ITOH DENKI

POWER MOLLER PLUS

Convey

Emergency Closure Supporting Module

Gap-Roller

Gap-Roller

〈 User Manual 〉

※The transfer conveyor is not included in this product.

Read this manual before use

Thank you for purchasing the Emergency Closure Supporting Module (hereinafter referred to as “this product”).

Make sure to read this manual carefully before using, and start using only after you have understood all the product’s functions, safety information and precautions.
After reading the manual, make sure to keep it safe in a specified place for future use, whenever necessary.

ITOH DENKI

Module

No.524

1. Introduction

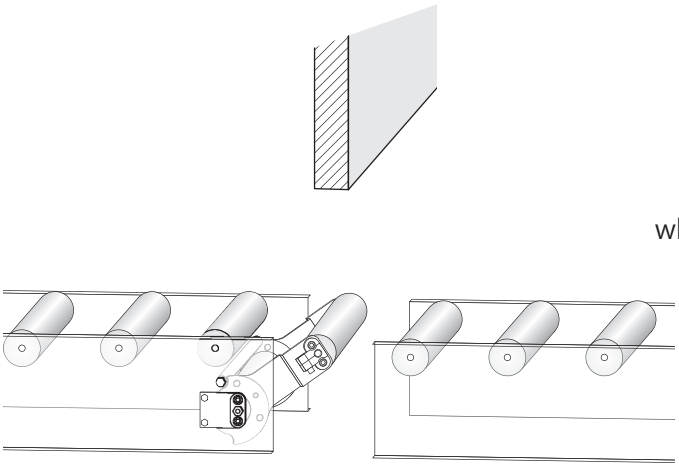
Features

Features of this product

- This product is used to bridge gaps between conveyors by the bridge roller.
- Secures any gap when closing the fire shutter.
- All-electric control. No pneumatics.

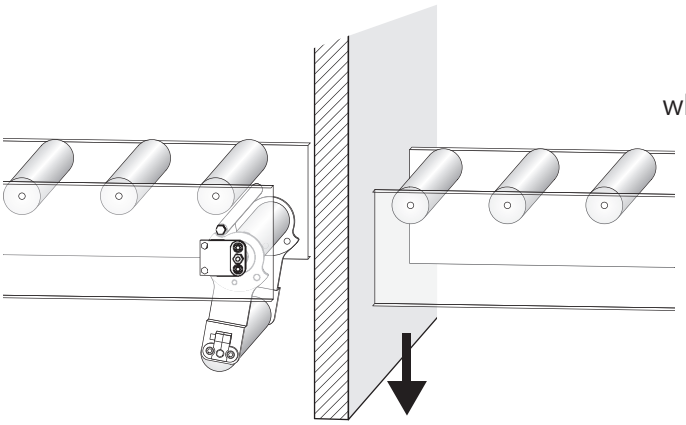
Operation description

When opening the fire shutter



Bridges gaps between conveyors when opening the fire shutter

When closing the fire shutter



Secures any gap when closing the fire shutter

1. Introduction

Limited warranty

- **This product is a module supporting emergency closure. The shutter, however, may not be closed due to problems, such as tray jam.**

・ This product is designed as a general industrial device. Do not use for other applications. We do not take any responsibility for any damage that may result from the disregarding of these warnings.
Also, in the event that an accident results from the use of this product, we do not compensate for any damage, including abnormalities of equipment, connection devices, and/or software, any damage resulting from malfunctions, and/or any other secondary damage.

Notes on industrial property rights

There are some examples of parts that need to be prepared by customers, as explained within this manual. However, this does not provide any guarantee against the existence of any rights, such as our industrial property rights, or those of other companies, in advance.

Notes on technical support

We respond to technical inquiries based on the contents described within this manual, and on this product within the range of general items for this product unit with standard specifications, and for the options prepared by us.
There are some descriptions in this manual, about parts, equipment, and wiring arranged by customers, as well as the controls and operation under such circumstances. However, these are not included in the guaranteed operating range and/or support.
When in use, please check and perform the aforementioned based on your responsibility according to operation.

About the risk category of this system

This product is intended to comply with the risk category 2※2 or lower as defined in EN 954-1※1. It does not comply with purposes beyond risk category 3 or higher.

※1: European machinery safety standards

※2: This indicates that even though events that would result in serious injury occur infrequently under assumed risk environment, there is a high probability to avoid danger if you observe the safety contents described in this manual.

About installation environment

This product is not equipped with special dust proof/waterproof countermeasures, and is intended to be used in environments of “Pollution Degree 2”, as defined in IEC60664-1.
For this reason, if you install this product in an environment that requires dust proof/waterproof treatments, you need to add necessary countermeasures, and check the performance based on your responsibility.

About description of the product

・ The emergency closure supporting module is described as GPR in this manual.
・ Depending on the signal type (NPN/PNP) specified by customers, different models of control driver cards are supplied as being the standard for this product.

Signal input/output type	NPN	PNP
Included driver card model	CB-016N6 (1) CB-016N6-MJ2 (1)	CB-016P6 (1) CB-016P6-MJ2 (1)

※ [CB-016N6] and [CB-016P6] are used only when the bridge roller is a motor driven roller (hereinafter referred to as "MDR").

In this manual, [CB-016N6] and [CB-016P6] are described as [CB-016], and [CB-016N6-MJ2] and [CB-016P6-MJ2] are described as [CB-016-MJ2].
[CB-016N6] / [CB-016P6] and [CB-016N6-MJ2] / [CB-016P6-MJ2] are described separately, when needed.

1. Introduction

Precautions when using the GPR

This product (GPR) is a module supporting emergency closure. Pay attention to the following items when using.

Do not use driver cards other than those specified.

Incorporate the safety circuit (safety relay), etc., and take countermeasures against malfunction. ⇒ P.15

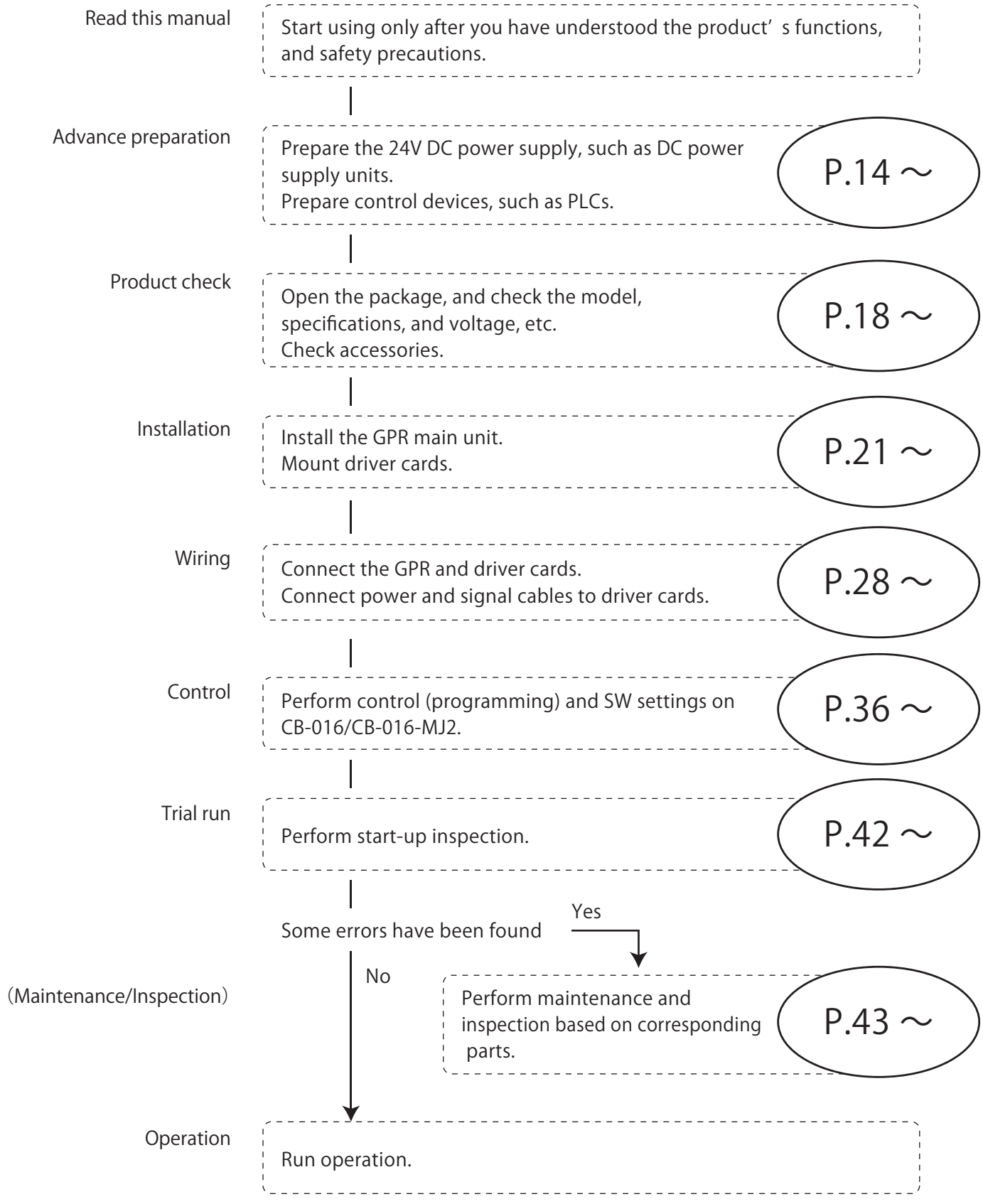
- In the case of emergency, such as a fire, loss of power could result in interference with shutter closure if trays stop on the bridge roller. Take appropriate measures, such as preparation of an emergency power supply. ⇒ P.15
- When an error occurs, eliminate the causes of the error immediately.
  Tray stoppage and/or jam due to an error of the bridge MDR prevents the shutter from closing. ⇒ P.46
- The GPR has the range of movement. Do not place obstacles in the range of movement. ⇒ P.23
- Perform settings on [CB-016-MJ2] so that the bridge roller should not interfere with the fire shutter when it lowers. ⇒ P.38

When there are trays on the GPR, do not turn off the RUN signal and/or power.
Failure to follow this could result in interference with shutter closure. ⇒ P.41、P.47

- When turning the RUN signal OFF, the GPR will lower by the dynamic brake control, and when turning the power OFF, it will lower in the free falling mode.
- Use the bridge MDR as an auxiliary unit of the front and back conveyors. ⇒ P.39
- Check other precautions in each section.

2. Procedures from installation to operation

Procedures from installation to operation



2. Procedures from installation to operation

INDEX

1. Introduction ····· 2

2. Procedures from installation to operation ····· 5

3. Safety precautions ····· 7
- 3-1. General precautions ····· 9
- 3-2. Precautions on installation ····· 11
- 3-3. Precautions on wiring ····· 11
- 3-4. Precautions related to control ····· 12
- 3-5. Precautions related to operation ····· 12
- 3-6. Precautions on maintenance and inspection ····· 13

4. Advance preparation ····· 14

5. Product check ····· 18

6. Installation/Wiring ····· 21
- 6-1. Preparation to install the GPR main unit ····· 22
- 6-2. Preparation to install driver cards ····· 24
- 6-3. Preparation of MDR extension cables ····· 24
- 6-4. Installation of the GPR main unit ····· 25
- 6-5. Installation of driver cards ····· 28
- 6-6. Connection between the GPR main unit and driver cards ····· 28
- 6-7. CB-016-MJ2 functions list ····· 29
- 6-8. Wiring for CB-016-MJ2 ····· 30
- 6-9. CB-016 functions list ····· 32
- 6-10. Wiring for CB-016 ····· 33
- 6-11. Wiring with the power unit ····· 35
- 6-12. Connection with PLCs ····· 35

7. Control/Operation ····· 36
- 7-1. Device configuration image ····· 37
- 7-2. Settings of driver cards for the lifting MDR ····· 38
- 7-3. Settings of driver cards for the bridge MDR ····· 39
- 7-4. Description of lifting operation ····· 41
- 7-5. Trial run ····· 42

8. Maintenance/Inspection ····· 43
- 8-1. Error details ····· 45
- 8-2. Error time chart ····· 47

Appendix ····· 53
- Appendix Product specifications ····· 54

3. Safety precautions

Refer to 5. Product check (P.18) for parts names in sentences.

3. Safety precautions

Danger level

To prevent hazards to users and/or others, and/or damage to property in advance, we explain important precautions to be followed securely as below.

■ We categorize the degree of hazard and/or damage that may result if a user disregards the description, and operates the product improperly, using and explaining the following symbols.

⚠ WARNING	This indicates a high possibility that severe injury or even death may result.
⚠ CAUTION	This indicates a high possibility that injury, or only property damage may result.

Symbol explanation

■ We categorize the type of those precautions using the following symbols throughout the manual.

	This symbol indicates a reminder you should pay attention to.
	This symbol indicates operations that are prohibited.
	A forced action you must always do.

3. Safety precautions

3-1. General precautions

⚠ WARNING

Do not use the product near places subject to explosive, flammable gas, and/or corrosive atmosphere, and/or combustible materials.

Failure to follow this could result in explosion, fire, electric shock and/or injury.

When using the product in places where serious accidents and/or damage may possibly occur, install backup and/or fail-safe functions systematically.

Failure to follow this could result in the inability to control this product due to driver card malfunction, which could lead to serious accidents.

⚠ CAUTION

Do not apply heavy loads to this product, such as stepping on it.

Failure to follow this could result in people falling and/or malfunction.

Do not put fingers, hands, and/or clothes close to the moving parts on the GPR main unit.

Failure to follow this could result in them getting caught and/or stuck.

Do not forcibly bend and/or pull cables.
Also, do not put heavy materials on cables, or do not get them stuck between cables.

Failure to follow this could result in fire and/or electric shock due to cable damage.

Never remodel the product and/or driver cards.

Failure to follow this could result in serious accidents.

Make sure to attach ground wires to this product and the DC power supply unit.

Failure to follow this could result in electric shock if any malfunction or leakage occurs.

Do not touch the product when it has just stopped operation.

Failure to follow this could result in burns.

Do not put water and/or oil on the product, and do not transfer wet and/or oily trays.

Failure to follow this could result in electric shock, and/or malfunction.

Do not apply strong impact and/or excessive force to the product, such as hitting it with objects, or dropping it. Also, do not use the equipment if strong impact has been applied, and/or if the appearance has become deformed.

Failure to follow this could result in malfunction due to applied impact.

3. Safety precautions

3-1. General precautions

⚠ CAUTION

Stop operation when abnormal sound is heard during operation.
Failure to follow this could result in unexpected accidents.

Do not use in a way exceeding the range of the product specifications.
Failure to follow this could result in malfunction, fire, and/or injury.

Turn off the power supply to the product before moving and/or installing the product, and performing maintenance and inspection (excluding those during operation).
Working while the power is on could result in accidents due to unexpected operation.

Observe the safety regulations for installation locations, and/or products in use.

Securely wire each cable to connection parts.
Improper wiring could result in electric shock and/or malfunction.

Do not turn on/off relays and/or contactors near power cables, signal cables, and/or driver cards.
Failure to follow this could result in malfunction due to noise generation.

LED or Pull-up/Pull-down circuits implemented in the output circuit of control devices could result in unexpected operation.
Carefully check the output circuit.

Turn on the power in order of external control devices, and then the product. Turn off the power in order of the product, and then external control devices.
Turning on/off the power in the wrong order could result in malfunction.

Do not unplug power and/or signal cables during operation except in an emergency.
Also, do not run/stop this product using the power supply. (Use the signal.)
Failure to follow this could result in malfunction.

Do not forcibly rotate the MDR at times other than maintenance and inspection.
Failure to follow this could result in damage to driver cards, and/or their lifetime to be significantly shortened.

Do not turn off the power during transfer (during MDR rotation) except in an emergency.
Failure to follow this could result in malfunction.

Make sure to perform the start-up inspection, and check that devices are free from any abnormalities, and that safety equipment functions correctly before using the product.

When disposing of the product, make consigning contracts with licensed industrial waste disposers, and consign the disposal to them.

3. Safety precautions

3-2. Precautions on installation

⚠ CAUTION

When handling, wear protective equipment, such as gloves.
Since this product consists in large part of metal, careless handling could result in hands getting injured.

