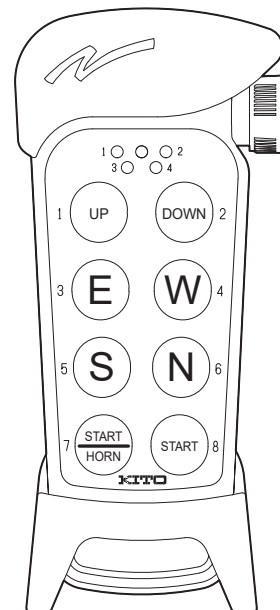


PK Series

KITO Radio Remote Control System

Owner's Manual



To Customer

- Thank you for purchasing KITO Radio Remote Control System.
- Operators and maintenance engineers are requested to read this manual. After reading, please keep this manual at hand for future use.

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Introduction

- The Owner's Manual is intended for a wiring contractor engaged in wiring between a radio system and a control box for the equipment operated such as an overhead crane, and a hoist, and an actual operator.
- This radio system has been certified by a local radio law (destination country). Contact KITO if you have any inquiry about the certification.
- To handle a motorized end carriage, hoist (electric chain hoist, etc.) and various types of trolleys, see their respective manuals.
- Assign a maintenance engineer* who will manage periodic inspection, repair, etc.
 - * Person familiar with the structure and mechanism of the radio device and recognized as having expertise by a business entity.
- If you have any question about the information in this Owner's Manual, contact the sales shop where you purchased the product.

■ Disclaimer

- KITO shall not be liable for any damage incurred thereof due to natural disaster such as fire, earth quake and thunderbolt, conduct by third party, accident, willful conduct or negligence by customer, erroneous use and other use exceeding the operational condition.
- KITO shall not be liable for any incidental damage due to the use or non-use of the product such as the loss of business profit, suspension of business and damage of the lifted load.
- KITO shall not be liable for any damage arising from negligence of the contents in the Owner's Manual and the use of the product exceeding the scope of its specification.
- KITO shall not be liable for any damage arising from the malfunction due to the combination of the product with other devices in which KITO is not concerned.
- KITO shall not be liable to supply the spare parts for the product for which it has passed for 10 years since the discontinue of the product.

■ Restriction on Use

- This radio system is designed and manufactured to remotely operate an overhead crane (electrically operated lifting, lowering, travel and traverse) by means of electric waves. In the case of using for other purposes, consult the sales shop beforehand where you purchased the product.

■ Operators

- Read carefully this Owner's Manual and the instruction manuals of related products, fully understand their contents, and the use and operate the product.
- Be sure to wear the proper clothing and protective equipment when using and operating the product.

■ Laws and Standards

Carry out installation, inspections, operations, maintenance management in accordance with the laws and standards of the country and region where the product is used.

An application before installation or a test before beginning usage may be required. Furthermore, the tester may be required to have specific qualifications. Be sure to check the laws and standards of the corresponding country and region before using the product.


Safety Precautions


If the radio receiver is wired or used in a wrong manner, the radio system may result in an electric shock or cause the crane to get out of control. Read this Owner's Manual carefully before installation, wiring, operation and maintenance/inspection. Use the product after fully understanding the product knowledge, safety information and precautions.


This Owner's Manual classifies the safety information and precautions into three categories of "DANGER", "WARNING" and "CAUTION".

To handle the motorized end carriage, hoist (electric chain hoist or wire rope hoist) and various types of trolleys, see their respective manuals to observe the described instructions.

Description of Signal Words

 **DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



 **WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



 **CAUTION** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Further, the event described in CAUTION may result in serious accident depending on the situation. All three categories describe important contents. Please follow the instruction.

After reading, please keep this manual at hand for future use by the user.

Description of Safety Symbols

 Means "Prohibited" or "You must not do".
Prohibited action is shown in the circle or described near the circle.
Prohibited This Owner's Manual uses  as the general prohibition.

 Means "Mandatory Action" or "You must do".
Required action is shown in the circle or described near the circle.
Mandatory This Owner's Manual uses  as the general instruction.

■ General Matters on Handling and Control

DANGER



Prohibited

- Only personnel familiar with the Owner's Manual and the warning labels allowed to operate.
- Only the maintenance engineer is allowed to disassemble and repair.
- Only eligible personnel are allowed to operate the crane and perform slinging work. See "Applicable Laws, Regulations and Standards".
- Do not modify the product and its accessories.

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- Understand the contents of the Owner's Manual sufficiently. Then operate the product.
- Warning label is affixed to each part of the product. Follow the instruction described in the warning label.
- Carry out daily inspection and periodic inspection before use.

Failure to comply with these instructions may result in death or serious injury.

(to be continued)

Safety Precautions (continued)

CAUTION



Prohibited

- Do not store the radio transmitter and radio receiver in a place subjected to dew condensation.
- Do not drop them from a high place.

Failure to comply with these instructions causes bodily injury or loss of property.



Mandatory

- When discarding the product, disassemble it not to be used and discard in accordance with the ordinances of local government or the rules specified by the business entity.
- Carry out daily inspection by user.
- Carry out periodic inspection (monthly, annual) by maintenance engineer.
- Keep the record of the periodic inspection.
- For inspection of related devices other than this radio system, conduct inspection according to their respective instruction manuals.
- Do not store the radio transmitter and radio receiver in a high-temperature and high-humidity place.
- When handling the radio transmitter, be careful not to shock it.

Failure to comply with these instructions causes bodily injury or loss of property.

■ Installation

DANGER



Prohibited

- Never allow wiring to be done by other than a professional contractor or a person having expertise.
- Do not connect the power for the controlled equipment body in reverse phase.

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- Be sure to conduct grounding. In addition to grounding, attach an earth leakage breaker to an electric circuit.
- Install the radio receiver in such a manner as to satisfy the working environmental conditions. (See “Radio Receiver Specifications”.)
- Select and use an electromagnetic contactor with appropriate capacity.
- Be sure to conduct a test run after completion of installation and wiring.

Failure to comply with these instructions may result in death or serious injury.

■ Operation

DANGER



Prohibited

- Before starting operation, check functioning of the overhead crane by the radio system. If it does not work smoothly, do not use it.
- Do not use the radio system being damaged, emitting an abnormal sound or vibrating abnormally.
- Only legally qualified personnel are allowed to operate.
- Do not drop the radio transmitter from a high place, give a strong impact to it or press operation buttons with a hard object such as a tool. (Do not apply an impact acceleration of 15 G or more to the radio transmitter.)

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- If the crane moves differently from the indicated direction of the operation button, stop operation immediately.
- Perform remote-control operation at the position where the crane and the lifted load are visible.
- In a place where multiple wireless cranes are installed, make sure of the intended one before operation.
- When not working with the crane, be sure to turn off the radio transmitter and the crane.

Failure to comply with these instructions may result in death or serious injury.

CAUTION



Prohibited

- Use the product only at the rated voltage.
- Do not perform plucking.
- Do not remove the warning and caution nameplates and labels attached to the radio system or leave them defaced.
- Do not perform excessive inching.
- Do not operate beyond a standard working range (within 100m between the radio transmitter and receiver (no obstacle)).

Failure to comply with these instructions causes bodily injury or loss of property.



Mandatory

- Be sure to attach an accessory shoulder belt to the radio transmitter and put on the belt to operate.

Failure to comply with this instruction causes bodily injury or loss of property.

■ Maintenance and Inspection

DANGER



Prohibited

- Do not modify the product and its accessories.
- Use only our genuine parts.

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- Be sure to turn off the power before conducting maintenance, inspection and repair work.
- Only personnel with expertise designated by a business operator are allowed to conduct maintenance, inspection and repair work.
- In case a defect is found in maintenance and inspection, repair it immediately without using the product.

Failure to comply with these instructions may result in death or serious injury.

CAUTION



Mandatory

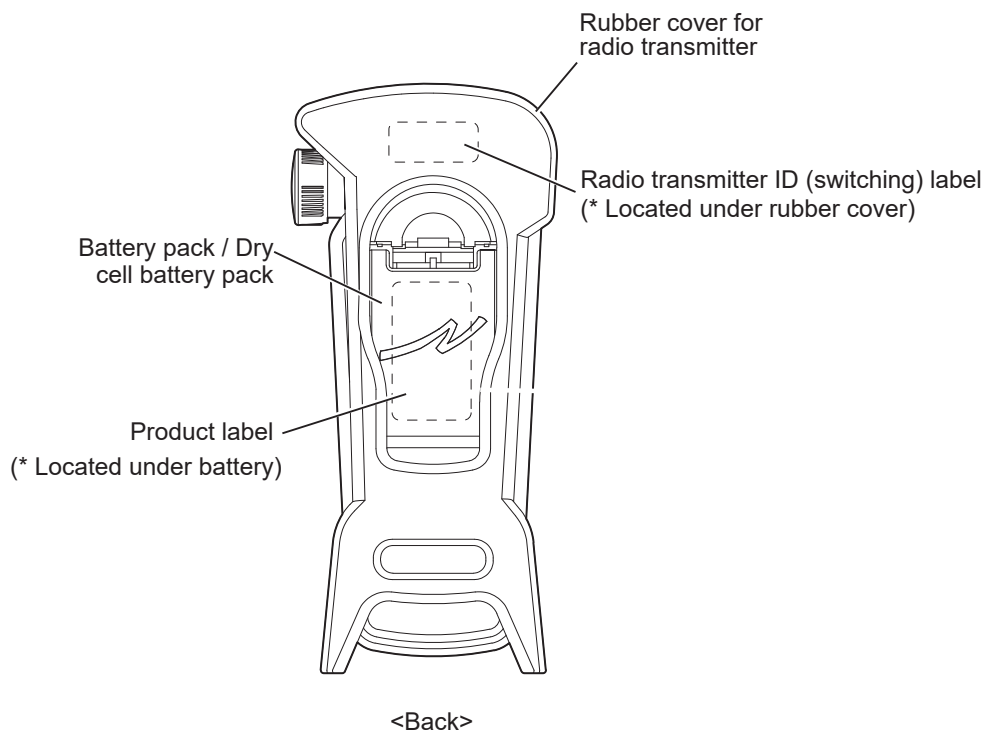
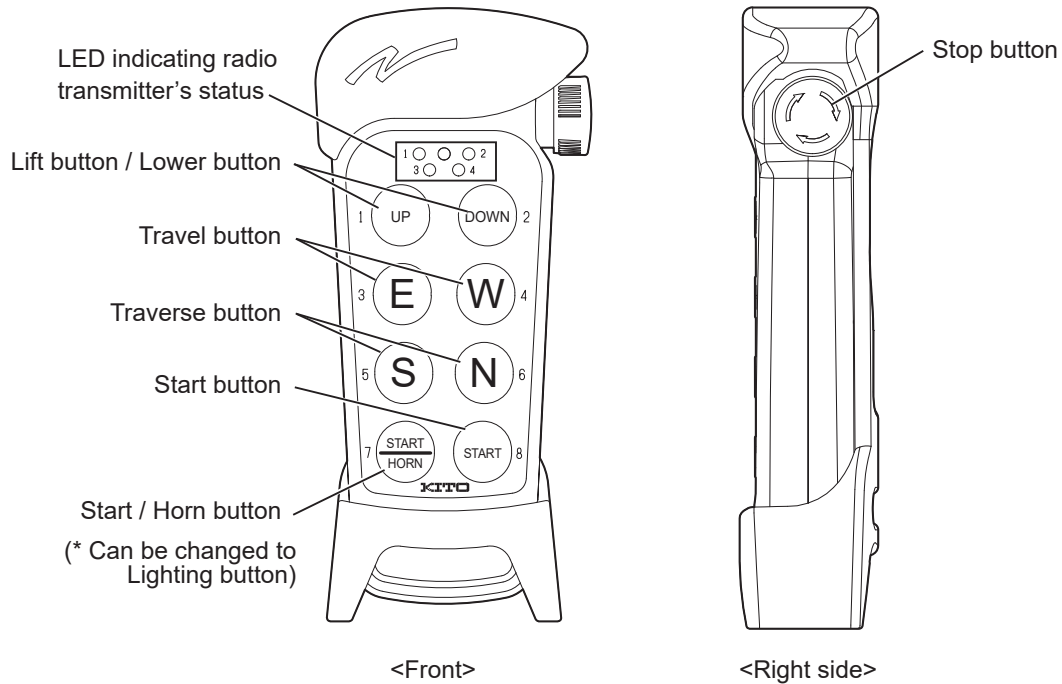
- When conducting maintenance, inspection and repair work, be sure to put up a notice (“Under Inspection”, “No Power”, etc.).
- The maintenance engineer confirms the results of daily inspection.
- In case the maintenance engineer is informed of a defect, etc., take necessary steps immediately such as prohibition of use, repair and so on.
- When conducting inspection or repair work, secure a safe work environment free from electric shock or fall.

Failure to comply with these instructions causes bodily injury or loss of property.

