KATO
PRECISION RAILROAD MODELS
UNITRACK

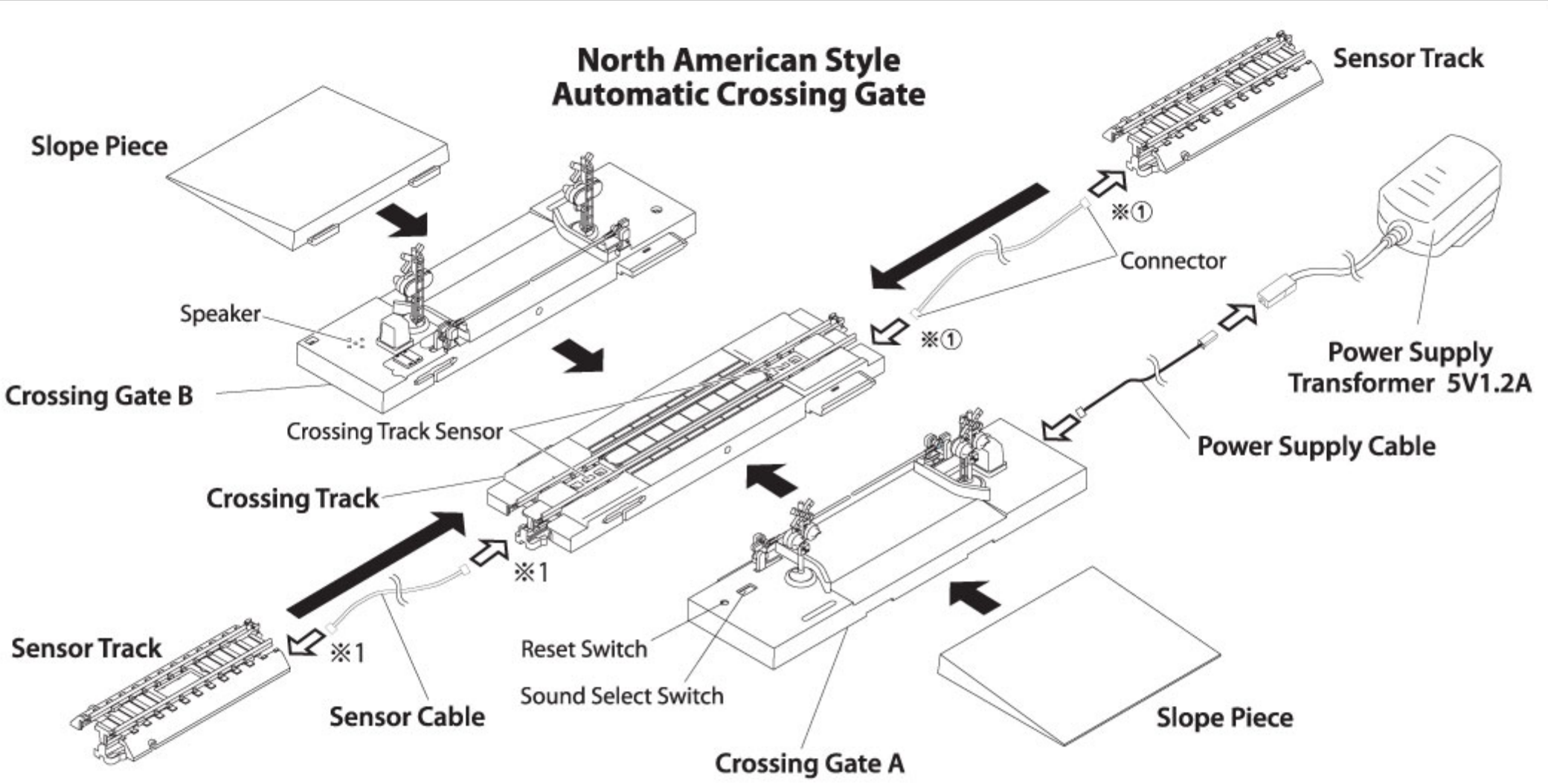
N Scale

20-652-1 North American Style Automatic Crossing Gate
20-653 Double Track Attachment Set for Automatic Crossing Gate
20-654 Sensor Track Extension Cable
Instructions

Product Features

1. Uses Infrared sensors for detecting cars and locos.
2. 4 kinds of crossing sounds are available with adjustable volume.
3. Alternating LED alert lights on the Signal Mast.
4. Powered independently from the track power circuit makes the crossing gate function even when on unpowered track.
5. DCC Friendly.
6. Capable of expanding to a maximum of six parallel tracks via double track attachments.
7. Can be placed into specific track plans such as those with one-directional traffic or ones using sidings.
8. Reset Switch in the event of any movement malfunctions.

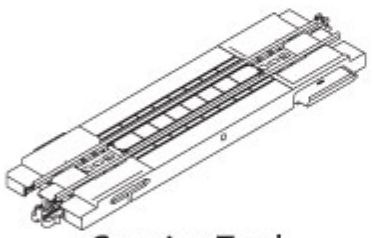
Product Contents



- Slope Piece・・・2
- Crossing Track – 4 7/8" (124mm) ・・・1
- Crossing Gate A・・1
- Crossing Gate B・・・1
- Sensor Track - 2 7/16" (62mm)・・・2
- Sensor Cable - 47 ¼" (120cm)・・・2
- Screwdriver・・・1
- Power Supply Cable・・・1
- Power Supply Transformer 5V1.2A・・・1
- Crossing Gate Sticker Sheet・・・1

※① Make sure that the connector is plugged in the correct direction. For reference, carefully read the "How to connect the Cable/Power Supply Cable" section on page 2

Contents of the 20-653 Double Track Attachment Set for Automatic Crossing Gate

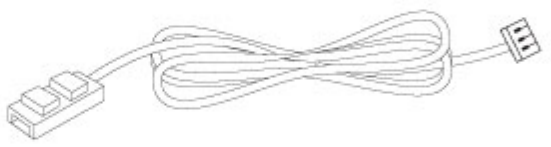


- Crossing Track - 4 7/8" (124mm) x 1

- Sensor Track - 2 7/16" (62mm) x 2

- Sensor Cable - 47 ¼" (120cm) x 2

Sensor Track Extension Cable Set 20-654



- Sensor Cable Extension 47 ¼" (120cm) x 1

NOTES

- **Only use the included Power Supply Transformer.**
- **Model Railroad use only. Do not use for other purposes.**
- **Do not damage the sensor part.**
- **Keep away from water.**

Returning the Crossing gate and accessories to the box

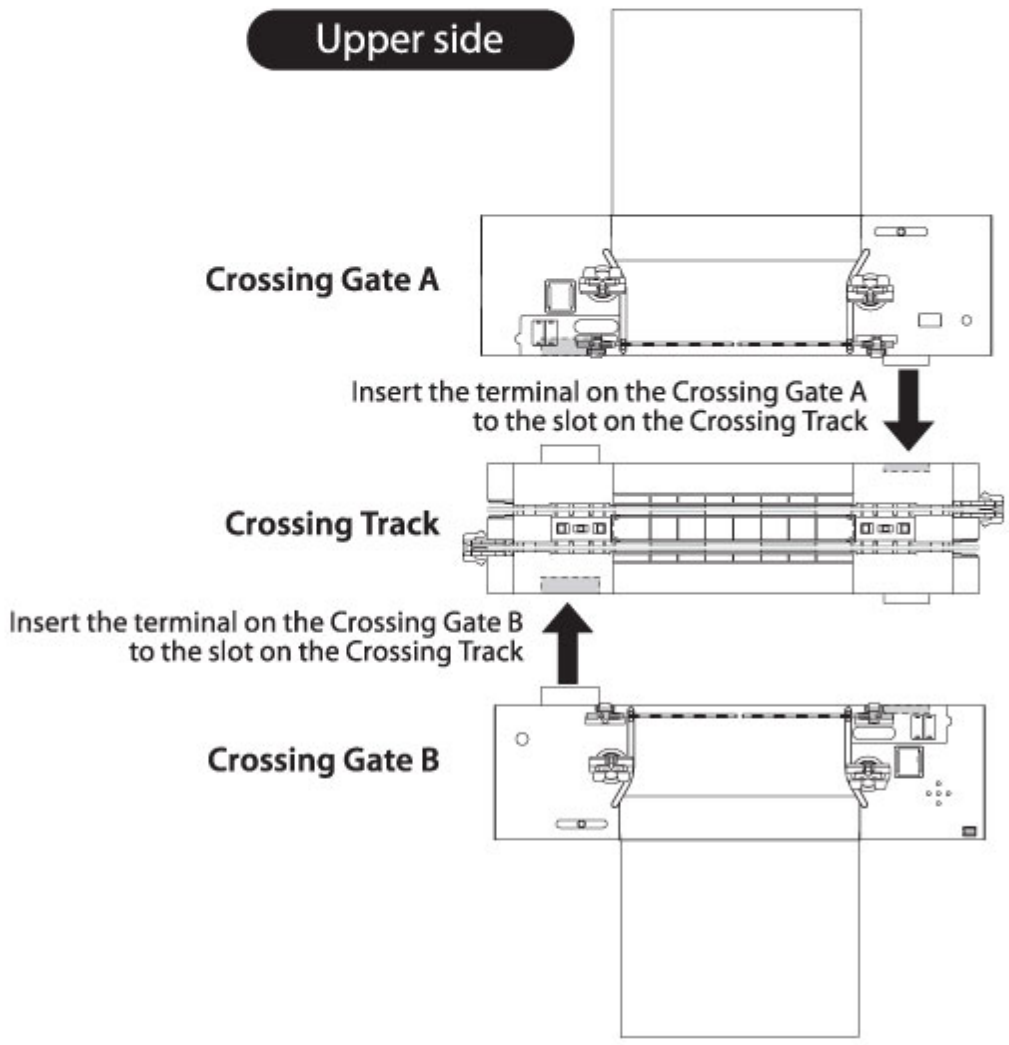
It is recommended to keep all components together as a set when packing the crossing gate away to avoid damage or lost parts.

