# POP-D DIVERT

## Operating Instructions

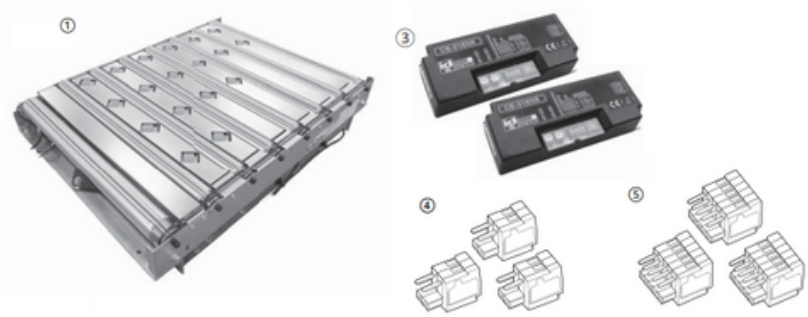
- Before using, please read the operating instructions carefully to obtain the product knowledge, safety information and to understand all of the caution items.
- After reading the instructions, store the booklet in a designated location for readily accessing at any time. When you open the crate, check the model, specifications, voltage, etc. are correct

| | |
|---|---|
| ⚠ | **One type of driver, for lifting and transporting, are included. Do not change the setting of the driver for lifting (with a green label) because it has been adjusted before factory shipping.** |
| ⚠ | **When the tray or object is less than 350×350mm, move the tray along the branching side edge** |

The crate contains the following items. Check that every item is included, and that the model, specification, etc. are as you ordered.

| Item | Quantity | Remarks |
|---|---|---|
| Pop-up Diverter main body | 1 unit | with roller bottom sensor (SN‧S) / roller top sensor (SN‧R ) |
| Hex bolt M8×20 / Spring washer | 4 sets | For installation of the Pop-up Diverter main body |
| Driver card CB-016□*6 | 3 | |
| Power connector (WAGO 34-102) | 3 | |
| Control connector (WAGO 733-105) | 3 | |
| Cross-slotted screw/washer M4×15 / Hex nut M4 | 6 | For mounting driver card |

* Depending on the input/output type of Pop-up Diverter, the included driver card operates with either NPN (N) or PNP (P) signal input

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# GENERAL CAUTIONS

- Be sure to comply with all of the caution items and instructions contained in this safety manual.
- To avoid functional deterioration, unexpected accident or product failure, check the operation according to this manual.

## WARNING AND CAUTION:

Shown below are the caution items for using the product safely and avoiding danger and damage to the user. Caution items can be classified into danger, warning and caution as described below.

| | |
|---|---|
| Danger | The most serious danger with possibility of death or serious injury |
| Warning | Incorrect handling may lead to death or serious injury, indicating potential danger. |
| Caution | Possible danger of light or medium injury, or only a material damage |

## BASIC WARNINGS:

| | |
|---|---|
| Warning | Incorrect handling may lead to death or serious injury, indicating potential danger. Comply with the following warning and perform the work correctly. |

- Do not use the product in an explosive, flammable or corrosive atmosphere, or near flammable material. It may cause explosion, fire, electrical shock or injury

## BASIC CAUTIONS:

| | |
|---|---|
| Caution | Incorrect work or use may lead to light or medium-level injuries and/or property damages. Comply with the following warning and perform the work correctly. |

- Do not step on the product or apply a load. It may lead to a failure or unexpected accident.
- Do not touch the mechanism by hand during operation. The hand may be caught by the mechanism and injured.
- Do not absolutely modify the Pop-up Diverter or the driver. Serious injury may be caused.
- Do not forcibly bend or pull the wire. Do not put a heavy item on the wire or pinch the wire. The cord may break and cause fire or electrical shock.
- To avoid a failure or electrical shock, ground the DC power supply or driver to the conveyor frame.
- Do not touch the equipment immediately after stopping. It may cause skin burn.
- Do not splash water on the equipment. Electrical shock or failure may be caused.
- Do not apply a strong impact or excessive force such as hitting the equipment or dropping an object.
- Do not use the equipment after it is impacted or deformed. It may cause a failure.
- When abnormal sound is heard during motion, stop the operation. Continued operation may cause an accident or failure.
- Do not use the equipment by exceeding the specification. It may cause a failure, fire or injury.
- Do not carry out operation of transfer, connection, maintenance inspection (except maintenance inspection to be performed during operation). Switch off the power before operation.
- Comply with the safety rules required for the location and equipment to be used.

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# GENERAL CAUTIONS

## BASIC CAUTIONS (CONTINUED):

| | |
|---|---|
| ⚠ Caution | **Incorrect work or use may lead to light or medium-level injuries and/or property damages. Comply with the following warning and perform the work correctly.** |

- Some type of driver failure may make the input/output ON condition or OFF condition. Apply an external monitoring circuit for the input/output signal that may lead to an injury or property damage.
- Connect or disconnect a connector when the power is shut off. Do not perform wiring with the connector inserted in the driver.
- Securely attach the connector of each connecting cable to the connection point.
- Incorrect wiring may cause a failure. Carefully check the wiring.
- Do not apply excessive force for operating the DIP switch.
- Do not perform on/off operation of a relay or connector near the power line, signal line, or driver. That may cause malfunction by noise.
- When LED circuit or Pull-up/Pull-down circuit is connected to the output circuit, unexpected operation may occur.
- Apply power ON in the order of external controller→Driver. Perform power OFF in the order of Driver→External controller. Incorrect order may cause malfunction.
- Cutting the power disables electrical braking control, and the roller becomes easy to be rotated.
- Do not pull out a cable during operation. It may cause a failure.
- Do not forcibly rotate MDR except during maintenance inspection. That may cause driver breakage or make the operation life extremely short.
- Do not shut off the power during MDR rotation. It may cause a failure.
- Do not apply power while riding on the conveyor or while a tray is unstable condition. MDR rotation immediately after power ON may cause injury, accident or breakage.
- When error occurs frequently, remove the cause.
- When disposing the equipment, make a consignment contract with an authorized industrial waste processing company for disposal.

## ABOUT RISK CATEGORY OF THIS SYSTEM:

| | |
|---|---|
| ⚠ Warning | **About Risk Category of this System** |

- This equipment intends to comply with risk category 2 or below in EN 954-1. It does not comply with risk category 3 or higher.


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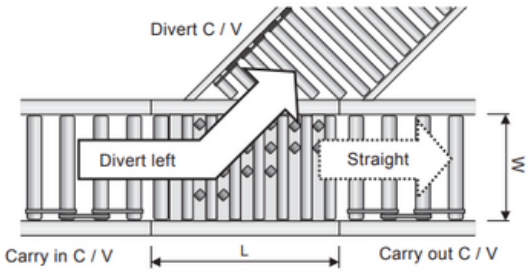
# PRODUCT DESIGNATION

## POP-D- (1) (2) - (3) (4) - (5) (6)

(1) Divert direction
L - Divert left
R - Divert right
(2) Divert angle
30D - 30 degrees
45D - 45 degrees




(3) Speed
60 - 60m/min

(4) Signal type selection
N - NPN input/output （NPN input/output driver / up/down sensor included）
P - PNP input/output （PNP input/output driver / up/down sensor included）

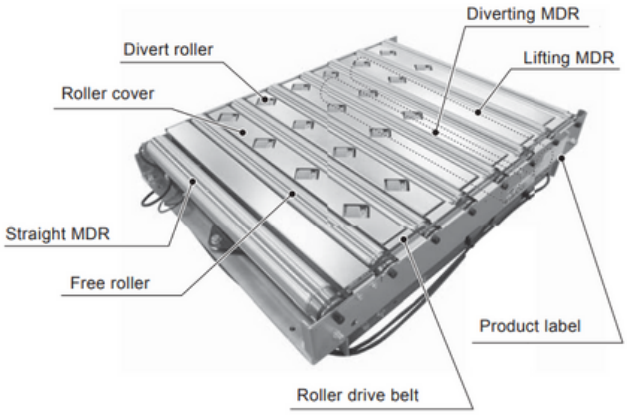
(5) Size
A - W 394mm (15.51") × L 760mm (29.92")
B - W 494mm (19.45") × L 760mm (29.92")
C - W 594mm (23.38") × L 760mm (29.92")
D - W 694mm (27.32") × L 760mm (29.92")

(6) Type
1

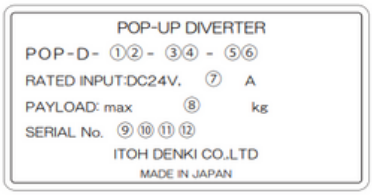
**Model example: POP-D-L45D-60N-B1**
Divert left 45 degrees, Transport speed 60m/min,
NPN input/output type, Size B (W500mm×L774mm), Type 1

# STRUCTURE

## MAIN UNIT:




Label detail




Product model
① Divert direction, ②Divert angle, ③Transport speed, ④ Input/output type, ⑤Size, ⑥Type
Transport capacity
⑦ Rated current of transport MDR, ⑧Available load weight
Serial No. （YY.MM.DD Lot No）
⑨ Year (last 2 digits) ⑩ Month ⑪ Day ⑫ Lot No (3 digits )

# POWER SUPPLY

- 24V DC Battery
- Switching power supply (24V DC • 10A 240W)
- Rectified power (With a rectifying capacitor, ripple rate 10% or below)
  - Supplied power must be a stabilized power supply of 24V DC, 10A or higher without fluctuation by load. In addition, the power supply should not activate protection with peak current 20A, 1ms or below.