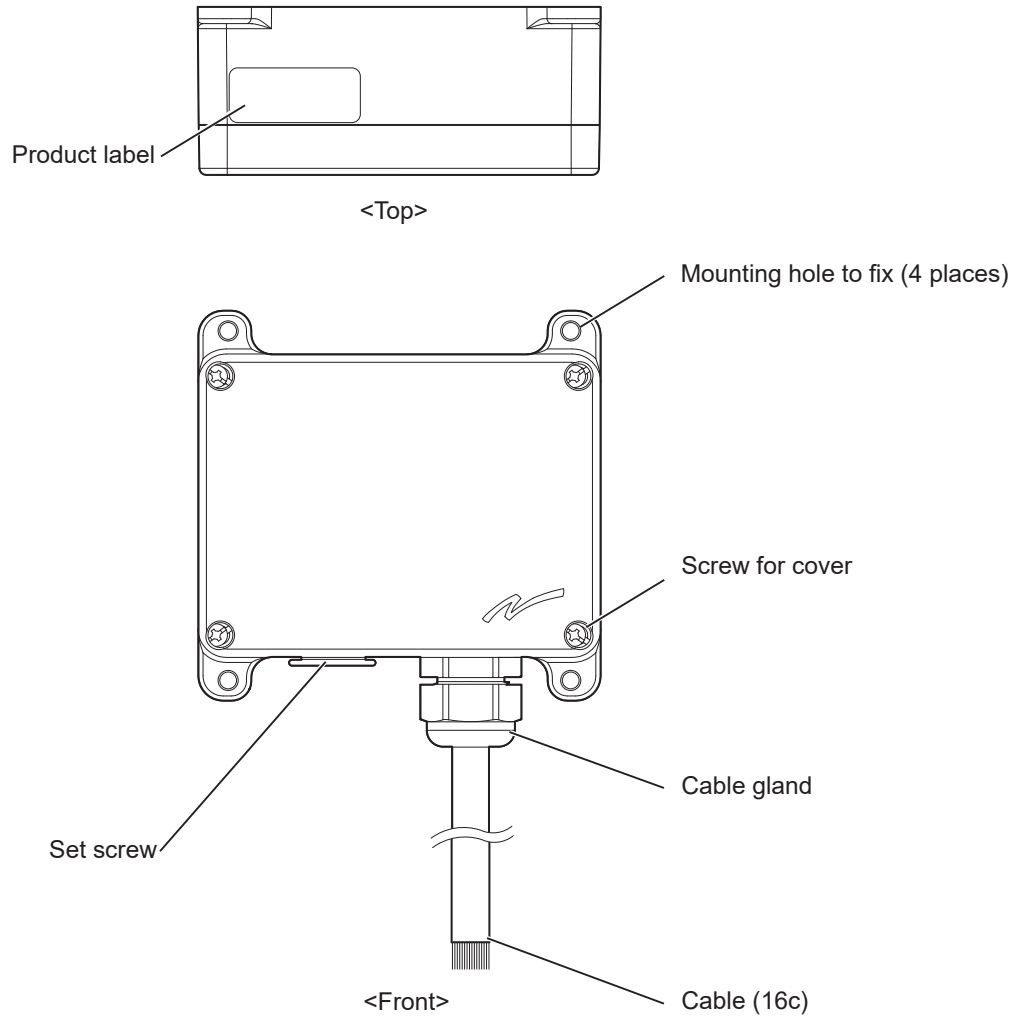
Component Parts and Names of Each Part

Radio Transmitter

Radio Transmitter with 8 Push Buttons

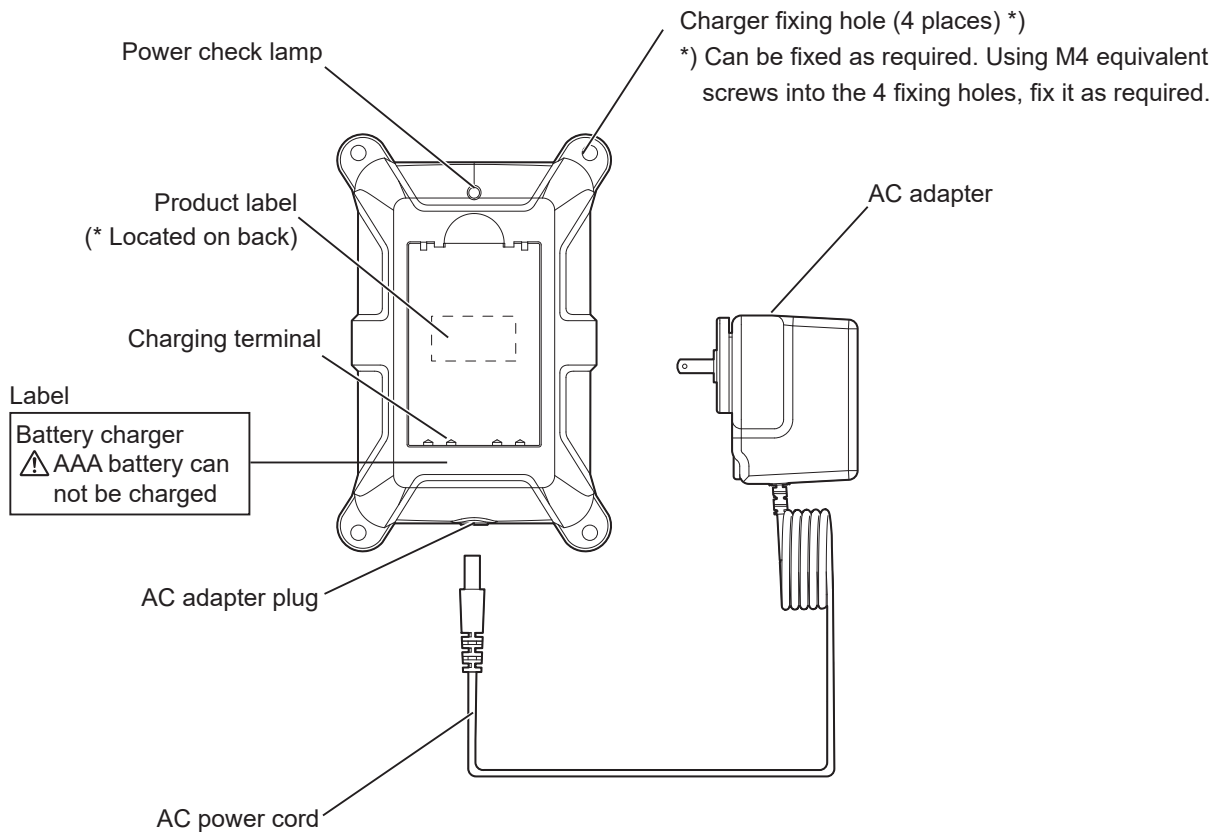


■ Radio Receiver

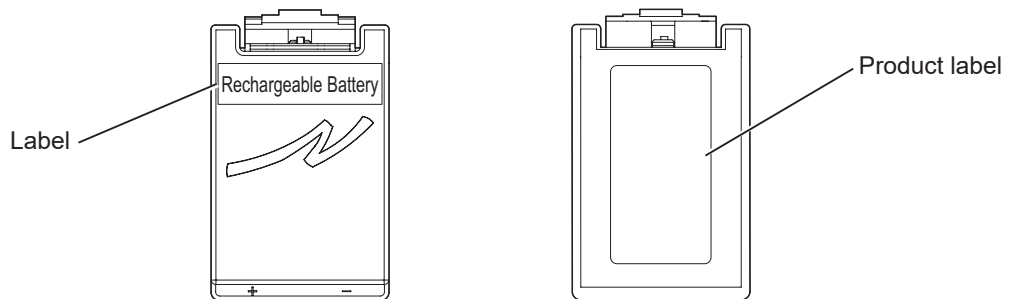


(to be continued)

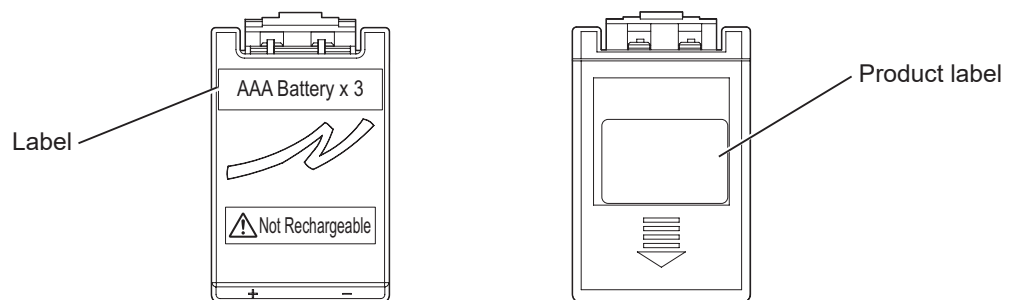
Charger and AC Adapter



Battery Pack



Dry Cell Battery Pack



Unpacking Inspection

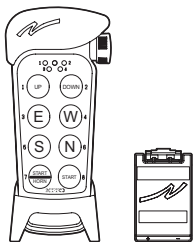
After receiving the radio system you have ordered, check the following items.

1) Based on the following table, check if the indications on the box and the product are consistent with your order.

Code	No. of buttons	Spare radio transmitter	Type of power
PK09DB1 (RAP9E54111)	8	No	Battery
PK09DB2 (RAP9E54121)	8	Yes	Battery

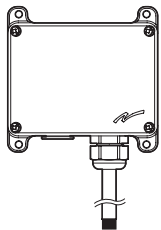
2) Check the number of packed items.

Radio transmitter
(with dry cell batteries)



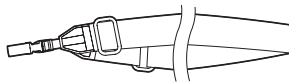
(1 set)
(2 sets if spare radio transmitter is included)

Radio receiver



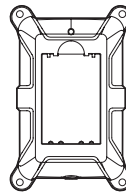
(1 unit)

Shoulder belt



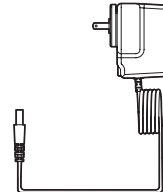
(1 belt)

Charger



(1 unit)

AC adapter



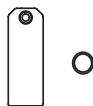
(1 adapter)

Battery pack



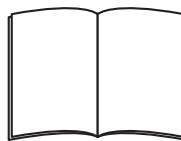
(1 pack)
(2 packs if spare radio transmitter is included)

Warning tag set



(1 set)
(2 sets if spare radio transmitter is included)

Owner's Manual



(1 manual)

3) Check whether or not each packed item is damaged.

4) Take down the following information as a customer copy in preparation for inquiring about the product or contacting the sales shop in case of trouble by any chance. For a warranty period, etc., see "WARRANTY" at the end of the document.

Code			
Product	Radio transmitter	Spare radio transmitter	Radio receiver
Product serial No.			
Radio transmitter ID			---
Date of purchase			
Name of the sales shop			

* The product serial no. is inscribed on the battery housing section of the radio transmitter and on the top surface of the radio receiver in the form of "SN: XXXXXXX".

Standard Specifications

Common Specifications

Reach distance	100m (under obstruction-free conditions)
Radio station classification	2.4GHz band advanced low power data communication system
Usage frequency	2,405 to 2,480MHz band (5MHz interval)
Number of channels	16
Radio wave type	G1D
Radio wave modulation system	O-QPSK
Transmission power	10mW or less
Safety category	PL d cat.3 (EN ISO 13849-1)
Response time	100ms or less

Radio Transmitter Specifications

Continuous usage time	Alkali batteries: 100 hours Lithium-ion battery: 150 hours When used in a temperature environment of +20°C *1	
Remaining power warning	Warning is given by a red flashing LED when the remaining power reaches 10%.	
Usage environment conditions	Operating temperature range	-20°C to +55°C
	Operating humidity range	4 to 100% RH
	Explosion proofing	Cannot be used in working environments that are subject to explosive gases or steam.
	Incompatible environments	Locations subject to organic solvents and volatile particulates, locations with large amounts of general particulates, and locations with large amounts of acids or salts
Storage temperature range	-40°C to +70°C	
Dimension	85 x 193 x 43mm	
Mass	300g	
Protection class	IP65	
Case materials	PA/ABS resin	
Antenna	Built-in	
Push button	8 x 2-step push buttons (Common for single speed and dual speed)	
Change to "Lighting" button	The setting of the "Horn" button can be changed to "Lighting".	
Auto power off function	Selectable from four stages, consisting of 3 minutes, 6 minutes (default), 12 minutes and unlimited (off).	

Radio Receiver Specifications

Power supply	AC48 to 230V *2	
Provided with a cable that has been wired internally	16c x 1mm ² (Length: 2.2m, Cable outer diameter: ϕ 13mm)	
Output relays	Stop relays: 10A, AC250V	
	Operation signal relays: 10A, AC250V	
Usage environment conditions	Operating temperature range	-20°C to +70°C *1
	Operating humidity range	4 to 100% RH *1
	Explosion proofing	Cannot be used in working environments that are subject to explosive gases or steam.
	Incompatible environments	Locations subject to organic solvents and volatile particulates, locations with large amounts of general particulates, and locations with large amounts of acids or salts
Storage temperature range	-40°C to +70°C	
Dimension	120 x 117 x 51mm	
Mass	400g	
Protection class	IP66	
Case materials	PC + 10% GF (Main unit), PC/ABS resin (Cover)	
Antenna	Built-in (Diversity system)	
Number of output signals	Stop relays: 2 points, Operation relays: 10 points	

*1: Indicates the operating temperature range and the operating humidity range of the single unit of the radio receiver. When attached to a radio-controlled equipment, observe the working range of the equipment.

*2: Input a voltage of 230V or lower to the radio receiver.

■ Battery Specifications

Type	Lithium ion
Voltage	DC3.7V
Capacity	1600mAh
Storage temperature range	0°C to 35°C
Service life	Number of charging cycles: 300 times

■ Charger and Adapter Specifications

Input voltage	AC100 to 240V, 0.3A, 50/60Hz
Safety standards	Electrical Appliances and Materials Safety Act (PSE)
Usage environments	Indoor
AC power cord	1.8m

■ Dry Cell Battery Specifications

Type	Alkali dry cell batteries * When using batteries other than alkali dry cell batteries, the usage time will be shorter than 100 hours.
Voltage	DC1.5V/battery
Size and number of batteries	AAA-size dry cell batteries x 3

Radio Receiver Installation Position and Wiring

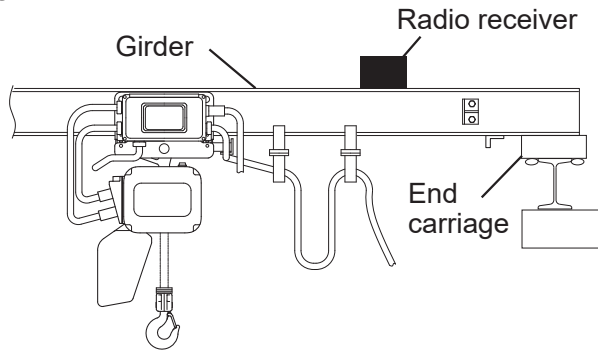
Normally, install the radio receiver to the crane girder or the hoist (including a travelling trolley). See the below-mentioned example of the radio receiver installation position and the precautions for installation to install it.

Radio Receiver Installation Position (Example)

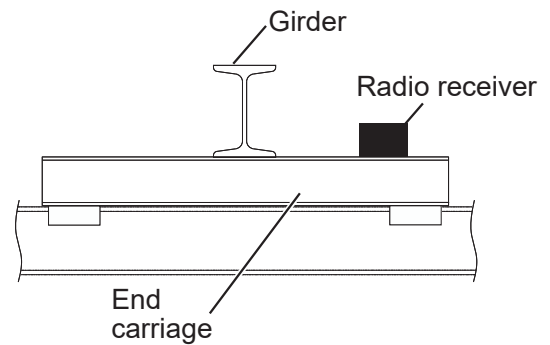
The following shows an example of the radio receiver installation position.

When installing it, see the precautions on this page and those on Pages 16 to 18 to select an installation position.

(1) Overhead crane

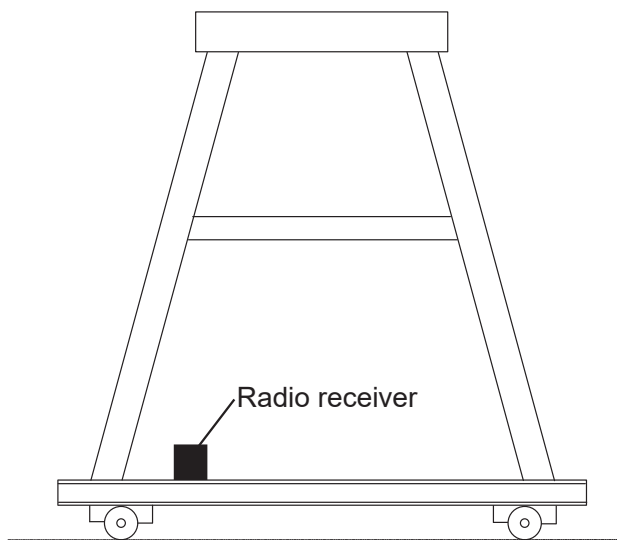


<Top surface of girder>

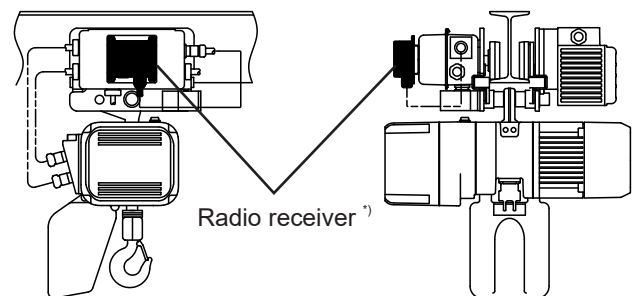


<Top surface of end carriage>

(2) Bridge crane



(3) Hoist



<Electric chain hoist>

*) The radio system with a KITO electric chain hoist mounting kit is available. Consult the sales shop where you purchased the product.

