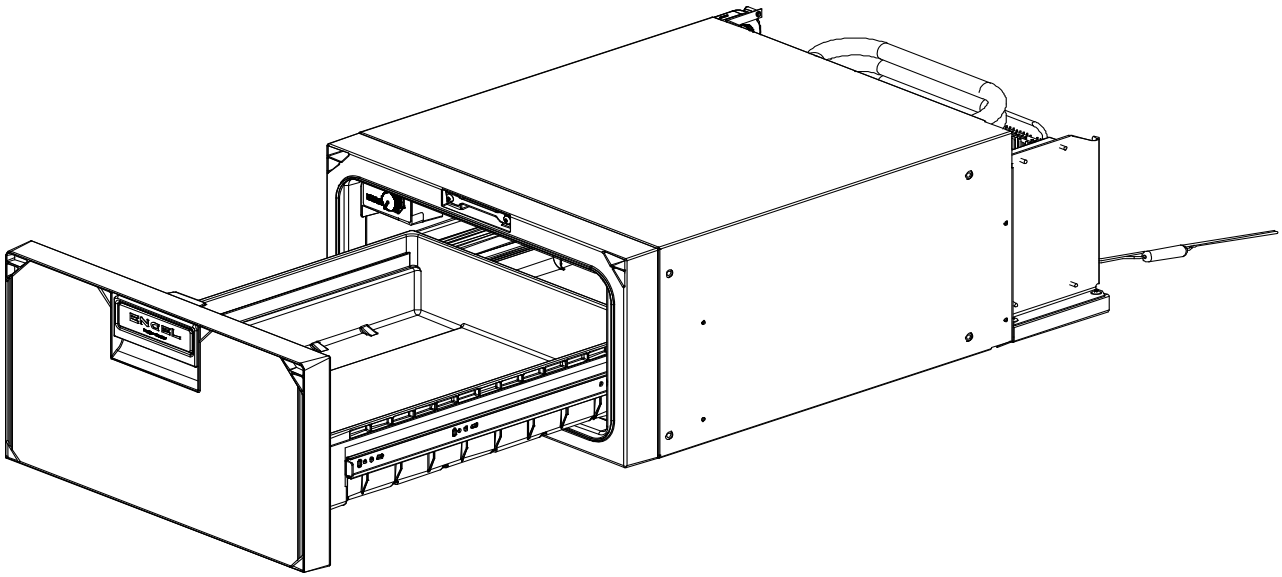
SERVICE MANUAL

MODEL :
SB30G 0643 030 1200



SAWAFUJI ELECTRIC CO., LTD.

2016. 10#0

This service manual describes maintenance procedures for ENGEL refrigerator.

This manual is intended for repair engineers who are familiar with basics service skills and knowledge for ENGEL refrigerator.

This manual does not guarantee correct maintenance when service is done by a non-skilled worker without technical knowledge.

Note that the content of this booklet including product specifications is subject to change for improvement without notice.

● FOR REFRIGERATOR USERS

- Failing to service properly may result in poor reliability of the refrigerator.
- Read this booklet carefully and perform servicing with great care.
- Always comply with the procedures, directions, and work tips in this booklet when servicing the refrigerator.

● FOR SAFETY OF YOURSELF

- To secure safe and correct servicing, read this manual thoroughly in advance and check if there are protective equipment and appropriate tools and service parts ready as well as technical skills necessary to perform servicing.

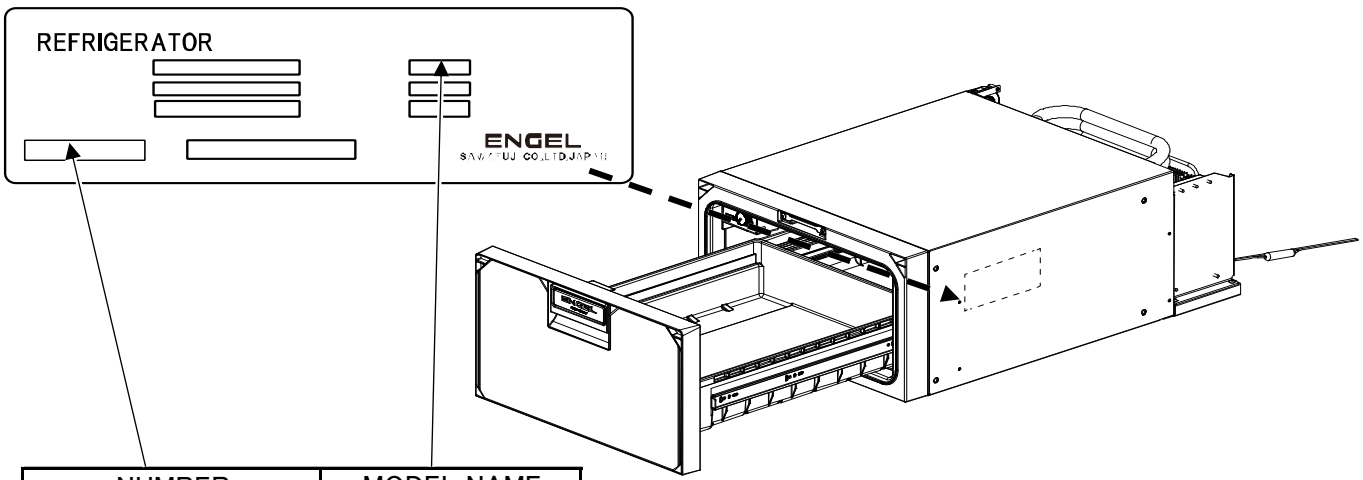
● SAFETY SYMBOLS

- The following warning labels in this booklet indicate precautions for service work.
  Comply with what each symbol indicates whenever it appears.

⚠ WARNING	May lead to death or serious injury if failed to comply with this precaution
⚠ CAUTION	May lead to injury if failed to comply with this precaution
WORK TIPS	Lead to failure of the refrigerator set or its components if failed to comply with this precaution

● REFRIGERATOR CODE NUMBERS

- This manual is compatible with described model in below.
  Please check refrigerator model name and number in label .(Label place as picture)