Make sure to use the recommended tightening torque to tighten bolts for installing the GPR main unit and/or fastening screws of driver cards.
Failure to follow this could result in bolts and/or screws loosening, and/or malfunction.

Check the corresponding installing direction to the loading/discharging sides before installing.
Failure to follow this could result in them getting caught and/or stuck.
＊Refer to P.23.

Avoid installing other devices within the GPR' s movable range.
Failure to follow this could result in malfunction if devices come into collision with each other.
＊Refer to P.23.

If necessary warning/caution labels become hidden after installation, affix again on places where they can be seen.

3-3. Precautions on wiring

⚠ CAUTION

Perform wiring when the power is shut off.
Failure to follow this could result in electric shock and/or accidents due to unexpected operation.

When attaching or removing connectors, turn off the power first, securely hold connectors, and perform operation. Also, do not apply excessive force to the driver card connection parts, such as obliquely attaching or removing connectors.
Failure to follow this could result in electric shock, malfunction, and/or accidents due to unexpected operation.

Securely attach connectors to the driver card connection parts.
Improper wiring could result in electric shock and/or malfunction.

Perform wiring to connectors so that cables make secure contact with connectors.
Barb lines from the cable core could result in heat generation and/or fire due to changes of contact resistance, and/or short circuit with the adjacent contact.

Since the bridge MDR cable moves according to the lifting operation, secure the cable appropriately.
Failure to follow this could result in cable disconnection.
※ For the wiring example, refer to P.27.

3. Safety precautions

3-4. Precautions related to control

⚠ CAUTION

Do not turn the driver card switches using excessive force.
Failure to follow this could result in malfunction.

3-5. Precautions related to operation

⚠ CAUTION

Make sure to perform the start-up inspection before starting operation.

At the start-up inspection, wear protective equipment, such as gloves.
Failure to follow this could result in hands getting injured by metal parts.

At the start-up inspection, shut off the power, and perform inspection.
(excluding inspection to be performed when operating this product.)

Failure to follow this could result in injury due to unexpected operation, such as getting caught and/or stuck.

When operating this product at the start-up inspection, check that there is no danger of fingers getting stuck and/or caught in the product, as well as that there are no materials in the GPR movable parts.
Also, get ready to shut off the power in the event that something should happen.

Failure to follow this could result in accidents/injury by getting caught and/or stuck.

If any abnormalities are found at the start-up inspection, make sure to take countermeasures before the trial run.

Failure to follow this could result in damage and/or malfunction.

3. Safety precautions

3-6. Precautions on maintenance and inspection

⚠ WARNING

If any abnormalities are found, do not use this product until the causes have been eliminated completely .
Using this product with unattended abnormalities could result in not only damage to the devices, but also unexpected accidents.

Have specialists (or people who have sufficiently acquired skills) perform maintenance and inspection under instructions by management supervisors.

At the time of repair and replacement work, turn off the power to all connecting devices.
To prevent wraparound for the power circuits and/or signals, shut off the power, wait a sufficient amount of time, and discharge electricity inside the DC power supply equipment.

At the time of maintenance and inspection, post warning labels so as to prevent unauthorized persons from turning on the power.
Failure to follow this could result in unexpected accidents.

⚠ CAUTION

When repairing/replacing, wear protective equipment, such as gloves.
Failure to follow this could result in hands getting injured by metal parts.

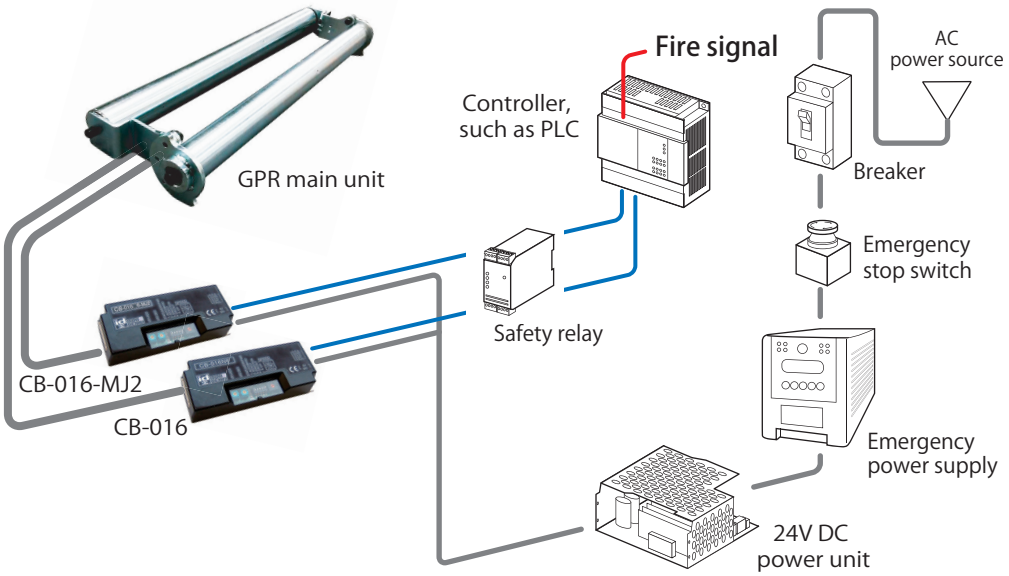
Do not disassemble sections and/or parts other than those specified.
Failure to follow this could result in malfunction and/or unexpected accidents.

Make sure to prepare repair/replacement parts designated by us.
Using parts other than those designated by us could result in malfunction.

4. Advance preparation

4. Advance preparation

Wiring image



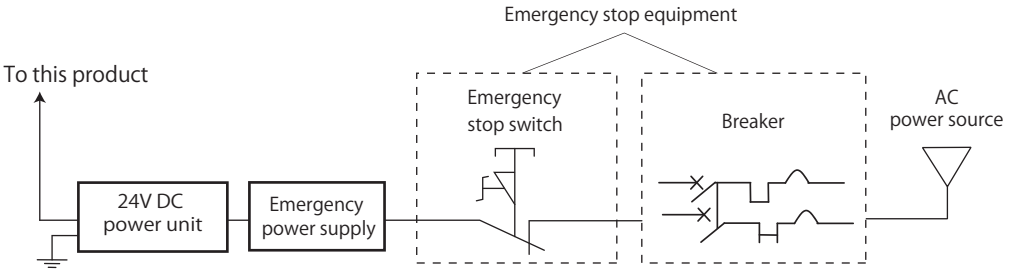
■ As for the sensor input, and input/output signals of driver cards, adopt the number of inputs/outputs based on operation.

Items to be prepared by customers

Before introducing this product, prepare the following devices separately.

Emergency stop equipment

This product does not include the emergency stop equipment. Customers must make sure to install it.



Checking the breaker

Regarding equipment where this product is incorporated, check that a breaker with appropriate capacity for the 24V DC power supply unit has been installed. If abnormal operation should occur, protection through the breaker could be effective. Note that when using an earth leakage breaker, select one that is "inverter corresponding". Some inverter non-corresponding earth leakage breakers could result in malfunction, since they may recognize high-frequency components of the switching power supply as leakage.

Operation check

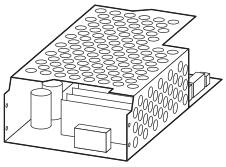
When the 24V DC power supply unit has been incorporated, check that the breaker and emergency stop switch can work properly. Perform operation following the trial operation after checking them.

① AC power input to the DC power supply unit is securely turned ON/OFF when turning ON/OFF the breaker.

② AC power input to the DC power supply unit is securely turned OFF/ON when turning ON/OFF the emergency stop switch.

4. Advance preparation

24V DC power　Power supply equipment to supply 24V DC to this product



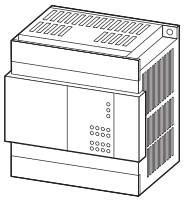
- Switching power supply (24V DC) ※

※ (When the bridge roller has the drive specifications: 10A 240W or more
When the bridge roller has the idler specifications: 5A 120W or more)

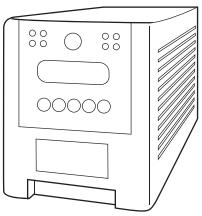
- 24V DC Battery

■ A switching power supply is recommended as the DC power supply (24V DC±10%) for drivers.
■ Use a stabilized power supply that has an adequate capacity of 24V DC and 10A/5A or higher and does not fluctuate due to load variation.
■ The power supply shall have a capacity larger than the rated value of this product.
■ A transformer type power supply cannot be used.
■ Secure a voltage of 24V DC±10% at the power supply terminal of a driver card.
■ If the power supply capacity is less than the rated power of this product, it may result in malfunction and/or damage to the product and driver cards due to the supply voltage drop. Be sure to use a power supply with a capacity larger than the rated power of this product.
■ The power supply should not activate protection with peak current 30A for 1ms or below.
■ For the power supply unit, use an isolation type switching power supply compliant with the safety standard (IEC60950-1 or UL60950-1). Do not use a non-isolation type power supply for safety reasons, since it may not conform to the radiation noise regulations.

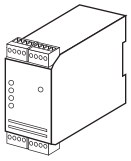
Control devices　Devices to control this product, such as PLCs



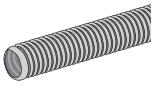
Emergency power supply



Safety relay



Wiring protective layers



4. Advance preparation

Wiring materials

Necessary for wiring of power and signal cables to driver cards.

〈Available wire diameter for driver card connectors〉

Connector \ Driver card	CB-016 ／ CB-016-MJ2
Power connector	0.5～1.5mm² (AWG：20～14)
Control connector	0.08～0.5mm² (AWG：28～20)

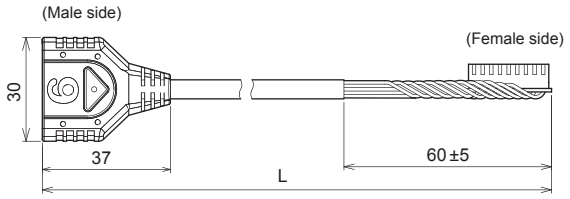
■ To select the current capacity of wiring materials, secure a high safety margin based on the current value in the equipment to be used.
■ Longer wiring between the power supply unit and driver cards/controllers could cause the voltage to decrease, resulting in malfunction and/or damage.

MDR extension cables (Option)

Necessary when the installing location of the GPR main unit is far from that of the driver cards.

■ CB-016 ／ CB-016-MJ2：9P extension cable

Model	9P extension cable length
ACE-CBM-B0600	L= 600mm
ACE-CBM-B0850	L= 850mm
ACE-CBM-B1200	L=1200mm
ACE-CBM-B2700	L=2700mm



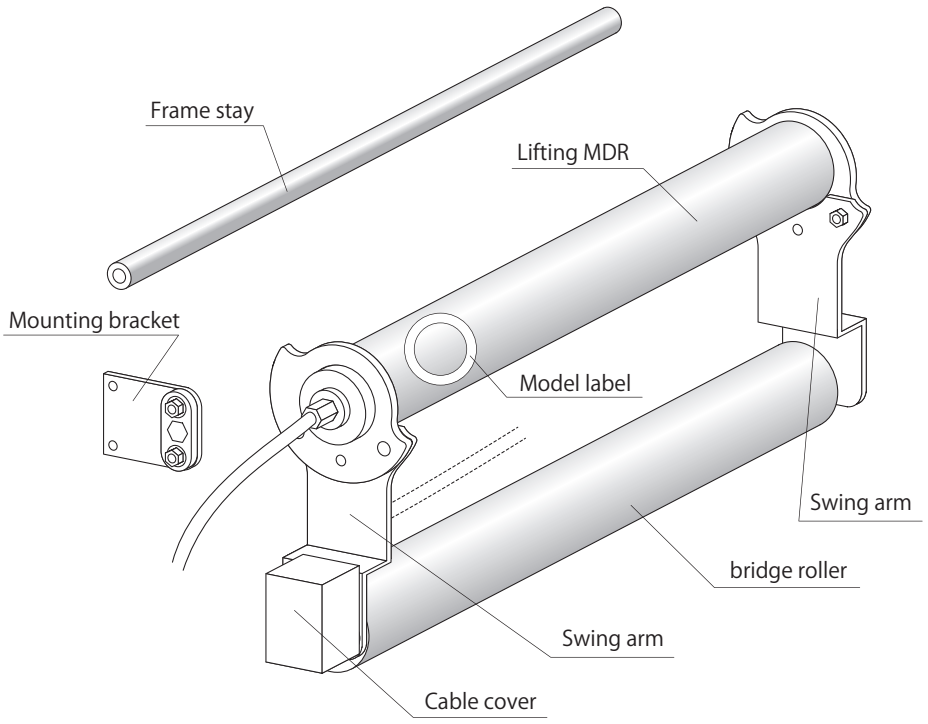
■ Cables can be extended up to 3000 mm, including the MDR cable length.
■ Do not extend cables by connecting multiple extension cables.

5. Product check

5. Product check

Checking the model

Unpack the product, and check that the product model is as ordered.



※ Included only when the bridge roller is an MDR.

Model description sample

GPR−500−60FEN

① Size between frames
400mm ～ 900mm

② Nominal speed for bridge MDR (PM486FE)
- 17 … 17m/min type
- 60 … 60m/min type
- 90 … 90m/min type

※No description when the bridge roller is the idler roller.
Example) GPR−500−ARN

※For details, refer to Transfer speed settings (P.40), 7. Control/Operation.

③ Bridge roller
- FE … PM486FE MDR type (Driving roller)
- AR … ARI-48 idler roller type

※No description when the bridge roller is the idler roller.
Example) GPR−500−ARN

④ Input and output signal type
- N … NPN (Driver card only for input and output)
- P … PNP (Driver card only for input and output)

Term

Nominal speed

The speed on the MDR roller surface (m/min), and the nominal speed with a nice round value for convenience. Values differ slightly from the actual speed.

Checking appearance

①Check that the main unit is free from any abnormalities, such as traces of scratches, dents, dirt, and/or corrosion (rust).
②Check that there is no omission and/or looseness of screws, etc.
※If any abnormalities are found, contact the supplier immediately.

5. Product check

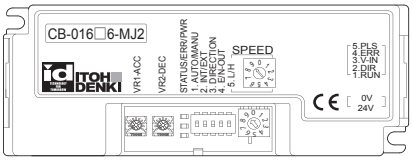
Checking accessories

Check that all the following items are included.

Driver card

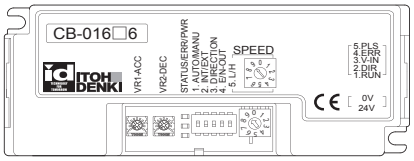
Depending on the GPR input and output signal type, driver cards with the NPN (N) or PNP (P) signal input are included.

