Voice Synthsizer
Instruction Manual
[TYPE : BKV]

Thank you very much for purchasing the Voice Synthsizer. Before use, please read this Instruction Manual thoroughly and use the productcorrectly.In addition, keep this manual in a safe place.When carrying out maintenance/check, repair etc. , be sure to reread this manual.If an unclear point arises, please inquire to each sales office or technical consultation service written in the last page.

Safety Precautions

In order to prevent harm on users or other persons and damage on properties, the matters to be kept without fail are explained as follows.

■The degree of harm and damage that will occur when misuse is made by ignoring the contents of indication is classified and explained by the following indications.

⚠WARNING | The column with this indication shows the contents in which "possibility of death or being seriously injured is assumed."

⚠CAUTION | The column with this indication shows the contents in which "possibility of being injured or only occurrence of property damage is assumed."

1.Matters to be kept without fail for Safety Purpose

⚠WARNING
●At the wiring and mounting of products, be sure to cut off power source.There is a risk of electrical shock.
●Do not disassemble or modify the product.There is a risk of fire, electrical shock etc. For repair, check etc of inside the product, please inquire to each sales office or technical consultation service written in the last page.
●Pay attention not to mistake wiring work.If wiring is mistaken,the internal circuit may burn out and it will become a cause of fire.
●Be sure to use the power supply within the allowable voltage range of the product.Otherwise,it may become a cause of fire and/or failure.
●For the installation with execution of work,be sure to ask a professional company.Otherwise,there is a risk of electrical shock,fire and/or falling etc.

⚠CAUTION
●Be sure to connect the external fuse for protection of the power supply circuit and internal circuit of the product.
●Do not use it at the place where vibration exists that is exceeding the specifications. In addition,be sure to install on upright direction at the place where vibration exists.There is a risk of damage and/or falling of the product.

The trouble occurred due to mishandling against the warning and caution matters, and/or due to disassembling, modification, natural disaster etc. cannot be guaranteed. Further, avoid the usage under conditions other than the contents described in this manual.

┌ Request ┐
●Use it in the environment where strong radio waves and/or inductive noise do not exist.Otherwise,there is a risk of noise generation from the Speaker.
●Use it in the environment where corrosive gas does not exist. Otherwise, it will become a cause of failure.
●In order to avoid electrostatic breakdown,start to work after discharging static electricity which is charged on a human body. By touching an earthed metallic part with a bare hand, static electricity can be discharged.
●Perform fitting of each part at a recommended torque value.
●Pay attention not to lose the parts such as the terminal covers,front covers etc. which are to be detached at performing work.
●If this product is used for the safety-sensitive security purpose, be sure to perform daily check, and establish the system design that can cope with the occurrence of accidental trouble and failure.

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It is strictly prohibited to copy/reprint the partial or whole contents of audio/music data of PATLITE Corporation or to transfer/sell them on computer networks etc. without the permission of the right holder.
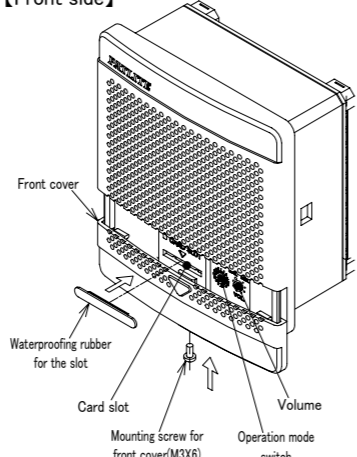
2.Indication Method of Models

BKV – 31 K F – J
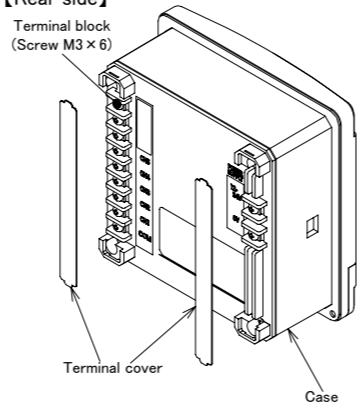
■Rated voltage
J: 12~24V DC
K: 100V AC
Q: 220V AC

■Body color
J : Light gray
K : Dark gray

3. Parts Names

【Front side】 【Rear side】

Terminal block (Screw M3 × 6)

Front cover

Waterproofing rubber for the slot

Card slot

Mounting screw for front cover(M3X6)

Volume

Operation mode switch

Terminal cover

Case

Mounting angle (Accessory)

SD Card
Model: SDV-128P (sold separately)

※PATLITE corporation is a member of the SD card Association.