NUMBER	MODEL NAME
0643 030 1200	SB30G

CONTENTS

1. SPECIFICATIONS

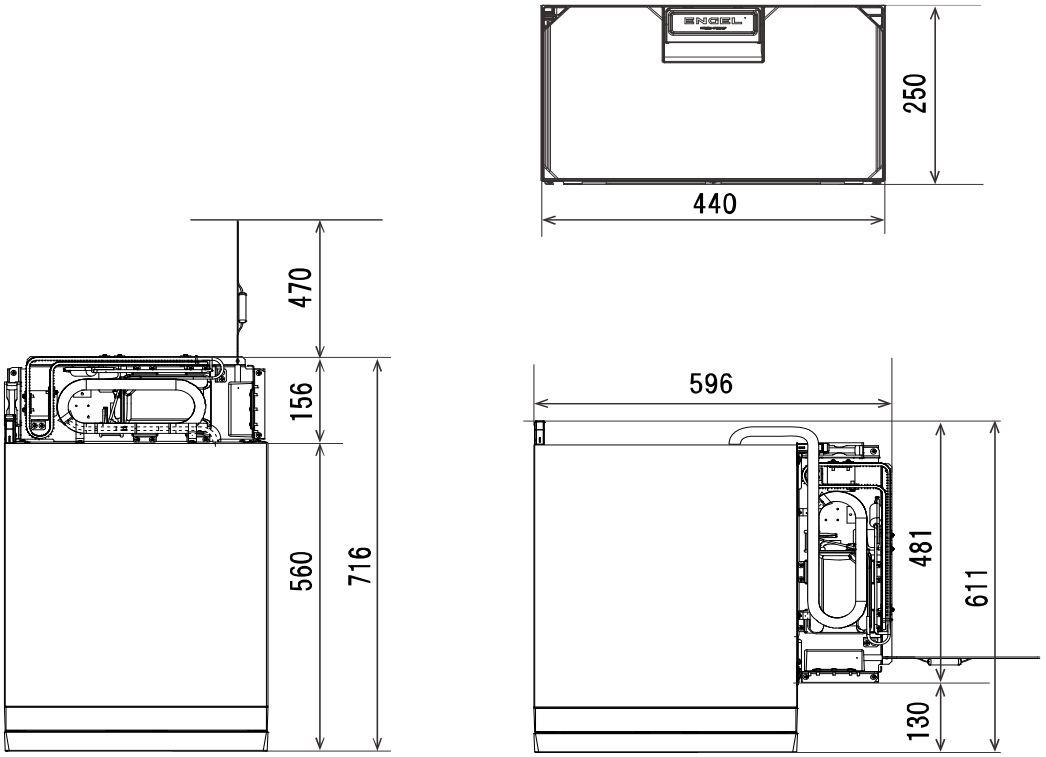
■ Spec Table

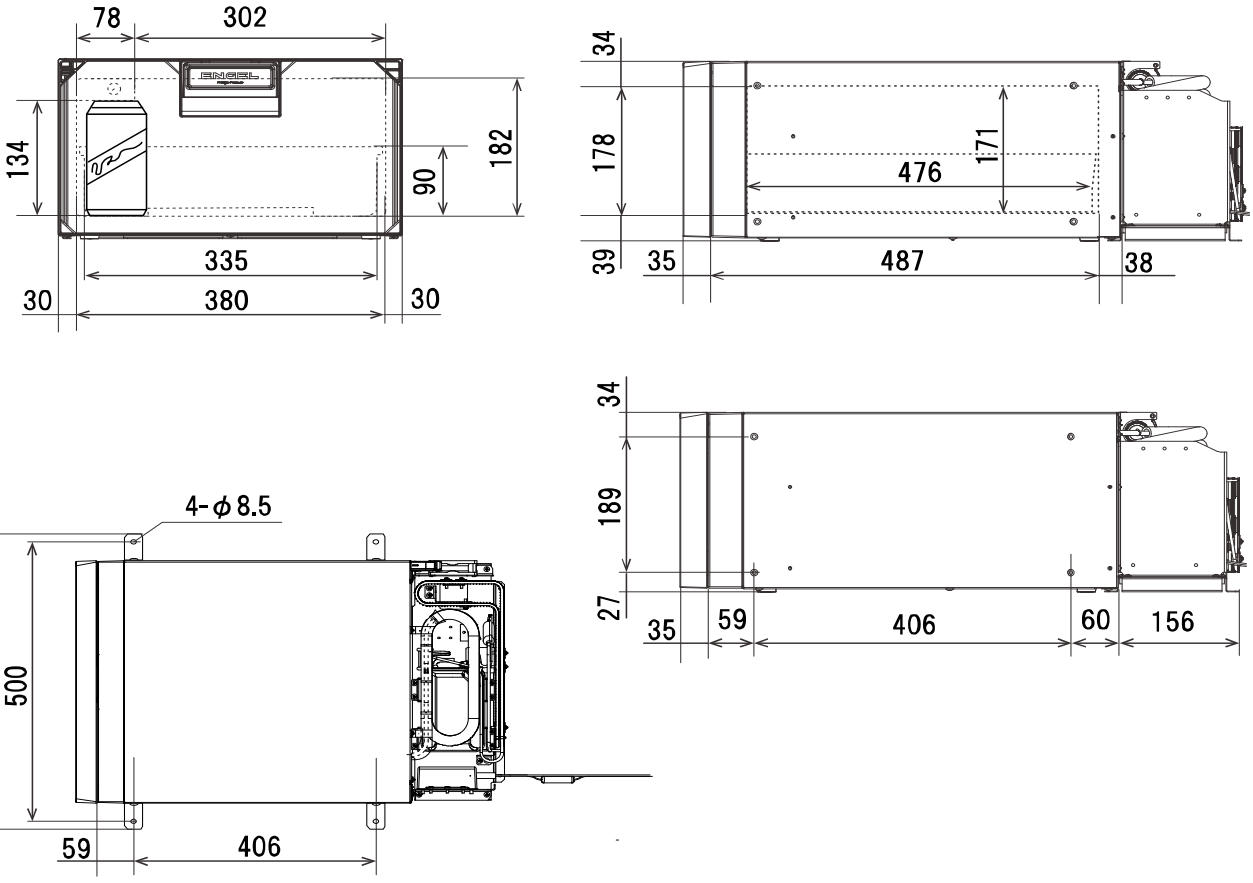
Model			SB30G
Model code			0643 030 1200
Storage volume		ℓ(liter)	30
Exterior dimensions W×D×H		in	17.3 × 28.2 × 9.8
		mm	440 × 716 × 250
Interior dimensions W×D×H			See page 2
		mm	
Outer enclosure	Cabinet	Case	SPCC powder coating, SGCC
		Cover	ABS resin
		Door	
Interior enclosure	Cabinet	Case, inner	
		Evaporator	Coating aluminum
		Door	ABS resin
		Tray	
Heat insulator		Cabinet	Foamed POLY URETHANE (CYCLOPENTANE)
		Door	
Input voltage		DC	12V / 24V
Rated amperage		DC12V/24V	2.7A / 1.5A
Compressor model			SK-511R
Compressor rating			AC7.8V, 3.3A, 27W
Refrigerant			HFC-134a
Average inside room temperature (Dial position: "1", Ambient temp. 30℃)			8±2℃
Average inside room temperature (Dial position: "5", Ambient temp. 30℃)			-8℃
Temperature control			Automatic temperature control by dial setting (Electronic thermostat control type)
Weight		LBS.	41.9
		Kg	19

1. SPECIFICATIONS

■ Dimensions

※ Tolerance is omitted　Unit (mm)





2. INSTALLING A REFRIGERATOR

■ How to Install the Refrigerator

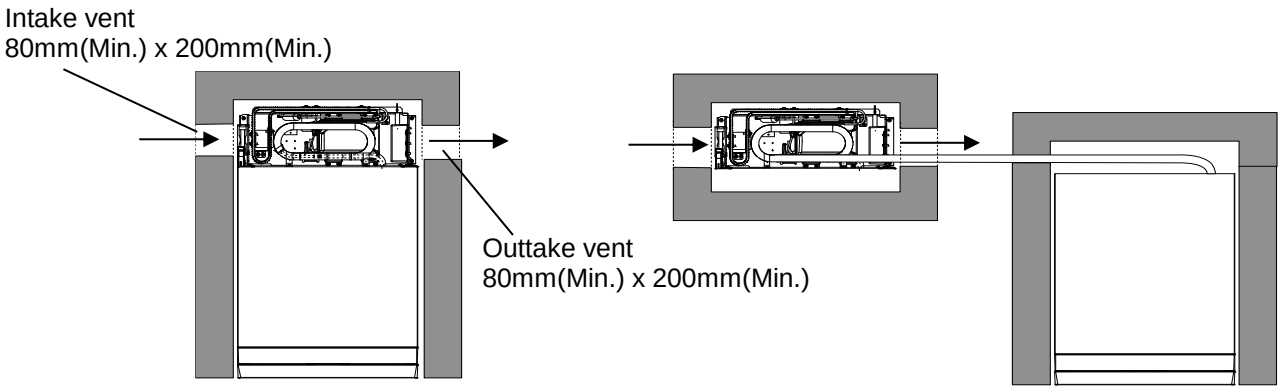
1) Make sure to install the product horizontally.
When installing in the Vehicle or Boat, make sure the product does not install an unstable place.

