereas the drawout type has a cradle equipped with interlock and earth at the bottom, and both have a high-value main circuit along with the interrupter on the upper part.

9-1. Operating Unit

The switching unit as shown in the figure is designed to have a compact structure in which electromagnetic force created from solenoid⑩ is connected to flange⑪, main shaft⑨ and operating lever⑧ to transfer kinetic energy to the interrupter③, and it is highly unlikely cause failure and at the same time, it has a semi-permanent lifespan.

9-2. Switchgear Operating Mechanism

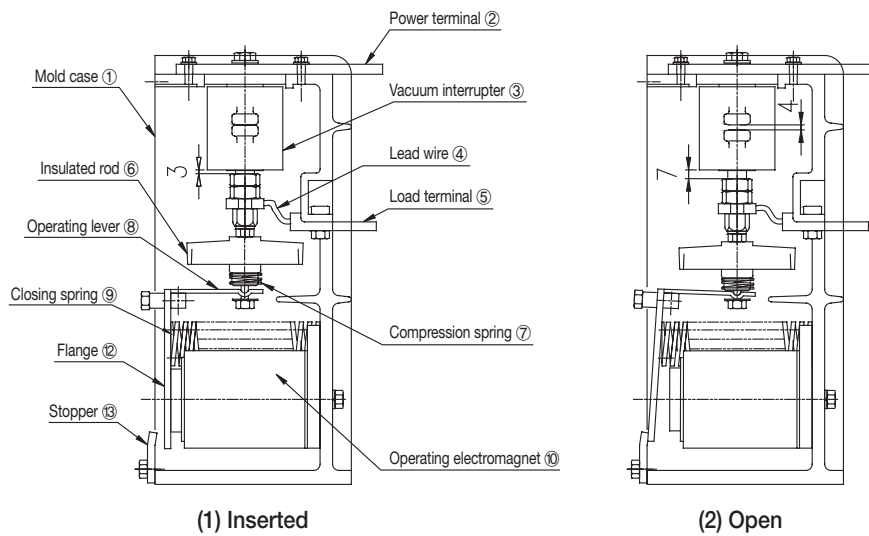
The control unit as shown in [Figure 2] is equipped with solenoid coil⑩ that controls the flange⑪, auxiliary switch for connection with external circuit, connector and extra rectifier for alternating operation, and it can use both AC and DC, ranging from 24V to 250V.

9-3. Latch Mechanism (latch type)

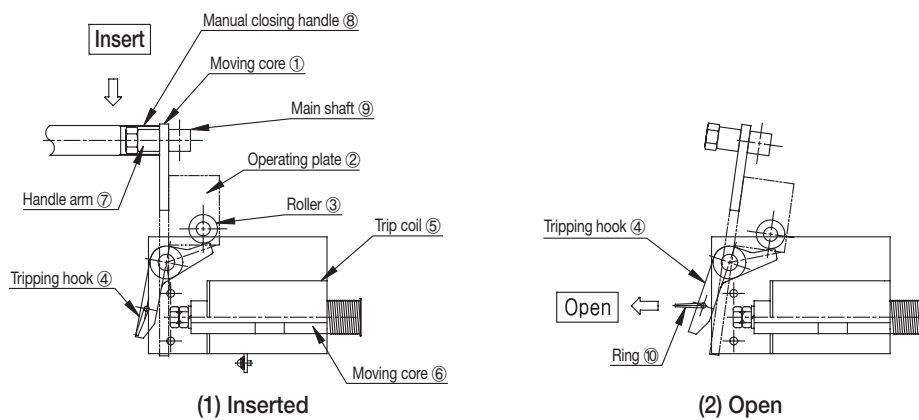
Given the close command, absorption by excitation of the closing coil rotates the moving core^①, operating plate^② and roller^③ around the main shaft, so that the roller is locked to the tripping hook^④ mounted on the mold case with closing energy to maintain mechanical level. Afterwards, the closing coil is demagnetized by the time-delay contact.

Given the trip command, the electromagnetic force created by excitation of the trip coil rotates the tripping hook^④ clockwise to overturn the closed condition locked to roller^③ and hook^④. by doing so, it triggers tripping.

For manual operation, insert the manual handle^⑧ into the handle arm^⑦ and press it down lightly to close, and pull the ring^⑩ mounted on the forefront of the tripping hook to open.



[Figure 2] Open/closing mechanism



[Figure 3] Latch mechanism

9-4. Power Fuse (when the power fuse is installed)


Vacuum Contactor Switch uses a light, small-sized Type M power fuse with large interrupting capacity (7.2kV/3.6kV, 40kA) designed primarily to protect the motor circuit in compliance with JEC-201.

It quickly cuts off a large fault current within 0.5 cycles and protects circuit devices and cables.

It prevents a fault current from spreading across the power and other systems.

If the power fuse is blown by fault current, the pilot-wire in the fuse box is melted and pushes the strike-pin outward to indicate fuse-blown, while the fuse melting detector (designated part) attached on top performs phase protection according to the fuse-melting indication contact.