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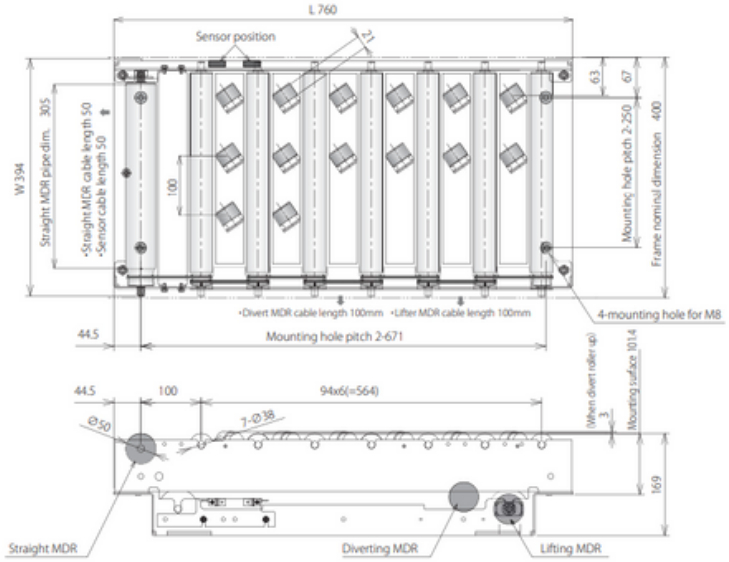
# DIMENSIONS

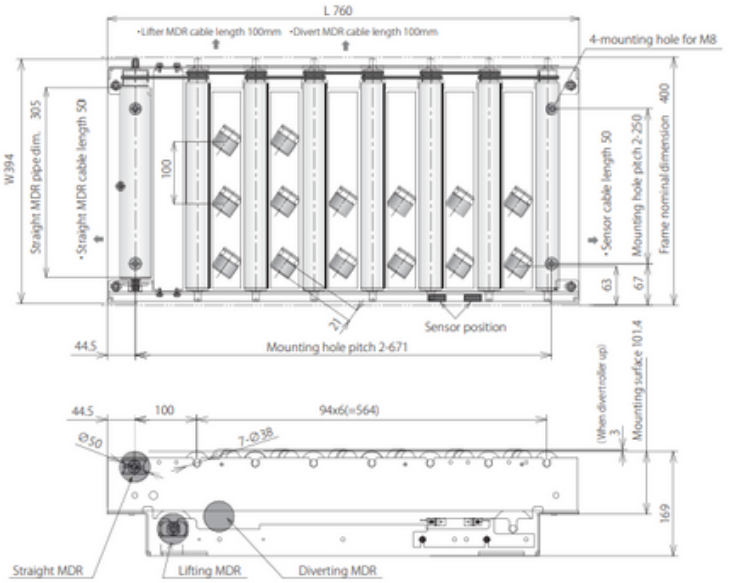
## SIZE A:

**W 394mm (15.51") × L 760mm (29.92")**
**Divert Left**




## SIZE A:

**W 394mm (15.51") × L 760mm (29.92")**
**Divert Right**

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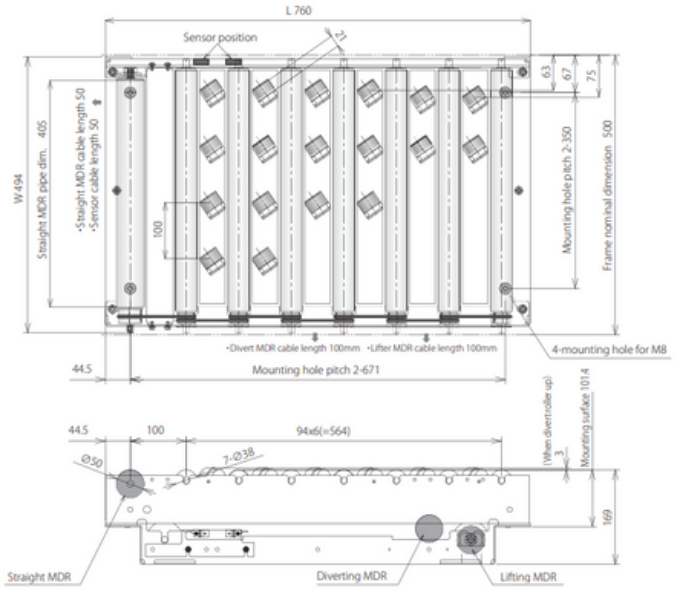
# DIMENSIONS

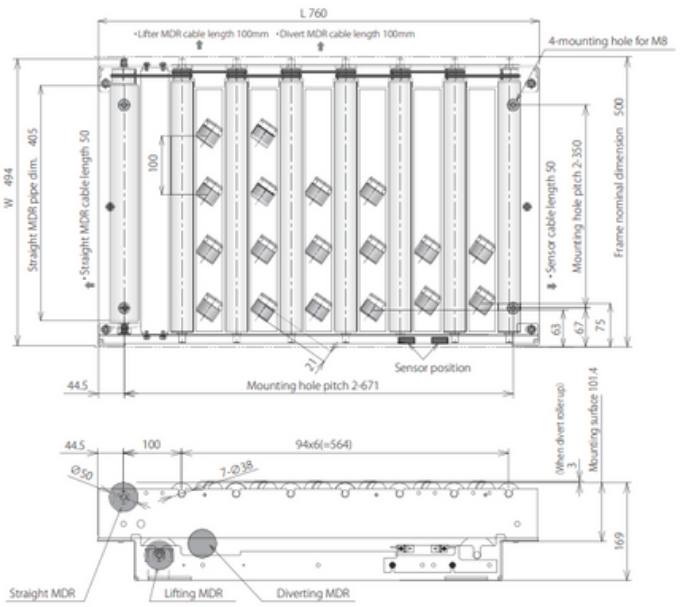
## SIZE B:

**W 494mm (19.45") × L 760mm (29.92")**
**Divert Left**




## SIZE B:

**W 494mm (19.45") × L 760mm (29.92")**
**Divert Right**

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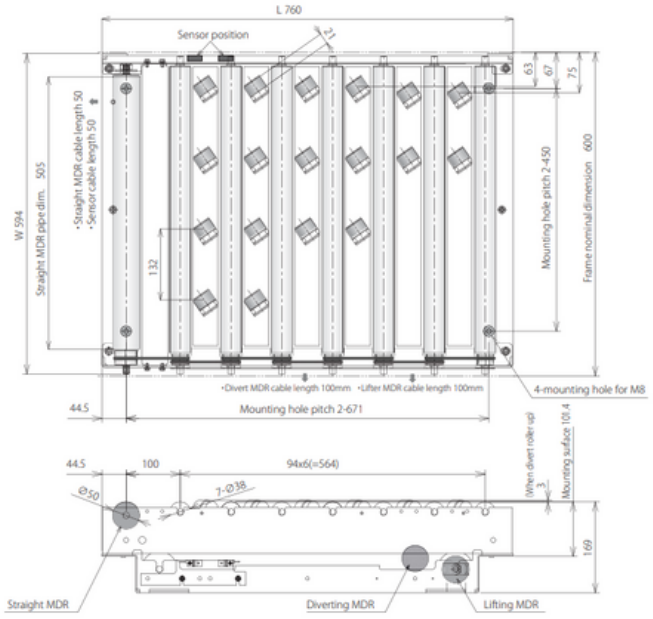
# DIMENSIONS

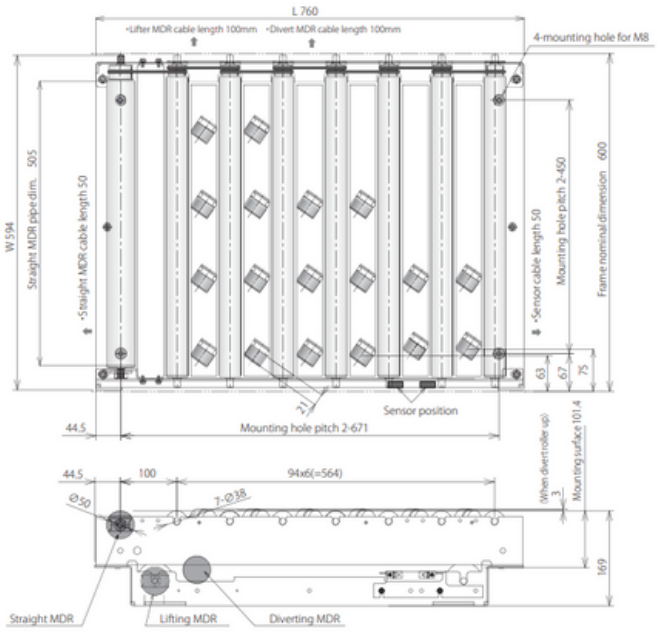
## SIZE C:

**W 594mm (23.38") × L 760mm (29.92")**
**Divert Left**




## SIZE C:

**W 594mm (23.38") × L 760mm (29.92")**
**Divert Right**

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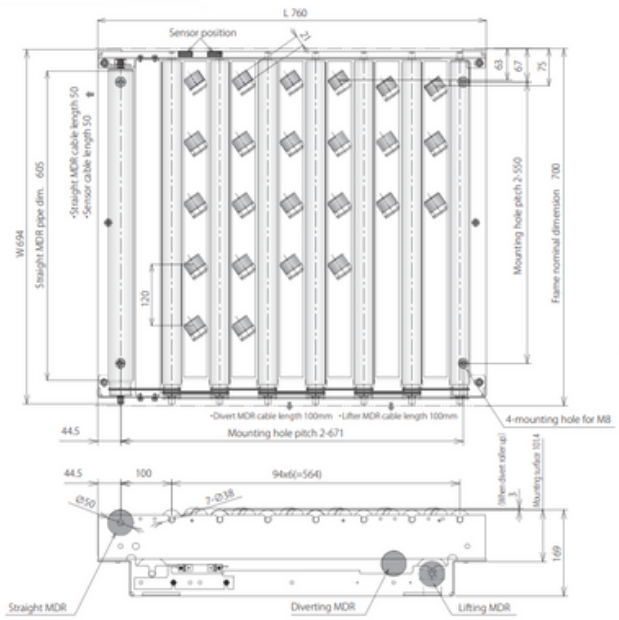
# DIMENSIONS

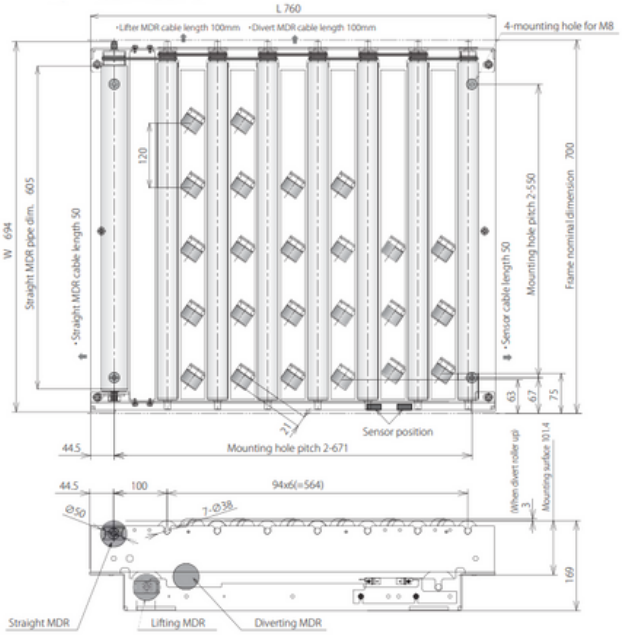
## SIZE D:

**W 694mm (27.32") × L 760mm (29.92")**
**Divert Left**




## SIZE D:

**W 694mm (27.32") × L 760mm (29.92")**
**Divert Right**

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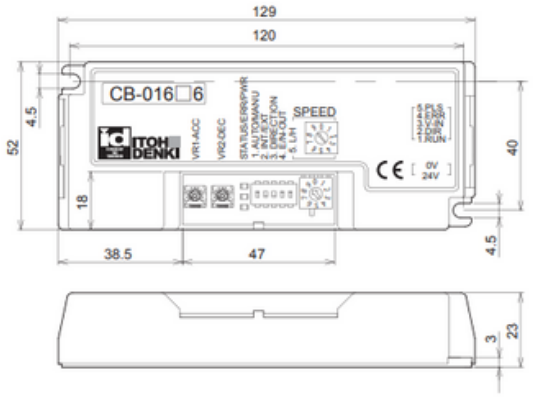
# DIMENSIONS

## ACCESSORY:

- CB-016□6

  □=N（NPN input/output）
  or P（PNP input/output）




# INSTALLATION AND OPERATION

## CAUTION WHEN TRANSPORTING:

| | |
|---|---|
| ⚠ Caution | **Avoiding injuries**<br>-Majority of this product is made from metal and careless handling may cause injury of hands. Be sure to wear protective means such as gloves to avoid injury<br>**Handle the heavy item by two persons as a rule**<br>-Some product type weighs over 50kg. To protect the operators, transport the unit by two or more persons as a rule of handling a heavy item |

- **Prohibiting Impacts**
  - This product contains precision components such as bearing and microchip. Use caution for avoiding impacts by dropping or collision during transportation as impacts may cause damage of such components.