2) Make sure to install the product where the air flow is available.
If the Machine parts air flow contaminated, the cooling system will degrades.

3) Avoid from direct Sunlight, Stove, or anything related to heat.
If you install the product near a gas stove, a heater, any other heat-generating appliances or place in direct sunlight, the cooling performance is deteriorated. And there is a risk of discoloration or deformation.

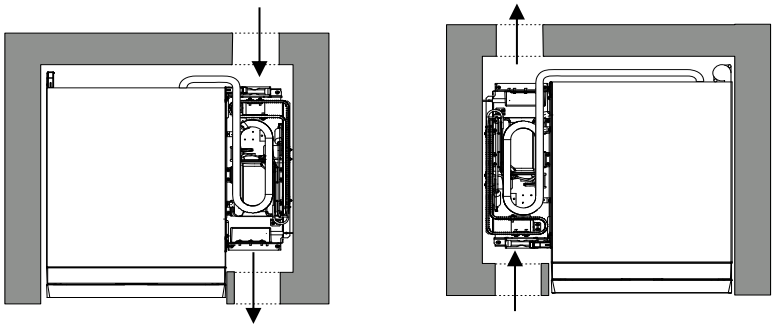
4) Avoid installing the product close to a kitchen sink or water faucet.
Easily with the dew on the outer case and inner case and then installed in wet locations.
If installed in locations subject to water will damage the electrical circuits and other.

5) To achieve good cooling performance and less current consumption, adequate ventilation for product is needed
a) Below drawing: the heat will flow in the arrow direction.
b) Make sure NOT to block the intake vent and outtake vent of the Machine parts.
c) Recommended vent size : vertical length of 80mm and side length of 200mm
If blocked, the cooling performance is deteriorated.
And there is a risk of the failure of the cooling system.



WORK TIPS

Failure to provide the necessary venting will result in poor refrigeration, continuous compressor operation, accelerated battery discharge and sometimes shorten the life of fridge.



■ Connection of the Battery Power Supply

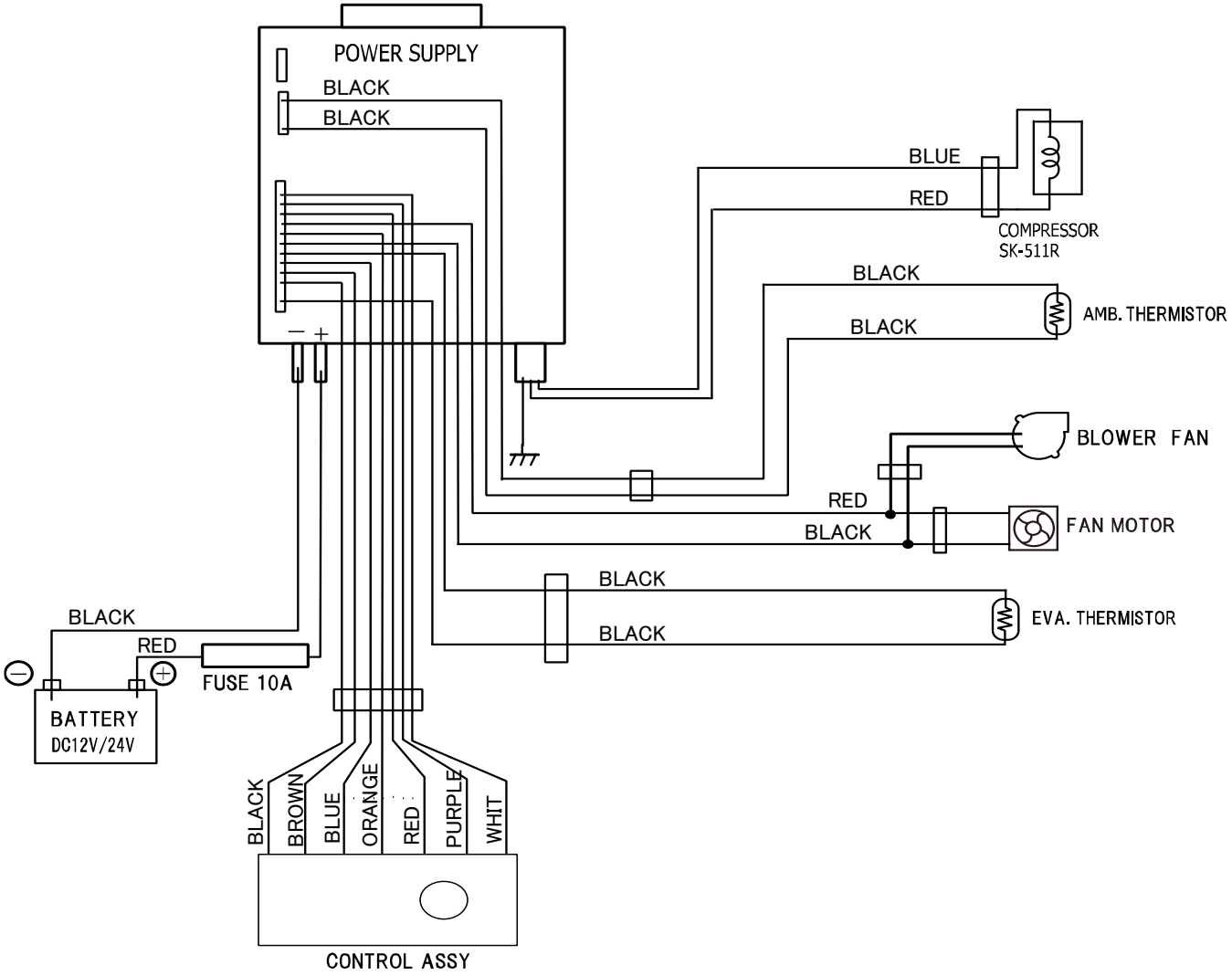
WIRE GAUGE IS IMPORTANT !

Connect the product to battery as follows:

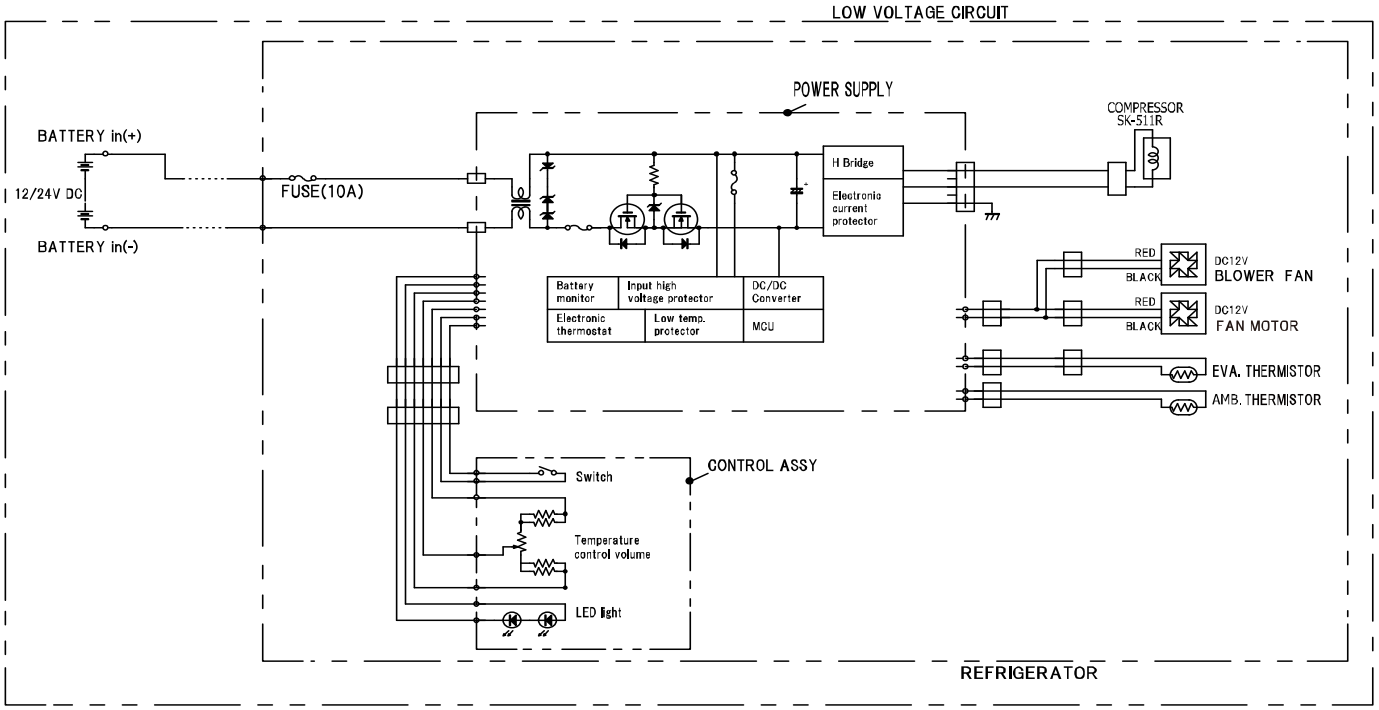
Distance between product and battery	Wire gauge	
	DC12V USE	DC24V USE
Less than 6m (19ft.)	SWG#16 (AWG#14) / 2.1㎟	SWG#18 (AWG#16) / 1.25㎟
From 6m (19ft.) TO 10m (32ft.)	SWG#14 (AWG#12) / 3.3㎟	SWG#16 (AWG#14) / 2.1㎟
More than 10m (32ft.) (Not recommended,too long)	SWG#12 (AWG#10) / 5.3㎟	SWG#14 (AWG#12) / 3.3 ㎟

3 .CONNECTING DIAGRAM

■ Block Diagrams

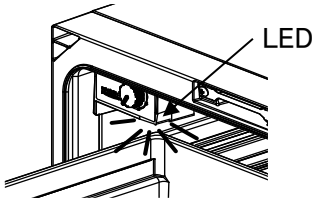


■ Wiring Diagrams



4. TROUBLE SHOOTING

■ Error Display List (Slowly LED flashing)

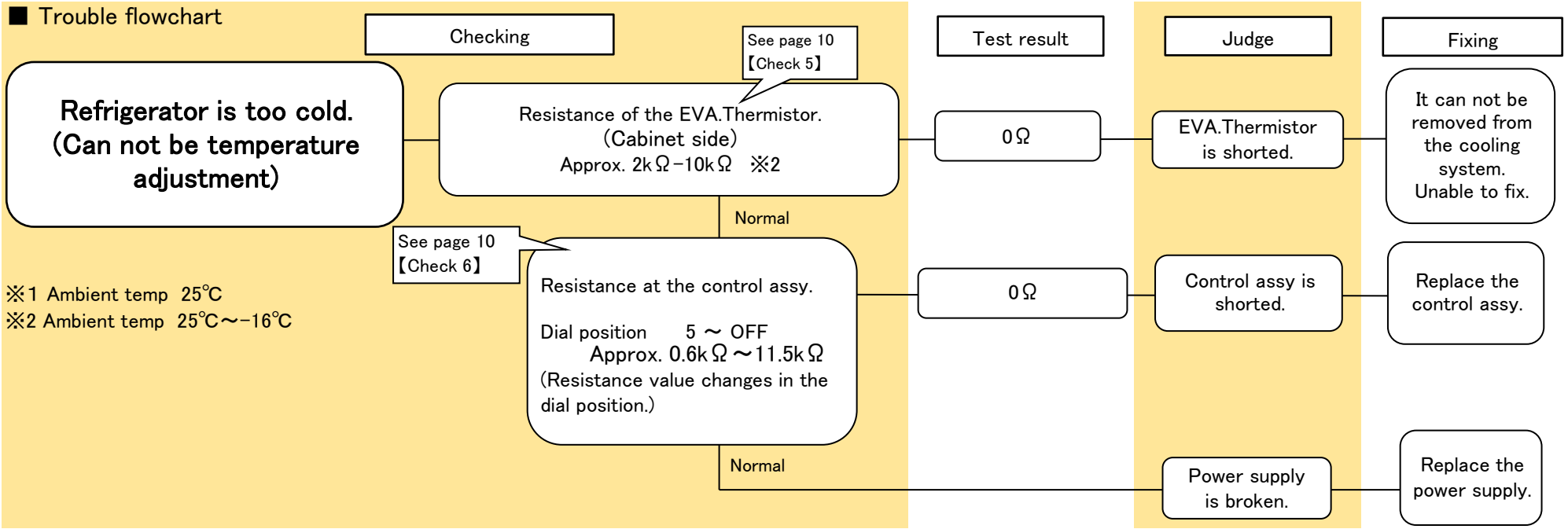


If the LED is flashing, it is considered the cause of the table below.