9-5. Drawout Mechanism (drawout type)

 CAUTION	<ul style="list-style-type: none">- Mount and anchor the contactor on a flat, even surface. There is the risk of conduction when the contactor is drawn out.- Insert the contactor properly. Otherwise, it can be slipped out and cause loss of life.- Make sure to open the contactor (green on the on/off indicator) before inserting/withdrawing. Too much of pressure can damage the contactor.
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The drawout type is composed of the rod interlock attached on the contactor and the interlock plate^② on the switchboard as shown in Figure 4.

The handle^③ (connected to the rod interlock) on the front of the contactor is used to perform inserting and withdrawing of the contactor.

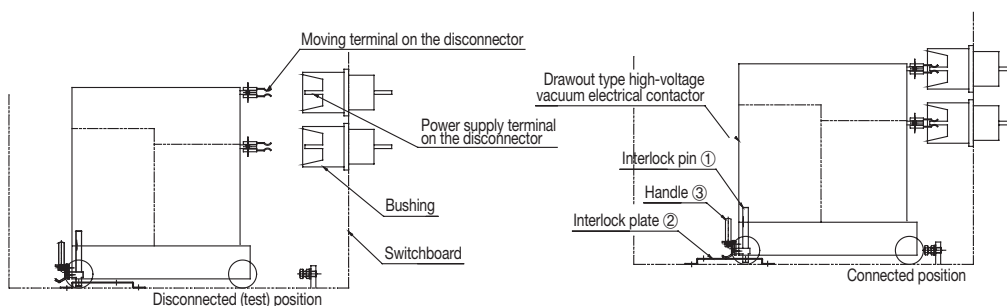
The main circuit is closed automatically, and the interlock at the bottom of the drawout type is attached for safe operation.

1) When the contactor is closed, it cannot be connected to panel (mechanical).

2) Without unlocking the mechanical interlock on open position (test) and closed position (run), the contactor cannot be drawn out.

3) The contactor cannot be inserted between disconnected position (test) and closed position (run) (mechanical, electrical).

4) The contactor cannot be drawn out of the panel at the closed position, and it must come to a stop at the disconnected position (test).



[Figure 4] Inserting/withdrawing mechanism diagram

1) Contactor inserting/withdrawing

(1) Inserting into the unit

Put VCS on the unit, lift up the interlock handle and push it into TEST POSITION HOLE (test position). When the rod interlock is put into the hole and locked, it indicates that the interlock has reached the test position.

(At this position, VCS is not connected to the primary main circuit and, you can test the ON/OFF of VCS.)

(2) Insert the connection terminal into the connector housing at the lower right-hand corner of VCS front.

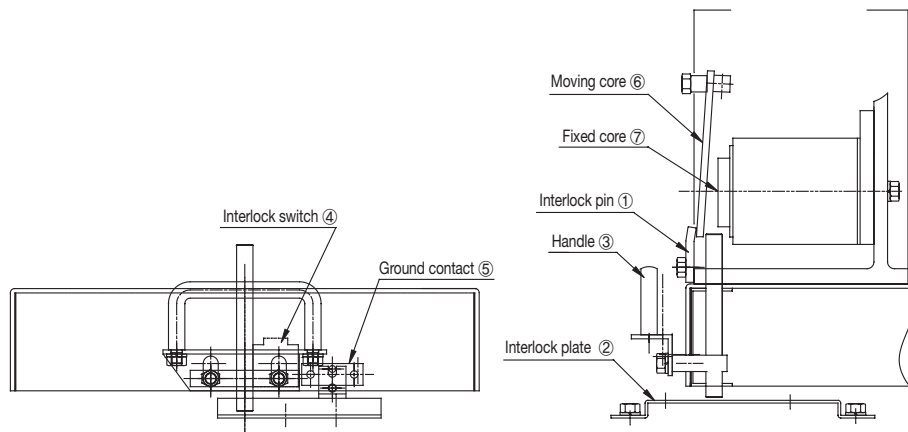
(3) Test 2-3 times to check that VCS can be turned on/off, and the connector is well connected.

(4) Pull the tripping hook of inserted VCS to the connection position (for continuous excitation, turn the power off first), check whether VCS is in the open condition and then, lift up the interlock handle, unlock the disconnection hole and push VCS until the rod interlock is locked onto the connection hole. This is the connection position.

(At this position, VCS is connected to the primary main circuit.)

(5) At the disconnection position, lift up the handle, unlock the pin from the connection hole and pull it towards until the pin reaches and is locked onto the disconnection hole. This is the test position.

*Note: when VCS is inserted, the handle③ will not be lifted. In this case, check VCS again.