Model Specifications

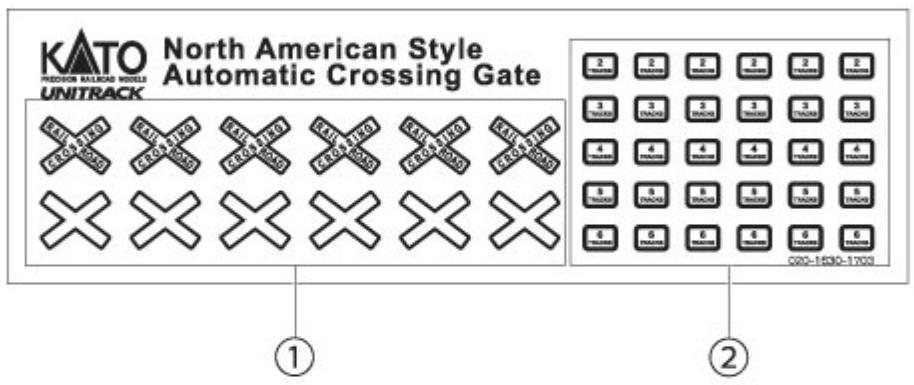
·Length–Assembled Length: 7 13/16" x 4 7/8" (198mm x 124mm)
·Power Input Voltage: 5V 1.2A 6W
·Maximum Current Draw: 960mA (with maximum 6 tracks)
·Sensor Type: Infrared

Basic Set Up

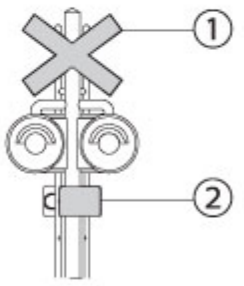
■How to connect the crossing gates and track



■Crossing Gate Sticker Sheet

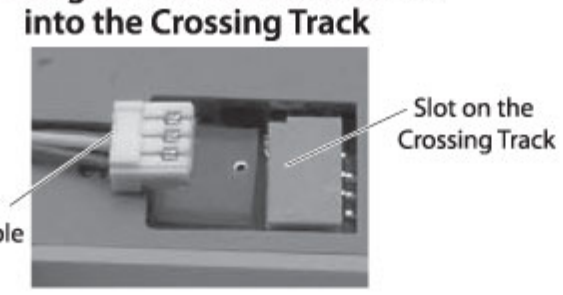


It is recommended to keep all components together as a set when packing the crossing gate away to avoid damage or lost parts.

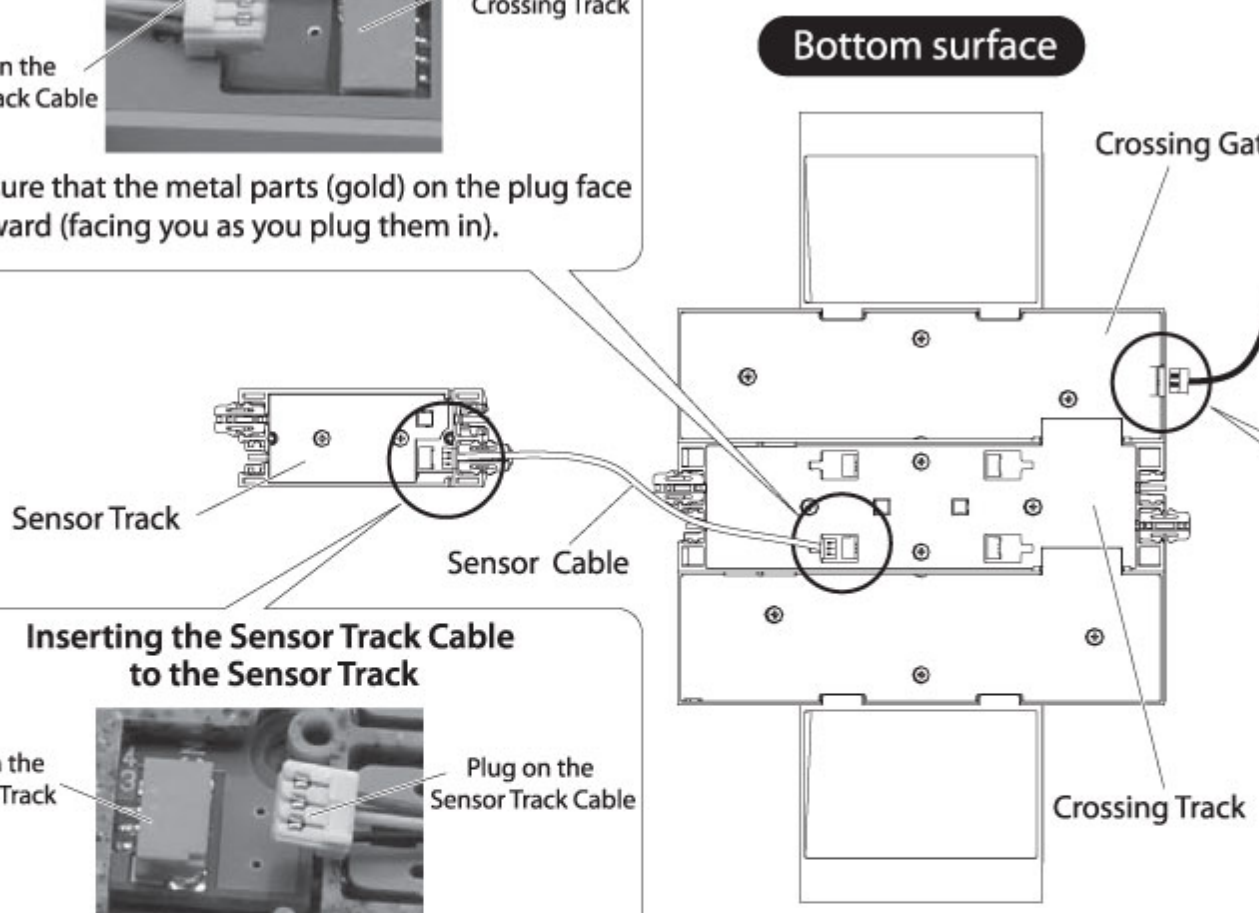


■How to connect the Cable/Power Supply Cable to each connector

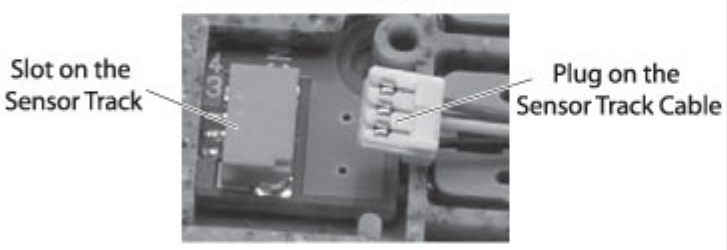
Inserting the Sensor Track Cable into the Crossing Track



Make sure that the metal parts (gold) on the plug face downward (facing you as you plug them in).

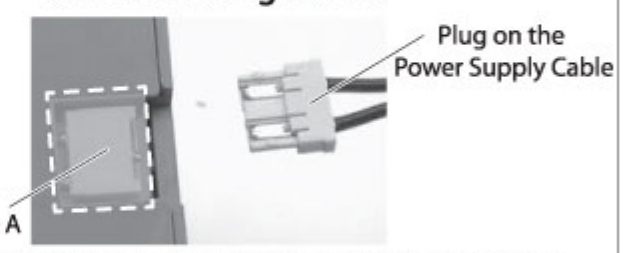


Inserting the Sensor Track Cable to the Sensor Track



Make sure that the metal parts (gold) on the plug face downward (facing you as you plug them in).

How to connect the Power Supply Cable to the Crossing Gate A



Note: Photo ② has been re-colored to emphasize the plug slot - on the real product the area inside of the dotted line is the same color as the rest of the part.

Make sure that the metal parts (silver) on the plug face downwards (facing you as you plug them in).

⚠ NOTE

- When the Power Supply Cable is connected to the Crossing Gate, the crossing gate is automatically powered on, and after a few seconds of activation will run a calibrating self-test.
- Make sure that the Sensor Tracks are clear when the power is turned on, otherwise, the sensor will not function correctly at detecting locomotives or cars.
- **The connectors are very small and fragile, so please ensure that they are being installed in the proper connecting direction, and also handle with extreme care when connecting or disconnecting them.**

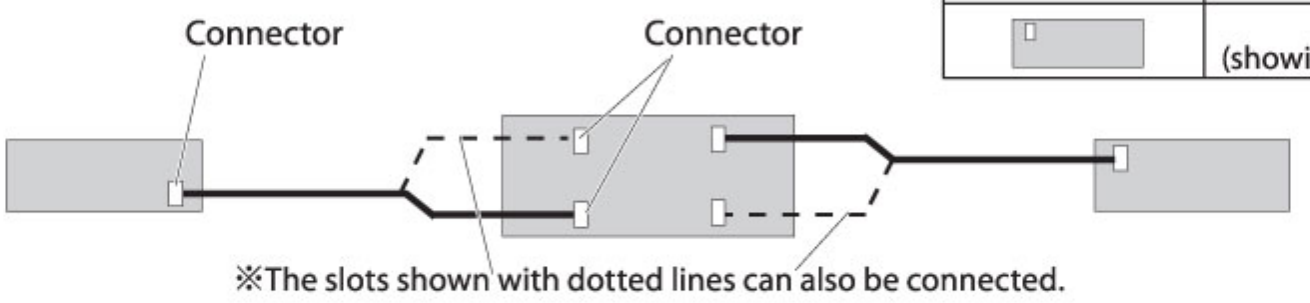
How to connect the Crossing Track and Sensor Track

Basic Connection **※For connecting one Crossing Track and two Sensor Tracks**

The Sensor Track Cable can be connected to either slot on the Crossing Track.