## CAUTION FOR UNPACKING:

| | |
|---|---|
| ⚠ Caution | **Avoiding injuries**<br>-Majority of this product is made from metal and careless handling may cause injury of hands. Be sure to wear protective means such as gloves to avoid injury |

- **Appearance Check**
  - Check the following when opening the crate.
    1. Abnormality on the unit such as dent, concave mark, smear, corrosion (rust), etc.
    2. Loose or missing screws. Please report to the supplier when you find abnormality.

## CAUTION DURING INSTALLATION - ELECTRICAL:

- **Checking the Circuit breaker**
  - For the facility equipment using this product, check that a power breaker with appropriate capacity has been installed. In case the product generates abnormal motions, protection by the breaker is sometimes effective. If the earth leakage breaker is planned for use as a breaker, select a type compatible with inverter. Certain type of incompatible ground fault interrupter causes malfunction by sensing high frequency component of switching power supply as leak current.

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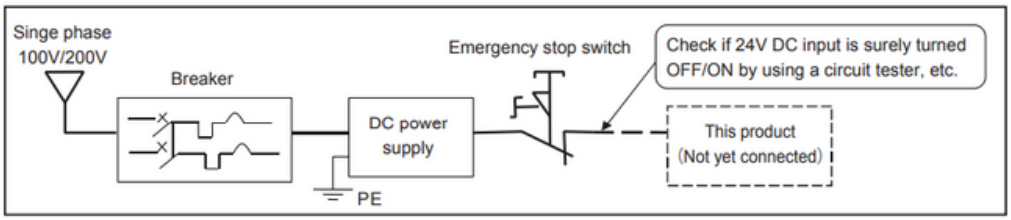
# INSTALLATION AND OPERATION

## CAUTION DURING INSTALLATION - ELECTRICAL:

- **Checking the DC Power Supply**
  - DC power supply must be an insulation type switching power supply certified by the safety standard (IEC60950-1 or UL90950-1) for ensuring safety. Do not use non-insulation type series power supply for safety as well as conforming to radiation noise restriction. Current capacity of the DC power supply should have sufficient capacity to accommodate this product. Current capacity of the wiring material should also provide sufficient margin to the specified current value.
- **Checking the Wiring**
  - When the DC power supply is integrated, check if the equipment breaker and emergency stop switch correctly operate. Test operation and any further procedure should be performed after finishing this check.
    1. ON/OFF operation of the breaker reliably turns ON/OFF of the input (single phase 100V, 200V) to the DC power supply unit.
    2. ON/OFF operation of the emergency switch reliably turns ON/OFF of the input (DC24V) to this product.
  - Carefully check if these wiring would not contact any moving parts of this product.



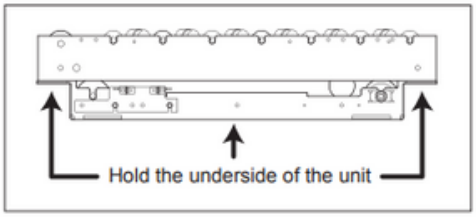

## CAUTION DURING INSTALLATION - MAIN UNIT:

- **Installation environment**
  - This product is not equipped with a special dust or water proof measures, and is intended for use in "pollution level 2" defined by IEC60664-1. For this reason, when the product is installed in the environment requiring dust or water proof measures, the user needs to provide additional protection and check the performance.
  - Vibration level of the environment in which this product is used must be 0.5G or below.
  - Install this product with the tilt of 5/1000 or below
  - Secure a work space around this product for maintenance purpose.
  - Comply with the safety rules required for the place of installation or equipment to be used.

- **Main unit installation**

| | |
|---|---|
| ⚠ Caution | During installation, use caution for installing direction (orientation). Be sure to use the specified mounting holes. (Refer to 5. Dimension P.5, P.6, P.7, P.8).<br>Incorrect direction (orientation) or using non-specified securing holes may cause unexpected accident |

  - Perform installation operation always by two persons
  - Use caution for motor cable or sensor cable not to be pinched by other object.
  - Do not attach the driver card on the pop-up diverter unit. It may cause loose screws or other failure by vibration.
  - Securely attach the unit on the frame by considering the product weight, tray weight, and vibration

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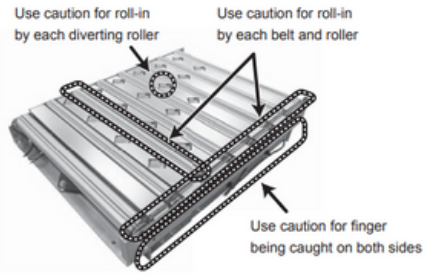
# INSTALLATION AND OPERATION

## CAUTION DURING INSTALLATION - MAIN UNIT:

**Safety Assurance**

| | |
|---|---|
| ⚠ Warning | Operator should not come close to any moving part that may hook or roll-in objects. Provide a means for not permitting the operator to touch the moving part with a safety fence |
| ⚠ Caution | To prevent any object from popping out of the area by collision, and to avoid injury by such object, install a safety fence around the equipment. |

- If the warning label becomes hidden by installing the product, reattach the warning label in a visible place.
- When performing maintenance operation, make sure the main power is completely shut off.



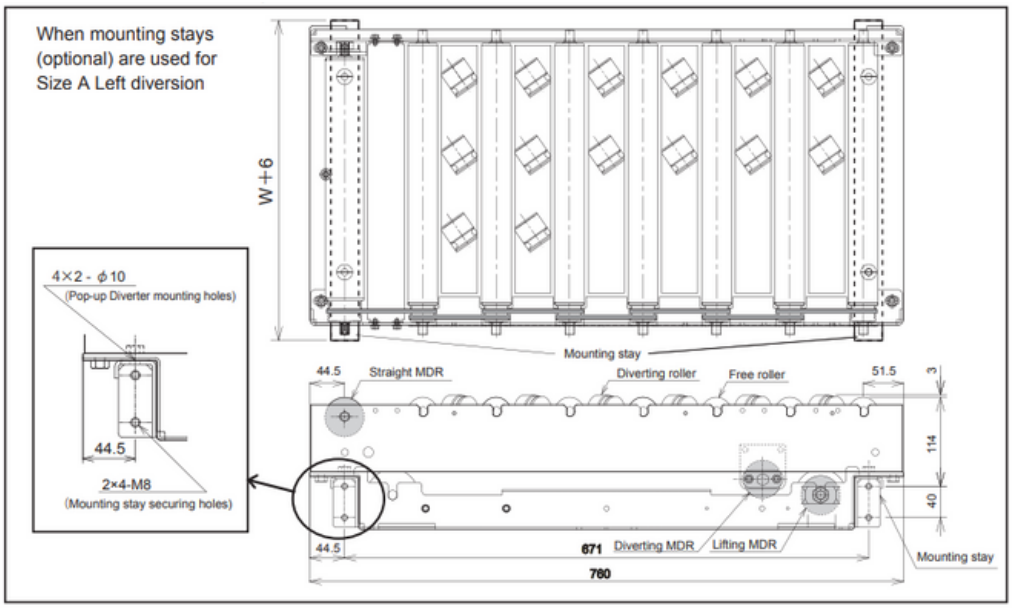

## INSTALLATION:

- Attach the Pop-up Diverter by using the mounting holes (Refer to Section 5-Dimension)
- When using mounting stays, refer to the attachment example shown below

**C/V Transport Level (Height)**

- Align the inbound C/V level with the roller surface of the Pop-up Diverter, and diverting C/V level with the diverting roller surface (3mm above the roller surface).

- Attachment reference example

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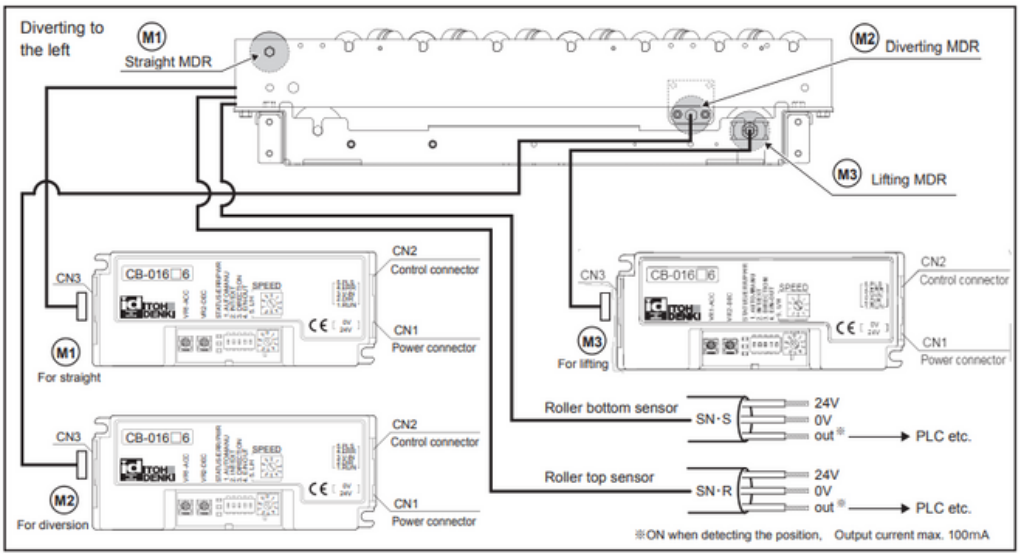
# INSTALLATION AND OPERATION

## INSTALLATION

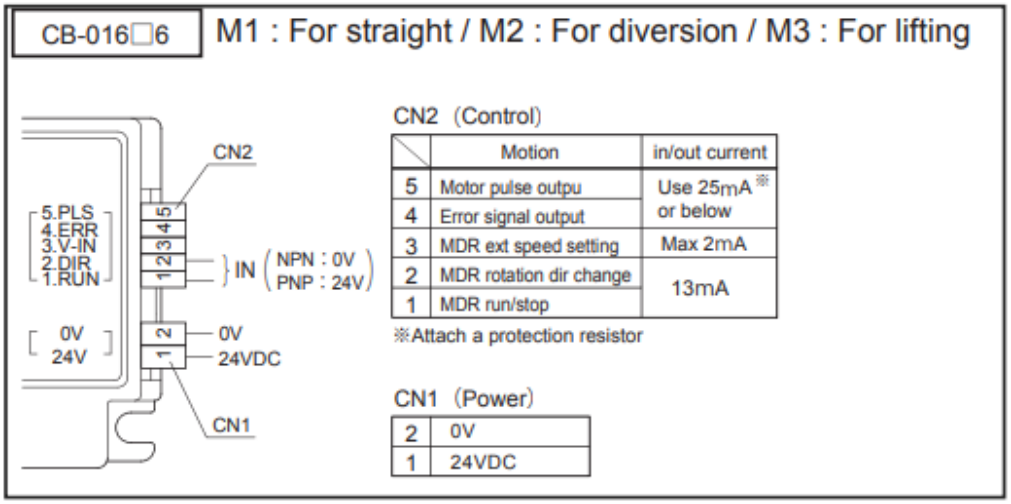
### Connection

- Attach the power connector <CN1>, Control connector <CN2>, MDR connector <M1 for straight, M2 for diversion, M3 for Lifting> to the driver card as shown below
  - Connector attachment and detachment must be made after shutting off the power and by holding the connector.
  - Securely attach each connector to the contact part.