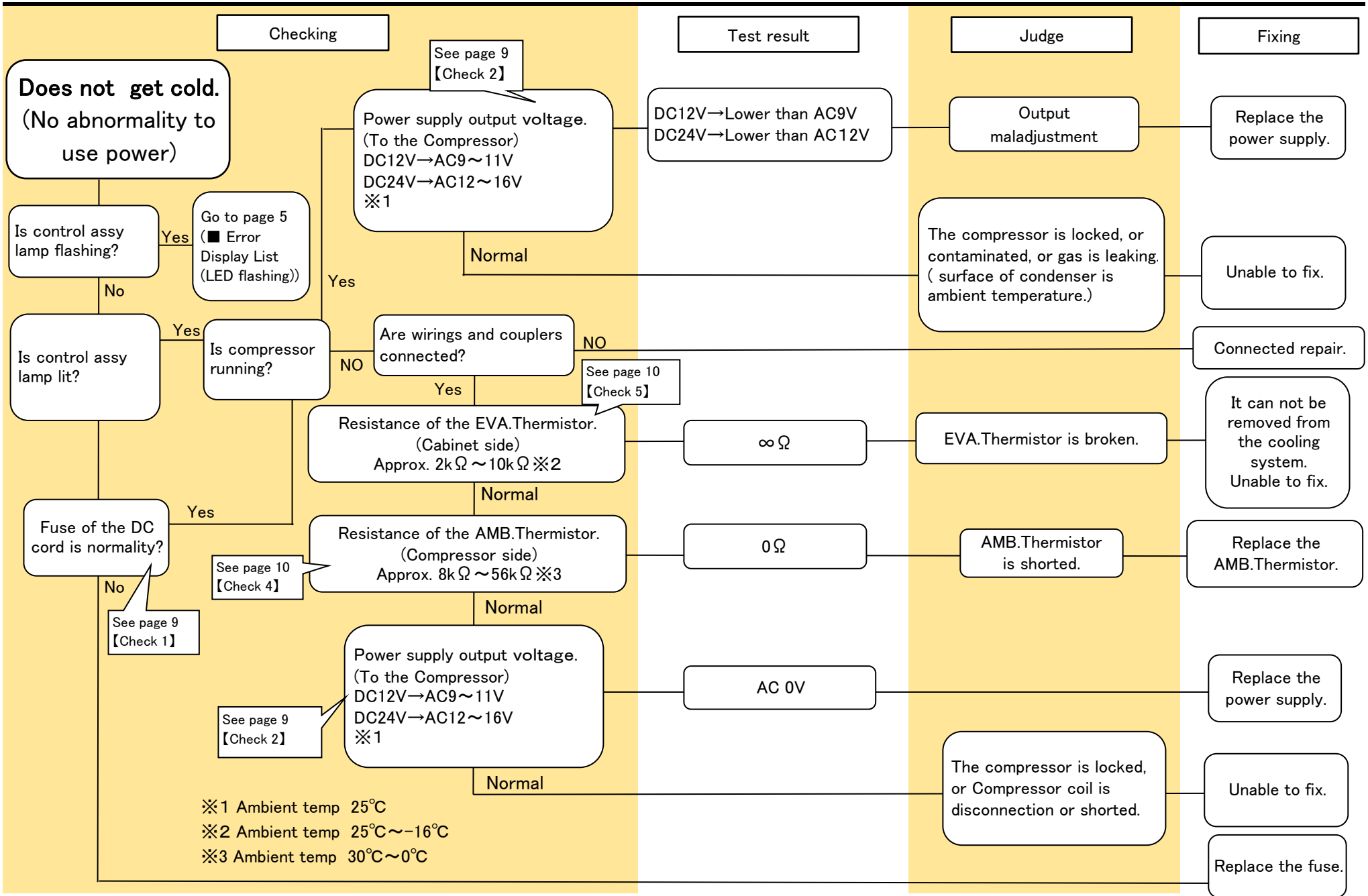
Abnormal item		Test result	Compressor	Fixing	See page
Battery voltage drop	12V battery use	Lower than DC9.6V	Stop	Charge the battery	–
	24V battery use	DC17V ～ 20.4V	Stop	Charge the battery	–
Overvoltage		More than DC32V	Stop	Please use DC12V or DC24V	–
Ambient temperature	LOW	Ambient temperature < −20℃	Stop	–	–
	HIGH	Ambient temperature > 55℃	Stop	–	–
AMB.Thermistor is abnormality (Compressor side)	Shorted	0Ω	Stop	Replace the thermistor (Compressor side)	See page9 【Check 4】
	Disconnection	∞Ω	Running		
EVA.Thermistor is abnormality (Cabinet side)	Shorted	0Ω	Running	It can not be removed from the cooling system. Unable to fix.	See page9 【Check 5】
	Disconnection	∞Ω	Stop		
Fan motor		Disconnection	Running	Replace the fan motor	–

※It will be reset by turning off the power.

■ Trouble flowchart



4. TROUBLE SHOOTING



4. TROUBLE SHOOTING

■ Typical Problem

Symptoms	Cause	Treatment
Does not get cold.	See page 6	
Cooling is weak	* Fan motor is broken	Replace fan motor
	* Blower fan is broken	Replace blower fan
	* Ambient temparature is higher than 30℃	
	* Ventilation at mechanical part is not enough	See page 3
	* Too many things are put inside	Make some room for cool air
	* Gas is leaking from cooling system	Unable to fix.
Lamp of temperature control assembly is not lit.	* The special fuse inside DC cord is open	Replace the fuse
	* DC power line in the vehicle is bad	Check the vehicle

■ Technical Data

※1 Ambient temp 25℃ ※2 Ambient temp 25℃ ～ −16℃
※3 Ambient temp 30℃ ～ 0℃ ※4 Tester uses the accuracy 10mΩ or less.

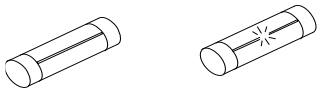
Checking items	Checking Points	Normal data	See page
Output voltage of power supply	Between outgoing cords from power supply (by ditaching from terminal of compressor)	・DC12V: Approx. AC9～11V ※1 ・DC24V: Approx. AC12～16V ※1	See page 8
Resistance of the compressor	Between incoming cords to compressor (by detaching from terminal of compressor)	Approx. 0.46Ω ※1, ※4	See page 8
Fuse	Check the fuse by visual confirmation or check the continuity with a tester.	That the fuse is not broken.	See page 8
Resistance of EVA.Thermistor (Cabinet side)	Between two pin of the two poles coupler.	Approx. 2KΩ ～ 10KΩ ※2	See page 9
Resistance of AMB.Thermistor (Compressor side)	Between two pin of the three poles coupler.	Approx. 8kΩ～ 56kΩ ※3	See page 9
Control assy	Between two pin of the seven poles coupler.	Dial position 5 ～ OFF Approx. 0.6kΩ～11.5 kΩ	See page 9

5. CHECK POINT & CHECK METHOD

【Check 1】Fuse (Fig.1)

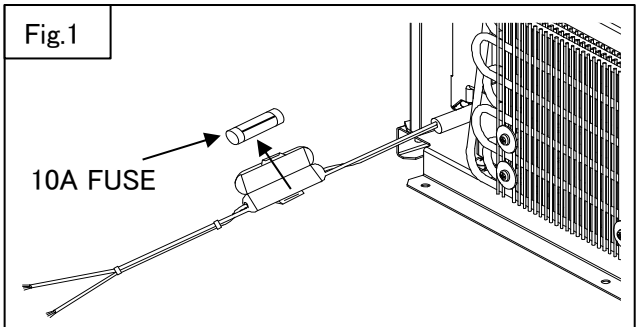
◇ Check the fuse by Visual confirmation or check the continuity with a tester.

Continuity check	Judge
YES	Normal
NO	Broken



Normal Broken

Fig.1



【Check 2】Output Voltage of the Power Supply

◇Checking point

・Check at two poles coupler of power supply. (Fig.2)

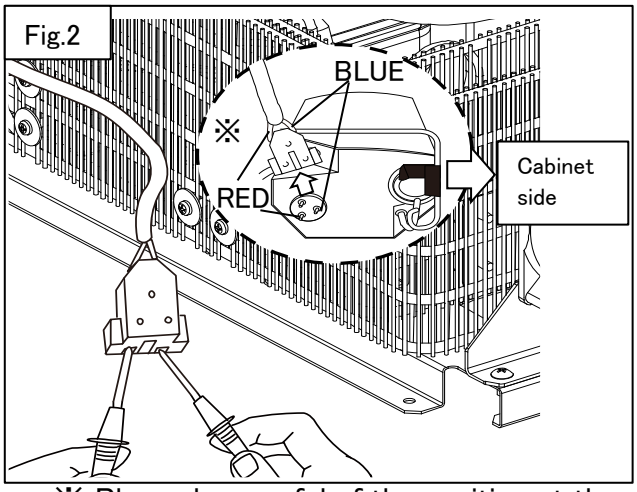
<Use power DC12V> (Ambient temp 25℃)

Test result	Judge
Approx. AC9～11V	Normal
AC 0 V	Power Supply is broken
Approx. AC9V less than	

<Use power DC24V> (Ambient temp 25℃)

Test result	Judge
Approx. AC12～16V	Normal
AC 0 V	Power Supply is broken
Approx. AC12V less than	

Fig.2



※ Please be careful of the position at the time of the coupler connection.

