AD-4981-3585

Flipper Type Rejector

INSTRUCTION MANUAL

A&D Company, Ltd.

1WMPD4004690

WARNING DEFINITIONS

The warnings described in this manual have the following meanings:

⚠WARNING	A potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	A potentially hazardous situation which, if not avoided, may result in minor or moderate injury or damage to the instrument.
	This symbol indicates caution against electrical shock. Do not touch the part where the symbol is placed.
	This symbol indicates the ground terminal.
	This symbol indicates that an operation is prohibited.
Note	Information or cautions to use the device correctly.

The contents of this manual and the specifications of the instrument covered by this manual are subject to change for improvement without notice.

Contents

1. Introduction

The AD-4981-3585 is a flipper type rejector that can be used by connecting to the AD-4991 X-ray inspection system or AD-4961A checkweigher. When the AD-4976-39 rejector power supply module (sold separately) is attached, the AD-4981-3585 can also be used connected to AD-4976-H series and AD-4971 series metal detectors.

By operating its arm using the air cylinder, the AD-4981-3585 can sort products in two directions: diverted and straight. When a flipper arm AD-4981-FL3585 or AD-4981-FR3585 (sold separately) is attached, the sorting directions can be increased to three directions: two diverted and one straight.

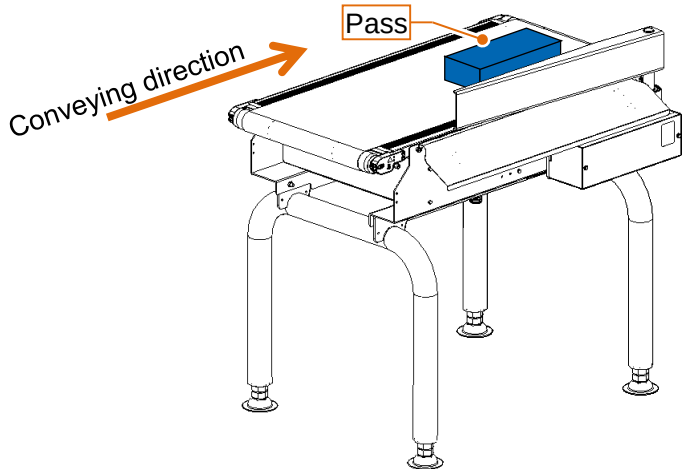


Fig. 1 Image of sorting (conveying products in a straight direction)

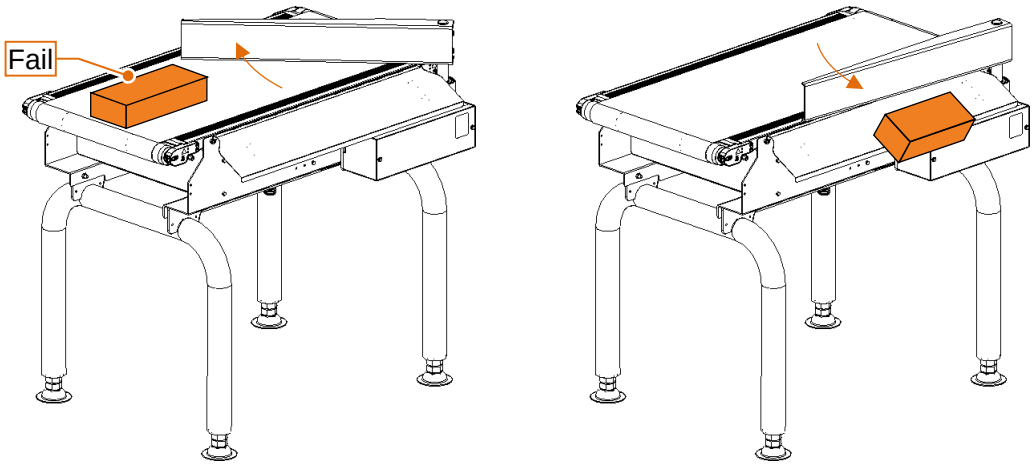


Fig. 2 Image of sorting (conveying products in a diverted direction)

2. Unpacking

Before assembling, make sure that the following items are included in the package and that they are not damaged.

If anything is missing or damaged, please contact your local A&D dealer.

Depending on how you purchased it, your product may be delivered pre-assembled.

Table 1 Packing list (1/2)

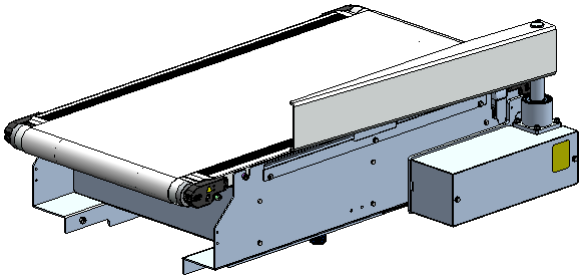
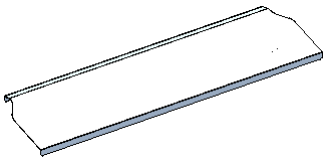
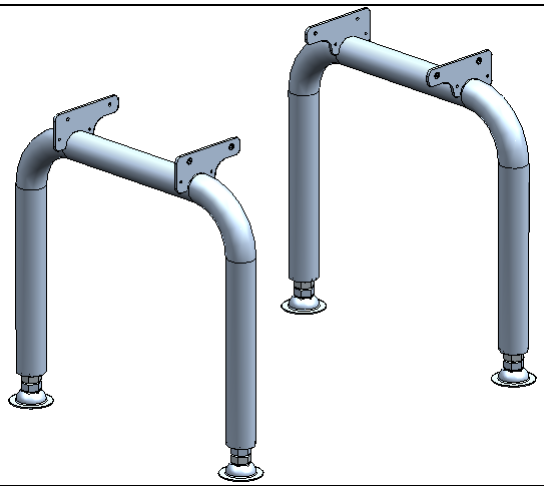
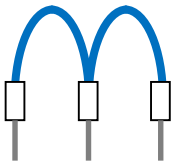
Item	External view
Rejector main unit	
Chute plate	
Base unit	
Mounting screws for the base unit (8 pieces, M6, 20 mm in length)	

Table 2　Packing list (2/2)

Item	External view
Filter regulator	
Filter regulator bracket	
Mounting screws for the filter regulator bracket (2 pieces, M4, 10 mm in length)	
24 V crossover cable	

3. Descriptions of parts

3-1 Overall view

Front view

Rear view

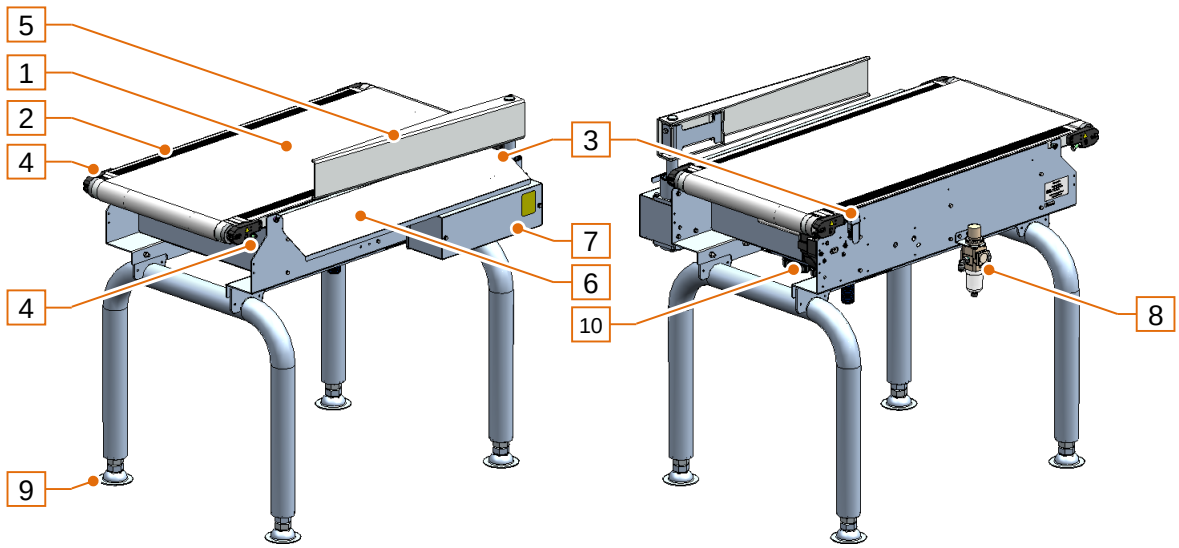


Fig. 3 Overall view (AD-4981-3585)

Table 3 Part names and functions

No.	Name	Function
1	Belt	Conveys products. Can be removed and cleaned.
2	Conveyor base	The pulleys to move the belt and the base to convey products.
3	Draw latches of the conveyor	To firmly attach the conveyor base to the rejector, there is one latch on the front side and one on the back side of the rejector.
4	Belt tension adjusting screws	To adjust the tension of the belt, there is one screw on the front side and one on the back side of the rejector. Belt meandering can be also adjusted by adjusting the screws.
5	Arm	Operates according to external signals for rejecting products away from the conveying direction.
6	Chute plate	When a product is rejected, it slides down on the surface of the plate.
7	Cylinder case	An air cylinder for moving the arm is built in. The speed controller attached to the air cylinder can adjust the speed of the air cylinder.
8	Filter regulator	Adjusts the air pressure supplied to the air cylinder.
9	Adjustable feet	The height of the conveyor can be adjusted by turning the height adjustment nuts.
10	Control box	Contains a circuit board that controls the motor and a solenoid valve that controls the air cylinder.

3-2 Cables

This rejector has four cables that are routed externally.

The cables are routed from the bottom of the rejector through the corrugated tube.

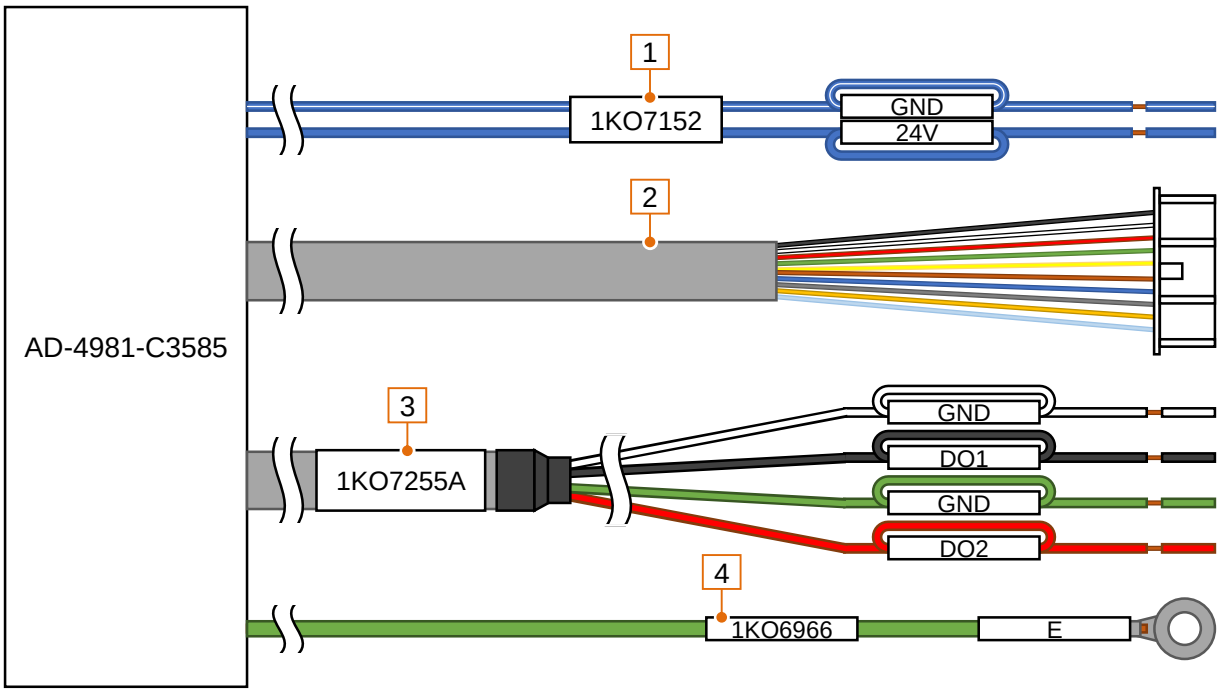


Fig. 4 Appearances of cable tips

Table 4 Cable name and function

No.	Name	Function
1	Motor power cable (1KO7152)	Connects the external power supply to the motor control board of the rejector.
2	Motor control cable (1KO4338)	Connects the external motor control signal source to the motor control board of the rejector.
3	Screening signal cable (1KO7255A)	Connects the external general-purpose output signal source to the solenoid valve of the rejector.
4	Ground cable (1KO6966)	Connects the ground of the inspection system to the main unit of the rejector.