For GPR−□□□−□□FE□



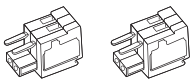
Driver card CB-016□6-MJ2 (for lifting)

1

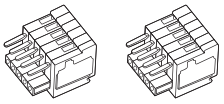


Driver card CB-016□6 (for the bridge roller)

1



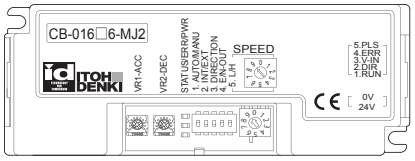
Power connector
(common to each driver card)
EAHB05
2



Control connector
(common to each driver card)
PACB16
2

M4 cross-recessed head SW screw x 15
/ M4 hex. nut
(for securing each driver card)
4 sets

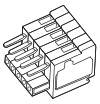
For GPR−□□□−AR□



Driver card CB-016□6-MJ2 (for lifting)

1

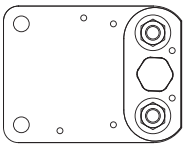
Power connector
EAHB05
1



Control connector
PACB16
1

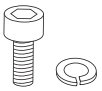
M4 cross-recessed head SW screw x 15
/ M4 hex. nut
(for securing each driver card)
2 sets

For installing the GPR main unit



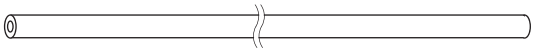
Mounting bracket
(No.MBB-081)
1

Mounting bracket fixing bolt
M5 hex. bolt x 15
/ M5 hex. nut with flange
2 sets



Mounting bolt on the mounting side
M8 hex. socket head bolt x 14
/ M8 spring washer
1 sets

Frame stay



Frame stay
ϕ15 × Size between frames
1

Frame stay mounting bolt
M8 hex. bolt x 20 / M8 spring washer
2 sets

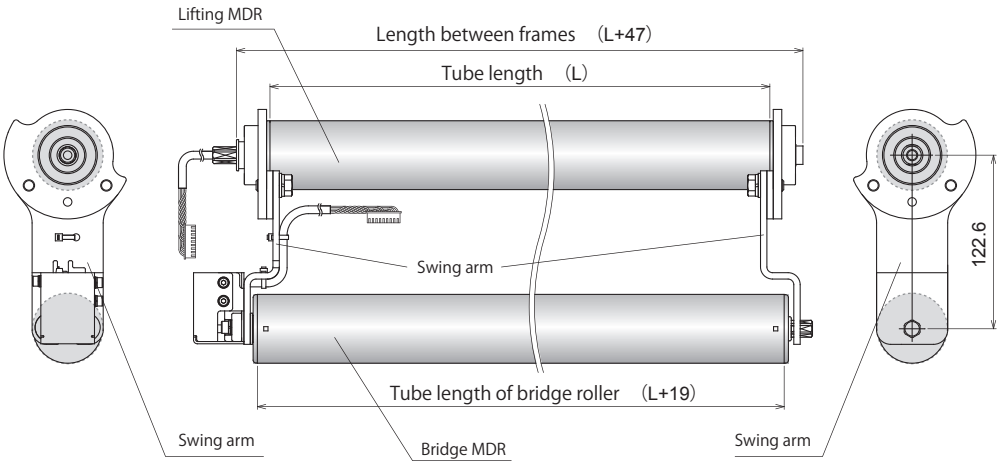
6. Installation/Wiring

6. Installation/Wiring

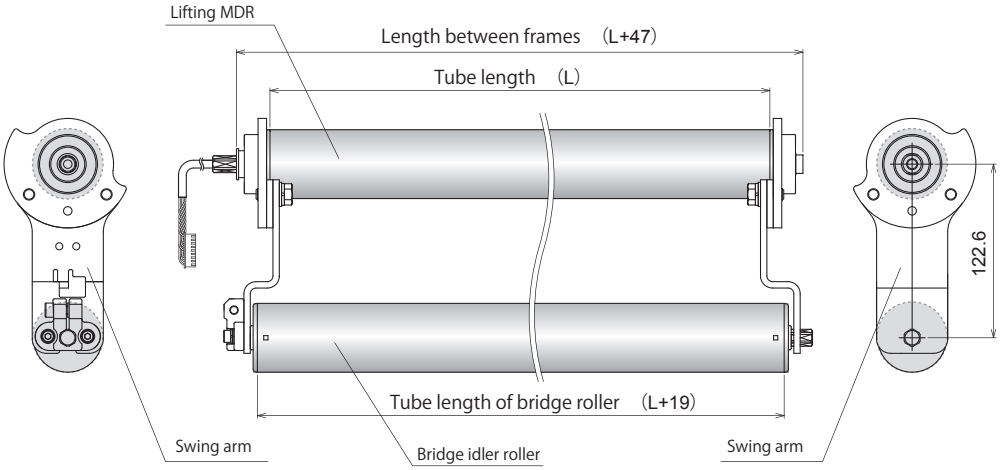
6-1. Preparation to install the GPR main unit

GPR diemensions

When the bridge roller is an MDR



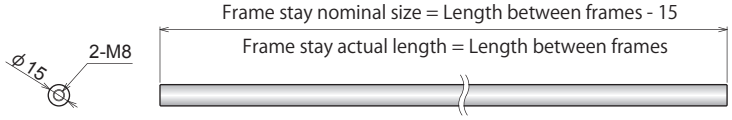
When the bridge roller is an idler roller



Cable length

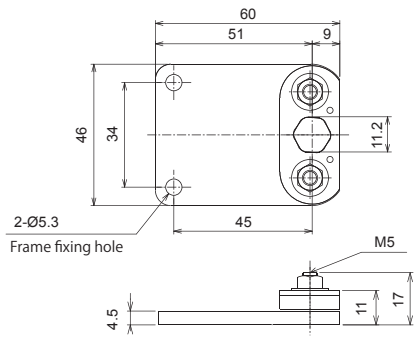
Roller	Cable length	Lead length
Lifting MDR	300mm	300mm
Bridge MDR	1500mm	1350mm

Frame stay dimensions



Mounting bracket dimensions

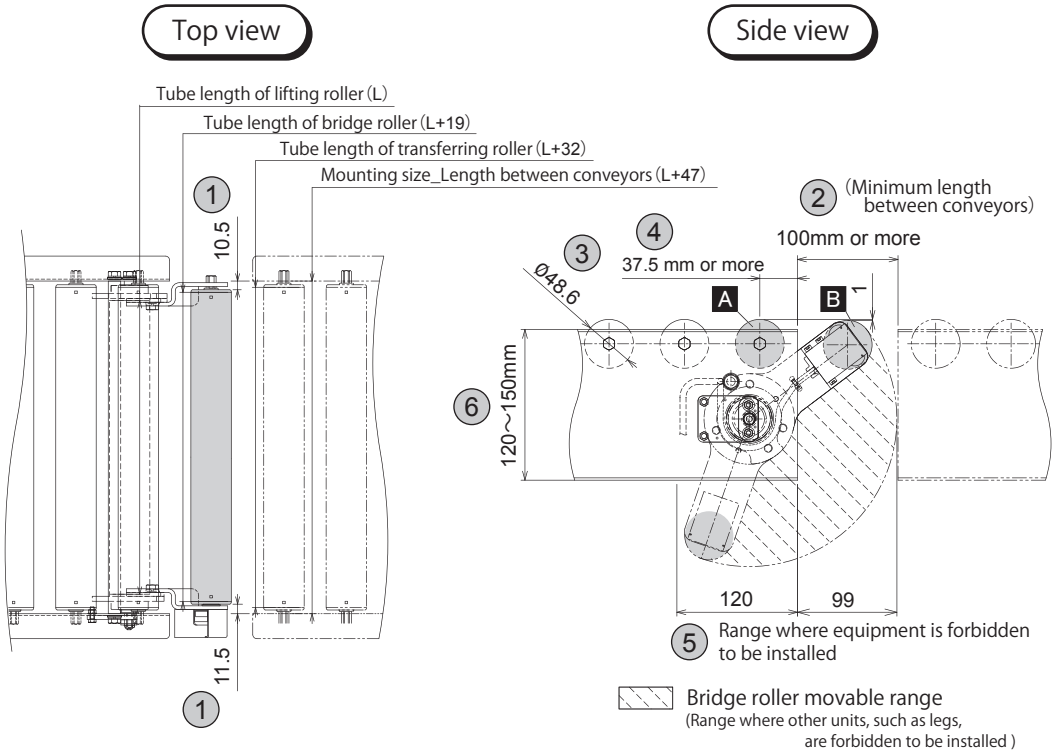
〔No.MBB-081〕



6. Installation/Wiring

6-1. Preparation to install the GPR main unit

Precautions on installation



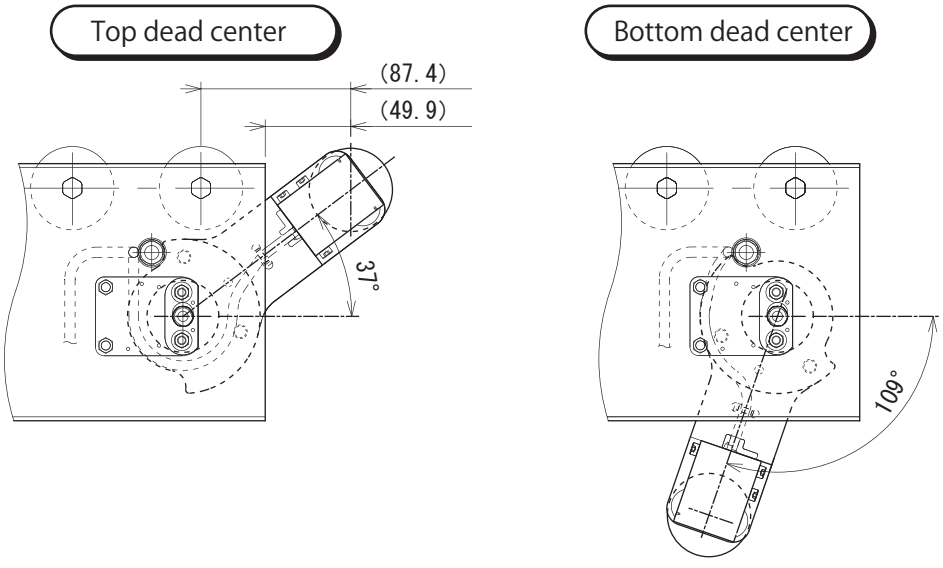
1. To prevent the bridge roller from interfering with the adjacent conveyor frame, install the bridge roller with a distance of 5mm or more from the adjacent conveyor frame.
2. Install the GPR with a distance of 100mm or more from the adjacent conveyor.
3. ϕ48.6 is the only available tube diameter for the transferring roller.
4. Keep a distance of 37.5mm or more from the edge of the conveyor to the roller axis core A.
5. Do not place structural objects, such as equipment, in the range under the conveyor where the GPR is installed (120mm from the edge of the conveyor).
6. Use the conveyor frame of 120mm to 150mm in height.

Other precautions

- Prevent people and structural objects excluding the fire shutter from entering the shaded area.
- Prevent structural objects, such as equipment, from sticking out from the adjacent conveyor.

■ Part B is designed to be 1mm lower than part A to prevent the bridge roller from lowering when the tray is transferred onto the bridge roller.

GPR's movable range



6. Installation/Wiring

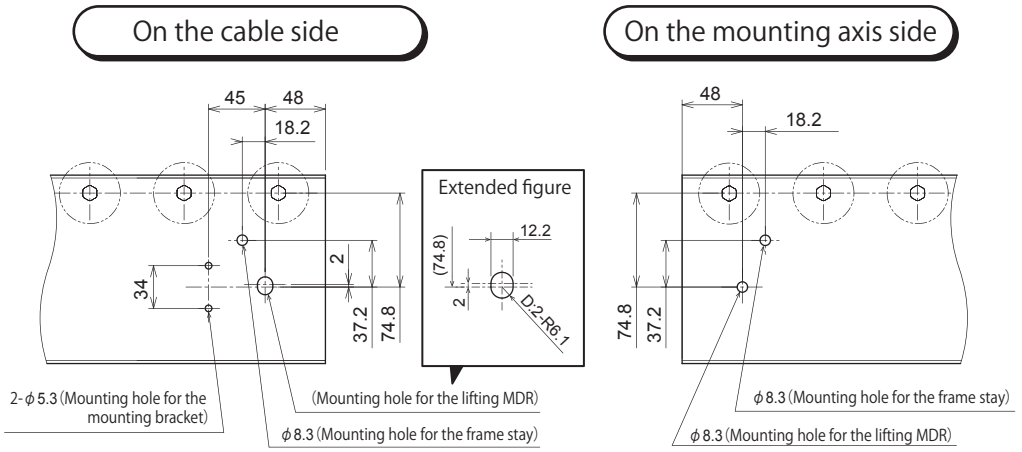
6-1. Preparation to install the GPR main unit

Hole processing on frames

1 Process the mounting holes for [lifting MDR], [mounting bracket], and [frame stay (stopper)], which is required to install the GPR main unit.

※For mounting hole processing positions, refer to the figure below.

Figures of GPR mounting holes



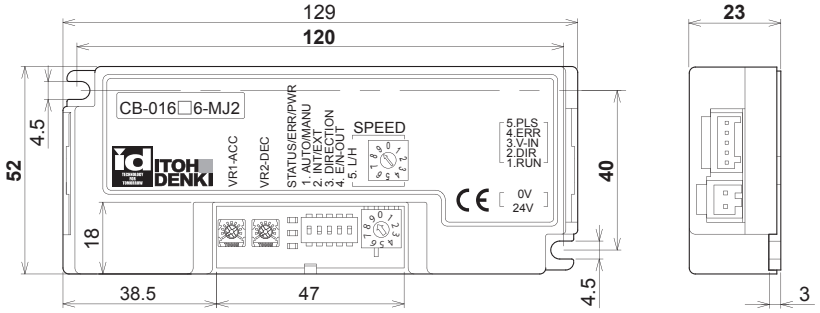
6-2. Preparation to install driver cards

Hole processing on frames and control panel

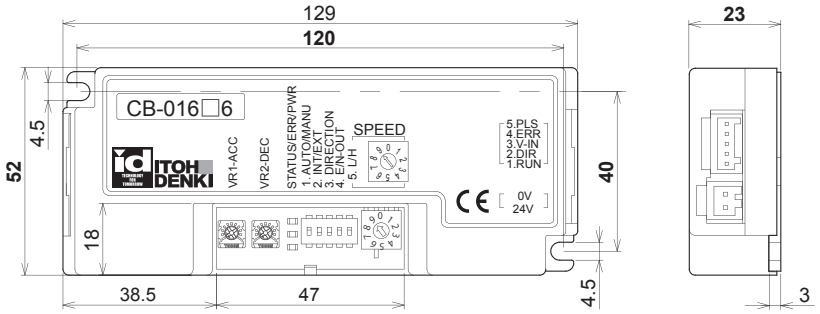
1 Perform mounting processing on the frames and control panel by reference to the mounting holes for driver cards.

> ■ Mount driver cards on a flat surface where heat can be released easily.
> ■ Prevent chips generated during processing from entering driver cards.

CB-016-MJ2
(Driver card for lifting)



CB-016
(Driver card for the bridge MDR)



6-3. Preparation of MDR extension cables

If the mounting location of the GPR main unit is far from that of driver cards, prepare the MDR extension cables separately.

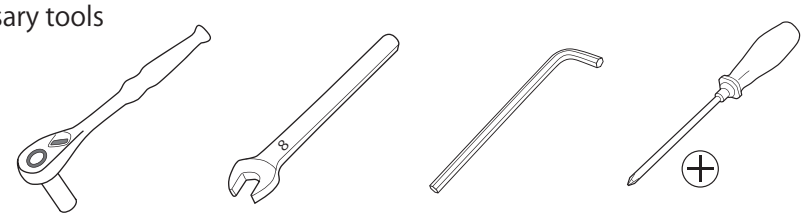
● For CB-016-MJ2 ／ CB-016 (9P extension cable)：ACE-CBM-B○○○○

> ■ Cables can be extended up to 3000mm, including the MDR cable length.
> ■ Do not extend cables by connecting multiple extension cables.

6. Installation/Wiring

6-4. Installing the GPR main unit

Necessary tools

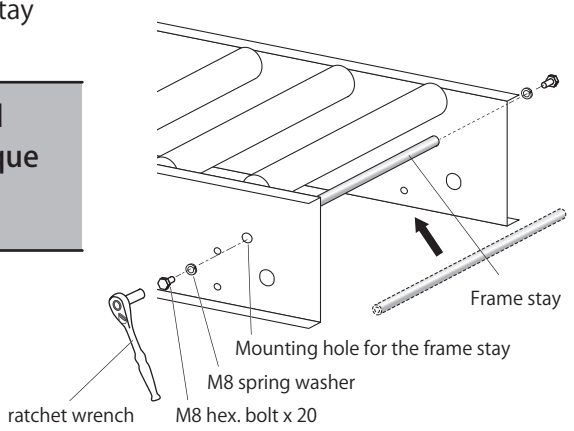


Mounting the frame stay (stopper)

Mounting the frame stay (stopper)

1 Put and mount the frame stay (stopper) between frames.

> ■ **Recommended tightening torque**
> 11.6N・m

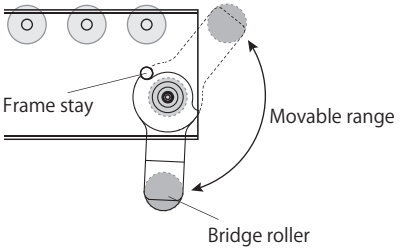


Mounting the GPR main unit

Mounting the GPR main unit

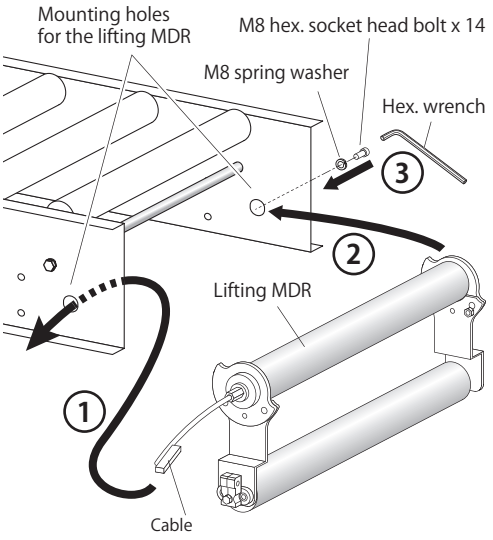
1 Check the installing direction.