CAUTION



Mandatory

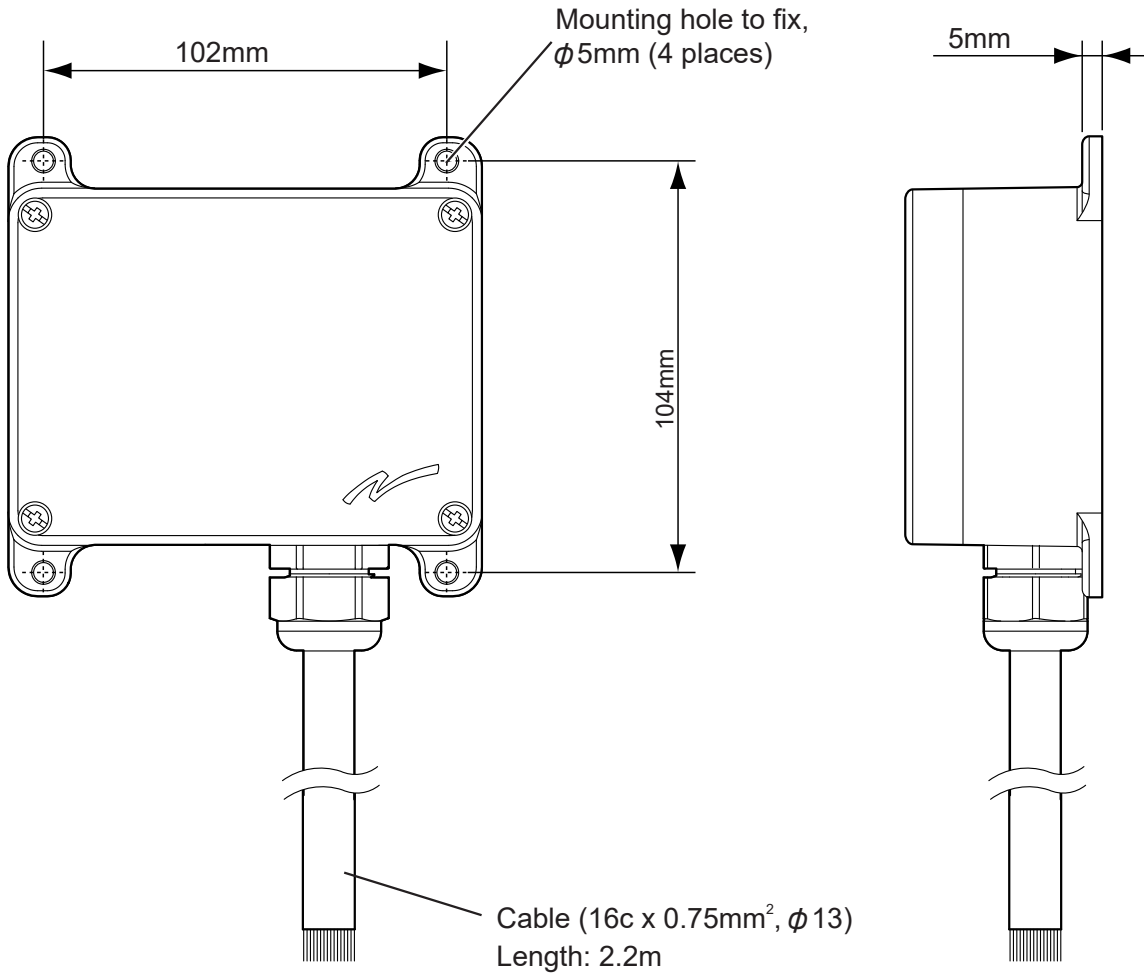
- When installing the radio receiver, select the position and direction which meet the following conditions.
 - The intended structure of its installation should have the sufficient strength.
 - It should not interfere with the power-feeding cable and the accessories of the equipment operated.
 - Install it vertically.
 - It should not interfere with the surrounding structure and the wires within a moving range of the equipment operated.
 - The specification labels, warning labels, etc. of the equipment operated and the radio receiver should be visible.
- If the position meeting the above-mentioned cannot be found, consult the sales shop where you purchased the product.

Failure to comply with these instructions causes bodily injury or loss of property.

■ How to Install the Radio Receiver

Use M4 bolts and nuts to install the radio receiver ($\phi 5\text{mm}$ holes, 4 places).

Dimensions for installing the radio receiver



When wiring an accessory cable to the control panel, etc., prepare exclusive terminals.

(to be continued)

Radio Receiver Installation Position and Wiring (continued)

■ About a Dead Point

An electric wave transmitted from the radio transmitter may have its strength weakened locally by the one reflected on the wall, etc. due to its characteristics. Such a point is called a dead point.

If the radio receiver enters the dead point, the electric wave's strength is weakened even in the same building, there may occur phenomena such as disrupting the communications for a moment, but this is not a device failure.

If a radio link fails or communications are disrupted, the radio receiver automatically stops the radio system. A maximum stop time is 0.5 seconds.

In order to prevent a communication failure caused by the dead point, observe the following precautions as to the installation position of the radio receiver and its surrounding circumstances.

■ Precautions for Installing and Wiring the Radio Receiver

DANGER



Prohibited

- Do not modify the radio system, equipment operated or its switchboard.
- Never drill a hole in the radio receiver.
- Do not disable the safety devices for the radio system and the equipment operated.

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- Only qualified personnel are allowed to mount and wire the radio receiver.
- Before using the radio receiver, make sure that the supply voltage of the radio receiver is within a specified range. (See "Radio Receiver Specifications".)
- Bundle the wires so that they will not interfere with the movable parts.

Failure to comply with these instructions may result in death or serious injury.

WARNING



Prohibited

- Do not install the radio receiver in a place exposed to strong vibrations or loud noise.
- Do not shield the radio receiver with a metal object.

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- Install the radio receiver visible to the operator without covering or shielding it. Install it at an easily accessible position in consideration of maintenance and inspection.
- Do not install the radio receiver in a metal container. Failure to comply with these instructions may reduce a working range of the radio system.
- Wire the power for the radio receiver in such a manner that it can be shut off at the time of installation, wiring, maintenance, etc.
- Connect the radio receiver immediately downstream of the main switch of the equipment operated or that of the switchboard in order to minimize voltage fluctuations of the power.
- After installation and wiring are completed, be sure to inspect whether the equipment functions as operated (be sure to particularly inspect stop operation).
- When installing and wiring, observe the instructions in the Owner's Manual and the local laws and regulations.
- Upon completion of installation, check whether or not the mounting bolts of the radio receiver body and the locking bolts of the brackets used for installation are loosened.
- Close the case of the radio receiver so as not to lose the protection class against dust and water. Check packings for any flaw. Overlap the component parts of the case firmly on each other and tighten screws.
- In the following cases, see "Maintenance and Inspection" to conduct the described inspections.
 - a) When installing or incorporating the radio system and the equipment operated.
 - b) When changing the installation position (such as relocating the work site of the crane)

Failure to comply with these instructions may result in death or serious injury.

CAUTION



Prohibited

- Do not install the radio receiver near the equipment which may generate a jamming wave. (Trolley duct, insulated trolley wire, mercury lamp, etc.)

Failure to comply with these instructions causes bodily injury or loss of property.



Mandatory

- When installing to the position exposed to strong vibrations or an impact (impact acceleration of 5 G or more), take a measure to reduce the impact and vibrations applied to the radio receiver.
- Install the radio receiver on the flat surface.
- When installing, observe the usage environment conditions (see "Radio Receiver Specifications").
 - When installing a bridge crane, etc. to the position or outdoors directly exposed to wind, rain and snow, prepare a roofed shelter or put the radio receiver in another box to protect from wind, rain and snow.
 - Do not install the radio receiver to the position likely to come into contact with oil, chemical and acid steam.
- In case there is a risk for an electromagnetic switch to generate an excessive counter electromotive voltage, be sure to consult KITO before installation.

Failure to comply with these instructions causes bodily injury or loss of property.

How to Wire

See the following precautions and the wiring procedures to wire the crane and hoist. Wiring differs depending on the type of the equipment operated such as the crane and hoist. For details, check the relevant wiring diagrams properly to wire them.

If you have any question about installation and wiring, contact the sales shop where you purchased the product.

DANGER



Prohibited

- Never do wiring work with the power turned on.
- Never touch electric parts with the power turned on.

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- Check that the supply voltage conforms to the rated voltage of the radio receiver.
- Check that the circuit breaker ratings conform to the system including the equipment operated and the radio receiver.
- Check that the power for the equipment body controlled has positive phase connection.

Failure to comply with these instructions may result in death or serious injury.

WARNING



Mandatory

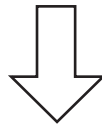
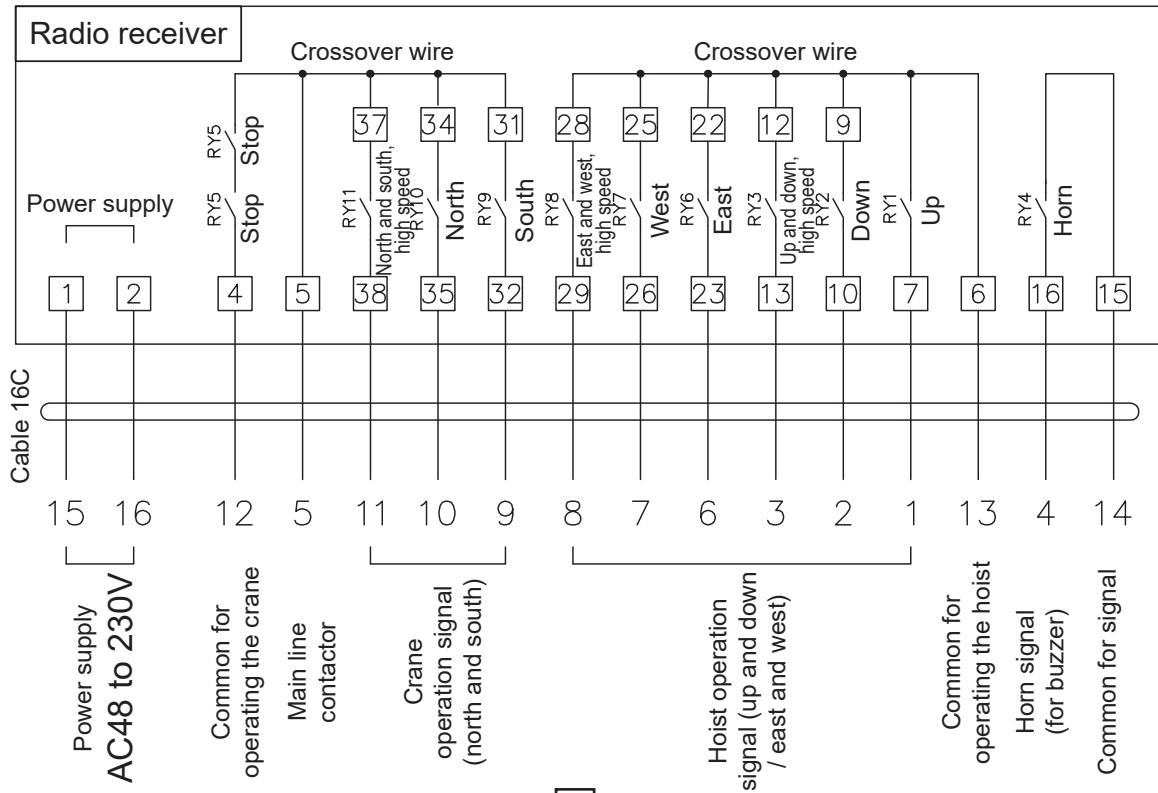
- Be sure to have wiring done by a qualified electrician or a professional contractor.
- When wiring, be sure to conduct grounding.
- Before activating the equipment operated such as the crane, check whether wiring is correctly done, and whether or not wiring connections are loosened, and then turn on the power.
- Before turning on the power, check the connection of the operation circuit terminal block in the radio receiver.

Failure to comply with these instructions causes bodily injury or loss of property.

■ Wiring Procedures

The following connection example is pasted to the back of the radio receiver cover.

Connection example (dual speed type with 8 push buttons for crane)



To equipment operated (crane, hoist, trolley)

Fig. 3 and Fig. 4 on Page 21 onward show the examples of standard wiring for KITO electric chain hoist (ER2 series) (except for lighting and horn wiring). When doing wiring work, check the relations between the operating directions to be set for the push buttons of the radio transmitter and the corresponding radio receiver relays.

If you have any question about the lighting and horn wiring, contact the sales shop where you purchased the product.

DANGER



Mandatory

- When installing, observe the usage environment conditions (see "Radio Receiver Specifications").
- After wiring is completed, conduct a trial run with no load applied. Be sure to check whether the equipment functions as operated.

Failure to comply with these instructions may result in death or serious injury.

(to be continued)

Radio Receiver Installation Position and Wiring (continued)

• Radio transmitter with 8 push buttons

Fig. 1 shows an example of the dual speed type radio transmitter with 8 push buttons. In case the equipment operated is a single speed one with 4 push buttons (telpher), etc., set the push button positions unused as required.

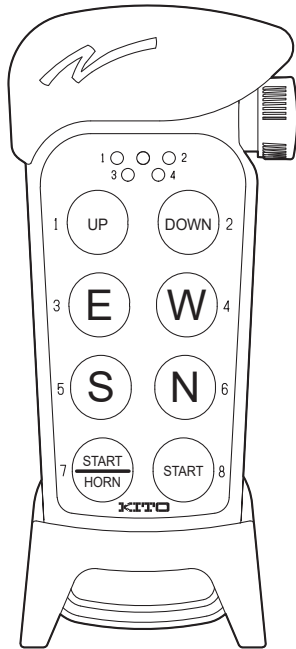


Fig. 1: Example of dual speed type radio transmitter with 8 push buttons

<Radio transmitter operation buttons vs. radio receiver relays>

Radio transmitter operation button		Radio receiver relay
Stop	-	RY5
		RY5
UP	1-step (Low speed)	RY1
DOWN		RY2
E (East)		RY6
W (West)		RY7
S (South)		RY9
N (North)	RY10	
START / HORN	(Horn)	RY4
UP	2-step (High speed)	RY3
DOWN		RY8
E (East)		RY8
W (West)		RY8
S (South)		RY11
N (North)	RY11	

