E-MOVE

Service Manual

decon

Version: 20151203

Foreword

This Service Manual describes the procedures for inspecting, adjusting, and assembling the E-Move, as well as how to handle errors.

Symbols Used in This Manual

Items concerning proper handling are indicated with the following symbols.

Warning

• Indicates that misuse may lead to fatal or severe injury, or disability.

Note

• Indicates that misuse may lead to material damage.

Important

• Indicates correct methods and key points when operating the product.

Ref.

• Provides information that user will find it useful to know.

Other Precautions

- For product improvement purposes, the descriptions and specifications in this manual are subject to change without notice.
- Due to changes in the specifications, some of the photos and descriptions may differ from the actual product.
- This manual is intended for use by persons possessing the basic technical knowledge and skills.
- Persons who do not possess the general service skills and knowledge should not rely solely on this service manual to perform inspection, adjustment, disassembly, or reassembly.
  Failure to observe this precaution can lead to maintenance problems or mechanical damage.

Contents

1. Product Overview ····· 1
- 1.1 Product Features ····· 1
- 1.2 Variations ····· 2

2. Installation Requirements ····· 3
- 2.1 Strength Requirements ····· 3
- 2.2 Structural Requirements ····· 3
- 2.3 Functional Requirements ····· 5

3. Unit Installation and Removal ····· 6
- 3.1 E-Move Components ····· 7
- 3.2 Installing the E-Move ····· 8
- 3.3 Battery Bag Installation (Separated Battery Seat Type) ····· 13
- 3.4 Installing and Removing the Wheel Drive Unit Assembly ····· 17

4. Pre-Delivery Adjustment ····· 19
- 4.1 Adjusting the Battery Seat Angle ····· 19
- 4.2 Adjusting the Power Switch Position ····· 21
- 4.3 Installing the Mode Switch ····· 24
- 4.4 Adjusting the Switch Angle ····· 27
- 4.5 Adjusting the Switch Length ····· 28
- 4.6 Relocating the Switch (Left/Right) ····· 31
- 4.7 Connecting the Coupler Box Cables ····· 34
- 4.8 Repositioning the Coupler Box Cables ····· 37
- 4.9 Adjusting the Warning Lamp (LED) Direction ····· 38
- 4.10 Using Offset Washers ····· 39
- 4.11 Adjusting the Battery Bag Cable Length (Separated Battery Seat Type) ····· 40
- 4.12 Checklist After Installing the Electric Power-Assist Unit ····· 43

5. Component Removal, Installation and Adjustment for Investigation and Repair ····· 44
- 5.1 Removing and Re-installing the Handrim ····· 44
- 5.2 Removing and Re-installing the Wheel Assembly ····· 47
- 5.3 Removing and Re-installing the Circuit Board ····· 49
- 5.4 Removing and Re-installing the Coupler Box ····· 52
- 5.5 Removing and Re-installing the L/R Connecting Cable (Standard Battery Seat Type) ····· 58
- 5.6 Removing and Re-installing the Battery Bag ····· 60
- 5.7 Removing and Re-installing the L/R Connecting Cable and Coupler (Separated Battery Seat Type) ····· 62
- 5.8 Adding and Removing the Springs ····· 64
- 5.9 Copying Setting Data ····· 66
- 5.10 Calibrating the Handrim Sensor Neutral Position ····· 68

6. JW Smart Tune ····· 70

7. Warnings ····· 71
- 7.1 Warnings List ····· 71

8. Self-diagnosis ····· 73
- 8.1 Self-diagnosis (Self-diagnosis Function) ····· 73
- 8.2 Fault Detection Chart ····· 73

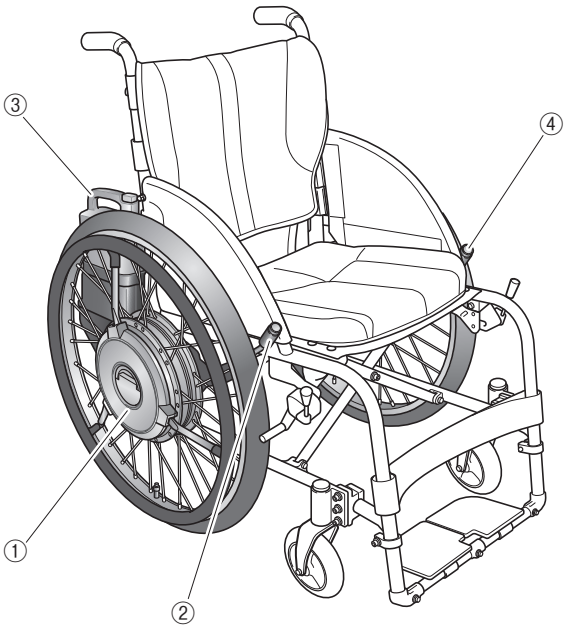
9. Inspections and Maintenance ····· 76
- 9.1 Inspection Checklist ····· 76

10. Specifications and Other Information ····· 77
- 10.1 Specifications ····· 77
- 10.2 Dimensions and Diagrams ····· 78
- 10.3 Wiring Diagram (Separated Battery Seat Type) ····· 79
- 10.4 Wiring Diagram (Standard Battery Seat Type) ····· 80

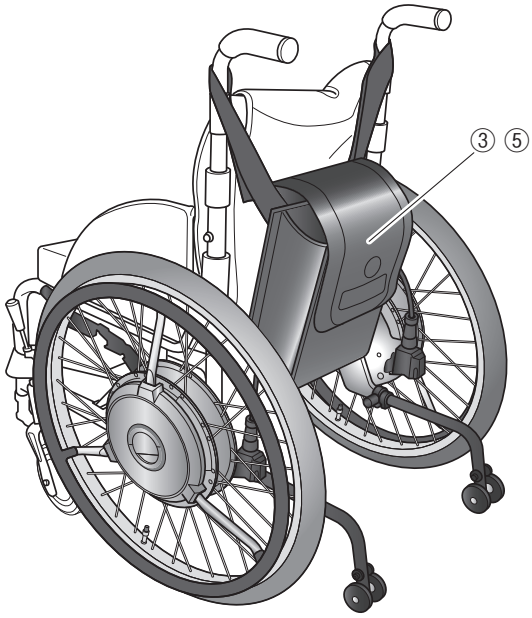
1. Product Overview

1.1 Product Features

Sample E-Move Installation



E-Move Standard battery seat model



E-Move Separated battery seat model

① Wheel drive unit assembly with AC servo flat motor
② Power switch
③ Dedicated battery with built-in microprocessor
Choice of nickel-metal hydride or lithium-ion battery
④ Mode switch (option)
⑤ Battery bag

1.2 Variations

Model E-Move

Product	Tire size	Note
E-Move	20"	
E-Move	22"	
E-Move	24"	
E-Move	25"	
E-Move	26"	

Selectable Part

Hand rims: Stainless steel / Plastic coated

Battery: Nickel-metal hydride / Lithium-ion

Optional Part

Mode switch (Driving mode changing system)

2. Installation Requirements

2.1 Strength Requirements

To install the E-Move, the wheelchair frame must meet the strength requirements listed below.

Warning

・Do not install the E-Move on a wheelchair frame that does not meet the strength requirement.

(1) The wheelchair frame must not have a camber angle.
(2) The wheelchair frame must be sufficiently strong. (Note that the strength of a wheelchair frame may decline with prolonged use.)

Example:
- Play or deformation in components such as rivets, bolt fastenings or casters.
- Components with visible wear or corrosion.

2.2 Structural Requirements

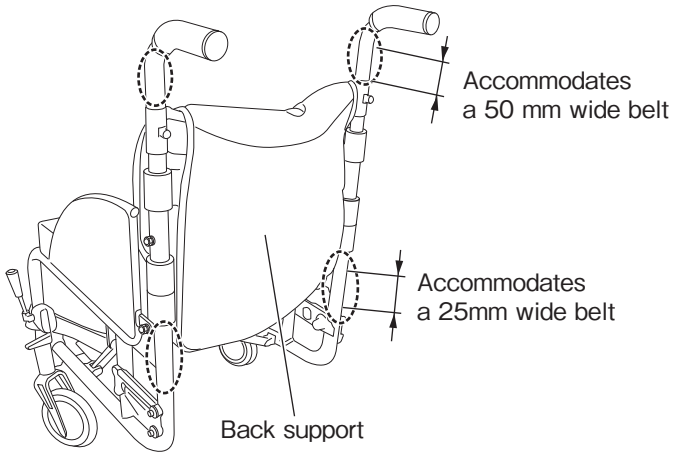
To install the E-Move, the wheelchair frame must meet the structural requirements listed below.

Warning

・Do not install the E-Move on a wheelchair frame that does not meet the structural requirements. Even where it can be successfully installed, problems may arise during use that could cause injury or accident.

2.2.1 Wheelchair frame

(1) The diameter of the axle hole is 18 mm or 20 mm.
(2) The contact surfaces for the nuts around the axle hole must be fl at and have ample surface area.
(3) When the E-Move is installed, there must be no interference between the E-Move and the wheelchair.
(4) On separated battery seat models, a 50 mm wide belt can be threaded through the frame at the top of the back support. The part through which the belt is threaded is constructed such that once threaded, belt is held secure and will not slip down. A 25 mm wide belt can also be threaded through the frame at the bottom of the back support.



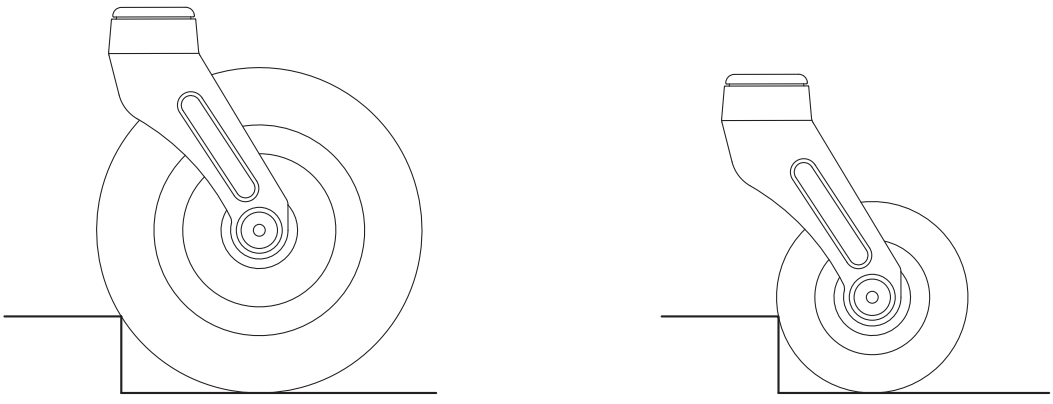
Important

- If you are using offset washers to avoid such interference, check the two items below and install up to three washers on each side.
  — The nut seats are completely secure.
  — The wheelchair brake seats are completely secure.

2.2.2 Casters

Seven-inch or larger casters are recommended for the front casters.

With small-diameter casters, it is difficult to get over large bumps. The shock experienced going over bumps is also greater if the casters are small.



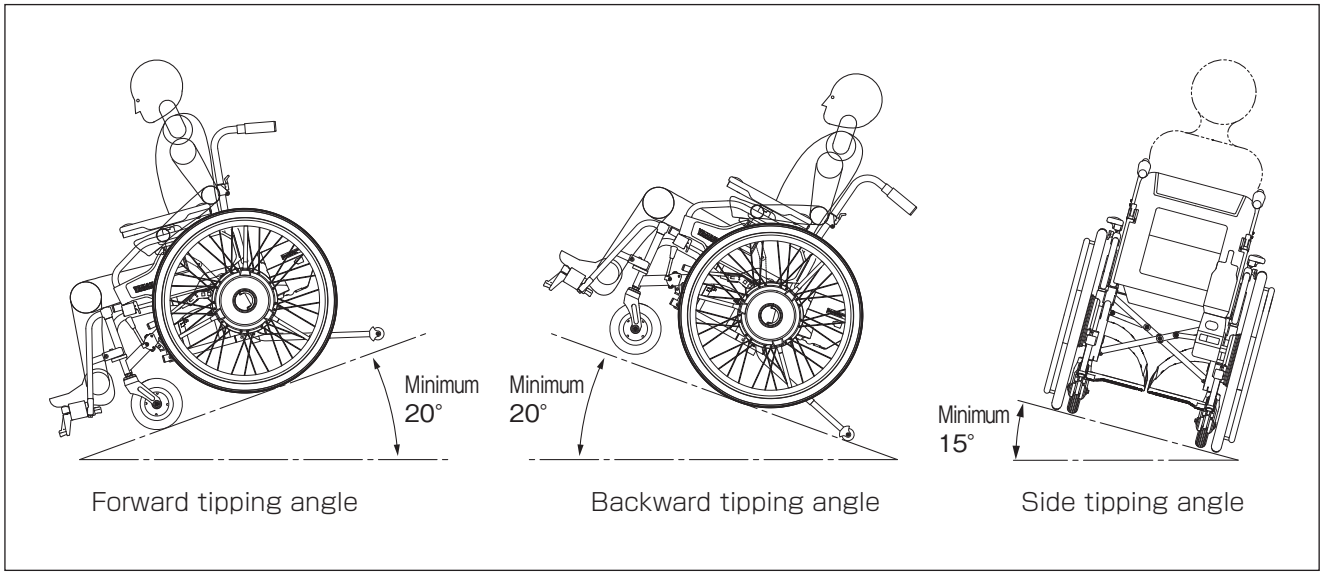
2.3 Functional Requirements

Warning

- **Do not install the E-Move on a wheelchair frame that does not meet the functional requirements. Even where it can be successfully installed, problems may arise during use that could cause injury or accident.**

To install the E-Move, the wheelchair frame must meet the functional requirements listed below.

(1) The frame must be constructed to allow 22- or 24-inch wheels to be attached.
(2) The wheelchair is equipped with a parking brake that can be relocated and adjusted to the correct position on the tires. When applied, the brake must be capable of stopping the wheelchair with the E-Move installed on a 7° forward or backward incline.
(3) With the E-Move installed, it must be possible to tip the wheelchair forward and back by at least 20° and to the side by at least 15° .
(A backward tipping angle of at least 25° is recommended.)



(4) Take care to ensure that the functioning of the wheelchair frame is not impaired by the installation of the E-Move.

Example:
- Movement of moveable arm supports, folding mechanism, parking brake effectiveness, etc.

3. Unit Installation and Removal

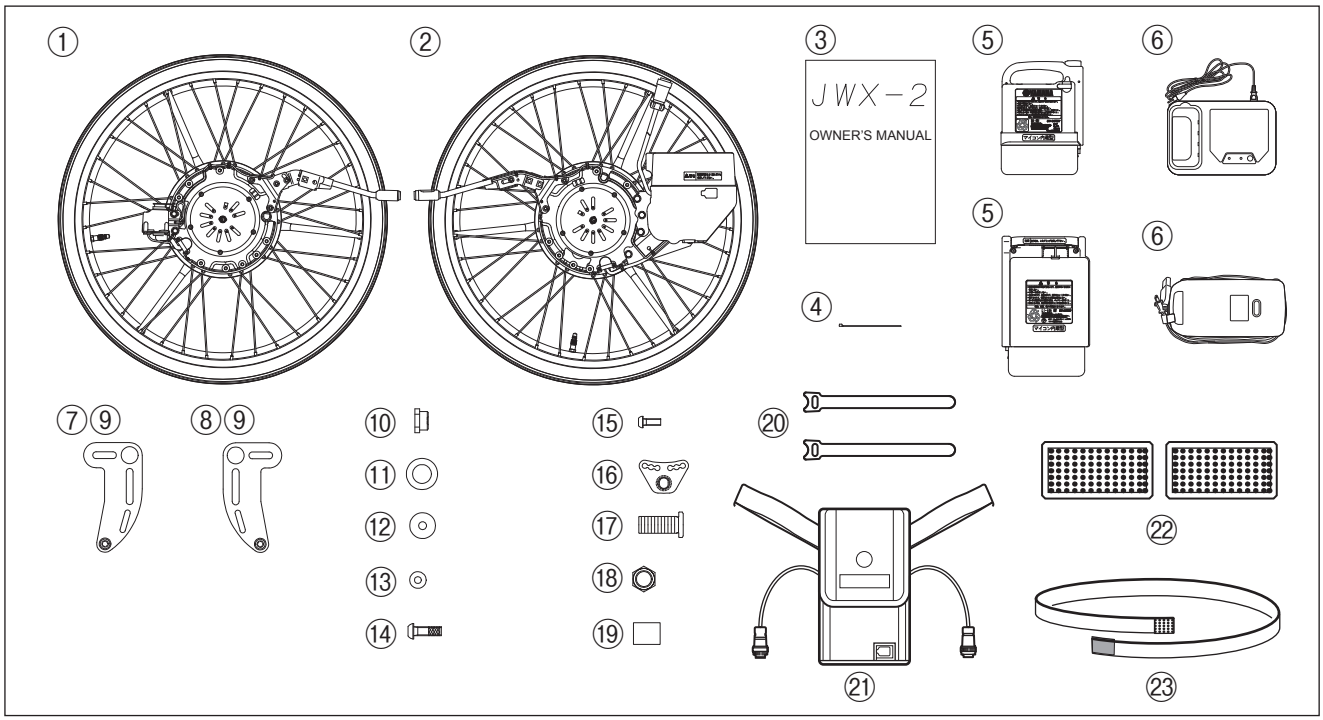
Warning

- When cutting cable ties, do not cut on an angle. Always cut off the surplus as close as possible to the fastener. Cable ties cut to a point could cause injury to the customer.

Note

- In locations where the tightening torque is specified, always tighten to the specified torque. Insufficient tightening torque will cause looseness, while excessive torque could cause damage.
- Install the unit with the battery removed.

3.1 E-Move Components



No.	Component	Remarks	Qty
①	Left wheel drive unit assembly	For 22-inch or 24-inch (selectable)	1
②	Right wheel drive unit assembly	For 22-inch or 24-inch (selectable)	1
③	Manual set	Owner's Manual, Warranty, Guidelines for Safe Use, Installation Manual	1
④	Cable ties		10
⑤	Battery	Nickel-metal hydride or lithium-ion (selectable)	1
⑥	Charger	Nickel-metal hydride or lithium-ion (selectable)	1
⑦	Stopper arm	Left	1
⑧	Stopper arm	Right	1
⑨	O-rings	Fitted onto stopper arms	4
⑩	Boss		2
⑪	Washers	For stopper arm offset (axle sleeve) For axle sleeve installation – 35/18.5 mm dia., 3.2 mm thick	8
⑫	Washers	For stopper arm offset (boss) 28/8.5 mm dia., 3.2 mm thick	6
⑬	Washers	For plate offset - 18/6.2 mm dia., 1.6 mm thick	12
⑭	Bolts	For stopper arm – M8	2
⑮	Bolts	For plate lock – M6	4
⑯	Plate lock		2
⑰	Axle sleeve		2
⑱	Nuts	For axle sleeve installation	2
⑲	Bushes	For adjustment from 18 → 20 mm dia. axle sleeve	2
⑳	Surface fastener tape	For securing the cable	2
㉑	Battery bag	With built-in battery seat	1
㉒	Fitting tape	Fastener (hook and loop) tape is attached to both sides of the bag to secure the belt at the top of the battery bag	2
㉓	Belt	Lower belt for installing the battery bag	1

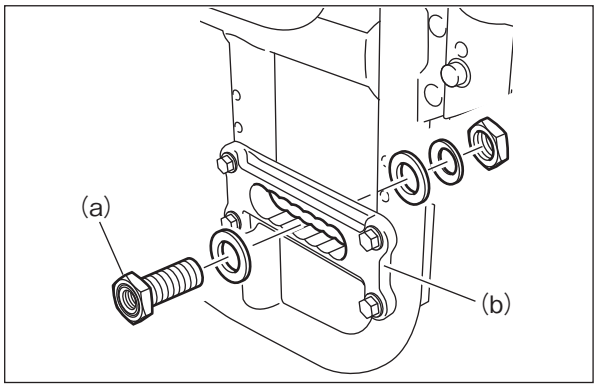
* The components No. ⑦ ~ No. ⑲ are not included in the "without mounting bracket" models. See "1.2 Variations".

* Items ㉑ to ㉓ are only included when a separated battery seat type is selected. On such models, the battery seat is not included in the right wheel drive unit assembly ② .

3.2 Installing the E-Move

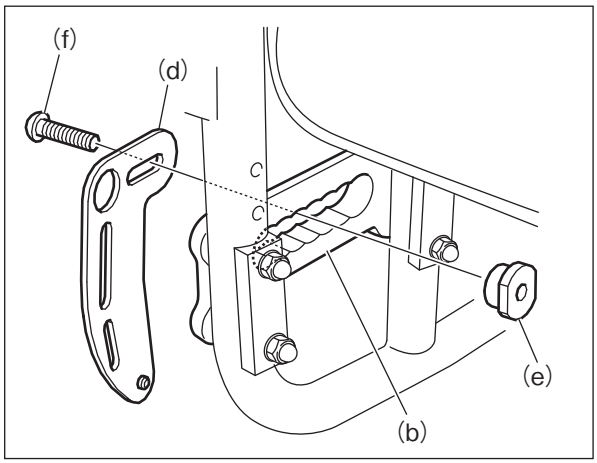
With the exception of the cabling, the procedure for installing the E-Move in a modular-type wheelchair is the same for both left and right sides. Accordingly, the model description given below is for installation on the left side. Use the same procedure to install on the right.

Required tools: 4 mm and 5 mm hexagonal wrenches (Allen keys), 24 mm socket, socket wrench, torque wrench, 22 mm and 24 mm spanners



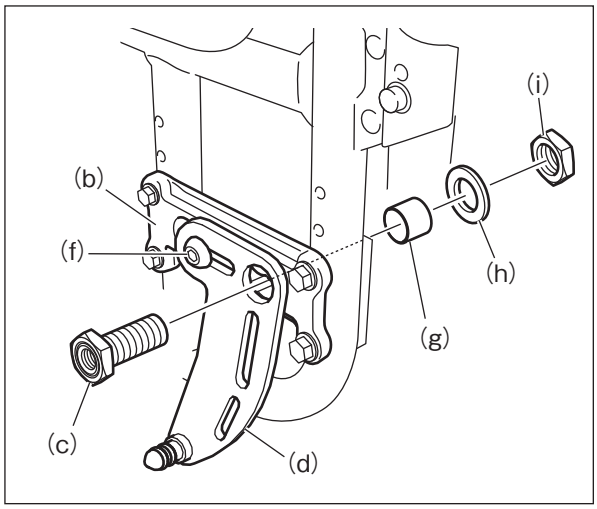
Step 1 Remove the axle sleeve (a) installed on the wheelchair.

Remove the existing wheel and axle sleeve (a) from the side bracket (b) on the wheelchair.



Step 2 Install the axle sleeve (c).

(1) Install the stopper arm (d) and boss (e) on the wheelchair side bracket (b) and temporarily tighten the bolt (f).



(2) Fit the axle sleeve (c) into the stopper arm (d) and side bracket (b).

Important

- Insert the axle sleeve (c) from the stopper arm side.
- The outer diameter of the threaded section of the axle sleeve (c) is 18 mm. If the diameter of the axle hole in the wheelchair side bracket (b) is 20 mm, insert the bush (g) between the axle hole and axle sleeve (c).

(3) Fit the 3.2 mm thick washer (h) onto the axle sleeve and temporarily tighten the nut (i).

(4) Fully tighten the nut (i) and bolt (f) in the sequence below.

