

LOW AMBIENT COOLING PARTS; OPTION PAC-205FC (Fan controller)

1. Outline

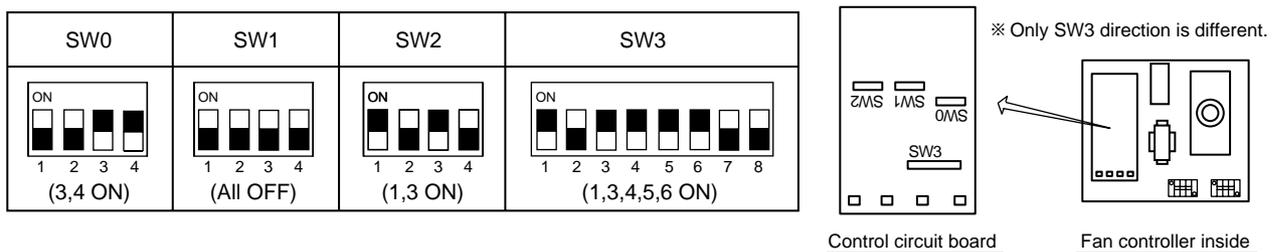
This fan controller apply to following units.

Model name	Q'TY	Model name	Q'TY
PRHG-8,10	1 set	PRHG-15,20	2 set

These units can be operated on cooling mode at the low ambient temperature with this optional FAN CONTROLLER. Please read carefully this manual and install following this.

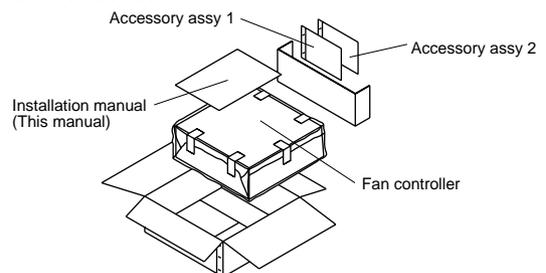
2. Caution

- Fan controller changes the outdoor fan speed.
Strong wind is injurious to fan speed controller.
Please install the windproof when unit is influenced by strong wind such as install it on the place there is no building in surrounding or the rooftop
- As the case may be the operation with FAN CONTROLLER generate an electromagnetic sound from fan motor.
Please consider the soundproofing wall equipment etc. when using the fan controller in the place where the noise becomes a problem.
There is no worry which interferes to the unit though an electromagnetic sound might be generated from fan motor.
- When shipping the fan controller, the dip switch on the control circuit board is set as follows.
Do not change factory set of all dip switches.



3. Parts

There are the following parts in this box, and confirm whether there are all attached.
There are two kinds of wiring sticker in this box.
Please select the pertinent one by model name.



Accessory assy 1

Name	Wiring sticker	Screw	Connector cap	Spring	Earth sticker	Grommet
Shape						
Amount	2	12	1	1	1	2

Accessory assy 2

Name	Attachment	Attachment	Attachment	Pipe cover	Band	Connector assy
Shape						
Amount	1	1	3	3	15	1

4. Installation

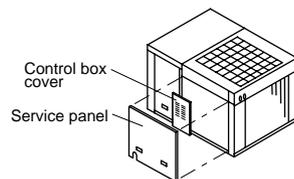
4.1. PRHG-8,10

Please use the following parts during installation of fan controller.
There are two kinds of wiring sticker, please use writing as "W881927".

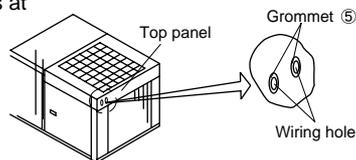
Use	Accessory assy 1					Accessory assy 2	
	① Wiring sticker	② Screw	③ Spring	④ Earth sticker	⑤ Grommet	⑥ Pipe cover	⑦ Band
	1	3	1	1	2	3	15
Not use	Accessory assy 1				Accessory assy 2		
	Wiring sticker	Screw	Connector	Attachment	Attachment	Attachment	Connector assy
	ONLY PU(H)-7,8,10 						
	1	9	1	1	1	3	1

4.1.1. Install

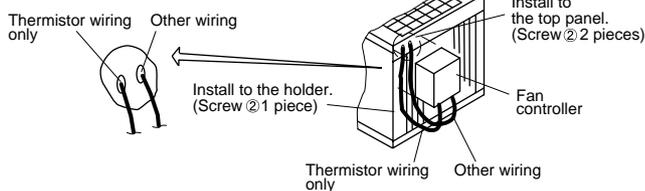
- The service panel and control box cover are removed.