- Pop-up diverter zone sensor is not included. User needs to provide it.

### Wiring




CN2 (Control)

| | Motion | in/out current |
|---|---|---|
| 5 | Motor pulse outpu | Use 25mA※ or below |
| 4 | Error signal output | |
| 3 | MDR ext speed setting | Max 2mA |
| 2 | MDR rotation dir change | 13mA |
| 1 | MDR run/stop | |

※Attach a protection resistor

CN1 (Power)

| | |
|---|---|
| 2 | 0V |
| 1 | 24VDC |

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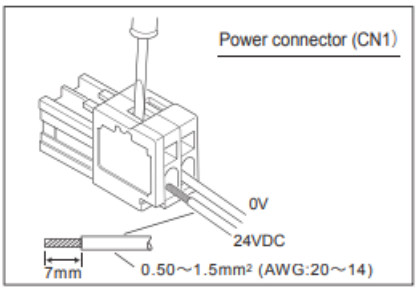
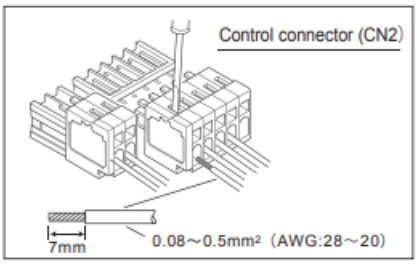
# INSTALLATION AND OPERATION

## INSTALLATION:

### Connector Wiring Common to CB-016

1. Connect 24V DC / 0V wires to the power connector < CN1(2 contacts)>.
   - Do not connect any branching wire. It may cause electrical shock, short-circuit or failure due to over capacity of the connector. (Connector capacity：10A)
   - Do not wire in reverse polarity.
   - Wiring should be made before inserting the connector into the driver card.
2. Connect wires to control connector < CN2(5 contacts)>.
   - Input voltage supplied to CN2#1(MDR run/stop ), CN2#2(MDR rotation direction change) must be common to the power supply voltage. ( Connector capacity :4A)
3. Plug the power connector < CN1(2 contacts)>, control connector < CN2 (5 contacts)>, MDR connector to the driver card.
   - Connector attachment/detachment must be made after shutting off the power and by holding the connector.
     ※Securely insert the connector to the contact part.



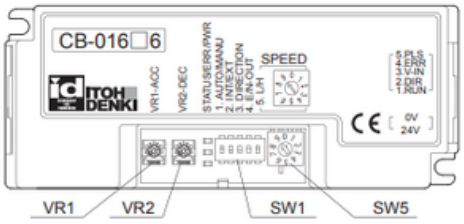

For a detailed specification of CB-016□6, please download the driver operating instruction manual at itohdenki.com/tech-documents

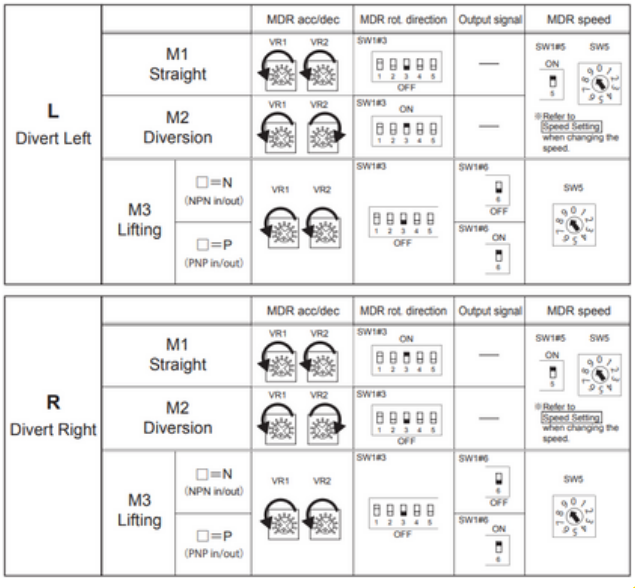
### Driver Card Setting

| Caution | M3：For lifting has been set by the factory. Do not change setting. Changing by the user may cause a failure. |
|---|---|

M1 : Straight / M2 : Diversion / M3 : Lifting CB-016 6

※□=N (NPN input/output) or P (PNP input/output)





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# INSTALLATION AND OPERATION

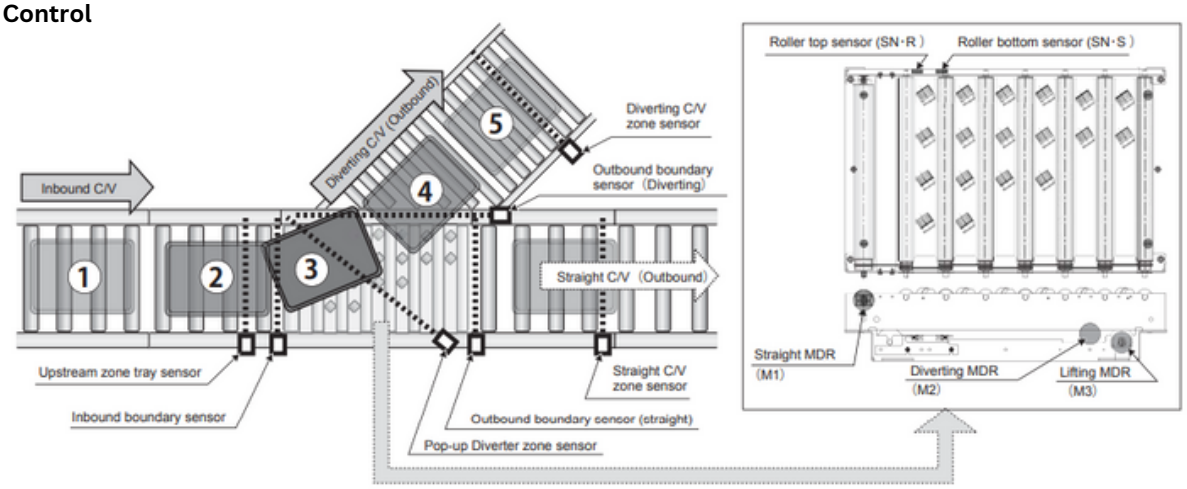
## INSTALLATION:

### Speed Setting

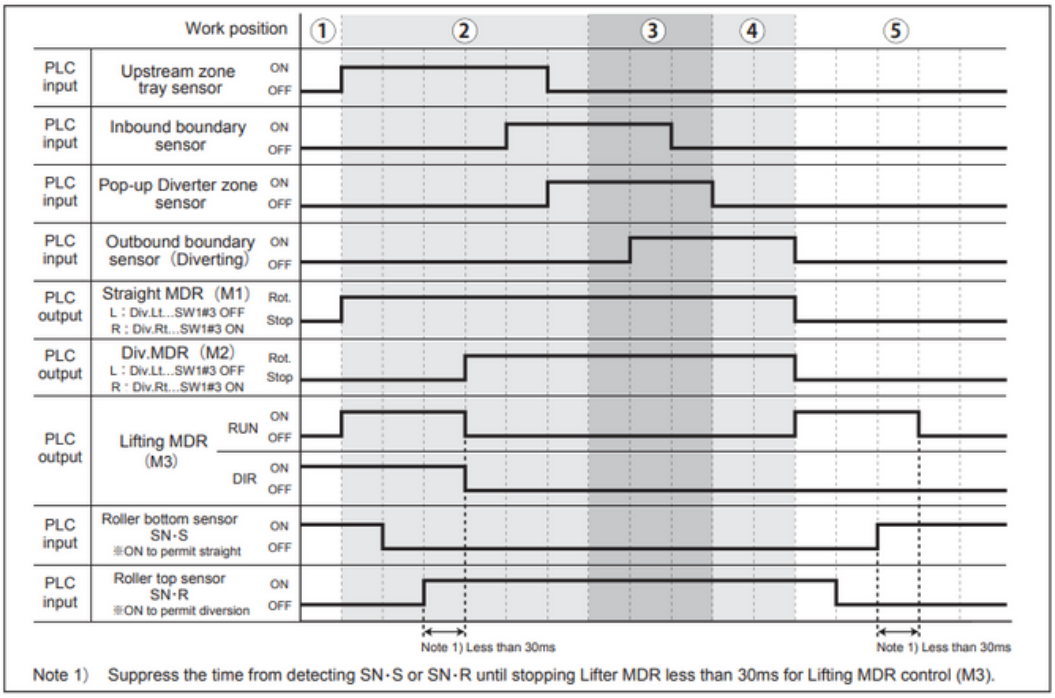
(m/min) Speed accuracy: ±3%

| | SW1#5 : ON | | | | | | | | | | SW1#5 : OFF | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW2 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| M1 : Straight | 53.5 | 53.5 | 53.5 | 51.4 | 48.9 | 46.3 | 41.2 | 38.6 | 36.0 | 33.4 | 30.9 | 28.3 | 25.7 | 23.1 | 20.6 | 18.0 | 15.4 | 12.9 | 10.3 | 7.7 |
| M2 : Diverting | 90.2 | 90.2 | 90.2 | 85.8 | 81.5 | 77.4 | 68.6 | 64.4 | 60.0 | 55.9 | 51.6 | 47.2 | 42.9 | 38.5 | 34.4 | 30.2 | 25.8 | 21.5 | 17.1 | 12.8 |

### Control




### Example Time Chart when Diverting




Note 1) Suppress the time from detecting SN·S or SN·R until stopping Lifter MDR less than 30ms for Lifting MDR control (M3).

- Use control components with response time 20ms or shorter to avoid abnormal motion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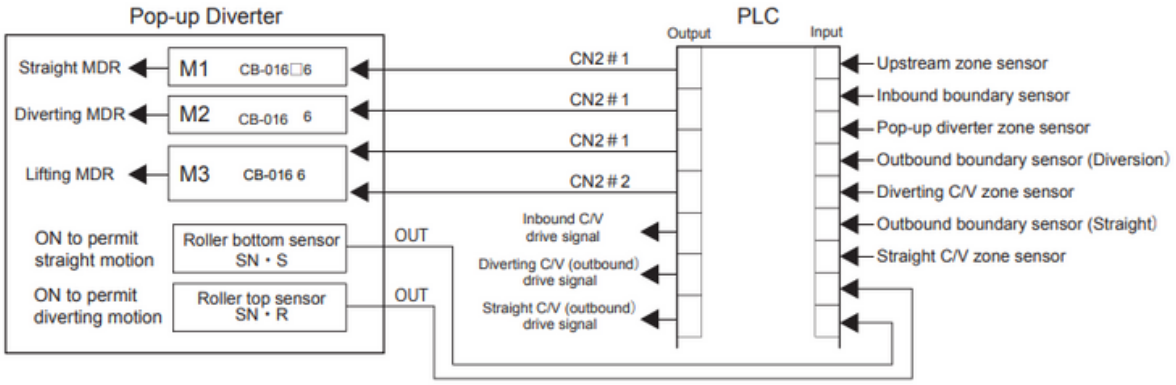
# INSTALLATION AND OPERATION

## INSTALLATION:

**Example of Connector Wiring using a PLC**




## PRECAUTIONS FOR A TRIAL RUN

**Checking the environment for permitting trial run**

| | |
|---|---|
| ⚠ Caution | Make sure other devices in the system do not run. In the case of a conveyor line integrated in a system, starting signal would cause a tray to flow down the conveyor and cause danger. Before trial run, make sure that other elements of the system does not operate. |

Trial run should be performed without trays and make sure no abnormal operation occurs.
At such time, check the following points.