3-3 Warning labels

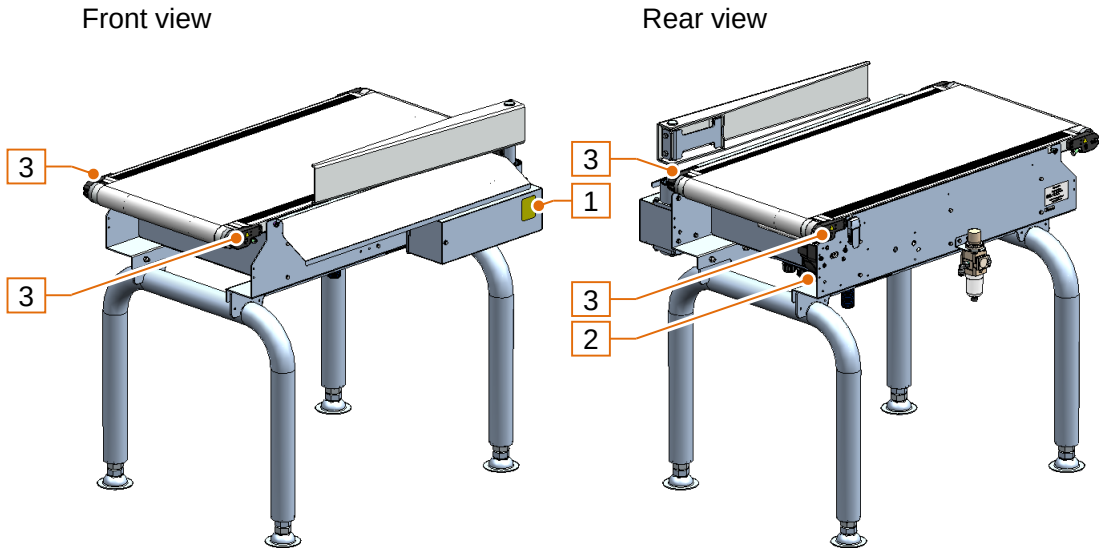


Fig. 5 Positions of the warning labels

Table 5 Warning labels

No.	Label	Meaning of the label
1		Be careful not to get hands, etc., caught in the flipper arm.
2		Be careful not to get hands, etc., caught in rotating parts of the motor gears.
3		Be careful not to get hands, etc., caught in pulleys and the belt.

4. Assembly

4-1 Main unit

Caution:

Assembly work should be done by two or more people.

1. Using a 10 mm wrench, attach the base unit to the rejector main unit with the mounting screws for the base unit.

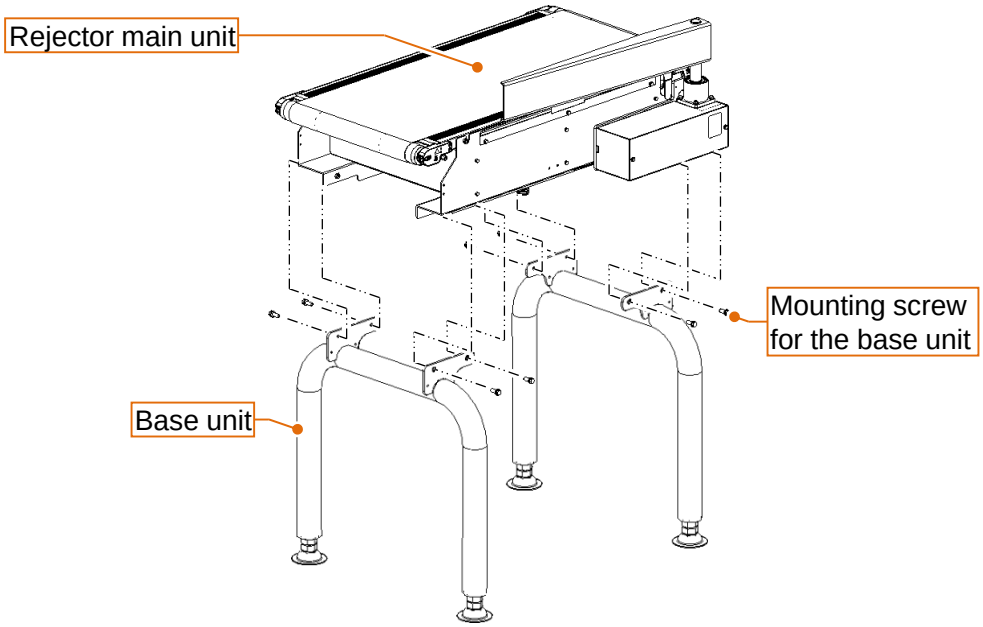


Fig. 6 Attaching the base unit

2. Using a 7 mm wrench, attach the filter regulator bracket to the rejector main unit with the filter regulator bracket mounting screws. In the figure below, it is attached to the rear side of the rejector, but it can also be attached to the front side.

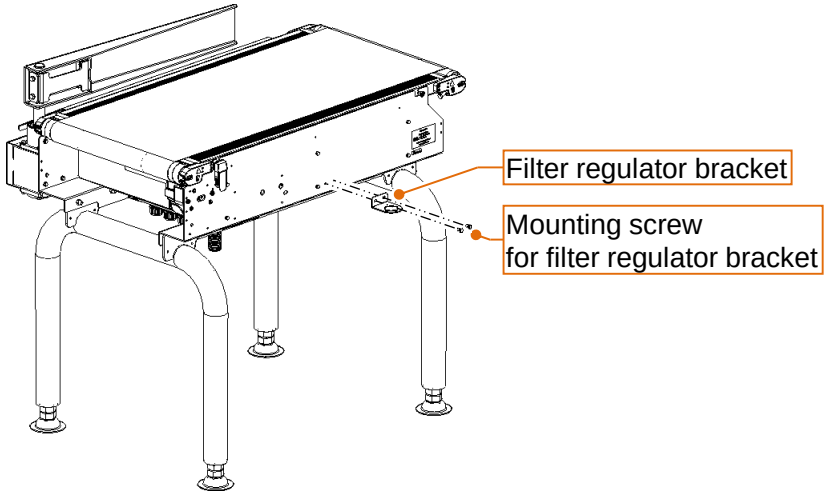


Fig. 7 Attaching the filter regulator bracket

3. Attach the filter regulator to the filter regulator bracket using the filter regulator nut.

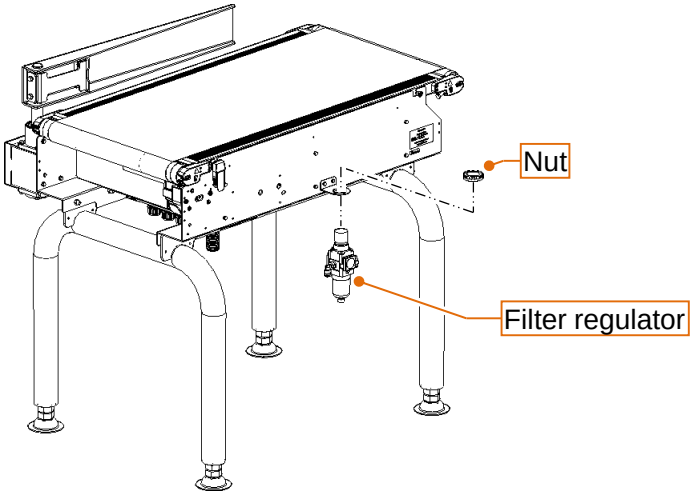


Fig. 8 Attaching the filter regulator

4. Connect the air tube (longer one) of the control box to the filter regulator.

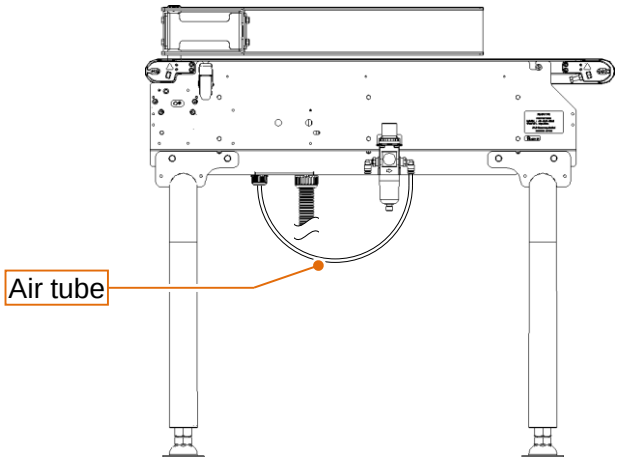


Fig. 9 Connecting the air tube to the filter regulator

5. With the chute plate tilted about 15 degrees, pass the chute plate under the flipper arm (A). Then, hook the chute plate claw into the groove on the rejector main unit (B) while the chute plate is tilted to the installation position (C).

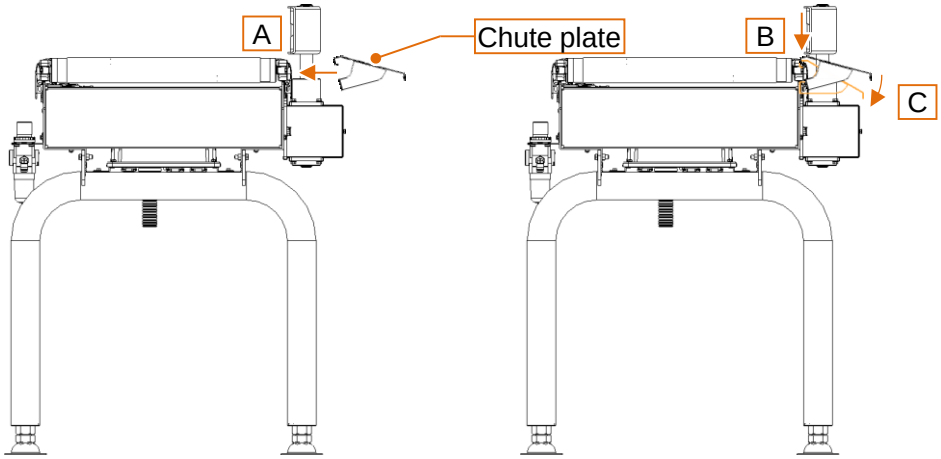


Fig. 10 Attaching the chute plate

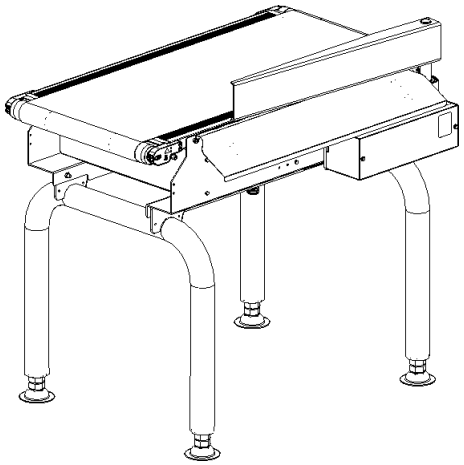


Fig. 11 Completed assembly of the main unit

4-2 Flipper arm (sold separately)

Caution:

To prevent injury or equipment failure during work, cut off the power supply to the inspection system (X-ray inspection system, checkweigher, or metal detector) connected to the rejector.

1. Tilt the chute plate about 15 degrees (A) while pulling the chute plate out of the groove in the rejector main unit (B).
   Then remove the chute plate by passing the chute plate under the flipper arm (C).

