

Voice Synthesizer

Instruction Manual

[TYPE : BKV]

Thank you very much for purchasing the Voice Synthesizer. Before use, please read this Instruction Manual thoroughly and use the product correctly. 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.

~ Caution on copyright ~

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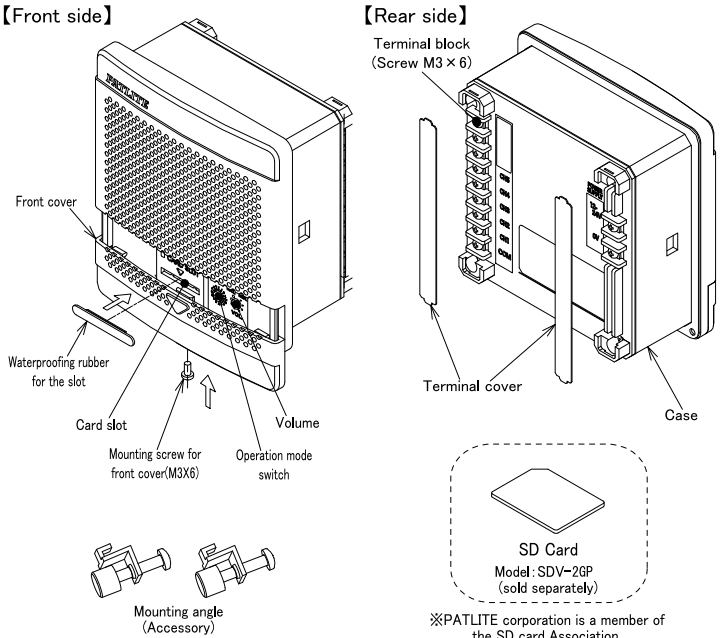
2. Indication Method of Models

BKV - 31 **K** F - **J**

■ Rated voltage
J: 12-24V DC
K: 100V AC
Q: 220V AC

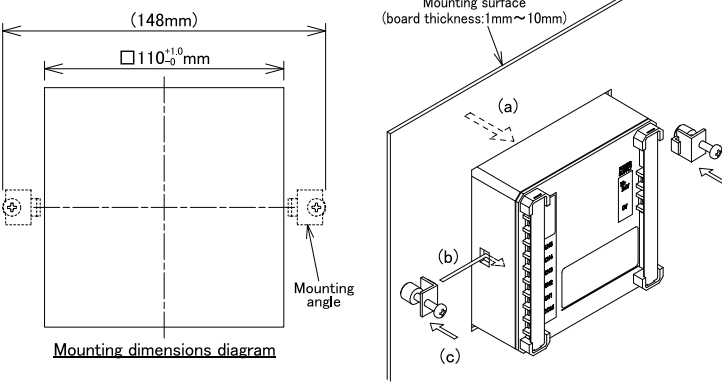
■ Body color
J: Light gray
K: Dark gray

3. Parts Names



4. How to install

- Install the product according to the procedure below.
- ① Create 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: $0.7 \pm 0.1 \text{ N} \cdot \text{m}$)
 - ③ Confirm that the product and the mounting angles are installed properly.



⚠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, apply thread locking adhesive or the like, and perform periodic checking of the tightness of the mounting angle.
- If 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 ($0.3 \text{ N} \cdot \text{m}$)

■ Wiring examples

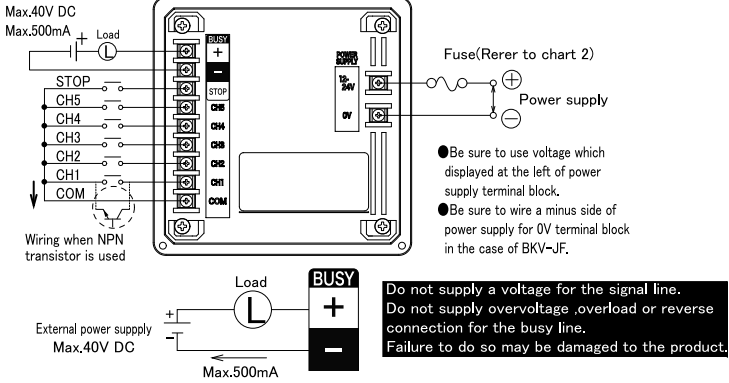


Chart 1. Specifications of Signal line

No-voltage contact circuit	NPN open collector circuit
External point of contact	External point of contact
7mA	7mA
BKV	BKV
Signal line	Signal line
12V (15V)	12V (15V)
COM	COM