4. How to install

Install the product according to the procedure below.
①Create mounting holes on a mounting surface (board thickness: 1mm ~ 10mm) where there is enough space for the mounting angle. (See the mounting dimensions diagram)
②(a)Insert the product from the front of the mounting surface.
　(b)Attach the mounting angle which comes with the product to the holes on the side of the product.
　(c)Then fasten the screws of the mounting angle. (Recommended tightening torque: 0.7±0.1N·m)
③Confirm that the product and the mounting angles are installed properly.

(148mm)
□110⁺⁰·¹₋₀ mm

Mounting surface (board thickness:1mm~10mm)

Mounting angle

Mounting dimensions diagram
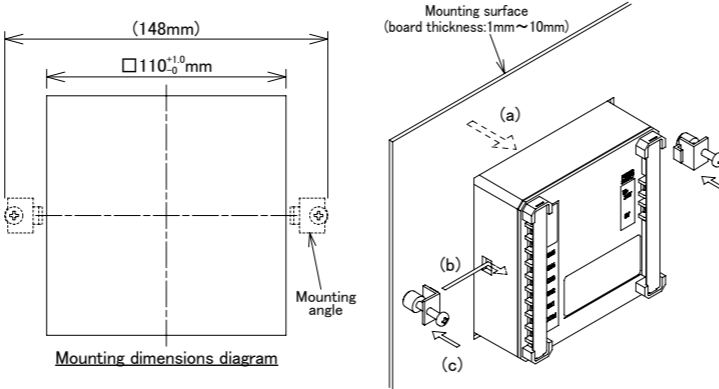
⚠WARNING
●At the mounting of products, be sure to cut off power source. There is a risk of electrical shock.
●For the installation with execution of work, be sure to ask a professional company. Otherwise, there is a risk of electrical shock, fire and/or falling etc.

⚠CAUTION
●Choose a location for the mounting surface where it has enough strength to support the weight of the product, and where there is less vibration. In addition, do not use as a vehicle. Failure to do so may be the cause of injury or damage to the product.
●Be sure to use both pieces of mounting angle, and fasten them with the recommended tightening torque. Failure to do so may be the cause of injury or damage to the product.

┌ Request ┐
●Secure a enough space in which the mounting angle can also be installed when choosing a mounting surface.
●Install the product on a flat surface without bumps and dips. Failure to do so may weak its resistance to water and dust.
●To prevent the product from falling in places where vibration may be generated, applthread locking adhesive or the like, and perform periodic checking of the tightness of the mounting angle.
●I When mounting it at a high place, choose the place where a foothold exists for facilitating repair work.
●If it is used under the connected state to the power supply, then provide a switch which can easily cut off power supply in proximity to the product, for the safety purpose.

┌ Other Precautions ┐
●The clamp face might resonate by the material, the thickness of the clamp face, and the reproduction volume of the product, and the vibration sound be generated. Measures can be done by reinforcing the clamp face.

5. How to perform wiring

Before wiring the product remove the terminal cover. And after the completion of the wiring attach the terminal cover.
●For the external contact of signal line, use no-Voltage contact circuit such as relay switch or open collector circuit(NPN type). As for the contact capacity,see the table below.
●The terminal screws should be fastened with the recommended tightening torque (0.3N·m).
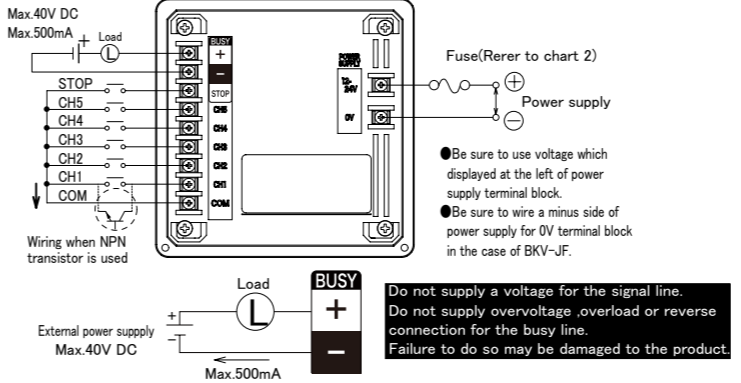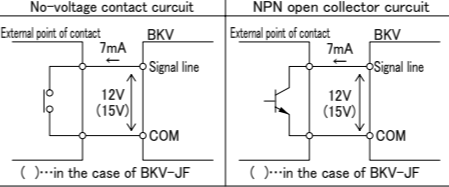
■Wiring examples

Max.40V DC
Max.500mA

STOP
CH5
CH4
CH3
CH2
CH1
COM

Wiring when NPN transistor is used

Fuse(Rerer to chart 2)
Power supply

●Be sure to use voltage which displayed at the left of power supply terminal block.
●Be sure to wire a minus side of power supply for 0V terminal block in the case of BKV-JF.