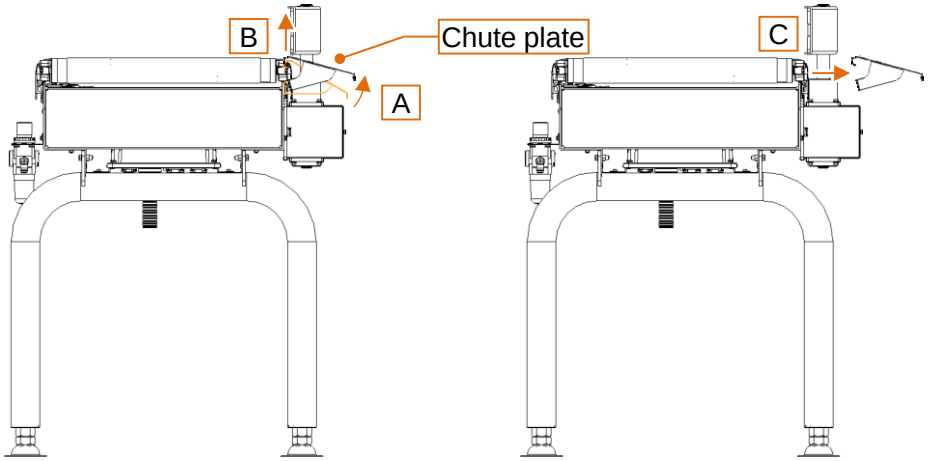


Fig. 12 Removing the chute plate

2. Release the draw latches of the conveyor.

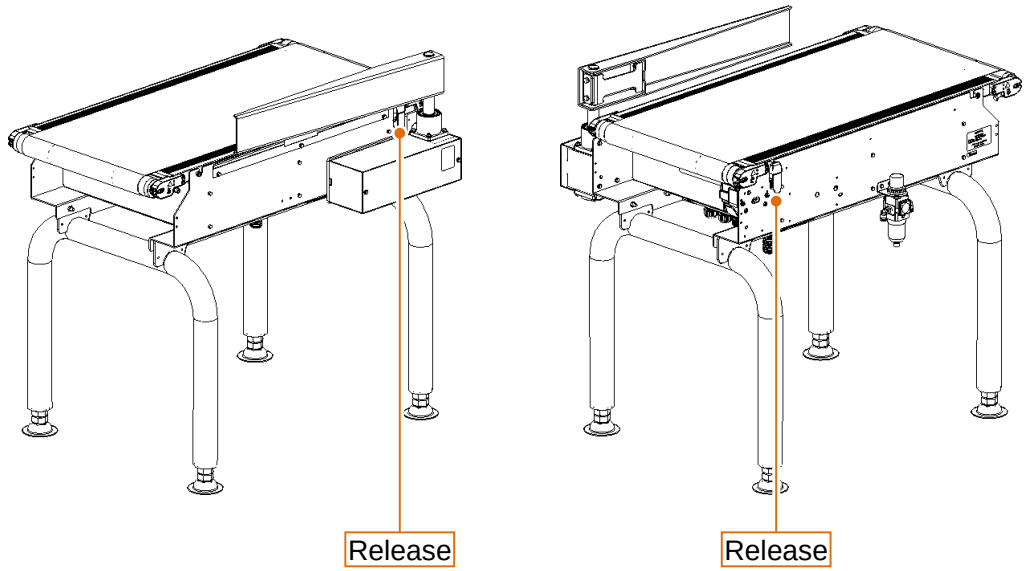


Fig. 13 Releasing the draw latches of the conveyor

3. Lift the conveyor draw latch side of the conveyor base (A).
   Next, slide the conveyor base towards the side of the conveyor draw latches (B).
   Then lift the conveyor base and remove it from the rejector main unit (C).

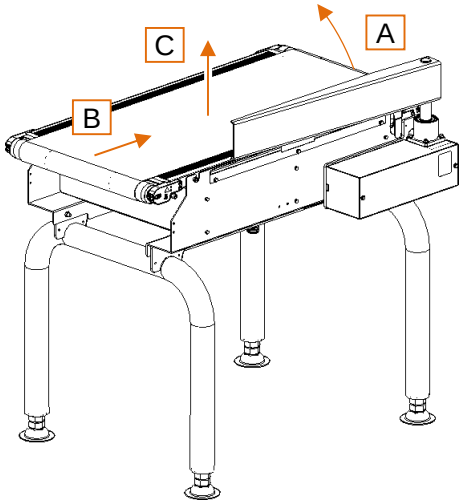


Fig. 14 Removing the conveyor base

4. Using a 7 mm hex socketed screwdriver, attach the chute plate holder to the rejector main unit with the hex bolts.

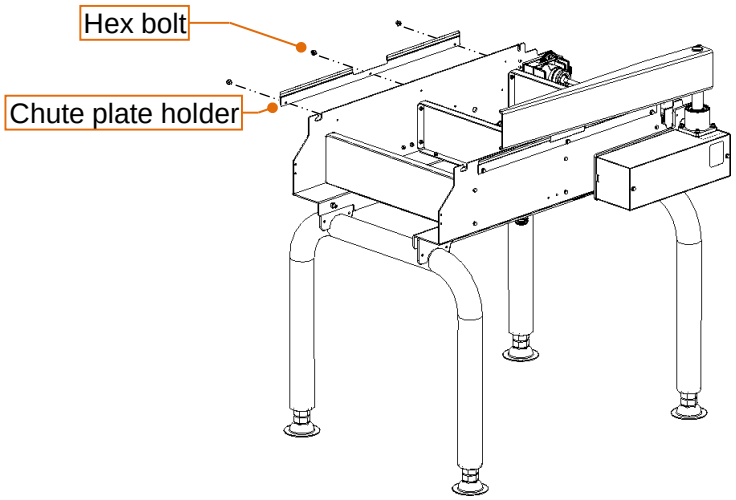


Fig. 15 Attaching the chute plate holder

5. Using a 7 mm hex socketed screwdriver, remove the motor unit and hex bolts, being careful not to let the motor unit fall to the floor.

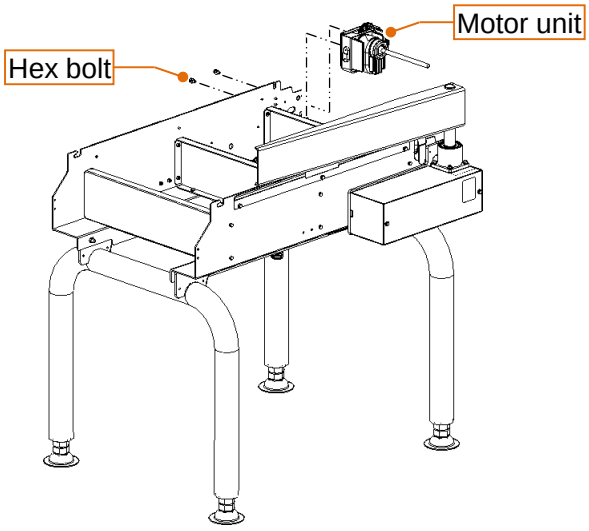


Fig. 16 Removing the motor unit

6. Using a 7 mm hex socketed screwdriver, attach the cylinder case to the rejector main unit with the hex bolts. Attach it, being careful not to pinch the air tubes coming out of the cylinder case.

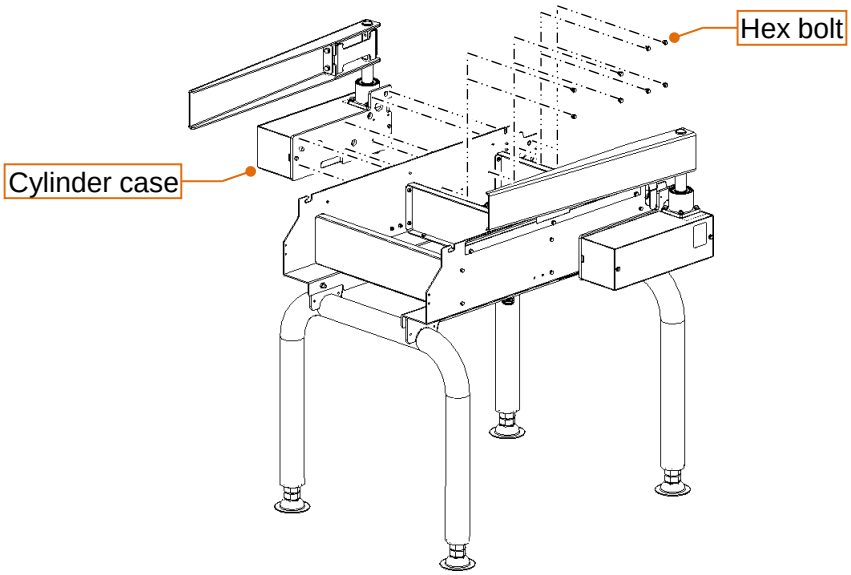


Fig. 17 Attaching the cylinder case

7. Using a 7 mm hex socketed screwdriver, attach the motor unit to the rejector main unit with the hex bolts.

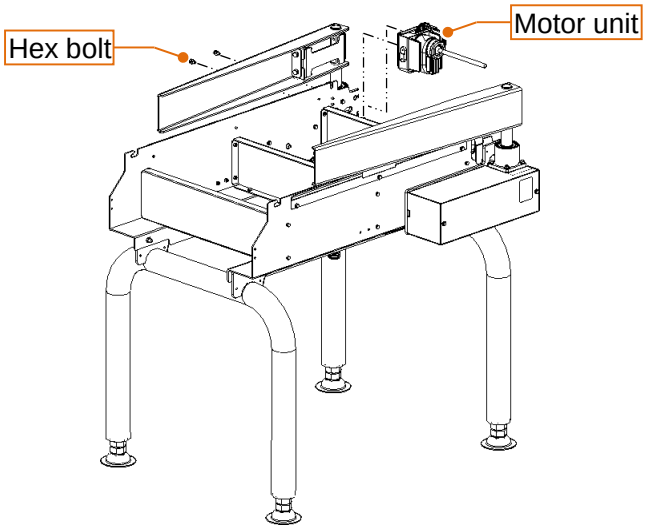


Fig. 18 Attaching the motor unit

8. Using a 7 mm hex socketed screwdriver, remove the control box case and hex bolts.

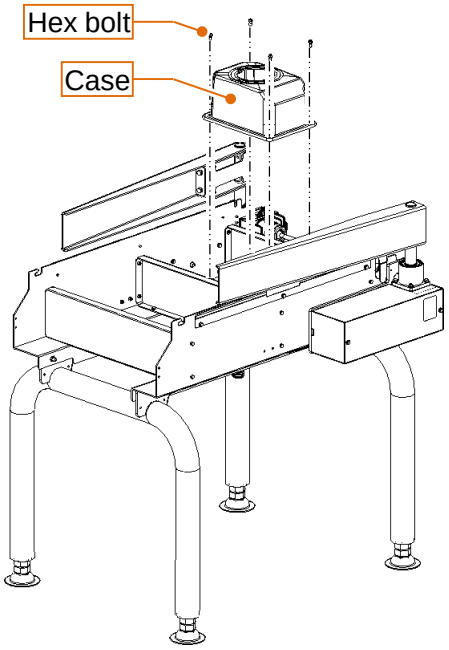


Fig. 19 Removing the control box case

9. Using a #1 Phillips screwdriver, remove the blanking plate and pan head screws from the manifold. Then attach the solenoid valve and pan head screws where the blanking plate was removed.

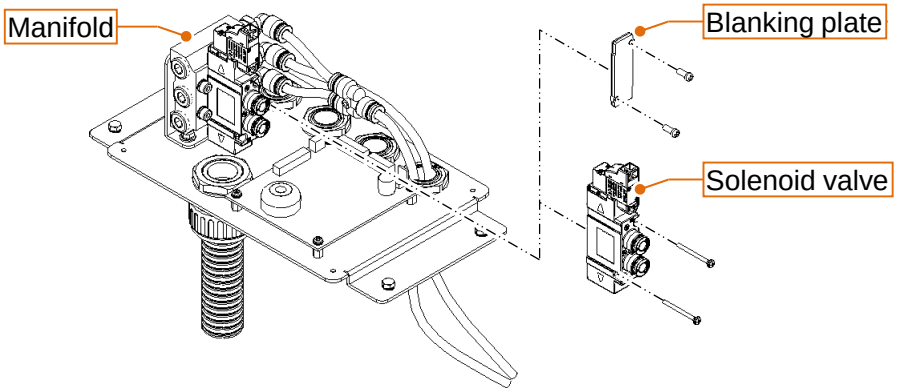


Fig. 20 Attaching the solenoid valve

10. Connect the connector of the solenoid valve attached in step 9 to the connector of the screening signal cable (1KO7255A).