> ■ When installing the lifting MDR, the conveyor edge should be on the right side as viewed from the motor cable side.



2 Pass the lifting MDR's shaft with motor cable through the mounting hole for the lifting MDR on the frame, and fix the other shaft with the bolt.

> ■ **Recommended tightening torque**
> 11.6N・m



6. Installation/Wiring

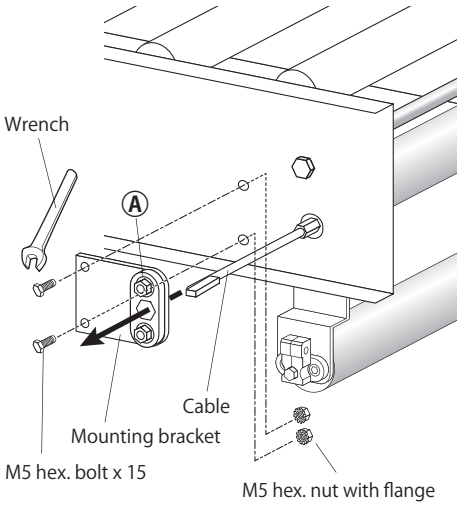
6-4. Installing the GPR main unit

3 Pass the the motor cable for the lifting MDR and its shaft through the mounting bracket's hole for fixing shaft, and fix the mounting bracket on the frame.

■ Loosen (remove) the [nut with flange] Ⓐ in advance to make the mounting bracket easier to mount.

■ **Recommended tightening torque 3.5N·m**

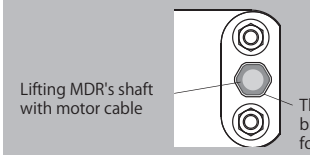
■ Do not forcibly bend and/or pull cables and/or connectors.

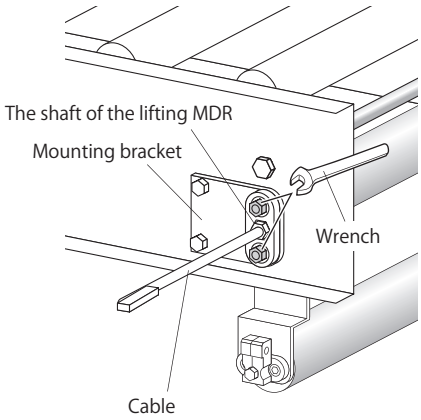


4 Use the M5 hex. nut with flange of the mounting bracket to fix the lifting MDR.

■ **Recommended tightening torque 6～10N·m**

■ Check that the lifting MDR's shaft has been passed through the bracket hole before tightening the nut.

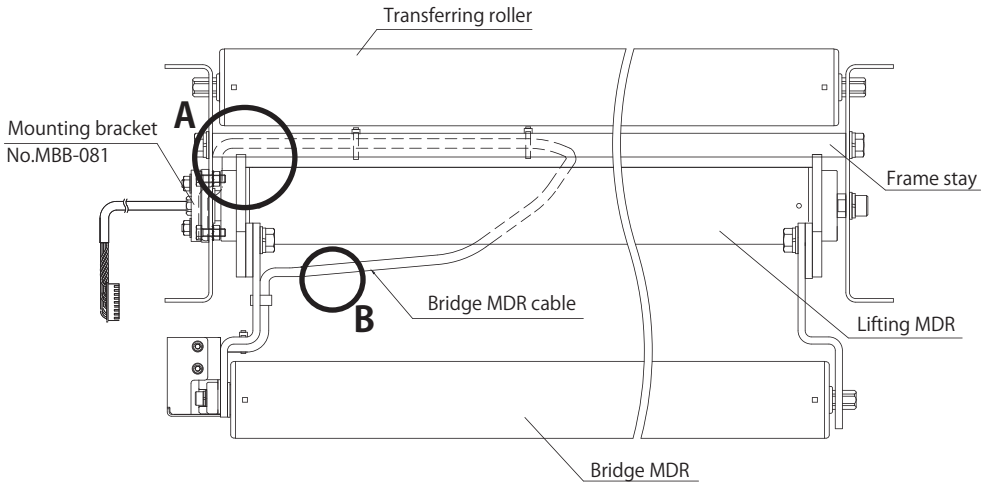




6. Installation/Wiring

Wiring example

【Example: When the bridge roller is an MDR, [GPR−□□□−□□FE□]】



1 Put the bridge MDR cable along the frame stay.

2 Fix the frame stay and cable by binding bands.

Precautions on wiring

A：Pay attention that the bridge MDR cable does not get stuck and/or caught between the frame stay and the swing arm when performing wiring.

B：(1) During wiring, pay attention that the bridge MDR cable does not be pulled when moving it between the top and bottom dead centers.
(2) Use cable protective layers to prevent the bridge MDR cable from coming into contact with the lifting MDR.

⚠ CAUTION

Perform wiring when the power is shut off.
Failure to follow this could result in electric shock and/or accidents due to unexpected operation.

When attaching or removing connectors, turn off the power first, securely hold connectors, and perform operation.
Also, do not apply excessive force to the driver card connection parts, such as obliquely attaching or removing connectors.
Failure to follow this could result in electric shock, malfunction, and/or accidents due to unexpected operation.

Perform wiring to connectors so that cables make secure contact with connectors.
Barb lines from the cable core could result in heat generation and/or fire due to changes of contact resistance, and/or short circuit with the adjacent contact.

Since cables of the bridge MDR move according to the lifting operation, secure cables appropriately.
Failure to follow this could result in cable disconnection.

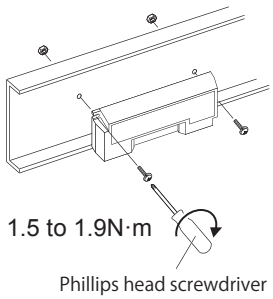
6. Installation/Wiring

6-5. Mounting driver cards

Mounting driver cards

1 Use the included screws and nuts to mount driver cards on the conveyor frames or control panel.

> ■ Recommended tightening torque
> 1.5 to 1.9N·m

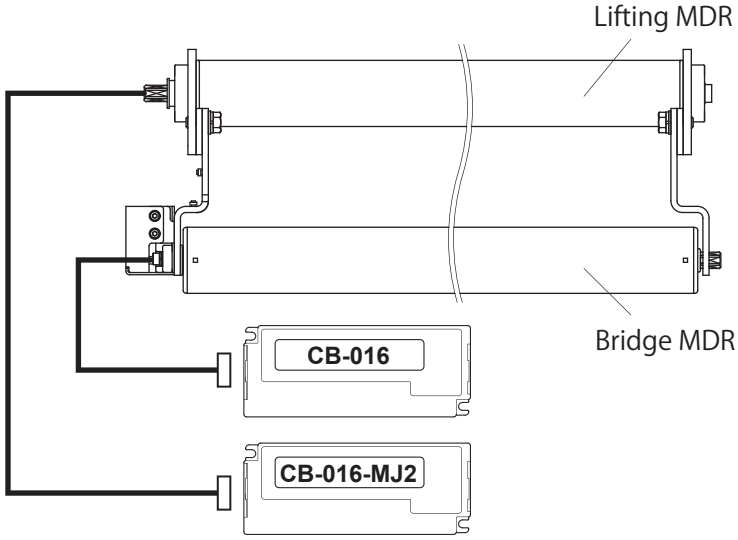


6-6. Connection between the GPR main unit and driver cards

Connection between the GPR main unit and driver cards

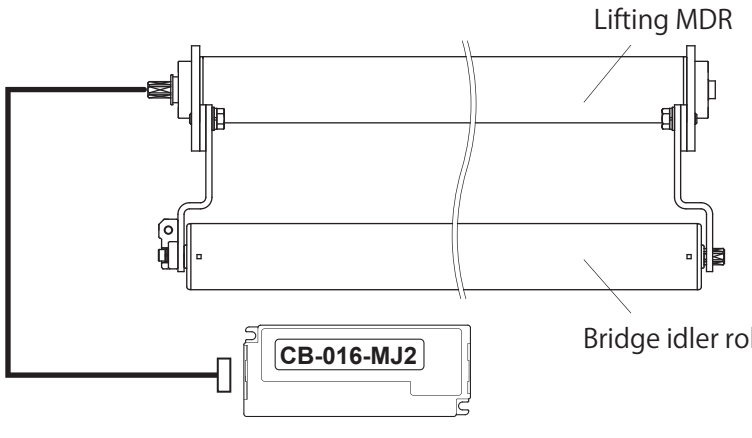
1
- Securely connect the MDR connectors coming from the GPR main unit to driver cards.
- When using extension cables, securely connect them to the MDR connectors, as well as to the driver card connectors.

When the bridge roller is an MDR
〔GPR−□□□−□□FE□〕



> ■ Make sure to connect CB-016 to bridge MDR and CB-016-MJ2 to lifting MDR.

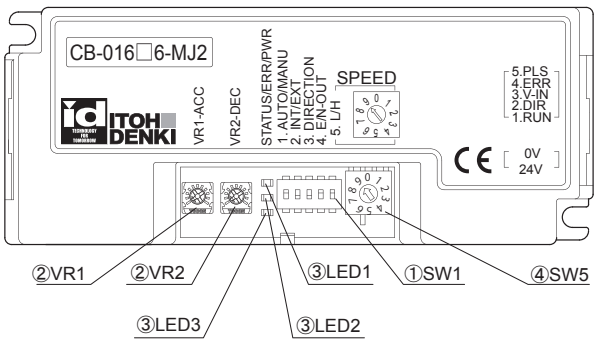
When the bridge roller is an idler roller
〔GPR−□□□−AR□〕



6. Installation/Wiring

6-7. CB-016-MJ2 functions list

〔CB-016-MJ2〕
Lifting MDR



①SW1 (DIP switch)

No.	Function	ON	OFF	Default	References
1	Thermal error / Low voltage error reset	Manual	Automatic	ON	8-1. Error details
2	Speed variation	Not used		OFF	—
3	Rotation direction ※			OFF	—
4	Error signal	Output under the normal condition	Output when an error occurs	OFF	6-8. Error signal output
5	Speed range	Not used		OFF	—

※ Always turn OFF the rotation direction selection on SW1#3.

②VR (Volume)

No.	Function	Min. (To the CCW end)	Max. (To the CW end)	Default	References
1	Not used (No response even if changed)			Min.	—
2				Min.	

③LED

No.	Color	Display	References
1	Green	Powered and functions normally	8-1. Error details
2	Red	Indicates the type of errors	
3	Not used		—

④SW5

The electric brake working position can be changed in 10 levels.
(※ For details, check 7-2. Settings of driver cards for the lifting.)

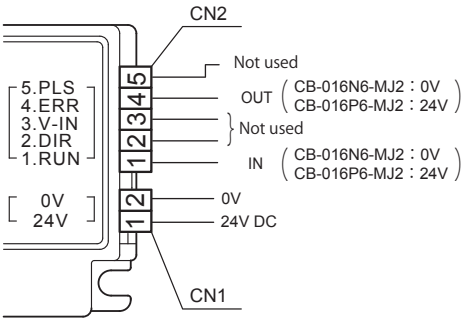
6. Installation/Wiring

6-8. Wiring for CB-016-MJ2

〔CB-016-MJ2〕
Lifting MDR

Wiring for CB-016-MJ2

CB-016-MJ2



■ Connector descriptions

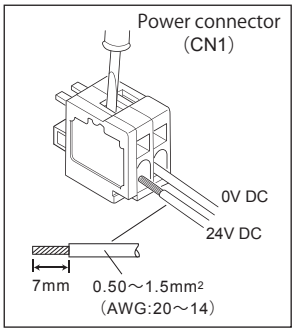
CN1 (Power)	#2	0V
	#1	24V DC

		Functions		Detailed descriptions
CN2 (Control)	#5	Not used		
	#4	Output	Error signal output	• Detects errors of the lifting MDR and outputs. • Settings for normal output and error output can be specified by ON/OFF of DIP-SW1#4. • Open collector output. • Attach protection resistance so that the output is 25mA or less. • Protection resistance of 100Ω is included inside driver cards.
	#3	Not used		
	#2	Used when resetting the error. ⇒ Refer to 8-1. Error details on P.45		
	#1	Input	RUN/STOP the lifting MDR	Required for RUN/STOP signals.

Power connector（CN1）

1 Connect the 24V DC and 0V cables to CN1 (2pin).

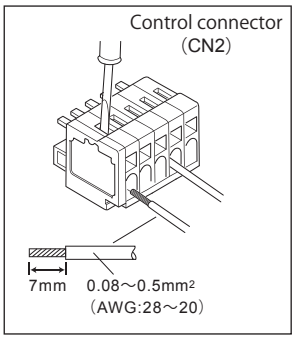
■ Do not connect multiple power cables to one pole. Failure to follow this could result in electric shock, short circuit, and/or damage due to the capacity of connectors being exceeded. (Connector capacity: 10A)
■ Do not connect the 24V DC and 0V cables incorrectly.
■ Do not connect cables when connectors are plugged in.



Control connector（CN2）

2 Connect each cable to CN2 (5pin).

■ Refer to the above, and perform wiring according to operation.
■ Use the same voltage to be input to CN2#1 (RUN/STOP of the lifting MDR) as the power supply voltage. (Connector capacity: 4A)



Connecting to driver cards

3 Connect the power connector (CN1) and control connector (CN2) to driver cards.

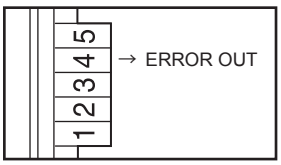
6. Installation/Wiring

6-8. Wiring for CB-016-MJ2

〔CB-016-MJ2〕
Lifting MDR

Error signal output on CB-016-MJ2

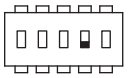
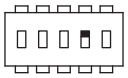
The error signal is output from CN2#4.
Output is the open collector output.



CB-016N6-MJ2	CB-016P6-MJ2
NPN open collector output	PNP open collector output

■ The error signal flows when turning the power ON/OFF. Disregard the error signal sent from the driver card for 0.5 seconds when turning the power ON, and for two seconds when turning the power OFF.

Signal output settings under the normal condition/when an error occurs can be specified on SW1#4.

SW1#4 OFF 	SW1#4 ON 
Output the signal when an error occurs	Output under the normal condition
Open under the normal condition (The transistors inside driver cards are turned ON when an error occurs.)	Open when an error occurs (The transistors inside driver cards are turned OFF when an error occurs.)

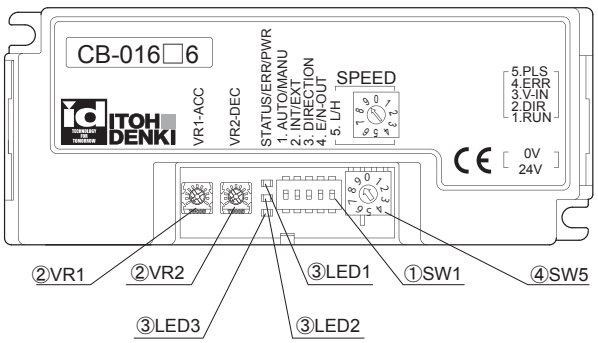
■ Attach protection resistance so that the output is 25mA or less.
Using the product with an output of over 25mA could result in damage to the transistors inside driver cards.

■ Protection resistance of 100Ω is included inside driver cards.

6. Installation/Wiring

6-9. CB-016 functions list

〔CB-016〕
Bridge MDR



①SW1 (DIP switch)

No.	Function	ON	OFF	Default	References
1	Thermal error / Low voltage error reset	Manual	Automatic	ON	8-1. Error details
2	Speed variation	External	Internal	OFF	7-3. Settings of driver cards for the bridge MDR
3	Rotation direction	(refer to rotation direction switching)		OFF	7-3. Settings of driver cards for the bridge MDR
4	Error signal	Output under the normal condition	Output when an error occurs	OFF	6-10. Error signal output
5	Speed range	High speed range	Low speed range	ON	7-3. Settings of driver cards for the bridge MDR

②VR (Volume)

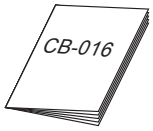
No.	Function	Min. (To the CCW end)	Max. (To the CW end)	Default	References
1	Acceleration time from the RUN signal input to the specified speed	0 sec.	2.5 sec.	Min.	For details, refer to the instruction manual for CB-016
2	Deceleration time from the STOP signal input to the specified speed	0 sec.	2.5 sec.	Min.	