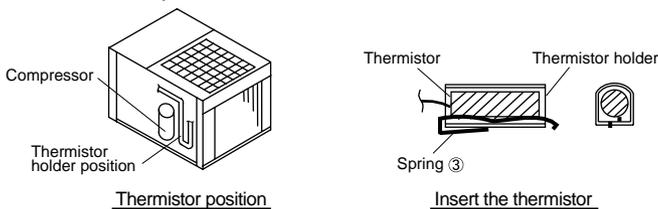
- Penetrate the knockout holes at the top panel.
The grommet ⑤ (2 pieces) install to the hole for wiring in the top panel.



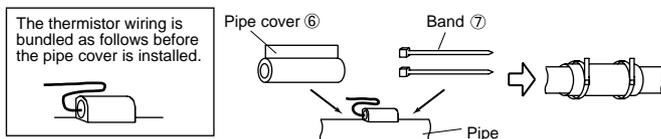
- Wiring from the fan controller is passed through the hole of procedure 2.
The thermistor and other wiring should use separate wiring hole.
The fan controller install to the top panel with the screw ② (2 pieces) and install to the holder with the screw ② (1 piece).



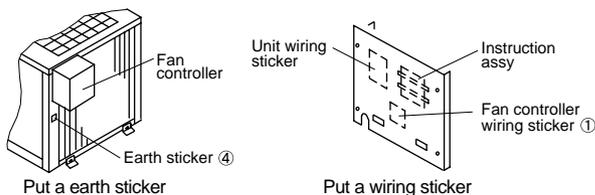
- Confirm the thermistor holder position.
The spring ③ insert in the thermistor holder.
The thermistor (black wiring) which is connected to the fan controller is put in the holder.



- Please use the pipe cover ⑥ (1 piece) and fix with the band ⑦ (2 pieces).

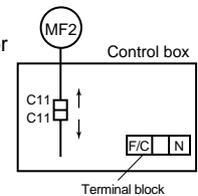


- The earth sticker and wiring sticker are put on an following place.
 - The earth sticker ④ is put on the pillar.
 - The wiring sticker ① is put on the service panel cover (inside).

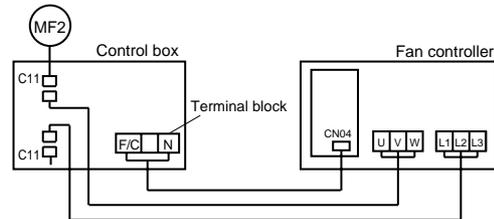


4.1.2. Wiring

- Disconnect connector C11 - C11.
The connector C11 removes to the motor side and the control box side.

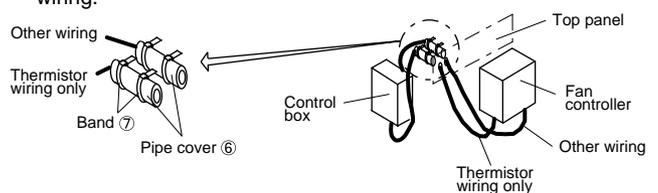


- When the fan controller is installed, the connector is connected in the control box.
The wiring from CN04 connect to the terminal block (F/C, N) in the control box.



Please be careful, do not damage wires by the sheet metal edges or the fin, etc.

- After connect wiring, to prevent wiring being damaged with the fin, the pipe cover ⑥ (2 pieces) and band ⑦ (4 pieces) are used.
In that time, never bundle the thermistor wiring with other wiring.



- After wiring ends, the wiring is bundled with a remaining band.
Never bundle the thermistor and other wiring together.

- Ensure there is not wiring mistake found, then only install the controller box cover and service panel.

4.2. PRHG-15,20

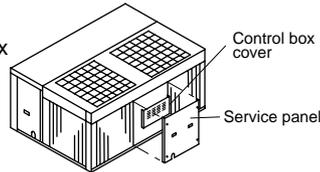
Please use the following parts during installation of fan controller. There are two kinds of wiring sticker, please use writing as "W881927".

The fan controller is necessary for these models by two sets. (The following accessory parts show the fan controller one set.)