1. Nut (i)

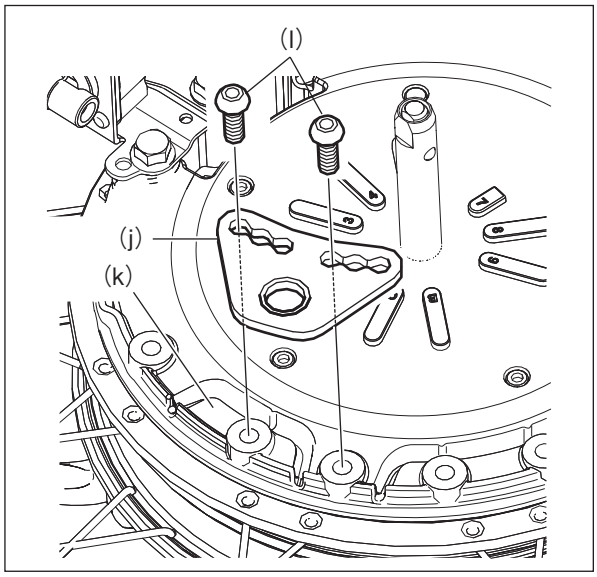
Tightening torque	40 – 50 N·m

2. Bolt (f)

Tightening torque	8.5 – 12 N·m

Note

- **If the wheelchair frame interferes with the stopper arm (d). insert a 3.2 mm thick offset washer between the stopper arm (d) and the wheelchair side bracket (b). For details, see "4.10 Using Offset Washers" .**
- **Use up to 3 offset washers on each side. For details, see "4.10 Using Offset Washers" .**



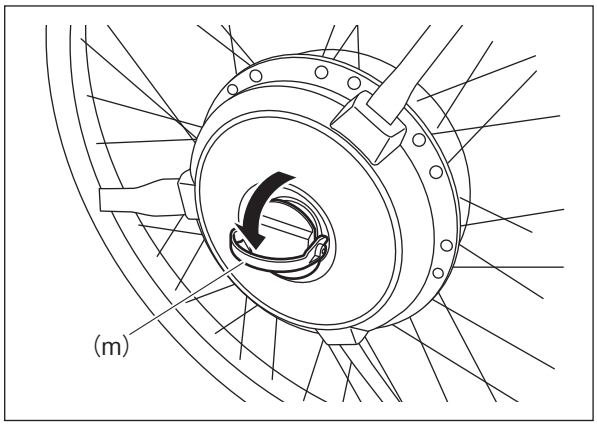
*Step*3 Install the plate lock (j) on the wheel drive unit assembly (k).

Install the plate lock (j) on the wheel drive unit assembly (k) and secure it using the bolts (l).

Tightening torque	8.5 – 12 N·m

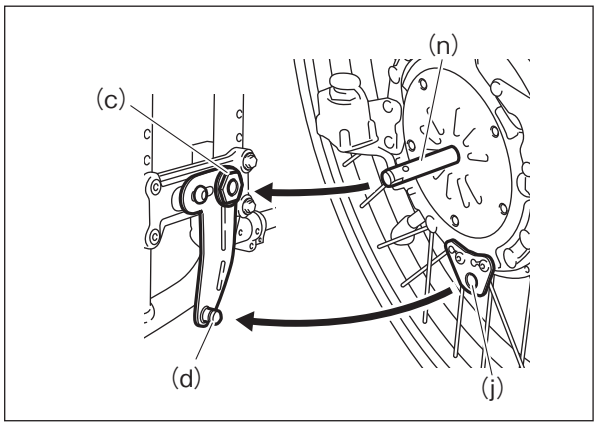
Important

- Install the plate lock (j) so that it faces in the direction indicated in the figure.
- Once the wheel drive unit assembly (k) is installed, use washers to adjust the spacing so that stopper arm (d) engages correctly with the hole in the plate lock (j). For details, see "4.10 Using Offset Washers" .
- Use up to 3 washers on each side. For details, see "4.10 Using Offset Washers" .



Step 4 Install the wheel drive unit assembly (k).

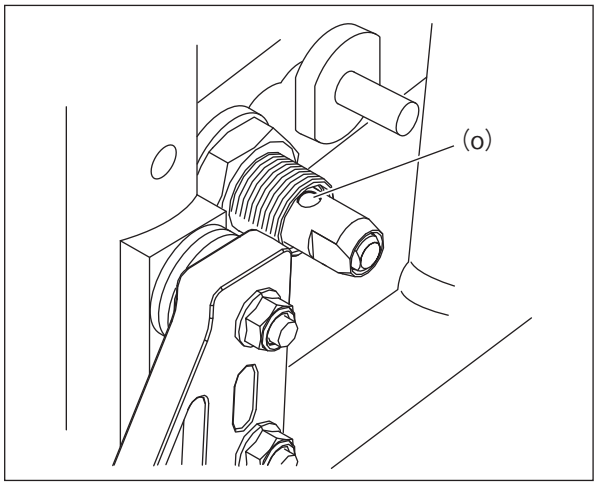
(1) Lift up the handle plate (m).



(2) Align the holes in the axle (n) and plate lock (j) with the axle hole in the axle sleeve (c) and the pin on the stopper arm (d) and then fit them together.

Note

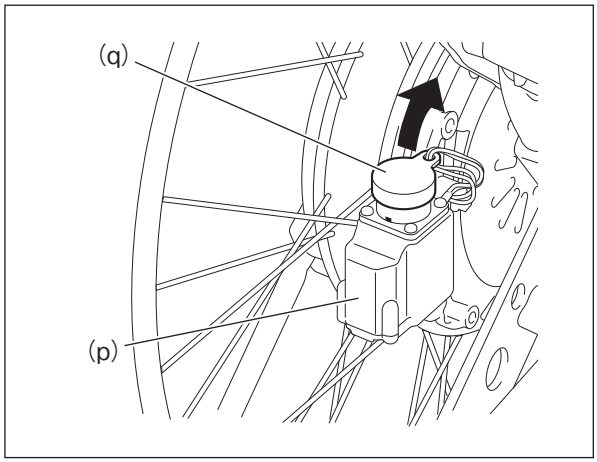
- **If there is interference between the wheelchair frame and components such as the power switch, insert 3.2 mm thick offset washers between the axle sleeve (c) and the stopper arm (d). For details, see "4.10 Using Offset Washers" .**
- **Use up to 3 offset washers on each side. For details, see "4.10 Using Offset Washers" .**



(3) Set the handle plate (m) back down and check that the wheel retaining ball (o) is locked.

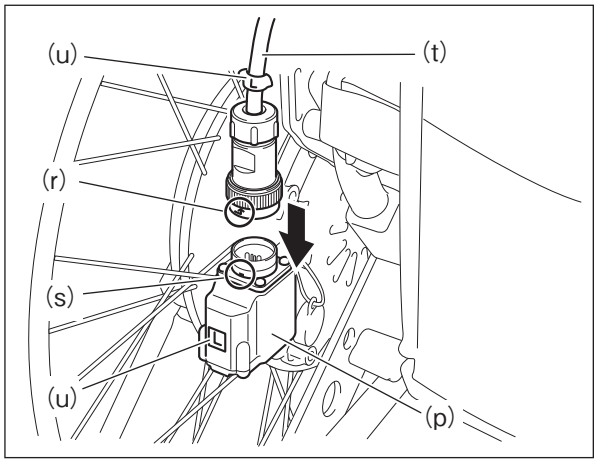
Step 5 On separated battery seat models only, install the battery bag.

See “3.3 Battery Bag Installation”.



Step 6 Fit the cable.

(1) Open the cap (q) on the coupler box case (p).

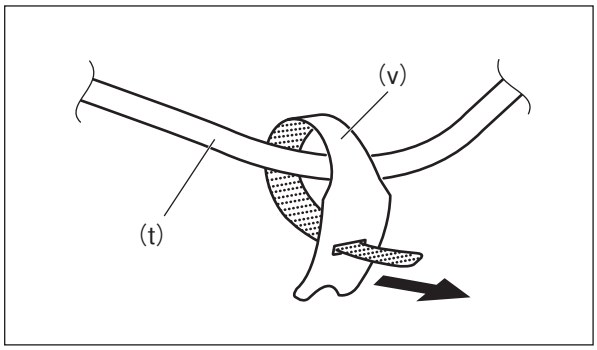


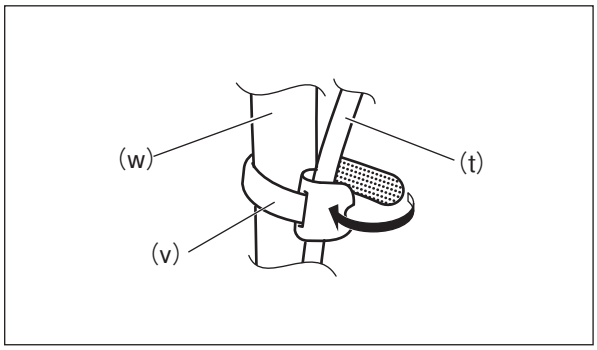
(2) Align the white mark (r) (indicated by the arrow) on the end of the cable with the white mark on the wheel coupler (s) and push the cable in until it clicks into place.

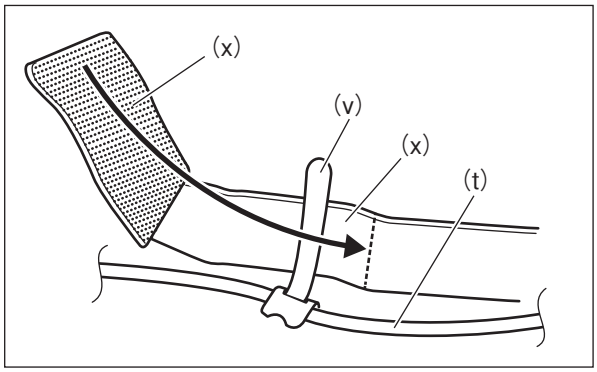
Note

On separated battery seat types, note the following:

- **There are right-hand and left-hand cables. To ensure that you do not mix up the left and right cables, match up the identification marks (w) on the cable (t) and coupler box (p) when connecting the cable.**
- **Once the cable is connected, check that the connection is secure. If you cannot connect the cable because it is stretched or is too short, lengthen the cable. See “4.11 Adjusting the Battery Bag Cable Length” .**







Step 7 Check the status of the cable (t).

Check that the cable is not stretched, is not trapped or pinched when the frame is collapsed, and is not wrapped around or otherwise touching any moving parts. If necessary, use the surface fastener tape (v) to secure the cable (t).

(1) Attach the surface fastener tape (v) to the cable (t).

(2) Secure the cable (t) as described in the example below.

Attachment example ①

Fix the cable (t) by securing it around the frame (w).

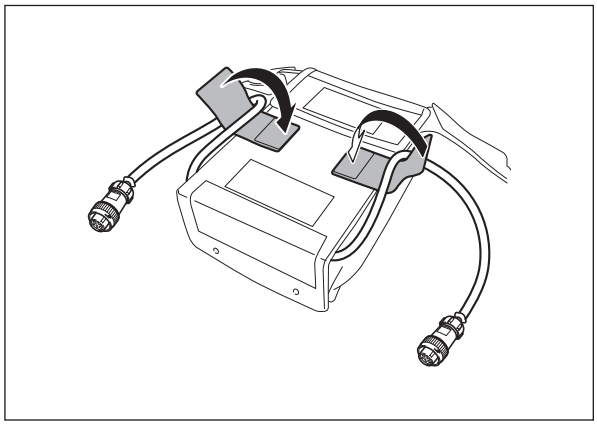
Attachment example ②

Fix the cable (t) by trapping it in the back support surface fastener (x).

3.3 Battery Bag Installation (Separated Battery Seat Type)

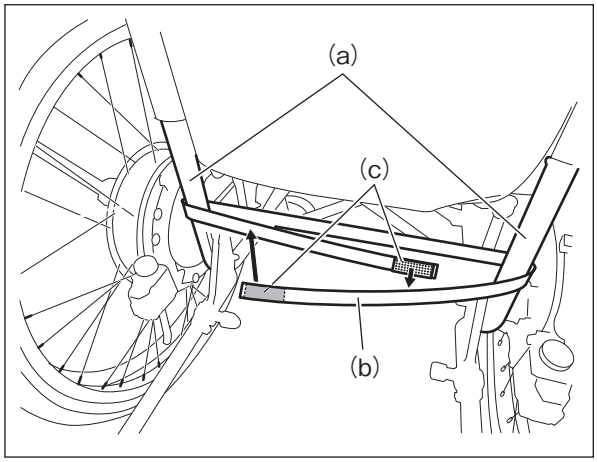
Note

- Installing the battery bag may prevent the frame from being folded.



Note

- Secure the battery bag cables with the surface (hook and loop) fasteners on the bag cable retainers. When doing so, ensure that the interlocking surfaces on the fasteners are fully engaged. If the cables are not secured or the surface fasteners are not fully engaged, the cables could touch and/or become entangled in moving parts.

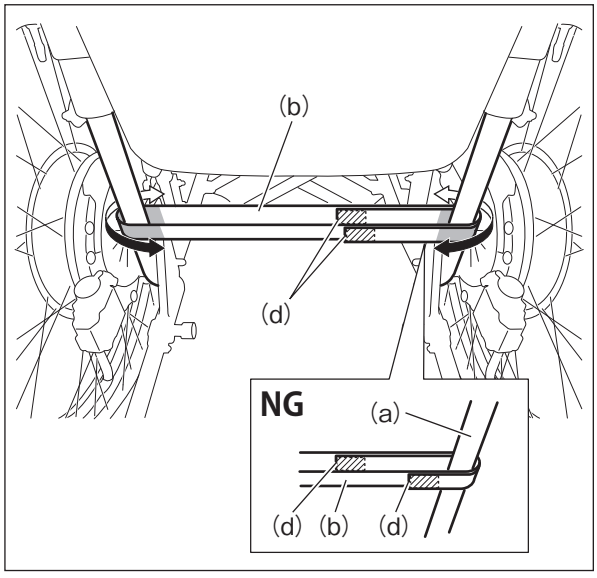


Step 1 Attach the belt (b).

(1) Run the belt (b) around the frame (a) at the bottom of the back support and fasten the hooked sections of the surface fastener (c) to secure the belt.

Note

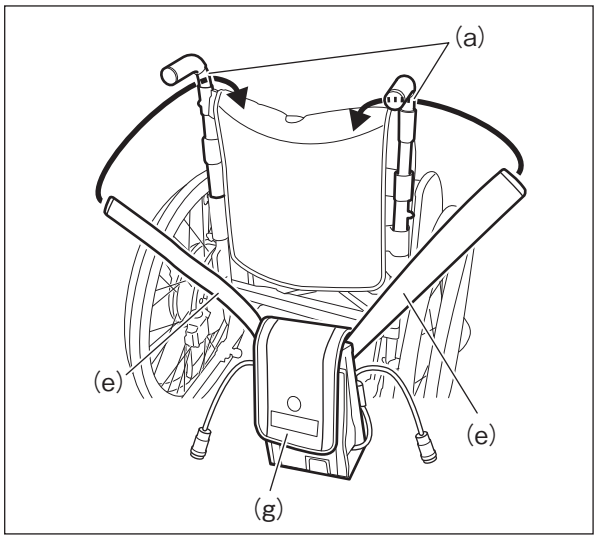
- Take care to fasten all of the two hooked sections of the surface fastener (c) at each end of the belt (b).



(2) Slide the belt (b) around so that the 2 fastened ends (d) are as close as possible to mid-way between the wheels.

Note

- Keep the ends of the belt (d) away from the frame (shaded area ▨ in the figure) to ensure that they do not touch or become entangled in moving parts.
- Ensure that that there is no play or slack when attaching the belt (b).

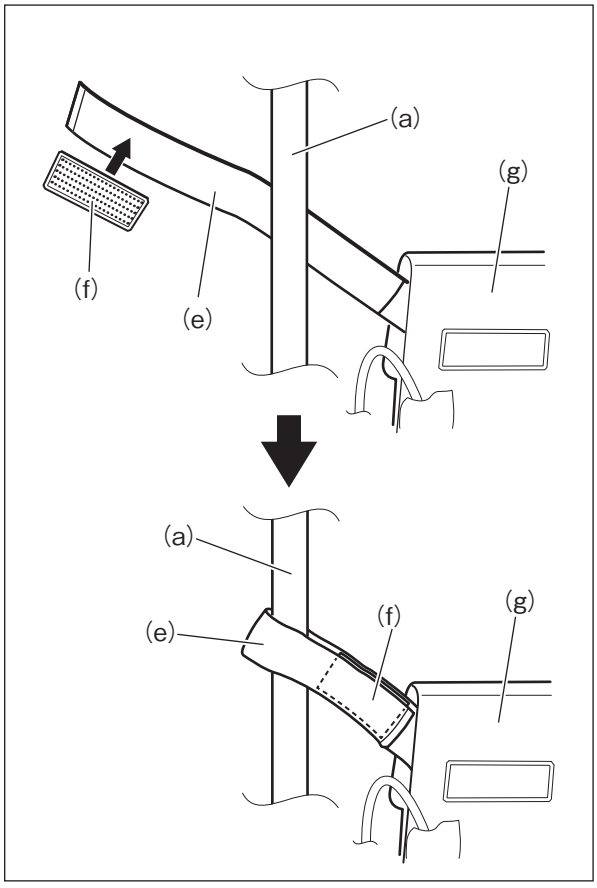


Step 2 Attach the battery bag belt (e).

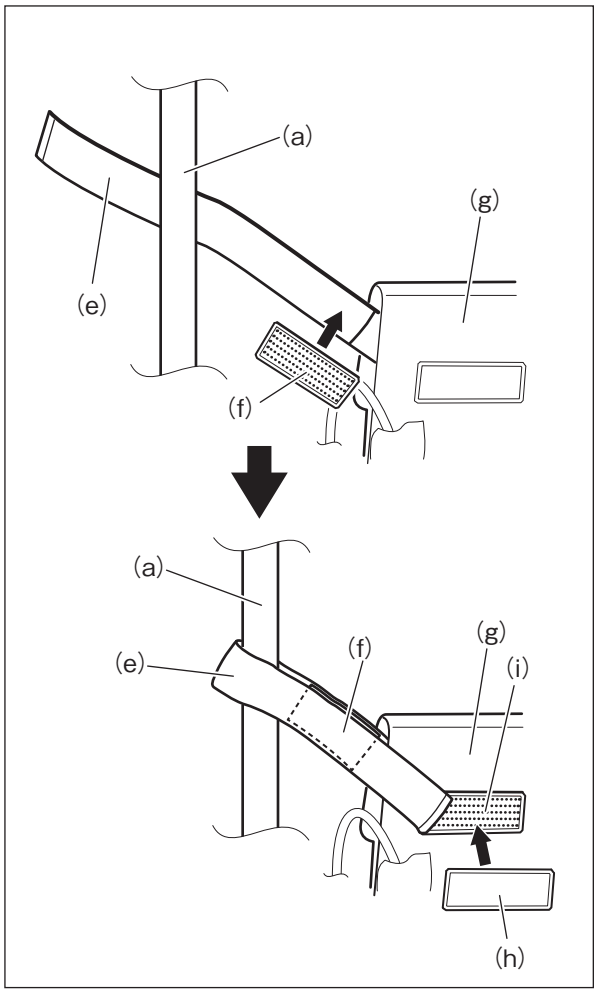
Run the battery bag belt (e) around the top of the back support frame (a) and fasten it in place using the fitting tape (f) (surface fastener with hooked surfaces on both sides). There are two ways to affix the fitting tape (f), as described below.

Note

- **Run the battery bag belt (e) around the part of the top of the back support frame (a) that is constructed to hold the belt so that it will not slide down.**
- **Stick the entire surface of the fitting tape (f) to the battery bag belt (e).**
- **Ensure that that there is no play or slack when attaching the battery bag belt (e).**



1. If the end of the battery bag belt (e) does not reach the battery bag (g).
   Attach the fitting tape (f) so that it is at the end of the battery bag belt (e).
   Run the belt (e) around the frame (a) and then stick the fitting tape (f) at the end of the belt to the belt (e) to fasten it in place.



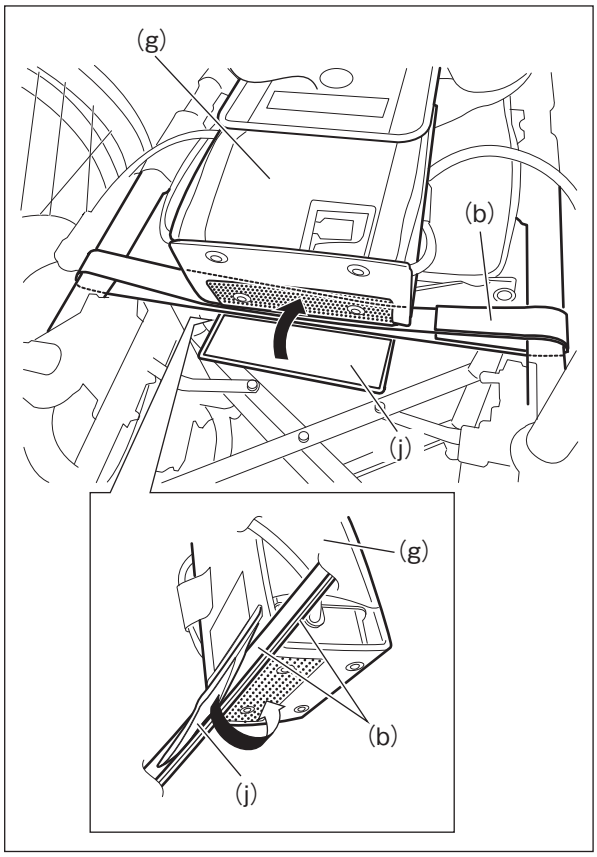
2. If the end of the battery bag belt (e) reaches the battery bag (g).

Affix the fitting tape (f) to the battery bag belt (e) so that it is at the end of the surface fastener (looped tape) where it emerges from the bag.

Run the belt (e) around the frame (a) and then stick the belt (e) to the fitting tape (f) to fasten it in place.

Secure the remaining end of the belt in place by briefly peeling off the looped tape fastener (h) off the battery bag (g) and sticking the end of the belt to the hooked fastener (i) on the battery bag (g).

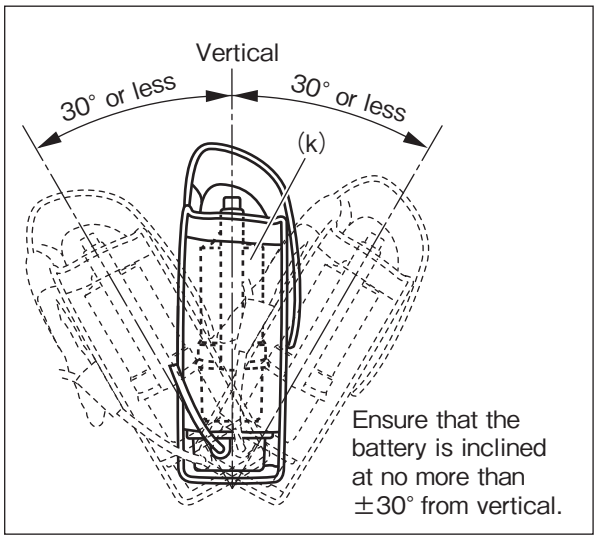
After sticking the belt (e) in place, re-affix the looped tape fastener (h).



Step 3 Secure the battery bag (g).

(1) Remove the surface fastener on the bottom of the battery bag (j) and run both sides of the belt (b) through the fastener.

(2) Re-affix the surface fastener (j) to secure the battery bag (g) in place.



Note

- **The battery (k) should be installed so that it is inclined at no more than ± 30° from vertical in the direction of chair movement.**
- **Take care to install the battery bag so that it is not trapped or pinched when the frame is collapsed.**
- **Install the bag so that it does not touch or become entangled in moving parts.**

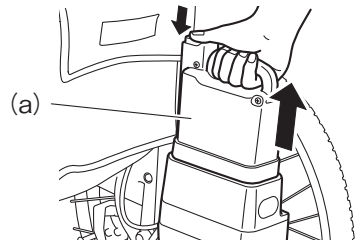
3.4 Installing and Removing the Wheel Drive Unit Assembly

Important

- The same procedure is used for installing and removing both the left and right wheel drive unit assemblies. Accordingly, the model description below is for the right side. Use the same procedure for the left side.

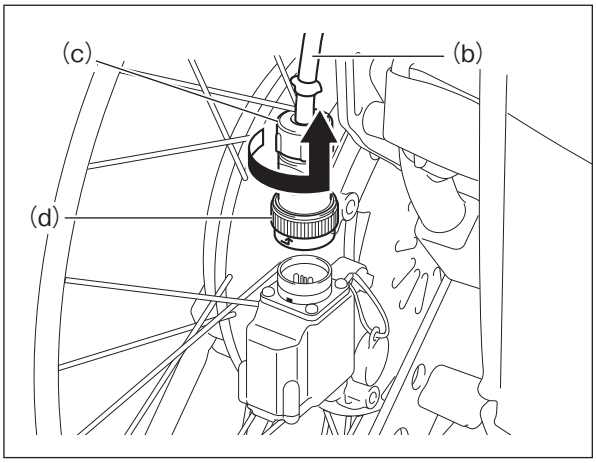
Required tools: 17 mm deep socket, socket wrench, torque wrench

3.4.1 Removal Method for Releasable Wheels



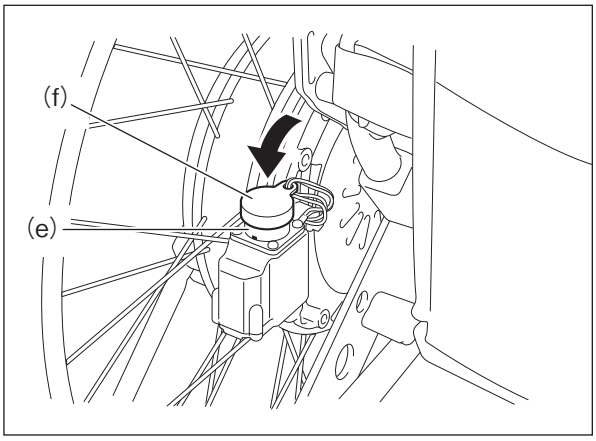
The figure shows the procedure for a nickel-metal hydride battery.