③LED

No.	Color	Display	References
1	Green	Powered and functions normally	8-1. Error details
2	Red	Indicates the type of errors	
3	Orange	Indicates the number of times for thermal error/lock error/low voltage error	For details, refer to the instruction manual for CB-016

④SW5

10 speeds can be specified.
(※ When combined with SW1#5, up to 20 speeds can be specified.)



For more details on CB-016, please download the driver card user manual from our web page.

ITOH DENKI Home > Download/Support > User Manual
http://itohdenki.co.jp/english/support/manual.html

6. Installation/Wiring

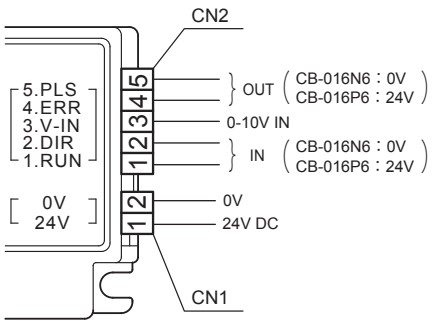
6-10. Wiring for CB-016

〔CB-016〕
Bridge MDR

Wiring for CB-016

The driver card is included only when the GPR main unit model is 【GPR−□□□−□□FE□】

CB-016



■ **Connector descriptions**

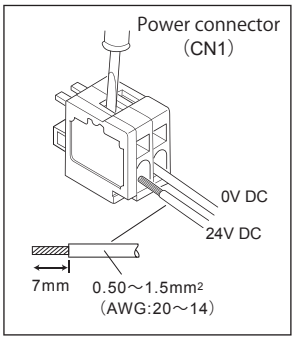
CN1 (Power)	#2	0V
	#1	24V DC

		Functions		Detailed descriptions
CN2 (Control)	#5	Output	Motor pulse output	・Outputs 2-pulse signal per rotation of the internal motor. ・NPN open collector output. ・Attach protection resistance so that the output is 25mA or less. ・Protection resistance of 100Ω is included inside driver cards.
	#4	Output	Error signal output	・Detects errors of the bridge MDR, and outputs. ・Settings for normal output and error output can be specified by ON/OFF of DIP-SW1#4 ・Open collector output. ・Attach protection resistance so that the output is 25mA or less. ・Protection resistance of 100Ω is included inside driver cards.
	#3	Analog input	MDR external speed setting	The transfer speed can be set by the voltage input of 0 - 10V.
	#2	Input	MDR rotation direction switching	The transfer direction can be switched.
	#1	Input	MDR RUN/STOP	Required for RUN/STOP signals.

Power connector（CN1）

1 Connect the 24V DC and 0V cables to CN1 (2pin).

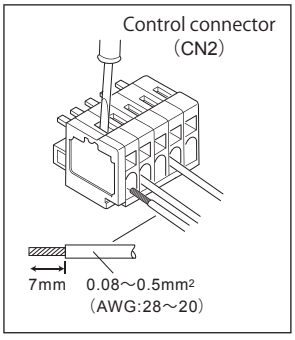
■ Do not connect multiple power cables to one pole. Failure to follow this could result in electric shock, short circuit, and/or damage due to the capacity of connectors being exceeded. (Connector capacity: 10A)
■ Connect the 24V DC and 0V cables correctly.
■ Do not connect cables when connectors are plugged in.



Control connector（CN2）

2 Connect each cable to CN2 (5pin).

■ Refer to the above, and perform wiring according to operation.
■ Use the same voltage to be input to CN2#1 (RUN/STOP of the bridge MDR) and CN2#2 (rotation direction of the bridge MDR) as the power supply voltage. (Connector capacity: 4A)



Connecting to driver cards

3 Connect the power connector (CN1) and control connector (CN2) to driver cards.

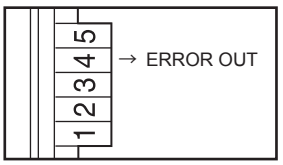
6. Installation/Wiring

6-10. Wiring for CB-016

〔CB-016〕
Bridge MDR

Error signal output on CB-016

The error signal is output from CN2#4.
Output is the open collector output.



CB-016N6	CB-016P6
NPN open collector output	PNP open collector output

■ The error signal flows when turning the power ON/OFF. Disregard the error signal sent from the driver card for 0.5 seconds when turning the power ON, and for two seconds when turning the power OFF.

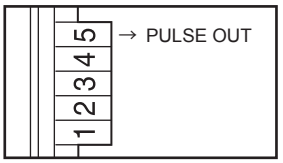
Signal output settings under the normal condition/when an error occurs can be specified on SW1#4.

SW1#4 OFF	SW1#4 ON
Output the signal when an error occurs	Output under the normal condition
Open under the normal condition (The transistors inside driver cards are turned ON when an error occurs.)	Open when an error occurs (The transistors inside driver cards are turned OFF when an error occurs.)

■ Attach protection resistance so that the output is 25mA or less.
Using the product with the output over 25mA could result in damage to the transistor inside driver cards.
■ Protection resistance of 100Ω is included inside driver cards.

Motor pulse signal output on CB-016

The motor pulse signal for the bridge MDR is output from CN2#5.
Output is the NPN open collector output of 2-pulse signal per rotation of the internal motor.



Accuracy: ±3%

Internal speed settings SW1#5	SW5	Frequency (Hz)	Motor speed (r/min)	Analog voltage input (V)
ON	9	166	4969	9.6～9.9
	8	152	4556	9.1～9.4
	7	145	4349	8.6～8.9
	6	138	4141	8.1～8.4
	5	131	3934	7.6～7.9
	4	124	3727	7.1～7.4
	3	110	3313	6.6～6.9
	2	104	3106	6.1～6.4
	1	97	2899	5.6～5.9
	0	90	2692	5.1～5.4
OFF	9	83	2485	4.6～4.9
	8	76	2278	4.1～4.4
	7	69	2071	3.6～3.9
	6	62	1864	3.1～3.4
	5	55	1657	2.6～2.9
	4	48	1450	2.1～2.4
	3	41	1242	1.6～1.9
	2	35	1035	1.1～1.4
	1	28	828	0.6～0.9
	0	21	621	0.1～0.4

■ Attach protection resistance so that the output is 25mA or less.
Using the product with the output over 25mA could result in damage to the transistor inside driver cards.
■ Protection resistance of 100Ω is included inside driver cards.

6. Installation/Wiring

6-11.
Connecting to power supply units

6-12.
Connection with PLCs

Connecting to power supply units

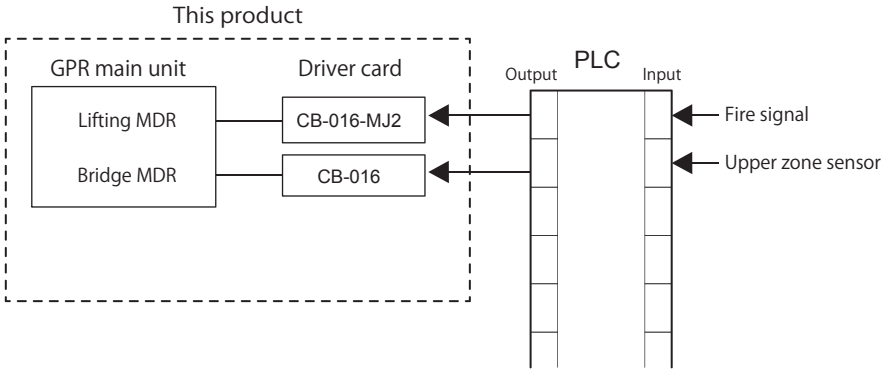
1 The power is supplied to driver cards from the power connector (CN1).
Connect customer-prepared power cables for the fire signal, etc.

Connecting signal cables of driver cards/sensors to PLCs

1 Connect signal cables of driver cards to controllers, such as PLCs.
Connect customer-prepared signal cables for the fire signal, etc.

— Connection example —

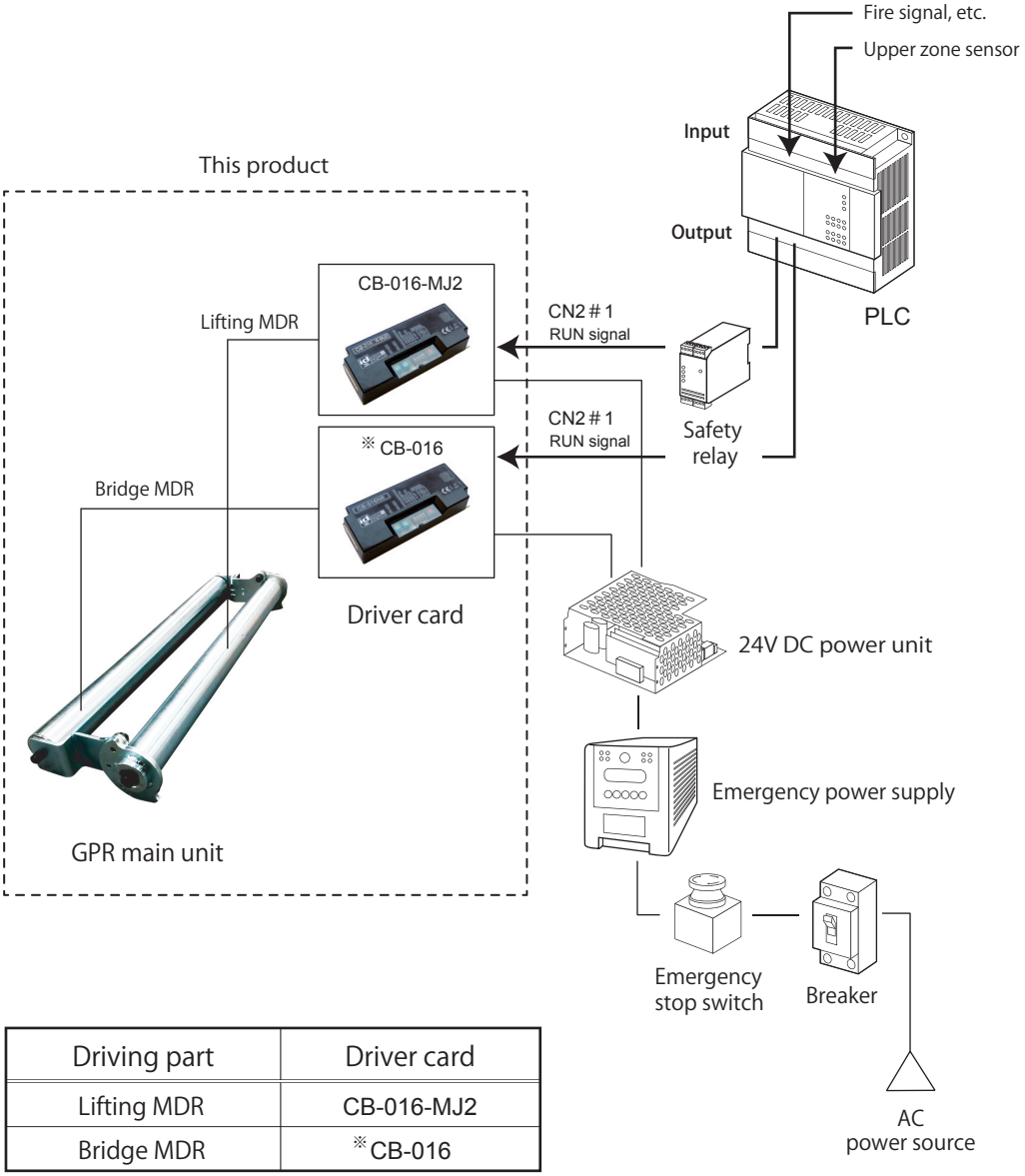
The following is an example. For input and output of each signal, perform wiring according to your operation.



7. Control/Operation

7. Control/Operation

7-1. Device configuration image



Driving part	Driver card
Lifting MDR	CB-016-MJ2
Bridge MDR	※CB-016

※ CB-016 is used only when the bridge roller is an MDR.

7. Control/Operation

7-2. Settings of driver cards for the lifting MDR 〔CB-016-MJ2〕

Settings of driver cards for the lifting MDR

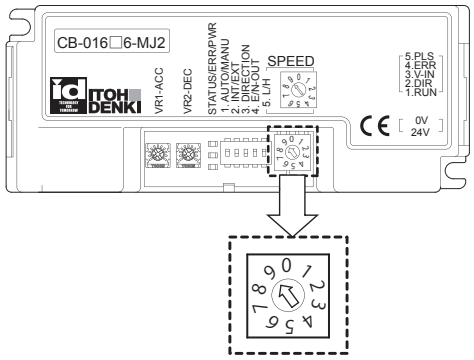
Speed setting of the lifting MDR

The lifting MDR speed is fixed to 1 m/min.

Electric brake settings

The electric brake working position can be adjusted by the rotary switch on the driver card.
Adjust the position based on the bridge roller weight (bridge MDR/idler roller, tube length).

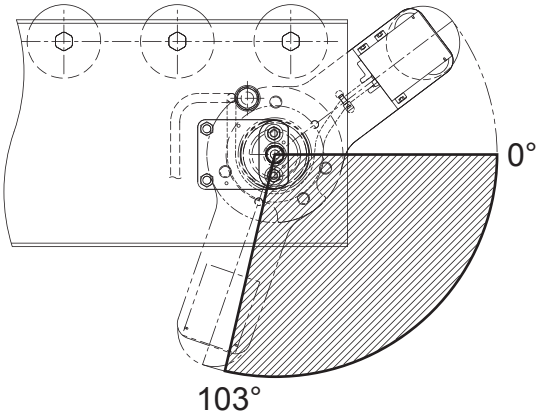
■ When the power is turned OFF due to emergency stoppage, the electric brake does not work. (Free falling)



■ The rotary switch settings for dyamic brake working position

Rotary switch settings	0	1	2	3	4	5	6	7	8	9
Working position (angle)	103	96	90	84	77	71	65	58	52	46

: Default setting



■ Refer to the above table, and adjust the dynamic brake working position for the lifting MDR between 46° and 103° .

■ Adjust the position so that the bridge roller stops at an angle of 90° or more, and at the position where it does not come into contact with the bottom dead center.

■ The bridge roller stop position depends on its weight.

7. Control/Operation

7-3. Settings of driver cards for the bridge MDR

〔CB-016〕

Settings of driver cards for the bridge MDR

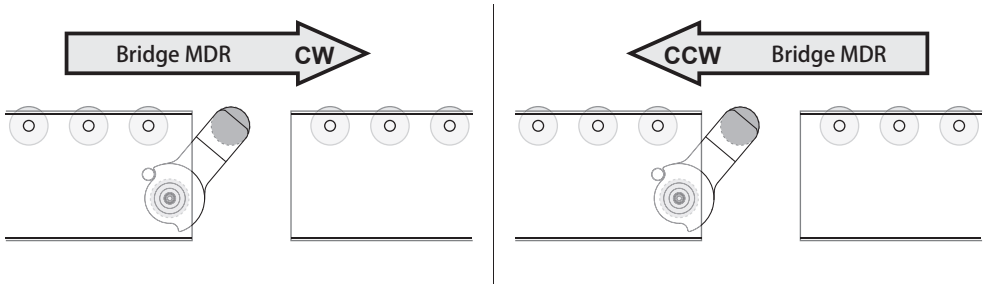
The driver card is included only when the GPR main unit model is 【GPR−□□□−□□FE□】

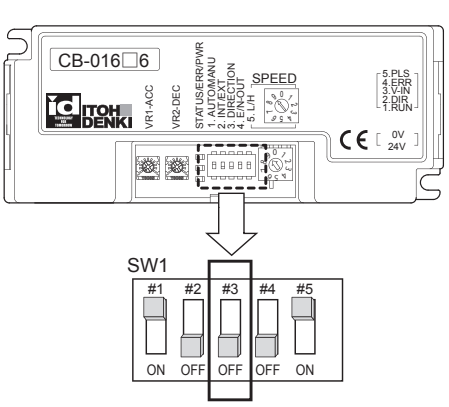
Transfer direction settings

Check the GPR main unit installation direction and the transfer direction, and set SW1#3 on CB-016.