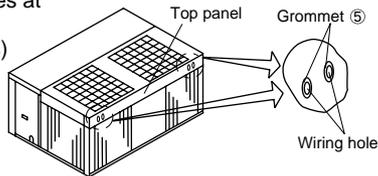
Use	Accessory assy 1					Accessory assy 2	
	① Wiring sticker	② Screw	③ Spring	④ Earth sticker	⑤ Grommet	⑥ Pipe cover	⑦ Band
	1	3	1	1	2	3	15
Not use	Accessory assy 1				Accessory assy 2		
	Wiring sticker	Screw	Connector	Attachment	Attachment	Attachment	Connector assy
	ONLY PU(H)-7,8,10 						
	1	9	1	1	1	3	1

4.2.1. Install

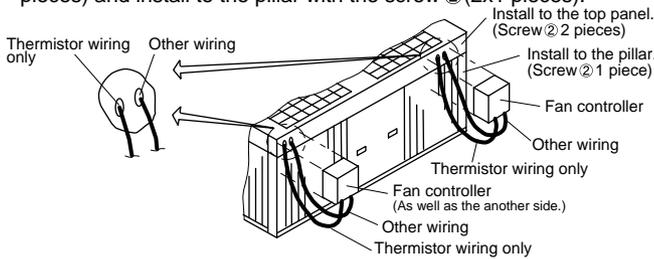
- The service panel and control box cover are removed.



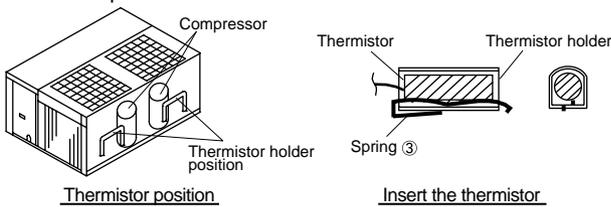
- Penetrate the knockout holes at the top panel. The grommet ⑤ (2x2 pieces) install to the hole for wiring in the top panel.



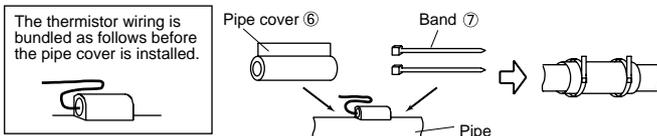
- Wiring from the fan controller is passed through the hole of procedure 2. The thermistor and other wiring should use separate wiring hole. The fan controller install to the top panel with the screw ② (2x2 pieces) and install to the pillar with the screw ② (2x1 pieces).



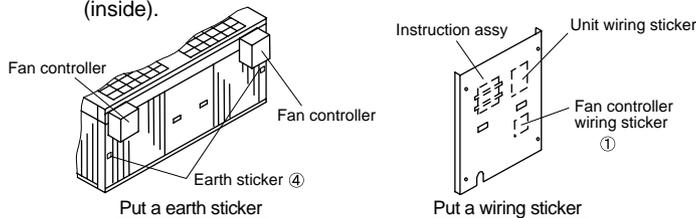
- Confirm the thermistor holder position. (2 places) The spring ③ (2x1 pieces) insert in the thermistor holder. The thermistor (black wiring) which is connected to the fan controller is put in the holder.



- Please use the pipe cover ⑥ (2x1 pieces) and fix with the band ⑦ (2x2 pieces).

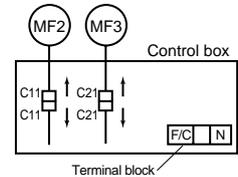


- The earth sticker and wiring sticker are put on an following place.
 - The earth sticker ④ (2x1 pieces) is put on the pillar.
 - The wiring sticker ① (1 piece) is put on the service panel cover (inside).

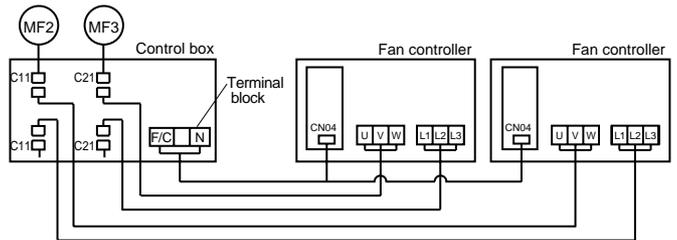


4.2.2. Wiring

- Disconnect connector C11 - C11 and C21 - C21. The connector C11 and C21 remove to the motor side and the control box side.