【Check 3】Resistance of the Compressor

◇Checking points

Measured between the terminal of the compressor. (Fig.3)

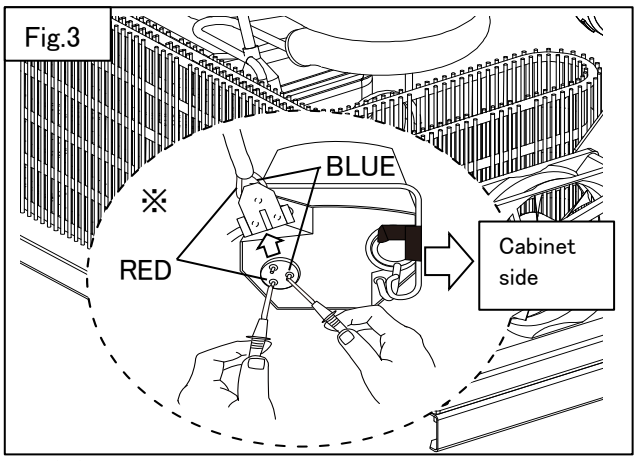
(Ambient temp 25℃)

Test result ※1	Judge
Approx. 0.46Ω	Normal
∞Ω	Broken ※2
0Ω	Coil of compressor is short circuit. ※1

※1 Tester uses the accuracy 10mΩ or less.

※2 It can not be removed from the cooling system. Unable to fix.

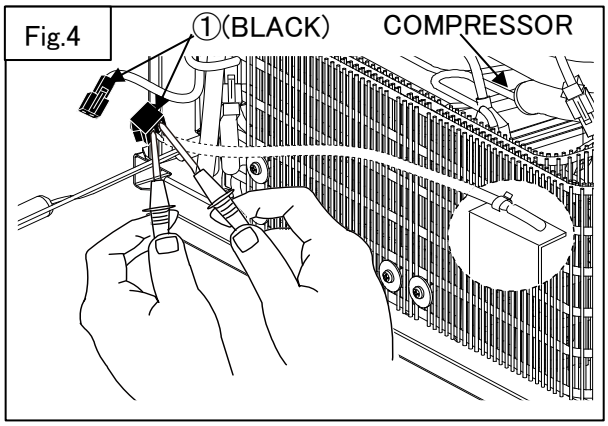
Fig.3



※ Please be careful of the position at the time of the coupler connection.

5. CHECK POINT & CHECK METHOD

【Check 4】Resistance of the AMB.Thermistor（Compressor side）



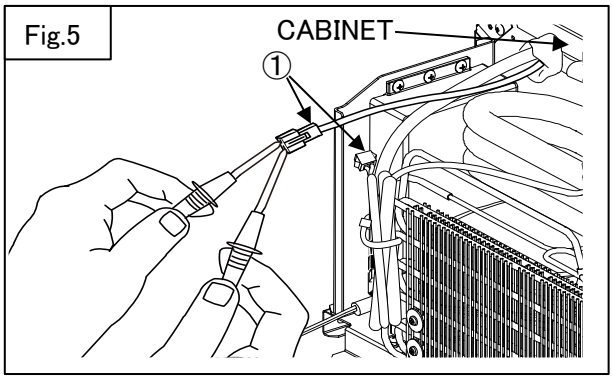
◇Checking points

Remove the two poles couplers. (Fig.4-①)

(Ambient temp 30℃～0℃)

Test result	Judge
Approx. 8kΩ～56 kΩ	Normal
∞Ω	Broken
0Ω	Short Circuit

【Check 5】Resistance of the EVA.Thermistor（Cabinet side）



◇Checking points.

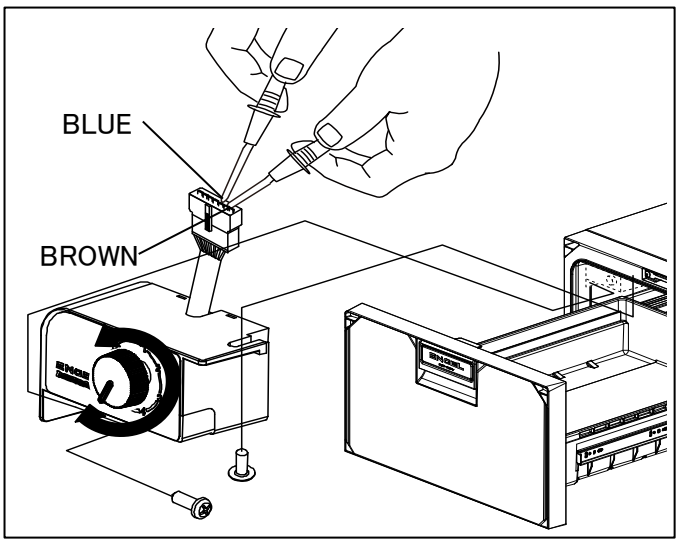
Remove the two poles couplers (Fig.5-①)

(Ambient temp 25℃～-16℃)

Test result	Judge
Approx. 2 kΩ～10 kΩ	Normal
∞Ω	Broken ※
0Ω	Short Circuit ※

※It can not be removed from the cooling system. Unable to fix.

【Check 6】Resistance of the Control Assy



◇Checking points.

Check the resistance at between terminals brown and blue.

(Ambient temp 25℃)

Test result Dial position 5 ～ OFF	Judge
Approx. 0.6kΩ～11.5 kΩ	Normal
∞Ω	Broken
0Ω	Short Circuit

※Resistance value changes in the dial position.

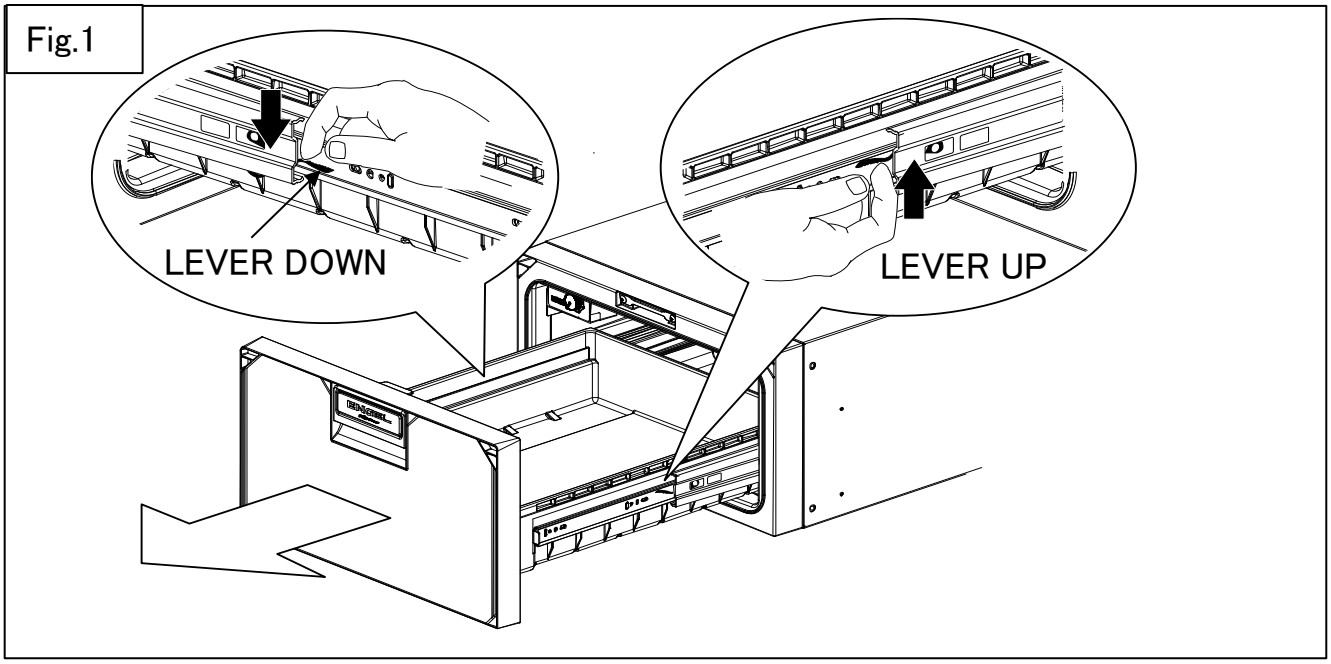
6. REPLACING PARTS

【How to Replace Drawer & Slide Rail】

Step 1. Remove the drawer

- While pressing the lever as shown in the figure below, take out the drawer.