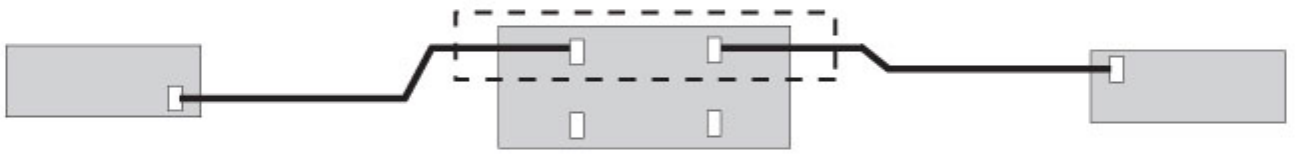
Number of connection slots		
	Crossing Track (showing the bottom side)	4 pcs
	Sensor Track (showing the bottom side)	1 pc

Example 1

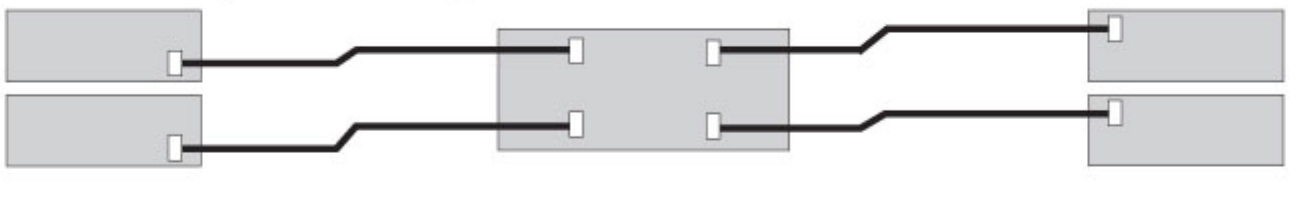


The connection indicated with dot line on the drawing can also work.

Example 2

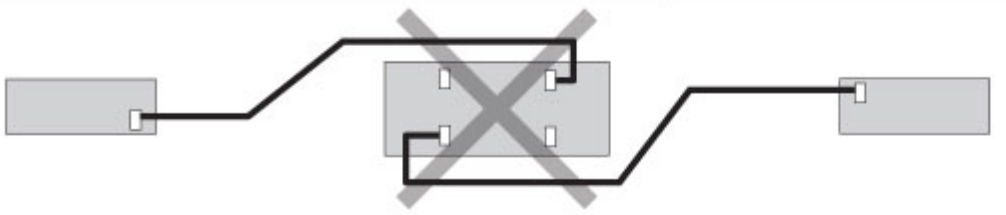


Advanced Example **※For connecting one Crossing Track to more than three Sensor Tracks**



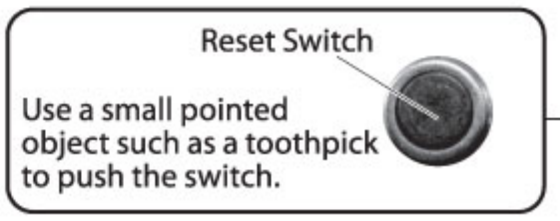
⚠ NOTE

The Sensor Cables for the sensor tracks must be connected on the closest side of the sensor track to function properly each Sensor Track.

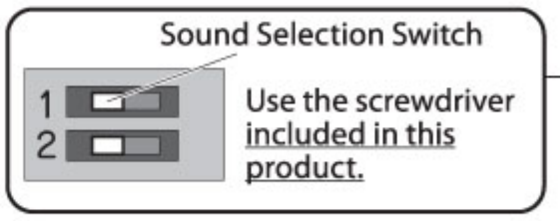


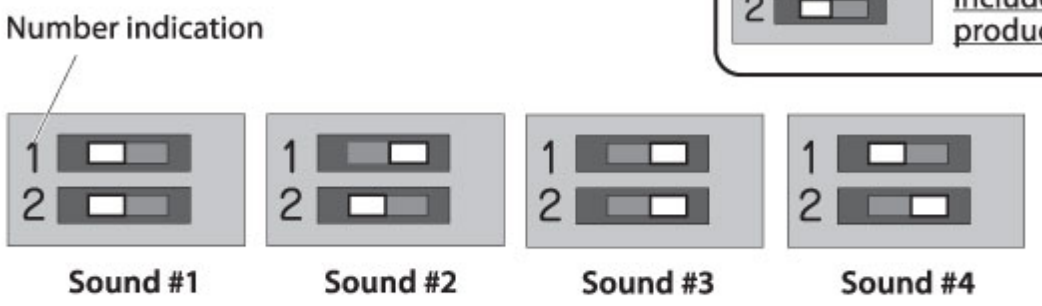
Features

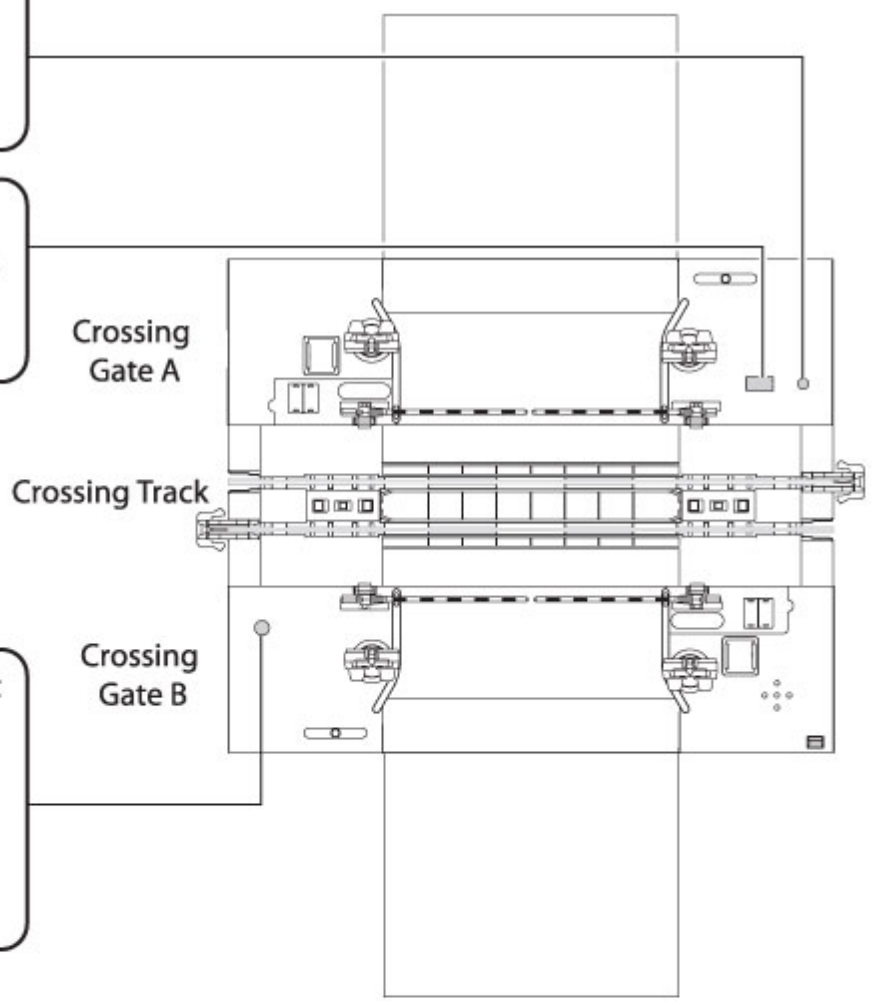
■How to reset



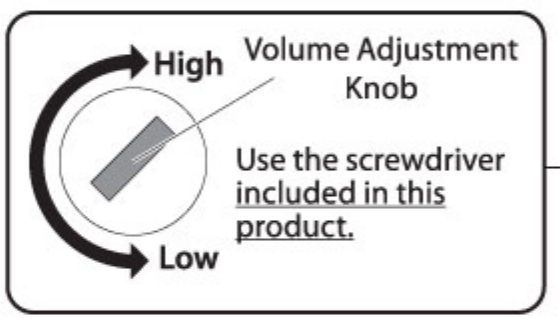
■How to swap between the 4 sound options