Step 1 Remove the battery (a).

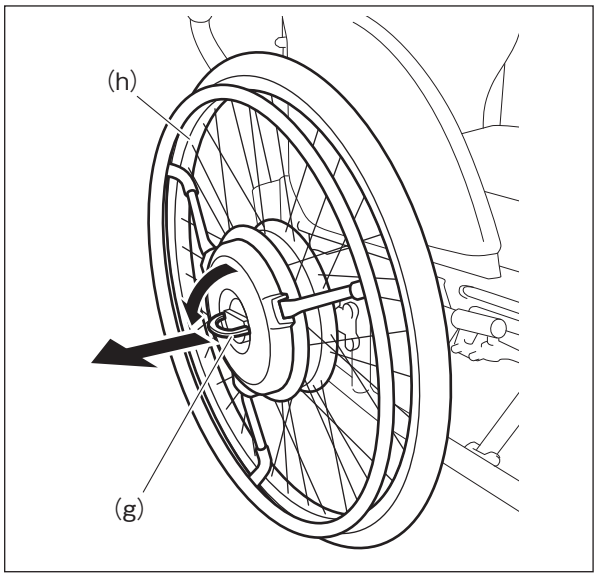


Step 2 Disconnect the cable (b).

1. Turn the ring (d) on the coupler (c) on the end of the cable (b) to loosen it, and then pull it upwards to disconnect the cable.



2. Fit the cap (f) onto the coupler (e) for the left wheel.



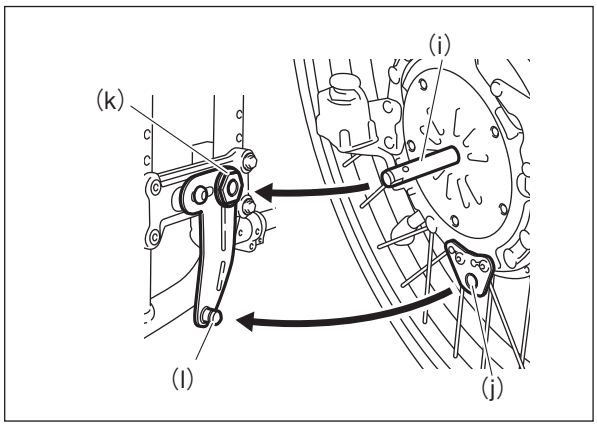
Step 3 Remove the wheel drive unit assembly (h).

Raise the handle plate (g). Then, while supporting the battery housing so that the wheel drive unit assembly (h) does not rotate, pull the handle plate (g) to remove the wheel drive unit assembly (h), taking care not to damage the cable.

Note

- **Support the battery housing so that the wheel drive unit assembly (h) does not rotate while you are removing the assembly. Otherwise, the wheel drive unit assembly (h) could rotate during removal and damage the switch or battery housing.**

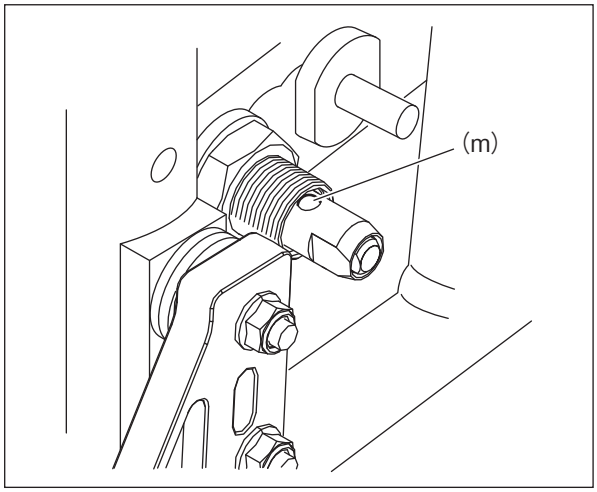
3.4.2 Installation Method for Releasable Wheels



The installation procedure is simply the removal procedure in reverse, but care should be taken with the items below.

Note

- **Insert the axle (i) and the plate lock hole (j) by aligning the axle hole in the axle sleeve (k) with the stopper arm pin (l).**



Warning

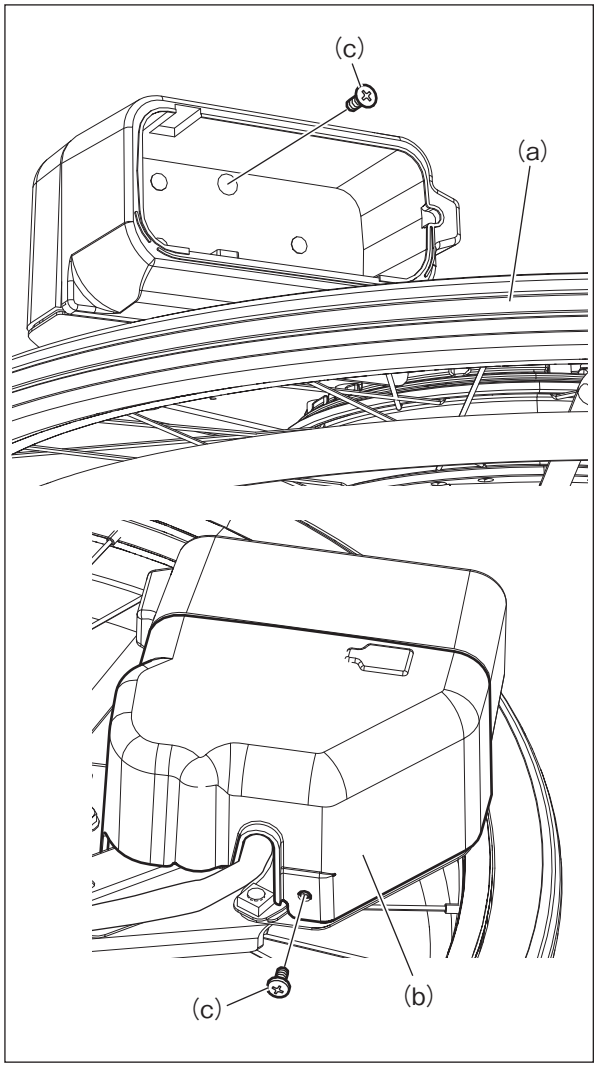
- **Check that the wheel retaining ball (m) is locked and that the wheel drive unit assembly cannot be removed.**

4. Pre-Delivery Adjustment

4.1 Adjusting the Battery Seat Angle

When adjusting the battery seat angle because interference with the seat back makes battery removal difficult, adjust the angle so that the battery is roughly parallel with the wheelchair back pipe.

Required tools: Philips-head screwdriver, 12 mm socket, socket wrench, torque wrench

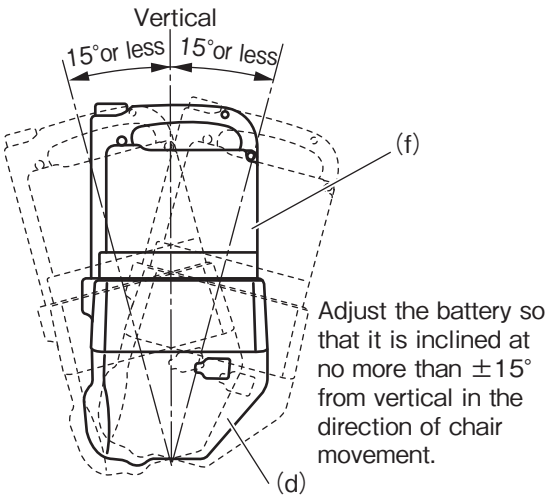


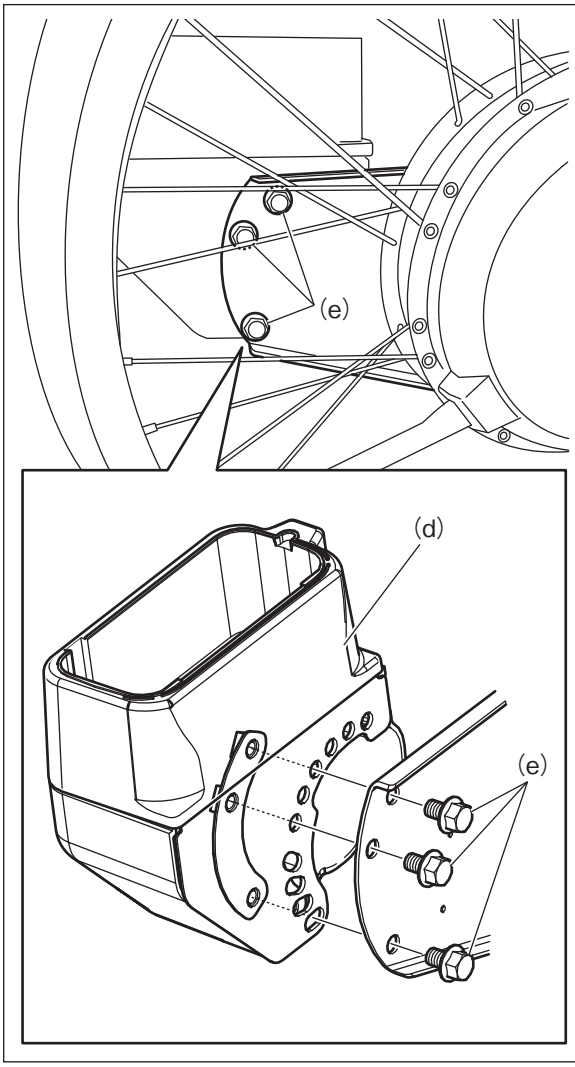
Step 1 Dismount the right-hand wheel drive unit assembly (a).

Dismount the right-hand wheel drive unit assembly (a) from the wheelchair frame.

Step 2 Remove the cover (b).

Remove the 2 screws (c) and then remove the cover (b) below the battery seat.





Step 3 Adjust the angle of the battery seat (d).

Remove the 3 bolts (e) and adjust the angle of the battery seat (d).

Important

- The battery seat (d) can be adjusted through 4 steps.
- The seat angle shifts through roughly 15 ° for each step.

Step 4 Re-install the removed components.

(1) Tighten the 3 bolts (e).

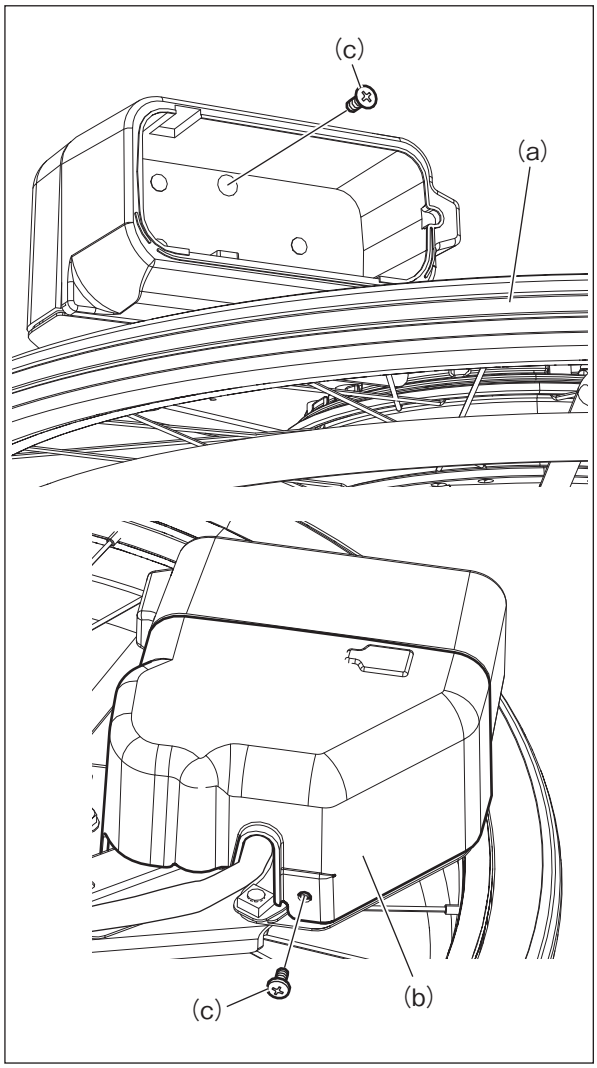
Tightening torque	8.5 – 14 N·m

(2) Install the cover (b) below the battery seat and secure it in place with the 2 screws (c).

Tightening torque	2 – 3.5 N·m

4.2 Adjusting the Power Switch Position

Required tools: Philips-head screwdriver, nippers, 4 mm hexagonal wrench (Allen key), 10 mm socket, socket wrench, torque wrench

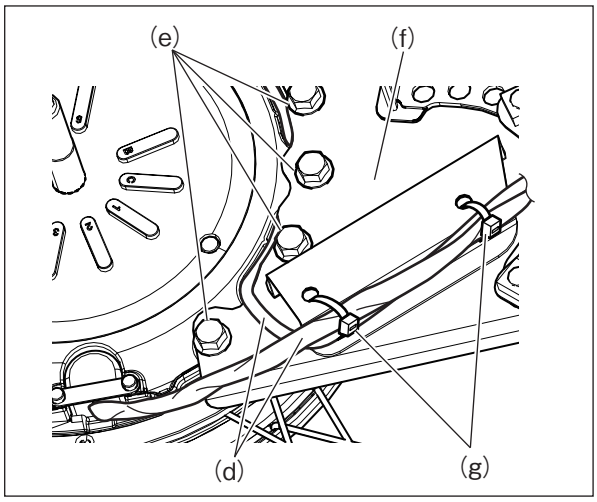


Step 1 Dismount the right-hand wheel drive unit assembly (a).

If the right-hand wheel drive unit assembly (a) is installed in the wheelchair frame, dismount it.

Step 2 Remove the cover (b).

Remove the 2 screws (c) and then remove the cover (b) below the battery seat.

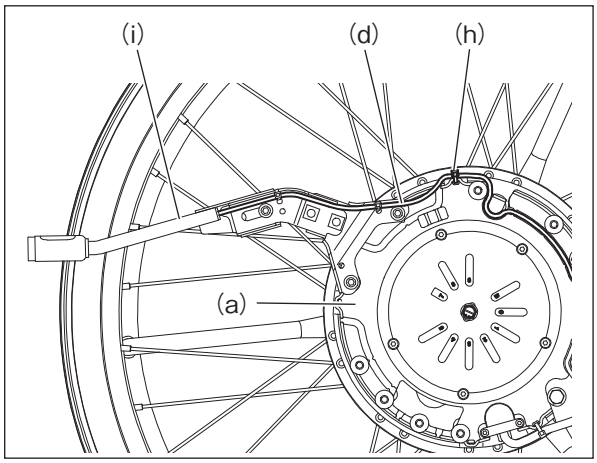


Step 3 Free the cables (d).

(1) Remove the 4 bolts (e) and remove the battery seat (f).
(2) Cut the cable ties (g).

Note

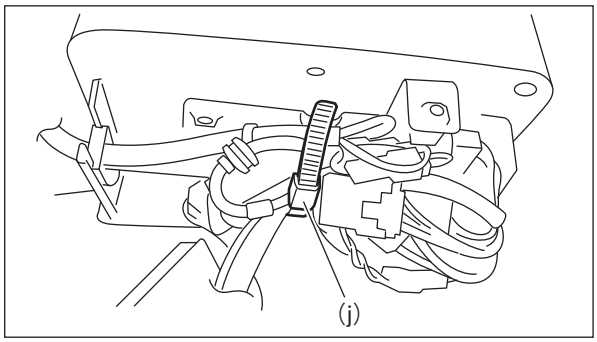
• When cutting the cable ties (g), take care not to cut the cables (d).



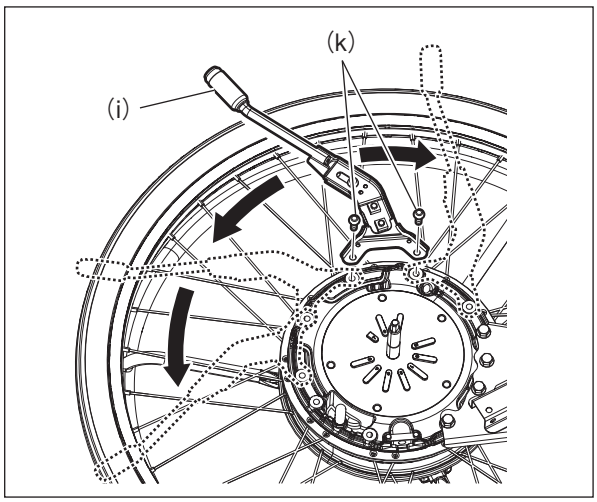
(3) Cut the cable tie (h) and pull the cable (d) for the power switch (i) out of the channel in the unit back plate (a).

Note

• When cutting the cable tie (h), take care not to cut the cable (d).



(4) Loosen and remove the cable tie (j) under the battery seat.



Step 4 Adjust the position of the power switch (i).

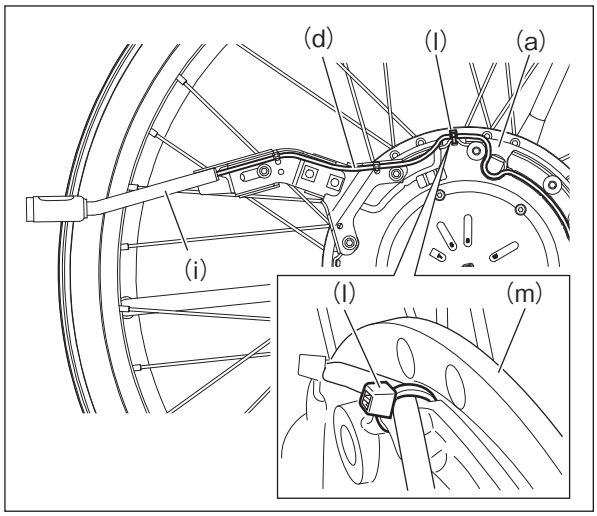
(1) Remove the 2 bolts (k) and adjust the position of the power switch (i).

Important

- The switch can be set to any of 4 positions.
- Moving the switch one position changes the angle by roughly 40° .

(2) Tighten the 2 bolts (k) to lock the position of the power switch (i).

Tightening torque	10 – 16 N·m

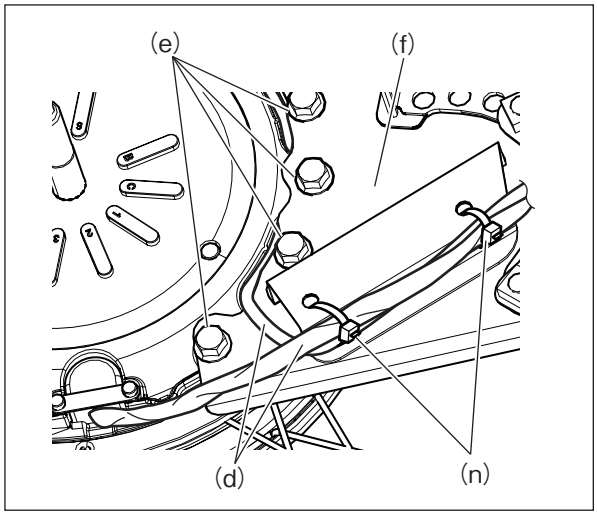


Step 5 Secure the cable (d).

(1) Starting from the power switch (i), fit the cable (d) into the channel in the unit back plate (a) and secure it with the cable tie (l).

Note

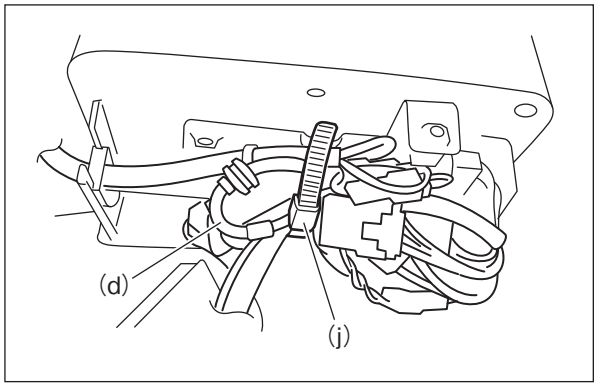
- **Avoid excessive looseness or tautness in the cable (d).**
- **Fasten the cable tie (l) as shown in the figure so that it does not touch the wheel (m).**



(2) Install the battery seat (f) secure it in place with the 4 bolts (e).

Tightening torque	8 – 13 N·m

(3) Secure the cables (d) with the cable ties (n).



(4) Bundle the cables (d) together with the cable tie (j) under the battery seat.

Step 6 Re-install the cover (b).

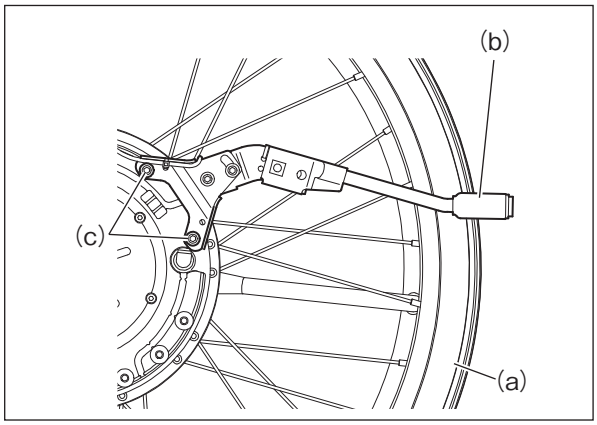
Install the cover (b) below the battery seat and secure it in place with the 2 screws (c).

Tightening torque	2 – 3.5 N·m

4.3 Installing the Mode Switch

Install the optional mode switch using the procedure below.

Required tools: Philips-head screwdriver, nippers, 4 mm hexagonal wrench (Allen key), 10 mm socket, socket wrench, torque wrench



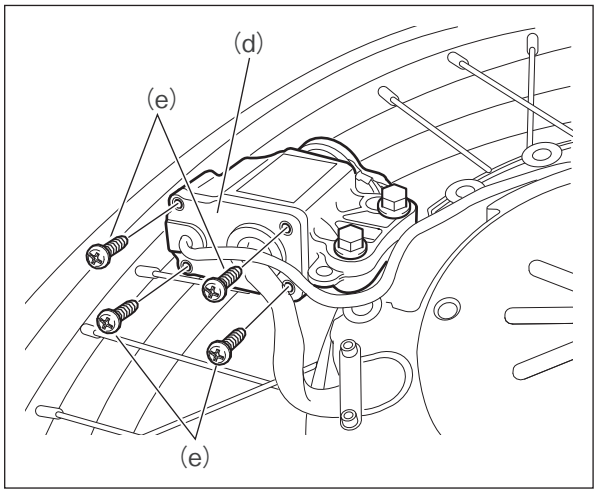
Step 1 Dismount the left-hand wheel drive unit assembly (a).

If the left -hand wheel drive unit assembly (a) is installed in the wheelchair frame, dismount it.

Step 2 Install the mode switch assembly (b).

Note the position in which the power switch is installed and then fasten the mode switch (b) in the correct position with the 2 bolts (c).