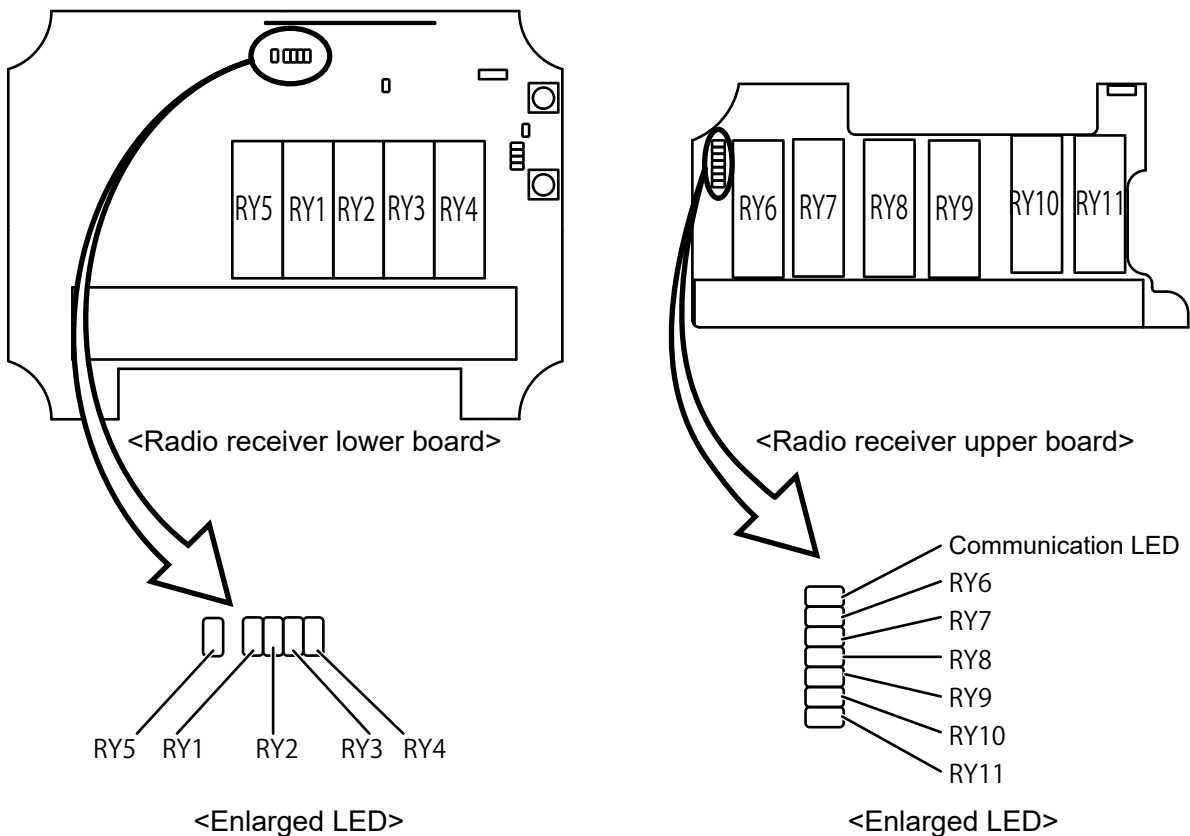
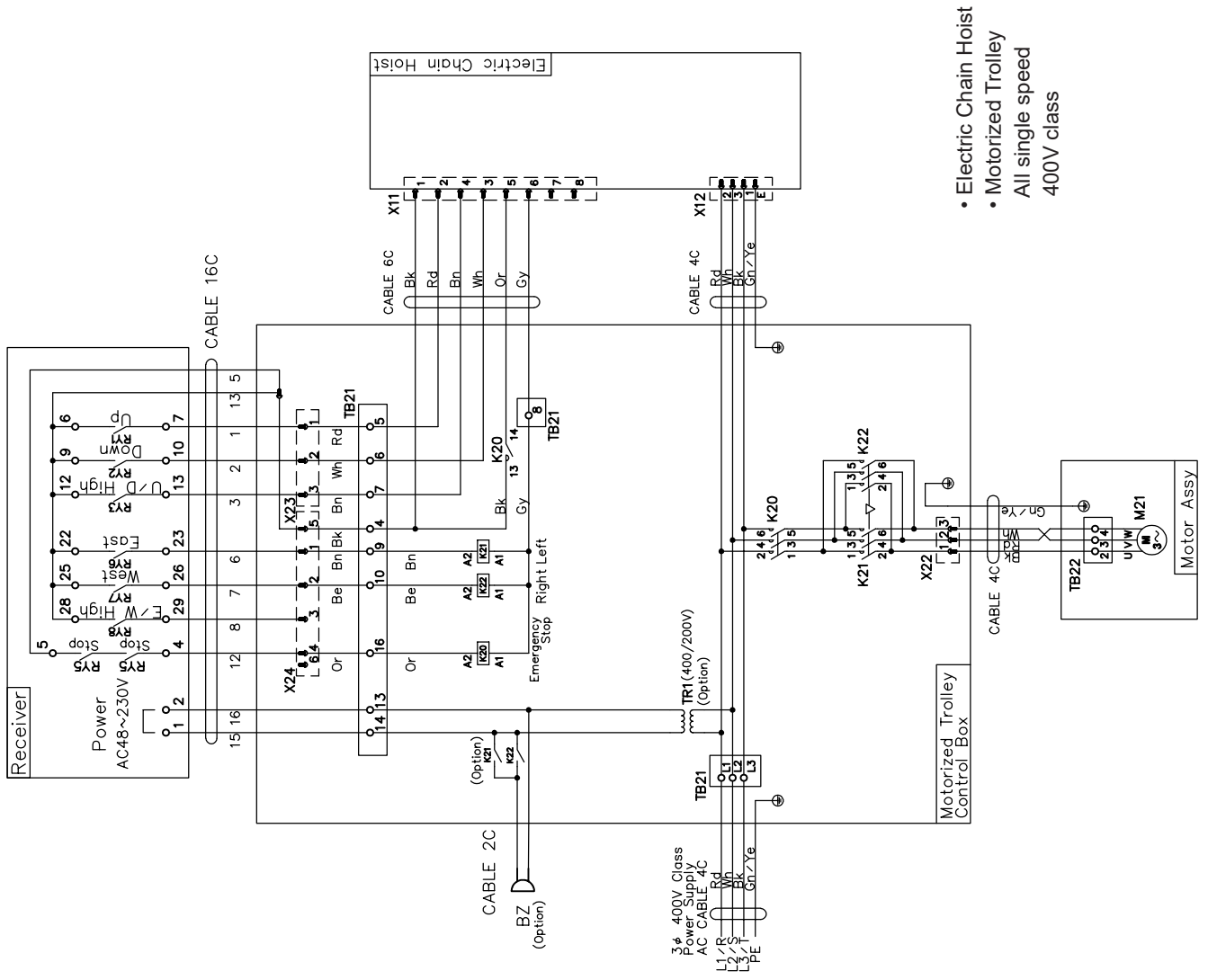


Fig. 2: Arrangement of relay and LED

Radio Receiver Installation Position and Wiring (continued)

■ Wiring Diagram for Crane Operated with 4 Push Buttons (Single Speed) (For Telpher)

Fig. 4 shows an example of wiring for KITO electric chain hoist (ER2).



- Electric Chain Hoist
- Motorized Trolley
- All single speed
- 400V class

Fig. 4

Operation

■ Charging the Battery

Charge the battery before using it for the first time.

■ How to Charge

- 1) Set the battery in a charger.
- 2) Insert an accompanying AC adapter into the lower plug socket of the charger to supply the power to the charger.
The operating voltage of the AC adapter is 100V to 240V AC.
* To use the AC adapter, push an accompanying socket plug into it.
Note: Push in the socket plug deeply until it clicks.
Once charging starts, a charge check lamp is turned on in red.
(It will be fully charged in 3 hours at longest.)
Once the charge check lamp is turned on in green, the battery is finished with charging.
- 3) After charging is completed, remove the battery from the charger.
* Once charging is completed, disconnect the AC adapter from the power supply.

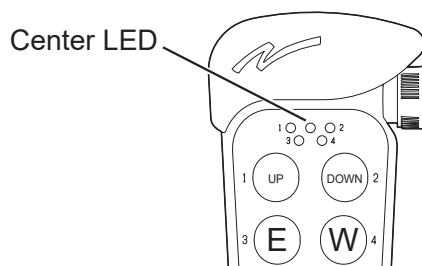
The charger has the charge check lamp to indicate the charge status.

Charge status	Check lamp
Charging	Turned on in red
Completed	Turned on in green

■ Warning about Remaining Battery Capacity of Radio Transmitter

Once the remaining battery capacity is running out during use, the radio transmitter's center LED is turned on as follows to warn you.

Remaining battery capacity	Radio transmitter's center LED
About 10%	Blinking in red



■ Precautions for Charging

Be sure to read the following precautions thoroughly and observe them.

DANGER



Prohibited

- Do not drill a hole in the charger and remodel/modify it.
- Do not handle the charger with a wet or moist hand. Also, do not use a non-insulated tool or device to work with the charger.
- In any case, do not use a damaged or wet tool, etc.
- Do not use or leave the charger and the AC adapter in a place exposed to wind and rain.
- Never use the damaged battery, charger and AC adapter.
- Do not charge near a heat source.
- Never use the battery, charger or AC adapter inappropriately. It may result in a fire, explosion and other dangers. The examples of inappropriate use include the following.
 - Short-circuiting of battery terminals
 - Disassembly, cutting, opening, compression, deformation, perforation, remodeling and modification of the battery
 - Insertion of foreign substance into the battery
 - Immersion of the battery in water and other liquids or adhesion of liquid to it
- Do not put a dry cell battery pack in the charger, which is an accessory of the radio transmitter.

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- Use only a genuine battery to charge. Use only the charger and AC adapter provided by KITO for this product to charge the battery.
- Place the charger and AC adapter under the indoor temperature of 5°C to 40°C to charge.
- Check that the voltage supplied to the AC adapter is 100V to 240V AC.
- When charging, check that the equipment operated is in a safe condition, having no risk of causing a danger.
- In case charging is not completed beyond a predetermined charging time, stop charging. If charging is continued, the battery may generate the heat, blow up or ignite.
- If the battery has a liquid leak or has a foul odor, put it away from the fire immediately. An electrolytic leak may catch fire, resulting in burst or ignition.
- In the case of coming into contact with the liquid leaking from the damaged battery, wash a contact area immediately and fully with clean water such as plenty of tap water, and consult a medical doctor.

Failure to comply with these instructions may result in death or serious injury.

⚠ DANGER



Prohibited

- Do not short-circuit the battery terminals.
- Do not use the exclusive charger to charge other batteries.
- Do not place the charger directly on the floor. Dust and dirt tend to accumulate in the concaves, causing a failure.

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- Store the charger in a dry place free from liquid (water, etc.) splashes and away from a heat source.
- When charging, check that the contact part between the radio transmitter and receiver is clean. If dirty, wipe with cloth, etc. to keep it clean. When wiping, be sure to shut off the power for the charger.
- Care should be taken not to allow adhesion of concrete, sand, lime, etc. to the charger and AC adapter.
- See to it that children will not play with this product.

Failure to comply with these instructions may result in death or serious injury.

■ Handling the Battery

A lithium-ion battery is used. Its service life depends on how it is handled. Note the following.

- If the battery is shocked by falling, and so on, its performance may be deteriorated. Be sure to attach the accessory shoulder belt to the radio transmitter to prevent a fall.
- The battery is fully charged by 3-hour charging at longest and becomes continuously usable for about 150 hours. When using the radio transmitter for 8 hours a day, 5 days a week, charge it once every 3 weeks as a guide.
- If the remaining battery capacity is running short and the radio transmitter's center LED blinks in red, charge the battery.
- Do not place the radio transmitter in a high-temperature, high-humidity place.
- Store the battery in a temperature environment of 0°C to 35°C in order to prevent the battery's service life from being shortened. When storing it for a long period of time (1 year or longer), do not use it up fully. Charge it supplementarily for about 1 hour or so once a year to prevent it from being fully discharged.

⚠ DANGER



Prohibited

- Do not throw the battery into fire.




Failure to comply with this instruction may result in death or serious injury.

■ Replacing the Battery

The battery is a consumable part and has a service life. In case the operating time has been clearly shortened, purchase a new one to replace. Contact the sales shop for purchase and replacement of the battery.

■ Precautions for Maintenance of the Charger

- Precautions for maintenance and inspection
Be sure to read the following precautions thoroughly and observe them.

 DANGER	
 Prohibited	<ul style="list-style-type: none">• In case the charger or AC adapter goes out of order by being dropped, crushed or other carelessness, do not use it until the sales shop's serviceman confirms that it functions normally. Failure to comply with this instruction may result in death or serious injury.
 Mandatory	<ul style="list-style-type: none">• Before cleaning or maintenance, disconnect the power cable of the AC adapter from the charger.• Check that the inscriptions on the nameplate are legible and not defaced. If they are illegible or defaced, request KITO for replacement.• In case a trouble occurs, conduct trouble diagnosis. Failure to comply with these instructions may result in death or serious injury.

■ Disposal

When disposing of the AC adapter, observe the regulations of the relevant local government. Be careful not to dispose of it together with household garbage or combustible waste.

■ Replacing and Using the Dry Cell Batteries




All package boxes of the radio transmitter include accessory dry cell battery packs (dry cell batteries contained). Once the accessory dry cell batteries are exhausted, replace them with commercially available AAA alkaline ones.

* If a rechargeable dry cell battery (nickel-metal-hydride battery) used, continuous working hours will be shorter than 100 hours.

■ Handling the Dry Cell Batteries

Note the following in handling the dry cell batteries.

- Use the dry cell batteries included in the package box of the radio transmitter within 1 year of purchase. After 1 year, dispose of them.
- If the dry cell batteries are shocked by dropping, and so on, their performance may be deteriorated. Be sure to attach the accessory shoulder belt to the radio transmitter to prevent from being dropped.
- The dry cell batteries are continuously usable for about 100 hours. When using the radio transmitter for 8 hours a day, 5 days a week, replace them with new ones every other week as a guide.
- If the remaining capacity of the dry cell batteries is running out and the radio transmitter's center LED blinks in red, replace them.
- Do not place the radio transmitter in a high-temperature, high-humidity place.

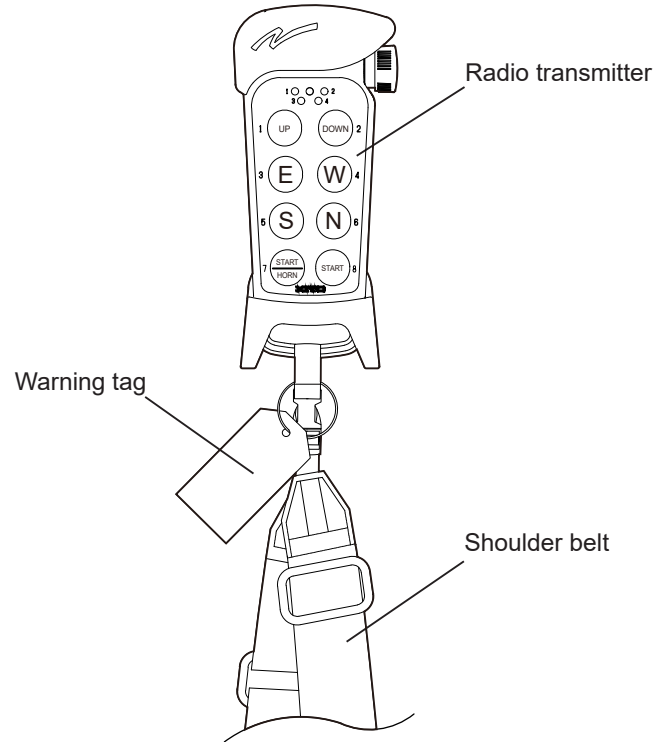
 DANGER	
 Prohibited	<ul style="list-style-type: none">• Do not short-circuit the terminals of the dry cell battery pack.• Do not throw the dry cell battery pack into fire.• Do not put the dry cell battery pack in the charger. Failure to comply with these instructions may result in death or serious injury.
 Mandatory	<ul style="list-style-type: none">• Before using the dry cell batteries, confirm their recommended expiration date to use them before expiration.• Do not use new dry cell batteries together with the existing ones.• Set the dry cell batteries in the correct direction.• In case you come into contact with a liquid leaking from the damaged dry cell battery, wash a contact area immediately and fully with clean water such as plenty of tap water, and consult a medical doctor. Failure to comply with these instructions may result in death or serious injury.

■ Disposal

When disposing of the dry cell batteries, comply with local laws and regulations for appropriate disposal.

■ Attaching the Shoulder Belt to the Radio Transmitter

- 1) Attach a warning tag to the shoulder belt as illustrated below.
- 2) Put the belt around your shoulder to adjust its length.



■ Putting on the Radio Transmitter

When using the shoulder belt, put it on across your body from one side of the shoulder to the other side of the waist.