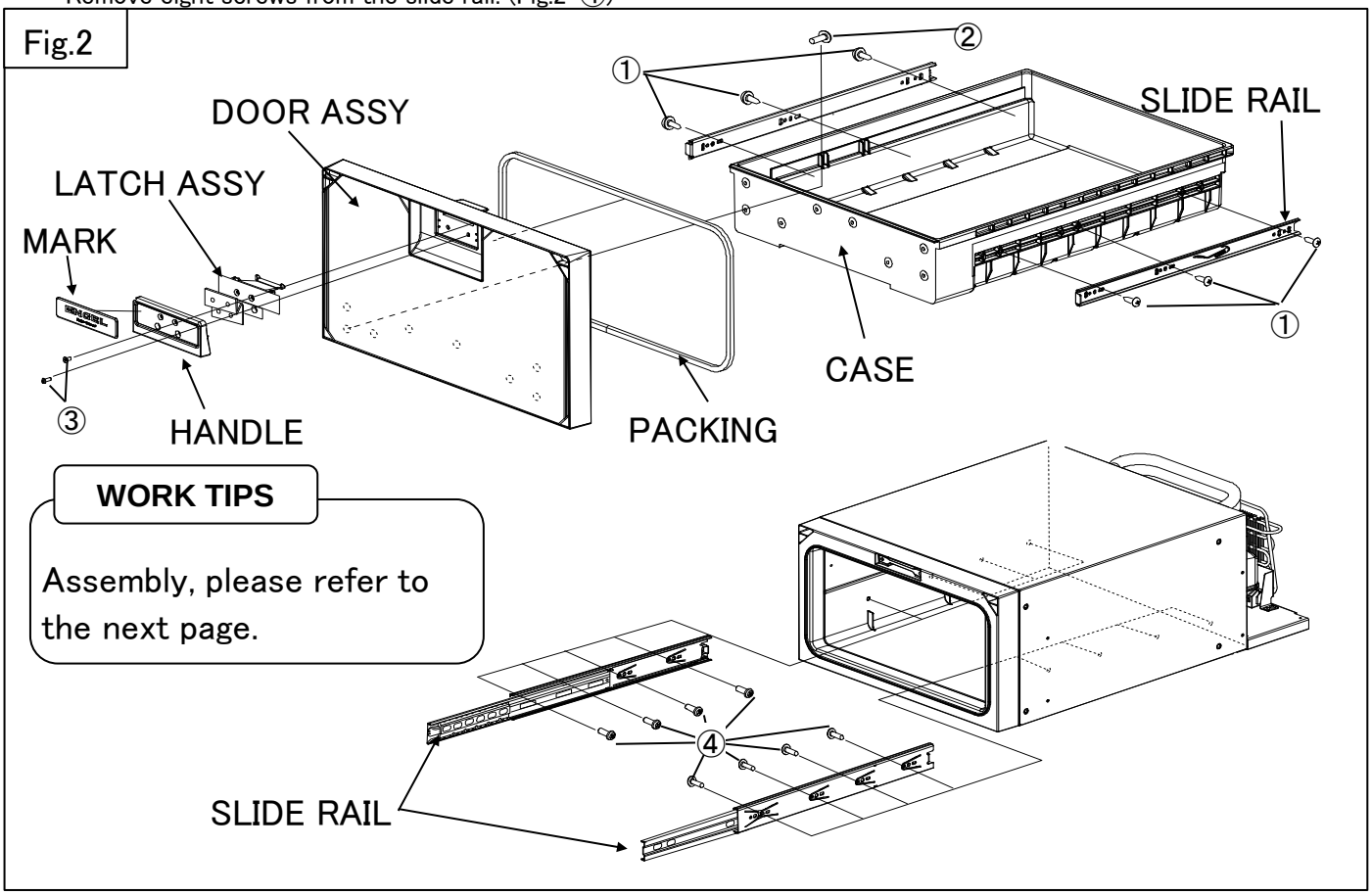
Fig.1



Step 2. Decomposition of the drawer

- Remove six screws from the slide rail. (Fig.2-①)
- Remove eight screws from the case. (Fig.2-②)
- After peeling the mark off, remove four screws from the handle. (Fig.2-③)
- Remove eight screws from the slide rail. (Fig.2-④)

Fig.2

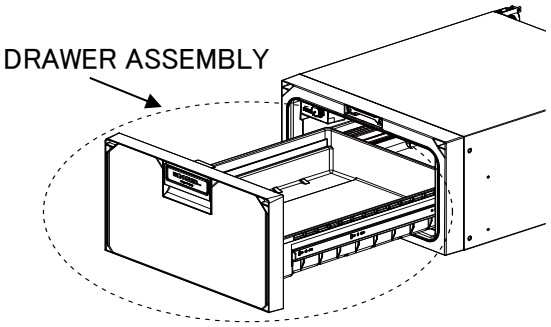


6. REPLACING PARTS

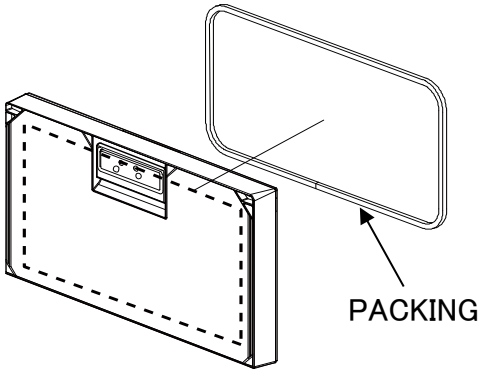
【Note for drawer assembly】

WORK TIPS

Please note below for assembling the drawer assembly.



1) Note for the packing replacement.

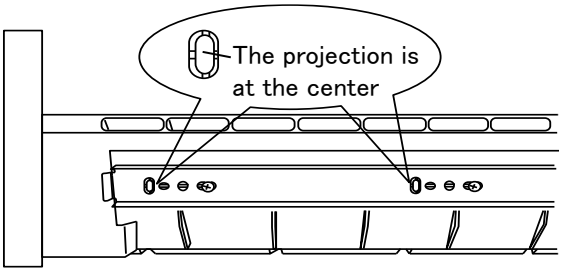


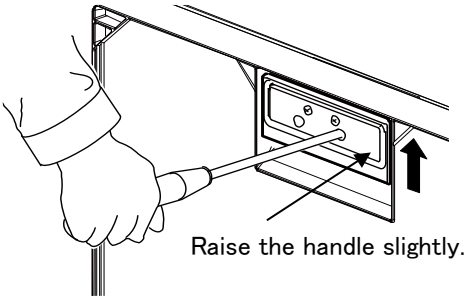
WORK TIPS

New packing tightens the door closing, but it gets to fit after a while.
So please check opening / closing door one hour later after exchanging it. (See 3) below)

2) Note for the slide rail and handle assembly.