Tightening torque	10 – 16 N·m

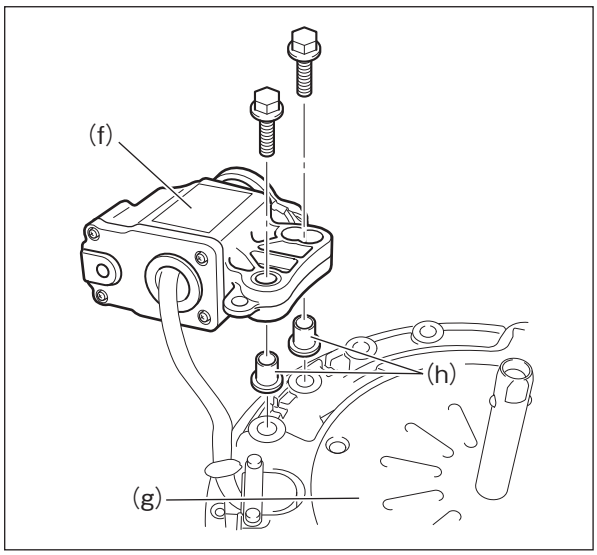


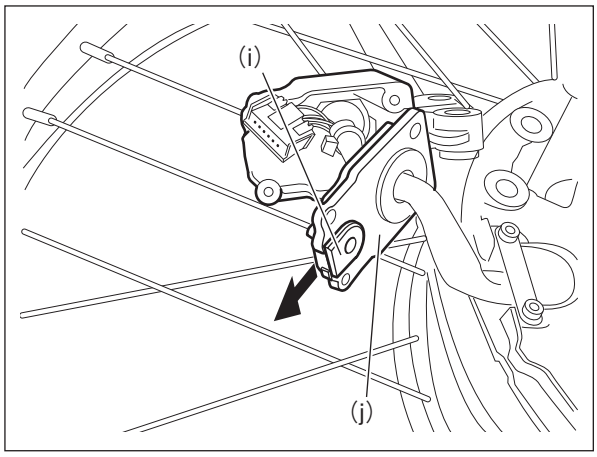
Step 3 Remove the coupler box cover (d).

Remove the 4 screws (e) used to secure the coupler box bottom cover (d).

Note

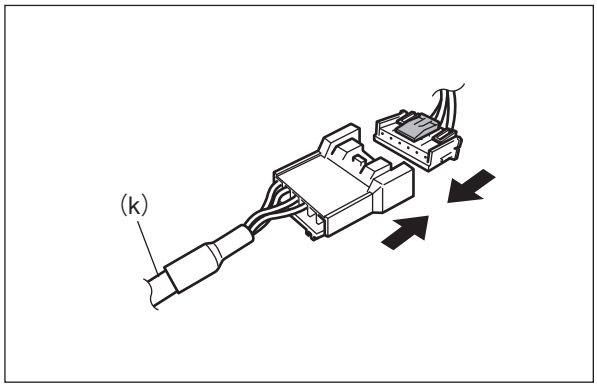
- **To make installation easier, remove the coupler box (f) from the unit back plate (g). Take care not to lose the collars (h).**





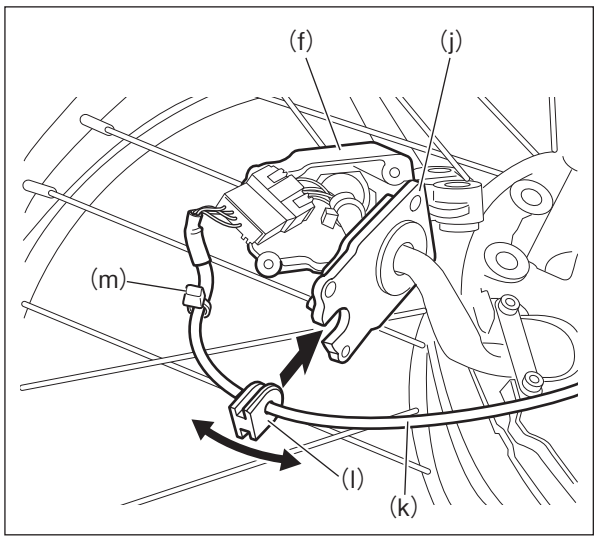
Step 4 Remove the grommet (i).

Remove the grommet (i) from the coupler box bottom cover (j).



Step 5 Connect the mode switch cable (k)

Connect the mode switch cable (k) to the coupler inside the box.

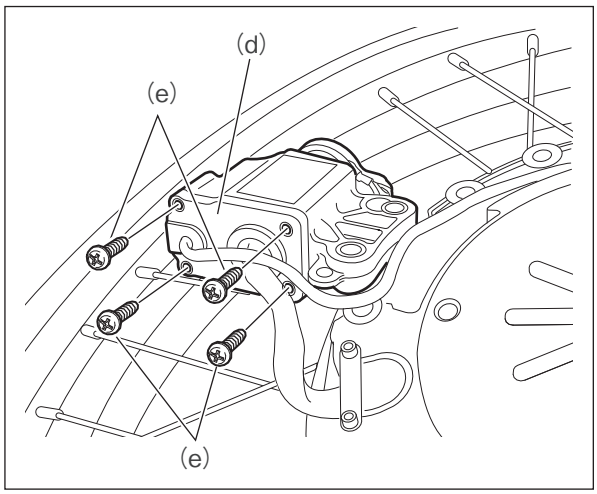


Step 6 Secure the mode switch cable

Run the mode switch cable (k) through the grommet (l), fit it into the coupler box bottom cover.

Note

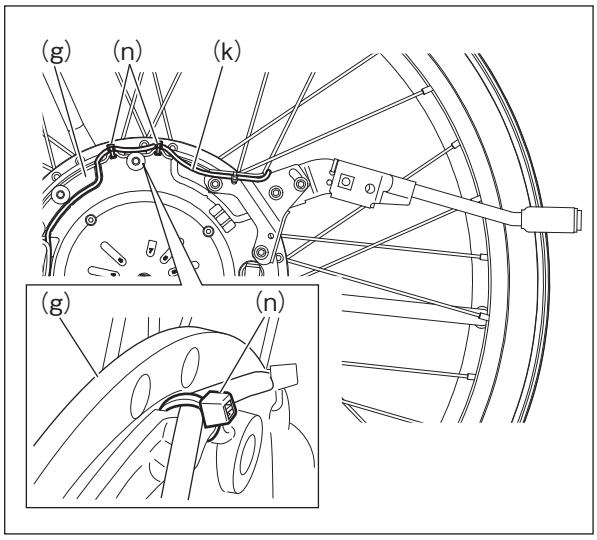
- **Stow the surplus switch cable (k) inside the coupler box case (f). Once you have determined how much of the switch cable (k) to stow inside the coupler box case (f), slide the grommet (l) along the cable and firmly secure it in the slot in the coupler box bottom cover (j).**
- **To lengthen the cable (k), move the grommet (l) up to the clamp (m) attached to the cable (k).**



Step 7 Assemble the coupler box bottom cover (d)

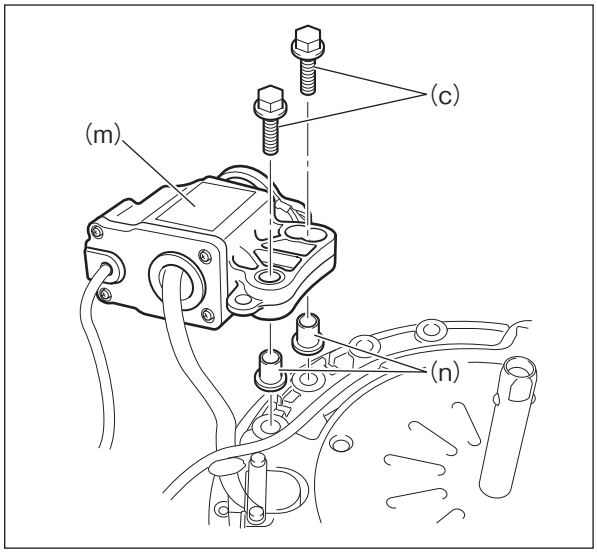
Install the coupler box bottom cover (d) with tightening the screws (e).

Tightening torque	0.6 – 0.8 N·m



Step 8 Secure the cable (k)

Secure the mode switch cable (k) in the channel in the unit back plate (g) and fasten the cable in place using the cable tie (n).

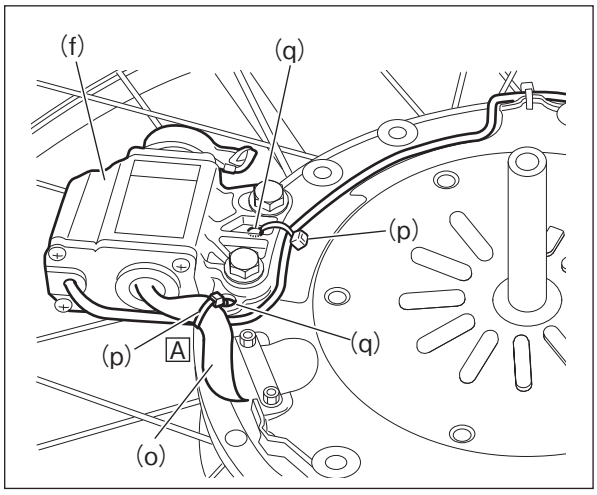


Step 9 Assemble the coupler box.

Note

- **If you removed the coupler box (m) from the unit back plate for this procedure, be sure to install the collars (n) in the coupler box (m) when re-assembling the coupler box.**

Tightening torque	8 – 13 N·m



Step 10 Run the cable (k), (o)

Run the cable (k), (o) and put it in the hollow in the unit back plate, and secure with the clamp (p).

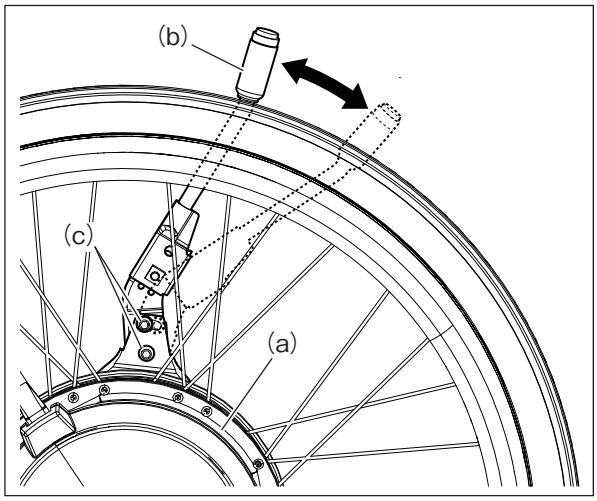
Note

- **Run the cable tie (p) through the hole (q) in the coupler box case to secure the cable.**
- **In section A, bundle together the coupler box cable (o) and the switch cable (k) and secure them to the coupler box case (f) with a cable tie (p).**

4.4 Adjusting the Switch Angle

The description of the method for adjusting the power switch angle also serves as a model for mode switch angle adjustment. Use the same procedure for the mode switch.

Required tools: 10 mm socket, socket wrench, torque wrench, 10 mm spanner



Step 1 Dismount the right-hand wheel drive unit assembly (a).

If the right-hand wheel drive unit assembly (a) is installed in the wheelchair frame, dismount it.

Step 2 Adjust the angle of the power switch (b).

(1) Loosen the 2 bolts (c) and adjust the angle of the power switch (b).

Important

- The angle of the switch (b) can be adjusted through 30° .

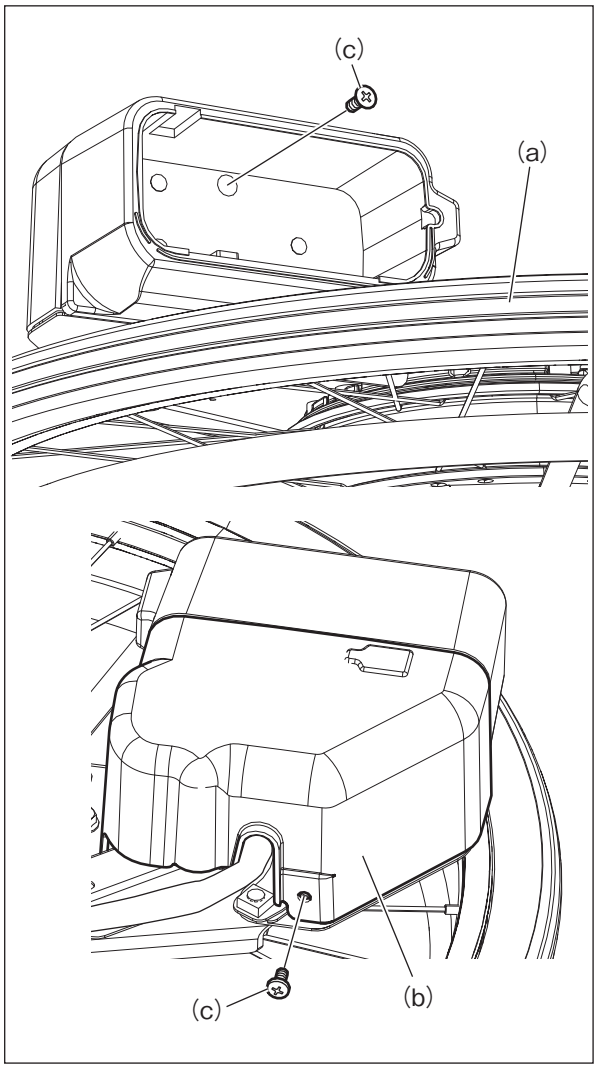
(2) Tighten the 2 bolts (c).

Tightening torque	8 – 12 N·m

4.5 Adjusting the Switch Length

The description of the method for adjusting the power switch length also serves as a model for mode switch length adjustment. Use the same procedure for the mode switch.

Required tools: Philips-head screwdriver, nippers, 4 mm hexagonal wrench (Allen key), 10 mm socket, socket wrench, torque wrench

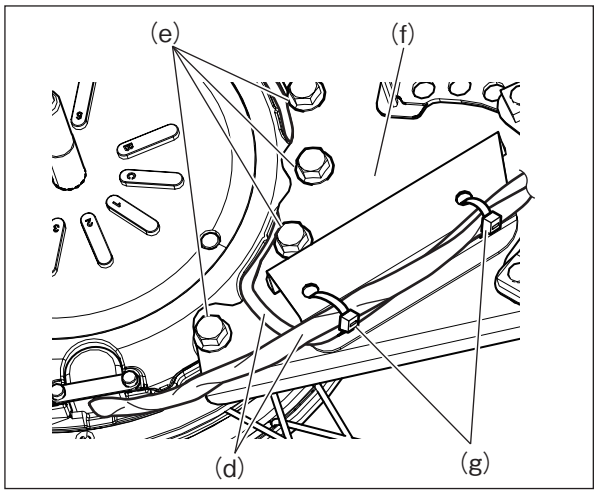


Step 1 Dismount the right-hand wheel drive unit assembly (a).

If the right-hand wheel drive unit assembly (a) is installed in the wheelchair frame, dismount it.

Step 2 Remove the cover (b).

Remove the 2 screws (c) and then remove the cover (b) below the battery seat.

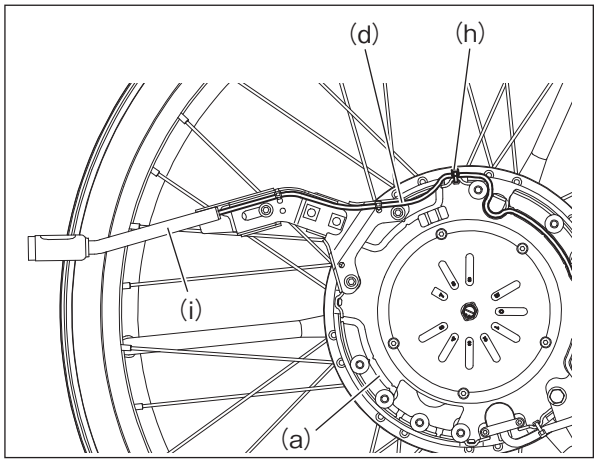


Step 3 Free the cables (d).

(1) Remove the 4 bolts (e) and remove the battery seat (f).
(2) Cut the cable ties (g).

Note

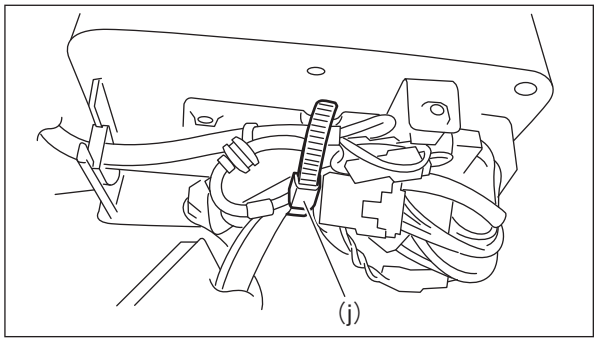
• When cutting the cable ties (g), take care not to cut the cables (d).



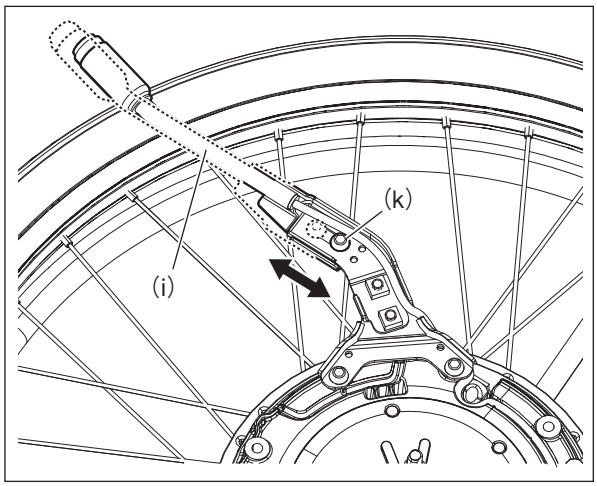
(3) Cut the cable tie (h) and pull the cable (d) for the power switch (i) out of the channel in the unit back plate (a).

Note

• When cutting the cable tie (h), take care not to cut the cable (d).



(4) Loosen and remove the cable tie (j) under the battery seat.



Step 4 Adjust the length of the power switch (i).

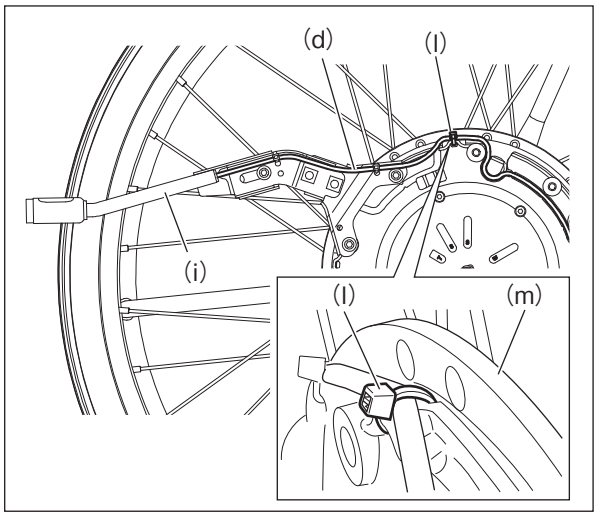
(1) Remove the bolt (k) and adjust the length of the power switch (i).

Important

• The length of the power switch (i) can be adjusted through 15 mm.

(2) Tighten the bolt (k) to lock the length of the power switch (i).
Apply thread-locking compound to the bolt during installation.

Tightening torque	8 – 12 N·m

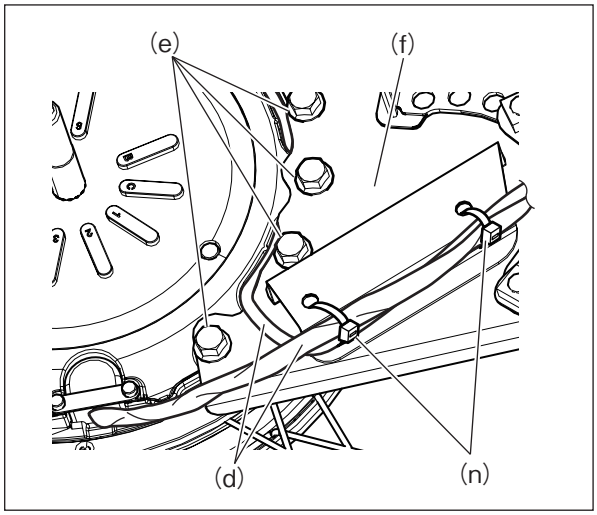


Step 5 Secure the cable (d).

(1) Starting from the power switch (i), fit the cable (d) into the channel in the unit back plate (a) and secure it with the cable tie (l).

Note

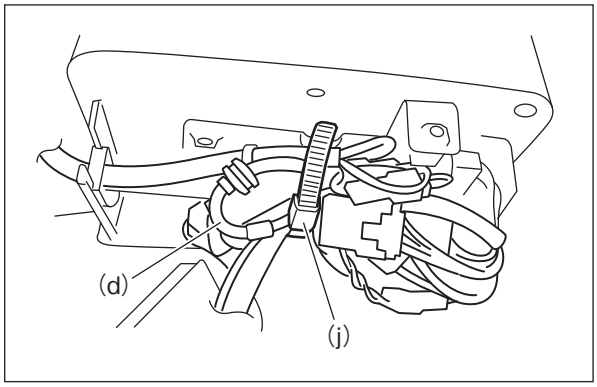
- **Avoid excessive looseness or tautness in the cable (d).**
- **Fasten the cable tie (l) as shown in the figure so that it does not touch the wheel (m).**



(2) Install the battery seat (f) and secure it in place with the 4 bolts (e).

Tightening torque	8 – 13 N·m

(3) Secure the cables (d) with the cable ties (n).



(4) Bundle the cables (d) together with the cable tie (j) under the battery seat.

Step 6 Re-install the cover (b).

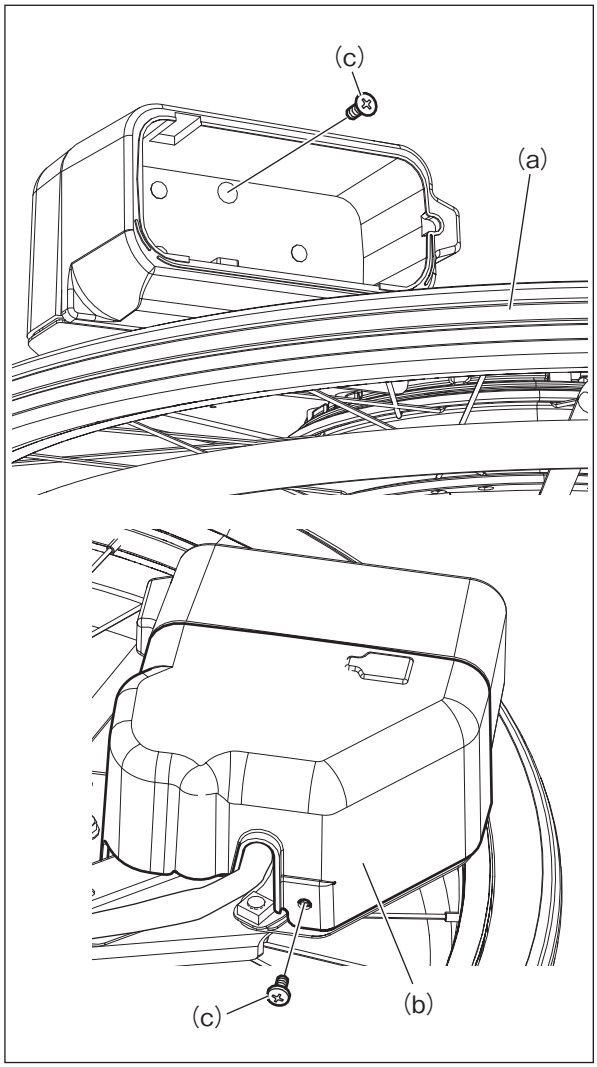
Install the cover (b) below the battery seat and secure it in place with the 2 screws (c).

Tightening torque	2 – 3.5 N·m

4.6 Relocating the Switch (Left/Right)

This section describes how to swap the switch positions between left and right when the power switch and mode switch are installed. If no mode switch is installed, use this procedure only for the power switch.

Required tools: Philips-head screwdriver, nippers, 4 mm hexagonal wrench (Allen key), 10 mm socket, socket wrench, torque wrench

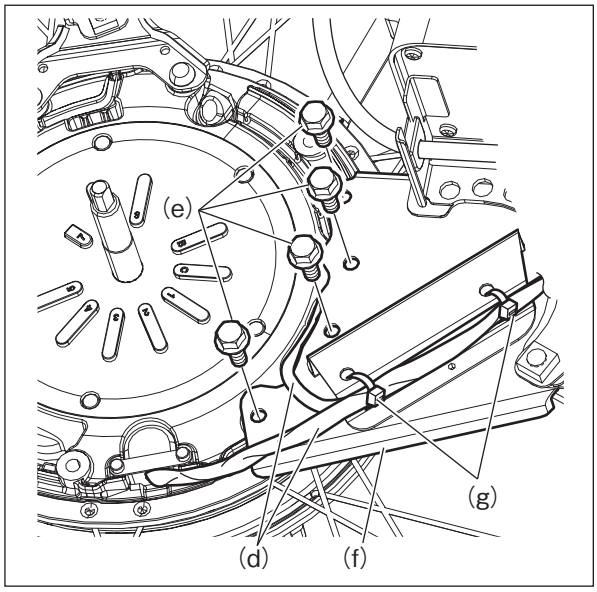


Step 1 Dismount the left or right wheel drive unit assembly (a).