⚠ CAUTION



Mandatory

- Put on the shoulder belt correctly.
- Failure to comply with this instruction causes bodily injury or loss of property.

How to Operate

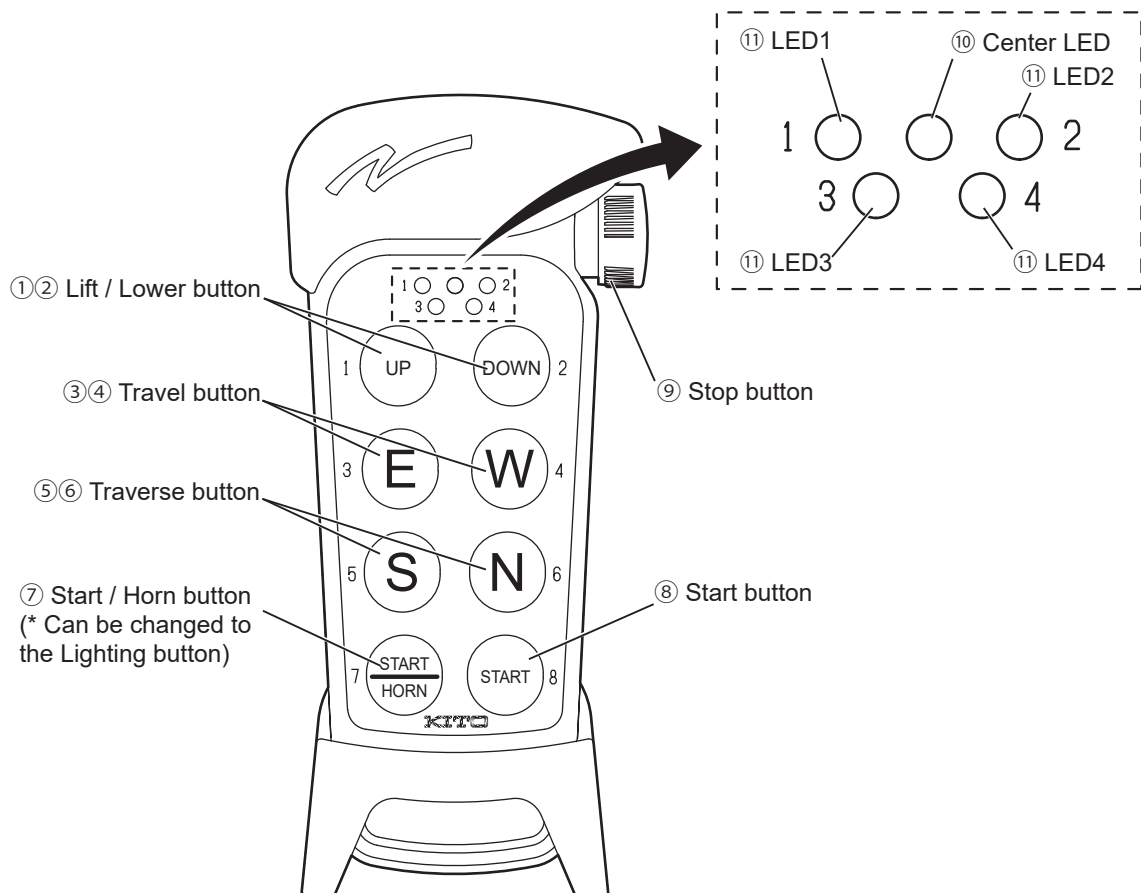
Before operating this radio system, read the following thoroughly to use it correctly.

Names and Functions of Radio Transmitter Operation Buttons

The following describes the operation buttons and LEDs, taking the dual speed type with 8 operation buttons (for crane) as an example.

The button indications show an indication example of the standard specifications.

- ①② Lift / Lower button: Used to lift and lower the hoist. With normal power connection, the left-side button corresponds to lifting. In the case of the dual speed design, low-speed operation is allowed by pressing the button to the 1st-step and high-speed operation by further pressing to the 2nd-step. *1)
- ③④ Travel button: Used to operate the travel trolley. In the case of the dual speed design, low-speed operation is allowed by pressing the button to the 1st-step and high-speed operation by further pressing to the 2nd-step. *1)
- ⑤⑥ Traverse button: Used to traverse. In the case of the dual speed design, low-speed operation is allowed by pressing the button to the 1st-step and high-speed operation by further pressing to the 2nd-step. *1)
- ⑦ Start / Horn button: Available as the Horn button after being used as the start button when starting operation. Changeable to the “Lighting” button by setting. For details, see Appendix-1 Setting Manual.
- ⑧ Start button: The radio system is started by simultaneously pressing the buttons ⑦ and ⑧.
- ⑨ Stop button: Used to immediately stop the equipment. It is locked in the pressed state. To unlock, turn it to the right in the arrow-indicated direction. It returns to the original position.
- ⑩ Center LED: Used to indicate the radio system setting status, radio transmitter operation status and a remaining battery capacity warning.
- ⑪ LEDs 1, 2, 3, 4: Used to indicate the radio system setting status and radio transmitter status.



*1: All buttons are designed to be pressed to two steps. In the case of single operating speed, the equipment is operated at single speed at both the 1st-step and 2nd-step.

■ Basic Operation

It is interlocked so as to allow only one radio transmitter to be operated for one radio receiver. If you have purchased together with a spare radio transmitter, the right of operation is given to the radio transmitter which has gone through start operation first. For transfer of the right of operation from the main radio transmitter to the spare one, see “ ■ Handling the Spare Radio Transmitter” on Page 32.

• How to start operation

- 1) Turn on the crane and the hoist, and check that the radio receiver is receiving the power.
- 2) Turn the ⑨ Stop button on the upper right side of the radio transmitter to the right according to its indication to check that it is unlocked.
- 3) Press the ⑦ Start/Horn button and the ⑧ Start button simultaneously for 1 second or longer.
- 4) If there is nothing wrong at start time, the ⑩ Center LED blinks in green, allowing communications with the radio receiver. After checking the safety around the crane and the hoist, start operation.

• How to lift, lower, travel and traverse

Once the radio system is started successfully, operation is allowed.

• How to stop in the case of emergency

- 1) In case it is necessary to immediately stop the crane and the hoist, press the ⑨ Stop button.
- 2) In the case of resuming operation after pressing the ⑨ Stop button, check that it is safe to operate, and then, turn the ⑨ Stop button to the right according to its indication to unlock it. After that, repeat the steps after 3) in “How to start operation”.

Note) Press the stop button when it is necessary to immediately stop the equipment operated such as when the crane or the hoist malfunctions, or when the operator is exposed to a danger.

• How to end operation

The radio transmitter and receiver can be turned off in the following two manners.

- 1) The radio transmitter is turned off by pressing the stop button at the end of operation or in the case of emergency.
- 2) The radio transmitter is automatically turned off if not operated for 6 minutes.
* Auto power off function

■ Trial Run

Before actual work, be sure to conduct a trial run in the following manner when the radio system is ready for operation.

- 1) Once installation and wiring of the radio receiver and preparation of the radio transmitter are completed, check the tightening and wiring conditions again, and check also whether the equipment is operated in the directions as indicated by the radio transmitter's operation buttons.
- 2) After completing operation check of the operation buttons by the radio transmitter, check that radio operation is available in the range of all work areas where the crane is used.

■ Precautions for Operation

When operating the radio crane, observe the following precautions.

DANGER



Prohibited

- Only legally qualified personnel are allowed to operate.
- Do not let one operator operate two or more cranes at the same time.
- Do not suspend work with a load lifted in the air.
- If you notice a trouble, damage or a defective part, stop using the radio system. Do not use it again until the problem is solved completely.
- Do not leave the radio system unattended with the radio transmitter turned on.
- Do not turn on the power or use the radio system in a closed place where the equipment operated is invisible or outside the standard working range (100m or more away from the equipment operated).

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- In operation of the radio crane, the operator tends to mistake the operating direction of the crane, depending on where he/she stands. When operating, check thoroughly the direction plate of the crane, etc. and the directional indications of the operation buttons of the radio transmitter.
- Secure fully the walkway of the operator.
- Ensure that the floor surface of the workplace is free from dangers such as slippage, stumbling and falling.
- When interrupting work, be sure to turn off the radio transmitter.
- When slinging with the radio transmitter held in your hand, turn off the radio transmitter certainly in order to prevent part of the body or lifted load from contacting the radio transmitter's operation buttons, etc., resulting in malfunctioning of the crane.
- Before using, press the stop button of the radio transmitter and check that it can be unlocked. If it cannot be unlocked, do not use the radio system.
- Pay attention to all working ranges. When there is a danger, press the stop button to stop the equipment operated.
- Operate at the position where you can visually check the movements of all the equipment and the lifted load in the working range of the radio system.
- Turn on the power only when doing work.

Failure to comply with these instructions may result in death or serious injury.

CAUTION



Mandatory

- Except when operating alone, operate according to the signals from a person working together after fully checking the surrounding safety.
- In case there are two or more radio cranes, be sure to check that the radio transmitter is for the intended crane.
- Be careful not to allow foreign substances such as concrete, sand and lime into the radio devices.

Failure to comply with these instructions causes bodily injury or loss of property.

■ Procedure for Ending Work

Conduct the following when ending work.

- Turn off the radio transmitter.
- Remove dust, dirt and oil adhered to the surface of the radio transmitter.
- Store the radio transmitter in a predetermined storage.

■ Procedure for Malfunctioning

In case the equipment operated malfunctions, conduct the following steps.

- Press the stop button of the radio transmitter immediately to stop the equipment and contact the maintenance engineer without delay for instructions.
- In case there is a blackout during work, turn off the radio transmitter. Before resuming work, check that the power is recovered.

■ Safety Functions

This radio system is provided with some advanced functions to secure safety.

• Stop button function

In case it is necessary to immediately stop the radio operated equipment by any chance such as when the equipment operated causes a danger or the operator is in an abnormal condition, press the stop button to turn off and stop the equipment immediately.

• Fail-safe stop function

This function is designed to stop the equipment when there is a failure in transmission/reception during operation. In the case of radio communication failure/shutoff or power loss of the radio transmitter, the radio receiver automatically stops the radio operated equipment. A time required to activate the stop function after the occurrence of failure is called a “fail-safe stop time”, which is 0.5 seconds at maximum. If the equipment stops frequently, contact the sales shop where you purchased the product.

• Restrictions on the radio transmitter’s right of operation for 1 radio receiver

Restrictions on the radio transmitter’s right of operation refer to an interlock function which always allows only one radio transmitter to be operated for each radio receiver. To transfer the radio transmitter’s right of operation to the spare radio transmitter, it is necessary to take the operational steps for abandoning the right of operation of the radio transmitter having it and receiving that of the radio transmitter to which it is transferred. For details, see “■ Handling the Spare Radio Transmitter” on Page 32.

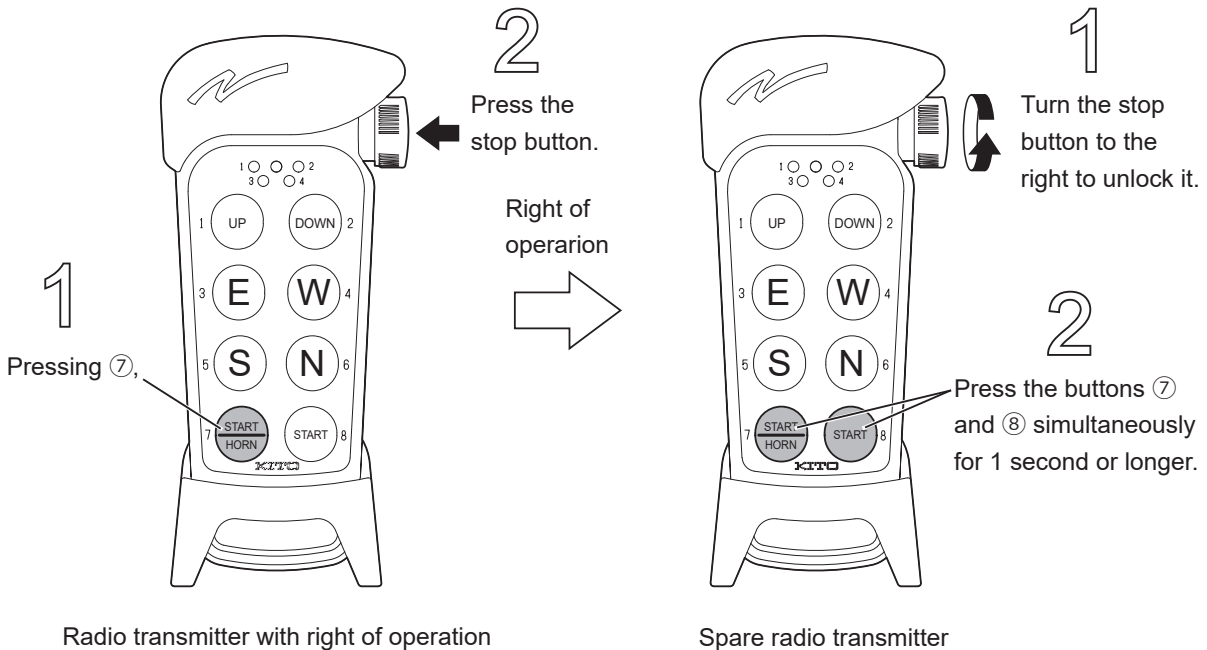
■ Handling the Spare Radio Transmitter

■ Transferring the Right of Operation to the Spare Radio Transmitter

It is interlocked so as to always allow only one radio transmitter to be operated for one radio receiver. If you have purchased together with the spare radio transmitter, the right of operation is transferred to the radio transmitter which has gone through start operation first.

The following describes how to transfer the radio transmitter's right of operation to the spare radio transmitter.

- 1) According to "How to start operation" on Page 29, make the radio transmitter with the right of operation ready for operation.
- 2) In order to abandon the right of operation, press the stop button together with the ⑦ Start/Horn button. Abandonment of the right of operation is completed.
- 3) In order for the radio transmitter, to which the right of operation is to be transferred, to receive it, make the relevant radio transmitter ready for operation according to "How to start operation" on Page 29. Reception of the right of operation is completed, transferring it to the spare radio transmitter.



(Radio transmitter which has gone through start operation first at purchase time)

Maintenance and Inspection

■ General Matters on Maintenance and Inspection

DANGER



Prohibited

- **Periodic inspection must be performed by a maintenance engineer.**
- **Turn off the main power when carrying out the inspection.**

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- **Conduct periodic inspections (monthly, annual). It is necessary to conduct them before the schedule, depending on the working conditions. Paying attention to daily inspection results and an operating sound, conduct them at appropriate frequency.**
- **Do not use the product when any abnormality is observed during the periodic inspection. Indicate “FAILURE” on the product and contact with a maintenance engineer or the sales shop where you purchased the product for repair.**
- **Turn off the main power before carrying out the maintenance work.**
- **Once the periodic inspections (monthly, annual) are finished, conduct a function check/test to check whether the product functions properly.**

Failure to comply with these instructions may result in death or serious injury.