1. No error LED blinks on the driver card.
2. No abnormal sound or high temperature is detected.

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# REPAIR/REPLACEMENT

In order to avoid accident or damage during operations, confirm safety. The illustration used for repair and inspection is size C, left diversion. Use caution for different shape when other size or right diversion is used. (Refer to Section 5-Dimensions)

**Safety Check Before Repairing/Replacing a Part**

| | |
|---|---|
| Warning | In order to avoid interference by power circuit and signals, turn off the power of all connected devices.<br>1. After turning off the power switch, leave for more than 3 minutes for discharging the DC power supply.<br>2. Indicate warning to prevent other people from turning the power |

**Part Repair/Replacement**

| | |
|---|---|
| Warning | In order to avoid interference by power circuit and signals, turn off the power of all connected devices.<br>1. After turning off the power switch, leave for more than 3 minutes for discharging the DC power supply.<br>2. Indicate warning to prevent other people from turning the power |

- When a damaged component is discovered, promptly replace with a new component.
- Do not perform disassembly other than in a designated place. Unexpected accident may occur.
- Repair/replacement operation sometimes requires turning or lifting a component. Use caution for being caught or pinched by other parts and injured.

**Component repair and confirmation after replacement**

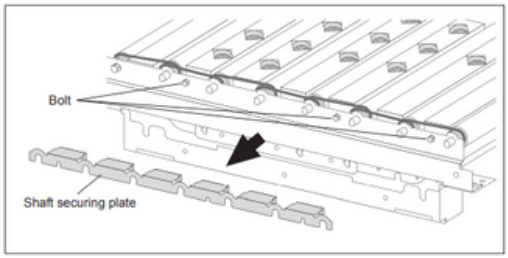
- When component repair and replacement is completed, check the following before starting trial run.
  (a) Roller link belt and diversion roller link belt are attached in the right groove.
  (b) The removed cover is securely closed.
  (c) All removed components and parts are attached.

## REPLACEMENT OF FREE ROLLERS, ROLLER LINK BELT, STRAIGHT MDR:

Tools needed: 8mm • 19mm spanners, flat-tip screw-driver, nipper

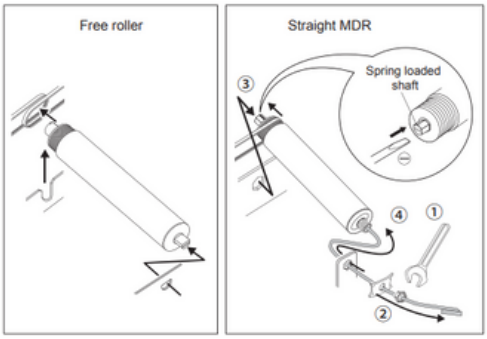
**1. Remove the shaft securing plate**

- Loosen the bolts on the shaft securing plate and pull out the plate to remove.




**2. Remove free rollers or straight MDR from the end of the module.**

- A roller without a power cable is a free roller.
- To remove straight MDR, loosen the attachment bracket on the power cable side and remove the cable tie which secures the MDR connector and cable.

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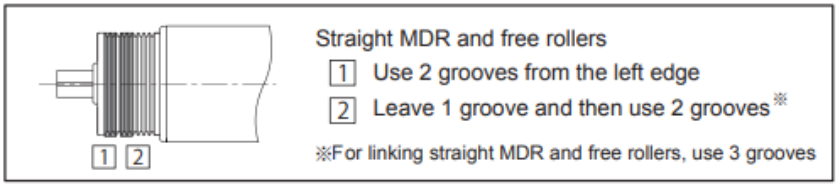
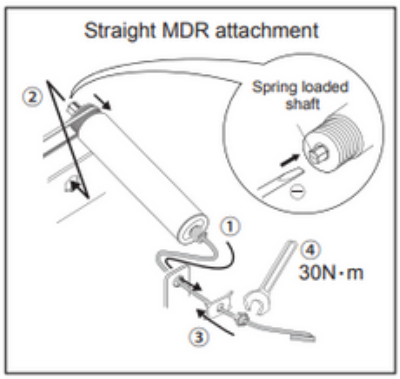
## REPLACEMENT OF FREE ROLLERS, ROLLER LINK BELT, STRAIGHT MDR:

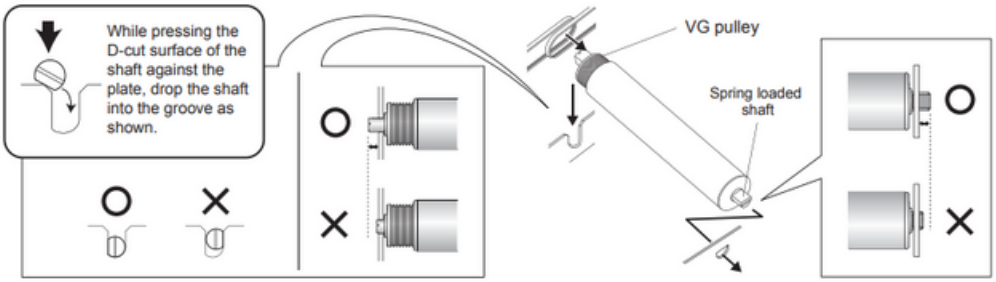
**3. Replace and assemble free rollers, roller link belt, straight MDR.**

- Attach the straight MDR, and assemble free rollers from the straight MDR side toward the end of the module.
- After assembling straight MDR, attach the MDR connector to the driver and secure the cable with general-purpose cable-ties.
- 3-1. Engage the link belt on all rollers. Refer to the following chart for groove position on which the link belt is attached.
  - Linking the straight MDR and free rollers - PJ316 (3PJ316)
  - Linking free rollers - PJ286 (2PJ286)




- 3-2. Assemble free rollers one by one in the order of the "shaft opposite from the VG roller" → "VG pulley side shaft".



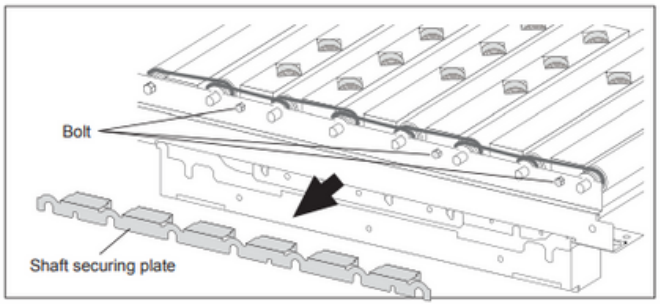

**4. Attach the shaft securing plate.**

## REPLACEMENT OF A DIVERTING ROLLER:

Tools Needed: 8mm • 19mm spanners, cross-tip screw-driver, flat-tip screw-driver, nipper, 10mm socket wrench

**1. Remove the shaft securing plate**

- Loosen the bolts on the shaft securing plate and pull out the plate to remove.

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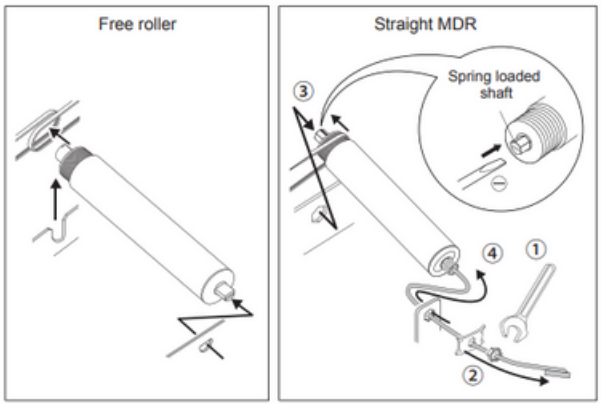
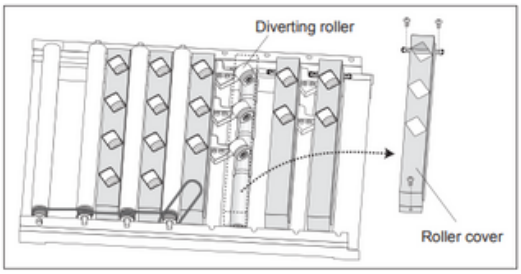
## REPLACEMENT OF A DIVERTING ROLLER:

**2. Remove free roller or straight MDR from the end of the module**

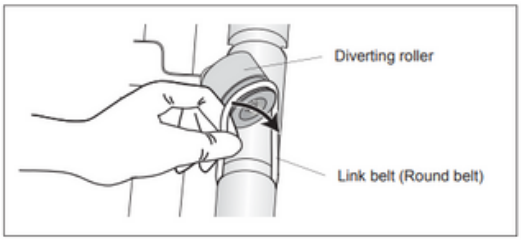
- Remove free rollers until those on both sides of the diverting roller to be replaced can be removed.
- A roller without a power cable is a free roller.
- To remove a straight MDR, loosen the attachment bracket on the power cable side and remove the cable tie which secures the MDR connector and cable.




**3. Remove the roller cover of the diverting roller to be replaced**

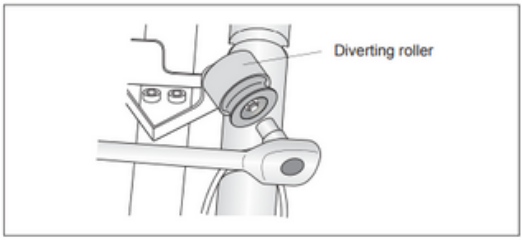



**4. Remove the link belt (round belt) of the diverting roller to be replaced**



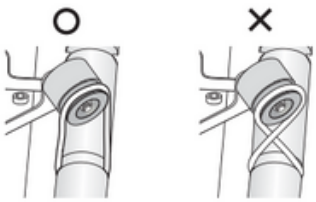

**5. Replace the diverting roller**

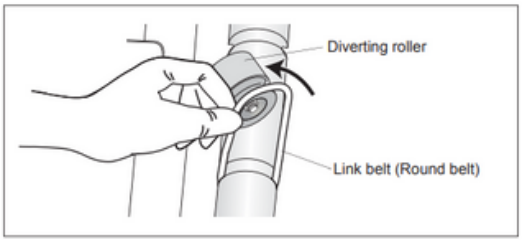
- Check the direction of the diverting roller when assembling. (Fastening torque 5.4N·m)
- Always use a new nut.
  - Old nut may not be fully fastened.