External power suppply Max.40V DC
Max.500mA

BUSY

Do not supply a voltage for the signal line.
Do not supply overvoltage ,overload or reverse connection for the busy line.
Failure to do so may be damaged to the product.

Chart1.Specifications of Signal line

No-voltage contact curcuit | NPN open collector curcuit
External point of contact BKV | External point of contact BKV
7mA Signal line | 7mA Signal line
12V(15V) | 12V(15V)
COM | COM
( )···in the case of BKV-JF | ( )···in the case of BKV-JF

Chart2. Inrush current・Fuse

Model	Inrush current	Fuse
BKV-JF	Max.10A / 5ms	125V 1A
BKV-KF	Max.1.5A /12ms	125V 0.5A
BKV-QF	Max.1.2A/0.5ms	250V 0.5A

Chart3. Contact Capacity

Current capacity	10mA or more
Withstand Voltage	20V DC or more
Leakage current	0.1mA or less
ON voltage(Vsat)	1V or less

⚠WARNING
●At the wiring of products, be sure to cut off power source. There is a risk of electrical shock.
●Pay attention not to mistake wiring work. If wiring is mistaken,the internal circuit may burn out and it will become a cause of fire.

⚠CAUTION
●Be sure to connect the external fuse for protection of the power supply circuit and internal circuit of the product.
●The terminal screws should be fastened with the recommended tightening torque (0.3N·m). Otherwise, there is a risk of damage by short-curcuit, after wiring comes off.

┌ Request ┐
●Before switching on the power supply, confirm that the wiring is correctly performed.
●For countermeasure of noise, it is recommended to perform wiring as short as possible, and to use shielded wires. In addition, if a signal line is passing along high voltage cables or its wiring is located at the place likely to receive induction noise, there is a risk of malfunction by the effect of noise.
●If a no-voltage contact such as a relay or a switch etc. is used for power supply line, select the contact for which rush current is considered. If capacity is insufficie nt, it will become a cause of welding (deposition) of the contact and/or malfunction.
●The use of M3 ring terminals with insulating coating is recommended for the wiring of terminal block to prevent disconnection of wires. Recommended product: N1.25-3 (Product confirming to RoHS)
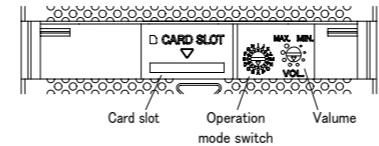
┌ Other Precautions ┐
●If power supply or signal lines are switched on simultaneously at the use of plural units, a shift of playing the voice period will occur.
●BKV-31JF comes to receive the influence of the noise easily if you connect the 0V terminal to the terminal COM.

6.How to use the product

6-1. Opening and closing the front cover

Open or close the front cover according to the procedure shown below when performing tasks such as adjusting the volume of the voice or selecting the mode switch.

①Remove the mounting screw (M3 × 6) for the front cover.
②Push the lower front cover section (Part A in the figure on the right) lightly with finger to slide it downward.
③When a SD card is to be used,remove the waterproof packing for the slot.
④After completing tasks, attach the parts removed in the procedure from ① to ③ in the opposite order. (Recommended tightening torque: 0.3N·m)

CARD SLOT
Card slot
Operation mode switch
Volume
Waterproof packing
Part A
+Screw(M3x6)
Front cover

┌ Other Precautions ┐
●Attach the waterproof packing for the slot securely. Failure to do so may weaken the product's resistance to water and dust.
●Fasten +screw for front cover with the recommended fastening torque. There is a risk of damage and/or falling of the product at the place where vibration exists.