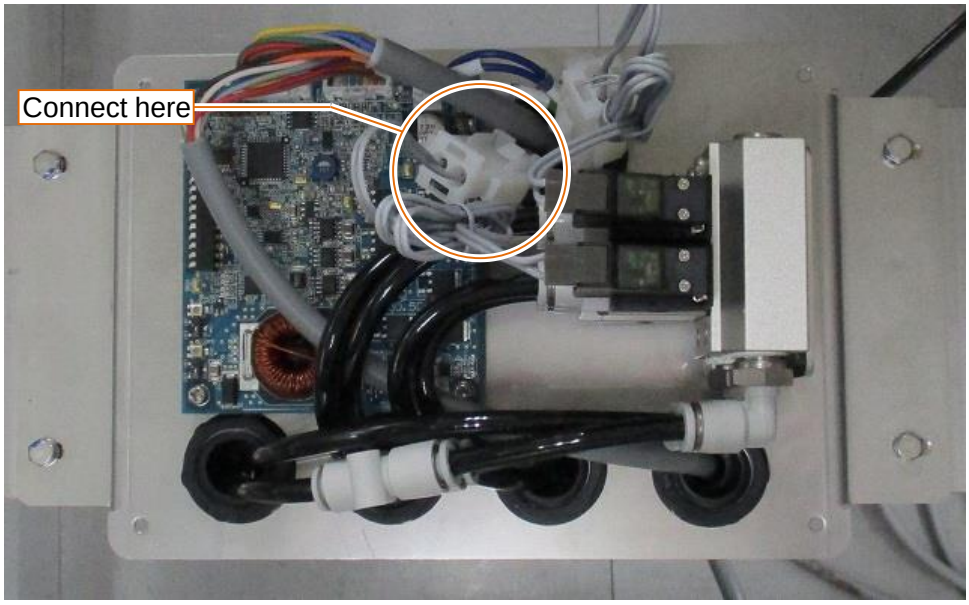


Fig. 21 Connecting the solenoid valve connector

11. Pass the air tubes of the cylinder case attached in step 6 through the cable gland of the control box.

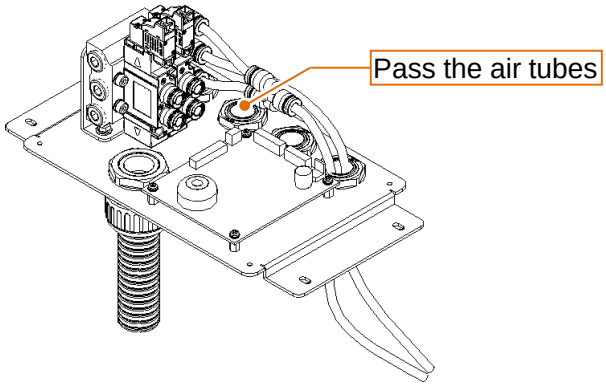


Fig. 22　Cable gland (air tubes)

12. Connect the air tubes to the solenoid valve attached in step 9. Connect as shown in Fig. 23, being careful to follow the markings on the air tubes. The figure shows an example when installing the AD-4981-FL3585 left arm; for the AD-4981-FR3585 right arm, read marking C as marking A and marking D as marking B for connection.

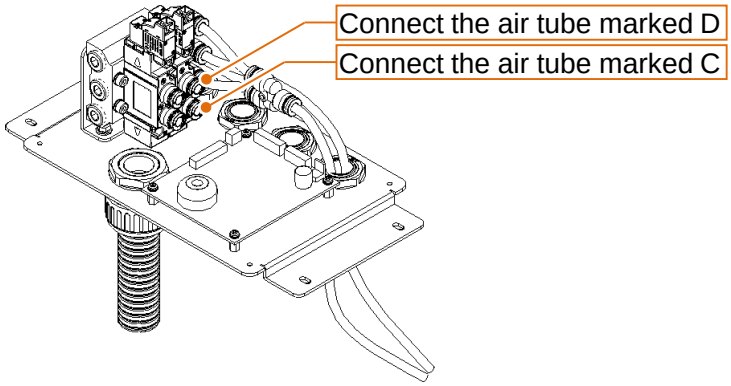


Fig. 23　Connecting the air tubes to the solenoid valve

13. Using a 7 mm hex socketed screwdriver, reattach the control box case and hex bolts removed in step 8.
14. Reattach the conveyor base removed in step 3.
15. Close the draw latches released in step 2 to reattach and secure the conveyor base.
16. Reattach the chute plate removed in step 1.
    Also attach the chute plate for the added flipper arm.

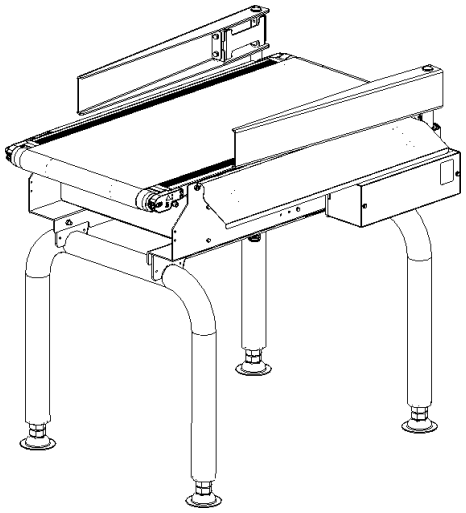


Fig. 24 Completed assembly of the flipper arm (sold separately)

4-3 Reject confirmation unit (sold separately)

Caution:

- **To prevent injury or equipment failure during work, cut off the power supply to the inspection system (X-ray inspection system, checkweigher, or metal detector) connected to the rejector.**
- **In this section, the three-direction reject confirmation unit is described.**

1. Using a 7 mm wrench, attach the reject confirmation unit to the rejector with the hex bolts.
   By loosening the hex socket set screws using a 2 mm hex wrench, the height of the sensor and reflector can be adjusted.

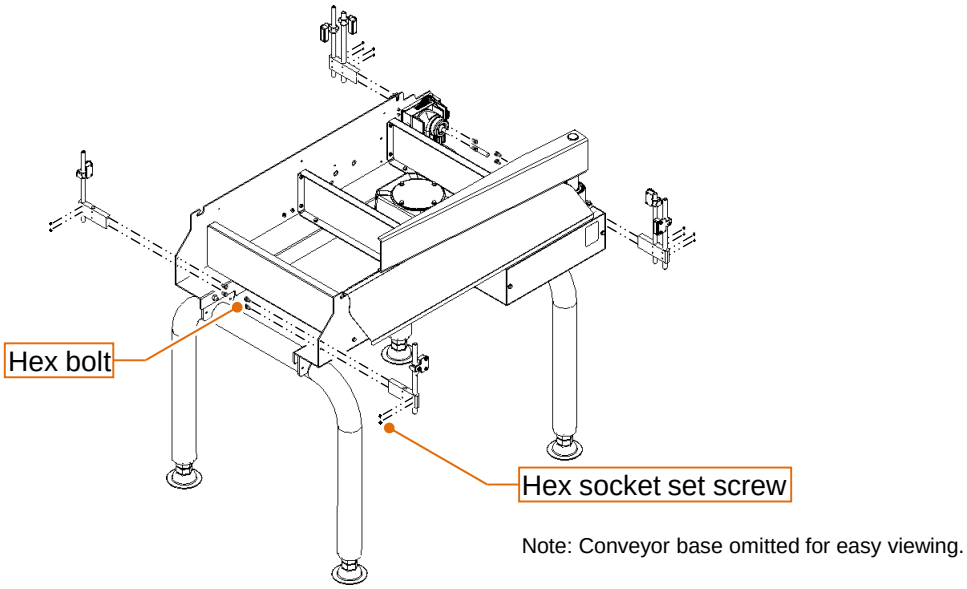


Fig. 25 Attaching the reject confirmation unit

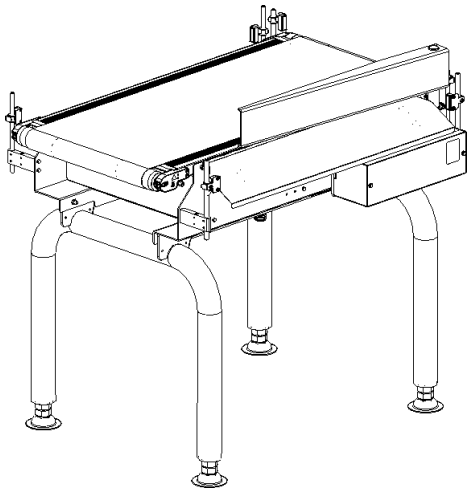


Fig. 26 Completed assembly of the reject confirmation unit

5. Installation

1. Install the rejector next to the unit (X-ray inspection system, checkweigher, or metal detector) it will be connected to.
2. The arrow indicates the direction in which products are conveyed. When installing, pay attention to the conveying direction and the orientation of the rejector.

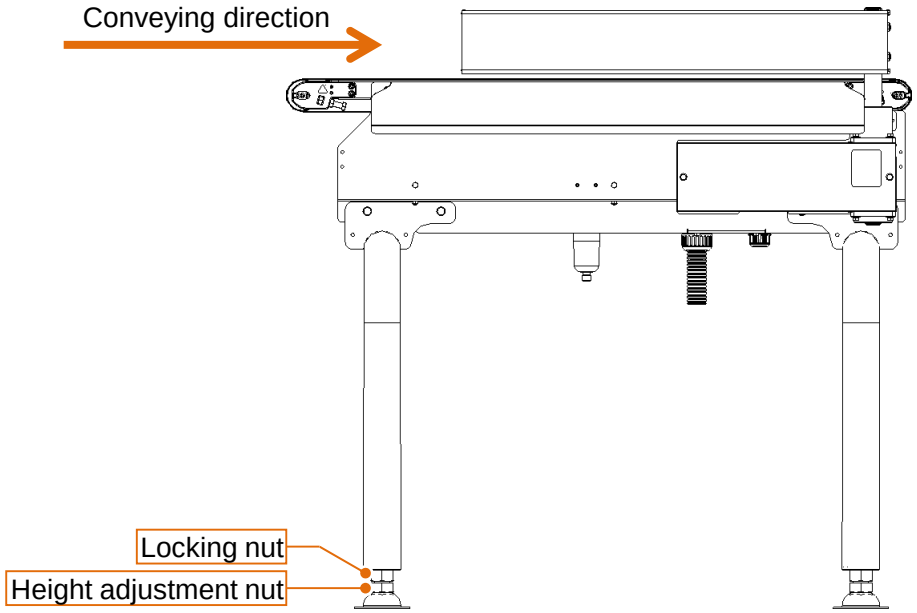


Fig. 27 Installation

3. Using a 30 mm wrench, adjust the conveyor height with the height adjustment nuts.
4. Using a 30 mm wrench, secure the adjustable feet with the locking nuts.

6. Connection

6-1 Connecting to the AD-4991 series

Caution:

To prevent injury or equipment failure during connection work, cut off the power supply to the AD-4991 series.

1. Remove the rear cover of the AD-4991 series.

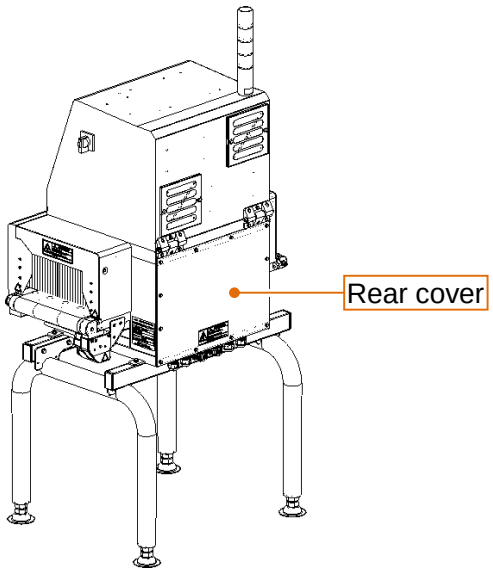


Fig. 28 Removing the rear cover (AD-4991 series)

2. Pass the motor power cable (1KO7152), motor control cable (1KO4338), screening signal cable (1KO7255A), and ground cable (1KO6966) of the rejector through the cable gland of the AD-4991 series.
   Keep the plug removed from the cable gland in a safe place.