**6. Attach the link belt (round belt) around the diverting roller**

- Use caution to avoid twisting the link belt.

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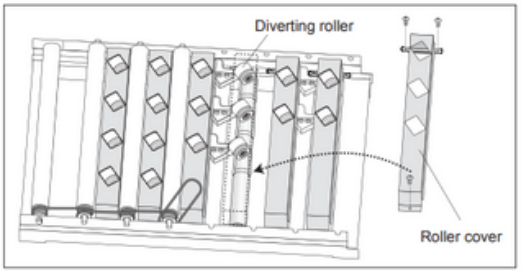
## REPLACEMENT OF A DIVERTING ROLLER:

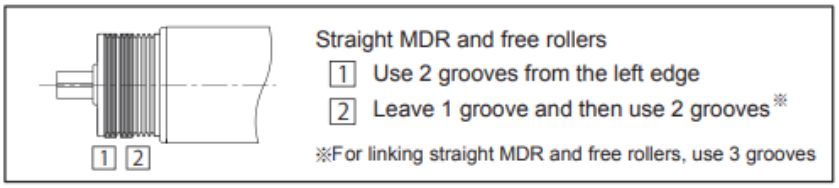
**7. Attach the roller cover on the diverting roller**

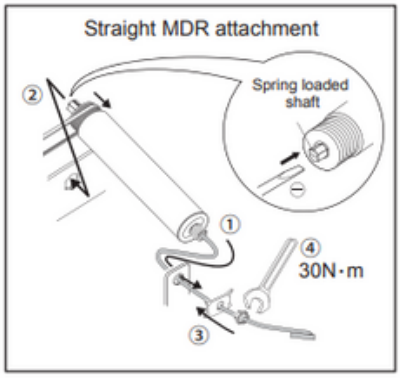



**8. Replace and assemble free rollers, roller link belt, straight MDR**

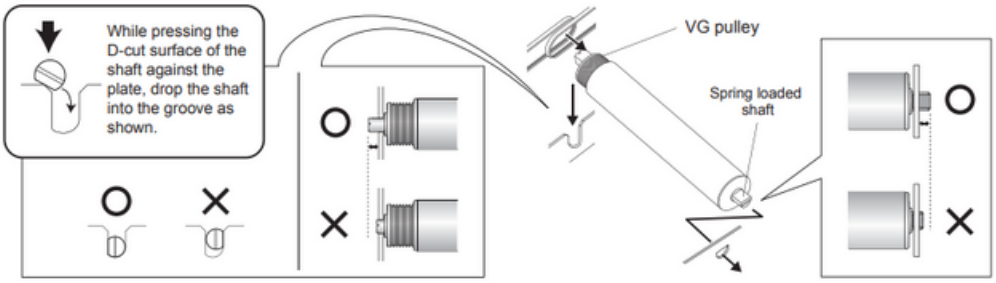
- Attach the straight MDR, and assemble free rollers from the straight MDR side toward the end of the module.
- After assembling straight MDR, attach the MDR connector to the driver and secure the cable with general-purpose cable-ties

- 8-1. Engage the link belt on all rollers.
- Refer to the following chart for groove position on which the link belt is attached
  - Linking the straight MDR and free rollers - PJ316 (3PJ316)
  - Linking free rollers PJ286 (2PJ286)




- 8-2. Assemble free rollers one by one in the order of the "shaft opposite from the VG roller" → "VG pulley side shaft".




**9. Attach the shaft securing plate**

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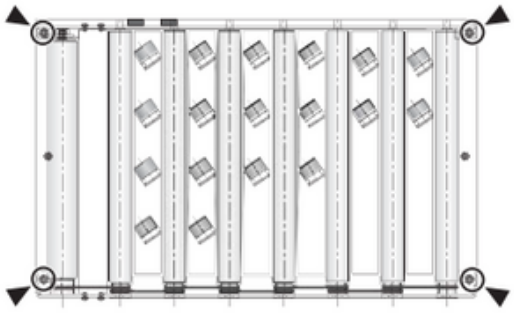
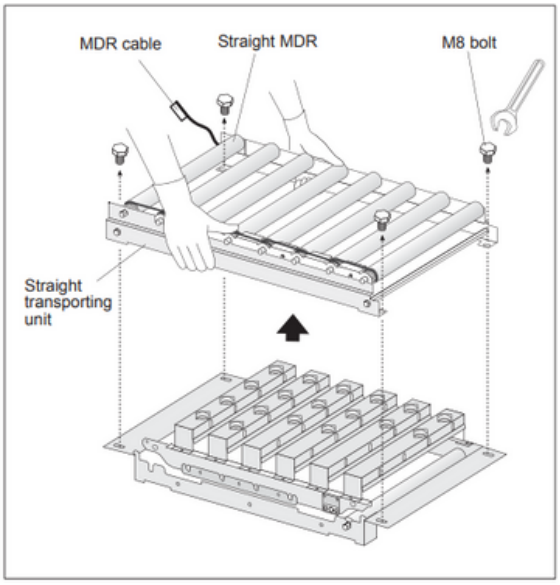
## REPLACING/ASSEMBLING LINKING BELTS (ROUND BELTS) OF DIVERTING ROLLERS:

Tools Needed: 13mm spanner (2), 19mm spanner, flat-tip screw-driver, nipper, 8mm box wrench

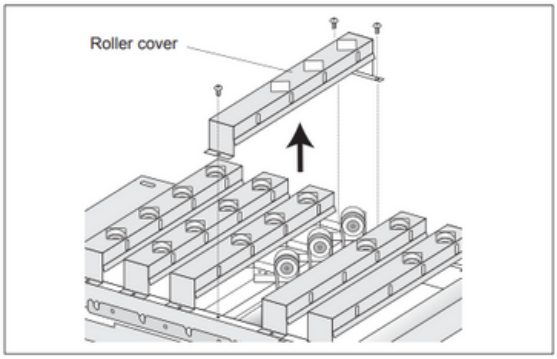
**1. Loosen the M8 bolts at the 4 corners of Pop-up Diverter and remove the straight transporting unit**



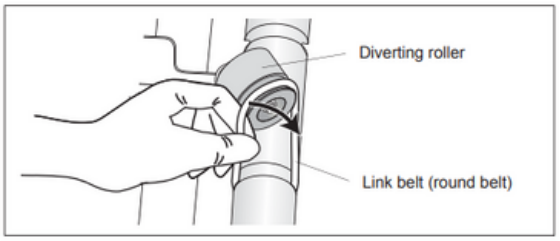



- Disconnect the straight MDR connector from the driver card.
- Remove the cable tie which secures the cable.
- When lifting the straight transport unit for removal, hold the unit as shown.
  - Because the straight MDR is heavy, use caution for not dropping or giving strong impacts.
  - Use caution not to damage the straight MDR cable by pinching, hooking, or forcibly pulling.

**2. Remove the diverting roller cover**




**3. Remove all link belts (round belts) attached on the diverting rollers**

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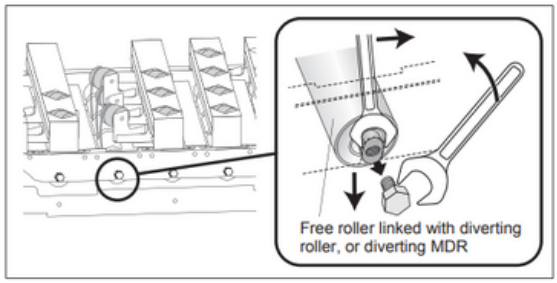
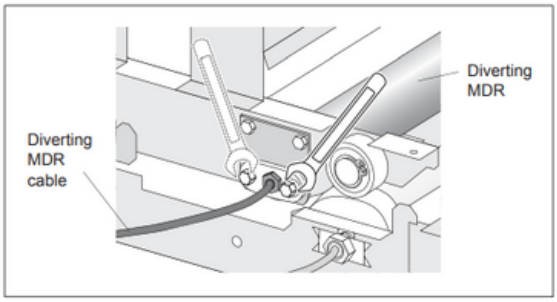
## REPLACING/ASSEMBLING LINKING BELTS (ROUND BELT) OF DIVERTING ROLLERS:

**4. Remove the free roller linked with diverting roller, or diverting MDR**

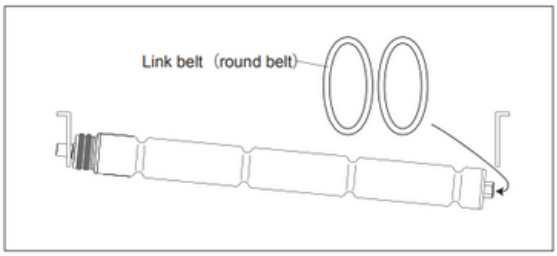
- Remove only the attachment shaft opposite from VG pulley. (It is not necessary to completely remove the free roller linked with diverting roller or diverting MDR)
  - If the spanner cannot be inserted in the gap, move the roller to VG pulley to secure a gap for inserting the spanner.




- When replacing a diverting MDR link belt (round belt), first, loosen the 2 hex bolts on the attachment bracket on VG pulley side.

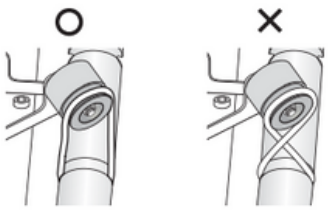


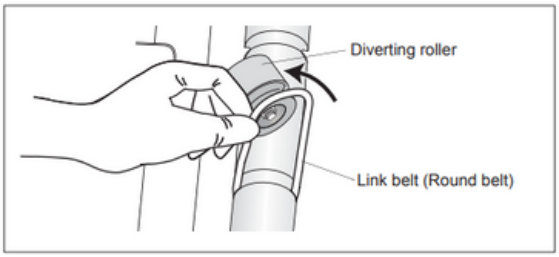

**5. Attach and replace a link belt from the attachment shaft side**




**6. Attach a link belt (round belt) on the diverting roller**

- Use caution to avoid twisting the link belt.

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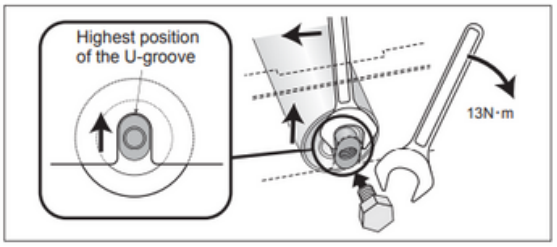
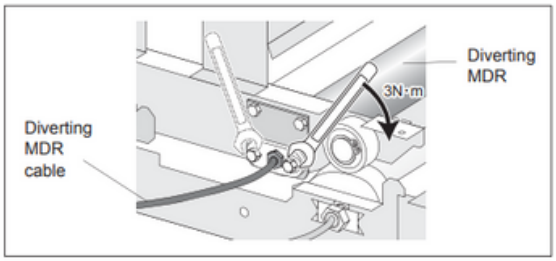
## REPLACING/ASSEMBLING LINKING BELTS (ROUND BELT) OF DIVERTING ROLLERS:

**7. Secure the free roller linked with diverting roller, or diverting MDR**

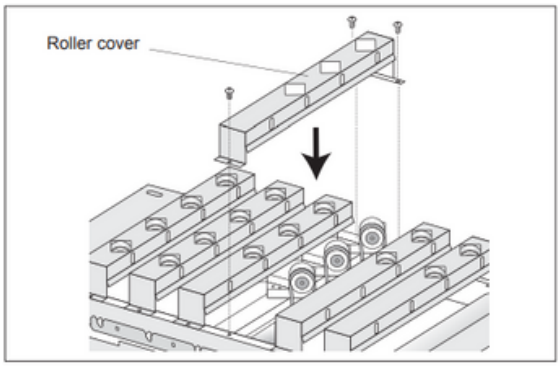
- Fasten the hex bolt of attachment shaft at the highest position of the U-groove for securing.