[Figure 5] Interlock mechanism diagram

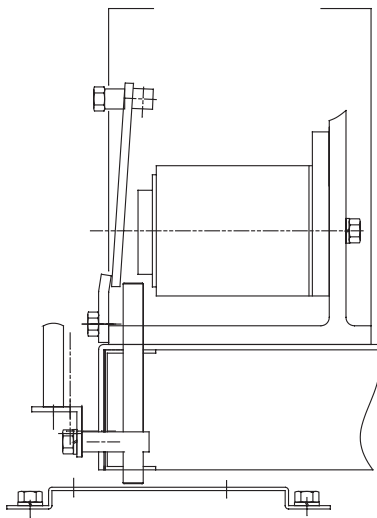
2) Contactor withdrawing

(1) Lift the handle (lift the rod interlock from the interlock plate) and pull the contactor until it stops at the disconnection (test) position. When the contactor is inserted, the rod interlock cannot be withdrawn from the interlock plate. In this case, check VCS again.

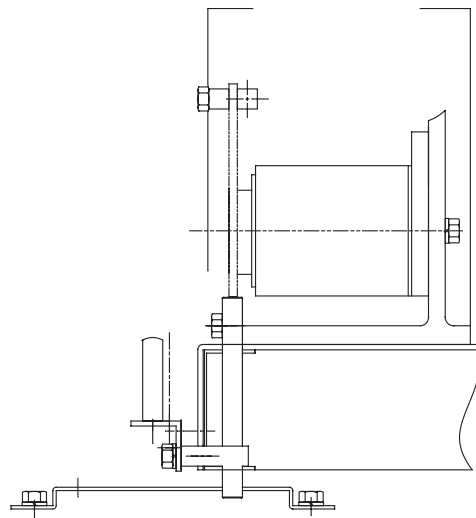
(2) To withdraw the contactor from the panel, pull out the connector of the control circuit when the contactor is at the disconnection (test) position.

(3) Set the auxiliary rail of the lifter at the position of the rail on the panel.

(4) Hold up the handle③ and pull it towards to withdraw the contactor from the panel.



(1) Moving from the disconnection position to the connection position



(2) Connection position (inserted)

[Figure 6] Interlock mechanism diagram

10. Maintenance and Checkup



CAUTION

- Maintenance and checkup must be performed by the contactor user or qualified professional.
- If any problem found during maintenance and checkup, please contact VITZRO EM or your dealer for A/S.

The regular inspection interval is stated herein, by default. The exact interval may vary depending on the installation site and the frequency of open/closing. Inspect all the items after a year of operation and, on the basis of this inspection, determine an appropriate inspection and maintenance interval. It is recommended to determine the interval based on working conditions, such as environment, load current and frequency of use. Do not dismantle each part. If repairs are needed, see guidelines and dismantle as little as possible. It is recommended to perform a no-load operation test to check the state of the operating parts before/after the inspection.

Object	Items	Standard Interval	Check Procedure
Contactor overall	Insulation	3 years	Wipe out dirt and moist on the surface with a dry cloth
	Overall	6 years	Check if the exterior is damaged (if a part has been badly damaged, replace it with a spare or contact the dealer).
Power Fuse (only when it is installed)	Fuse box	3 years or fault current is cut off	<ul style="list-style-type: none"> - Check if the strike-pin at the front side of the fuse box is out (if the fuse is blown, a red-colored pin will pop out about 10mm). - If the fuse is blown, replace it with a spare. In this case, it is recommended to replace fuses for all three phases.
	Fuse melting detector	3 years	<ul style="list-style-type: none"> - Check if the fuse-melting indication contact works. - Check if the fuse melting detector works fine.
	Fuse terminal plate	6 years	<ul style="list-style-type: none"> - Check for any discoloration caused by the heated fuse terminal plate, loosened bolt and missing spring washer.
Vacuum interrupter	Contact wear	6 years or per 50,000 cycles	<ul style="list-style-type: none"> - Measure the contact wear with a gauge and if the measured result is less than 2mm, it can be used. - If the measured result is more than 2mm, it means that the contact erosion is expired and it needs to be replaced. In this case, it is recommended to replace vacuum interrupters for all three phases.
	Vacuum pressure	6 years or if there is the risk of breakdown due to certain causes	<ul style="list-style-type: none"> - Use the vacuum checker while it is in the open condition, or measure the internal pressure between circuit breakers. For 3.3KV, AC 10KV in one minute; for 6.6KV, AC 16KV in one minute - If flashover does not occur during the withstanding voltage test, it means the vacuum pressure is good.
	Conductive-part of the main circuit	6 years	<ul style="list-style-type: none"> - After prolonged use, bolts mounted can be loosened and, washer and spring washer can be damaged due to vibrate or other causes. Therefore, check the following: <ul style="list-style-type: none"> (a) parts that tighten power and load terminals (b) parts that tighten the vacuum interrupter fixture (c) parts that tighten moving core and lead wire of the vacuum interrupter
Opening/closing (switch) mechanism	Main shaft and bearing	6 years	<ul style="list-style-type: none"> - Add 2-3 drops of mineral oil (JISK2213 Type 2 turbine oil or equivalent) to the bearing.
	Weld spring	6 years	<ul style="list-style-type: none"> - Check for deformation, damage and rust. (If there is serious deformation, damage and rust, replace with a spare. Failure to do this can cause the vacuum interrupter to become overheated or melt.)