CAUTION



Mandatory

- **Indicate “Under Inspection” when performing the periodic inspection.**
When a crane is operated erroneously during the inspection, it may result in the accident such as fall-off of parts/tools and downfall.
- **Wear protection equipment such as protection goggles and gloves depending on the work contents.**
Otherwise, it may result in the injury due to scattered oil or sharp edge of a part.
- **Pay attention to the work method, work procedure and work posture.**
If the product or the part is heavy, your hand may be caught or your waist may be hurt.
Especially be careful for the work on an unstable scaffold such as the work at high lifted place using stepladder.
- **Put on a helmet and a safety belt when working at a high place.**
You may get injured or fall down.
- **Remove the oil attached to the product or spilt on the floor.**
Otherwise, it may result in injury due to drop of the product or overturning.
- **Keep the work area clean when disassembling the product.**
Assembling or mixing the part other than genuine parts may result in the damage of the product or the accident due to defective operation.

Failure to comply with these instructions causes bodily injury or loss of property.

Note

- **When performing the monthly inspection, carry out the daily inspection at the same time.**
- **When performing the annual inspection, carry out the monthly inspection and daily inspection at the same time.**

Maintenance and Inspection (continued)

■ Daily Inspection

Be sure to inspect the following items before starting daily work. For other inspection items, comply with the Owner's Manual for the equipment operated.

- 1) Check the radio transmitter for a trace of strong impact*, and the operation buttons for any abnormality.
- 2) Check the surface of the radio transmitter and the yellow part, etc. of the stop button and other buttons for adherence of dust, dirt and grease.
- 3) Check the surface sheet of the operation buttons for abnormalities such as hardening and elongation.
- 4) Check whether the characters inscribed on the radio transmitter such as direction are identifiable.
- 5) Check whether the label pasted on the back of the radio transmitter is legible.
- 6) Check whether the remaining battery capacity is enough.
- 7) Check whether there was any abnormality during previous operation.
- 8) Check whether the center LED is turned on properly when the radio transmitter is turned on.
- 9) Check whether the crane operates in the same direction as indicated by the operation button.
- 10) When pressing the stop button of the radio transmitter, check whether the crane stops immediately.
- 11) Check the concaves of the charger for accumulation of dust and dirt.

*) Ensure that the impact acceleration applied to the radio transmitter is 15G or lower. (See "Safety Precautions".)

■ Periodic Inspection

Conduct periodic inspection at the following intervals. Before starting daily operation after periodic inspection, conduct also daily inspection. For other inspection items, comply with the Owner's Manual for the equipment operated.

● Monthly maintenance and inspection

- 1) Remove dust and other deposits from the radio receiver. To clean it, never use a solvent or a combustible and corrosive substance. Also, do not use a high-pressure cleaning machine or a steam cleaning machine.
- 2) Check the radio receiver for physical damage.
- 3) Check whether the warning inscriptions and the specifications nameplates are legible and not damaged.
- 4) Check whether the radio receiver body is firmly fixed, and whether mounting bolts are properly tightened.
- 5) Check whether or not the radio receiver's component parts (radio receiver cover, wiring cable glands, etc.) are properly clamped free from rattling.
- 6) Check the wiring between the radio receiver and the equipment operated for any abnormality.

● Annual maintenance and inspection

The inspection items are common to those of monthly inspection. For other inspection items, comply with the Owner's Manual for the equipment operated.

■ Replacing the Parts

Replace each part periodically according to the following start count.

The switch alone cannot be replaced; a set of unit has to be replaced.

Before replacement, consult the sales shop where you purchased the product.

Part	Replacement frequency	Remark
Radio receiver relay switch	Every start count of 500,000 times	Induced load current value of relay switch to be 250V AC, 3A or less
Radio transmitter operation button switch	Every start count of 1,000,000 times	—

Check Sheet for Inspecting the KITO Radio Remote Control System

Item to be inspected	Capacity	Lot No. or product serial No.	Your CTRL No.	Installation date	Location	Effective date of inspection certificate
Equipment operated (crane, etc.)						
Radio system	—					—

It is obligated by the "Safety Ordinance for Cranes" to save the inspection records of 0.5-ton cranes or above for 3 years.

Daily Inspection for the Radio System

Check result: ○ = Good, △ = To be replaced (adjusted) next inspection, × = Bad, Needs replacement (adjustment)

Category	Check item	Check method	Criteria	Inspection date/result					
				/	/	/	/	/	/
Appearance	Radio transmitter body and charger	Check visually.	No trace of impact such as deep scratch, crack and dent						
			No adherence of dust, dirt or grease						
	Clean charging terminals								
	Operation button	Check visually.	No hardening or elongation of rubber						
	Direction plate and symbol	Check visually.	No peeling or tear and identifiable						
Dry cell battery	Charging status	Check.	Radio transmitter's center LED not blinking in red						
Battery	Charging status	Check.	Radio transmitter's center LED not blinking in red.						
Function	Operational status	Check.	No abnormality during previous operation						
	Inside of radio transmitter	Turn on the power to start up.	Radio transmitter's center LED blinking in green						
	Operation check	Press the operation button to check operation.	Operated in same direction as indicated by operation button All operation stopped by pressing stop button No abnormality found in inspection items described in Owner's Manual for main body						
Executed by	Inspector								
Checked by	Maintenance engineer								

Monthly and Annual Inspection for the Radio System

Check result: ○ = Good, △ = To be replaced (adjusted) next inspection, × = Bad, Needs replacement (adjustment)

Category	Check item	Check method	Criteria	Inspection date/result					
				/	/	/	/	/	/
Prior inspection	Daily inspection	Check execution.	No abnormality (Conduct daily inspection together with monthly inspection)						
Appearance	Radio receiver body	Check visually.	No dust or deposit No trace of impact such as deep scratch, crack and concave						
	Indications of warnings and specifications	Check visually.	Clear and legible indications						
Fixing status	Radio receiver body	Check for looseness.	Check that the radio receiver locking bolts are not loosened.						
	Radio receiver installation parts		Check that the each mounting bolt of the radio receiver mounting brackets is not loosened.						
	Radio receiver component parts		Check that the mounting bolts of the radio receiver cover are not loosened. Check that the wiring cable glands are not loosened.						
Wiring	Inside of radio receiver	Check visually.	Check that the radio receiver is correctly wired to the equipment operated without abnormality.						
Executed by	Inspector								
Checked by	Maintenance engineer								

Troubleshooting

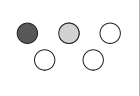
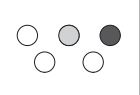
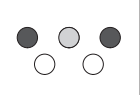
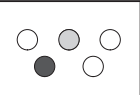
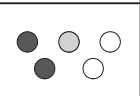
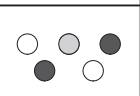
■ Trouble Diagnosis

In case the radio operated equipment does not function by any chance, it is necessary to determine which is defective, the equipment operated or the radio remote control system. If there are push buttons, etc. connected with cables, accordingly, conduct test operation before checking to identify the cause.

If the radio remote control system has the cause, check the following troubleshooting.

● Troubleshooting the radio transmitter

Status	Cause	Remedy	
The radio transmitter does not start up.	No LED is turned on.	The battery has run out.	Charge the battery.
	The battery is charged, but no LED is turned on.	The operation button is pressed. (It is held pressed (locked).)	Press the locked operation button to unlock it.
	The battery is charged and no operation button is pressed, but no LED is turned on.	The internal electric system of the radio transmitter is out of order.	If it remains locked, replace it. Replace the radio transmitter.

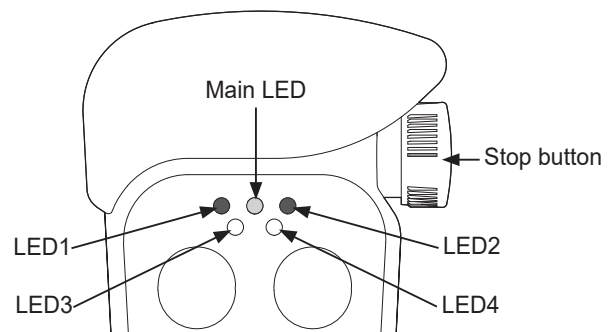
Status	LED indication	Cause	Remedy	
The LED lighting pattern is different from a regular one.		The main LED is alternately turned on in green and red, and the LED 1 is turned on in red.	Production data error	Replace the radio transmitter.
		The main LED is alternately turned on in green and red, and the LED 2 is turned on in red.	Radio initialization error	Replace the radio transmitter.
		The main LED is alternately turned on in green and red, and the LEDs 1 and 2 are turned on in red.	It is necessary to test the stop button.	Press the stop button to restart the radio transmitter.
		The main LED is alternately turned on in green and red, and the LED 3 is turned on in red.	CPU 2 error	Replace the radio transmitter.
		The main LED is alternately turned on in green and red, and the LEDs 1 and 3 are turned on in red.	Stop button memory error	Replace the stop button.
		The main LED is alternately turned on in green and red, and the LEDs 2 and 3 are turned on in red.	Control error	Replace the radio transmitter.

Button names and error example

The main LED is alternately turned on in green and red, and the LEDs 1 and 2 are turned on in red.

It is necessary to test the stop button.

→ Press the stop button to restart the radio transmitter.



• Troubleshooting the radio receiver

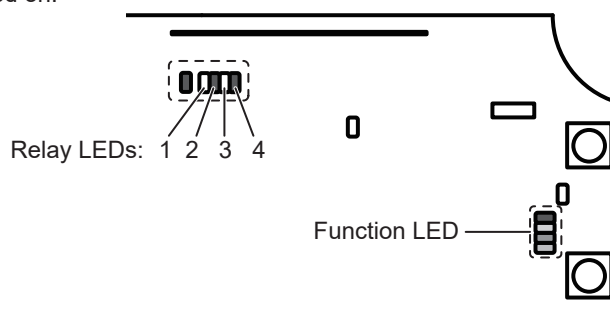
Status	Cause	Remedy	
The radio receiver does not work.	No LED of the radio receiver is turned on.	The power is not connected to the radio receiver.	Connect the power to the radio receiver.
	The power is connected, but no LED of the radio receiver is turned on.	The internal electric system of the radio receiver is out of order.	Replace the radio receiver.
	The LEDs of the radio receiver are turned on, but they do not work if the radio transmitter's buttons are pressed.	1. An unregistered radio transmitter is used. 2. Other radio transmitter has logged in.	1. Register the radio transmitter. 2. Log in after logging out other radio transmitter.

Status	Relay LEDs	Cause	Remedy
The function LED blinks continuously and the relay LEDs are turned on.		Production data read error	Replace the radio receiver.
		Radio initialization error	Replace the radio receiver.
		CPU 1 memory test error	Replace the radio receiver.
		Extension board software error	Replace the extension board (D12-1).
		Stop relay error	Turn off and turn on the radio receiver. If not reset by repeating this step, replace the radio receiver.
		CPU 2 error	Turn off and turn on the radio receiver. If not reset by repeating this step, replace the radio receiver.
		Hardware version error	Replace the radio receiver.
		Control error	Replace the radio receiver.

Button names and error example

The function LED blinks and the relay LEDs 2 and 4 are turned on.

Stop relay error → Replace the radio receiver.



! DANGER



- Only qualified personnel are allowed to conduct trouble diagnosis.
- Failure to comply with this instruction may result in death or serious injury.

(to be continued)

■ Troubleshooting

In case the cause cannot be found as a result of troubleshooting, ask the sales shop for repair and inspection.

When this is done, let them know the following information.

- Product specifications (number of push buttons, number of speed steps, etc.)
- Product serial No. (The product serial no. is inscribed on the battery housing section of the radio transmitter and on the top surface of the radio receiver in the form of "SN: XXXXXXXX".)
- Date of purchase
- Name of the sales shop
- Code and capacity of the equipment (for example, ER2) to which this radio remote control system has been installed, and the installation position
- Place of use, etc. (address, company name, phone number, etc.)
- Details of trouble

For a warranty period and warranty conditions, see "WARRANTY" on the next page.

WARRANTY

■ Warranty Coverage

During the warranty period, if there is a failure or damage in the product due to defective designing, manufacturing or materials, despite it being used as instructed by the Owner's Manual or the warnings and cautions displayed on the product, we will repair free of charge based on the descriptions in this warranty.

■ Warranty Period

It shall be one year from the date of delivering this product.

■ Items out of Warranty

In the following situations, the repair may be charged even during the warranty period.

- 1) When the product is used in the environment beyond the product specifications (where the product can be affected by external factors such as smoke, chemicals and chloride damage, or it is used under special condition)
- 2) When inspections and maintenance after use are not performed as instructed in the Owner's Manual
- 3) When the failure is caused by wrong inspections or maintenance, or wrong handling
- 4) When the product or accessories are remodeled
- 5) When the genuine parts are not used
- 6) When the product is used against the instructions in the Owner's Manual, etc.
- 7) When the damage is caused by natural disasters such as earthquake, typhoon and flood, as well as accidents or fires
- 8) When the defect is caused by wear or deterioration with age

* Note that the following part is considered as consumable parts and any failure or damage caused by the part is not included in the warranty. (Battery)

We will not be responsible for secondary damage such as reduced production due to the troubles of this product. In case such a situation is predicted, prepare an alternative product, etc. in advance.

■ Repair Service

In the case of asking for repair, see "Troubleshooting" on the previous page and let the sales shop know the information such as product specifications and product serial No.

■ Application of Warranty

The warranty is valid only in the country of sale.

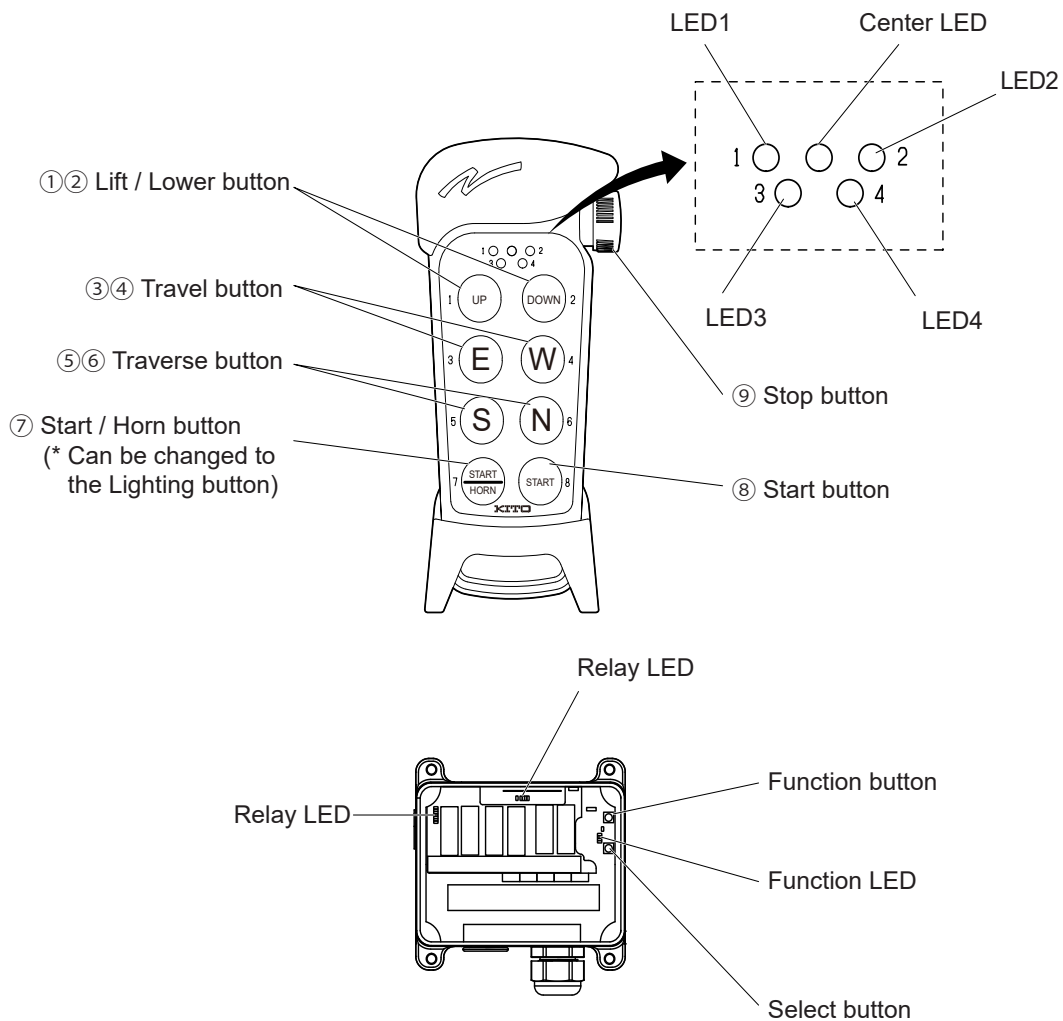
Appendix 1

Setting Manual

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1. Description of Operation Button LEDs



2. Setting of Radio System

2.1 Auto Power Off Setting

Auto power off setting is used to disable the auto power off function of the radio transmitter or set a time to automatically turn off the power. Once the set time passes without operating the buttons, the radio transmitter is automatically turned off. Upon shipment, auto power off is set to 6 minutes.