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(V_{sat})	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 ($0.3 \text{ N} \cdot \text{m}$). Otherwise, there is a risk of damage by short-circuit, 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 insufficient, 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 conforming to RoHS)

Other Precautions

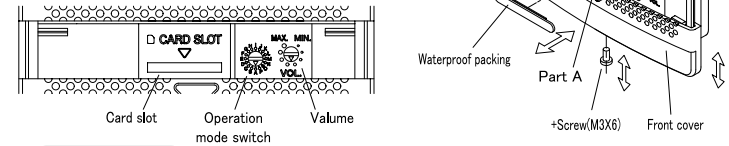
- If power supply or signal lines are switched on simultaneously at the use of plural units, a shift of playing the voice period will occur.
- BKV-31JF comes to receive the influence of the noise easily if you connect the 0V terminal to the terminal COM.

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.

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



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

- ① Change 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.
- ② Reactivate 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.)
- ③ Confirm 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 reduction mode	CH input : CH1 - CH4 / Number of playing messages : 4 CH5 : Input reduces the volume by 15dB.
D	Binary input sound reduction 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.

6-3. Rewriting the Message

By using an SD Card (Model: SDV-26P 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

- ① Turn 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.
- ② After opening the front cover and inserting the SD card which be rewritten the playlist and message data. Playing the information sound "PIPO" and Rewriting is begun.
- ③ When 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.

Request

- For the SD card, use type SDV-26P 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

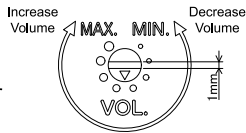
Volume can be adjusted using the volume control. Use a flat-blade screwdriver with the blade thickness of 1.0mm or thinner for tuning the Volume control.

Request

- Turn the volume control lightly. It may be damaged if a torque of $0.3 \text{ N} \cdot \text{m}$ or higher is applied.

6-4. Volume Adjustment

The sound level can be adjusted by the volume control.
Use a flat-head screwdriver with a blade width of 1.0mm or thinner for turning the volume control.



PLEASE

- Turn the volume control lightly, a torque over 0.3N·m can damage the volume control.

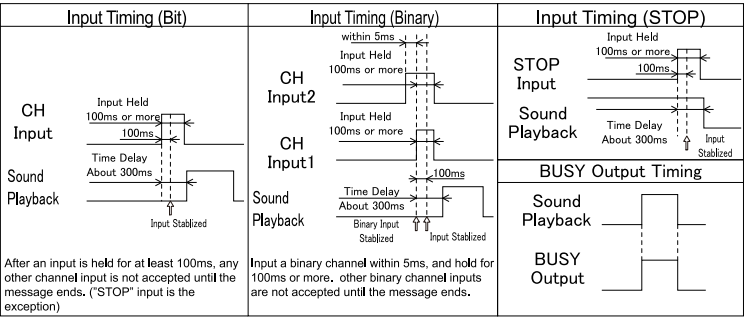
NOTE

- As the sound increases, the possibility of distortion may also occur.
- Due to environmental conditions and tolerances, the volume may not be at zero sound level.
- The volume is turned half-way at the factory prior to shipment.

6-5. Message Playback

Turn the product on and short-circuit the signal line to the common line to for operation.

- Short-circuit the signal wire to common for 100ms or more (Pulse input).
- When controlling this product via the power supply, the start-up takes about 500ms before the sound can play back.
- The input timing for all modes, from the “BUSY” output to the “STOP” input, and all the CH inputs are the same for when playing back messages. Please refer to the Input Timing Chart below for operation.
- When two or more signal wires are short-circuited at the same time to the common lines for bit input, the higher channel takes priority (bit input only).
Priority Input Order: STOP>CH5>CH4>CH3>CH2>CH1



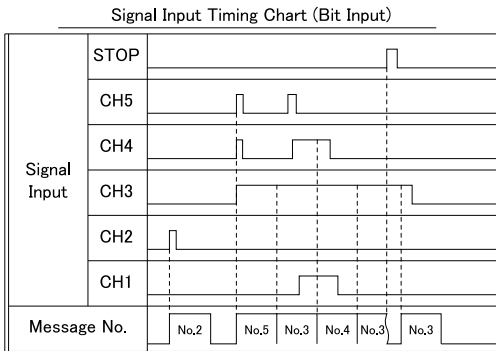
NOTE

- Although a pop noise may occur when the playback is controlled via the power supply or playback start and finish, it is not an indication of failure.
- Even when starting two or more units simultaneously, a lag will occur during message playback.