Object	Items	Standard Interval	Check Procedure
Operating electromagnet	Core	6 years	- Check for loosened bolts that tighten moving core, fixed core and stopper, and if the spring washer is damaged or missing.
	Closing coil	3 years	- Check for loosened wire, verdigris and broken lead wire. - Check the rated voltage of the coil. It should work fine in the ideal state (unloaded) with the rated voltage between 85% and 110%.
	Closing spring	6 years	- Check for deformation, scratch and rust. (If there is serious deformation, damage and rust, replace with a spare. Otherwise, it can cause malfunction.)
Latch mechanism (for latch type)	Hook and roller	6 years	- Check if the surface of hook and roller is damaged and rusty. (Remove any rust with sandpaper) - Grease the roller (lithium-grease). - The gap between the roller and the hook should be between 0.2mm and 0.5mm in the closed condition.
	Trip coil melting detector	3 years	- Check for any loosened wire, verdigris and broken lead wire. - Check the rated voltage. It should be able to trip (open) at less than 75% of the rated voltage.
Auxiliary switch, special B auxiliary switch	Contactors	3 years	- Check for any roughness and damage to the contact according to the contact resistance. (The contact resistance should be less than 200M Ω)
	Wiring	3 years	- Check for any loosened wire, rust and broken lead wire.
Drawout mechanism (for drawout type)	Conductive-part of the main circuit	6 years	- Check for any roughness to the contact and, if its color has been changed due to overheating. - Check if it moves smoothly (connection-disconnection)
	Interlock	6 years	- Check if the interlock works smoothly - Check if it moves smoothly (connection-disconnection)
Insulation resistance	Main circuit	3 years	- Insulation resistance between line-earth (phases), breakers and electrodes should be above 5 M Ω at 1000V mega. If it is less than 5 M Ω , look into the cause.
	Control circuit	3 years	- Insulation resistance between the control line (3 phases) and the earth should be above 1 M Ω at 500V mega. If it is less than 1 M Ω , look into the cause.

11. Parts Replacement



CAUTION

- Read and fully understand the following before replacing the parts.
- Make sure that you use the genuine parts or the qualified parts.
- If there is any problem during replacement, please contact VITZRO EM or the dealer.

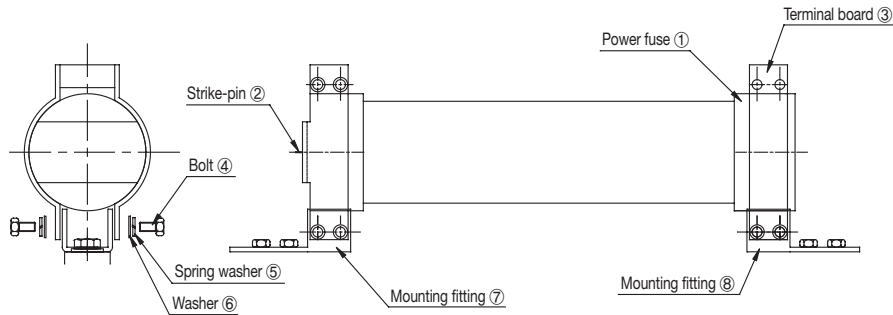
11-1. Power Fuse Installed

1) Dismantlement

- (1) Release the bolt④, spring washer⑤ and washer⑥ that together tighten the power fuse①.
- (2) Take off the power fuse.

2) Installation

- (1) Check the rated current of the power fuse.
- (2) Place the power fuse in a way that the strike-pin faces towards the contactor.
- (3) Fasten the power fuse③ terminal board and the mounting fittings⑦⑧ with bolt, spring washer and washer.



[Figure 7]

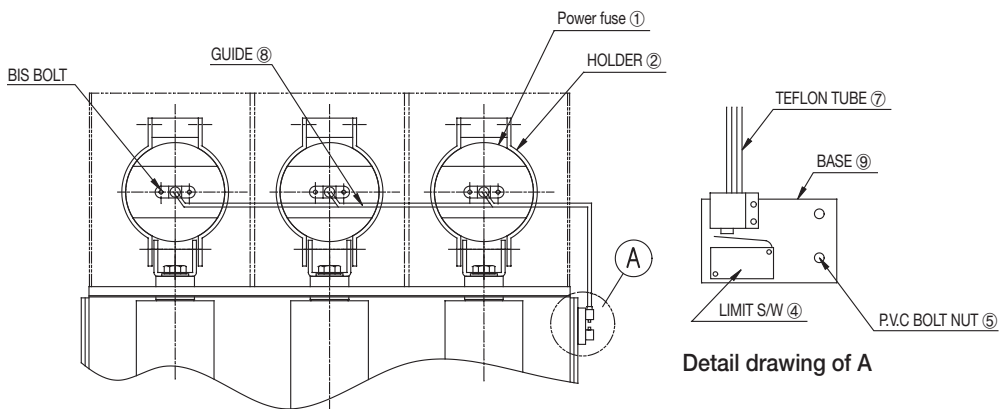
11-2. Fuse melting detector (both power fuse and fuse melting detector installed)

1) Dismantlement

- (1) Place 6 BIS bolts③ side to side, and pull 3 sets of the guide⑧.
- (2) Once P.V.C bolt and nut⑤ that fix the base⑨ on the insulation barrier are loosened, the whole 1 set will be dismantled.
- (2) Be careful not to lose or damage these parts because they are reusable.
- (3) Take off the power fuse① according to 11-1, 1).