- When securing the link belt (round belt) of a diverting MDR, tighten the 2 hex bolts the VG pulley side attachment bracket. (Fastening torque 3N·m)

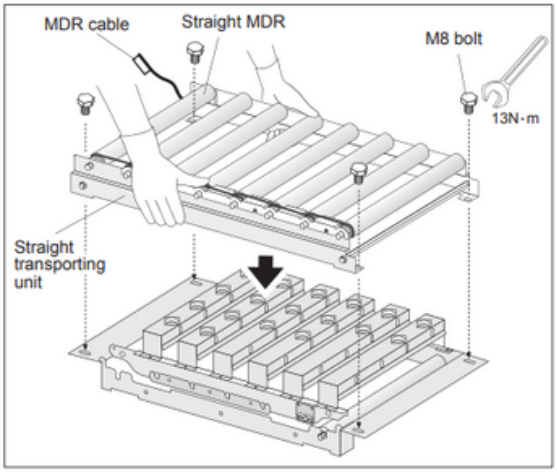



**8. Attach the roller cover of the diverting roller**




**9. Attach the straight transport unit and secure the 4 corners**

- Use caution for the orientation of the unit to be attached
- Avoid MDR cable being pinched by other objects.
- During attachment operation, avoid interference between the straight transport unit rollers and roller cover of the diverting roller.
- Attach the connector of straight MDR to the driver card.
- Secure the cable with general-purpose cable ties.

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# SPECIFICATIONS

## POP-UP DIVERTER UNIT SPECIFICATIONS:

| | | |
|---|---|---|
| Roller diameter | | ϕ50mm |
| Diverting roller | | ϕ39.5mm |
| | | Polyurethane 90° |
| Size | Width(W) | 394, 494, 594, 694mm |
| | Length (L) spine direction | 760mm |
| Mechanism height | | 169mm (with diverting roller up : 172mm) |
| Transfer speed | Straight | Approx 60m/min |
| | Diversion | Approx 90m/min |
| Lifting stroke | | 3mm |
| Drive power | | 24VDC |
| Operating temperature | | 0 ~ 40℃ (No freezing) |
| Operating humidity | | 90%RH or below (No condensation) |
| Atmosphere | | No corrosive gas |
| Vibration | | 0.5G or below |
| Installed location | | Indoor |
| Lifting sensor (Roller btm sensor SN-S / Roller top sensor SN-R) | Current consumption | 15mA or below |
| | Output current | Max 100mA |
| | Output motion | ON when detecting the position |
| | Cable | Outer dia. ϕ3mm 0.15mm² 3 wires |

## CB-016□6 SPECIFICATIONS:

□=N (NPN in/out) or P (PNP in/out)

| | | |
|---|---|---|
| Power voltage | | 24VDC±10% |
| Rated voltage | | 24VDC |
| Static current | | 0.03A |
| Starting current | | 4.0A |
| Wire dia. | Pwr connector (CN1) | 0.50~1.5mm² (AWG:20~14) Note) |
| | Cntrl connector (CN2) | 0.08~0.5mm² (AWG:28~20) Note) |
| Motor rotation from drive input | | 15msec or below |
| Protection function | | Mis-wiring protection / Integral 6.3A fuse (7A for CBR-305) |
| Temperature protection | | 95℃ for circuit board, 105℃ for motor |
| Current limit | | 4A |
| Ambient temperature | | 0~40℃ (No freezing) |
| Ambient humidity | | 90%RH or below (No condensation) |
| Atmosphere | | No corrosive gas |
| Vibration | | 0.5G or below |
| Installed location | | Indoor |

Note) Conforming wire to the included connector

| | | | |
|---|---|---|---|
| PCB side | Power conrctor | 734-162 (WAGO) | (MAX:10A) |
| | Control connector | 733-365 (WAGO) | (MAX: 4A) |
| Wiring side | Power conn. (CN1) | 734-102 (WAGO) | (MAX:10A) |
| | Control conn. (CN2) | 733-105 (WAGO) | (MAX: 4A) |

## PRODUCT WEIGHT:

| Size | Weight |
|---|---|
| Size A | 46 kg (101.41 lbs) |
| Size B | 49 kg (108.03 lbs) |
| Size C | 51 kg (112.44 lbs) |
| Size D | 54 kg (119.05 lbs) |

## TRANSFER LOAD:

| Size | Transport Speed | Min. size ~ Max. size | Max. Load Weight |
|---|---|---|---|
| SizeA | Standard type | W300 × L300mm ~ W300 × L650mm | 30kg |
| Size B | | W300 × L300mm ~ W400 × L650mm | |
| Size C | | W300 × L300mm ~ W500 × L650mm | |
| Size D | | W300 × L300mm ~ W600 × L650mm | |

- Size and mass are approximate, as they vary by the load condition.
- Certain types of loads may not be transferred correctly depending on the bottom shape.

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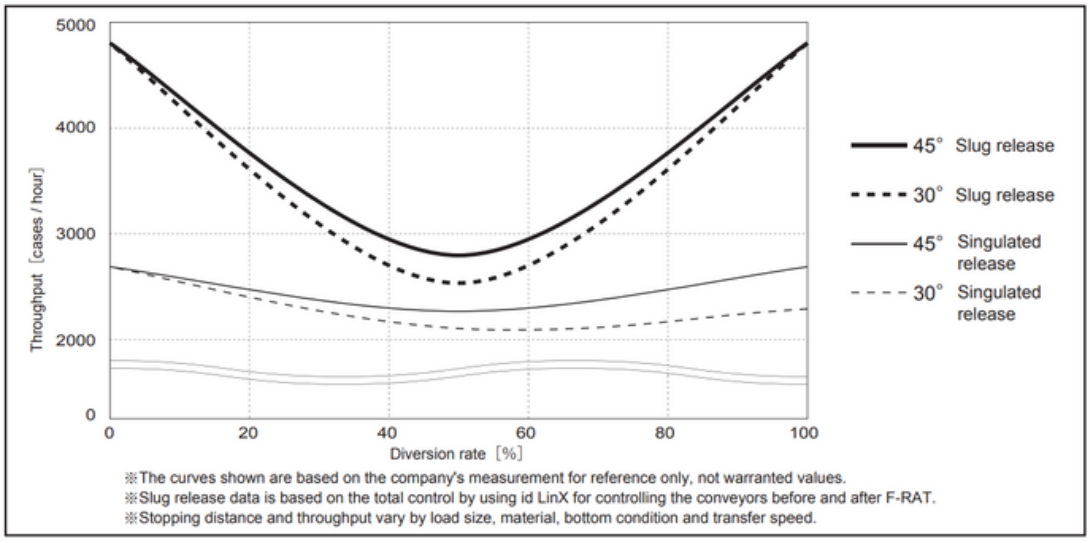
# SPECIFICATIONS

## TRANSFER THROUGHPUT:

- Transfer speed: 60m/min Size D type
- Load condition: Carton box W360×L360mm 30kg
- Diversion is made from the condition with every load staying in each zone of the inbound C/V




※The curves shown are based on the company's measurement for reference only, not warranted values.
※Slug release data is based on the total control by using id LinX for controlling the conveyors before and after F-RAT.
※Stopping distance and throughput vary by load size, material, bottom condition and transfer speed.

## REPLACEMENT PARTS FOR POP-UP DIVERTER:

| | Part Name | Part Number | | |
|---|---|---|---|---|
| 1 | Diverting roller link belt (round belt) | MXP5-04/87F L=260mm | | |
| 2 | Roller link belt (V-ribbed belt for straight move) | Free roller ⇔ Free roller | 2PJ286 | |
| | | MDR ⇔ Free roller | 3PJ316 | |
| 3 | Diverting roller | POP-D-ROL | | |
| 4 | Straight MDR | PM500FE-60-（305 ／ 405 ／ 505 ／ 605）-D-024-JW-C150-VG (sizeA ／ sizeB ／ sizeC ／ sizeD) | | |
| 5 | Free roller (For straight motion) | ARI-38-（329 ／ 429 ／ 529 ／ 629）-HX-VG (sizeA ／ sizeB ／ sizeC ／ sizeD) | | |
| 6 | Driver card | CB-016□6 (M1：Straight ／ M2：Diversion) | | □: Specify N = NPN or P = PNP according to the input/output type |
| | | CB-016 □6 (M3：Lifting) | | |

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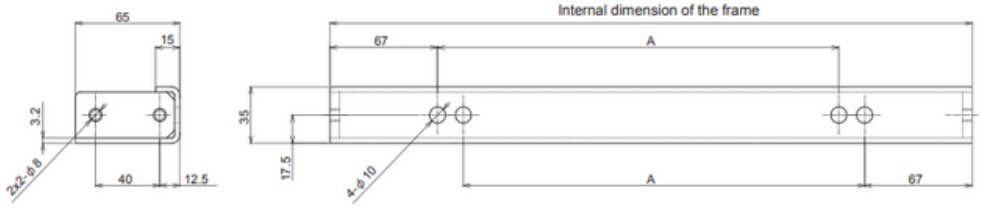
# SPECIFICATIONS

## OPTIONAL ITEM LIST:

### Mounting stay

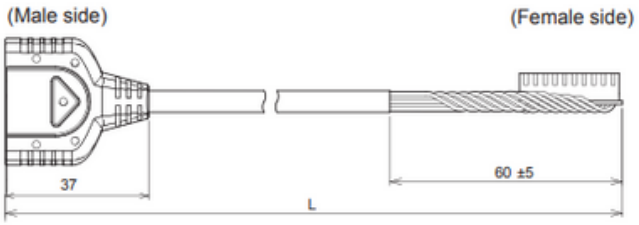
(mm)

| Size | Internal dim. of frame | A dim. |
|---|---|---|
| A | 400 - 499 | 250 |
| B | 500 - 599 | 350 |
| C | 600 - 699 | 450 |
| D | 700 | 550 |