- The transfer direction cannot be changed by SW1#3 during transfer (while MDR is running). Change the direction when the bridge MDR stops.

〈Transfer direction〉



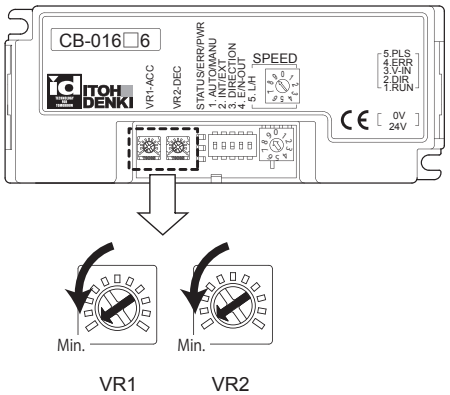


	SW1 # 3	
	ON (1 2 3 4 5)	OFF (1 2 3 4 5)
CN2# 5 4 3 2 1 ← IN	CW	CCW
CN2# 5 4 3 2 1 ← IN	CCW	CW

Setting VR1/VR2

Acceleration and deceleration time from the RUN signal to the specified speed can be adjusted by VR1/VR2.

（The minimum value is set under the default setting.） ⇒ Refer to P.32



7. Control/Operation

7-3. Settings of driver cards for the bridge MDR

〔CB-016〕

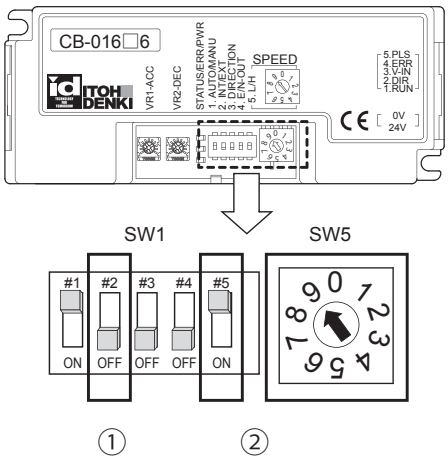
Transfer speed settings

There are two types of speed change settings: the internal speed setting to change the speed by switches on the driver card, and the external speed setting to change the speed by inputting the analog voltage to CN2#3.

Internal speed setting

① Turn OFF SW1#2 on CB-016.

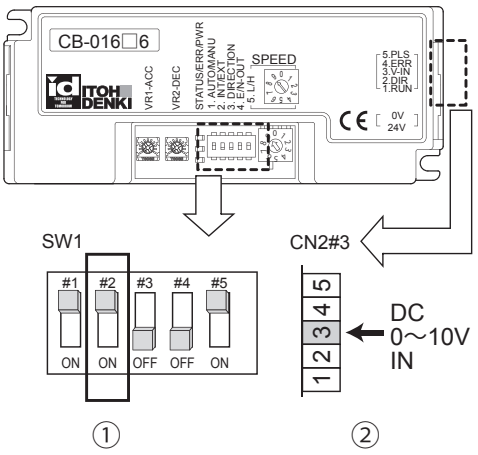
② Set SW1#5 and SW5 on CB-016.



External speed setting

① Turn ON SW1#2 on CB-016.

② Input the voltage to CN2#3 on CB-016.



- The speed can be changed even during transfer (when RUN signal is being input).
- For the setting speed, refer to the table below.

■ Roller transfer speed settings (m/min)

Speed accuracy: ±3%

		SW1#5：ON										SW1#5：OFF									
SW5		9	8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0
Nominal speed 17 m/min type	Setting	16.9	15.5	14.8	14.1	13.4	12.7	11.2	10.5	9.8	9.1	8.4	7.7	7.0	6.3	5.6	4.9	4.2	3.5	2.8	2.1
	Rated	14.6	14.6	14.6	14.1	13.4	12.7	11.2	10.5	9.8	9.1	8.4	7.7	7.0	6.3	5.6	4.9	4.2	3.5	2.8	2.1
Nominal speed 60 m/min type	Setting	60.0	55.0	52.5	50.0	47.5	45.0	40.0	37.5	35.0	32.5	30.0	27.5	25.0	22.5	20.0	17.5	15.0	12.5	10.0	7.5
	Rated	52.0	52.0	52.0	50.0	47.5	45.0	40.0	37.5	35.0	32.5	30.0	27.5	25.0	22.5	20.0	17.5	15.0	12.5	10.0	7.5
Nominal speed 90 m/min type	Setting	101.1	92.7	88.5	84.3	80.0	75.8	67.4	63.2	59.0	54.8	50.5	46.3	42.1	37.9	33.7	29.5	25.3	21.1	16.9	12.6
	Rated	90.6	90.6	88.5	84.3	80.0	75.8	67.4	63.2	59.0	54.8	50.5	46.3	42.1	37.9	33.7	29.5	25.3	21.1	16.9	12.6
Analog voltage input (V)		9.6 ∫ 9.9	9.1 ∫ 9.4	8.6 ∫ 8.9	8.1 ∫ 8.4	7.6 ∫ 7.9	7.1 ∫ 7.4	6.6 ∫ 6.9	6.1 ∫ 6.4	5.6 ∫ 5.9	5.1 ∫ 5.4	4.6 ∫ 4.9	4.1 ∫ 4.4	3.6 ∫ 3.9	3.1 ∫ 3.4	2.6 ∫ 2.9	2.1 ∫ 2.4	1.6 ∫ 1.9	1.1 ∫ 1.4	0.6 ∫ 0.9	0.1 ∫ 0.4

: Default setting

- Values in "Setting" indicate the speed when trays are not placed on rollers.

■ During operation, the transfer speed may not reach the specified value depending on ambient temperature.
Perform running operation thoroughly.

■ Values described above may differ from the actual transfer speed depending on the weight, material, and/or shape of trays.

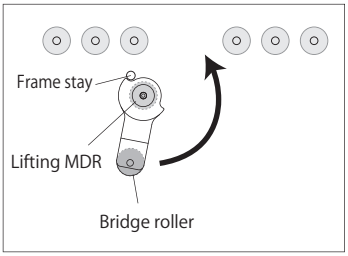
7. Control/Operation

7-4. Description of lifting operation

Lifting operation

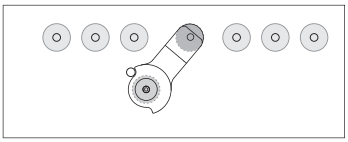
1 Input the 24V DC power to CB-016-MJ2.
The LED (green) lights up.

2 Input the signal to CN2#1 (RUN/STOP).
The lifting MDR is driven.

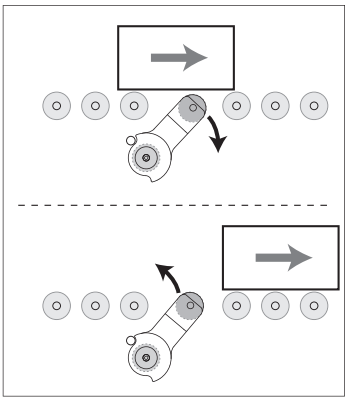


- Set 0V to be common to the power supply voltage.
- The 3mA current flows on CN2#1.
- Run the lifting MDR when one second or more has elapsed after the power is turned ON.

3 After running the lifting MDR, it will be locked at the frame stay (retained at the upper dead center).

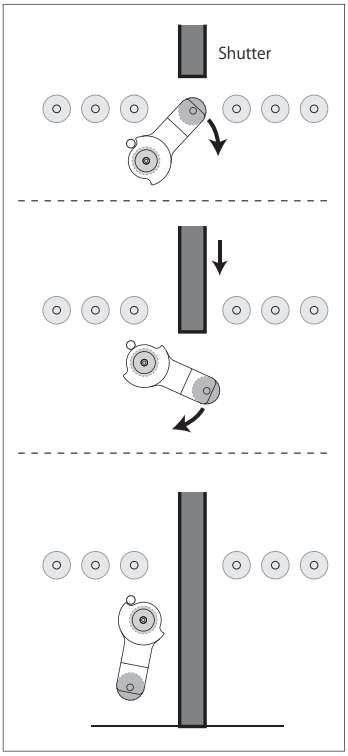


4 When the bridge roller lowers due to the passing of trays, it will lift again after trays have passed, and will be locked at the frame stay (retained at the upper dead center).



- The bridge roller will recover automatically.

5 When turning OFF the signal to CN2#1 (emergency stop), the lifting MDR will stop, and the bridge roller will lower.



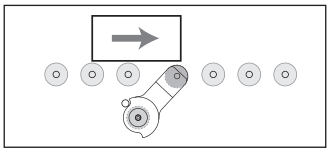
- Run/stop the lifting MDR by the RUN/STOP signale input.

- Time from when turning the RUN signal OFF to CN2#1 to when the bridge roller falls down depends on the bridge roller weight and electric brake working position.

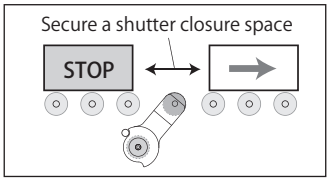
7. Control/Operation

Lifting operation if a thermal error occurs

1 A thermal error occurs on CB-016-MJ2.

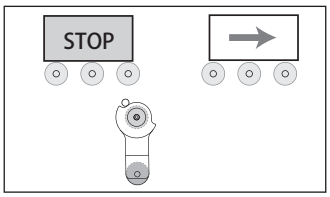


2 Continue to input the RUN signal (nine seconds at maximum).



3 After securing a shutter closure space, turn the RUN signal OFF.

■ After turning the RUN signal OFF, the lifting MDR will fall immediately.



※For details on errors on CB-016-MJ2, refer to P.45 and P.47.

Control if a thermal error occurs

When trays interferes with fire shutter closure due to a thermal error, adjust the RUN signal input time, and secure a fire shutter closure space.

7-5. Trial run

Performing the trial run

Trial run

Perform the trial run with careful attention to the following points, and check that operation is correctly performed.

① Check that there is no error (abnormal sound and/or operation failure) when running the GPR.
② Check that there is a distance of 100mm or more to the adjacent conveyor. ⇒ P.23
③ Check that there is a distance of 5mm or more between the bridge roller and the adjacent conveyor frame. ⇒ P.23
④ Check that there are no structural objects excluding the fire shutter in the GPR's movable range. ⇒ P.23
⑤ Check the rotation direction of the lifting MDR. ⇒ P.25
⑥ Check that fixing screws for the frame stay, etc. have not been loosened. ⇒ P.25
⑦ Check that the bridge roller cable has not come into contact with the lifting MDR, as well as that there is no danger of the bridge roller cable getting stuck and/or caught. ⇒ P.27

■Prevent other devices around the product from activating.
Other devices incorporated in the system, such as conveyor lines, could create dangerous situations, since trays may start to flow from upstream when the trial run is driven. Check carefully that other elements in the system will not operate when the product starts running.

■Make sure to check that wiring, driver card settings, and PLC settings have been carried out correctly before the trial run.

1 Turn on the power to each driver card.
After the power is turned on, the LED display is indicated as below.

CB-016-MJ2			CB-016		
PWR	(Green)	ON	PWR	(Green)	ON
ERR	(Red)	OFF	ERR	(Red)	OFF
STATUS	Not used	OFF	STATUS	(Orange)	OFF

2 Repeatedly lift and lower the GPR, and check that there is no error in operation.

■ The GPR may not lower completely depending on the electric brake working position.
■ Change the dynamic brake working position by the rotary switch on CB-016-MJ2.

3 Check that the GPR will lower when lowering the fire shutter.
Also, check that a space for the fire shutter has been secured.

■ When dividing the power and control for the conveyor, the GPR may not lower when lowering the fire shutter. To make the GPR operate simultaneously with the fire shutter, design the power partition and control for the conveyor.

8. Maintenance/Inspection

8. Maintenance/Inspection

GPR inspection items

GPR inspection items

1 The space to the adjacent conveyor (between conveyor frames) is less than 100mm.

■ Make a space of 100mm or more to the adjacent conveyor.
⇒ P. 23

2 There are structural objects excluding the fire shutter in the GPR's movable range.

■ Remove structural objects from the GPR's movable range.
⇒ P. 23

3 Fixing screws for the frame stay, etc. have been loosened.

■ Tighten screws using an appropriate torque.
⇒ P. 25

4 The bridge MDR cable has come into contact with the lifting MDR.

■ Use cable protective layers, or correct arrangement of the bridge roller cable.
⇒ P. 27

5 The bridge roller has come into collision at the bottom dead center when lowering it.

■ Change the dynamic brake working position using the rotary switch on CB-016-MJ2. ⇒ P. 38

6 There are errors (abnormal sound and/or operation failure) when running the GPR.

■ Perform repair and/or replacement, if necessary.

7 There are errors on driver cards.

■ Check the error details on the next page or later.

Make sure to inspect items **1** to **7** once every day.

8. Maintenance/Inspection

8-1. Error details

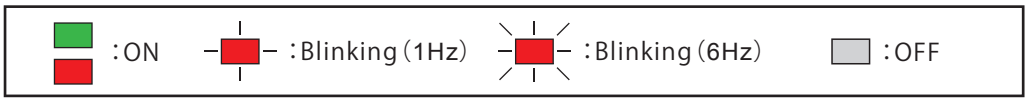
〔CB-016-MJ2〕
Lifting MDR

Error details on CB-016-MJ2

Errors can be checked by PWR (Green), ERR (Red), and signals from CN2#4.

- ■ When error signals have been released by CN2#1 (RUN / STOP), the GPR instantly starts up when RUN is input.
- ■ When the power supply voltage is dropped to 8.5V or less, an operation when the power is shutdown or an unexpected operation may occur.
- ■ To restart the GPR, switch the ON → OFF → ON / OFF → ON → OFF / RUN → STOP → RUN signals at intervals of 100ms or more.

LED display explanation



Error details

Ⓜ : Manual recovery setting (SW1#1 ON <factory setting>) / Ⓐ : Automatic recovery setting (SW1#1 OFF)

PWR (Green) / ERR (Red)	CN2#4 (Error signal) SW1#4 OFF	CN2#4 (Error signal) SW1#4 ON	Cause	How to release error signals		Recovery operation
	Output	Open	(Normal operation)	—		
	Open	Open	No power supply	Supply 24V DC		Refer to P.30 6-8. Wiring for CB-016-MJ2
	Open	Output	Damage to driver cards	Turn off the power, and replace the driver card		Refer to P.28 6-5. Mounting driver cards
	Open	Output	**Thermal error** Thermal protection has worked due to a temperature rise of driver cards or MDR	Ⓐ	When one minute has elapsed after decreasing to the recovery temperature, the error signal is released, and the unit starts up instantly	
					After decreasing to the recovery temperature, release the error signal, and start up the unit by RUN → STOP → RUN on CN2#1	
					After decreasing to the recovery temperature, switch ON → OFF → ON or OFF → ON → OFF on CN2#2	Start up the unit by RUN → STOP → RUN on CN2#1
						The unit starts up within one minute
				Ⓜ	After decreasing to the recovery temperature, release the error signal, and start up the unit by RUN → STOP → RUN on CN2#1	
					After decreasing to the recovery temperature, switch ON → OFF → ON or OFF → ON → OFF on CN2#2	Start up the unit by RUN → STOP → RUN on CN2#1
	Open	Output	Connector disconnected	Turn off the power, and connect the connector		Refer to P.28 6-6. Connection between the GPR main unit and driver cards
	Open	Output	**Low voltage error** Power supply voltage has been at 15V or less for one second, or decreases to 15V or less five times within 500ms	Ⓐ	Secure a power supply voltage of 18V or more	The unit starts up instantly
				Ⓜ	After securing a power supply voltage of 18V or more, release the error signal, and start up the unit by RUN → STOP → RUN on CN2#1	
					After securing a power supply voltage of 18V or more, start up the unit by ON → OFF → ON or OFF → ON → OFF on CN2#2	Start up the unit by RUN → STOP → RUN on CN2#1

Errors will be also released when the power is OFF (for two seconds or more).