2) Installation and adjustment

- (1) Install the power fuse according to 11-1, 2). In this case, the screw that fixes the front cover of the power fuse should be on a level with three phases.
- (2) Mount the guide^⑧ and the base^⑨ on the holder^② and the insulation barrier using bolt^③ and P.V.C bolt^⑤.
- (3) Check if the Teflon rod^⑥ works smoothly.
- (4) Check the limit switch^④ on the right side of the insulation barrier as follows:
It should be able to turn on/off the limit switch using a 9mm or shorter stroke, when the pin on the inside of the holder^② is pressed with the jig for fuse detection.



[Figure 7]

11-3. Vacuum interrupter

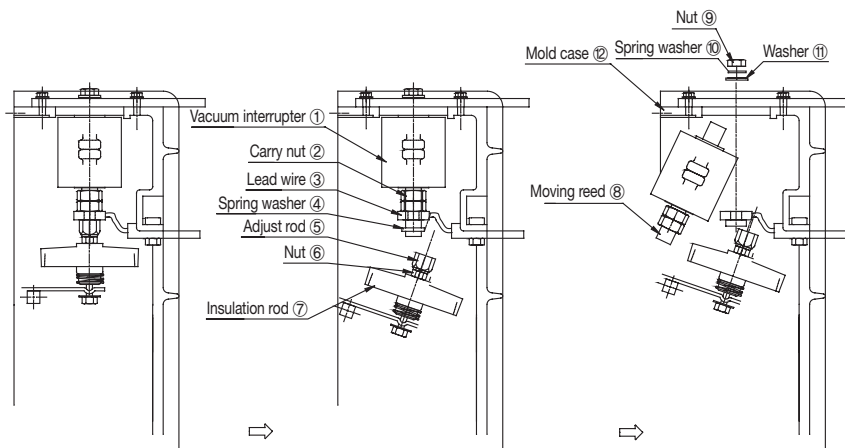
Prepare a gap-gauge, one of the standard parts of the contactor.

1) Dismantlement

- (1) Fix the adjust rod^⑤ using the spanner and loosen the nut fixing the insulation rod^⑪.
- (2) Fix the current carrying nut^② using the spanner while loosening the adjust nut to dismantle the moving reed^⑧ and control rod screw from the vacuum interrupter^①.
- (3) Dismantle the spring washer^④ and the lead wire^③ from the moving lead of the vacuum interrupter.
- (4) Loosen the nut^⑨ that fixes the vacuum interrupter, spring washer^⑩ and washer^⑪. Hold the vacuum interrupter with your left hand to prevent it from rotating.
(For 3.3/6.6KV 400A, there are bolts, spring washers, and washers.)
- (5) Tilt the vacuum interrupter^① and take it out from the contactor.

2) Installation and adjustment

- (1) Since the carry nut^② is attached on the vacuum interrupter^①, the gauge should be able to go 3mm deep into the gap between flange on the vacuum interrupter and the carry nut.
- (2) Place the vacuum interrupter on the mold case^⑫ in a way that its nameplate faces front and fasten it with screw^⑨, spring washer^⑩ and washer^⑪. In this case, hold the vacuum interrupter with your left hand to prevent it from rotating.
- (3) Put the lead wire and the spring washer into the vacuum interrupter's moving reed^⑧.
- (4) Screw down the adjust rod^⑤ into the vacuum interrupter's moving reed^⑧ as tightly as possible.
- (5) Fix the carry nut^② with the spanner and tighten up the adjust rod^⑤. Adjust the direction in which the lead wire does not screw and while doing so, make sure that the spanner stays still.
- (6) Measure the gap using the gap-gauge. The gap between flange on the vacuum interrupter and the carry nut^② should be 7mm in depth.
- (7) If the depth of the gap is less than 7mm, rotate the insulation rod^⑦ anti-clockwise and if it is larger than 7mm, rotate clockwise.
- (8) Once the depth of the gap is set to 7mm, hold the insulation rod with your hands and fasten it with the nut.
- (9) Fix the insulation rod with the spanner and tighten up the nut.
- (10) Switch the contactor 2-3 times manually and check if the gap is measured to 3mm in depth. Also, check that the gap is measured to 7mm while the contactor is being tripped.