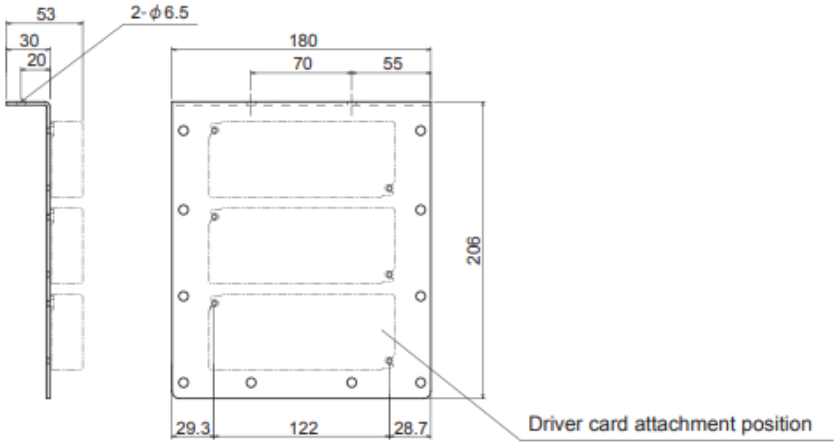

### Extension Cable

| Model | Cable specification |
|---|---|
| ACE-CBM-B0600 | 9P ext. cable length 600mm |
| ACE-CBM-B0850 | 9P ext. cable length 850mm |
| ACE-CBM-B1200 | 9P ext. cable length 1200mm |




### Driver Card Attaching Plate

(F-RAT-S1-DB)

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# TROUBLESHOOTING

**When troubleshooting, check the items shown below before contacting us or requesting a repair.**

| Problem | Check the Following | Perform the Following | Refer to |
|---|---|---|---|
| Pop-up diverter does not operate | Is PWR LED of each driver turned on? | Supply 24V DC. | Connector wiring (p.13) |
| | Is LED2 (red) of each driver blinking or lit, indicating error output? | Eliminate error cause and cancel the error setting. | Error detail/ cancel method (p.29) CB-016 User manual |
| | Is each connector correctly connected? Is the wiring correct? | Check the wiring and rewire correctly. | Connection (p.13) Wiring (p.13) |
| | Does each driver card type (NPN/ PNP input/output) and input/output signal (NPN input/output /PNP input/ output) of PLC, etc. match? | Match each driver card type (NPN input/output / PNP input/output) and input/output signal (NPN input/output / PNP input/output) of PLC, etc. | Wiring (p.13) |
| | Is the input voltage common to the supplied power voltage? | Make the input voltage common to the supplied power voltage. | Connector Wiring (p.13) |
| Lifting part does not operate, or lifter motion is strange | Is the control made for detecting lifted-up/down position when the roller bottom sensor (SN・S) or roller top sensor (SN・R) is ON? | Make the control to detect the lifter up/down position when the roller bottom sensor (SN・S) or roller top sensor (SN・R) is ON. | Control (p.15) |
| | M3: Is the RUN signal to the lifting driver card kept continuously entered? | Set the RUN signal to the M3: Lifting driver card to OFF when the lift up/down position is detected. | Control (p.15) |
| | M3: Is the lifting driver card LED2 (red) blinking or lit, indicating error output? | Eliminate the error cause and cancel the error. | Error detail/cancel method (p.29) |
| Cannot change the speed | Is speed change of straight MDR by operating M1: straight driver card switch, and diversion MDR speed by operating M2: diversion driver card switch individually? | Speed change of straight MDR should be operated by M1: straight driver card switch, and speed change of diverting MDR should be operated by M2: diversion driver card switch. If M3: lifting driver card switch is operated, return it to the original position. | Driver Card Setting (p.14) |
| | Is M3: lifting driver card switch operated? | | |

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# TROUBLESHOOTING

**When troubleshooting, check the items shown below before contacting us or requesting a repair.**

| Problem | Check the Following | Perform the Following | Refer to |
|---|---|---|---|
| During diversion, each load moves as if disturbed | During diversion, both straight MDR (M1) and diverting MDR (M2) are driven at the same time? | During diversion, straight MDR (M1) needs to be driven. | Control (p.15) |
| Rotation direction does not match (diverting roller / straight MDR) | Does the diversion type (L/R) of Pop-up diverter and switch setting of M1: straight driver card and M2: diversion driver card switch (SW1#3) match? | Switch setting of M1: straight driver card and M2: diversion driver card should match the Pop-up diverter type. | Driver Card Setting (p.14) |
| Some diverting rollers do not rotate during diversion | Is the tension on the diverting roller comparable to the tension on other link belt?<br>Is any link belt broken? | Replace the link belt. | Replacement/assembly of diverting roller link belt (round belt) (p.21) |

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# APPENDIX 1: MAINTENANCE

When starting and ending daily operation, perform maintenance inspection by referring to the following
To avoid accident or damage during operation, perform safety check and procedure.

**Safety check procedure before starting maintenance inspection operation**

| | |
|---|---|
| Warning | **To avoid interference by power circuit or signal, shut off power to all connected devices.**<br>• After turning off the power switch, leave for 3min or longer to discharge the DC power supply.<br>• To prevent unrelated personnel from supplying power, post a warning indication.<br>• When inspecting during operation for noise or abnormal rotation, use caution to avoid fingers being caught by rollers or other moving parts. In preparation for immediate stopping of the equipment apply sufficient safety measures.<br>Always use protective means such as gloves. Operations without using protective means may lead to cutting by a metal part and other injury |

**Confirmation after maintenance inspection**

After completing maintenance inspection operation, check the following before a trial operation.

- Whether the roller link belts and diversion roller link belts are attached in the correct groove position.
- Once-removed covers are securely installed.
- No components have been forgotten for assembly

| Inspection Locations | Inspection Items | Action Contents |
|---|---|---|
| ・Mounting points of Pop-up Diverter<br>・Mounting stay（Optional） | ・Loose screws | ・Tighten the screw |
| ・Driver card | ・Loose screws at mounting points | ・Tighten the screw |
| | ・Incorrect attachment of driver card | ・Attach connector correctly |
| | ・Wire damage, defective wiring | ・Correct the wiring |
| | ・Abnormal temp rise, damage | ・Stop and report to the distributor |
| ・Free roller | ・Abnormal sound<br>・Rotation failure<br>・Appearance defect by damage | ・Repair, replacement<br>P.16 P.23 |
| ・Roller MDR | ・Abnormal sound<br>・Speed degradation from setting<br>・Appearance abnormality, dent<br>・Abnormal temperature rise | |
| ・Roller link belt | ・Crack on belt surface<br>・Wear on belt surface<br>・Damage on belt side(degradation) | |
| ・Diverting roller | ・Surface crack, lost material<br>・Surface wear<br>・Appearance abnormality, dent<br>・Abnormal sound, poor rotation | |
| ・Diverting roller link belt | ・Belt surface crack<br>・Belt surface wear | |
| ・Other | ・Current leak from the equipment | ・Equipment grounding |
| | ・Component deformation, damage | ・Stop and report to distributor |

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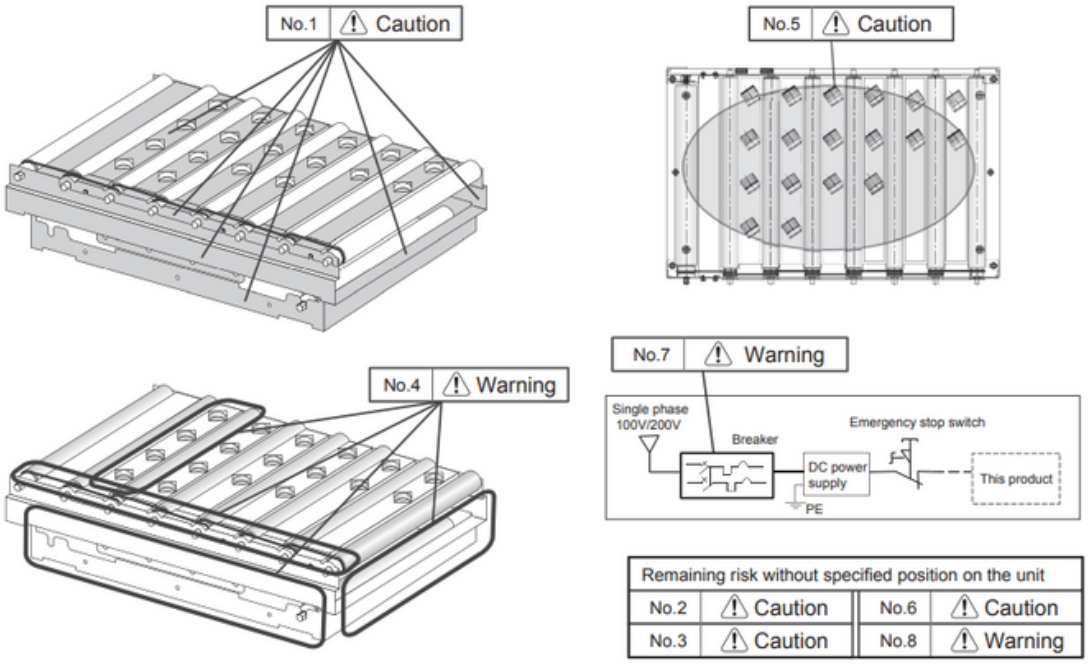
# APPENDIX 2: REMAINING RISKS

## List of Remaining Risks

| No. | Stage | Operation | Qualification for operation | Position on unit | Danger level | Remaining risk factor | Presumed measures | Implemented measures | Manual pages |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Preparation | Uncrate/ transfer | Fully reading the manual and understanding the content | Product metal part | Caution | Injury by product metal part | Wear protection: gloves, etc. | Explained in the manual | P9 |
| 2 | Preparation | Transfer | | No specific position | Caution | Heavy item transfer by a single operator may cause injury or damage on product | 2 or more operators hold product by both hands while supporting the bottom. | Explained in the manual | P9 |
| 3 | Operation | Trial opr. | | No specific position | Caution | During stand-alone trial operation, unexpected load transfer causes injury | Cut off the control to avoid motion of other parts before starting the unit. | Explained in the manual | P15 |
| 4 | Operation | All operations | | Between moving parts and between moving part and stationary part | Warning | Operator's fingers/hand are caught between the unit and moving part, or between moving parts | • Enclose the area with interlocked fence to prevent operator coming close.<br>• Add a cover to the gap in the unit to eliminate gap. | • Attach a warning/caution label<br>• Explained in the manual | P10 |
| 5 | Operation | All operations | | The upper surfase of product | Caution | Operator rides on the unit and slips and falls down | • Enclose the area with safety fence to prevent operator coming close.<br>• Train the operator not to ride on the equipment | Explained in the manual | P3 |
| 6 | Operation | All operations | | No specific position | Caution | Operator is injured by a load popped out of the C/V | Enclose the area with safety fence to keep people off and stop object to pop out. | Explained in the manual | P10 |
| 7 | Maintenance | All inspections | | Power supply to driver card | Warning | Power-on action by someone makes the product move unexpectedly and causes injury | Post a warning sign to prevent unrelated personnel from supplying power. | Explained in the manual | P16、P27 |
| 8 | Maintenance | All inspections | | No specific position | Warning | Operator's finger or hand is caught by the product | Work carefully by wearing protective items such as gloves. | Explained in the manual | P16、P27 |

## Remaining Risk MAP




| Remaining risk without specified position on the unit | | | |
|---|---|---|---|
| No.2 | Caution | No.6 | Caution |
| No.3 | Caution | No.8 | Warning |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