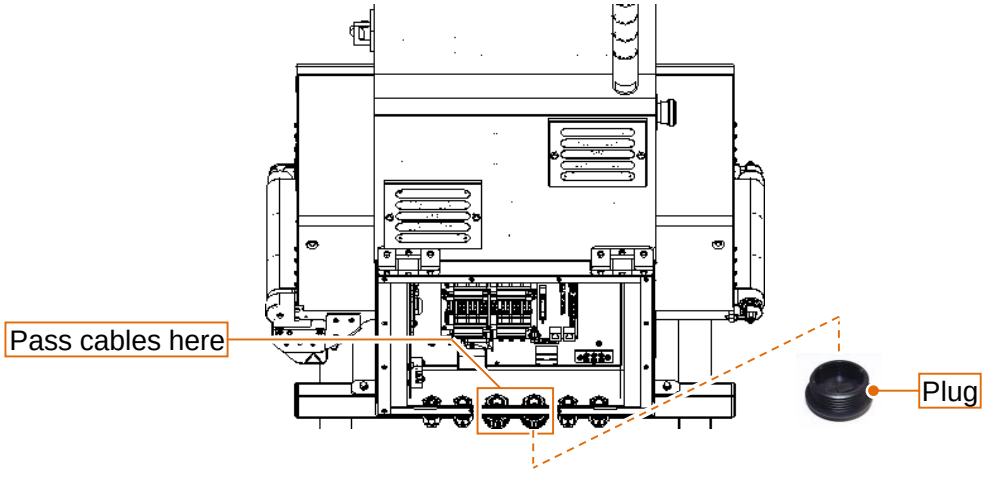


Fig. 29 Cable gland (AD-4991 series)

3. Connect the motor power cable (1KO7152) passed in step 2 to the connector shown below.

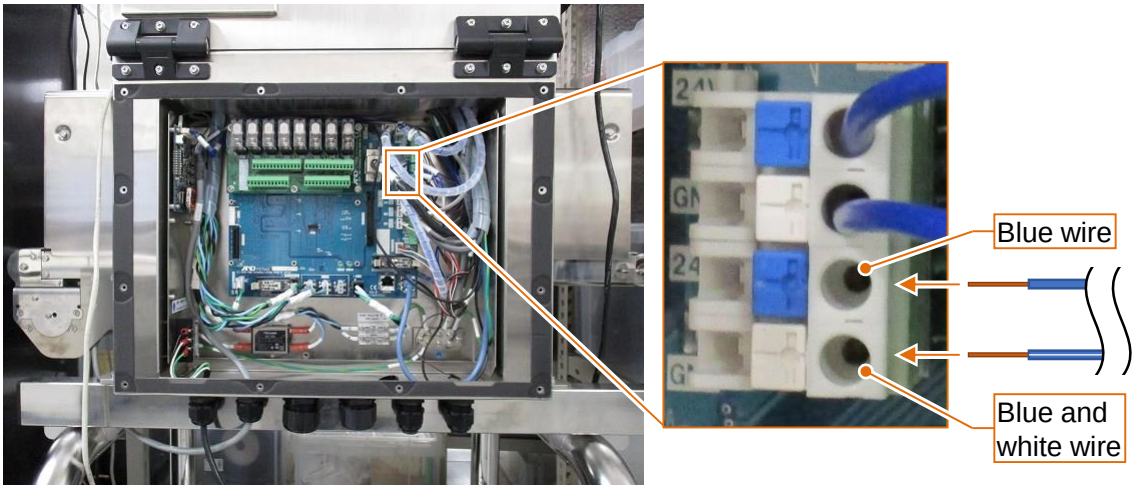


Fig. 30 Connecting the motor power cable

4. Connect the motor control cable (1KO4338) passed in step 2 to the connector shown below.

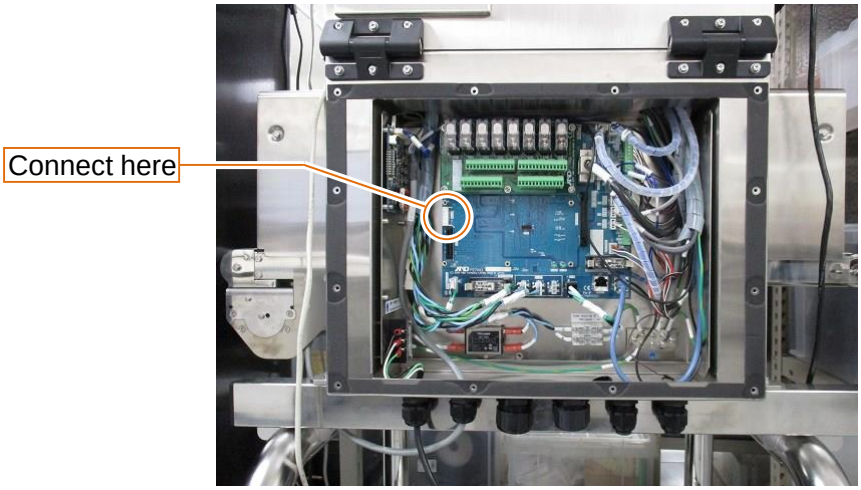


Fig. 31 Connecting the motor control cable

5. Remove the connector shown below and connect the screening signal cable (1KO7255A) passed in step 2 and the supplied 24 V crossover cable (1KO6457).
   The figure below shows an example of connection for rejection operation using DO1 and DO2 with a three-direction rejector.
   For a two-direction rejector, insulate unused terminals of the screening signal cable and 24 V crossover cable by wrapping them with tape, etc. so that the main board is not shorted (see the dashed line below).

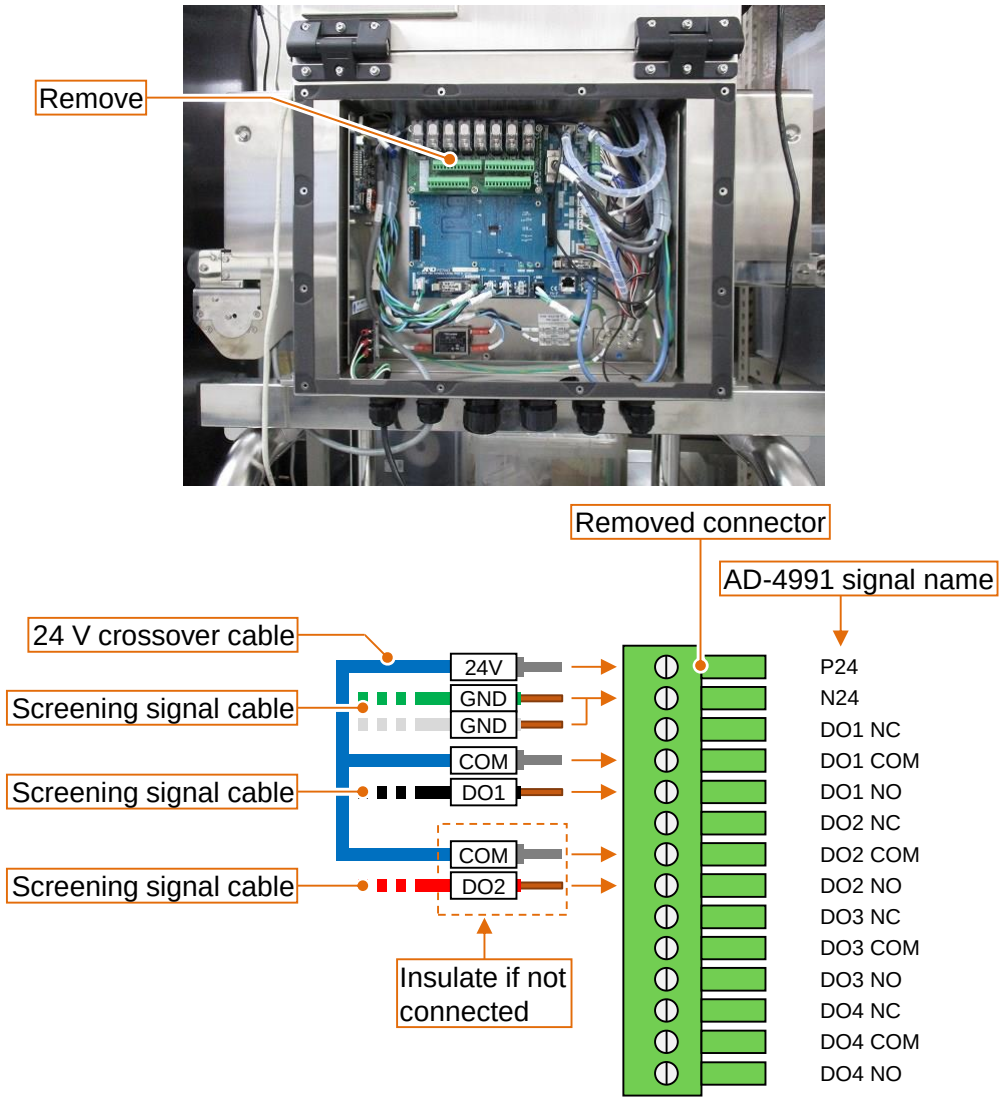


Fig. 32 Connecting the screening signal cable and 24 V crossover cable

6. Reattach the connector removed in step 5.

7. Pass the corrugated tube through the cable gland, and then tighten the sealing nut loosened in step 2.

Fig. 33 Tightening the sealing nut

8. Reattach the rear cover removed in step 1.
9. Start supplying power to the AD-4991 series, and set the following items as necessary.
   - Administrator settings (use of the rejector)
   - Belt settings (belt speed adjustment, error check)
   - Product settings (belt speed of rejector, DO map, DO behavior)
   - DI settings (DI setting, reject confirmation, reject timing)

6-2 Connecting to the AD-4976-H series

Refer to the instruction manual for the AD-4976-39 rejector power supply module.

6-3 Connecting to the AD-4971 series

Refer to the instruction manual for the AD-4976-39 rejector power supply module.

6-4 Connecting to the AD-4961A series

Caution:

To prevent injury or equipment failure during connection work, cut off the power supply to the AD-4961A series.

1. Pass the motor power cable (1KO7152), motor control cable (1KO4338), screening signal cable (1KO7255A), and ground cable (1KO6966) of the rejector through the cable gland on the back of the AD-4961A series control box.
   Keep the plug removed from the cable gland in a safe place.

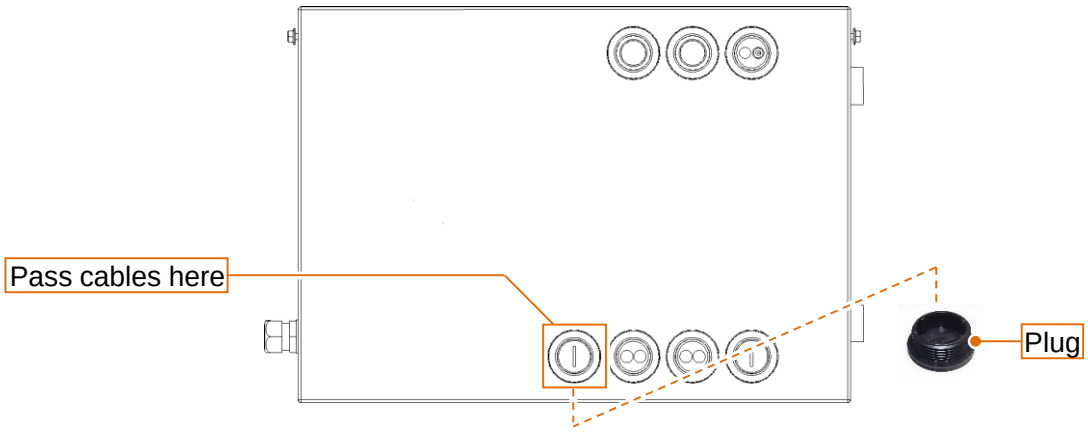


Fig. 34 Cable gland (AD-4961A series)

2. Connect the following wires to the terminal block (TB1) shown below in the control box.
   - Terminal No. 12: Black wire (DO1) of the screening signal cable
   - Terminal No. 11: Red wire (DO2) of the screening signal cable
   - Any of terminals No. 13 to 16: Wire length to reach TB3 described below (to be provided by customer)

     Caution: Terminals No. 13 to 16 have shorting pins connected to them and are set so that each terminal is at the same electric potential. Do not remove the short pin.