[Figure 9] Vacuum interrupter dismantlement diagram

11-4. Closing coil

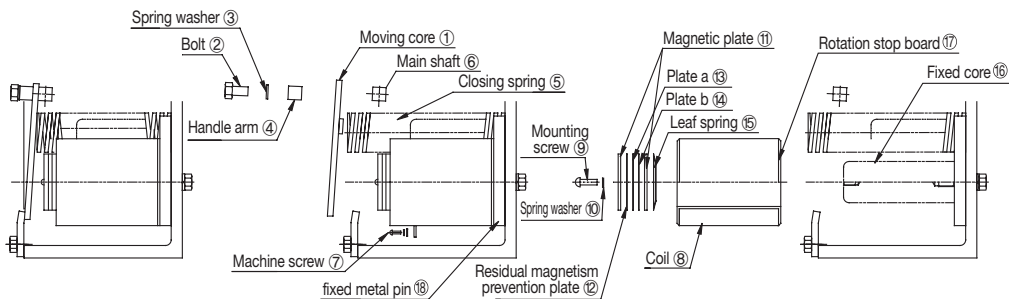
The continuous excitation type has both closing and input coils, whereas the latch type has only the closing coil (on the right side of the façade).

1) Dismantlement

- (1) Disassemble the bolt^②, the spring washer^③ and the handle arm^④ (for manual closing handle on the right-front) and then, take off the moving core^①. Press the moving core towards the main shaft^⑥ to loosen the bolt^②, since the moving core is pressed down by the closing spring^⑤.
- (2) Loosen machine screw^⑦ and take off the coil^⑧.
- (3) Dismantle the screw attached to the fixed core, the spring washer and then the magnetic plate^⑪, the residual magnetism prevention plate^⑫, plate A^⑬, plate B^⑭ and the leaf spring^⑮ in order. (There are one residual magnetism prevention plate^⑫ and plate A^⑬ on the left-front, and two of plate B^⑭ on the right side. The latch type has two of plate B^⑭, one on each side.)
- (4) Draw the coil out of the fixed core^⑯ ⑰.

2) Installation and adjustment

- (1) Check the rating of the coil, and on which side it should be installed.
(For the continuous excitation, input coil on the left side and closing coil on the right; for the latch type, closing coil on the right side)
- (2) Put the fixed core in the coil. Note that the coil bobbin holding the stopper is the inside. Stick the stopper in the guide hole of the core frame, and stop the rotation of the coil.
- (3) Spread the magnetic plate^⑪, the residual magnetism prevention plate^⑫, plate A^⑬, plate B^⑭ and the leaf spring^⑮, and attach them on the coil in order using the mounting screw^⑨ and the spring washer^⑩.
- (4) Wire the coil.
- (5) Fix the bolt^②, the spring washer^③ and the handle arm^④ (on the right side) in order. Press the moving core towards the main shaft^⑥ to tighten the bolt^②, since the force is applied by the closing spring^⑤.



[Figure 10] Closing and input coil dismantlement diagram

- (6) Check if the moving core is parallel to the operating lever on the main shaft, and the head of the screw that holds the fixed core is placed at the center of the moving core.