6-5-1. Bit Input Mode (Operation Mode Switch: A)

If signal wires from CH1 to CH5 are short-circuited to the common, the message of the selected channel will play back.

- During message playback, any input other than “STOP” is not accepted.

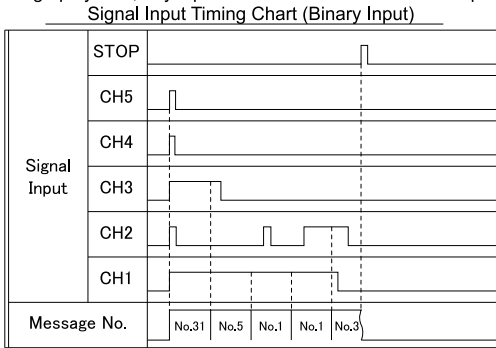


6-5-2. Binary Input Mode (Operation Mode Switch: B)

If signal wires from CH1 to CH5 are short-circuited to the common, the message corresponding to the binary input conversion table will be played back.

(Refer to the “Binary Input Table”)

- During message playback, any input other than “STOP” is not accepted.



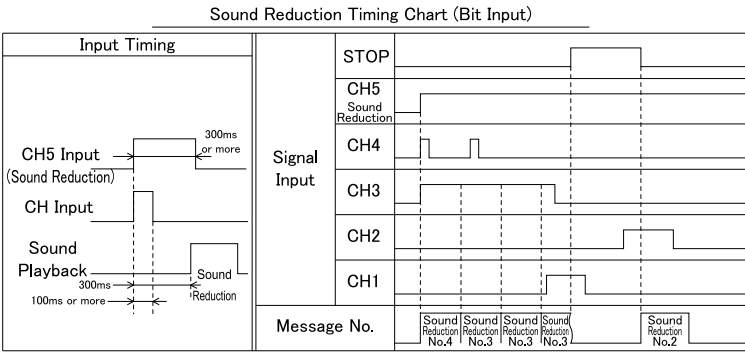
Binary Input Table

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	※ A "1" in the table refers to the short-circuit of the signal line to the common line.					
11	1	1	0	1	0	22	0	1	1	0	1						

6-5-3. Bit Input Sound Reduction Mode (Operation Mode Switch: C)

CH1 to 4 corresponds to Bit Inputs. CH5 Input reduces the volume by 15dB.

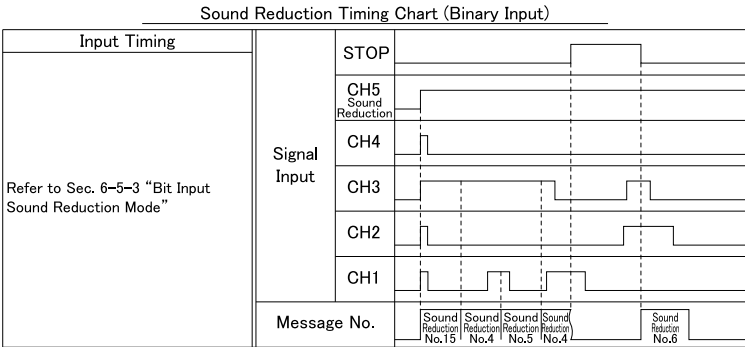
- CH5 has no input priority.
- When multiple messages are entered during playback, the next message will be reduced.
- Any input other than “STOP” or “Sound Reduction” will be ignored during playback.



6-5-4. Binary Input Sound Reduction Mode (Operation Mode Switch: D)

CH1 to 4 corresponds to Binary Inputs. CH5 Input reduces the volume by 15dB.

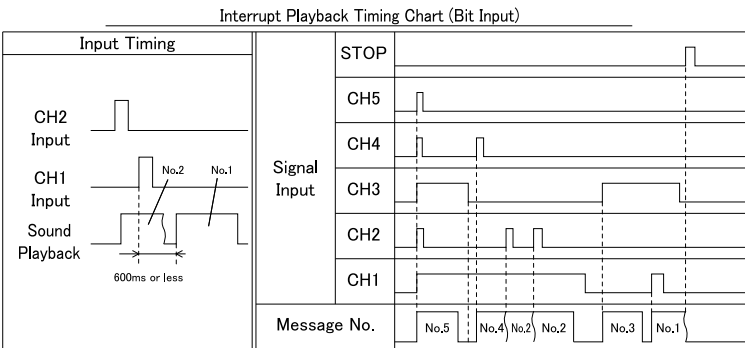
- CH5 has no input priority.
- When multiple messages are entered during playback, the next message will be reduced.
- Any input other than “STOP” or “Sound Reduction” will be ignored during playback.