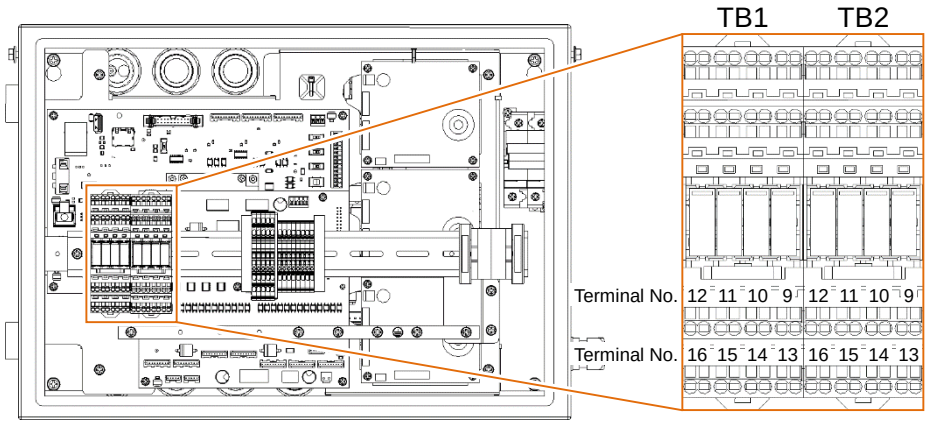


Fig. 35 Wiring to the terminal block (TB1)

3. Connect the following wires to the terminal block (TB3) shown below in the control box.
   - One of the rows of the terminal No. 1: Blue wire (24V) of the motor power cable
   - One of the rows of the terminal No. 1: The wire connected to any of the terminals No. 13 to 16 of TB1 in step 2
   - One of the rows of the terminal No. 2: Blue and white wire (GND) of the motor power cable
   - One of the rows of the terminal No. 2: White wire (GND) of the screening signal cable
   - One of the rows of the terminal No. 2: Green wire (GND) of the screening signal cable

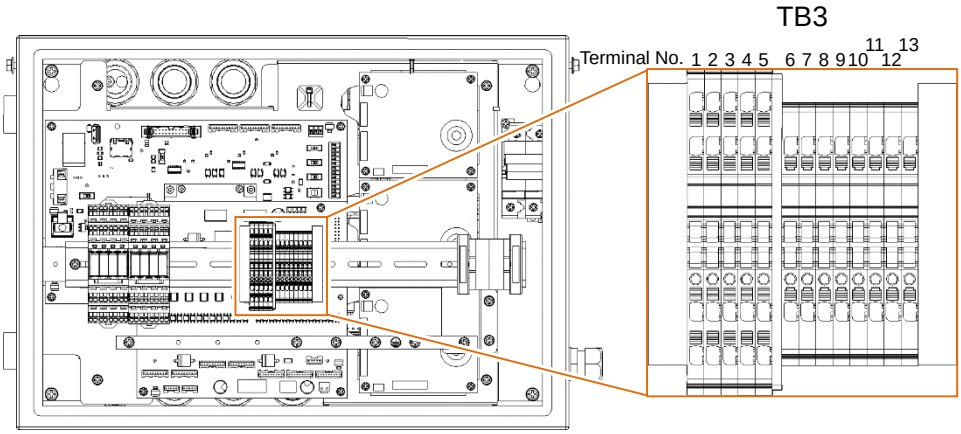


Fig. 36 Wiring to the terminal block (TB3)

Note:

Step 2 and step 3 shows an example of connection for rejection operation using DO1 and DO2 with a three-direction rejector.

For a two-direction rejector, do not connect the red wire (DO2) and the green wire (GND) of the screening signal cable, and insulate them by wrapping them with tape or other means to prevent them from shorting other circuits.

4. Connect the motor control cable to the connector (J113) shown below in the control box.

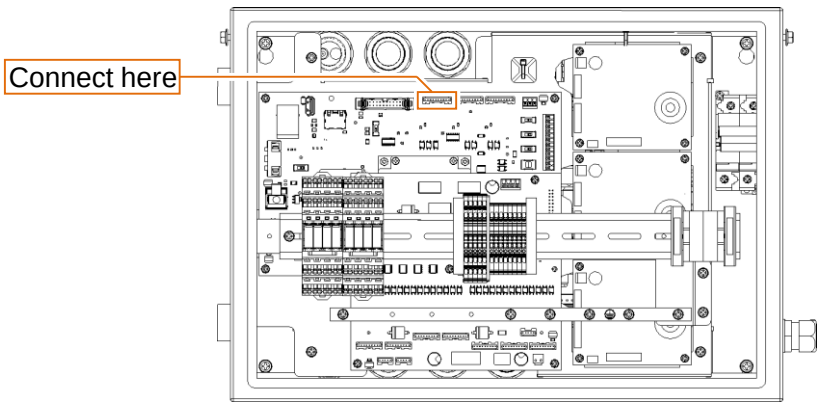


Fig. 37 Connecting the motor control cable

5. Connect the ground cable to the grounding bar shown below in the control box.

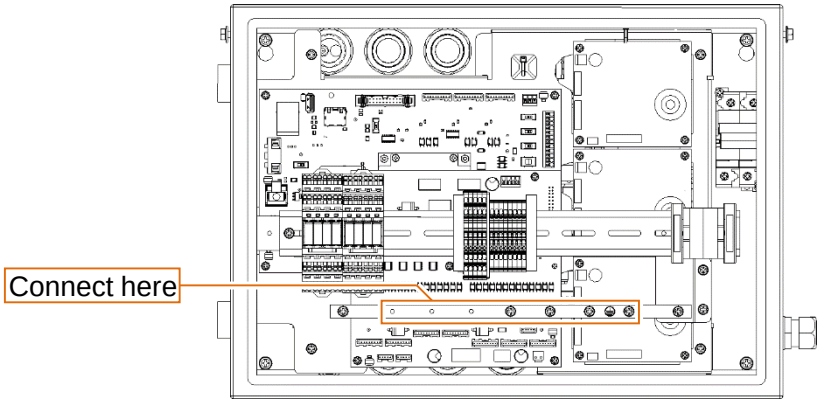


Fig. 38 Connecting the ground cable

6. Pass the corrugated tube through the cable gland, and then tighten the sealing nut loosened in step 1.

Fig. 39 Tightening the sealing nut

7. Start supplying power to the AD-4961A series, and set the following items as necessary.
   - Rejector connection settings
   - Belt settings (belt speed adjustment, error check)
   - Product settings (belt speed of rejector, DO map, DO behavior)
   - DI settings (DI setting, reject confirmation, reject timing)

7. Maintenance

7-1 Daily check

To ensure safe use, please check each part of this rejector before use.
If the status of the rejector does not match that of the check contents, please take the actions indicated in the table below.

Table 6 Daily check

No.	Check contents	Action contents
1	Make sure the installation position and height of the equipment in front of and behind the rejector allow products to be conveyed in and out.	Depending on the conditions of the floor on which the rejector is installed and the operating speed of the flipper arm, the installation position may be easily displaced by the vibration of rejection operations. If it is frequently displaced, please contact your local A&D dealer. For adjustment of the height, refer to "5 Installation (P. 22)."
2	Make sure the belt is not damaged, the tension of the belt is normal, and there is no meander. If conditions are not normal, the belt may be damaged.	If the belt is damaged, it needs to be replaced. Please contact your local A&D dealer. If the belt tension is abnormal or the belt is meandering, adjust the belt tension and meander (7-3 Belt meander adjustment (P. 36)).
3	Verify non-defective and defective products to ensure that they are successfully sorted.	If products are not screened correctly, check the following. • The DO of the inspection system is set. • Belt speed is normal. • The rejection operation is working.
4	Run the belt and check that there is no abnormal noise or other abnormality in the motor or gears.	If there is abnormal noise or other abnormality, the motor or gears needs to be replaced. Please contact your local A&D dealer.

7-2 Belt installation/removal

7-2-1 Removing the belt

Caution:

To prevent injury or equipment failure during belt removal work, cut off the power supply to the inspection system (X-ray inspection system, checkweigher, or metal detector) connected to the rejector.

1. Using a 10 mm wrench, loosen the belt tension adjustment screw to loosen the belt.

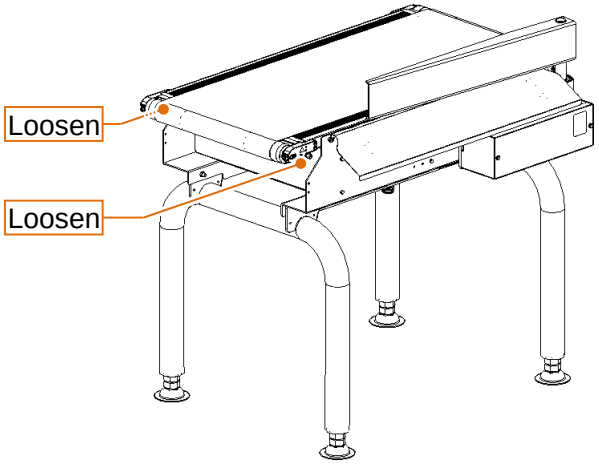


Fig. 40 Adjusting the belt tension

2. Tilt the chute plate about 15 degrees (A) while pulling the chute plate out of the groove in the rejector main unit (B).
   Then remove the chute plate by passing the chute plate under the flipper arm (C).

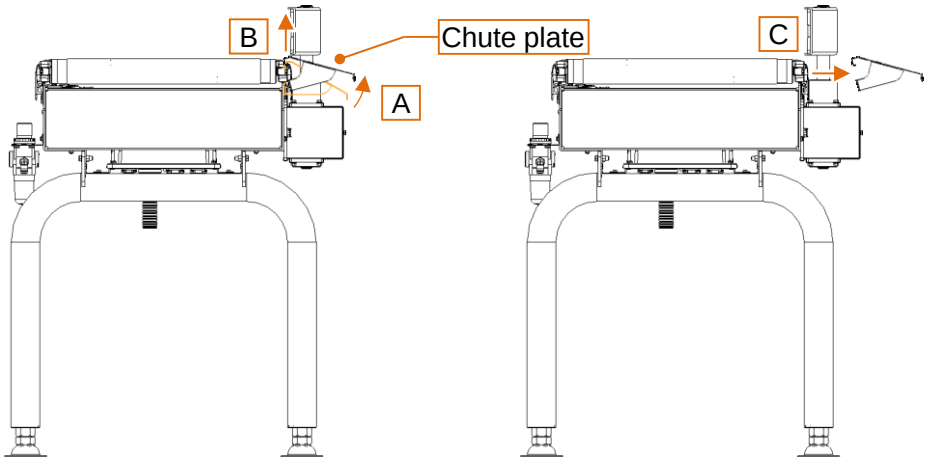


Fig. 41 Removing the chute plate

3. Release the draw latches of the conveyor.

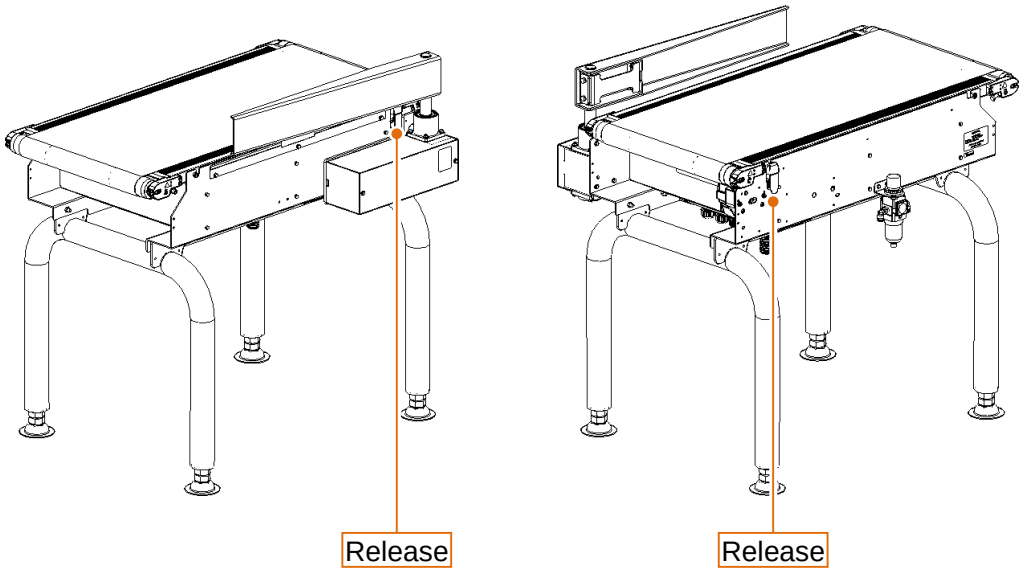


Fig. 42 Releasing the draw latches of the conveyor

4. Lift the conveyor draw latch side of the conveyor base (A).
   Next, slide the conveyor base towards the side of the conveyor draw latches (B).
   Then lift the conveyor base and remove it from the rejector main unit (C).