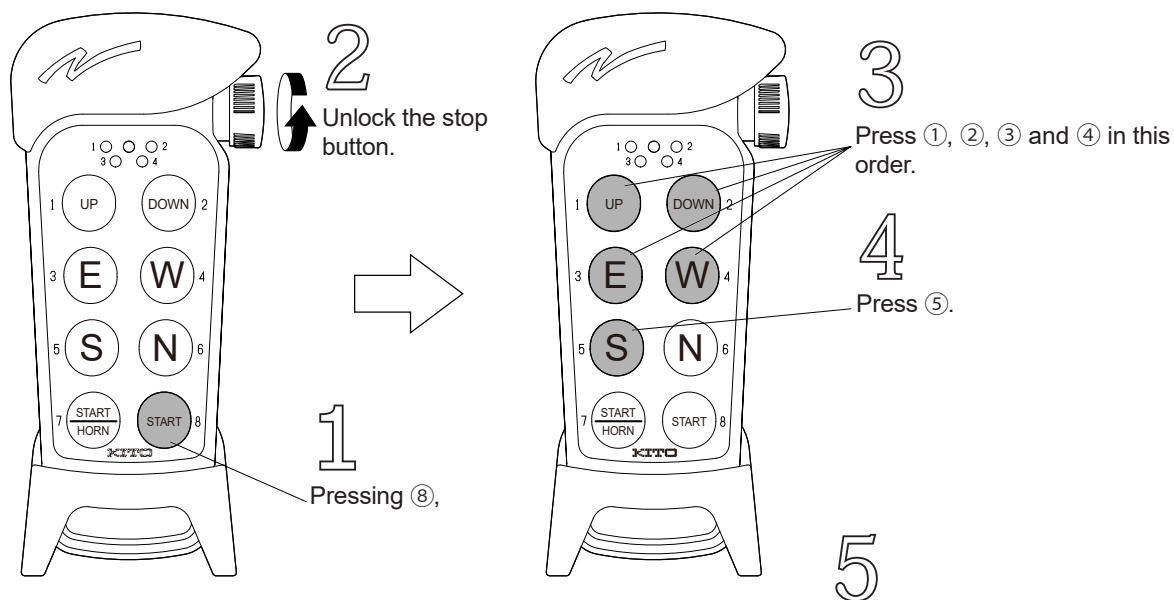
Operating method

- 1) Pressing the button ⑧, turn the stop button to the right to unlock.
- 2) Press the buttons ①, ②, ③ and ④ once each in this order.
- 3) Press the button ⑤ to start the auto power off setting mode.
- 4) Select a setting time from the following table.

Button	Setting
①	3 min.
②	6 min.
③	12 min.
⑦	No auto stop

- 5) After selecting the time, the radio transmitter is automatically turned off to complete setting.

* The setting is not enabled unless next operation is done within one minute of each operation.



Select the button to set auto power off.

Button ① → 3 min.

Button ② → 6 min.

Button ③ → 12 min.

Button ⑦ → No auto stop

2.2 Changing the Button ⑦ to the Lighting Button (Latch Type)

The button ⑦ functions as a horn button (momentary type) upon shipment, but it can be changed to a lighting one (latch type).

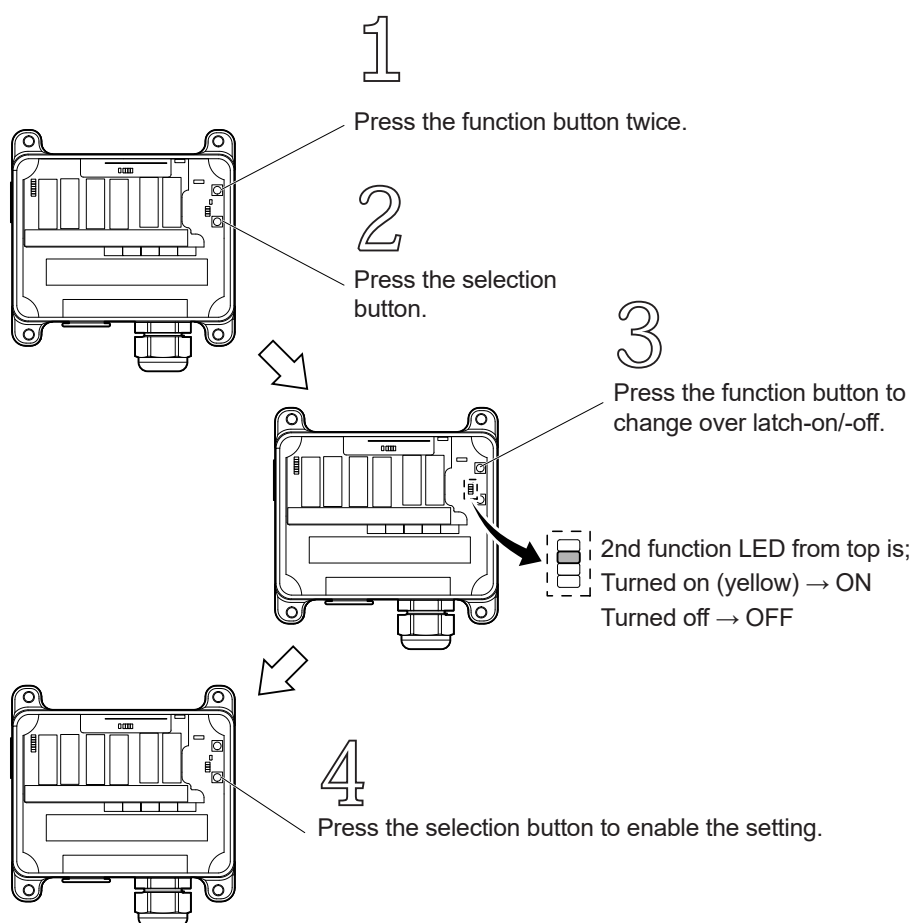
* The lighting button (latch type) is turned on by pressing it once and turned off by pressing it again.

Setting method

- 1) Check that the stop button of the radio transmitter having the right of operation is pressed.
- 2) Press the function button of the radio receiver twice successively.
- 3) Press the selection button of the radio receiver to start the latch changeover mode.
- 4) Latch-on/-off is changed over by pressing the function button. If the 2nd function LED from the top is turned on in yellow, latch setting is ON. If the function LED is turned off, latch setting is OFF.
- 5) Press the selection button to enable the setting as the lighting button (latch type).

* The setting is not enabled unless next operation is done within 10 seconds of each operation.

* Once the setting is made, it is not initialized even by turning off the radio receiver.



Precaution during operation

If the radio transmitter is turned off by the stop button or the auto power off function after changing to the lighting button (latch type), lighting is turned off. To turn on lighting, turn on the radio transmitter and press the lighting button (latch type) again. Lighting can be kept turned on by disabling the auto power off function.

2.3 Registering the New Radio Transmitter with the Radio Receiver

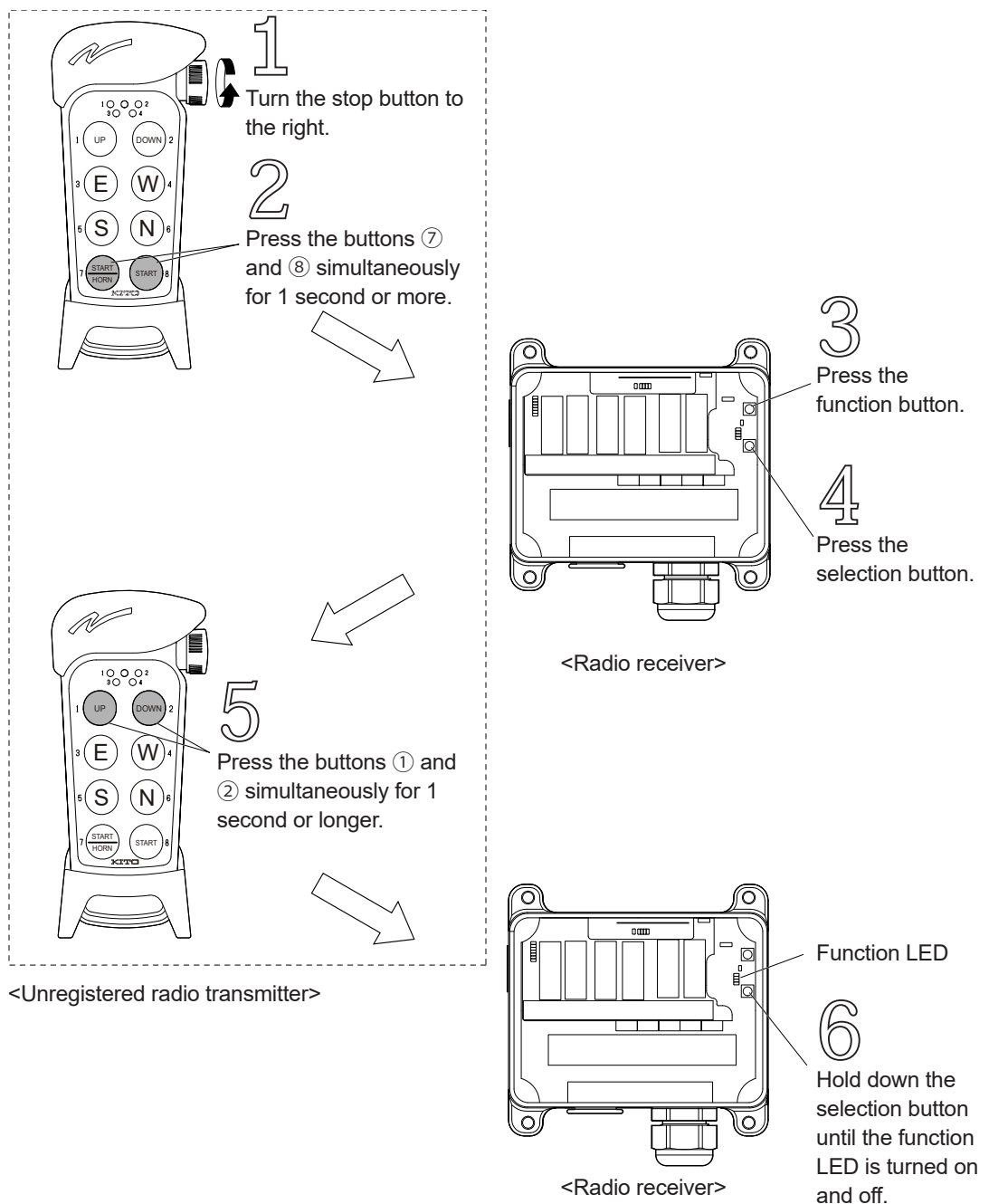
Method 1: When setting with the radio transmitter and receiver (when newly adding a radio transmitter)

In the cases such as purchasing a new radio transmitter, it is necessary to register it with the radio receiver. Up to 8 radio transmitters can be registered with the radio receiver.

Operating method

- 1) Turn the stop button of the new radio transmitter to the right to unlock it.
- 2) Press the buttons ⑦ and ⑧ of the radio transmitter simultaneously for 1 second or longer.
- 3) Press the function button of the radio receiver.
- 4) Press the selection button of the radio receiver.
- 5) Press the buttons ① and ② of the radio transmitter simultaneously for 1 second or longer.
- 6) Hold down the selection button of the radio receiver until the function LED is turned on and off.
- 7) The new radio transmitter is now registered with the radio receiver and has the right of operation.

* The setting is not enabled unless next operation is done within 10 seconds of each operation.

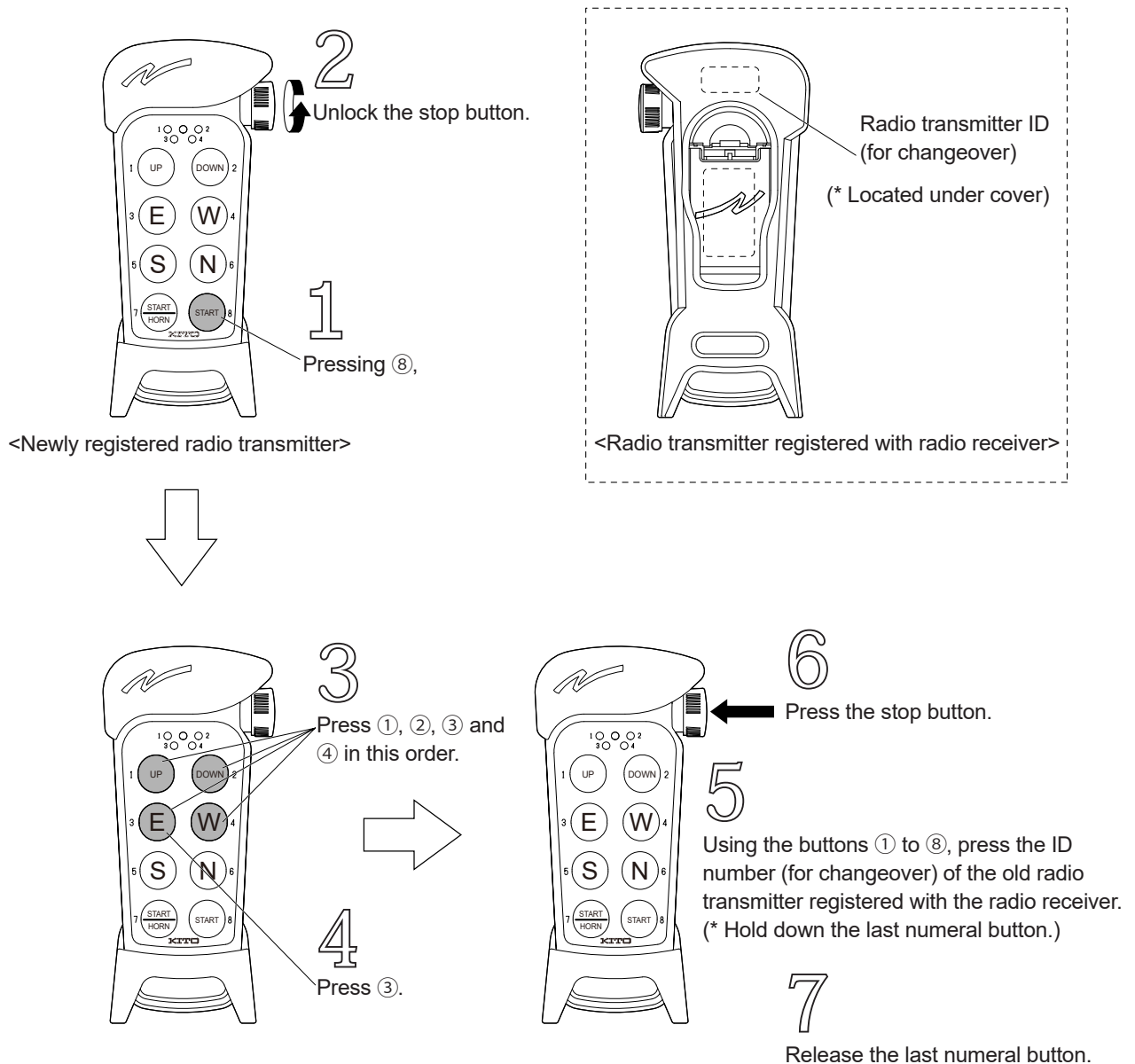


Method 2: When setting only with the radio transmitter (such as when the radio transmitter is out of order or lost)

This setting changes over the ID (peculiar number) of the radio transmitter already registered with the radio receiver to that of the newly registered one. Once the setting is enabled, note that the already registered radio transmitter is disabled and cannot communicate with the radio receiver.