8. Maintenance/Inspection

8-1. Error details

〔CB-016〕
Bridge MDR

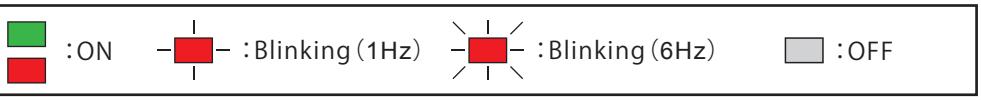
Error details on CB-016

The driver card is included only when the GPR main unit model is 【GPR−□□□−□□FE□】

Errors can be checked by PWR (Green), ERR (Red), and signals from CN2#4.

■ When error signals have been released by CN2#1 (RUN / STOP), the GPR instantly starts up when RUN is input.
■ When the power supply voltage is dropped to 8.5V or less, an operation for shutdown or an unexpected operation may occur.
■ To restart the GPR, switch the ON → OFF → ON / OFF → ON → OFF / RUN → STOP → RUN signals at intervals of 100ms or more.

LED display explanation



Error details

Ⓜ : Manual recovery setting (SW1#1 ON <factory setting>) / Ⓐ : Automatic recovery setting (SW1#1 OFF)

PWR (Green) / ERR (Red)	CN2#4 (Error signal) SW1#4 OFF	CN2#4 (Error signal) SW1#4 ON	Cause	How to release error signals		Recovery operation
	Output	Open	(Normal operation)	—		
	Open	Open	No power supply	Supply 24V DC		Refer to P.33 6-10. Wiring for CB-016
	Open	Output	Damage to driver cards	Turn off the power, and replace the driver card		Refer to P.28 6-5. Mounting driver cards
	Open	Output	**Thermal error** Thermal protection has worked due to a temperature rise of driver cards or MDR	Ⓐ	When one minute has elapsed after decreasing to the recovery temperature, the error signal is released, and the unit starts up instantly	
					After decreasing to the recovery temperature, release the error signal, and start up the unit by RUN → STOP → RUN on CN2#1.	
					After decreasing to the recovery temperature, switch ON → OFF → ON or OFF → ON → OFF on CN2#2	Start up the unit by RUN → STOP → RUN on CN2#1
						The unit starts up within one minute
				Ⓜ	After decreasing to the recovery temperature, release the error signal, and start up the unit by RUN → STOP → RUN on CN2#1.	
					After decreasing to the recovery temperature, switch ON → OFF → ON or OFF → ON → OFF on CN2#2	Start up the unit by RUN → STOP → RUN on CN2#1
	Open	Output	Connector disconnected	Turn off the power, and connect the connector		Refer to P.28 6-6. Connection between the GPR main unit and driver cards
	Open	Output	MDR disconnection	Turn off the power, and contact the supplier.		
	Open	Output	**Lock error** MDR has been locked, and four seconds have elapsed	Release the error signal, and start up the unit by RUN → STOP → RUN on CN2#1		
				Switch ON → OFF → ON or OFF → ON→ OFF on CN2#2		Start up the unit by RUN → STOP → RUN on CN2#1
	Open	Output	**Low voltage error** Power supply voltage is 15V or less	Ⓐ	Secure a power supply voltage of 18V or more	The unit starts up instantly
				Ⓜ	After securing a power supply voltage of 18V or more, release the error signal, and start up the unit by RUN → STOP → RUN on CN2#1	
					After securing a power supply voltage of 18V or more, start up the unit by ON → OFF → ON or OFF → ON → OFF on CN2#2	Start up the unit by RUN → STOP → RUN on CN2#1

Errors will be also released when the power is OFF (for two seconds or more).

■ The bridge MDR will stop after error output (abnormal detection). Eliminate the causes of the error since a tray stopped on the bridge MDR could prevent the shutter from closing.

8. Maintenance/Inspection

8-2. Error time chart

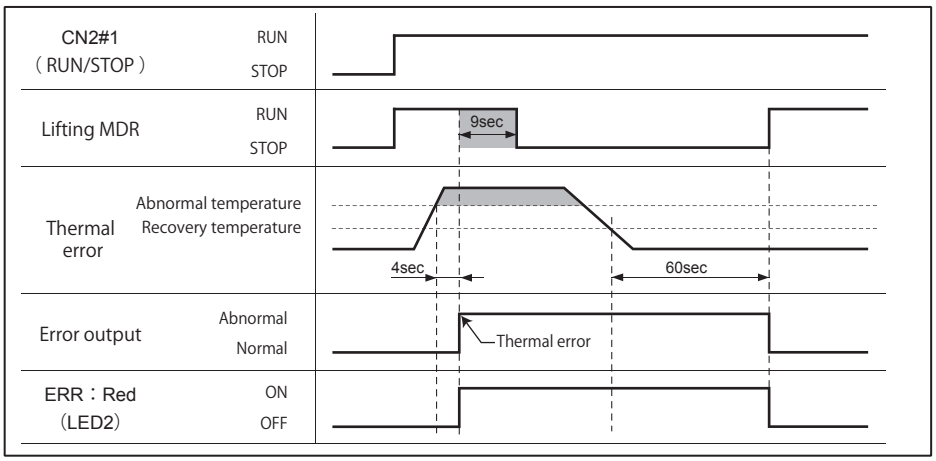
〔CB-016-MJ2〕
Lifting MDR

Thermal error
(Automatic recovery)

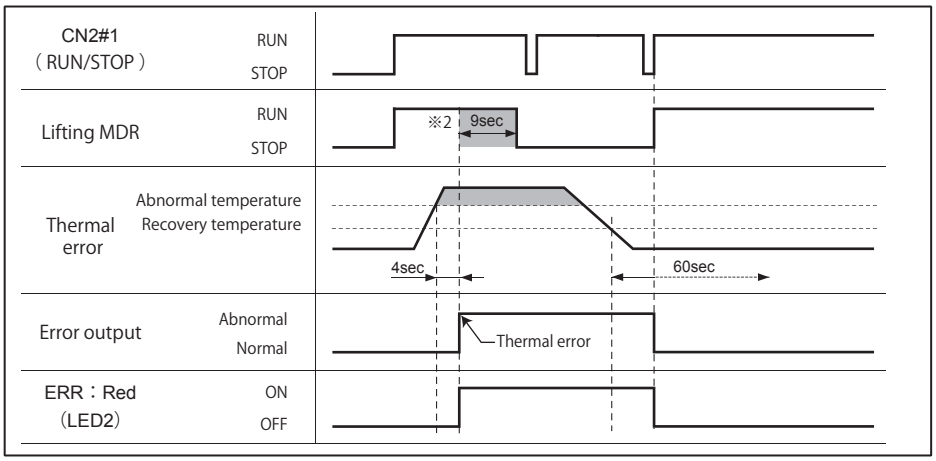
Error time chart〔CB-016-MJ2〕

Refer to each section for details on error conditions, recovery conditions, and LED indication.

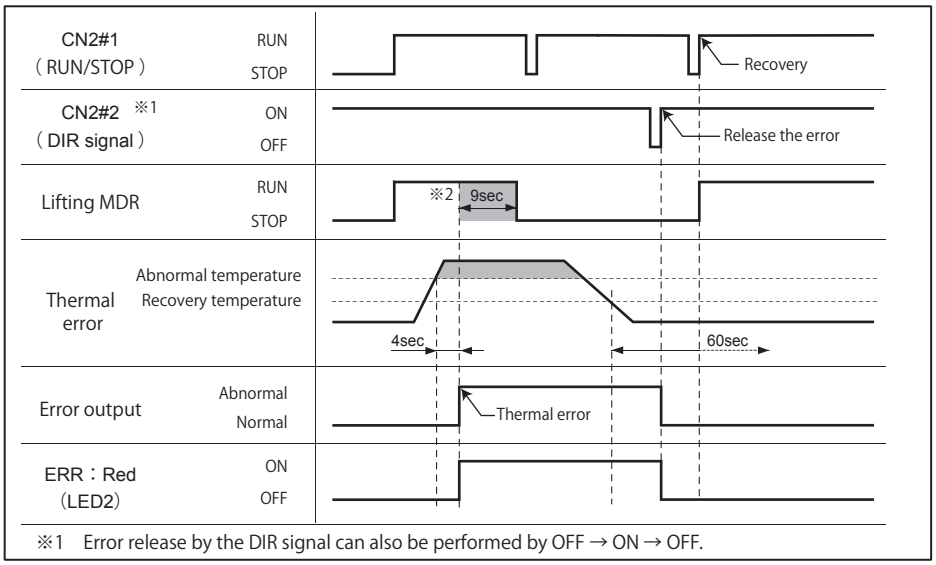
① When the thermal temperature decreases to the recovery temperature, the error will be released and recovered after 60 seconds.



② When the thermal temperature decreases to the recovery temperature, the error will be released and recovered by RUN/STOP signal.



③ When the thermal temperature decreases to the recovery temperature, the error will be released by the DIR signal, and recovered by RUN/STOP signal.



※1 Error release by the DIR signal can also be performed by OFF → ON → OFF.

※2 The lifting MDR can be driven for nine seconds after the thermal error output.
If trays interfere with shutter closure, do not turn off the RUN signal.

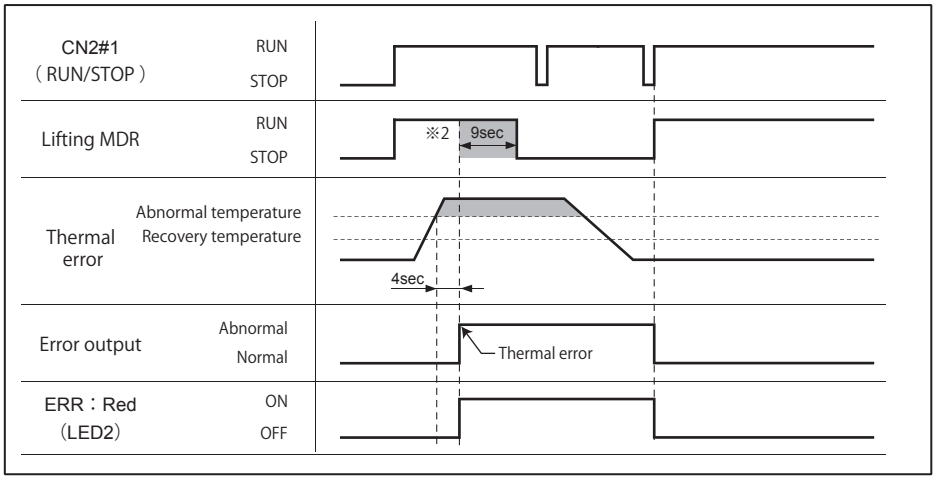
8. Maintenance/Inspection

8-2. Error time chart

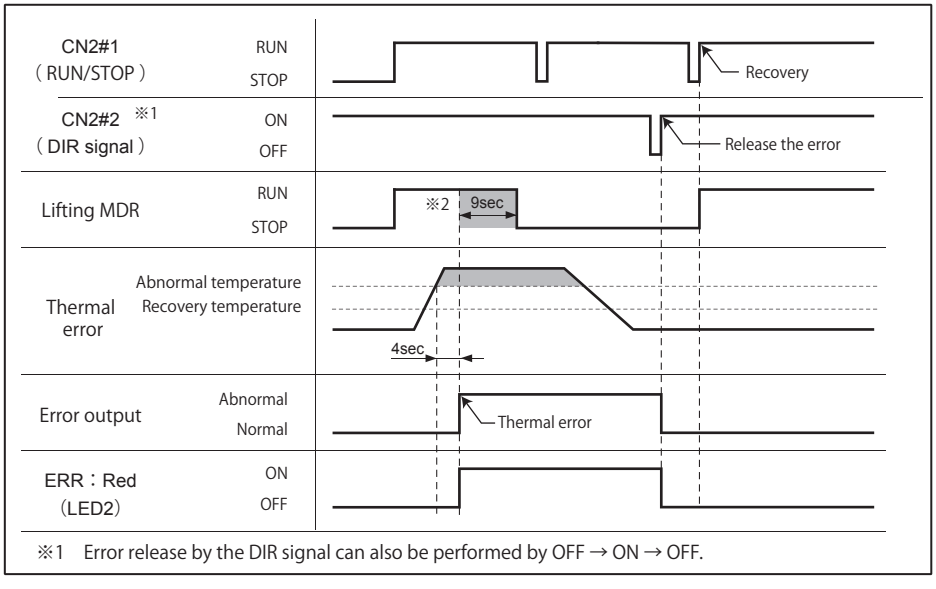
〔CB-016-MJ2〕
Lifting MDR

Thermal error (Manual recovery)

① When the thermal temperature decreases to the recovery temperature, the error will be released and recovered by RUN/STOP signal.



② When the thermal temperature decreases to the recovery temperature, the error will be released by the DIR signal, and recovered by RUN/STOP signal.



※1 Error release by the DIR signal can also be performed by OFF → ON → OFF.

※2 The lifting MDR can be driven for nine seconds after the thermal error output.
If trays interfere with shutter closure, do not turn off the RUN signal.

8. Maintenance/Inspection

8-2. Error time chart

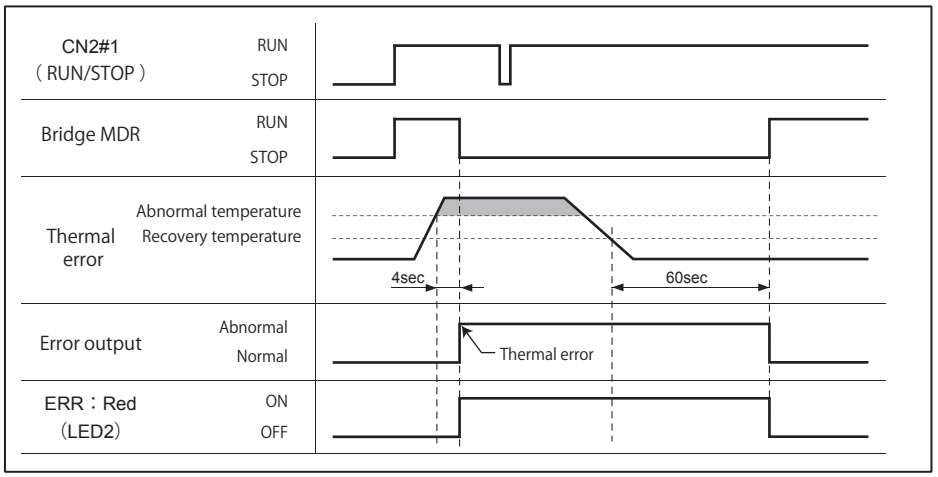
〔CB-016〕
Bridge MDR

Thermal error
(Automatic recovery)

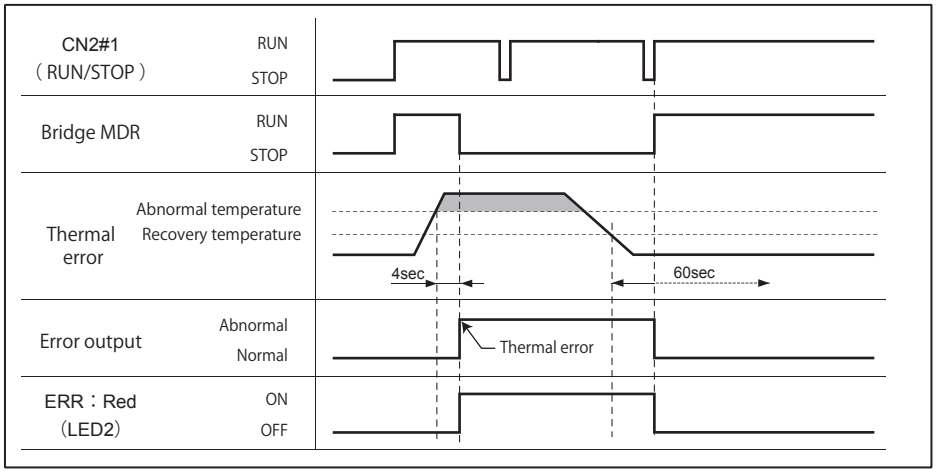
Error time chart〔CB-016〕

Refer to each section for details on error conditions, recovery conditions, and LED indication.