If the left or right wheel drive unit assembly (a) is installed in the wheelchair frame, dismount it.

Step 2 Remove the cover (b).

Remove the 2 screws (c) and then remove the cover (b) below the battery seat.

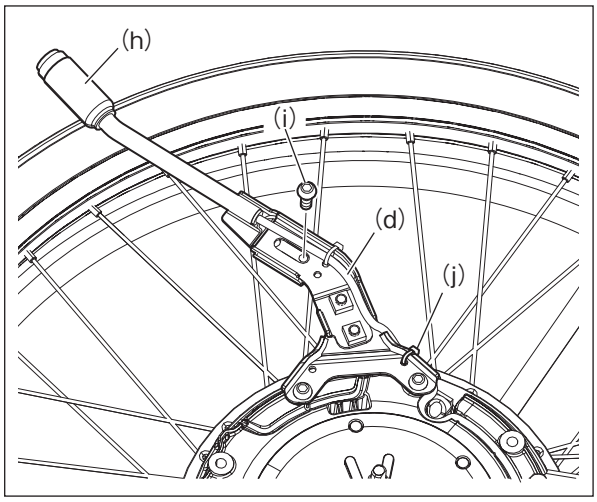


Step 3 Free the cables (d).

(1) Remove the 4 bolts (e) and remove the battery seat (f).
(2) Cut the cable ties (g).

Note

- **When cutting the cable ties (g), take care not to cut the cables (d).**

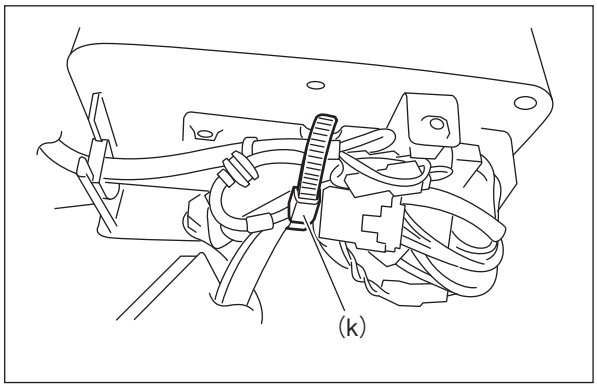


Step 4 Remove the power switch (h).

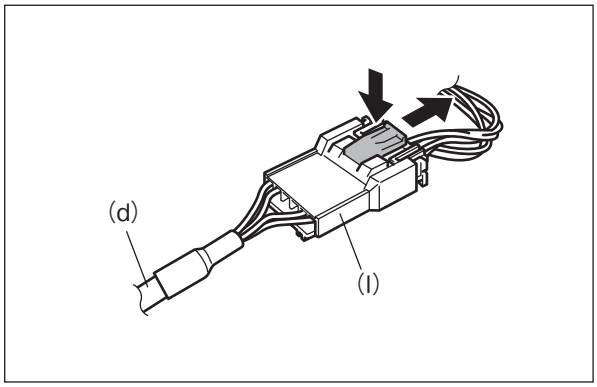
(1) Remove the bolt (i) and remove the power switch (h).
(2) Cut the cable tie (j).

Note

• When cutting the cable tie (j), take care not to cut the cable (d).



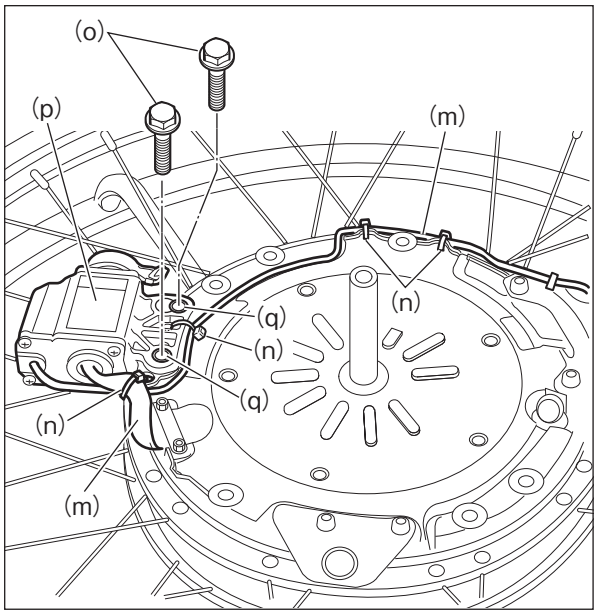
(3) Loosen and remove the cable tie (k) under the battery seat.



(4) Disconnect the coupler (l) on the end of the cable (d) for the power switch (i).

Important

• Press down on the location indicated in the figure and disconnect the coupler (l).



Step 5 Free the cables (m).

(1) Cut the cable tie (n) on the left-hand unit.

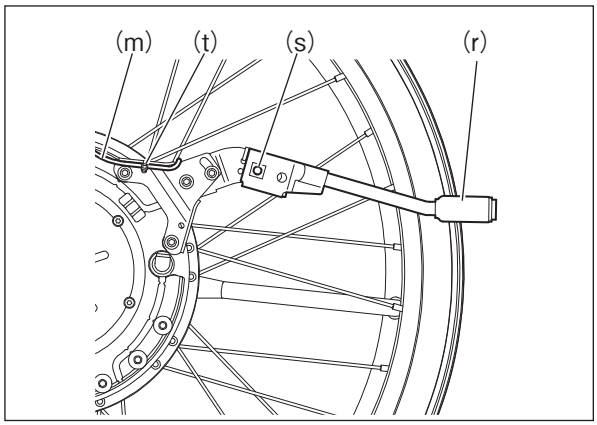
Note

• When cutting the cable tie (n), take care not to cut the cable (m).

(2) Remove the 2 bolts (o) and remove the coupler box (p).

Note

• Take care not to lose the collars (q).

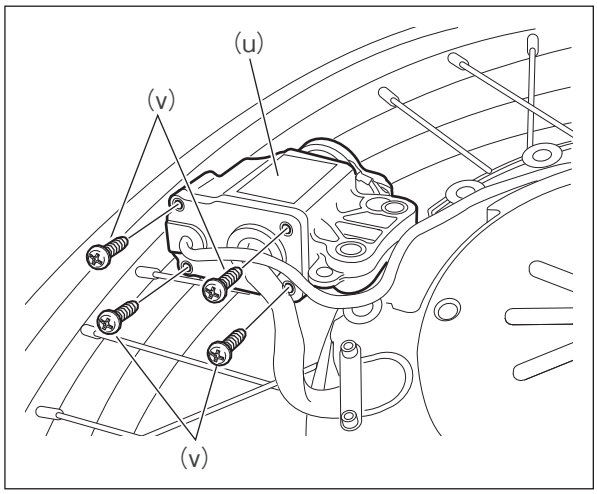


Step 6 Remove the mode switch (r).

(1) Remove the bolt (s) and remove the mode switch (r).
(2) Cut the cable tie (t).

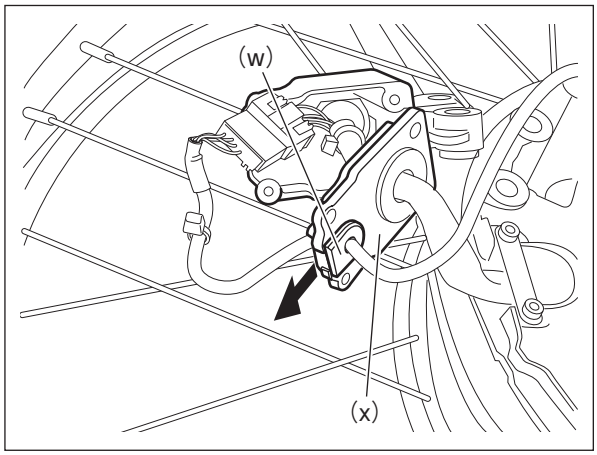
Note

• When cutting the cable tie (t), take care not to also cut the cable (m).



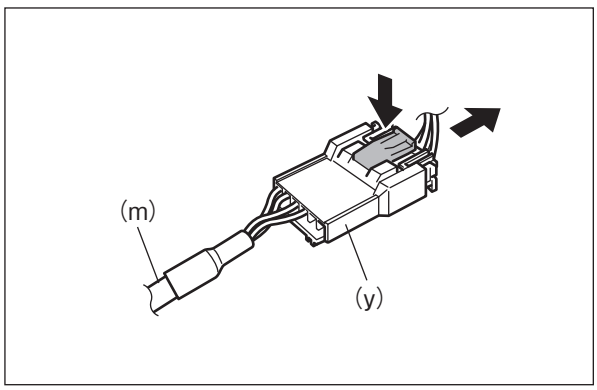
Step 7 Remove the coupler box case (u).

(1) Remove the 4 screws (v) holding the coupler box case (u).



Step 8 Remove the grommet (w).

Remove the grommet (w) from the bottom cover (x) of the coupler box.



Step 9 Switch the power switch (h) and mode switch around.

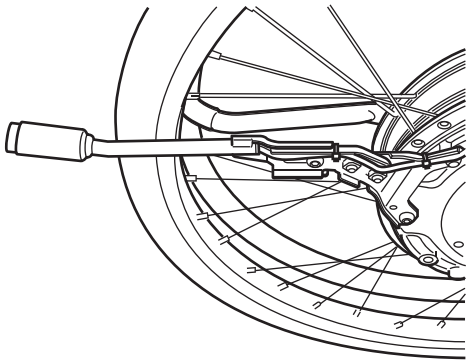
(1) Disconnect the coupler (y) on the end of the mode switch cable (m).
(2) Switch the power switch (h) and mode switch around.

Important

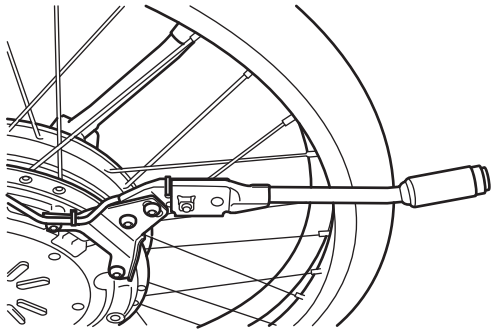
• Press down on the location indicated in the figure and disconnect the coupler (y).

For installation, carry out the removal procedure in reverse, noting the points outlined below.

Right unit back plate



Left unit back plate



Note

- **Install the switches so they face in the directions indicated in the figure. Failing to do so will cause the switches to interfere with the frame.**

- Apply thread-locking compound to the power switch and mode switch bolts (i, s) during installation.

Tightening torque	8 – 12 N·m

- Coupler box case mounting screws (v)

Tightening torque	0.6 – 0.8 N·m

- Coupler box mounting bolts (o)

Tightening torque	8 – 13 N·m

- Battery seat mounting bolts (e)

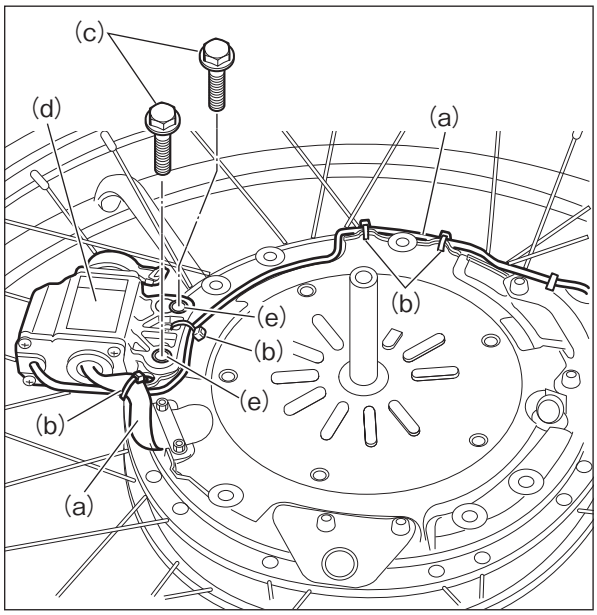
Tightening torque	8 – 13 N·m

- Cover mounting screw (c) below the battery seat

Tightening torque	2 – 3.5 N·m

4.7 Connecting the Coupler Box Cables

The procedures for connecting and disconnecting the coupler box cables during coupler box installation and removal are the same for both left and right sides. This explanation will describe the procedure for the left side as a guide for both sides. The procedure for the right side is the same.
For both sides, important precautions should be observed regarding running the cables.



Step 1 Free up the cable (a).

(1) Cut the cable tie (b) on the left unit.

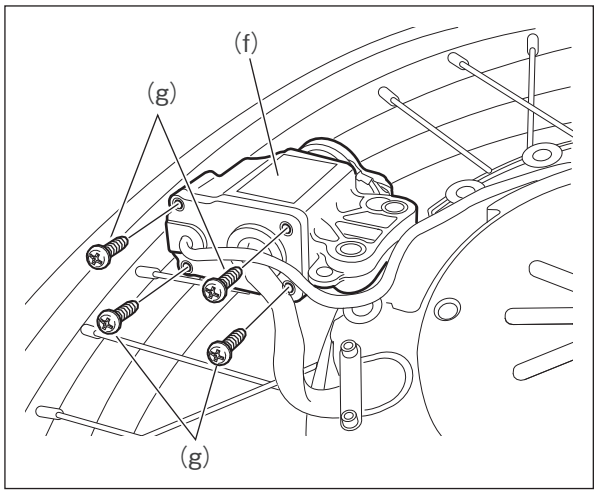
Note

- **When cutting the cable tie (b), take care not to also cut the cable (a).**

(2) Remove the 2 bolts (c) and remove the coupler box (d).

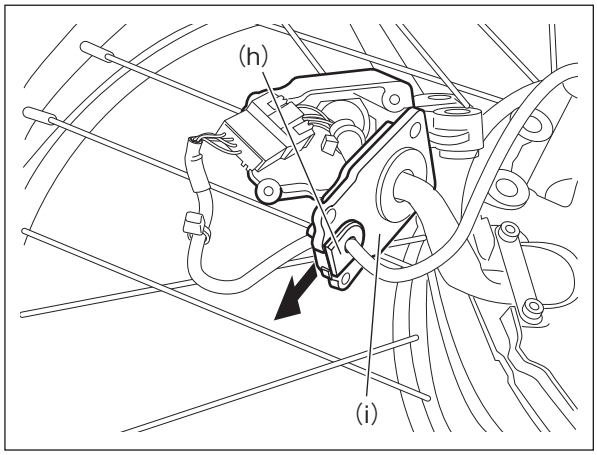
Note

- **Take care not to lose the collars (e).**



Step 2 Remove the coupler box case (f).

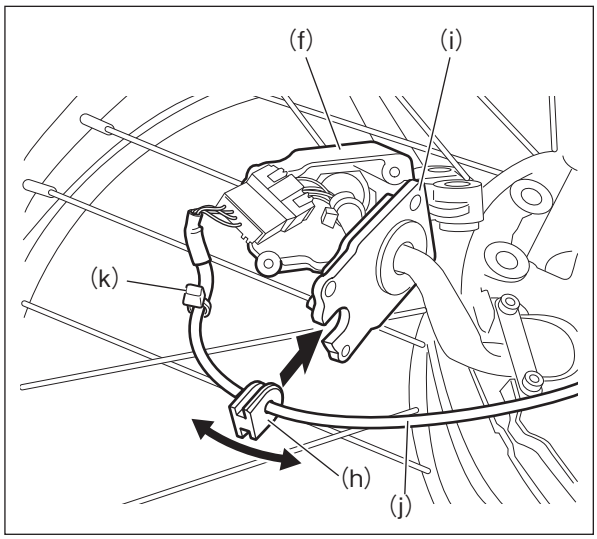
(1) Remove the 4 screws (g) holding the coupler box case (f).



Step 3 Remove the grommet (h).

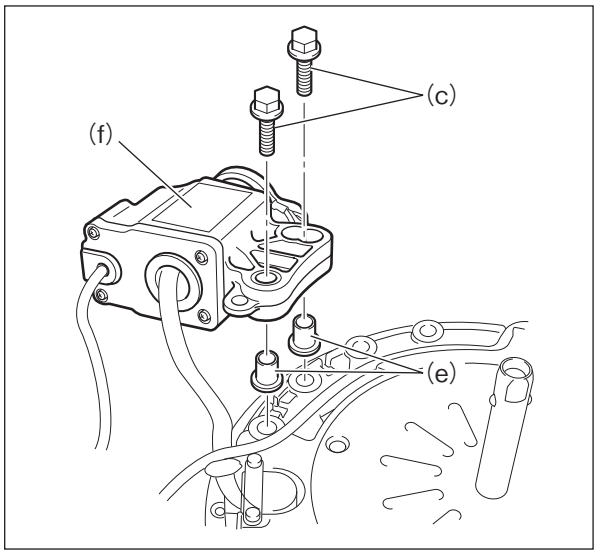
Remove the grommet (h) from the bottom cover (i) of the coupler box.

For installation, carry out the removal procedure in reverse, noting the points outlined below.



Note

- **Stow the surplus switch cable (j) inside the coupler box case (f). Once you have determined how much of the switch cable (j) to stow inside the coupler box case (f), slide the grommet (h) along the cable and firmly secure it in the slot in the coupler box bottom cover (i).**
- **To lengthen the cable (j), move the grommet (h) up to the clamp (k) attached to the cable (j).**



Note

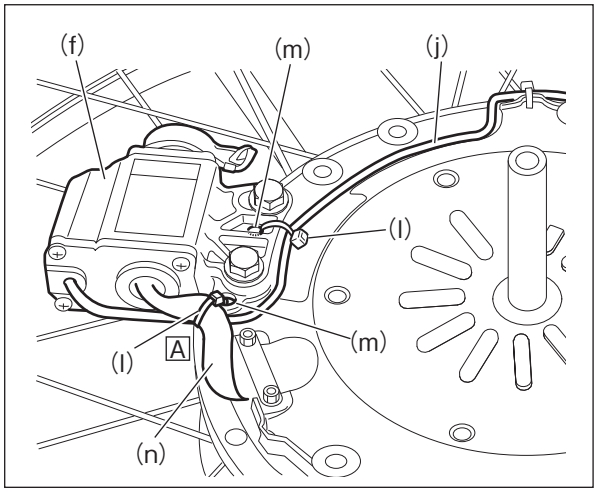
- **Install the collars (e) in the coupler box case (f) during assembly.**

- Coupler box case mounting screws (g)

Tightening torque	0.6 – 0.8 N·m

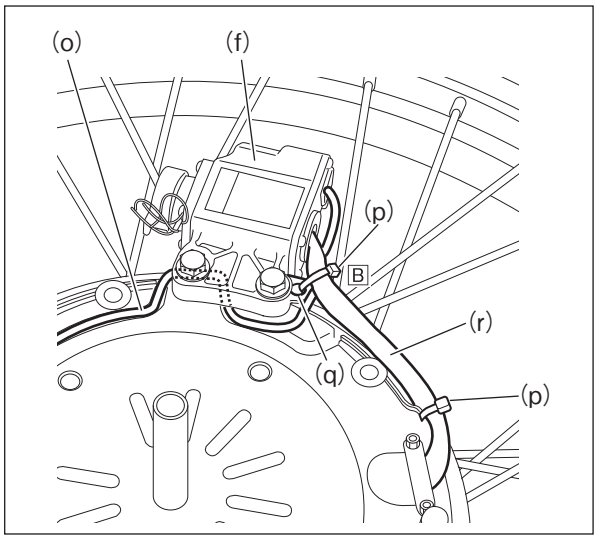
- Coupler box mounting bolts (c)

Tightening torque	8 – 13 N·m



Note

- **Run the cable tie (l) through the hole (m) in the coupler box case to secure the cable.**
- **In section A, bundle together the coupler box cable (n) and the switch cable (j) and secure them to the coupler box case (f) with a cable tie (l).**



For the right side

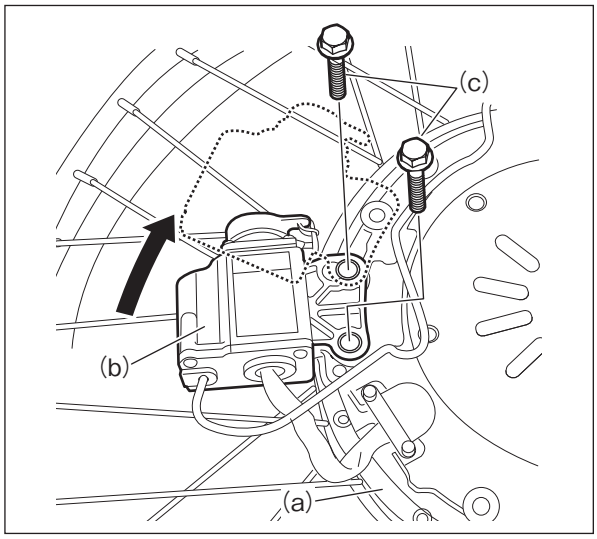
Note

- **For the unit back plate in a Separated Battery Seat Type, run the cable (o) as shown in the figure.**
- **Run the cable tie (p) through the hole (q) in the coupler box case to secure the cable.**
- **In section B, bundle together the coupler box cable (r) and the switch cable (o) and secure them to the coupler box case (f) with a cable tie (p).**

4.8 Repositioning the Coupler Box Cables

This explanation of how to reposition the coupler box cables describes the procedure for the left side as a guide for both sides. The procedure for the right side is the same.

Required tools: 10 mm socket, socket wrench, torque wrench, nippers

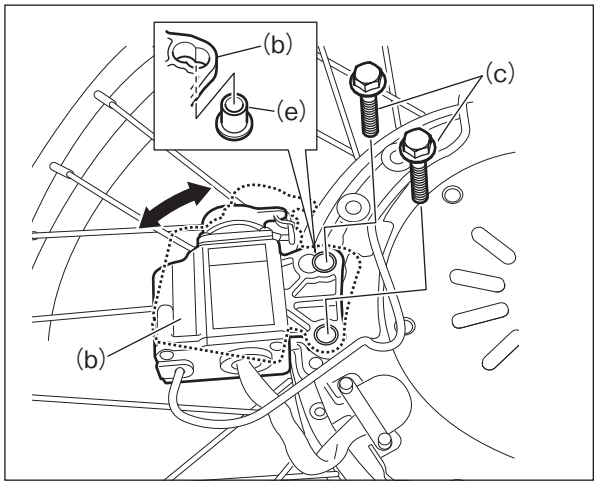


Step 1 Dismount the left-hand wheel drive unit assembly (a).

If the left-hand wheel drive unit assembly (a) is installed in the wheelchair frame, dismount it from the frame.

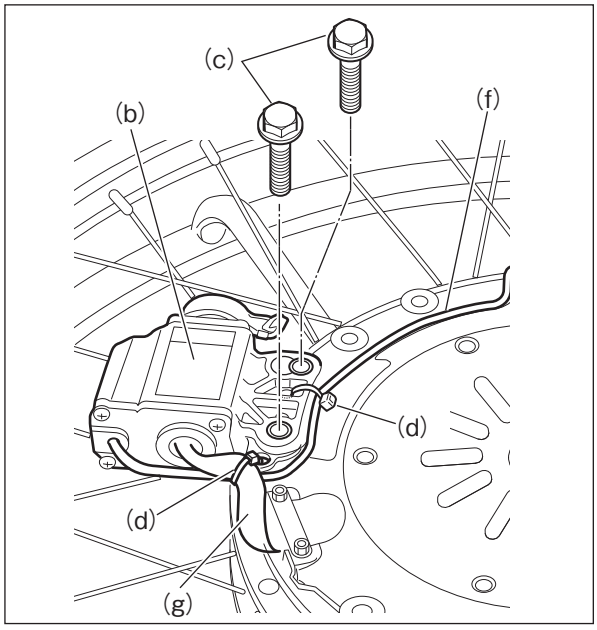
Step 2 Adjust the angle and position of the coupler box (b).

(1) Remove the 2 bolts (c) and adjust the angle and position of the coupler box (b).
To change the position, cut the cable tie (d).
To change the angle, reposition the collar (e).



Important

- When cutting the cable tie (d), take care not to also cut the cables (f, g).
- The position of the coupler box (b) can be adjusted through 2 steps. The upper hole is a slot, which allows the angle to be adjusted also.
- Moving the coupler by one step changes the angle by 20° vertically.
- The angle changes by 10° forward or back.



(2) Tighten the 2 bolts (c) to lock the coupler box (b) in position.