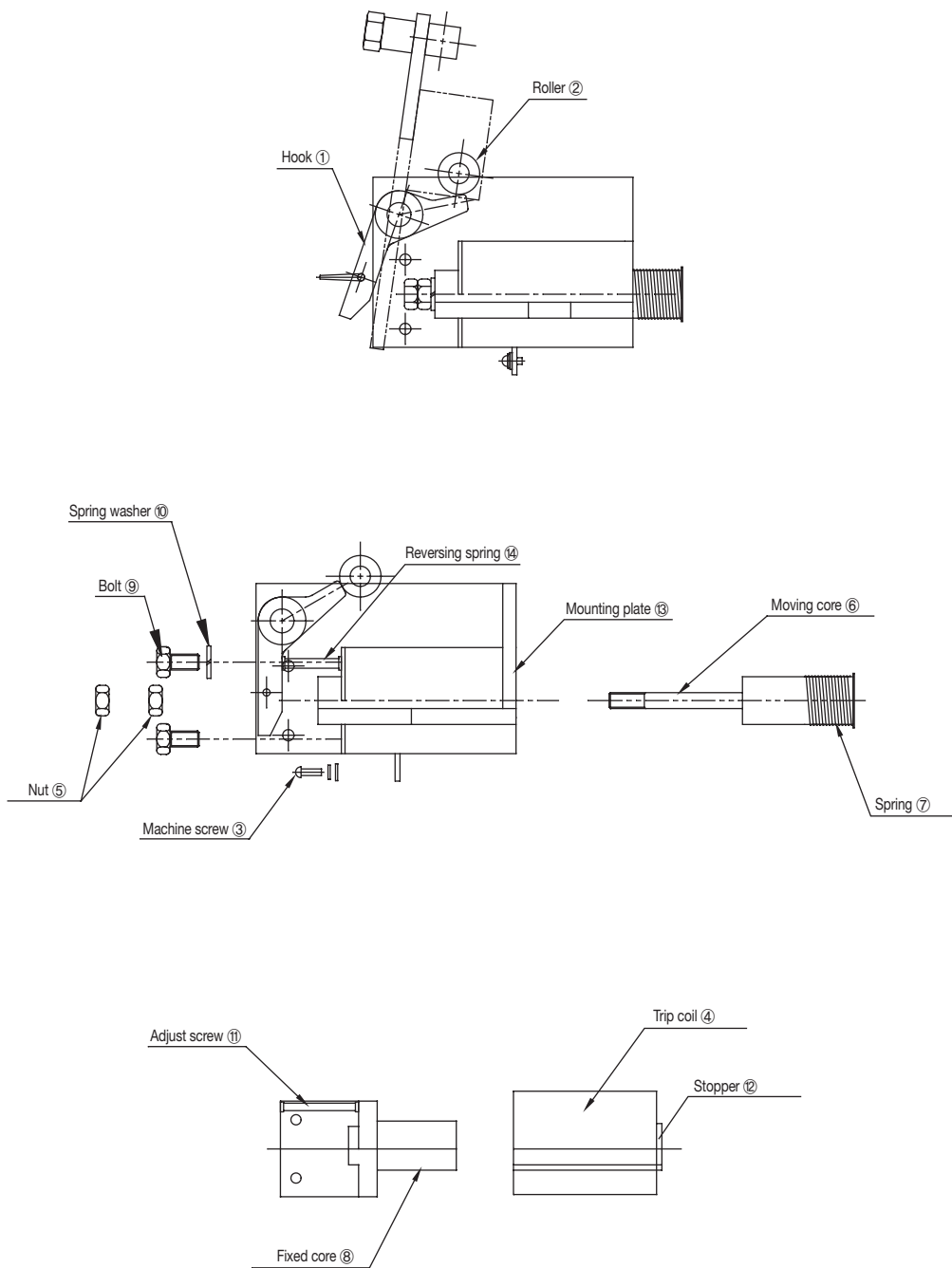
11-5. Trip coil

1) Dismantlement

- (1) Loosen machine screw^③ and remove the wire from the trip coil^④.
- (2) Loosen two bolts on the mold case and take off the latch mechanism.
- (3) Loosen the double nut^⑤ to disassemble the moving core^⑥ and the spring^⑦.
- (4) Remove the bolt^⑨ and the spring washer^⑩ from the fixed core to disassemble the fixed core and the trip coil^④. Do not loosen the hook-adjust screw^⑪ on the fixed core. Loosen machine screw and take off the coil^⑧.

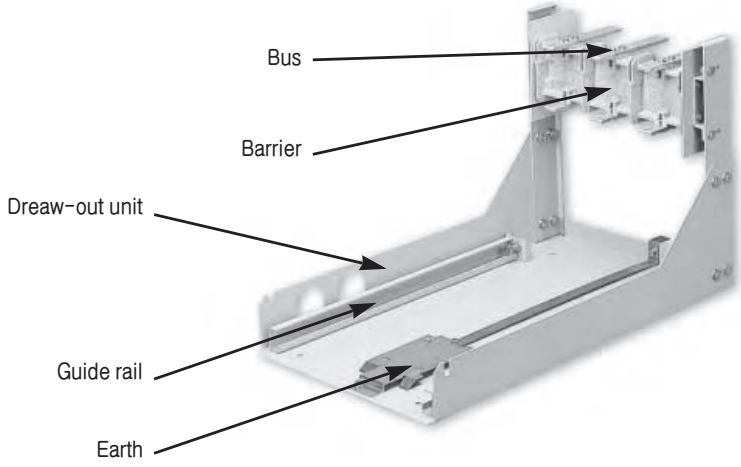
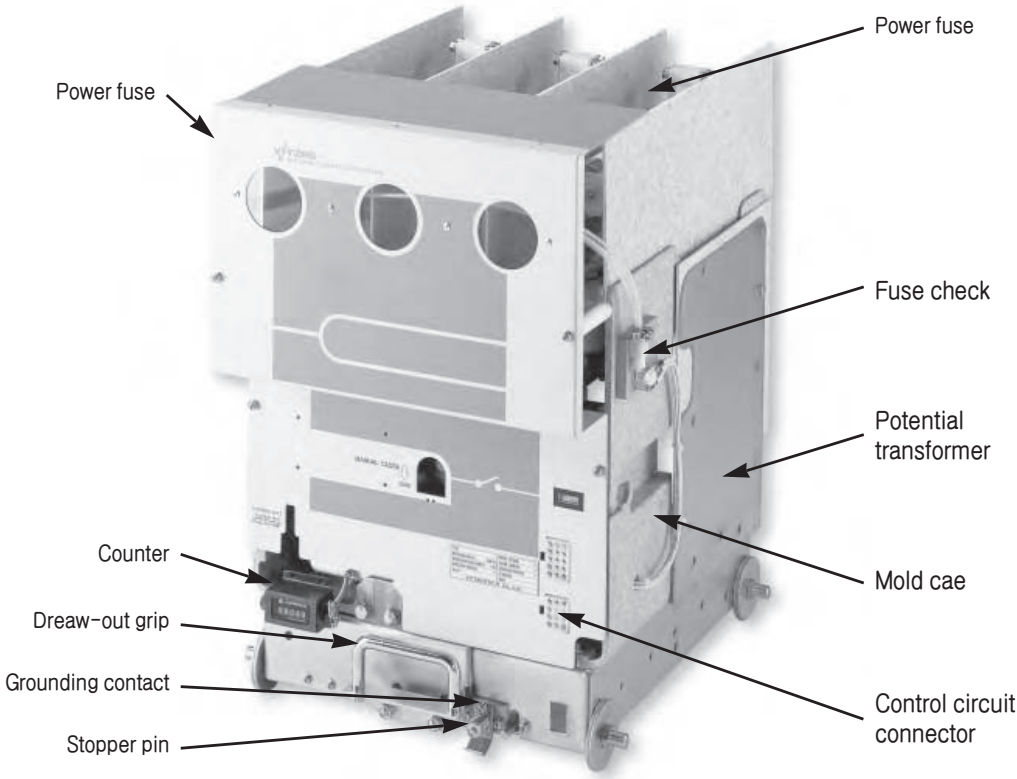
2) Installation and adjustment