6-5-5. Bit Input Interrupt Playback Mode (Operation Mode Switch: E)

When one of the signal wires from CH1 to CH5 are entered for a bit input and an input message is entered during message playback, the message will interrupt the message being played.

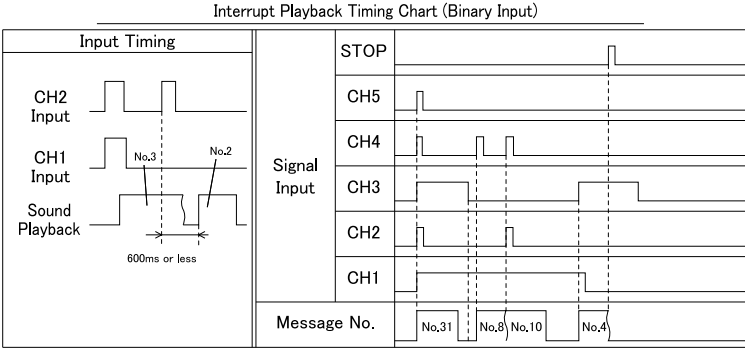
- Even if the input is held down, the message playback will be reproduced only once.
- There is no Priority Input Order



6-5-6. Binary Input Interrupt Playback Mode (Operation Mode Switch: F)

When one of the signal wires from CH1 to CH5 for a binary input are entered and an input message is entered during message playback, the message will interrupt the message being played.

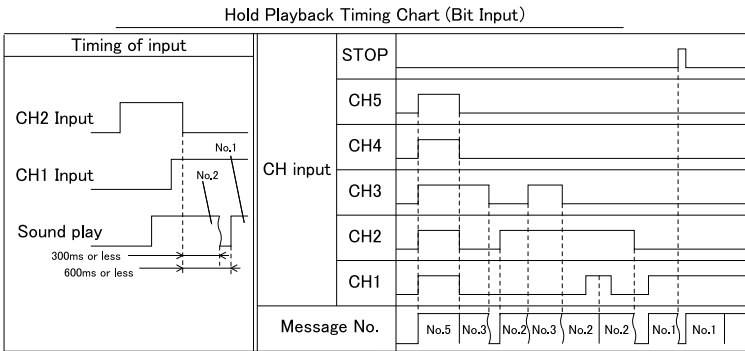
- Even if the input is held down, the message playback will be reproduced only once.
- There is no Priority Input Order



6-5-7. Bit Input Hold Playback Mode (Operation Mode Switch: G)

If the signal wires from CH1 to CH5 for a bit input are held when short-circuited to common, the message will repeat until the signal wire is removed from common.

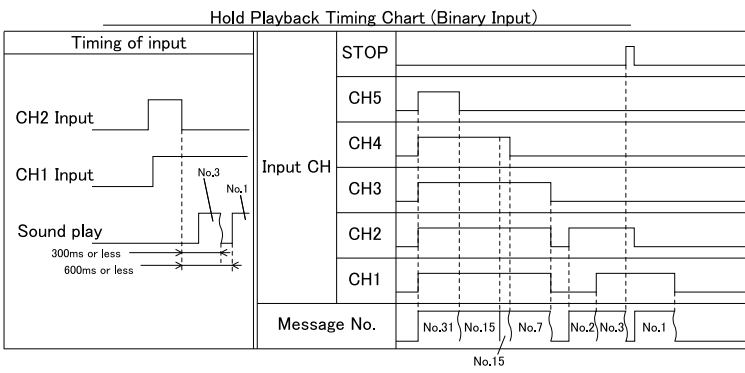
- Once the input is lost, the playback will stop.



6-5-8. Binary Input Hold Playback Mode (Operation Mode Switch: H)

If the signal wires from CH1 to CH5 for a binary input are held when short-circuited to common, the message will repeat until the signal wire is removed from common.

- Once the input is lost, the playback will stop.



6-5-9. Test Playback (Operation Mode Switch: I through P)

Message from CH1 continues being played back. Any other CH inputs are ignored during test playback.

- Use the “Test Playback Mode” when checking the operation or adjusting the volume.
- To operate in the “Test Playback Mode”, select the “Operation Mode Switch” to any mode from “I” to “P”.
- Because the “Test Playback Mode” automatically resets the “Operation Mode” to ‘A’, reboot the product after exiting the “Test Playback Mode” in order for the new settings to take effect.