6-2.Selecting play mode

By operating mode switch, one of the play modes shown below can be selected. [factory default setting]
　The message is registered to No.5 or earlier：A
　The message is registered to No.6 or later：B
Use a flat-blade screwdriver with the blade thickness of 1.0mm or thinner for turning the switch.
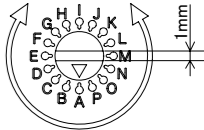
□how to select the play mode
①Change the operation mode switch to the play mode you want to use. When you select the mode I,J,K,L,M,N,O and P,The play mode is test mode.
②Reactivate the product.(It is also possible to reboot from the front side of the product with the SD card.When the SD card is inserted,the information sound is playing.Afterwards,when the information sound is playing again, the mode has been changed.)
③Confirm the message of each CH is playing, and the play mode was changed.

Play mode（Setting with operation mode switch）

A	Bit input mode	CH input：CH1 ~ CH5 / Number of playing messages：5
B	Binary input mode	CH input：CH1 ~ CH5 / Number of playing messages：31
C	Bit input sound redution mode	CH input：CH1 ~ CH4 / Number of playing messages：4 CH5：Input reduces the volume by 15dB.
D	Binary input sound redution mode	CH input：CH1 ~ CH4 / Number of playing messages：15 CH5：Input reduces the volume by 15dB.
E	Bit input Latest input priority play mode	CH input：CH1 ~ CH5 Number of playing messages：5 When the next message is input while message is being play, the message that is being played is stopped and the latest input message is playing.
F	Binary input Latest input priority play mode	CH input：CH1 ~ CH5 Number of playing messages：31 When the next message is input while message is being play, the message that is being played is stopped and the latest input message is playing.
G	Bit input Hold play mode	CH input：CH1 ~ CH5 Number of playing messages：5 Message play is possible only while the input is held. The play stops when the input stops.
H	Binary input Hold play mode	CH input：CH1 ~ CH5 Number of playing messages：31 Message play is possible only while the input is held. The play stops when the input stops.
I ~ P	Test mode	The message No.1 plays.

＊ Refer to"6.5 How to Play Messages"About the operation of each mode.

┌ Request ┐
●Make sure that there is no misalignment with the operation mode switch when selecting. If there is misalignment as shown in the figure on the right, the play mode selected may not play.

O　×
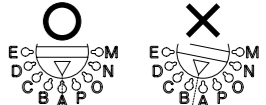
6-3.Rewriting the Message

By using an SD card (Model: SDV-128P Sold separately), and a sound writing tool (Model: FV-Win Sold separately), and a patlite playlist editor,the message can be rewritten. The maximum length of time for this product is a total of 63 seconds (in case of 64kbit/s, Fs=44.1kHz / internal memory size 504KB).For the method of creating data and storing it on an SD card, see the instruction manual for the sound writing tool.

Message rewriting procedure
①Turn on the power of the product, Confirm neither COM nor CH are short-circuited. ※The message rewriting cannot be done while the voice is playing or the test is playing.
②After opening the front cover and Inserting the SD card which is rewritten the playlist and message data, Playing the infomation sound "PIPO" and Rewriting is begun.
③When the rewriting is completed and information sound "PI", Remove the SD card. ＊Rewriting should be completed within 60 seconds. When playing the information sound other than the above,or when no response, the rewriting is not successfully completed. See Section "8. Before You Request a Repair."Moreover, when the volume has been minimized, the information sound is not heard.
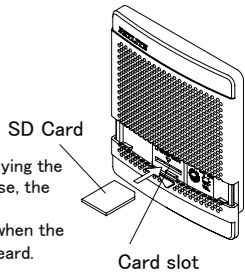
SD Card
Card slot

┌ Request ┐
●For the SD card, use type SDV-128P sold separately. Operation is not guaranteed if an SD card of any other type is used.
●When formatting the SD card, do it in either of FAT16.
●When inserting the SD card into the card slot, pay attention to the orientation of the SD card. And do not forcibly insert the SD card into the card slot. Doing so may cause damage to the product and the SD card.
●Please note that the foreign body doesn't enter the card slot.

6-4.Adjusting the volume

Volume can be adjusted using the volume control. Use a flat-blade screwdriver with the blade thickness of 1.0mm or thinner for turing the Volume control.

Volume larger　MAX. MIN.　Volume smaller
VOL.
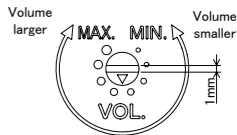
┌ Request ┐
●Turn the volume control lightly. It may be damaged if a torque of 0.3N·m or higher is applied.