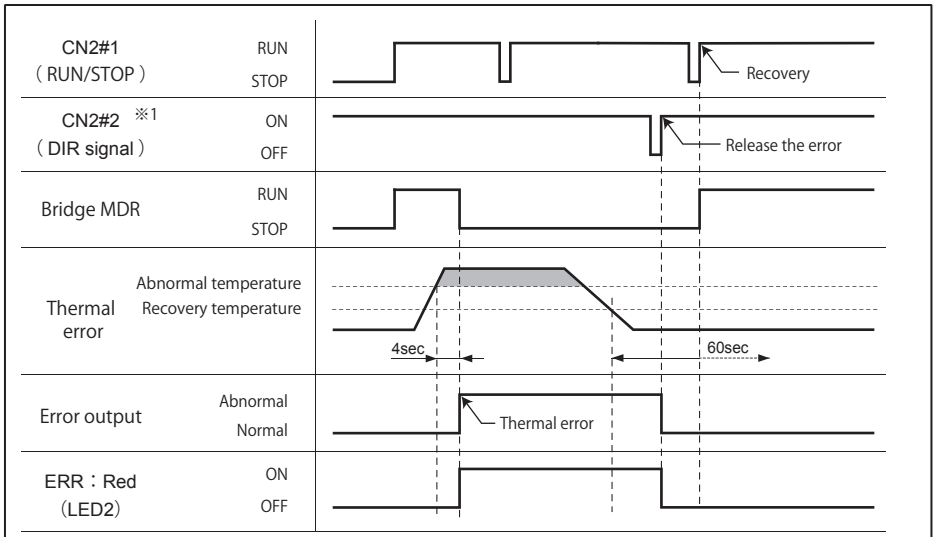
① When the thermal temperature decreases to the recovery temperature, the error will be released and recovered after 60 seconds.



② When the thermal temperature decreases to the recovery temperature, the error will be released and recovered by RUN/STOP signal.



③ When the thermal temperature decreases to the recovery temperature, the error will be released by the DIR signal, and recovered by RUN/STOP signal.



.※1 Error release by the DIR signal can also be performed by OFF → ON → OFF.

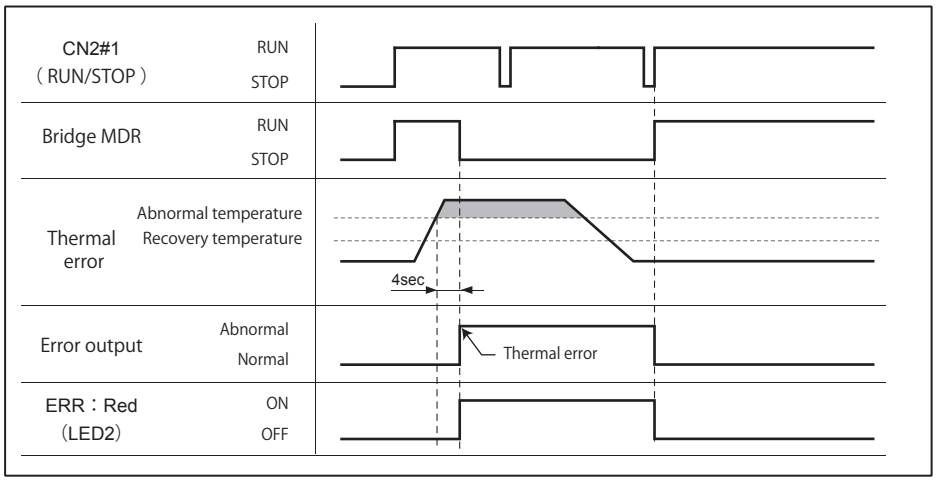
8. Maintenance/Inspection

8-2. Error time chart

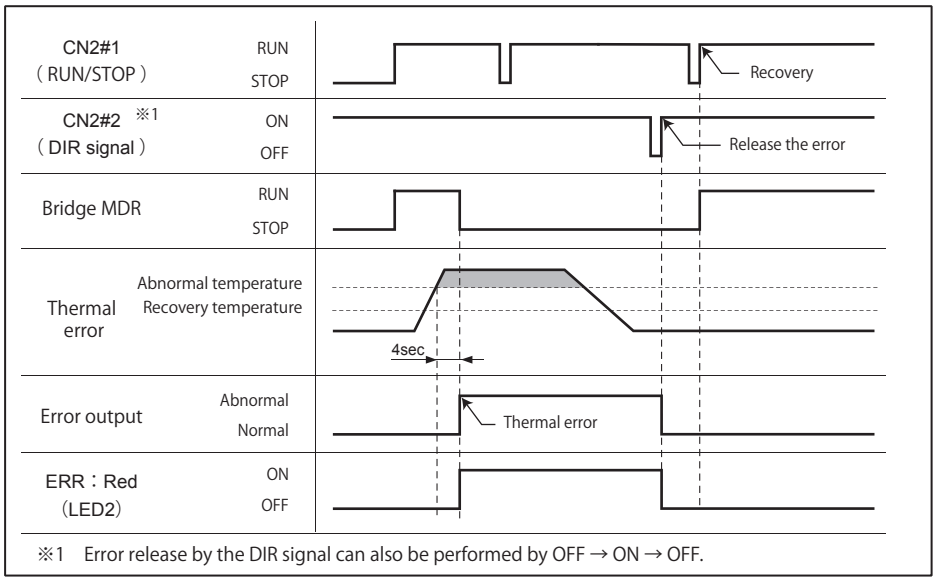
〔CB-016〕
Bridge MDR

Thermal error
(Manual recovery)

① When the thermal temperature decreases to the recovery temperature, the error will be released and recovered by RUN/STOP signal.



② When the thermal temperature decreases to the recovery temperature, the error will be released by the DIR signal, and recovered by RUN/STOP signal.



※1 Error release by the DIR signal can also be performed by OFF → ON → OFF.

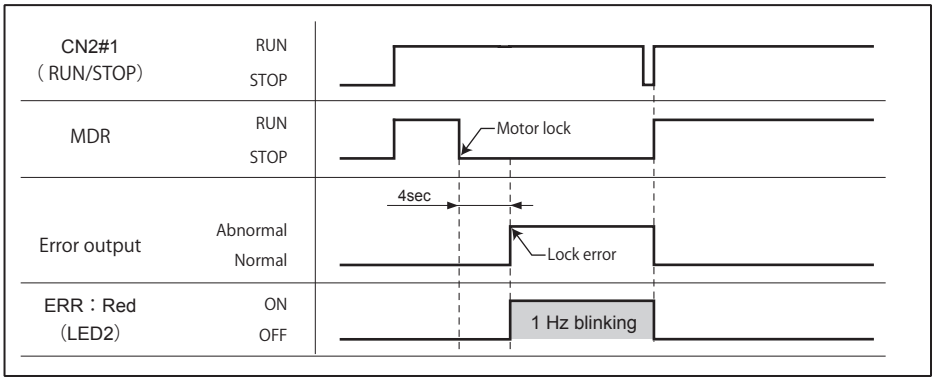
8. Maintenance/Inspection

8-2. Error time chart

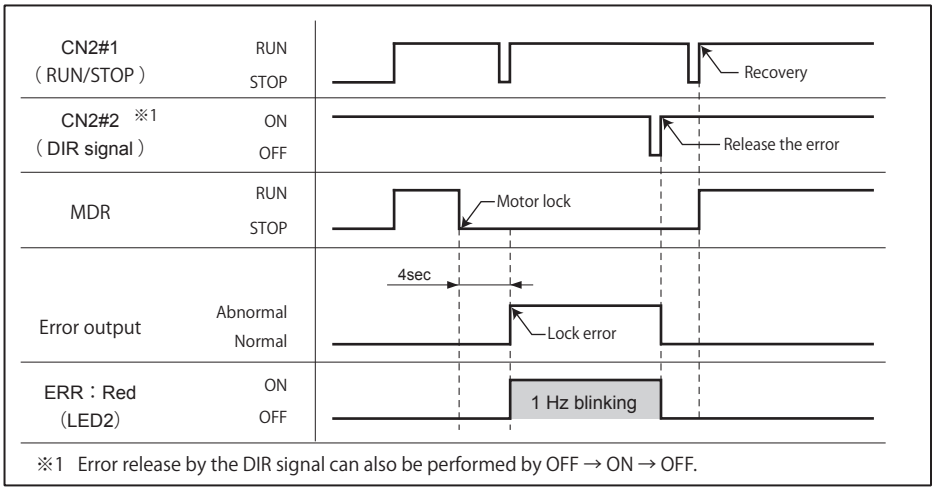
〔CB-016〕
Bridge MDR

Lock error
(Manual recovery)

① After the motor is locked, the error will be recovered by RUN → STOP → RUN on CN2#1.



② After the motor is locked, the error output and LED error will be released by CW → CCW → CW on CN2#2, and recovered by RUN → STOP → RUN on CN2#1.



※1 Error release by the DIR signal can also be performed by OFF → ON → OFF.

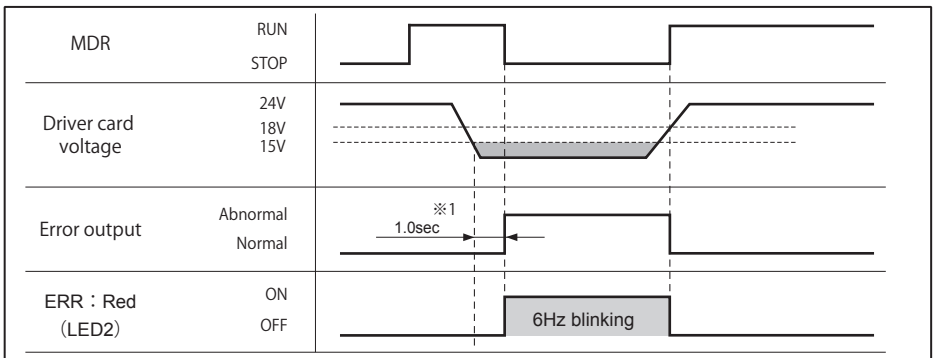
8. Maintenance/Inspection

8-2. Error time chart

Common to [CB-016-MJ2] lifting MDR and [CB-016] bridge MDR

Error time chart common to [CB-016-MJ2 / CB-016]

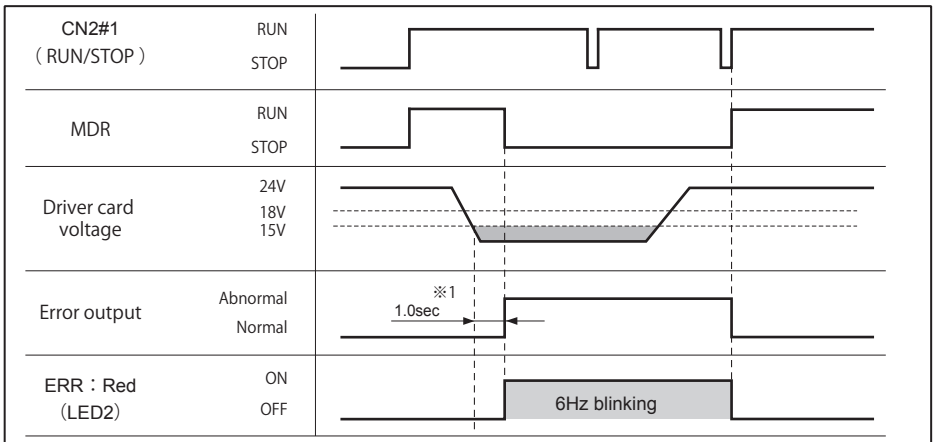
Low voltage error (Automatic recovery)



※1 An error occurs when a power supply voltage has been at 15V or less for one second, or decreases to 15V or less five times within 500ms

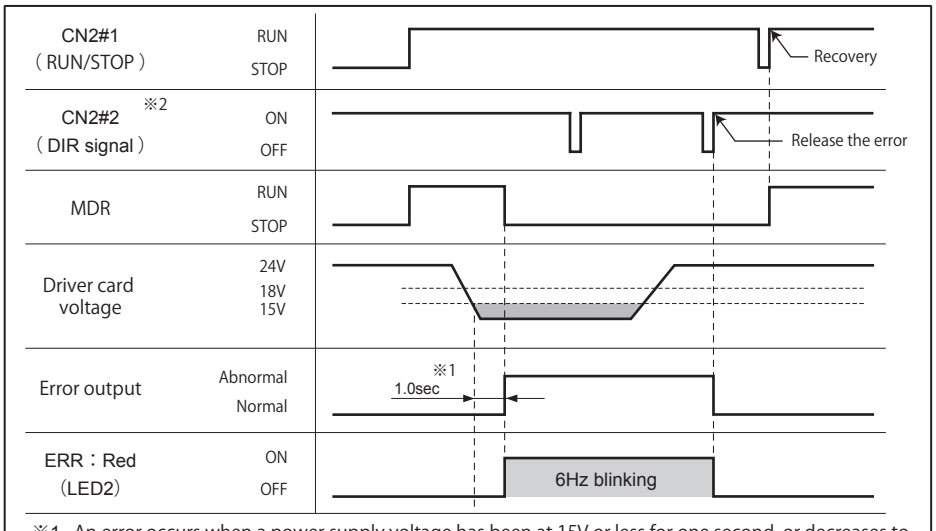
Low voltage error (Manual recovery)

① The error will be released and recovered by the RUN/STOP signal when a power supply voltage of 18V or more is secured.



※1 An error occurs when a power supply voltage has been at 15V or less for one second, or decreases to 15V or less five times within 500ms

② The error will be released by the DIR signal when a power supply voltage of 18V or more is secured, and recovered by the RUN/STOP signal.



※1 An error occurs when a power supply voltage has been at 15V or less for one second, or decreases to 15V or less five times within 500ms

※2 Error release by the DIR signal can also be performed by OFF → ON → OFF.

Appendix

Appendix

Appendix
Product specifications

GPR main unit specifications

Transferrd product	Maximum weight		30kg ※Available load weight varies product on product materials, bottom shape, size, and/or throughput.
	Material		Plastic tray, cardboard, etc. ※Large ribs or deformation on the bottom could produce overload on the lifting MDR, which could result in a thermal error being generated easily.
	Size		L: 250 mm or more
Speed	Lifting MDR		1 m/min
	Bridge MDR (transfer speed)		17m/min ／ 60m/min ／ 90m/min
Power supply	Voltage specifications		24V DC±10%
		Bridge MDR specifications	4.9A (Lifting MDR 2.2A + Bridge MDR 2.7A)
		Bridge idler roller specifications	2.2A (Lifting MDR 2.2A)
Installation environment	Ambient temperature		0 ～ 40℃
	Ambient humidity		90%RH or less (no condensation)
	Altitude		1,000m or less
	Atmosphere		No corrosive gas
	Vibration		0.5G or less
	Installation location		Indoor
	Mounting surface tilt (inclination)		0.5% or less
	Degree of contamination		2（IEC60640-1,UL840）

	Size	Bridge roller : MDR	Bridge roller : Idler roller
Product weight	400	6.5kg	5.3kg
	500	6.8kg	5.6kg
	600	7.1kg	5.9kg
	700	7.4kg	6.2kg
	800	7.7kg	6.5kg
	900	8.0kg	6.8kg

Driver card specifications

Model		CB-016□6-MJ2 （□=N：NPN ／ P：PNP）	CB-016□6 （□=N：NPN ／ P：PNP）
Power supply voltage		24V DC ±10%	24V DC ±10%
Rated voltage		24V DC	24V DC
Static current		0.03A	0.03A
Starting current		4.0A	4.0A
Peak current		20A(1msec)	20A(1msec)
Wire diameter	Power connector (CN1)	0.50 ～ 1.5mm² ※ （AWG：20 ～ 14）	0.50 ～ 1.5mm² ※ （AWG：20 ～ 14）
	Control connector (CN2)	0.08 ～ 0.5mm² ※ （AWG：28 ～ 20）	0.08 ～ 0.5mm² ※ （AWG：28 ～ 20）
Time from RUN signal input to motor starting		15msec	15msec
Protective functions		Incorrect wiring protection Built-in 6.3A fuse	Incorrect wiring protection Built-in 6.3A fuse
Thermal protection		Driver card: 95ºC / Motor: 105ºC	Driver card: 95ºC / Motor: 105ºC
Current limitation		4.0A	4.0A
Operating environment	Ambient temperature	0 to 40ºC (no freezing)	0 to 40ºC (no freezing)
	Ambient humidity	90%RH or less (no condensation)	90%RH or less (no condensation)
	Atmosphere	No corrosive gas	No corrosive gas
	Vibration	0.5G or less	0.5G or less
	Installation location	Indoor	Indoor

※ Applicable wires to standard connectors

Technology for tomorrow

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