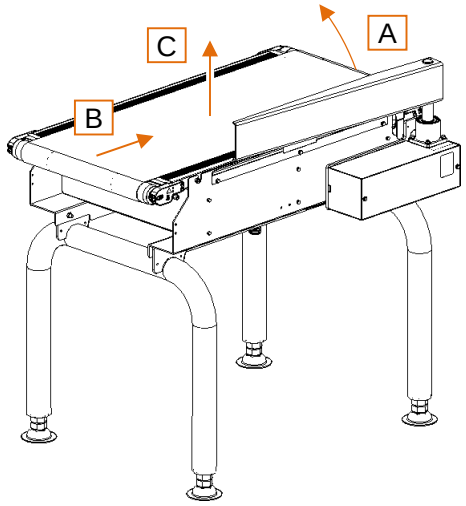


Fig. 43 Removing the conveyor base

5. Remove the belt from the removed conveyor base.

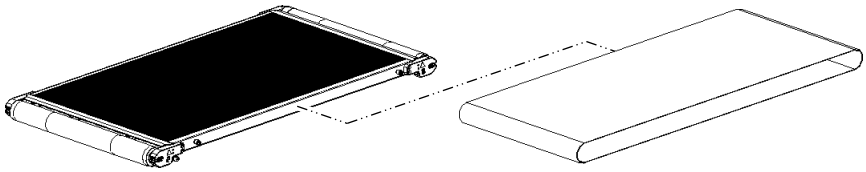


Fig. 44 Removing the belt

7-2-2 Attaching the belt

Caution:

To prevent injury or equipment failure during work, cut off the power supply to the inspection system (X-ray inspection system, checkweigher, or metal detector) connected to the rejector.

1. If the conveyor base is not removed from the rejector main unit, refer to "7-2-1 Removing the belt (P.31)" and remove the conveyor base from the rejector main unit.
2. Attach the belt to the conveyor base.
   If it is difficult to attach the belt, use a 10 mm wrench to loosen the belt tension adjustment screw.

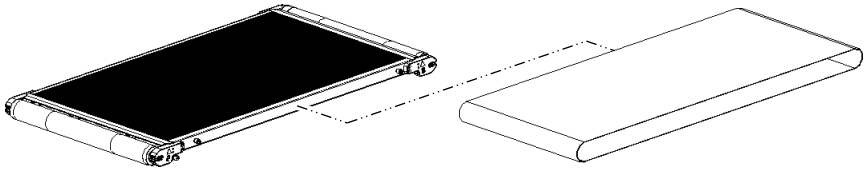


Fig. 45 Attaching the belt

3. Place the conveyor base (the side opposite the draw latches of the conveyor) on the rejector main unit (A).
   Next, slide the conveyor base to the side opposite the draw latches of the conveyor (B).
   Then place the conveyor base (the side of the draw latches of the conveyor) on the rejector main unit (C).

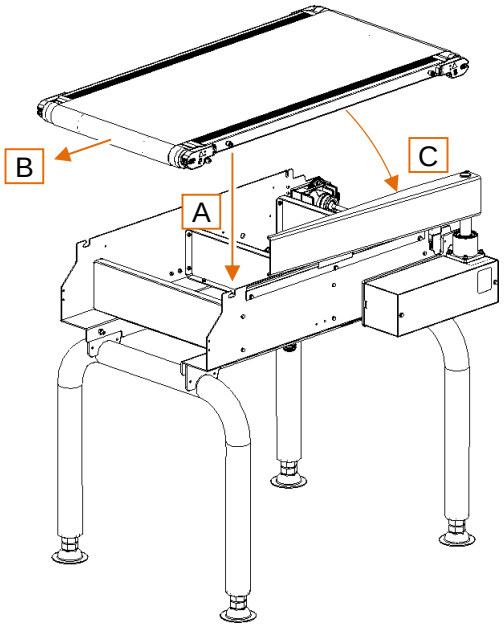


Fig. 46 Attaching the conveyor base

4. Close the draw latches of the conveyor to secure the conveyor base to the rejector main unit.

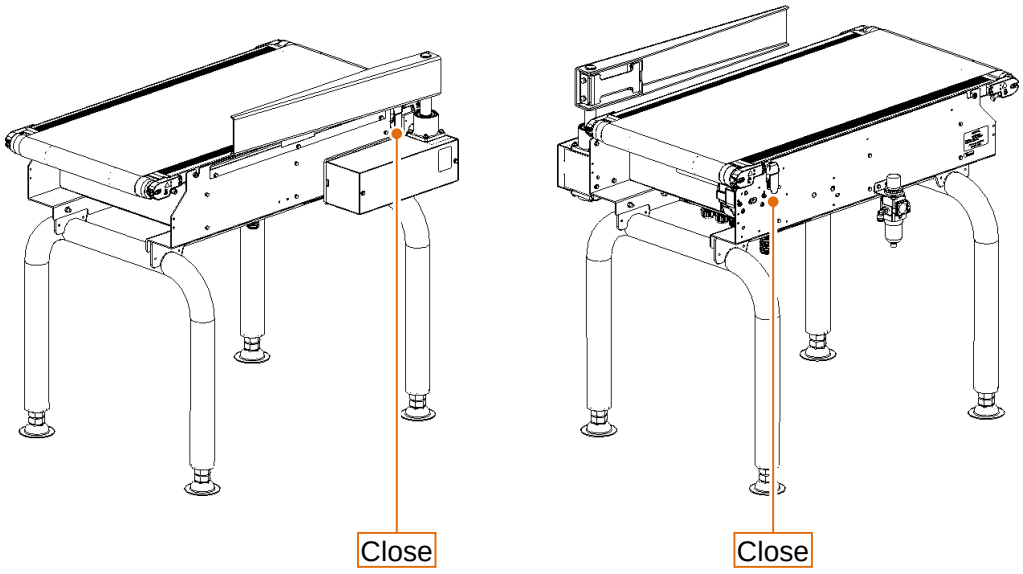


Fig. 47 Closing the draw latches of the conveyor

5. With the chute plate tilted about 15 degrees, pass the chute plate under the flipper arm (A). Then, hook the chute plate claw into the groove on the rejector main unit (B) while the chute plate is tilted to the installation position (C).

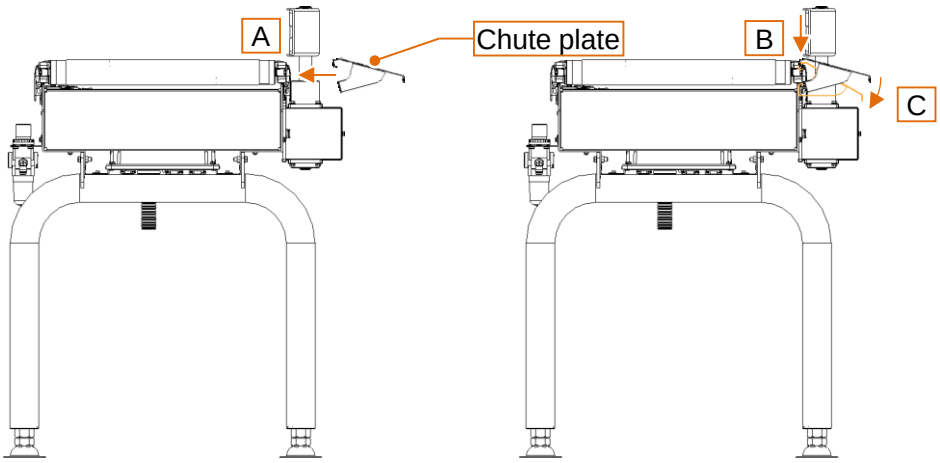


Fig. 48 Attaching the chute plate

6. Using a 10 mm wrench, tighten the belt tension adjustment screw to tighten the belt. Adjust the belt meander as necessary (7-3 Belt meander adjustment (P. 36)).

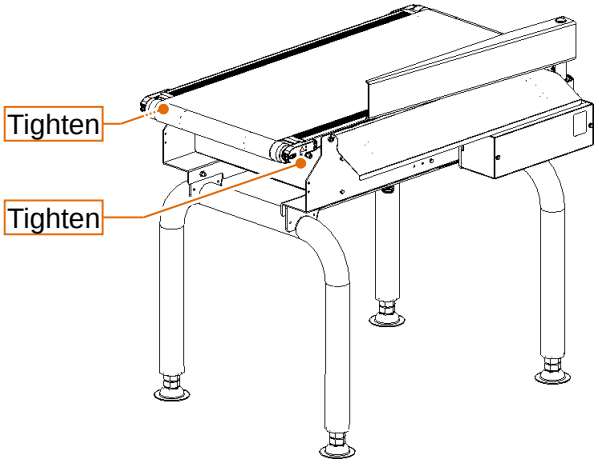


Fig. 49 Adjusting the belt tension

7-3 Belt meander adjustment

Caution:

The belt is running during belt meander adjustment work. Be careful not to let your fingers or clothes get caught in the running belt.

1. Operate the inspection system to start running the belt of the rejector.
2. Check if the belt meanders.
3. The belt meanders in the loosened direction.
   The belt also meanders in the opposite direction of the tensioned direction.
   Tension the belt in the direction of meandering (by tightening the belt tension adjustment screw) or loosen the belt tension in the opposite direction (by loosening the belt tension adjustment screw).
   Be careful not to over-tension or over-loosen the belt.

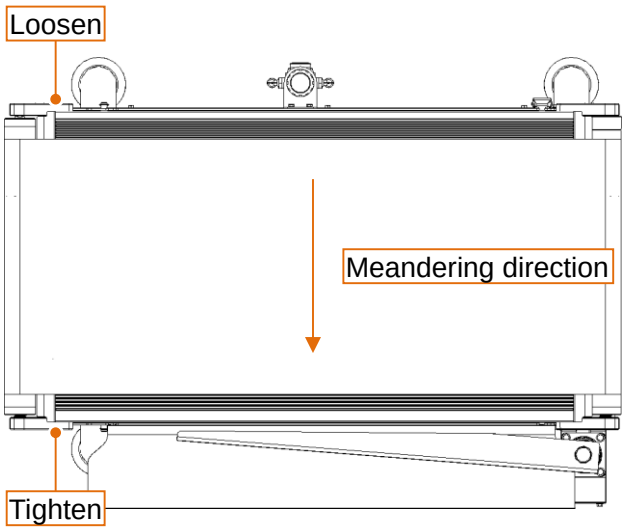


Fig. 50 Example of meandering adjustment (meandering to front side of the rejector)

4. Repeat steps 2 and 3 until the belt no longer meanders.
5. Operate the inspection system to stop the belt of the rejector.

7-4 Belt cleaning

In order to maintain a hygienic environment, please clean the rejector if it becomes noticeably dirty. If it becomes very dirty, the performance of the rejector may deteriorate.

Caution:

- **To prevent injury or equipment failure during cleaning work, cut off the power supply to the inspection system (X-ray inspection system, checkweigher, or metal detector) connected to the rejector.**
- **Clean the inside of the belt as any dirt may cause performance degradation.**

1. Remove the belt (7-2-1 Removing the belt (P. 31)).
2. Wipe off any dirt from the belt with a soft cloth. If it is very dirty, wipe off with lukewarm water at 60 °C or below, or a neutral detergent.
3. When the dirt is removed, wipe off the remaining water drops with a soft cloth.
4. Attach the belt (7-2-2 Attaching the belt (P. 33)).

7-5 Flipper arm operating speed adjustment

Adjust the speed controller inside the cylinder case to adjust the operating speed of the flipper arm. Using a 7mm wrench, remove the arm cover and hex bolts to access the speed controller.