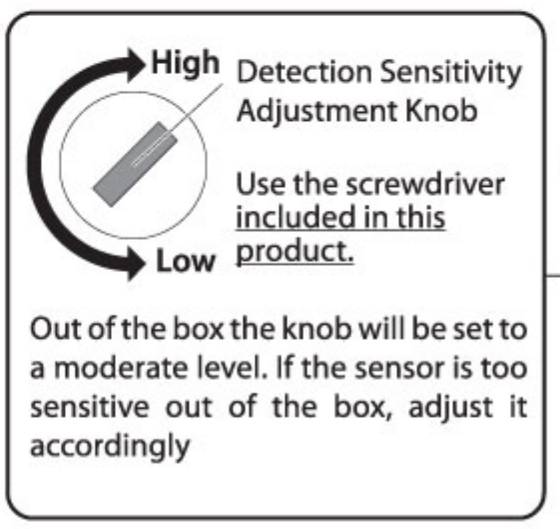


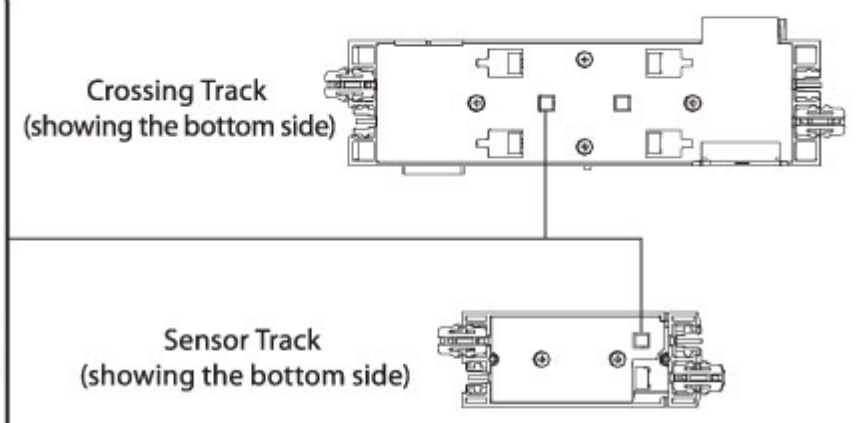


■How to adjust the sound volume



■How to adjust the sensitivity of the Sensor Track





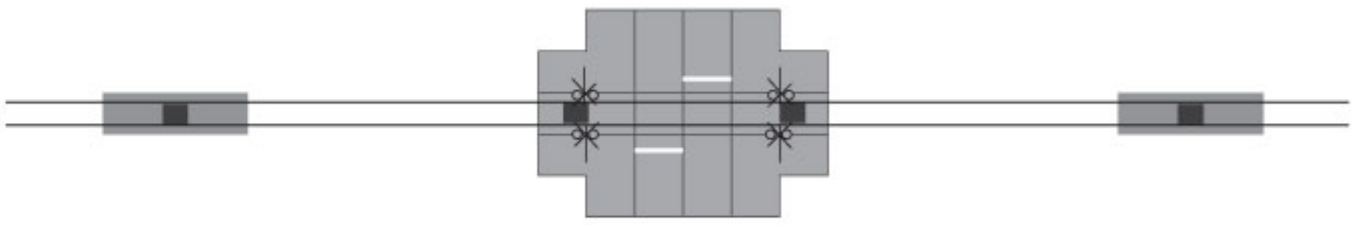
⚠ NOTE

DO NOT use excess force when rotating the dials, as it may cause damage

Basic and Expanded Plans

Basic Configuration

This setup consists of the four major components on the list shown to the right. Please adjust the distance between the sensor track and crossing track depending on the speed and length of your trains.



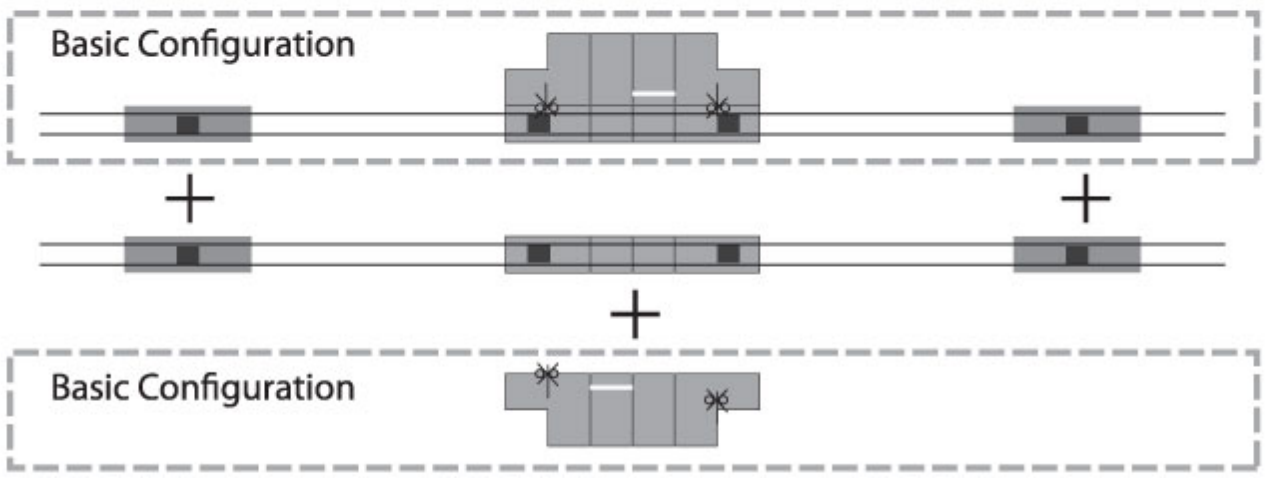
Automatic Crossing Gate Basic Set	
Crossing Gate B	
Crossing Gate A	
Crossing Track	
Sensor Tracks	× 2 pcs

Basic Expanded Plans

By adding the Double Track Attachment Set, you can expand the tracks to 2 track, 4 track, and even 6 track crossings.

■Double Track Plan

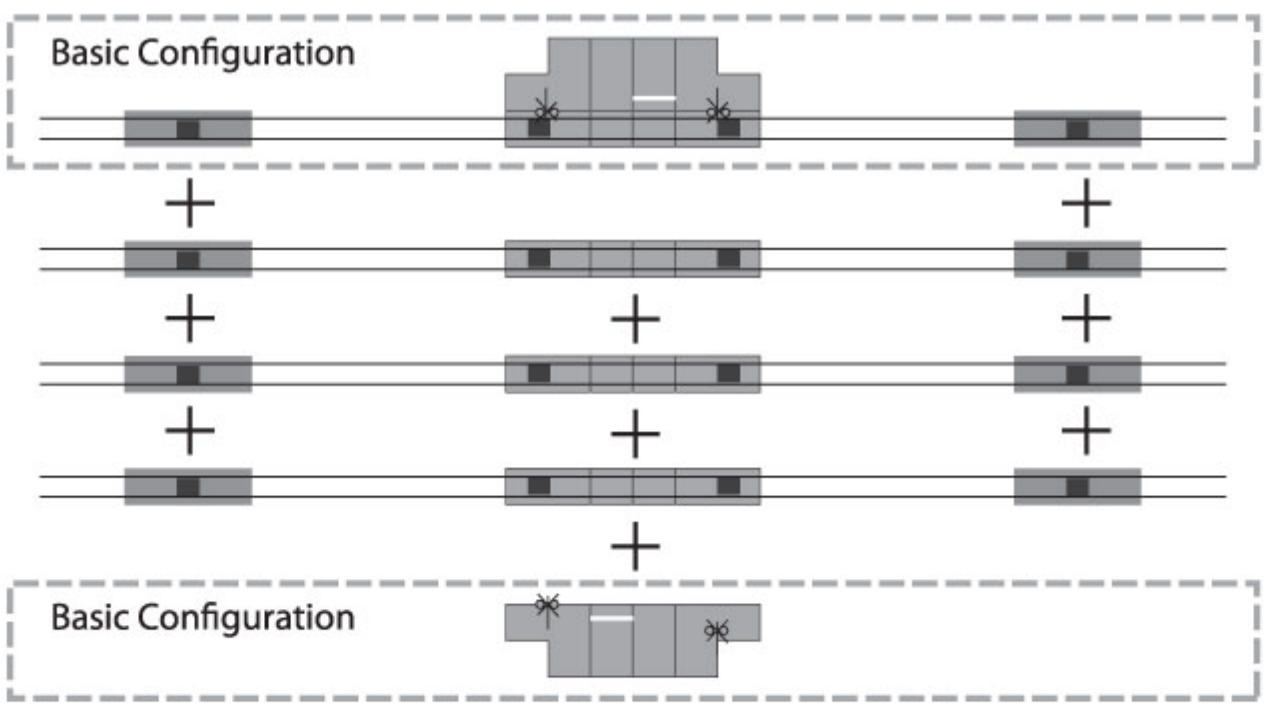
Expanded track plan by adding one Double Track Attachment Set (with two Sensor Tracks and one Crossing Track).