・Basic assembly.



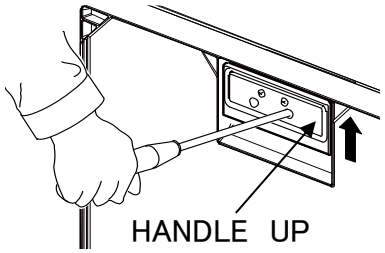


3)Note for opening and closing the door.

Please check and adjusut the door as below.

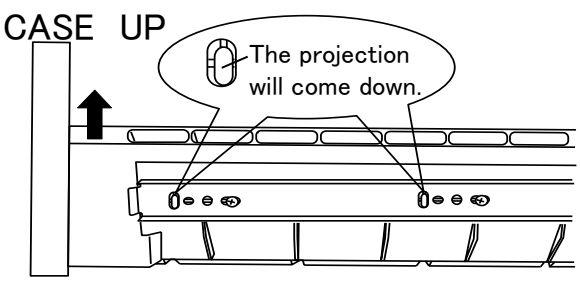
If the latch is loose.

・Slide-up and re-set the handle.



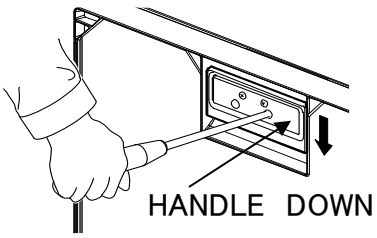
※If still loose.

・Push up the case and tighten the screws on slide rail.



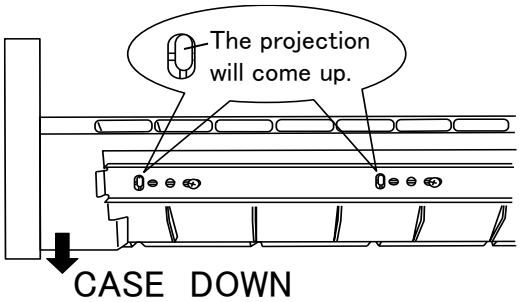
If the latch is stiff.

・Slide-down and re-set the handle.



※If still stiff.

・Push down the case and tighten the screws on slide rail.



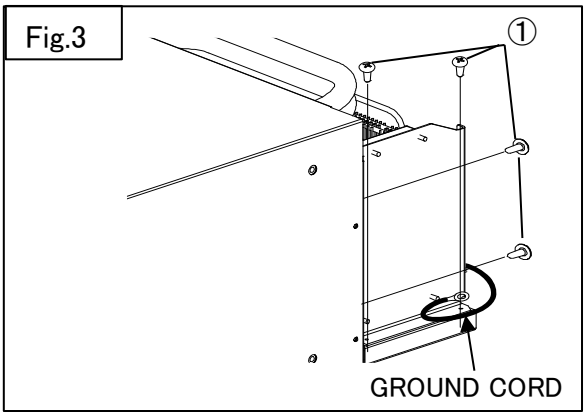
6. REPLACING PARTS

【Guidelines drawer assembly.】

Step 1. Remove the power supply plate.

- Remove four screws. (Fig.3-①)

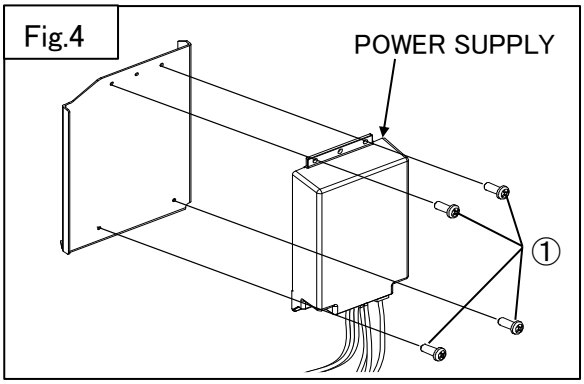
Fig.3



Step 2. Remove the power supply.

- Remove four screws. (Fig4-①)

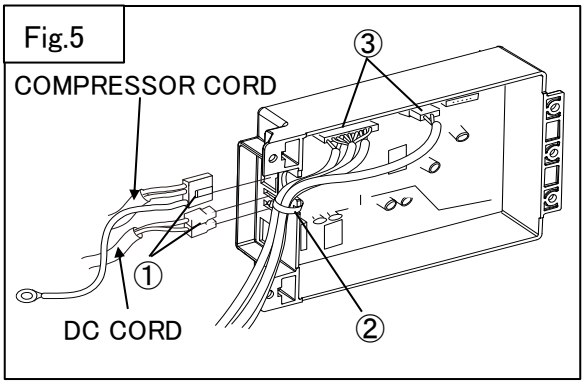
Fig.4



Step 3. Remove the cords of power supply.

- Remove the compressor cord & DC cord. (Fig.5-①)
- Cut out the fastener. (Fig.5-②)
- Remove the two coupler assy. (Fig.5-③)

Fig.5

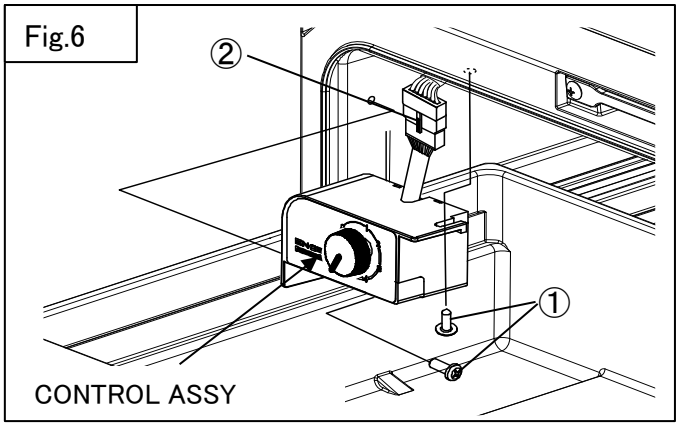


6. REPLACING PARTS

【How to Replace Control Assy】

- Remove two screws. (Fig.6-①)
- Pull out the coupler. (Fig.6-②)

Fig.6



【How to Replace Fan Motor & Blower Fan】

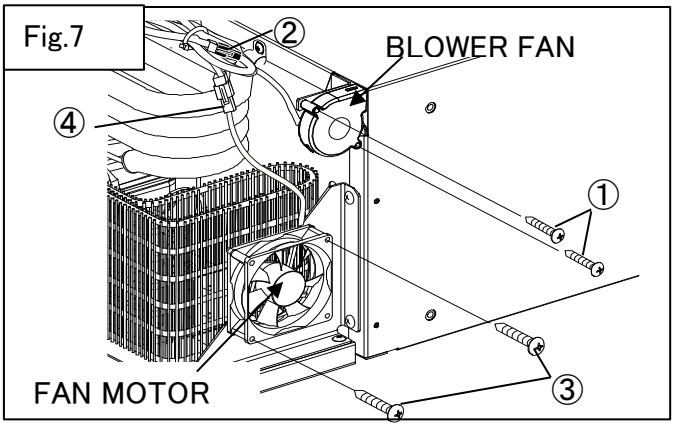
<Blower fan>

- Remove two screws. (Fig.7-①)
- Pull out the coupler. (Fig.7-②)

<Fan motor>

- Remove two screws. (Fig.7-③)
- Pull out the coupler. (Fig.7-④)

Fig.7

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