7. Options and Accessories

- SD Card: Model SDV-26P
The SD Card is used when changing the messages for the Voice Annunciator product.
- Voice Playlist Editor: Model FV-Win
MP3 Editor software with a collection of 2000 MP3 standard messages.
- Mounting Bracket: Model BK-001
Available for Models BK•BKV

8. Before Requesting Repair

Problem	Where to Check	What to do
No Sound	Is there power supplied?	Double check the wiring. (5. Wiring)
	Is the signal line to common line short-circuited correctly?	
	Is the STOP input on?	
	Is the volume turned down to minimum?	
Different Channel Plays Back	Is the signal line to common line short-circuited correctly?	Double check the wiring. (5. Wiring)
	Is the Operation Mode Switch set correctly?	
Cannot Record Message	Is there power supplied?	Double check the wiring. (5. Wiring)
	Is the playlist created on the SD card?	
	Is the file name and contents of the playlist folder right?	Double check the contents of the SD Card Playlist and Data Folder. (FV-Win or Patlite Playlist Editor Help File.)
	Is the data storage location correct?	
	Is the SD card an option product from our company?	Double check the SD Card. (6-3. Message Rewriting)
	Is the SD card inserted correctly?	
	Is the volume turned down to minimum? (Overwrite beep may not be heard)	Adjust the volume. (6-4. Volume Adjustment)
SD Card not being read	Is the “SDV-2GP” being used?	
	Is the SD Card correctly inserted?	Double check the SD Card. (6-3. Message Rewriting)

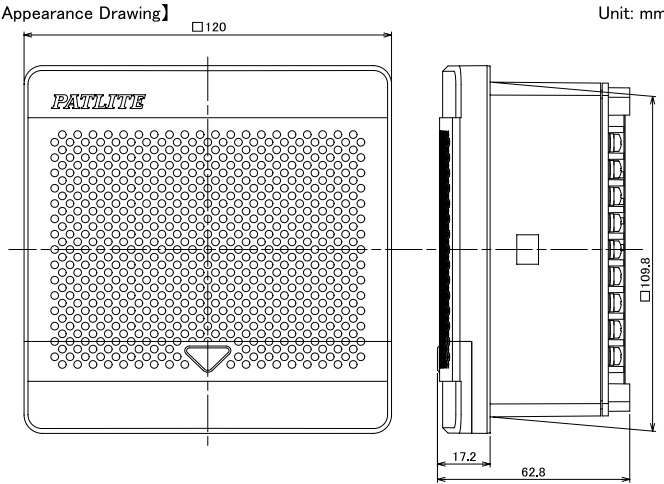
- Even after proper installation and handling, if the product does not operate correctly, contact your PATLITE Sales Representative.

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. 95dB: Placed on a 300mm ² base at a distance of 1 meter with a 1kHz sine wave at a -6dB input. Volume Adjustable ※ Sound level of message will vary with the surrounding environment.		
Audio File	MPEG1 Audio Layer III (MP3) Standard Bit Rate: 64kbit/s, Fs=44.1kHz (CD Quality)		
File Format	FAT16		
Internal Memory Size	504kB (MP3 data total)/ Maximum playback time 63sec (at Standard Bit Rate)		
Number of Playback Messages	Bit Input: 5 / Binary Input: 31		
Operating Temperature Range	-10 to +50℃		
Relative Humidity	85% RH or less (no condensation)		
Mounting Direction	Indoor: Upright, sideways and inverted mounting (Use Upright if water splashing is present) Outdoor: Upright Direction Only		
Protection Rating	IP54 (Upright Direction for Panel Mount only)		
Insulation Resistance	1MΩ or more (at 500V DC) between terminal and chassis		
Withstanding Voltage	500V DC for 1 minute	1000V DC for 1 minute	1500V DC for 1 minute
Vibration Resistance	45.0m/s ² (Upright Position)	19.6m/s ² (Upright Position)	
Mass	350g ± 10%	530g ± 10%	

- This product conforms to EN standard and shows the CE Marking. (24V type.)
- This product has been tested and found to comply with the limits for a Class A device, pursuant to EMC DIRECTIVE. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This product must not be used in residential areas.

【Outer Appearance Drawing】



- PATLITE Corporation disclaims all liability for any malfunction or damage occurring as a result of handling contrary to the instructions, cautions and warnings mentioned in this manual.
- Specifications may change without notice due to continual product improvement.

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