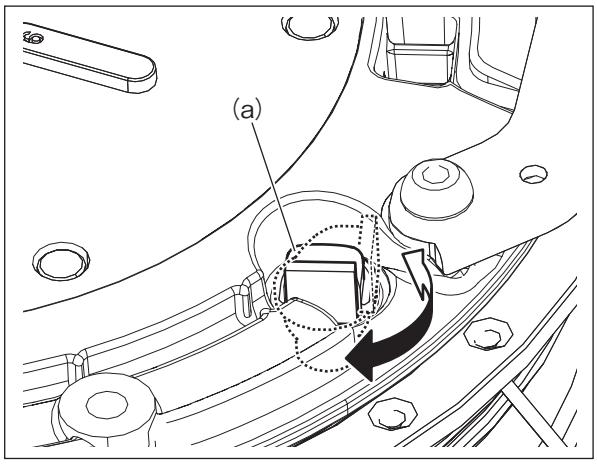
Tightening torque	8 – 13 N·m

(3) If you cut the cable tie (d), secure the cables (f, g) with a new cable tie.

Note

- **Ensure that the cable (f) is not overly stretched or loose.**
- **Fit the cable (f) into the channel in the wheel drive unit assembly (a).**
- **If you changed the position of the coupler box, see "4.7 Connecting the Coupler Box Cables" for information on how to run the cables.**

4.9 Adjusting the Warning Lamp (LED) Direction



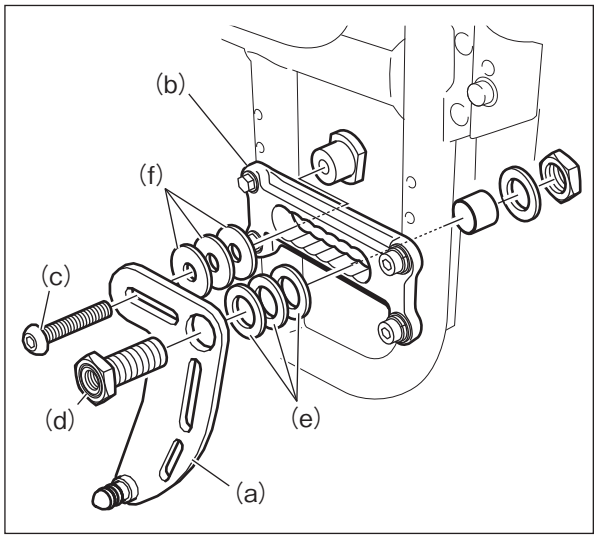
Adjust the direction in which the warning lamp (LED) (a) faces so that it is readily visible when the wheelchair is being operated.

Important

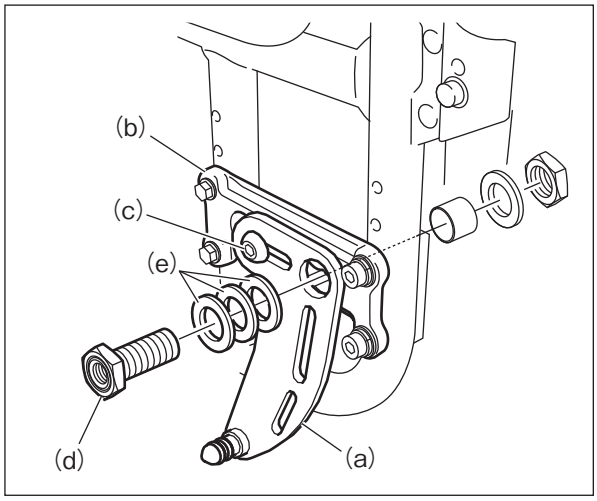
- The warning lamp (LED) (a) direction is adjustable through 360°. However, the range of adjustment is restricted if the switch cables are routed past the warning lamp unit.

4.10 Using Offset Washers

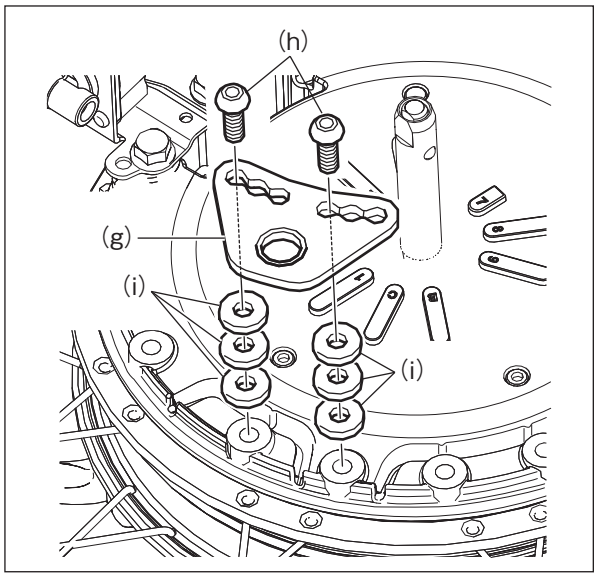
Required tools: 4 mm and 5 mm hexagonal wrenches (Allen keys), 24 mm socket, socket wrench, torque wrench, 22 mm and 24 mm spanners



In most cases where the wheel drive unit assembly or stopper arm (a) interferes with the wheelchair frame, the stopper arm (a) must be offset outwards.
In this case, fit 3.2 mm thick offset washers (e, f) on the axle sleeve (d) and on the bolt (c) between the stopper arm (a) and the wheelchair side bracket (b).



In most cases where the head of the bolt (h) used to attach the plate lock (g) interferes with the stopper arm (a), the axle sleeve (d) must be offset outwards.
In this case, fit 3.2 mm thick offset washers (e) between the axle sleeve (d) and the stopper arm (a).



Normally, neither of the 2 O-rings fitted to the pin for the stopper arm (a) and the corresponding socket for the hole in the plate lock (g) is visible.
If the socket is too shallow, offset the plate lock (g) inwards. Fit 1.6 mm thick washers (i) between the plate lock (g) and the wheel drive unit assembly.

Note

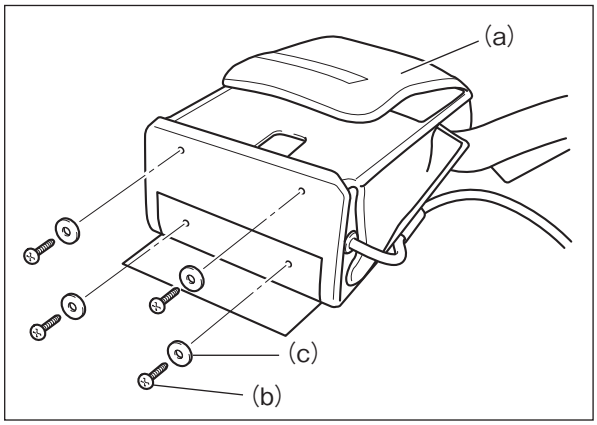
- **Use no more than 3 offset washers (i) on each side.**
- **Check that the nut seats are completely secure.**
- **Check that the parking brake seats are completely secure.**

Tightening torque	8.5 – 12 N·m

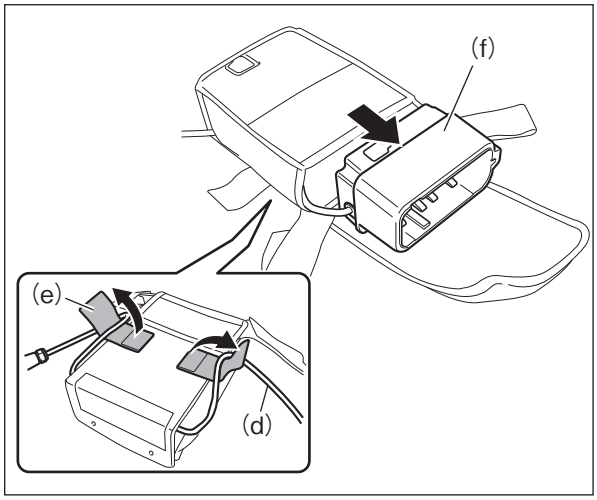
4.11 Adjusting the Battery Bag Cable Length (Separated Battery Seat Type)

Required tools: Phillips-head screwdriver

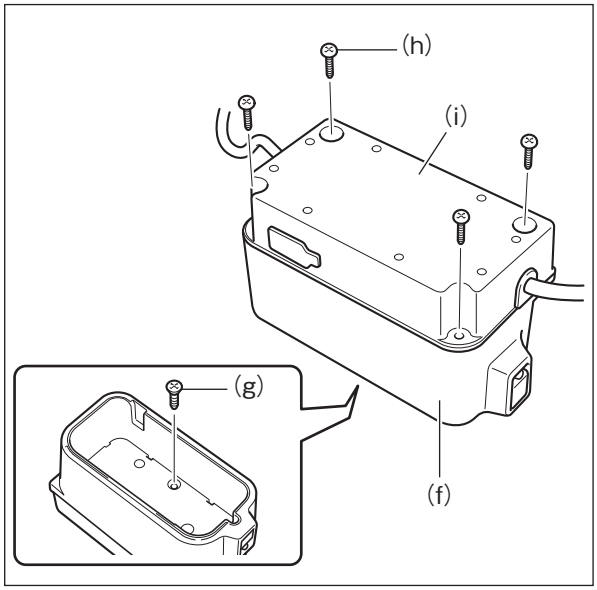
4.11.1 Disconnection Procedure



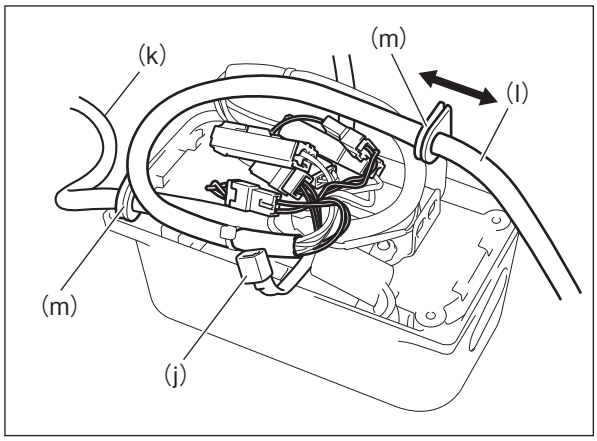
Step 1 **Remove the 4 screws (b) and washers (c) in the bottom of the battery bag (a).**



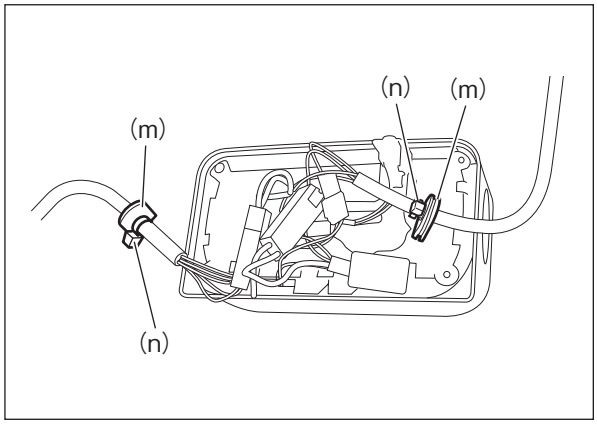
Step 2 **Remove the surface fastener (e) holding the cable (d) and remove the battery box (f) from the bag.**



Step 3 **Remove the screw (g) in the battery seat and then remove the 4 screws (h) in the bottom of the battery box and the cover (i).**



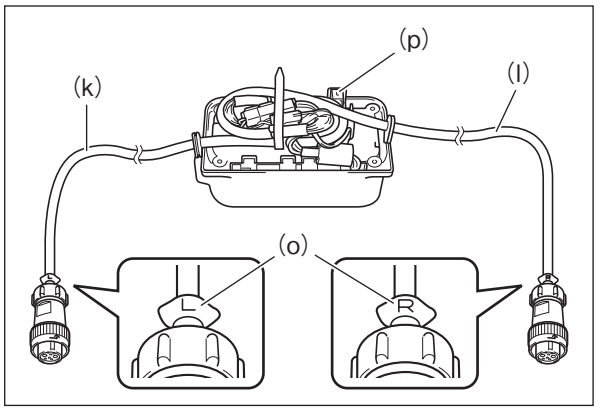
Step 4 **Remove the cable tie (j) and adjust the length of the left unit connecting cable (k) and the right unit connecting cable (l). Once you have set the length, slide the grommet (m) into place.**

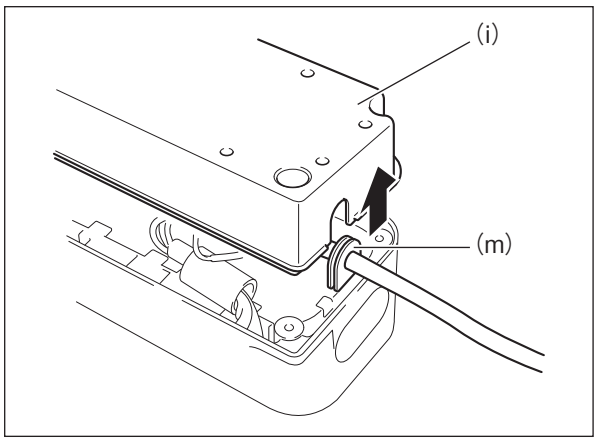


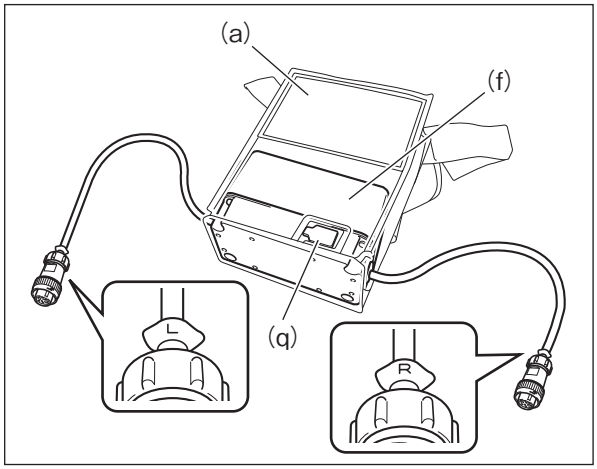
Note

- You can extend the cable until the grommet (m) touches the cable tie (n). The cable cannot be extended any further.

4.11.2 Reconnection Procedure







Reconnect the cables by carrying out the disconnection procedure in reverse, noting the points outlined below.

Note

- There are identification marks (o) on the ends of the left unit connecting cable (k) and the right unit connecting cable (l) indicating the side to which they should be connected. Connect the cables so that the identification marks match those on the coupler box, using the location of the pin jack (p) as a reference.
- Fit the grommet (m) securely into the slot in the cover (i).
- When attaching the cover (i), take care not to trap or pinch the cable.
- When fitting the battery box (f) into the bag, align the plug cap (q) with the position of the hole in the bag (a).

4.12 Checklist After Installing the Electric Power-Assist Unit

Item	Checked
Check that all components are securely tightened (recheck the installation status).	
The power switch and mode switch are not interfering with the tires or frame.	
When you get into or out of the wheelchair, your body does not hit the power switch and turn the power on.	
The power switch and mode switch cables are firmly secured.	
The stopper arm pin engages correctly with the plate lock hole. (In modular wheelchairs, the 2 O-rings should be hidden.)	
The anti-roll bar is installed correctly. (When the anti-roll bar makes contact with the ground, the caster height is no more than 10 cm and the auxiliary wheels on the anti-roll bar are behind the rearmost point of the rear wheels.)	
The cable condition (the cables are not stretched, are not trapped or pinched when the frame is collapsed, and are not tangled in or touching any moving parts)	
Check the tire pressures Standard : 20-inch···420kPa/4.2kg/cm^2; 22/24-inch···450kPa/4.5kg/cm^2	
Parking brake action	
Check for abnormal noise or vibration	
On removable models, check that the unit only releases when the handle plate is pulled.	
On Separated Battery Seat Types, check the battery bag installation (play or looseness in the top and bottom belts, the surface (hook and loop) fasteners on the upper and lower belts and on the bag cable retainers are fully pressed down and engaged, and the belts are not trapped or pinched when the frame is collapsed and are not tangled in or touching any moving parts)	
Name of tester, date	

5. Component Removal, Installation and Adjustment for Investigation and Repair

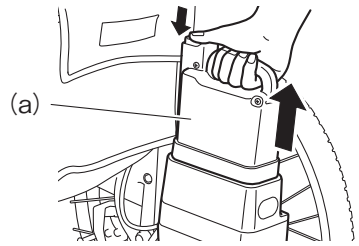
5.1 Removing and Re-installing the Handrim

Important

- The same procedure is used for removing and re-installing both the left and right handrims. Accordingly, the model description given below is for the right side. Use the same procedure for the left side.

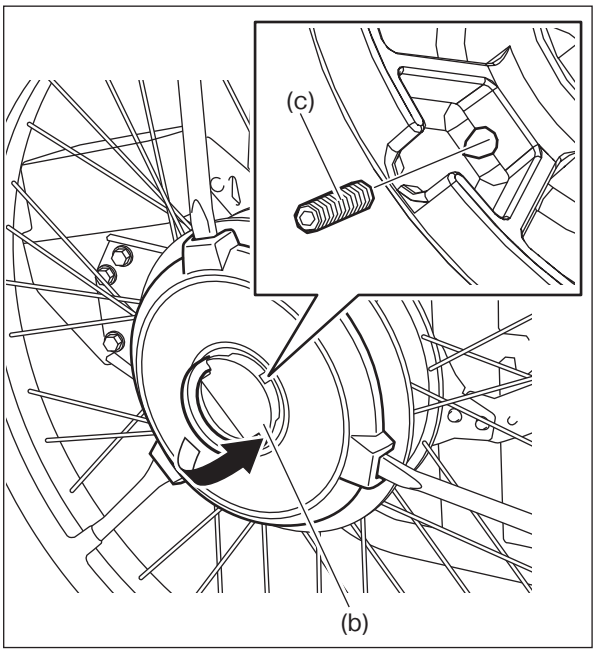
Required tools: 4 mm and 1.5 mm hexagonal wrenches (Allen keys), flat-head screwdriver

5.1.1 Removing the Handrim



The figure shows the procedure for a nickel-metal hydride battery.

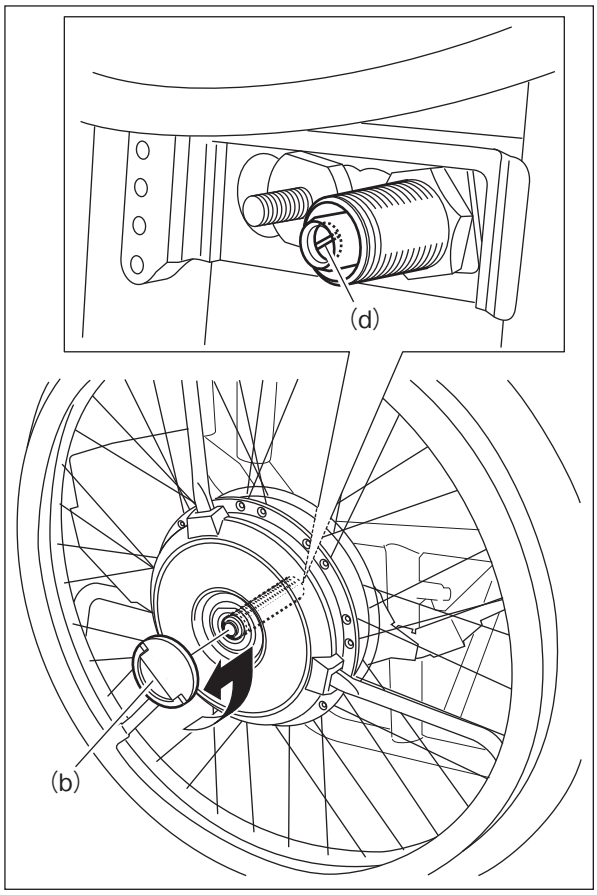
Step 1 Remove the battery (a).



Step 2 Release the rotation lock on the handle plate (b).

Raise the lever on the handle plate (b) and turn the lock screw (c) two or three times to loosen it.

Only loosen the screw; you do not need to remove it.

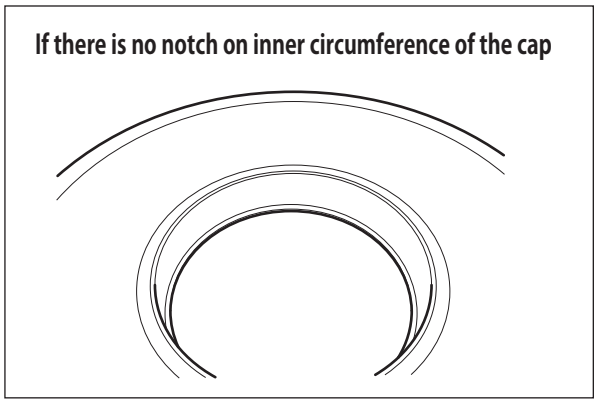


Step3 Remove the handle plate (b).

Turn the handle plate (b) counterclockwise to remove it.

Important

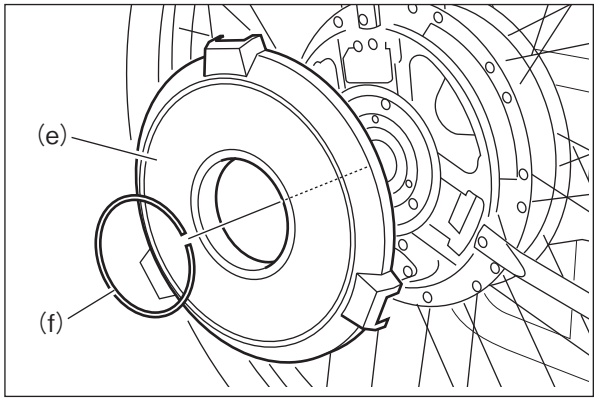
- Fit a flat-head screwdriver into the groove (d) in the end of the wheel axle on the inside of the chair to hold the axle so that it does not turn at the same time.



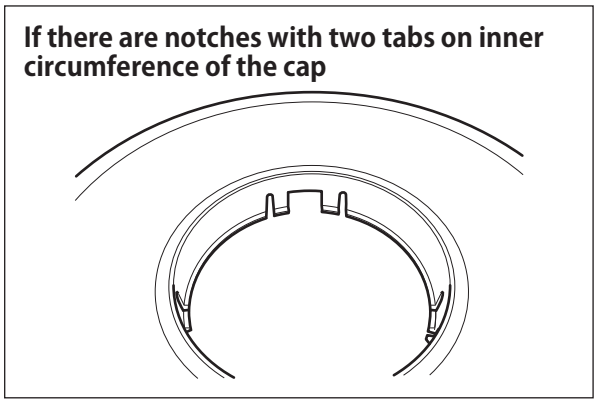
Step4 Remove the wheel cap assembly (e).

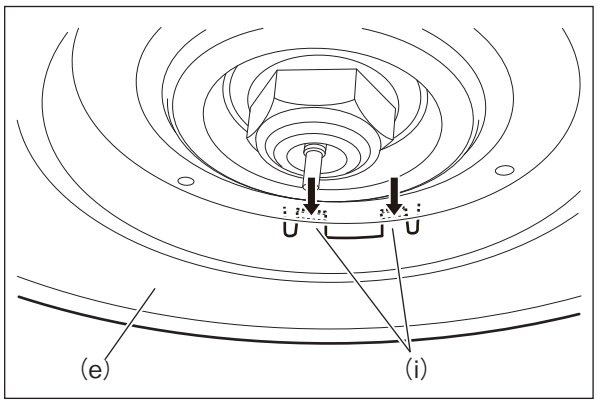
Important

- The wheel cap assembly comes in 3 different shapes. Depending on the shape, the removal and re-installation procedures differ. Use the correct procedure for your assembly shape.

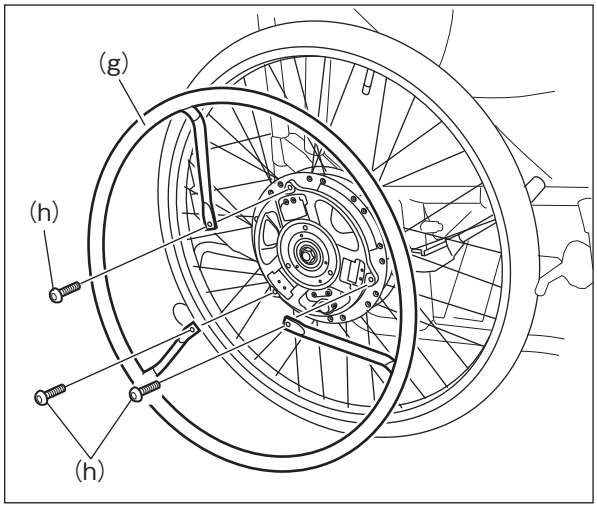


Remove the clip spring (f) and then remove the wheel cap assembly (e).