Additional Components	
Double Track Attachment Set	1 Set

■4 Tracks (2 Double Tracks) Plan

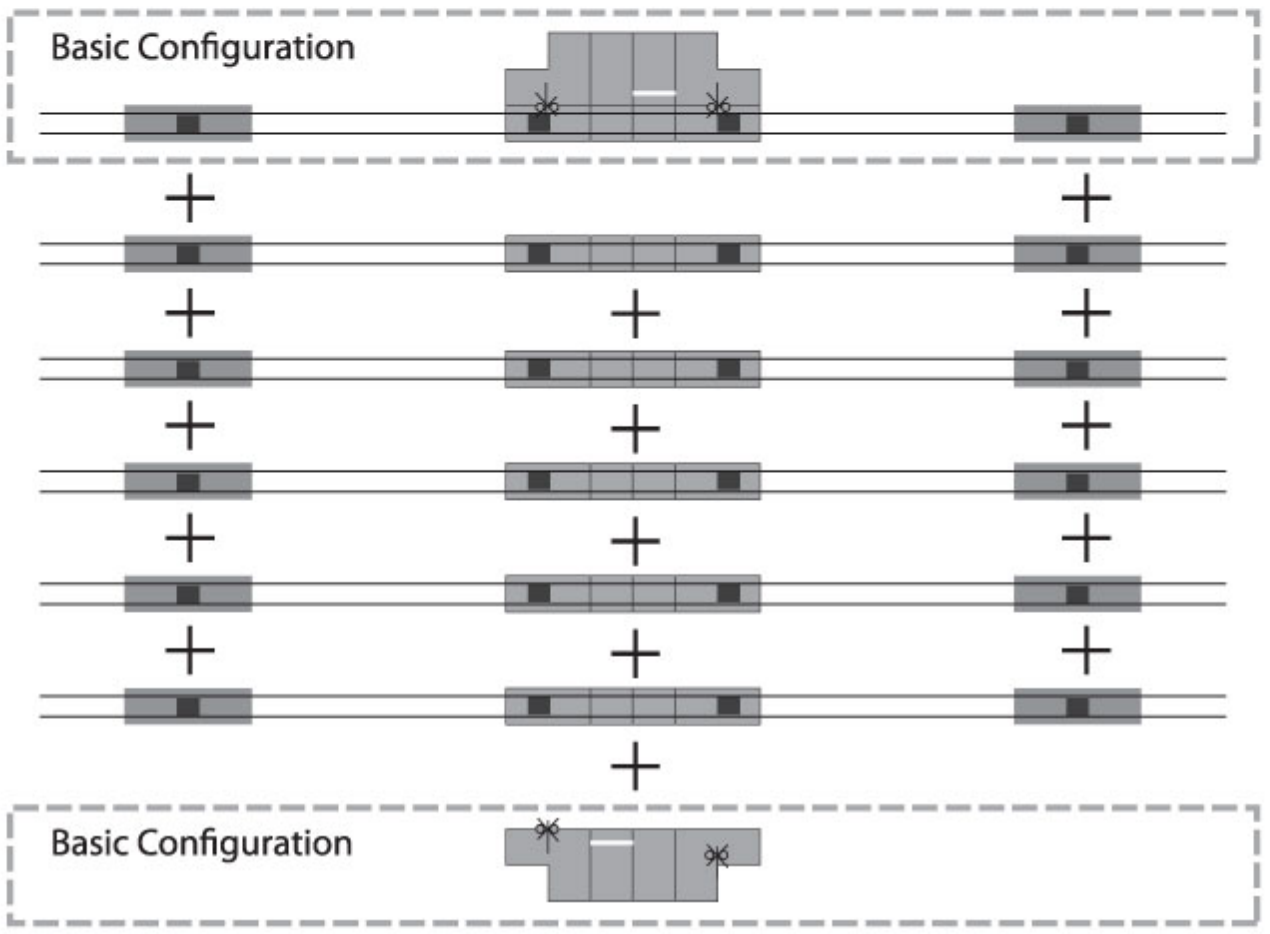
Expanded track plan by adding three Double Track Attachment Sets (with six Sensor Tracks and three Crossing Tracks).



Additional Components	
Double Track Attachment Set	3 Sets

■6 Tracks (3 Double Tracks) Plan

Expanded track plan by adding five Double Track Attachment Sets (with ten Sensor Tracks and five Crossing Tracks).



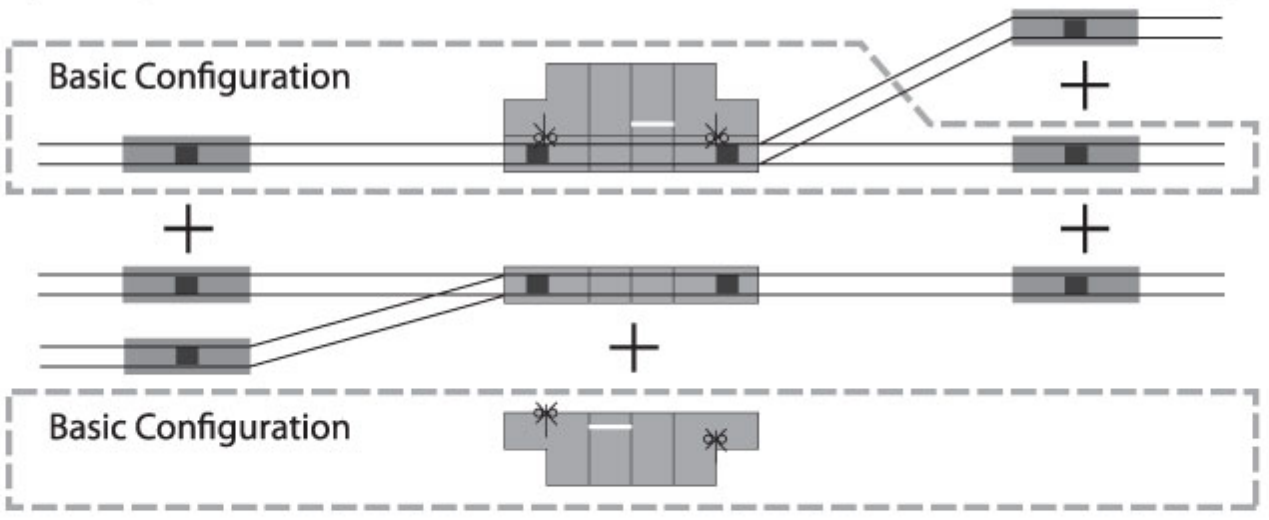
Additional Components	
Double Track Attachment Set	5 Sets

Advanced Expanded Configurations

By adding the Double Track Attachment Set, you can expand the tracks to the advanced plans shown below.

■Advanced Plan 1

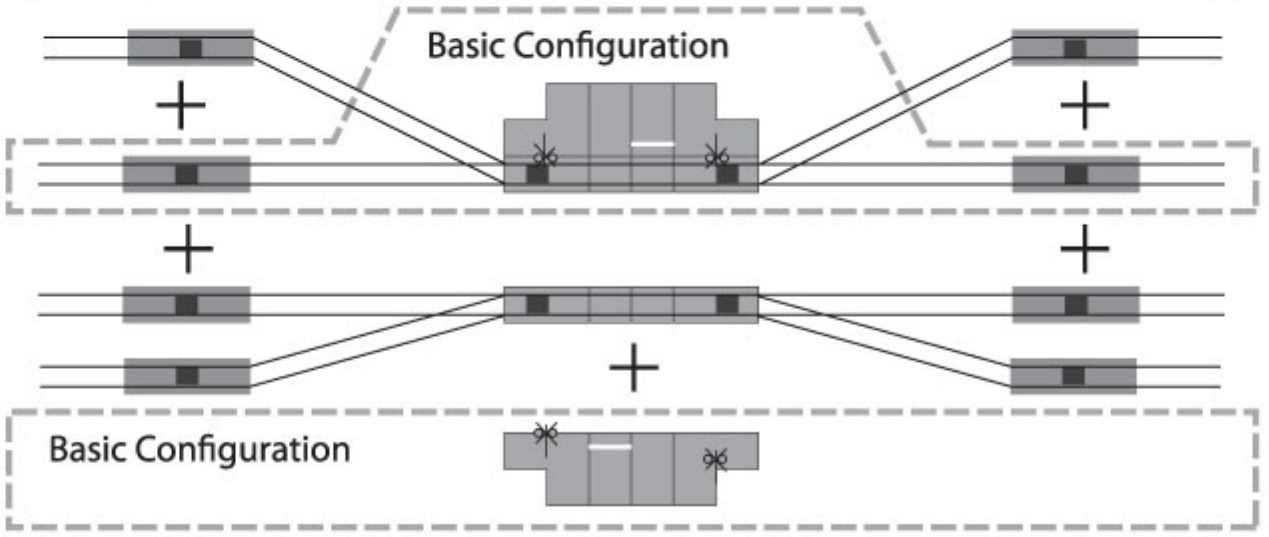
Expanded track plan by adding two Double Track Attachment Sets (with four Sensor Tracks and one Crossing Track, the second Crossing Track is NOT used.).



Additional Components	
Double Track Attachment Set	2 Sets

■Advanced Plan 2

Expanded track plan by adding three Double Track Attachment Sets (with six Sensor Tracks and one Crossing Track, two other Crossing Tracks are NOT used.).