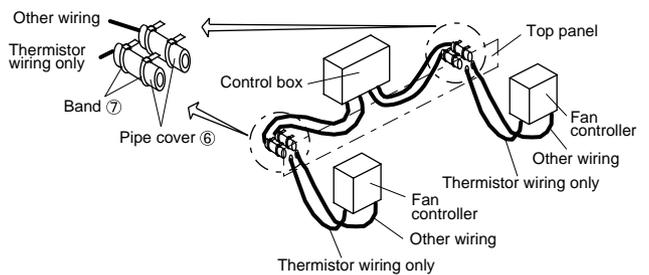


- When the fan controller is installed, the connector is connected in the control box. The wiring from CN04 connect to the terminal block (F/C, N) in the control box.



Please be careful, do not damage wires by the sheet metal edges or the fin, etc.

- After connect wiring, to prevent wiring being damaged with the fin, the pipe cover ⑥ (2x2 pieces) and band ⑦ (2x4 pieces) are used. In that time, never bundle the thermistor wiring with other wiring.



- After wiring ends, the wiring is bundled with a remaining band. Never bundle the thermistor and other wiring together.

- Ensure there is not wiring mistake found, then only install the controller box cover and service panel.

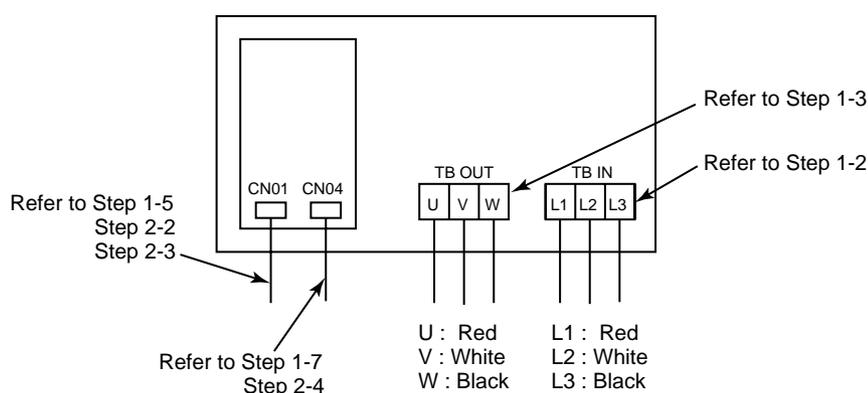
5. Before starting the trial run

Please execute the following confirmations to prevent wrong connection.
If there is wrong connection, it may damage fan controller, but also damage the unit.

Confirmation

Please intercept the power supply without fail, and secure safety when you execute detaching wiring, the connector, and the measurement machine to the following work.

Step	Confirmation matter	Check	Correspondence
Step 1 Connected confirmation	Step 1-1	Is fan controller's power supply input wiring position connected correctly as shown in installed manual?	
	Step 1-2	Is the phase of the connection of fan controller power supply input (TB IN) accurate?	
	Step 1-3	Is the phase of the connection of fan controller output (TB OUT) accurate?	
	Step 1-4	Is the phase of connection of fan controller output wiring to fan motor accurate?	
	Step 1-5	Is the thermistor for the condensing temperature detection of the attachment connected with CN01?	
	Step 1-6	Is the thermistor for the condensing temperature detection accurately installed in the unit?	
	Step 1-7	In case of the heat pump model, the wiring for full load input is connected with CN04?	
	Step 1-8	In case of the heat pump model, the wiring for full load input is connected accurately in control box?	
Step 2 Drive confirmation	Step 2-1	Does the fan rotate in a correct direction, when the unit is driven ?	Troubleshooting 1,2
	Step 2-2	The thermistor for the condensing temperature detection is removed to CN01. Drive to the cooling operation. (The unit stops abnormally when the cooling operation drive is continued for a long time occasionally. - High pressure switch off) Whether LED01 has blinked is confirmed. When the unit is in operation, the fan controller output voltage measured in TB OUT, and checked whether the output of about 200V. There is a problem when it is an output of about 300V.	Troubleshooting 3
	Step 2-3	The thermistor for the condensing temperature detection is surely connected with CN01 as before.	
	Step 2-4	In case of the heat pump model and the heating drive is possible, the heating drive is executed and the voltage of CN04 is input AC198V - 264V. In that case, the fan must be full load drive. (The output of the power-supply voltage is confirmed in TB OUT.) When heating cannot be driven, step 1-7, step 1-8 is executed again.	Troubleshooting 4



Fan controller layout

6. Troubleshooting (PAC-205FC)

Please intercept the power supply without fail, and secure safety when you execute detaching wiring, the connector, and the measurement machine to the following work.