There are two tabs (i) in each location. With your finger or a similar implement, push the tabs out to remove them. Do this in two locations and remove the wheel cap assembly (e).



Step 5 Remove the handrim (g).

Remove the 3 bolts (h) and then remove the handrim (g).

5.1.2 Re-installing the Handrim

The re-installation procedure is simply the removal procedure in reverse.

Bolts (h)

Tightening torque	9.0 – 12.0 N·m

Lock screw (c)

Tightening torque	0.8 – 1.1 N·m

Note

- **Always use new bolts (h) Owhen re-installing the handrim (g). Re-using old bolts could cause the bolts to come loose.**
- **Do not tighten up the handle plate (b) so hard. Tighten with low torque and stop tightening when stopped by itself. Lock it by tightening the lock screw (c).**

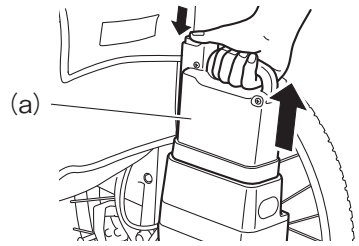
5.2 Removing and Re-installing the Wheel Assembly

Important

- The same procedure is used for removing and re-installing both the left and right wheel assemblies. Accordingly, the model description below is for the right side. Use the same procedure for the left side. In case a new wheel assembly was installed, the hand rim sensor has to be calibrated. See 5.10.

Required tools: 17 mm deep socket, socket wrench, 10 mm spanner

5.2.1 Removing the Wheel Assembly

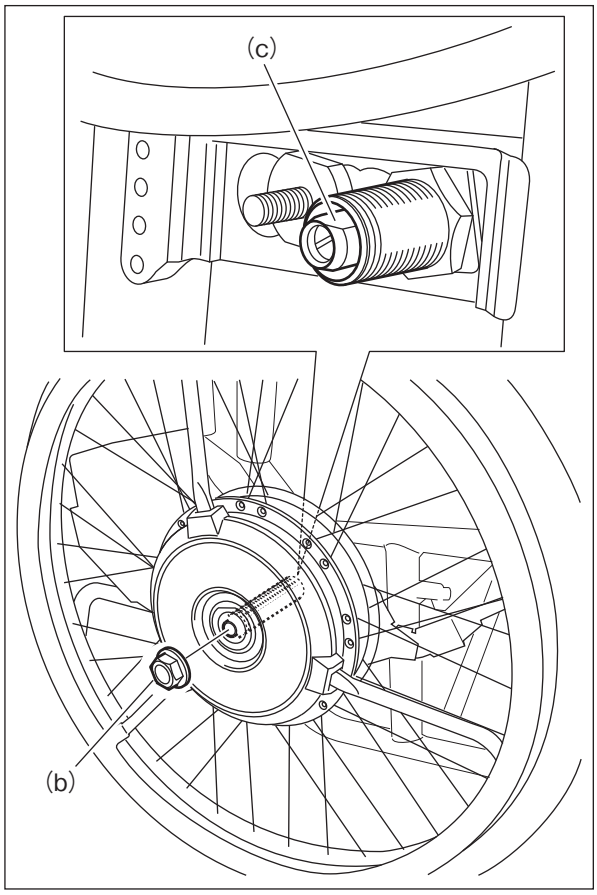


The figure shows the procedure for a nickel-metal hydride battery.

Step 1 Remove the battery (a).

Step 2 Remove the handle plate.

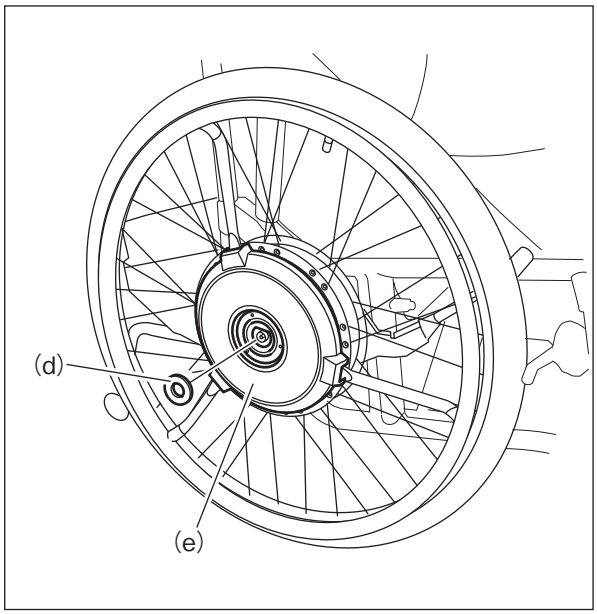
See “5.1 Removing and Re-installing the Handrim”.



Step 3 Remove the self-locking nut (b).

Important

- Use a spanner to hold the two flat sides (c) on the end of the wheel axle on the inside of the chair if the axle shaft turns when tightening the self-locking nut (b).



Step 4 Pull out the Wheel Assembly

Remove the washer (d) and wheel assembly (e), taking care not to damage the cables.

5.2.2 Re-installing the Wheel Assembly

The re-installation procedure is simply the removal procedure in reverse.

Self-locking nut (b)

Tightening torque	25.0 – 35.0 N·m

When the rear wheel assembly was replaced to new one, the spring covers should be re-assembled with adjustment.

Note

• Always use a new self-locking nut (b) when re-installing the wheel assembly (e). Re-using the old nut could cause the nut to come loose.

5.3 Removing and Re-installing the Circuit Board

Note

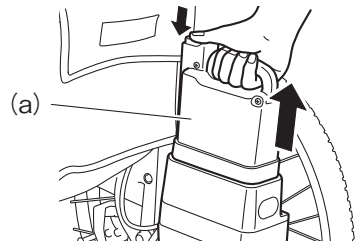
- **The circuit board is a precision electronic component. Do not expose it to static electricity or moisture. Doing so could cause a fault.**

Important

- The method for removing and re-installing the circuit board on the left is given here as a model. Use the same procedure for the circuit board on the right.

Required tools: Philips-head screwdriver

5.3.1 Removing the Circuit Board



The figure shows the procedure for a nickel-metal hydride battery.

Step 1 Remove the battery (a).

Warning

- **Always remove the battery. Failure to do so could result in an electric shock during the procedure.**

Step 2 Set the power switch to ON for 1 second.

With the battery removed and with the left/right units are connected by the cable, set the power switch to ON for 1 second to discharge any electricity in the board, and then set the power switch to OFF.

Note

- **Always discharge the circuit board. Failure to do so could result in a short-circuit and cause a fault.**

Step 3 Remove the wheel drive unit assembly L.

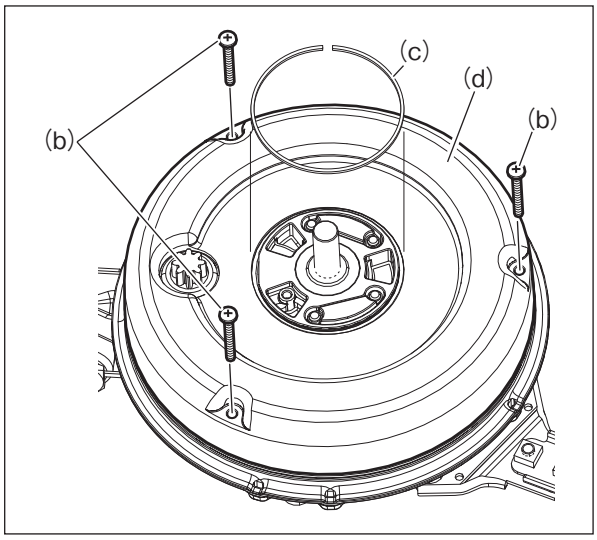
See “3.4 Installing and Removing and the Wheel Drive Unit Assembly”.

Step 4 Remove the handle plate and the wheel cap.

See “5.1 Removing and Re-installing the Handrim”.

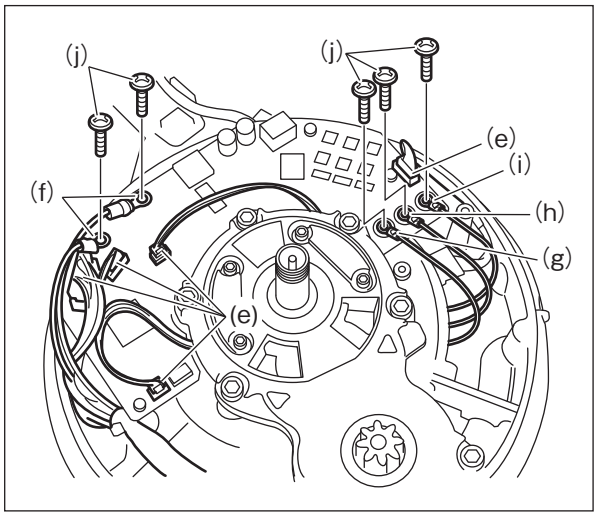
Step 5 Remove the wheel assembly.

See “5.2 Removing and Re-installing the Wheel Assembly”.



Step 6 Remove the transparent cover (d).

Remove the 3 screws (b) and the clip spring (c). Then remove the transparent cover (d).

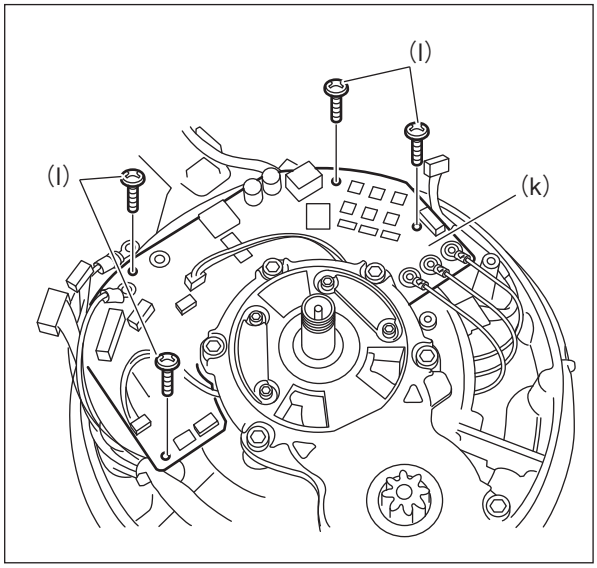


Step 7 Disconnect the coupler (e) and the cables (f, g, h, i).

1. Disconnect the 5 couplers (e) (6 couplers on the right).
2. Remove the 5 screws (j) and disconnect the 2 cables (f) and the 3 cables (g, h, i).

Note

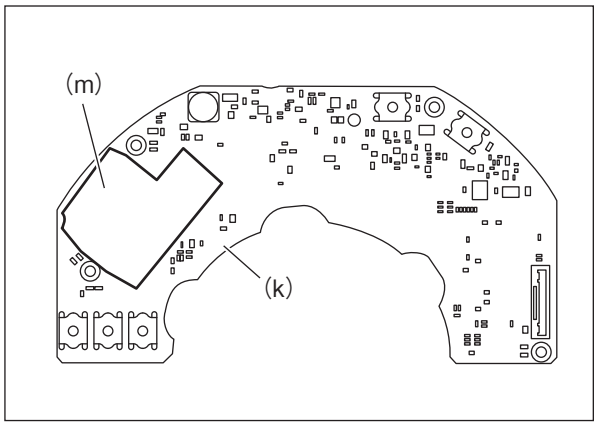
- **Take care not to bend the cables (g, h, i). Doing so could break the cables.**



Step 8 Remove the circuit board (k).

Remove the 4 screws (l) and then remove the circuit board (k).

5.3.2 Re-installing the Circuit Board

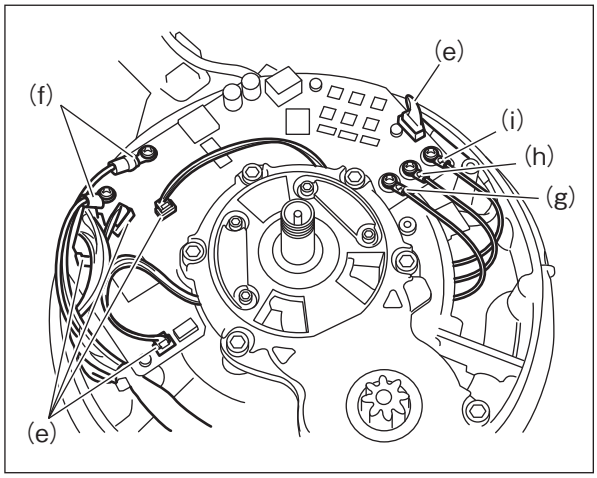


Step 1 Re-install the removed components.

The re-installation procedure is simply the removal procedure in reverse, but care should be taken with the items below.

Note

- **Before re-installing the circuit board (k), check that the heat dissipation sheet (m) is neatly affixed. If the sheet is not stuck down properly, fix it in place neatly.**



Note

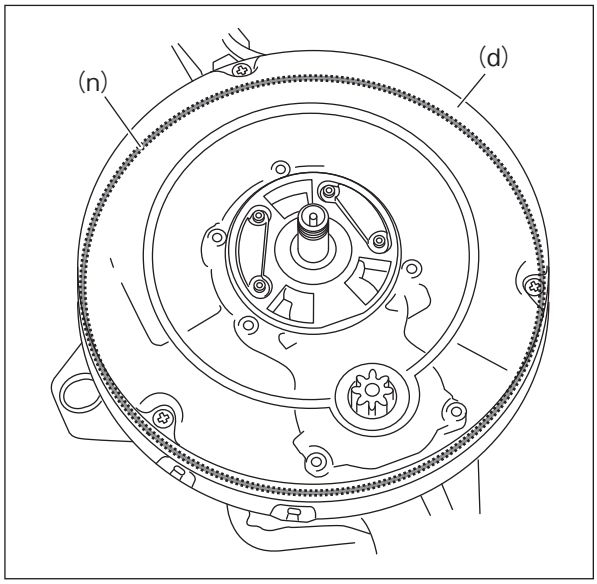
- **Run the cables (f, g, h, i) and the couplers (e) as shown in the figure and connect them to their respective terminals.**

Screws (l) fixing the circuit board

Tightening torque	0.4 – 0.6 N·m

Screws (j) fixing the wire terminals

Tightening torque	0.4 – 0.6 N·m



Note

- **Re-install the transparent cover (d), ensuring that the O-ring (n) is not twisted or pinched and that the cables (f, g, h, i) are not pinched.**

Screws (b)

Tightening torque	1.5 – 2.5 N·m

Step 2 Copy the setting data.

See “5.9 Copying Setting Data”.

Step 3 Calibrate the torque sensor neutral position.

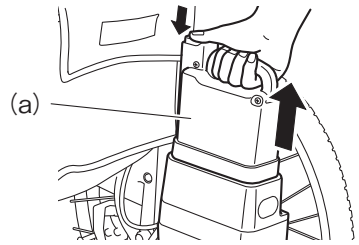
See “5.10 Calibrating the Handrim Sensor Neutral Position”.

5.4 Removing and Re-installing the Coupler Box

This explanation of how to remove and re-install the coupler box describes the procedure for the left side as a guide for both sides. The procedure for the right side is the same.

Required tools: Nippers, Phillips-head screwdriver, 10 mm socket, socket wrench, 2.5 mm hexagonal wrench (Allen key), torque wrench

5.4.1 Removing the Coupler Box



The figure shows the procedure for a nickel-metal hydride battery.

Step 1 Remove the battery (a).

Step 2 Discharge the electricity in the circuit board.

To discharge the electricity in the circuit board, remove the battery and set the power switch to ON for 1 second and the set it back to OFF.

Note

- **You must always discharge the circuit board. Failure to do so could result in a short-circuit and damage the circuit board.**

Step 3 Remove the left-hand wheel drive unit assembly.

See “3.4 Installing and Removing the Wheel Drive Unit Assembly”.

Step 4 Remove the handle plate or cap.

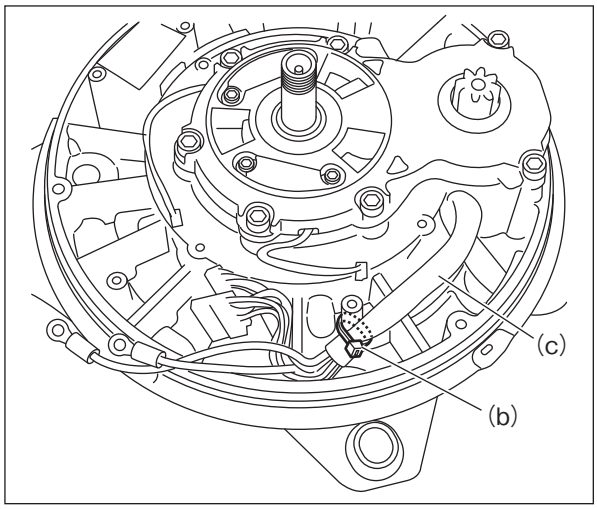
See “5.1 Removing and Re-installing the Handrim”.

Step 5 Remove the wheel assembly.

See “5.2 Removing and Re-installing the Wheel Assembly”.

Step 6 Remove the circuit board.

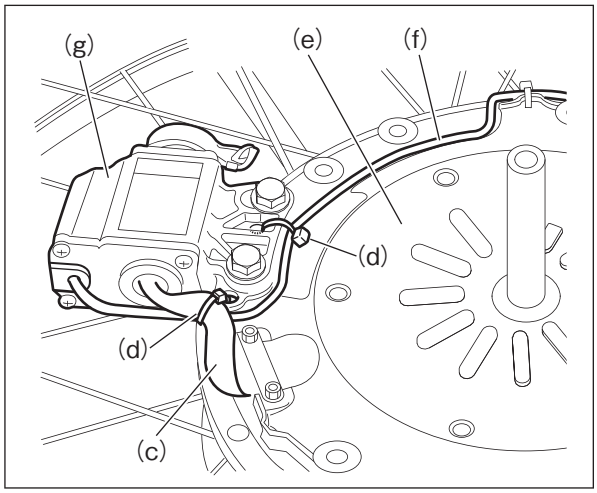
See “5.3 Removing and Re-installing the Circuit Board”.



Step 7 Cut the cable tie (b).

Note

- **When cutting the cable tie (b), take care not to also cut the cable (c).**

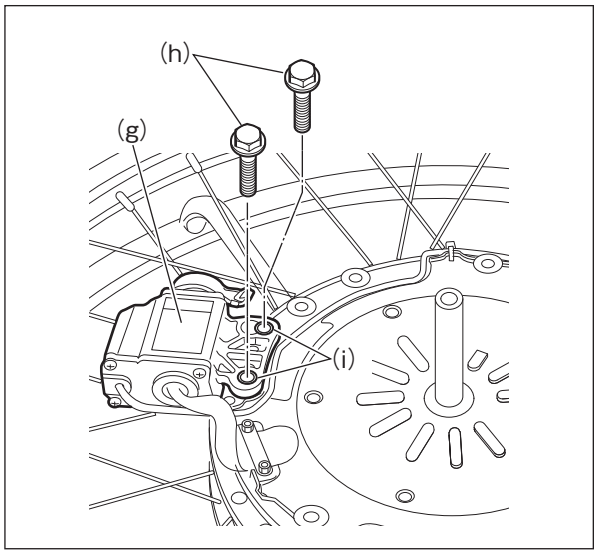


Step 8 Cut the cable tie (d).

Turn the drive unit (e) over and cut the cable tie (d) holding the cables (c, f) to the coupler box case (g).

Note

- **When cutting the cable tie (d), take care not to also cut the cables (c, f).**

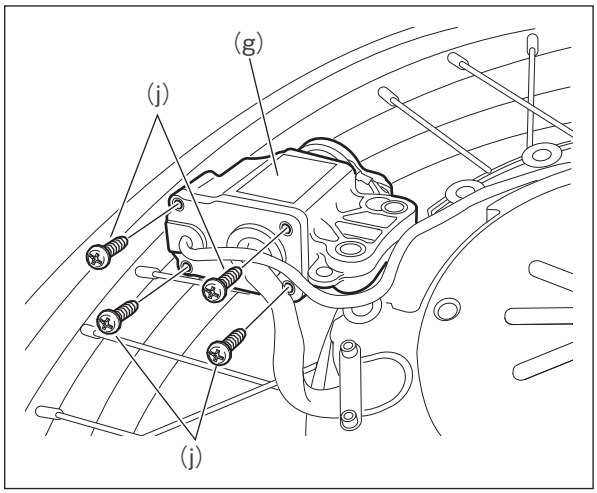


Step 9 Remove the coupler box case (g).

Remove the 2 bolts (h) and remove the coupler box case (g).

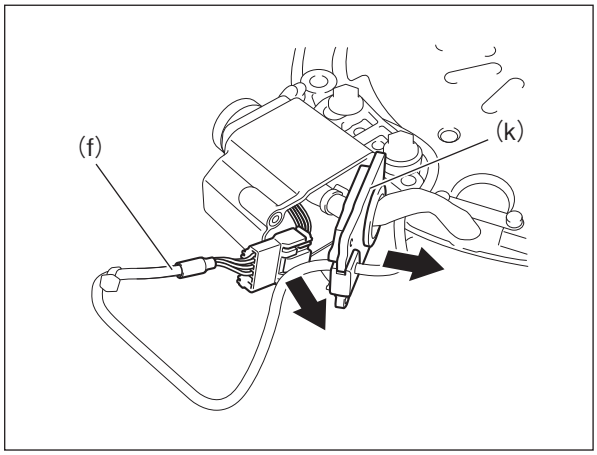
Note

- **Take care not to lose the collars (i).**

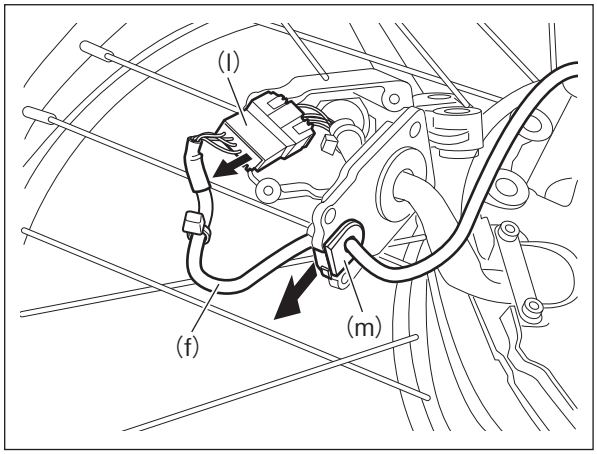


Step 10 Remove the screws (j).

Remove the 4 screws (j) holding the coupler box case (g).

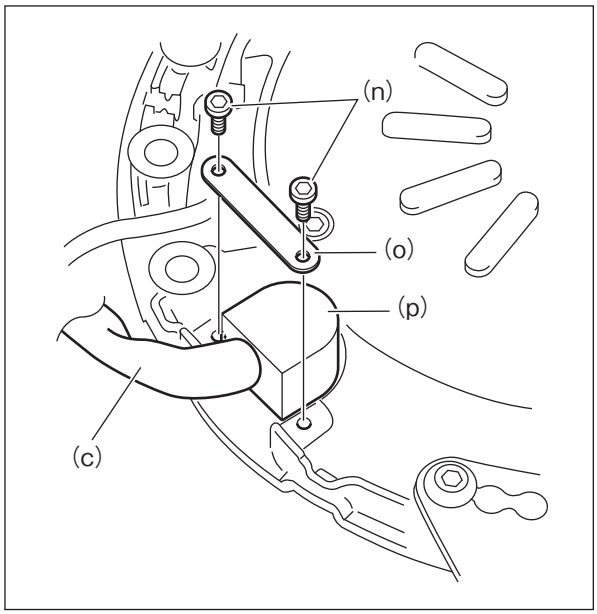


Step 11 Open the coupler box bottom cover and pull out the cable (f).



Step 12 Disconnect the mode switch cable (f).