Additional Components	
Double Track Attachment Set	3 Sets

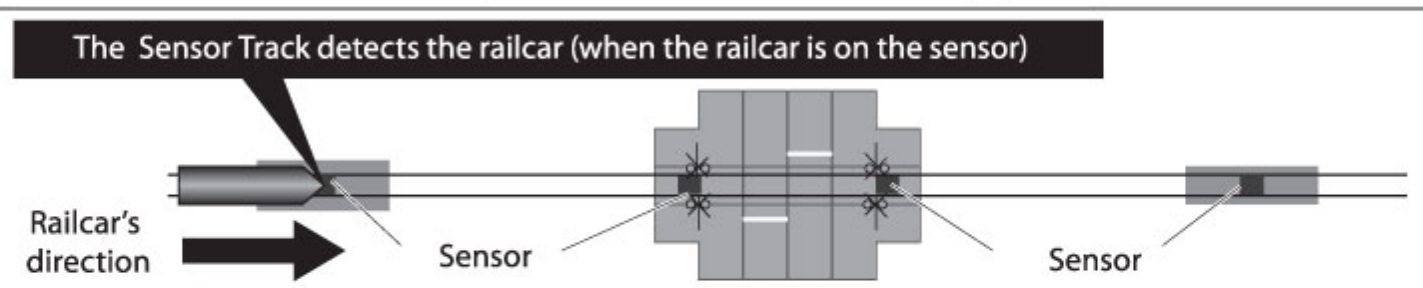
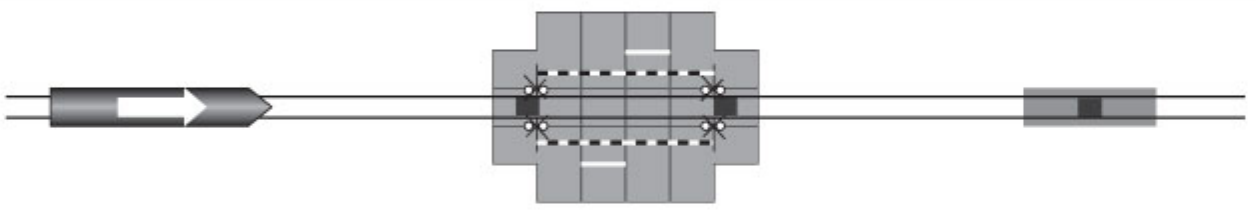
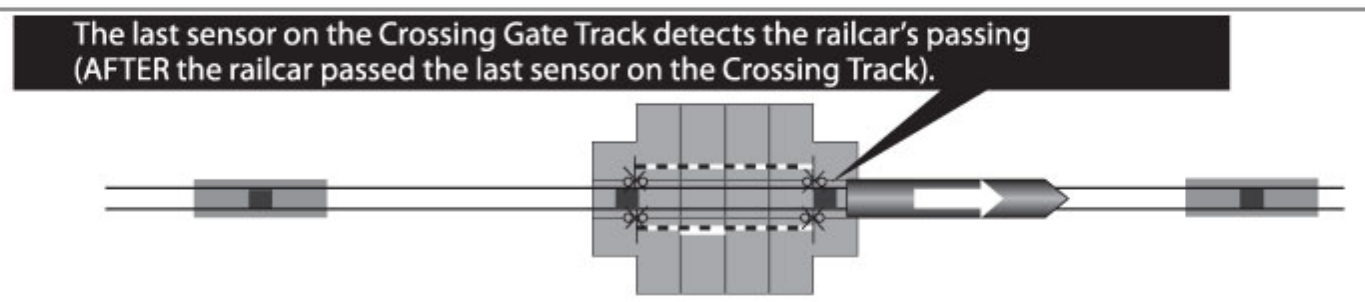
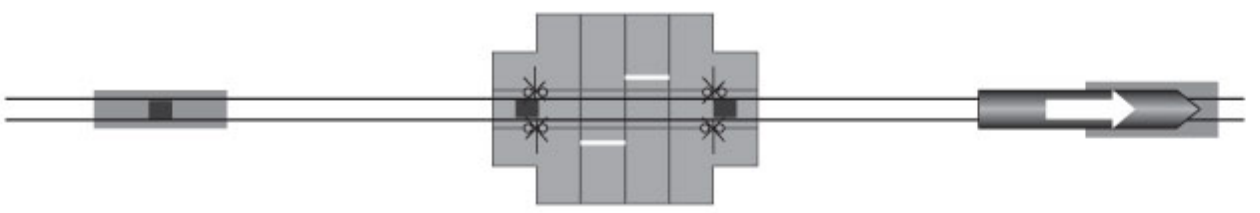
⚠ NOTE

DO NOT connect over the maximum number of components shown on the list, otherwise, it will cause the gate functions to malfunction.

Maximum number of connections	Crossing Gate A	Crossing Gate B	Crossing Track	Sensor Track
	1	1	6	12

Motion Patterns

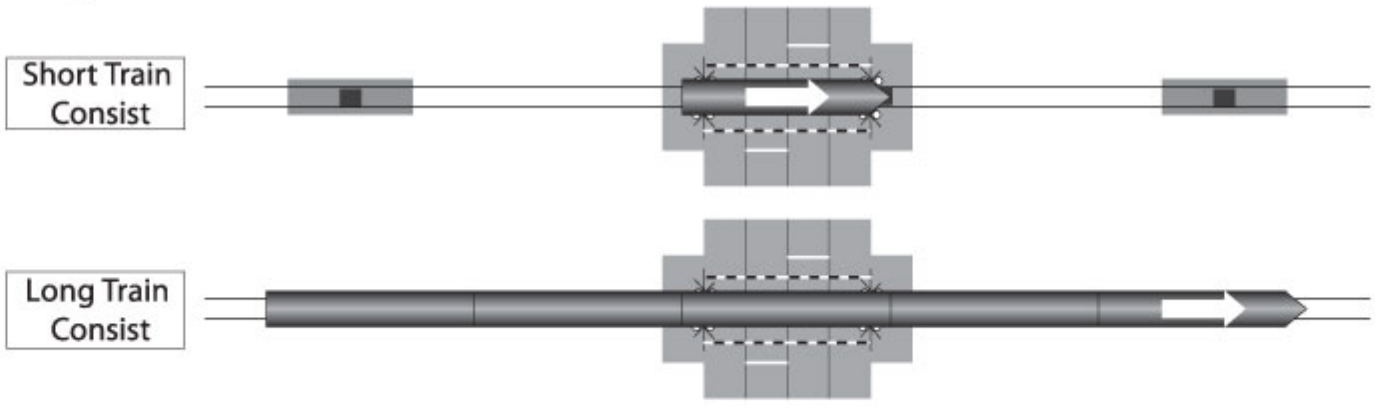
Basic Patterns The STEP 1 through 4 are the basic motion patterns. When ① the Sensor Track detects the railcar, the crossing gates close, and ② when the last sensor on the Crossing Track detects the railcar's passing, the crossing gates open.

The Sensor Track detects the railcar →	①**The crossing gates close.**
The last sensor on the Crossing Track detects the railcar's passing →	② **the crossing gates open.**
STEP 1 The Sensor Track detects the railcar.	
STEP 2 The Crossing Gates close.	
STEP 3 The last sensor on the Crossing Track detects the railcar's passing.	
STEP 4 The Crossing Gates open.	

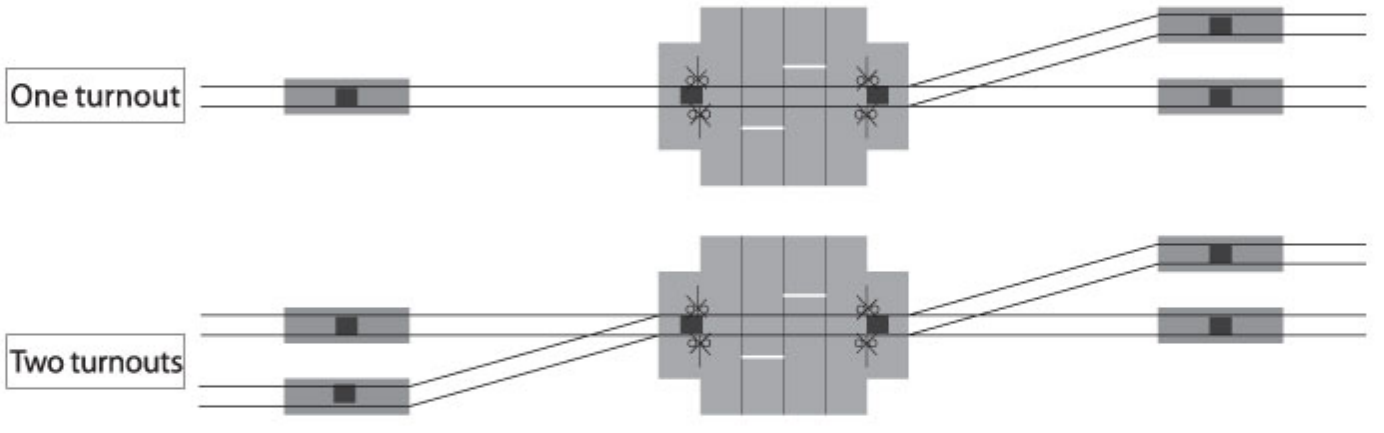
Advanced Patterns

On the below drawing, the same motion pattern as on the basic pattern occurrs. (①when the Sensor Track detects the railcar, the crossing gates close, and ②when the last sensor on the Crossing Track detects the railcar's passing, the crossing gates open.) Please refer the example of double track shown below.