State of Machine	Cause	Check point	Content of confirmation	Troubleshooting
1. The fan does not run.	1) The power-supply voltage is abnormal.	The value of power-supply voltage is confirmed. (TB IN)	Is the power-supply voltage 342-457V?	The power supply wiring is confirmed, and corrected.
	2) Connected mistake	The fan controller connection is confirmed.	TB IN-NF wiring TB IN-T01-CN02. NF-SCRM-TB OUT CNU, CNV, CNW-SCRM (The connection is noted.) CN02- thermistor TB OUT - fan motor	The wiring mistake is corrected.
	3) The transformer (T01) is defective.	The unit side connection is confirmed. The resistance is confirmed. (Between the lines of primary side, and lines of secondary side.)	Resistance between the lines of primary side (red and white) about 310 ohm. Resistance between the lines of secondary side (CN02 the connector is removed from the printing wiring board.) Between 1-3 pin about 0.9 ohm	Replace the transformer in case of abnormal resistance.
	4) The thyristor module (SCRM) is defective.	The content of P15 is checked. (SCRM)	The content of P15 is judgment. (SCRM)	Replace SCRM when abnormality is found.
	5) The control printing wiring board is defective.	The blinking of LED01 is confirmed.	After checking item 1)-4), when the power supply is turned on, the blinking of LED01 is confirmed.	At the time of turning on light. (always) The CN01 connector is removed, and measures resistance. When the resistance is 1 kilo-ohm or less, repair the control printing board due to the thermistor short-circuit breakdown. In case of thermistor is correct, the control printing board is defective and exchange. At the time of turning off light. The CN01 connector is removed, and measures resistance. When the resistance is 25 kilo-ohm or more, repair the control printing board due to the thermistor open breakdown. In case of thermistor is correct, the control printing board is defective and exchange.
	6) The fan motor and unit side control box are defective.	Fan power supply wiring is connected with fan controller power supply taking out part, and confirm operation.	Whether the voltage is input to fan motor is confirmed. Whether the fan motor operation is confirmed.	When the voltage impression and fan motor does not work, fan motor is defective. When the voltage is not impressed to the fan, the unit side control box is defective. When there is no wrong above-mentioned, it is assumed fan controller connection state, if abnormality relapses, the control printing board is defective and exchange.

State of Machine	Cause	Check point	Content of confirmation	Troubleshooting	
2. The fan rotates oppositely.	1) Power supply reverse-phase.	The phase of input voltage is confirmed. (TB IN)	Is the phase of L1, L2, L3 correct?	The phase of L1, L2, L3 is corrected.	
	2) Output wiring supply reverse-phase.	The phase of fan motor output wiring is confirmed. (TB OUT)	Is the phase of U, V, W correct?	The phase of U, V, W is corrected.	
	3) Connected mistake	The fan controller connection is confirmed.	TB IN-NF wiring (The connection phase is noted.) NF-SCRM-TB OUT (The connection phase is noted.) CNU, CNV, CNW-SCRM (The connection is noted.)	The connected phase is confirmed. The wiring mistake is corrected.	
3. The rotation speed of fans cannot control. •Something wrong occurs by step2-2 drive confirmation of installed confirmation matter. •It becomes high-pressure abnormal pressure.	1) During heating drive	The input voltage is confirmed. (CN04)	Is not AC198-264V input in CN04?	During heating drive, there is an input in CN04 and the fan becomes full load drive. → Normality	
	2) Power supply reverse-phase. Output wiring reverse-phase.	The phase of input voltage is confirmed. (TB IN)	Is the phase of L1, L2, L3 correct?	The phase of L1, L2, L3 is corrected.	
		The phase of fan motor output wiring is confirmed. (TB OUT)	Is the phase of U, V, W correct?	The phase of U, V, W is corrected.	
	3) Connected mistake	The fan controller connection is confirmed.	TB IN-NF wiring (The connection phase is noted.) TB IN-T01-CN02 (The connection phase is noted.) NF-SCRM-TB OUT (The connection phase is noted.) CNU, CNV, CNW-SCRM (The connection is noted.) CN02- thermistor	TB IN-NF wiring (The connection phase is noted.) TB IN-T01-CN02 (The connection phase is noted.) NF-SCRM-TB OUT (The connection phase is noted.) CNU, CNV, CNW-SCRM (The connection is noted.) CN02- thermistor	The connected phase is confirmed. The wiring mistake is corrected.
		CN04- the wiring for full load input in heating (CN04 input is AC198-264V in heating.)			In cooling, when there is an input in CN04, wiring of CN04 is mistake connection. The wiring is corrected.
					When there is a connector connection in CNX, it is removed.
					The connected phase is confirmed. The wiring mistake is corrected.
					When there is an input in CN04, the fan is full load. If the position where the thermistor is installed is wrong, the rotation speed control of the fan as condensing temperature is impossible.
	4) The control printing wiring board setting is defective.	The set of dip switch is confirmed. (SW0-3) (P2)	It is confirmed that the switch setting is corresponding to the electric wiring diagram.	The control substrate is matched to setting the electric wiring diagram.	
	5) The thyristor module (SCRM) is defective.	The content of P14 is checked. (SCRM)	The content of P14 is judgment. (SCRM)	SCRM exchange when abnormality is found.	