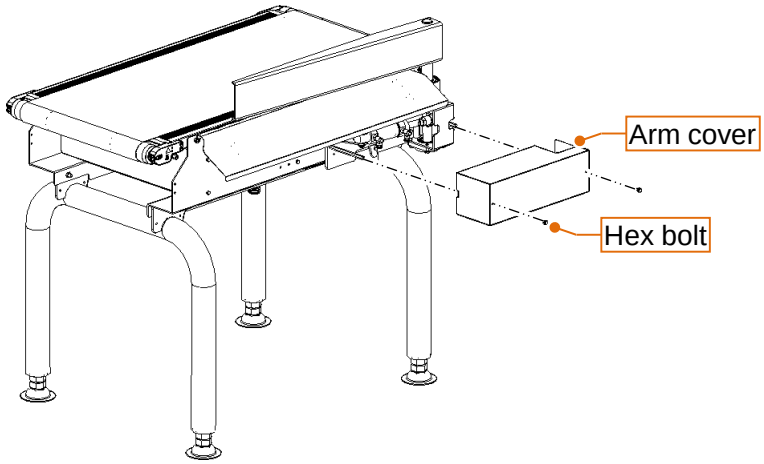


Fig. 51 Removing the arm cover

- A: Adjust the amount of air supplied when extending the air cylinder and the amount of air discharged when retracting.
- B: Adjust the amount of air discharged when extending the air cylinder and the amount of air supplied when retracting.

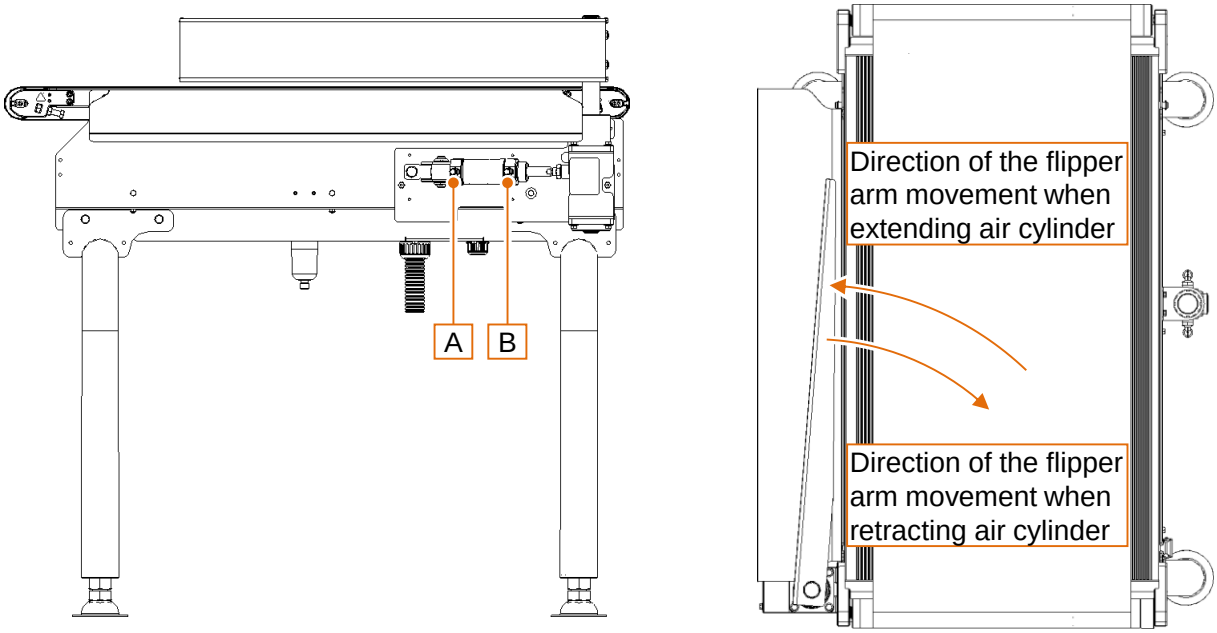


Fig. 52 Adjusting the flipper arm operating speed

8. Specifications

Table 7 Specifications

Specifications	AD-4981-3585
Conveyor width	350 mm
Rejector length	850 mm
Conveyor height	720 to 860 mm
Conveyor speed	10 to 50 m/min
Screening capacity	80 pcs/min
Air source	0.5 MPa, 0.4 NL/time φ 6 mm urethane air tube quick joint type
Conveyor load capacity	Up to 6 kg
Operating temperature/humidity	0 to 40 °C / below 85%RH, with no condensation
Dust-/water-proof protection rating	IP65
Maximum power consumption	Approx. 60 W
Weight	37 kg*
Belt material	Polyurethane

* Total weight of conveyor, flipper arm, and base. When the flipper arm is added, the total weight is 43 kg.

9. External dimensions

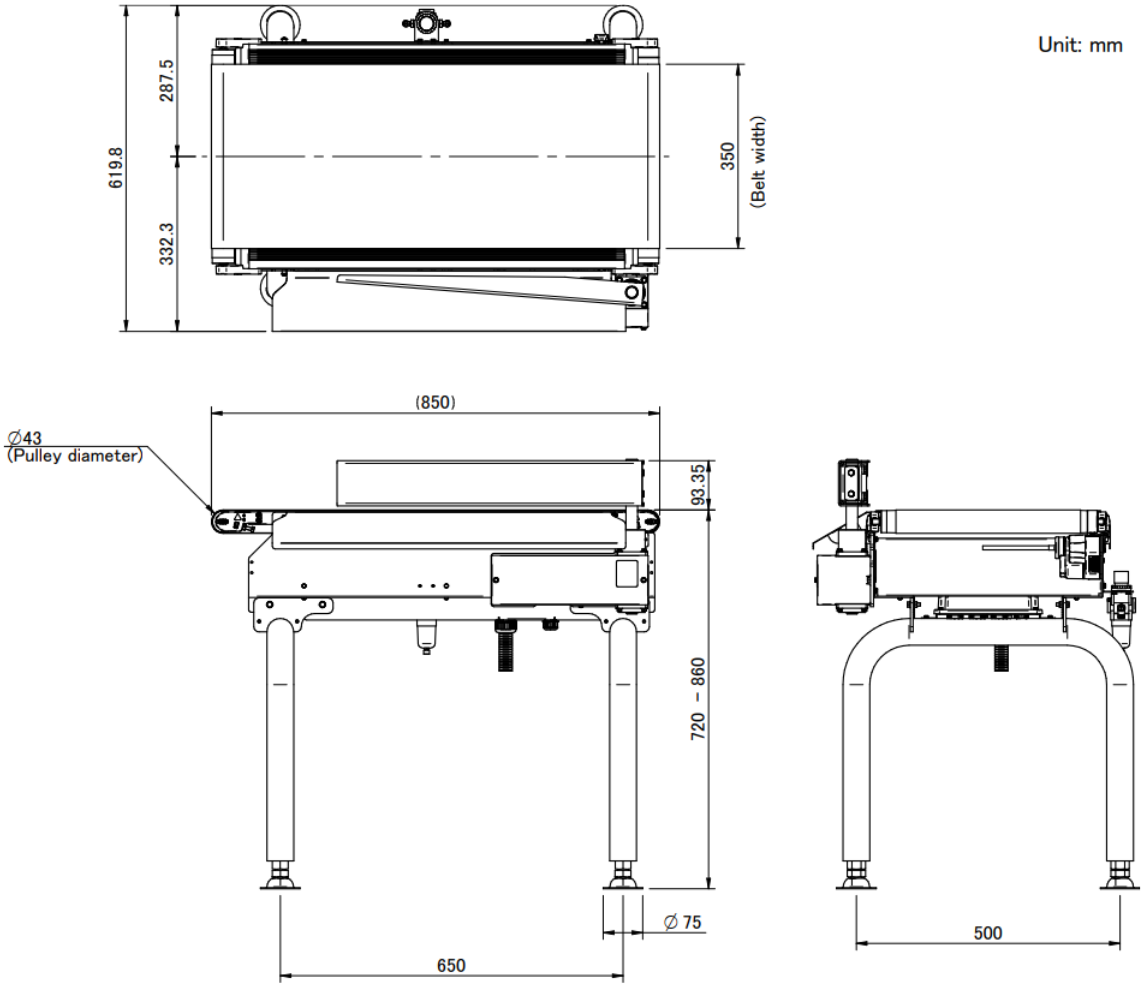


Fig. 53 External dimensions (standard)

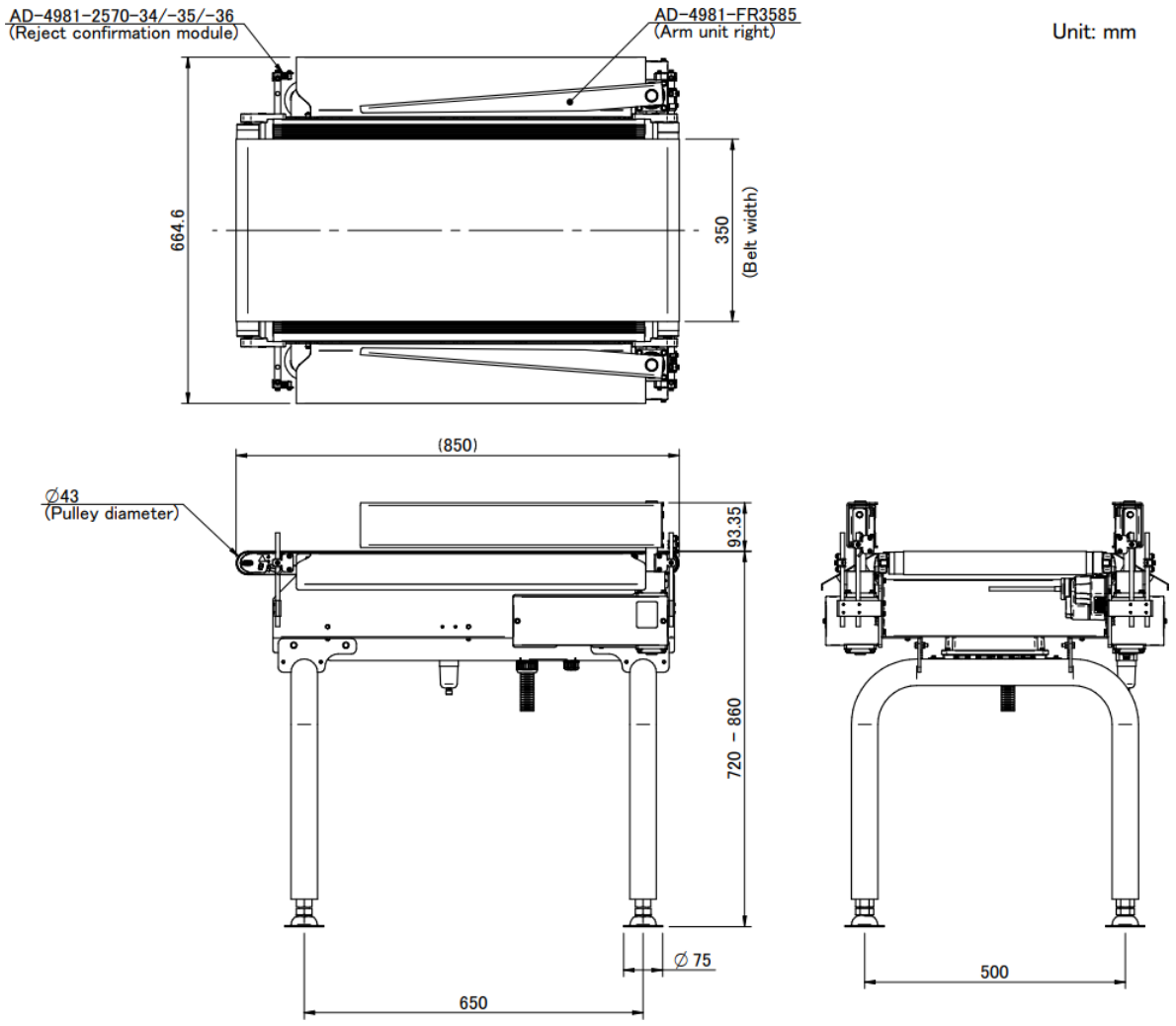


Fig. 54　External dimensions (when products sold separately are installed)

10. Revision history

Table 8 Revision history

Date	Part number	Description of issue
2022/04/01	1WMPD4004690	First edition

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