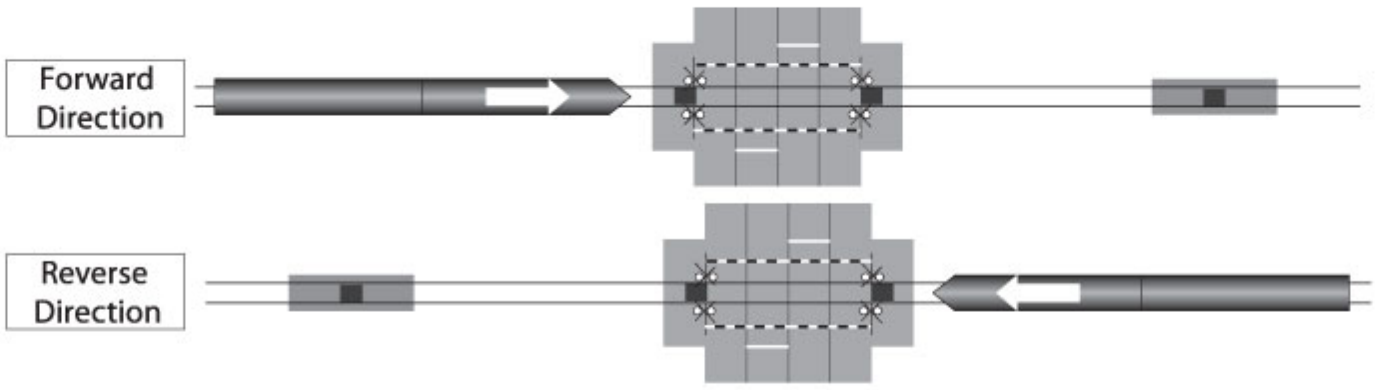
■Short Train Consist & Long Train Consist



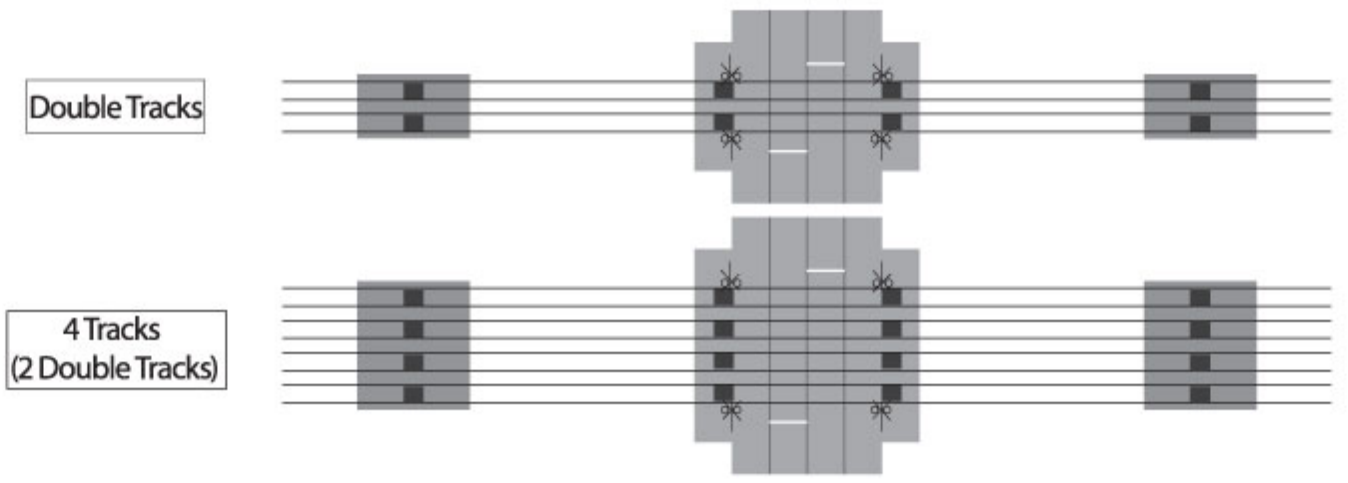
■Setting turnouts

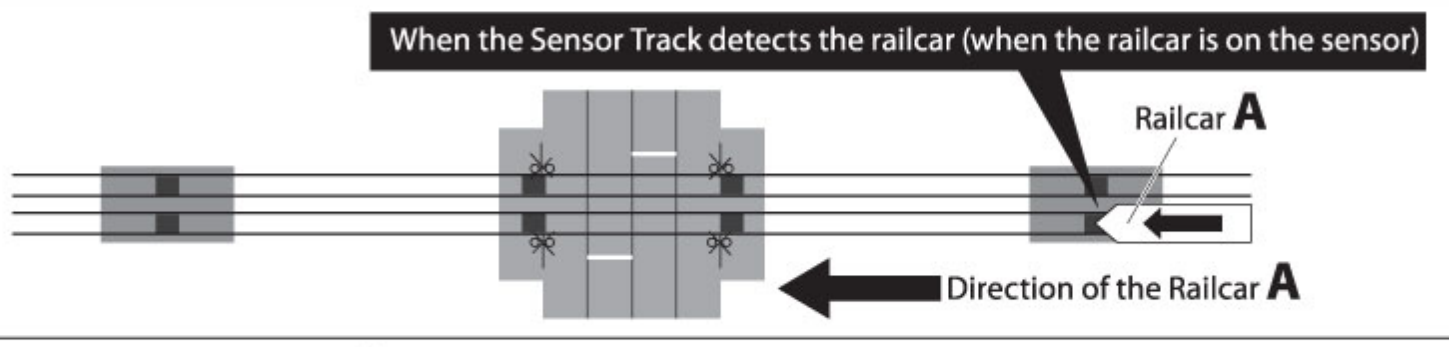
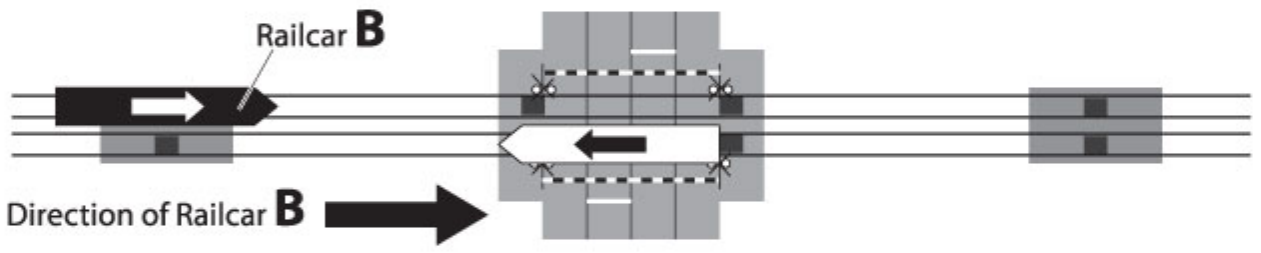
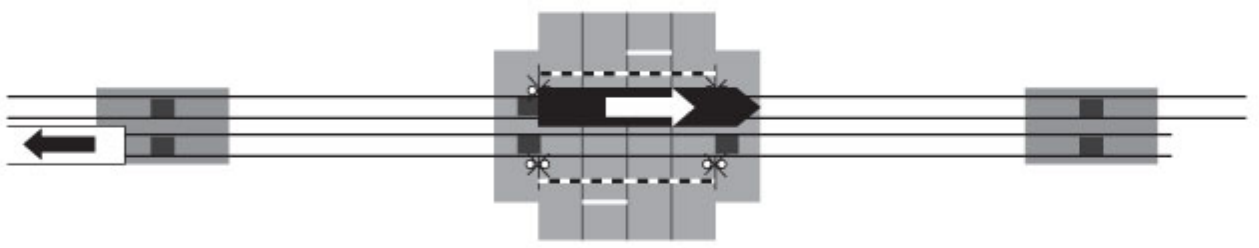
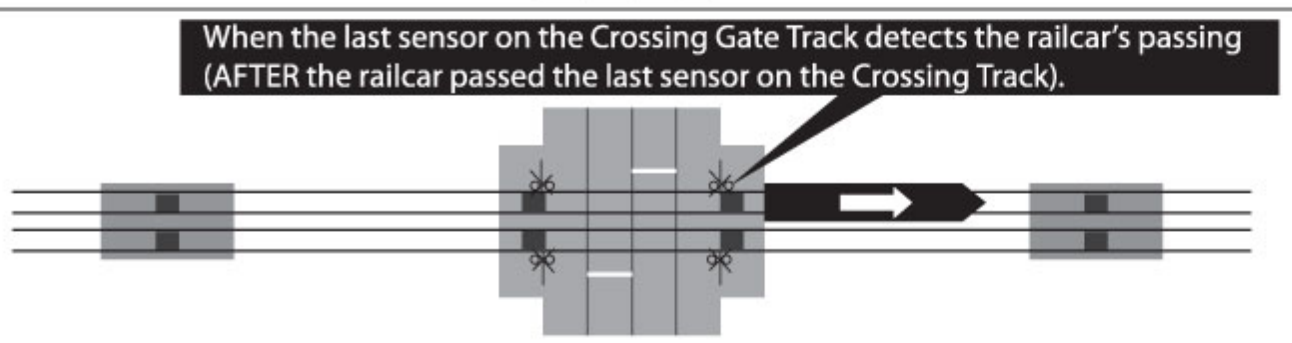