- (1) Check the rating of the trip coil, and on which side it should be installed. Note that the coil bobbin holding the stopper^⑫ is inside.
- (2) Put the stopper^⑫ together with the bobbin into the mouth hole of the mounting plate^⑬ to prevent the trip coil from rotating.
- (3) Stick the fixed core into the trip coil. Set the reversing spring of the hook^① on the L-shaped fitting of the fixed core^⑧.
- (4) Press the fixed core towards the coil trip and fasten it with the bolt^⑨ and the spring washer^⑩. Then, check if the trip coil has been damaged.
- (5) Screw the moving core^⑥ and the spring at the back using the nut.
- (6) Adjust the stroke of the moving core^⑥ to 10 ± 0.5 and tighten up two screws^⑤.
- (7) Mount the latch mechanism on the mold case using two bolts on the side.
- (8) Close the contactor using the manual closing handle. Adjust the gap between the roller^② and the hook^① to 0.2-0.5mm while the moving core of the closing electromagnet and the fixed core face each other and then, adjust and tighten the latch mechanism with the bolt.
- (9) Wire the trip coil using machine screw^③.
- (10) Close the contactor using the manual closing handle and check if the gap between the roller and the hook is between 0.2mm and 0.5mm. Check if the gap between the hook and the moving core is $5\text{mm}\pm 0.5$ while the roller and the hook interlock (the closed condition). Also check that the moving core can be pushed 10mm from the back and trip the contactor.



[Figure 11] Trip coil dismantlement•assembling drawing

12. Structure



MEMO

WARRANTY

Model

Manufacturing No.

Warranty Period		Year		
Date Purchased		Year	Month	Date
Customer	Company	Tel.		
	Address			
Store	Name			
	Store Name			
	Address		Tel.	

- This product has been manufactured through strict quality control and testing.
- If the product is defective due to any manufacturing defect, we will repair it at no cost within the warranty period.
- After the expiration of the warranty period, we will repair the product at actual cost.
- Please produce this warranty when requesting repair service.

☀ Service Details

• Free Service

- 2 years from date of purchase
(2.5 years from date of manufacture if purchase date can not be confirmed)

• Paid Service

- You must pay a certain amount of fee after the warranty period and in the following cases.
- When the product is defective due to user negligence.
- When the product has been repaired or remodeled by a person other than authorized service personnel.
- When the product is defective or damaged due to natural disasters such as fire and flood.
When the user is not able to produce this warranty.

VITZRO EM

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I N S T R U C T I O N M A N U A L

Vacuum Contactor Switch

Head office & factory

327, Byeolmang-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Korea
Tel. +82-31-489-2000 Fax. +82-31-492-2216

Seoul office

VITZRO Bldg, 7, Neungdong-ro 25-gil, Gwangjin-gu, Seoul, Korea
Tel. +82-2-2024-3100 Fax. +82-2-3436-1900

Busan office

3-109, Industrial Goods Shopping Center, 37, Gwaegam-ro,
Sasang-gu, Busan, Korea
Tel. +82-51-319-2765 Fax. +82-51-319-2766

Service Center

327, Byeolmang-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Korea
Tel. +82-31-489-2105 Fax. +82-31-489-2121

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- ※ This Instruction Manual may be modified without prior notice in order to improve the performance of products.
- ※ In the event of any problems or inconveniences related to our products, please contact VITZRO EM.

www.vitzroem.com



VITZROEM Co., Ltd.

Head office & factory

327, Byeolmang-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Korea
Tel. +82-31-489-2000 Fax. +82-31-492-2216

Seoul office

VITZRO Bldg, 7, Neungdong-ro 25-gil, Gwangjin-gu, Seoul, Korea
Tel. +82-2-2024-3100 Fax. +82-2-3436-1900

Busan office

3-109, Industrial Goods Shopping Center, 37, Gwaegam-ro,
Sasang-gu, Busan, Korea
Tel. +82-51-319-2765 Fax. +82-51-319-2766



Service Center +82-1577-1820

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VITZROEM Agency

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