6-5.How to Play Messages

When the common line and one of the signal lines is short-circuited after turning on the power.
・Playing the masseage once by the short-circuited of 100ms or more(Pulse input).
・When this product is operated by the power supply start, about 500ms is necessary from the turning on the power to the playing of the sound.
・All modes are common to timing from the BUSY output,the STOP input,and the CH input to the playing of the sound.
　Please refer to the table below for operation.
・In case there are two or more of CH1 ～ CH4 and the common line are short circuited, the message of a CH with a larger Number is played (bit input only).
　Signal entry priority order ： STOP＞CH5＞CH4＞CH3＞CH2＞CH1

Timing CH input of bit input	Timing CH input of binary input	Timing of stop input
CH input / Sound play	CH input2 / CH input1 / Sound play / Binary input	STOP input / Sound play / Timing of busy output / Sound play / BUSY output

6-5-1.Bit input mode （operation mode switch：A）
Play sound of selected CH,when short-curcuited common line and CH1～5 line.
●While playing sound,Any CH input is not accepted.(exclude the stop input)

Timing chart table of bit input

Message No.	No.2	No.5	No.3	No.4	No.3	No.3

6-5-2.Binary input mode（operation mode switch：B）
Play sound of selected binary code,when short-curcuited common line and CH1～5 line.
(Refet to binary code table)
●While playing sound,Any CH input is not accepted.(exclude the stop input)

Timing Chart table of binary input

Message No.	No.31	No.5	No.1	No.1	No.3

Binary code table

Message No.	CH1	CH2	CH3	CH4	CH5	Message No.	CH1	CH2	CH3	CH4	CH5	Message No.	CH1	CH2	CH3	CH4	CH5
1	1	0	0	0	0	12	0	0	1	1	0	23	1	1	1	0	1
2	0	1	0	0	0	13	1	0	1	1	0	24	0	0	0	1	1
3	1	1	0	0	0	14	0	1	1	1	0	25	1	0	0	1	1
4	0	0	1	0	0	15	1	1	1	1	0	26	0	1	0	1	1
5	1	0	1	0	0	16	0	0	0	0	1	27	1	1	0	1	1
6	0	1	1	0	0	17	1	0	0	0	1	28	0	0	1	1	1
7	1	1	1	0	0	18	0	1	0	0	1	29	1	0	1	1	1
8	0	0	0	1	0	19	1	1	0	0	1	30	0	1	1	1	1
9	1	0	0	1	0	20	0	0	1	0	1	31	1	1	1	1	1
10	0	1	0	1	0	21	1	0	1	0	1						
11	1	1	0	1	0	22	0	1	1	0	1						

※the"1"in the table refers to the short-circuit between the signal line and the common line.

6-5-3.Bit input・sound redution mode （operation mode switch：C）
CH1～4：Bit input/ CH5 Input reduces the volume by 15dB.
・When playing message have some phrase,Next phrase is reduced.
・According to the playlist,it is redused on the way of the phrase.
・There is no priority level in CH5.

Timing chart table of bit input・sound redution

Message No.	sound redution No.4	sound redution No.3	sound redution No.5	sound redution No.3		sound redution No.2

6-5-4.Binary input・sound redution mode （operation mode switch：D）
CH1～4：Bit input/ CH5 Input reduces the volume by 15dB.
・When playing message have some phrase,Next phrase is reduced.
・According to the playlist,it is redused on the way of the phrase.
・While playing sound,Any CH input is not accepted.
　(exclude the stop input and sound redution input)

Timing chart table of binary input・sound redution

Ref.6-5-3 binary input・sound redution mode

Message No.	sound redution No.15	sound redution No.4	sound redution No.5	sound redution No.4		sound redution No.6

6-5-5.Bit input・Latest input priority play mode（operation mode switch：E）
CH1～5：Bit input
・When the next message is input while message is being play, the message that is being played is stopped and the latest input message is playing.
・The play of the message ends by one time even if it keeps holding the input.

Timing chart table of bit input・latest input priority play

Message No.	No.5	No.4	No.2		No.3	No.1

6-5-6.Binary input・Latest input priority play mode（operation mode switch：F）
CH1～5：Binary input
・When the next message is input while message is being play, the message that is being played is stopped and the latest input message is playing.
・The play of the message ends by one time even if it keeps holding the input.

Timing chart table of binary input・latest input priority play

Message No.	No.31		No.8	No.10	No.4

6-5-7.Bit input hold play mode(operation mode switch：G)
CH input：CH1 － CH5
・Message play is possible only while the input is held.
・The play stops when the input stops.