■Forward & Reverse Directions



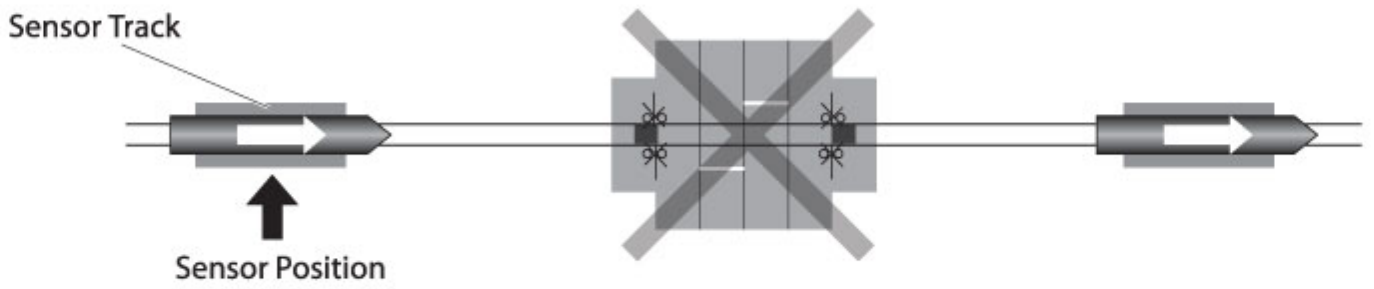
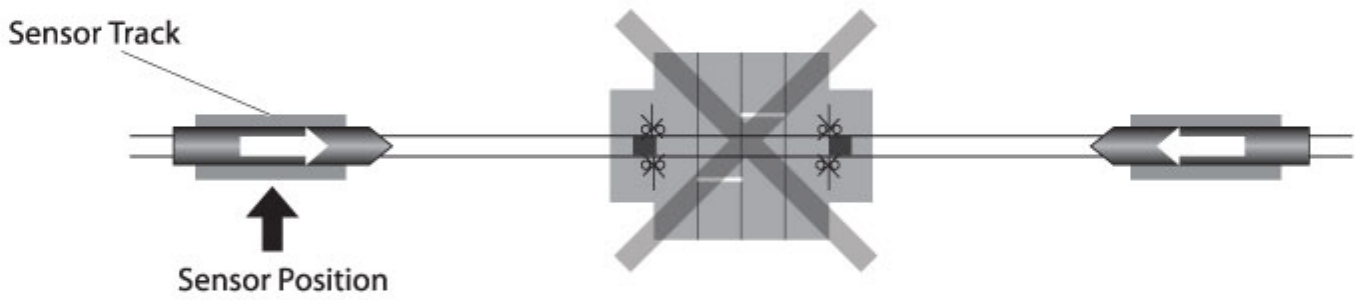
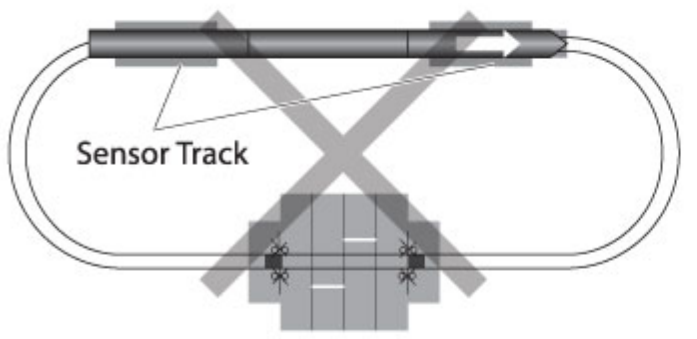
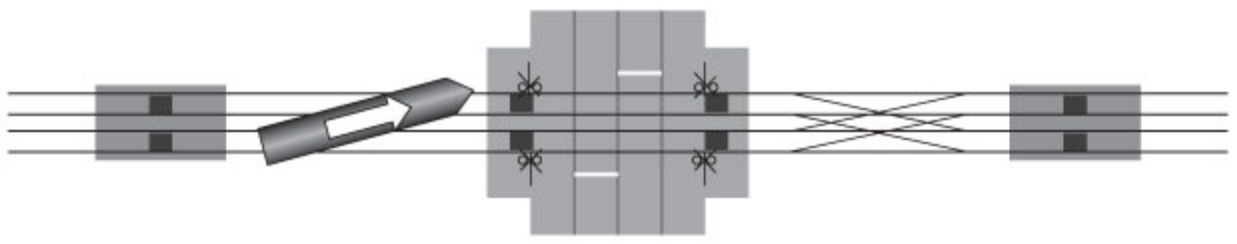
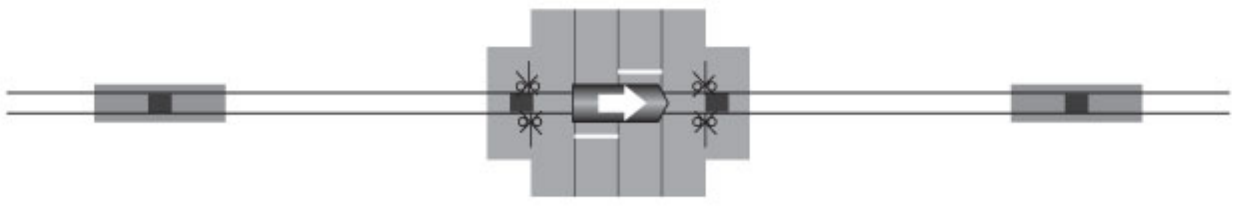
■Double Track Operation



Examples of Double Track Operations (same as for 3-6 Tracks Operations)	
STEP 1 When the Sensor Track detects the railcar A	
STEP 2 The Crossing Gates are close, and the railcar A is passing the Crossing Track.	
STEP 3 The railcar B is passing the Crossing Track.	
STEP 4 The last sensor on the Crossing Track detects the railcar B's passing, and the crossing gates open.	

NOTES on operation

Examples of ways NOT to set up the crossing gate. At the below cases, the Automatic Crossing Gate will not work correctly.

Running multiple trains: Before the first railcar passes the last sensor track, the second railcar passes the first sensor.	
Multiple Trains on DCC: Two trains are coming to the crossing gate from the both directions.	
Operating a long train on a small loop track which passes both sensor tracks at the same time without ever crossing the gate area.	
When the train passes a crossover in between the sensor track and crossing gate.	
Operating an extremely short loco or car that is less than 3 5/8" (92mm) long.	

Examples of improper motion The below conditions might cause improper operation.

- Exposure to direct or bright sunlight, interfering with the Infrared sensor.
- At the distance of within 3.28ft (1m) of a fluorescent lamp, incandescent lamp, or LED light.
- Direct light and heat from a halogen lamp.
- Operating near flicking lights.
- Operating a TV remote or other IR device near the layout.
- Setting the sensor track under a viaduct track or in a tunnel.
- Allowing the sensor to get covered with dust or scratches.
- The railcar passes the sensor at too high of a speed.
- Being used in a location with over 1,000 lighting lux. (1.64 – 3.28ft distance from a fluorescent lamp)

Maintenance tips

*Regular maintenance is recommended to prevent malfunctions.

- Keep the sensor parts of the Sensor Track and Crossing Track clean. Dusts and scratches may cause malfunctions.
- For the regular maintenance, wipe gently with a soft cloth containing a small amount of neutral detergent.
- When not in use, turn the power off, and keep the crossing gates closed.
- Before and after operating your trains, wipe the top of the rail with a soft cloth containing a small amount of rail cleaner. After that, wipe the rail with a soft dry cloth.
- When the wheels on your locomotives get dirty, wipe the wheels with a soft cloth containing a small amount of rail cleaner. After that, wipe the wheels with a soft dry cloth.
- DO NOT pull on the Power Supply Cable or Sensor Cables forcibly as it may cause damage.

Problem Check List

Problems	Solutions
Sensor track does not detect the railcar.	Are all cables connected properly? p2 Make sure the sensors are free of dust and debris. p7 Make sure there are no objects on the sensor part when the power turns ON. If there are objects covering the sensor on startup, the sensor will not work correctly. After confirming that there are no obstructions, push the Reset Switch or turn the power ON again. p2,3 Ensure that the sensor sensitivity knob is not turned too far to the left. This may reduce the sensitivity to below a level where it can detect a rail car. p3 Ensure that it has not been set up in an incompatible manner (see page 7) p7
Even after the train passes the crossing gate, the sound continues and the gates remain closed.	Make sure that the sensors are not connected in an improper position (see page 7) p7 Make sure that there is no dust or debris covering the sensors. In the event of any dust, wipe the track down to remove it. p7 Is the train or car moving too quickly? Or is it too short? This may cause the sensor to have difficulty detecting it. p7 Ensure that the sensor sensitivity knob is not turned too far to the left. This may reduce the sensitivity to below a level where it can detect a rail car. p3 Make sure that the total number of components is not exceeding the maximum number. Too many linked components will cause the operation to fail. p5
When recovering from a derailment on the crossing gate, the sound continues and the gates stay closed.	Make sure there are no objects covering the sensor. If the sensor is being covered, the gate cannot work correctly. After confirming that there are no obstructions, push the Reset Switch or turn the power ON again. p2,3
When the light in the room is turned ON, the crossing gate starts operation without a locomotive crossing a sensor.	Make sure that any fluorescent lamps in the room are not flickering as this will cause improper operation. If an old flicking fluorescent light is used, avoid using the crossing gate near it, and after confirming that there are no issues with the gate, push the Reset Switch or turn the power ON again. p3
When the power turns ON or the Reset Switch is pushed, the crossing gate works only for a brief second.	This is not the malfunction – this is actually the gate's test/calibration action.
When being operated, the crossing gates continue opening and closing, and the sound stops.	Make sure that the total number of components is not exceeding the maximum number. Too many linked components will cause the operation to fail. p5
When a Station building is set near the Sensor Track, the sound continues and the crossing gate stays closed.	Sometimes the sensor detects the shadow of the structure building. To reduce the sensitivity, rotate the Sensitivity Knob to the left direction to prevent this problem. p3
When the crossing gate is set under the viaduct track, the sound continues and the crossing gates stay closed, or there is no detection on the sensor.	The sensor is detecting the objects above it, so avoid setting the crossing gate under a viaduct or in a tunnel. p7
When the crossing gate is set near a window, light bulb, or fluorescent lamp, the sound continues and crossing gates stays closed closing, or operation is otherwise compromised.	Make sure that the crossing gate is set in an area that is not mentioned in the improper operation section. p7 Keep approximately 3.28ft – 6.56ft distance from the any windows through which direct sunlight passes to keep less than 1,000 lux of surrounding light. p7 Keep more than 3.28ft distance from any light bulb or fluorescent lamps to keep below 1,000 lux of lighting. p7

If there is still a problem after checking above list...

If repair is necessary, send it back to the below address to the attention of the repair department. Include a note with a copy of your sales receipt, description of your problems, and any operational circumstances to better allow troubleshooting.

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