State of Machine	Cause	Check point	Content of confirmation	Troubleshooting
6) The control printing wiring board is defective.		The blinking of LED01 is confirmed.	After checking item 1)-5), when the power supply is turned on, the blinking of LED01 is confirmed.	<p>At the time of turning on light (always) (There is a possibility of the thermistor short-circuit.) The CN01 connector is removed, and measures resistance. When the resistance is 1 kilo-ohm or less, repair the control printing board due to the thermistor short-circuit breakdown.</p> <p>In case of thermistor is correct, the control printing board is defective and exchange.</p> <p>At the time of turning off light (There is a possibility of the thermistor open breakdown.) The CN01 connector is removed, and measures resistance. When the resistance is 25 kilo-ohm or more, repair the control printing board due to the thermistor open breakdown.</p> <p>In case of thermistor is correct, the control printing board is defective and exchange.</p> <p>At the time of blinking The item 2), 3) are confirmed again, and there is no connection mistake, the control printing board is defective and exchange.</p>
4. The fan never becomes full load drive. (In heating)	1) Connected mistake	The fan controller connection is confirmed.	TB IN-NF wiring TB IN-T01-CN02 NF-SCRM-TB OUT CNU, CNV, CNW-SCRM (The connection is noted.) CN04- the wiring for full load input (CN04 input is AC198-264V in heating.) Position of the wiring for full load input (In heating)	<p>It is confirmed that wiring is correctly connected.</p> <p>The wiring mistake is corrected.</p>
2) The thyristor module (SCRM) is defective.		The content of P14 is checked. (SCRM)	The content of P14 is judgment. (SCRM)	Replace SCRM when abnormality is found.
3) The control printing wiring board is defective.		After checking item 1), there is a possibility of a defective printed circuit board if a normal drive is not done.	Item 1) is checked, again.	After checking item 1), if there is no problem, the control printing board is defective and exchange.

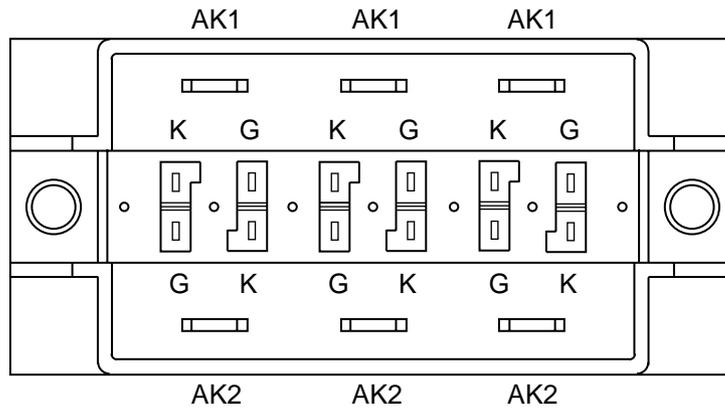
Thyristor module (SCRM)

<Judgment Method> Measure the resistance between each of the SCRM pins and judge if there is a failure or not by the resulting values.

<Judgment Values 1> Check between G and K.
Use the smallest resistance range on the tester.
Judgment Value: 1.5 ohm ~ 80 ohm

<Judgment Values 2> Check between AK1 and AK2.
Use the greatest resistance range on the tester.
Judgment Value: 60 kilo-ohm ~ ∞ ohm

<External View>



<Internal Circuit Diagrams>