Timing chart table of bit input・hold play mode

Message No.	No.5	No.3	No.2	No.3	No.2	No.2	No.1	No.1

6-5-8.Binary input hold play mode （operation mode switch：H）
CH input：CH1 － CH5
・Message play is possible only while the input is held.
・The play stops when the input stops.

Timing chart table of binary input・hold play mode

Message No.	No.31	No.15	No.7	No.2	No.3	No.1

No.15

6-5-9.Test play（operation mode switch：I～P）
The sound of CH1 keeps playing.While playing the sound,Any CH input is not accepted.
Use it when you confirming the operation and adjusting the volume.
・When the product is rebooted in test play mode,Operation is changed to ″A″ when you return the operation switch.Insert the SD card in the card slot or reboot, when you change excluding ″A″.

7. Options
■SD card　Model:SDV-128P
It is SD card for the sound and the voice product. When the message is changed,it uses.
■Voice writing tool Model：FV-Win
The voice writing tool and 2000 kinds of MP3 standard message are collected.
■Mounting Brcket for BK・BKV　model：BK-001

8. Before you request a repair

Symptom	Points to be checked	How to recover (Reference item)
No sound is played	Is the power supplied?	Confirm the wiring.(5.How to perform wiring)
	Are the common terminal and the CH terminal short-circuited correctly?	
	Is not STOP input?	
	Is the volume control not set to the minimum?	Adjusting the volume(6-4.Adjusting the volume)
It plays a different CH	Are the common terminal and the CH terminal short-circuited correctly?	Confirm the wiring.(5.How to perform wiring)
	Is the operational mode switch switch correctly set?	Confirm the operation mode switch(6-2.Selecting play mode)
Rewriting the sound is not possible	Is the power supplied?	Confirm the wiring.(5.How to perform wiring)
	Is the playlist made in the SD card?	Confirm playlist and data folder in the SD card. (FV-Win help file)
	Are the folder/file name, the content of the playlist folder/file correct?	
	Is the data correctly stored in the SD card?	
	Is the volume control not set to the minimum?	Adjusting the volume(6-4.Adjusting the volume)
The SD card is not read	Do you use″SDV-128P?	Confirm the SD card.
	Is the SD card correctly inserted?	(6-3.Rewriting the message)

●If the product does not operate correctly even after it is properly installed and handled, contact a branch office or the technical support printed on the last page. 。

9. Specifications

Model	BKV-31JF	BKV-31KF	BKV-31QF
Rated voltage	12 - 24V DC	100V AC(50/60Hz)	220V AC (50/60Hz)
Voltage range	10.8 - 26.4V DC	100V AC ± 10%	220V AC ± 10%
Power consumption	Max.9W	Max.10W	Max.10W
Sound Pressure Level	Max. 95 dB ： Condition for determination：Fit the product on the plate of □300mm, and measure the level with the 1kHz sine wave .at the distance of 1m from the center the product,in the front direction. volume adjustable ※The sound pressure label may be lower depending on the Sound. usage enviroment, and supplied voltage.		
Voice file	MPEG1-Audio Layer Ⅲ(MP3)　Standard bit rate：64kbit/s、Fs=44.1kHz		
File format	FAT16		
Internal memory size	504KB(Total of MP3 data)/Maximum playing time 63sec (At playing of the standard bit rate data)		
Number of playing message	Bit input：5／Binary input：31		
Operating temperature range	−10 ～ 50℃		
Relative humidity	85%RH or less (without the dew condensation)		
Mounting direction	Indoor：Normal and reverse direction are possible. (When it might be splashed with water,use the normal direction) Outdoor：Normal direction		
Protection rating	IP54 (Normal direction panel mounting only)		
Insulation resistance	1MΩ or more（at 500V DC）between current-carrying and non-current-carrying part		
Withstand voltage	500V AC (1 minute)	1000V AC (1 minute)	1500V AC (1 minute) （between current-carrying and non-current-carrying part）
Vibration resistance	45m³/s (Normal direction mounting)	19.6m³/s (Normal direction mounting) 30Hz 前後／左右／上下各2h	
Mass	350g ±10%		530g ±10%
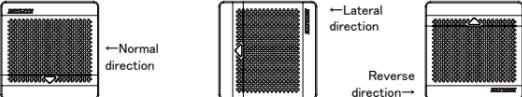
【Outline dimensional drawing】(mm)

□120 □109.8 17.2 62.8

PATLITE

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●Please note also that the contents in this document may be changed for improvement without notification in advance.