Operating method

- 1) Pressing the button ⑧ of the new radio transmitter, turn the stop button to the right to unlock it.
 - 2) Press the buttons ①, ②, ③ and ④ once each in this order, followed by the button ③.
 - 3) Using the buttons ① to ⑧ of the new radio transmitter, input the ID number of the old transmitter registered with the radio receiver. When this is done, hold down only the last numeral button.
 - 4) Holding down the last numeral button, press the stop button and release the last numeral button.
 - 5) The radio transmitter is automatically turned off in about 10 seconds to complete the setting.
- * The setting is not enabled unless next operation is done within 1 minute of each operation.

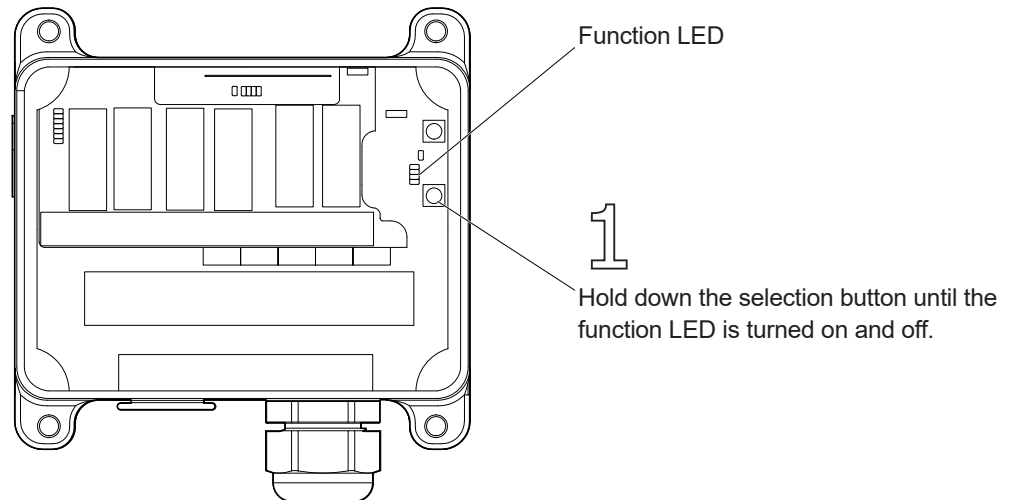


2.4 Resetting the Right of Operation with the Radio Receiver

When the radio transmitter having the right of operation gets out of order or lost, the right of operation can be reset with the radio receiver.

Operating method

- 1) Hold down the selection button of the radio receiver until the function LED is turned on and off.
- 2) The radio receiver's right of operation is reset.



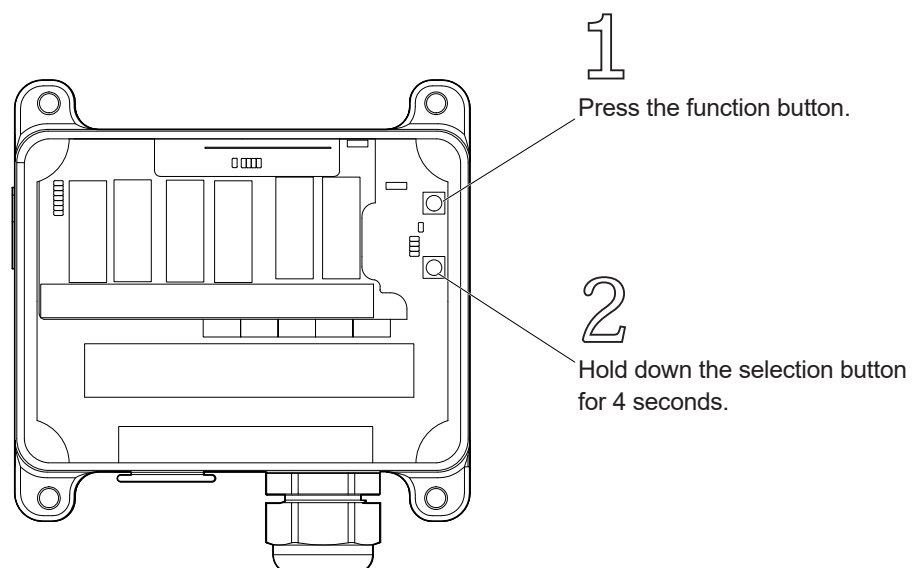
2.5 Deleting All Radio Transmitters Registered with the Radio Receiver

In the case of not properly managing registration of the radio transmitter with the radio receiver or in the case of resetting registration of the radio transmitter with the radio receiver once, all radio transmitters registered with the radio receiver can be deleted.

Operating method

- 1) Press the function button of the radio receiver.
- 2) Hold down the selection button of the radio receiver until all the LEDs of the radio receiver are turned off.
- 3) All radio transmitters registered with the radio receiver are deleted.

* The setting is not enabled unless next operation is done within 10 seconds of each operation.



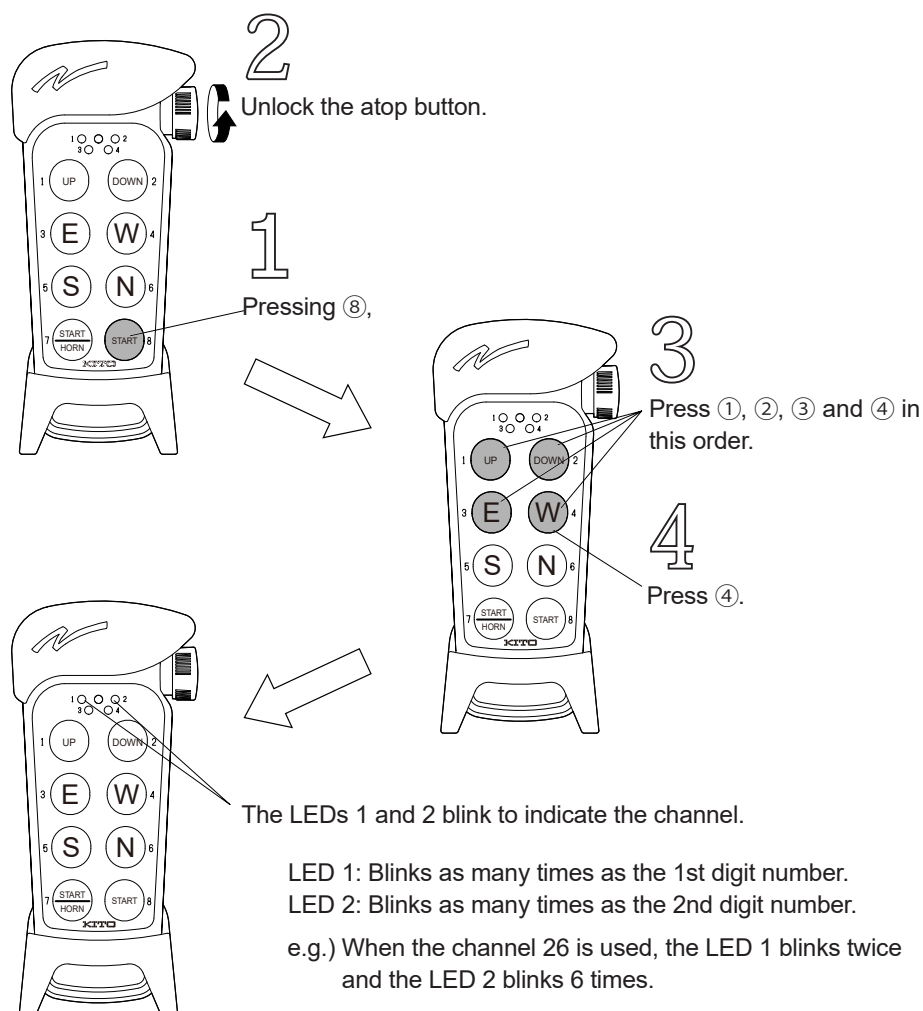
2.6 Setting the Radio Transmitter Channel

2.6.1 Indicating the Radio Transmitter Channel

The channel currently used by the radio transmitter can be confirmed. There are 16 channels in total, from 11 to 28. Upon shipment, one of 16 channels is allocated to each radio transmitter.

Operating method

- 1) Pressing ⑧ of the radio transmitter, turn the stop button to the right to unlock it.
- 2) Press the buttons ①, ②, ③ and ④ once each in this order, and then, press the button ④.
- 3) The LED 1 blinks as many times as the 1st digit number of the channel.
- 4) The LED 2 blinks as many times as the 2nd digit number of the channel.
- 5) After continuously blinking for 1 minute, the radio transmitter is turned off.



List of channels

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
11	2405MHz	15	2425MHz	19	2445MHz	23	2465MHz
12	2410MHz	16	2430MHz	20	2450MHz	24	2470MHz
13	2415MHz	17	2435MHz	21	2455MHz	25	2475MHz
14	2420MHz	18	2440MHz	22	2460MHz	26	2480MHz

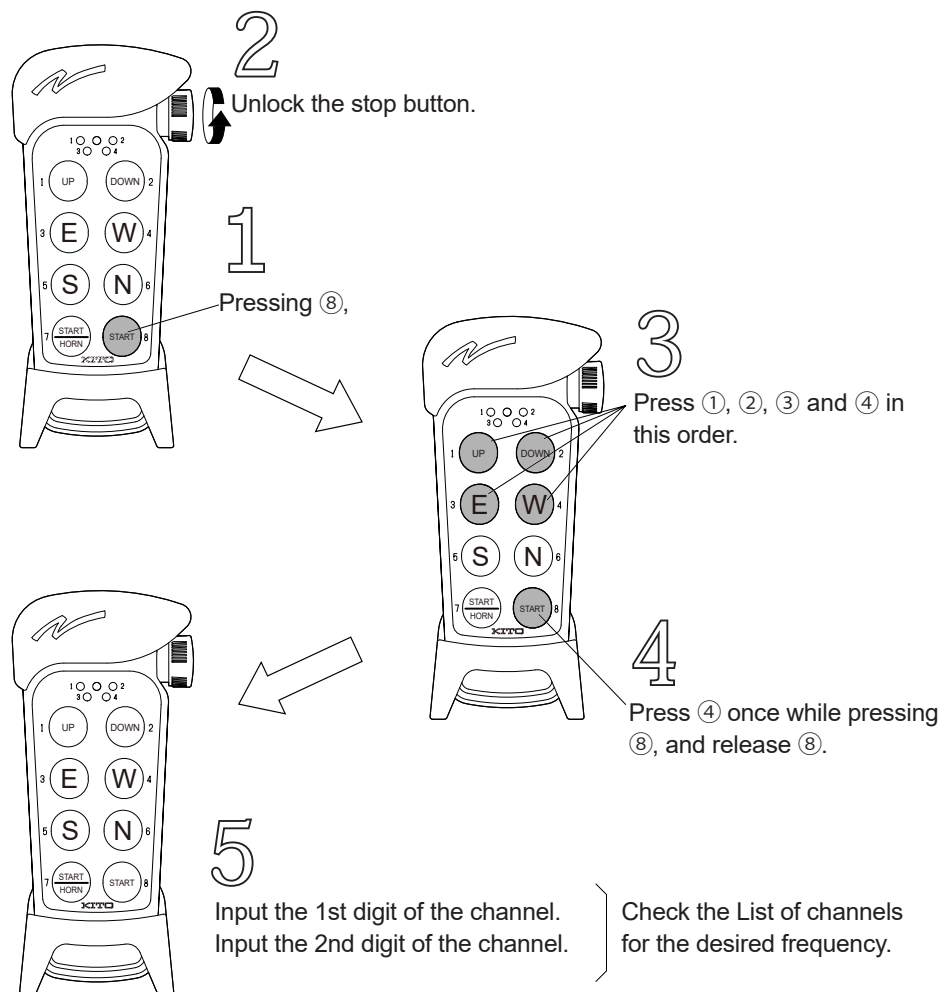
2.6.2 Changing the Radio Transmitter Channel

The radio transmitter channel can be changed by setting. If you change the radio transmitter channel registered with the radio receiver, the radio transmitter can communicate with the radio receiver as it is, requiring no reregistration with the radio receiver.

Operating method

- 1) Pressing ⑧ of the intended radio transmitter, turn the stop button to the right to unlock it.
- 2) Press the buttons ①, ②, ③ and ④ once each in this order. Then, press the button ④ once while pressing the button ⑧, and release the button ⑧.
- 3) Checking the List of input numbers, input the 1st and 2nd digits of the channel of the desired frequency
- 4) The center LED blinks 3 times and the radio transmitter is automatically turned off.

* The setting is not enabled unless next operation is done within 1 minute of each operation.



List of input numbers

Example of inputting a number

- 1) To input the 1st digit "1", press the button ①.
- 2) To input the 2nd digit "8", press the button ② once while pressing the button ⑧, and release the button ⑧.

Input number	How to press the buttons
1 to 6	Press the buttons ① to ⑥ directly.
7	Press ① once while pressing ⑧, and release ⑧.
8	Press ② once while pressing ⑧, and release ⑧.
9	Press ③ once while pressing ⑧, and release ⑧.
10	Press ④ once while pressing ⑧, and release ⑧.

Appendix 2

List of Supplementary Parts

The following List of supplementary parts describes the related parts of PK Series KITO Radio Remote Control System.

Used for	Part name	Code	Description
Radio receiver	Radio receiver	PKREV	With a 2.2m cable
	Radio receiver upper board	PKR01	With 6 relays
	Radio receiver case	PKR02	Including a cable gland and set screw
	Cable gland for radio receiver	PKR03	M20
	Set screw for radio receiver	PKR04	M20
	Screw for radio receiver cover	PKR05	1 piece
Radio transmitter	Radio transmitter casing	PKT01	Upper and lower parts, with stop button and rubber cover
	Rubber cover for radio transmitter	PKT02	
	KITO standard button sheet	PKT03	8-push button indication
	Rib plate	PKT04	For pasting KITO standard button sheet (upper surface)
	Stop button	PKT05	With a cable connector
Charger and AC adapter	Charger	PKB01	
	AC adapter for charger	PKB02	

How to order

- (1) When ordering, let us know the model of the radio remote control system, the name, code and quantity of each supplementary part.
- (2) For the prices and delivery periods of the supplementary parts, contact the sales shop where you purchased the product.

KITO