1. Disconnect the coupler (l) on the end of the mode switch cable.
2. Slide the grommet (m) out of its slot.



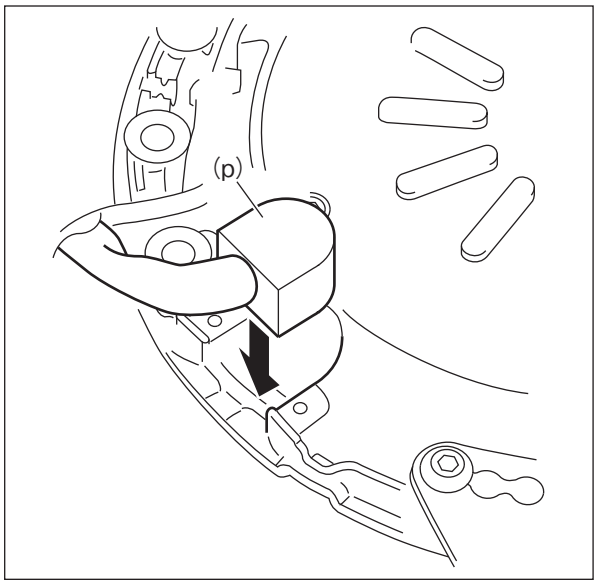
Step 13 Disconnect the coupler box cable (c).

1. Remove the 2 bolts (n).
2. Remove the plate (o) and the grommet (p) and pull out the coupler box cable (c).

Note

- **To avoid damaging the cable (c) or the terminal, do not use excessive force when pulling out the cable.**

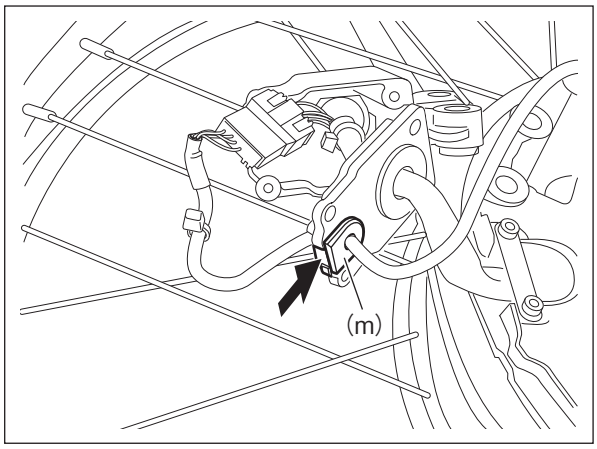
5.4.2 Re-installing the Coupler Box

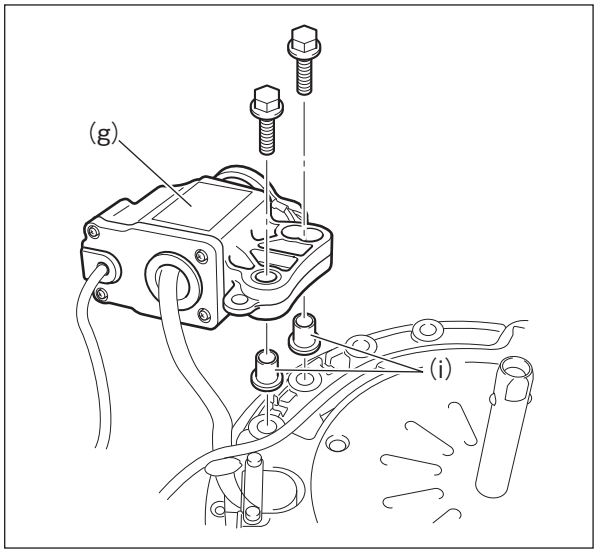


Re-install the coupler box by carrying out the removal procedure in reverse, noting the points outlined below.

Note

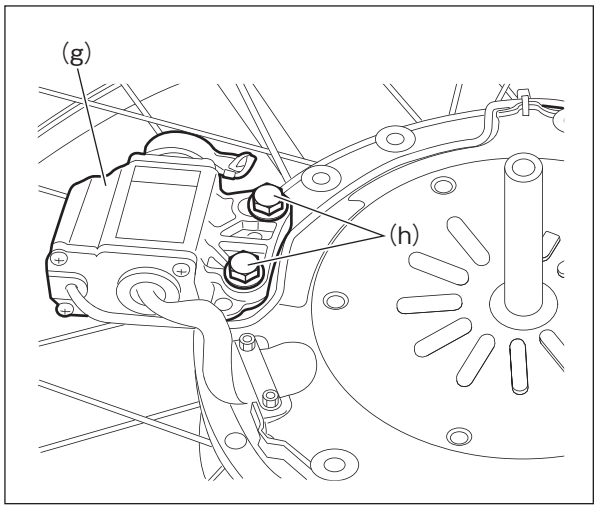
- To avoid damaging the cable or the terminal, do not use excessive force when re-inserting the cable.
- Push the grommets (p and m) fully and securely back into their respective slots.





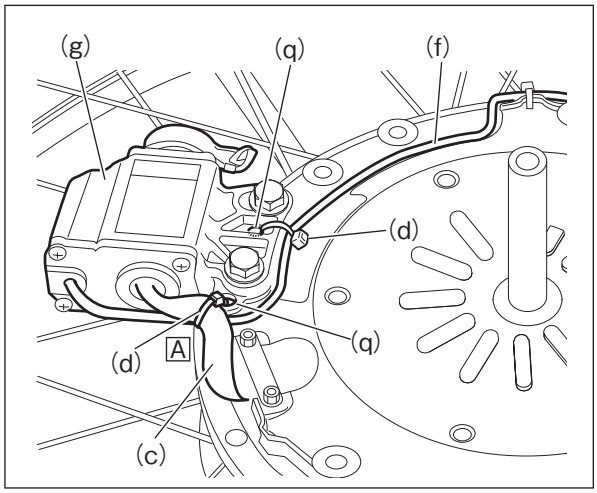
Note

- Install the collars (i) in the coupler box case (g) during assembly.



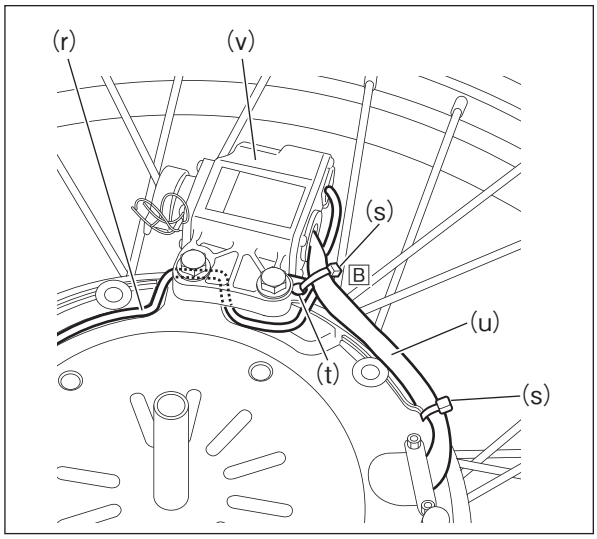
Note

- When tightening the bolts (h) used to install the coupler box case (g), the torque must be set to between 8.0 and 13.0 N·m.



Note

- Run the cable tie (d) through the hole (q) in the coupler box case to secure the cable.
- In section A, bundle together the coupler box cable (c) and the switch cable (f) and secure them to the coupler box case (g) with a cable tie (d).



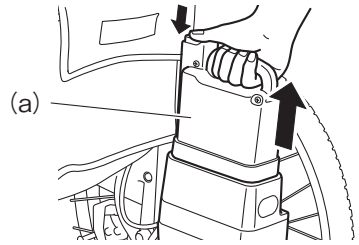
Note

- For the right-hand wheel drive unit assembly, run the cables (r) as shown in the figure.
- Run the cable tie (s) through the hole (t) in the coupler box case to secure the cable.
- In section B, bundle together the coupler box cable (u) and the switch cable (r) and secure them to the coupler box case (v) with a cable tie (s).

5.5 Removing and Re-installing the L/R Connecting Cable (Standard Battery Seat Type)

Required tools: Philips-head screwdriver

5.5.1 Removing the L/R Connecting Cable

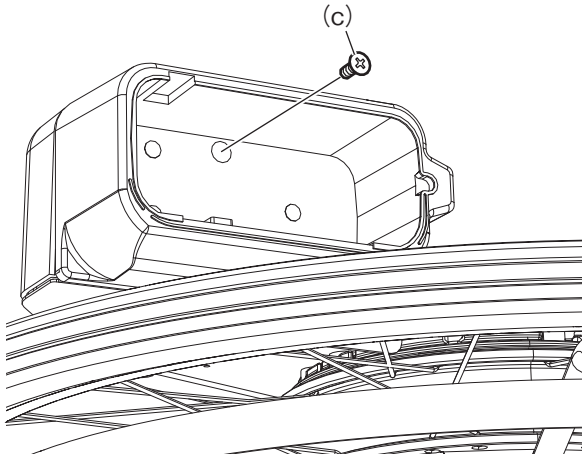


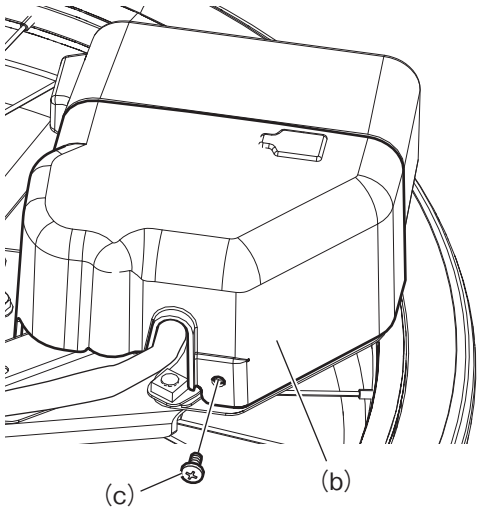
The figure shows the procedure for a nickel-metal hydride battery.

Step 1 Remove the battery (a).

Step 2 Dismount the wheel drive unit assembly R.

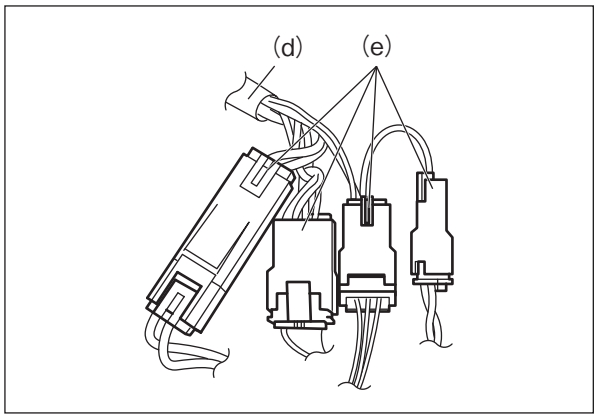
See “3.4 Installing and Removing the Wheel Drive Unit Assembly”.





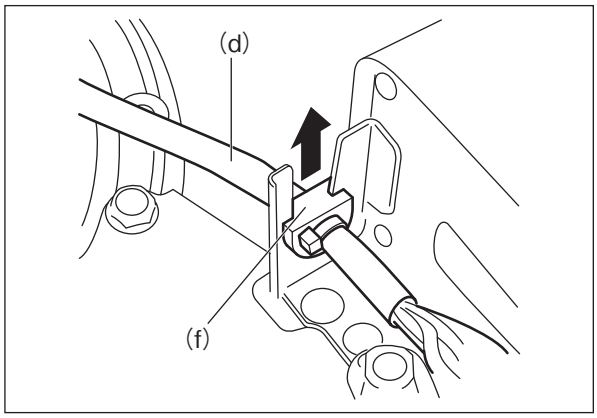
Step 3 Remove the battery seat cover (b).

Remove the 2 screws (c) and then remove the battery seat cover (b).



Step 4 Disconnect the couplers (e) for the L/R connecting cable (d).

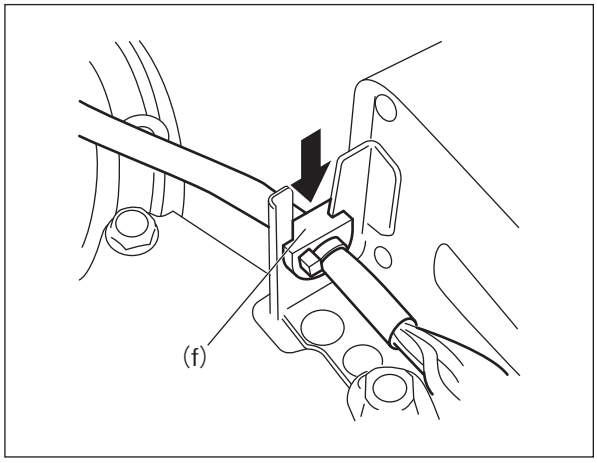
Disconnect the 4 couplers (e) on the end of the L/R connecting cable (d) in the battery seat cover (b).



Step 5 Remove the grommet (f) for the L/R connecting cable (d).

Slide the grommet (f) for the L/R connecting cable (d) upwards to remove it.

5.5.2 Re-installing the L/R Connecting Cable



The re-installation procedure is simply the removal procedure in reverse, but care should be taken with the items below.

Note

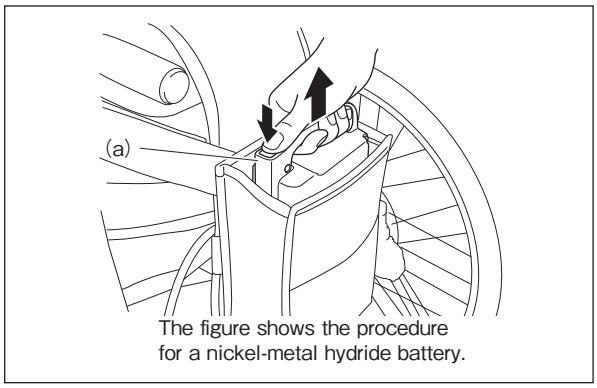
- **Push the grommet (f) firmly and securely into its slot.**

Battery seat cover fixing screws (c)

Tightening torque	2 – 3.5 N·m

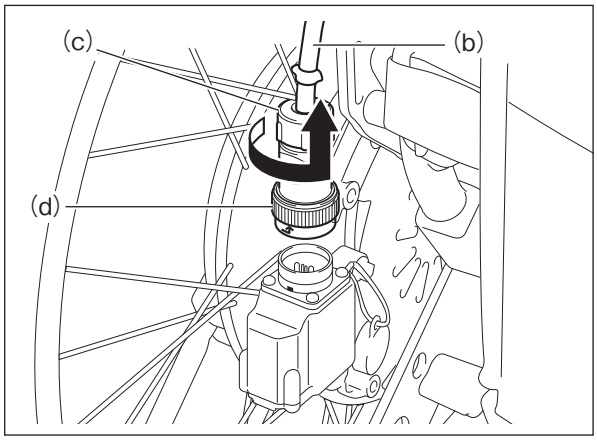
5.6 Removing and Re-installing the Battery Bag

5.6.1 Removing the Battery Bag



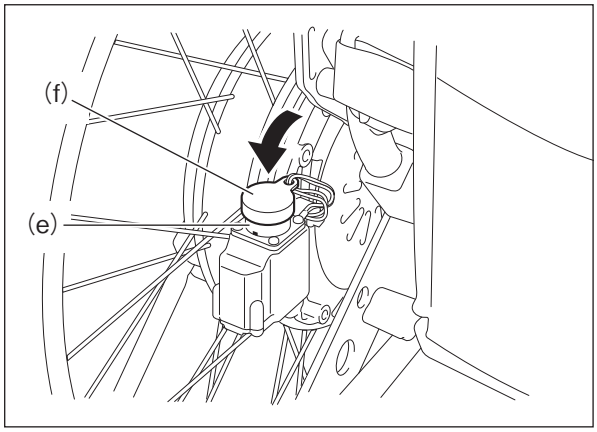
The figure shows the procedure for a nickel-metal hydride battery.

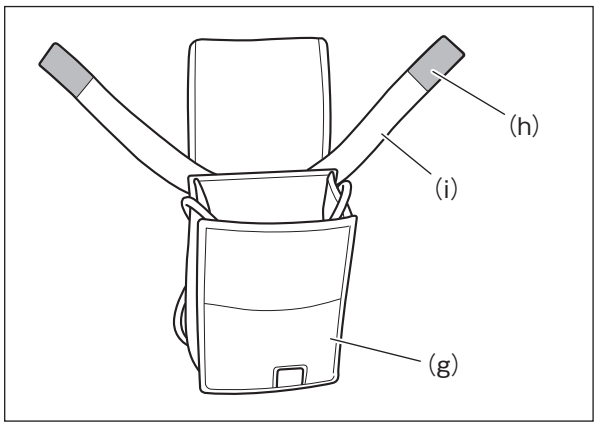
Step 1 Remove the battery (a).



Step 2 Disconnect the left-right cable (b).

1. Turn the ring (d) on the coupler (c) on the end of the cable (b) and pull the cable upwards to disconnect it.
2. Place the cap (f) over the coupler (e).





Step 3 Remove the battery bag (g).

Disconnect the surface fastener (h) and pull out the belt (i).
Disconnect all belts (i) and remove the battery bag (g).

5.6.2 Re-installing the Battery Bag

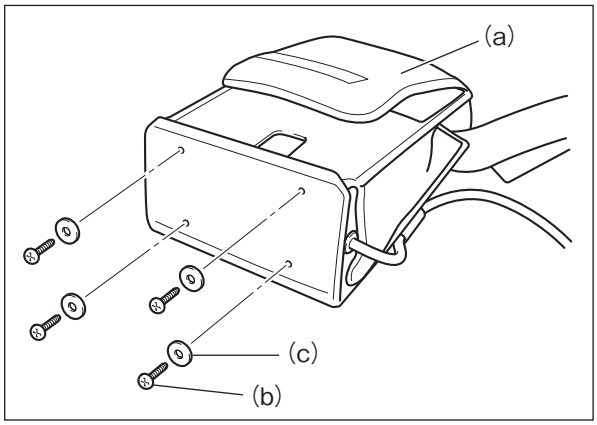
The installation procedure, see 3.3 Battery Bag Installation (Separated Batttery Seat Type).

5.7 Removing and Re-installing the L/R Connecting Cable and Coupler (Separated Battery Seat Type)

- This explanation of how to remove and re-install the L/R connecting cable and coupler describes the procedure for the JW Swing as a guide for other models also. The procedure for the E-Move Separated **Bat**tery Seat Type is the same.
- The L/R connecting cable is a cable that connects to the left-hand power unit assembly. The coupler is a cable that connects to the right-hand power unit assembly.

Required tools: Phillips-head screwdriver

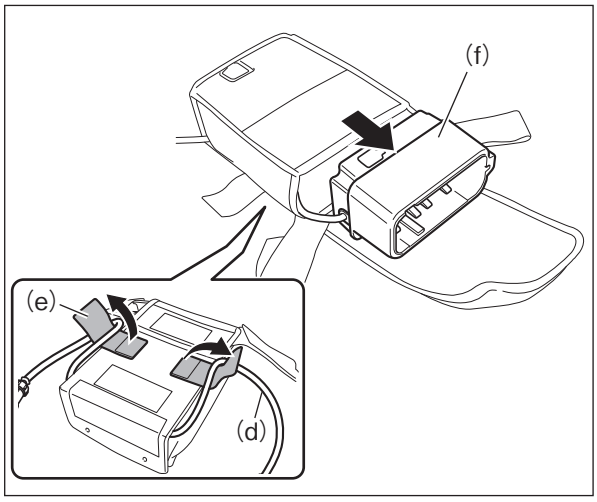
5.7.1 Removing the L/R Connecting Cable and Coupler



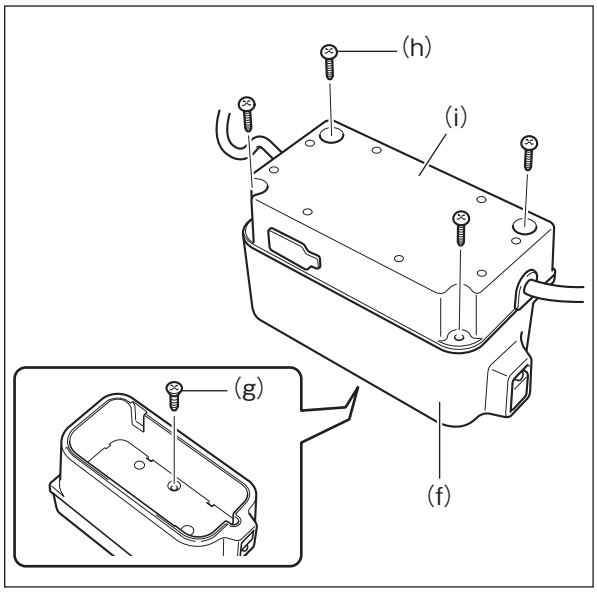
Step 1 **Remove the battery bag (a).**

See "5.6 Removing and Re-installing the Battery Bag".

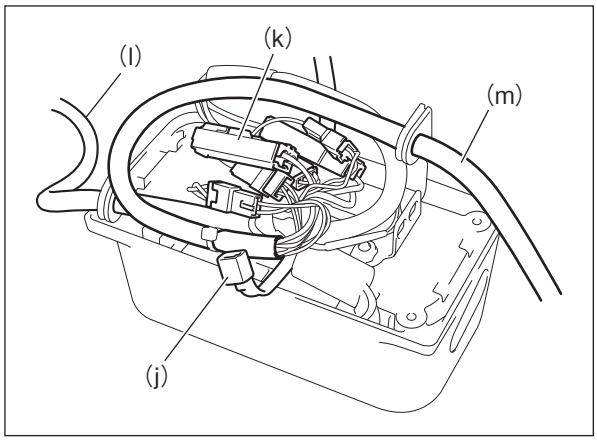
Step 2 **Remove the 4 screws (b) and washers (c) in the bottom of the bag.**



Step 3 **Remove the surface fastener (e) holding the cable (d) and remove the battery box (f) from the bag.**

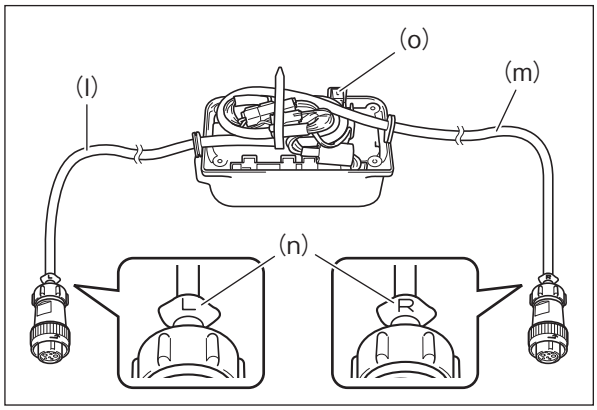


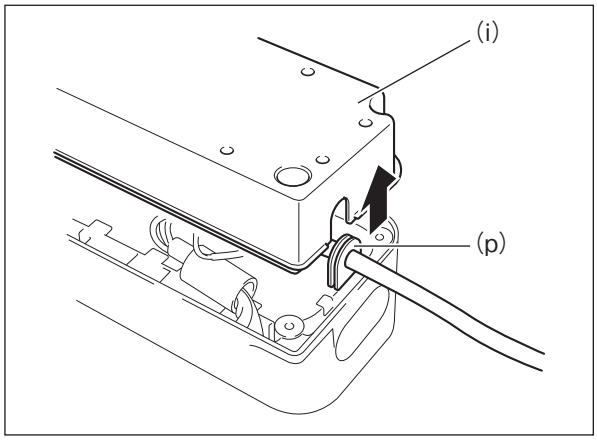
Step 4 **Remove the screw (g) in the battery seat and then remove the 4 screws (h) in the bottom of the battery box (f) and the cover (i).**

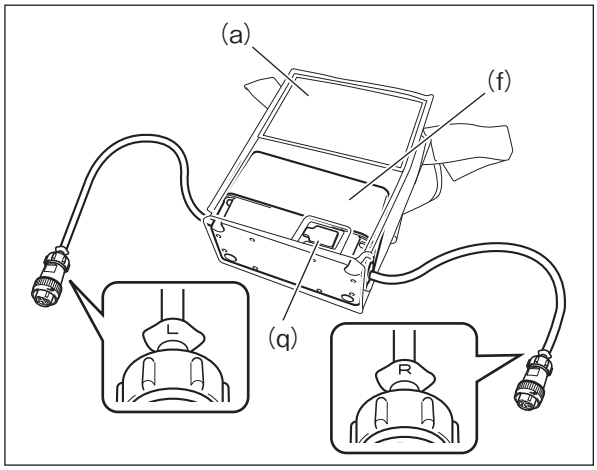


Step 5 Remove the cable tie (j) and the 6 couplers (k), and then disconnect the L/R connecting cable (connection to the left side) (l) and the coupler (connection to the right side) (m).

5.7.2 Re-installing the L/R Connecting Cable and Coupler







Re-install the L/R connecting cable and coupler by carrying out the removal procedure in reverse, noting the points outlined below.

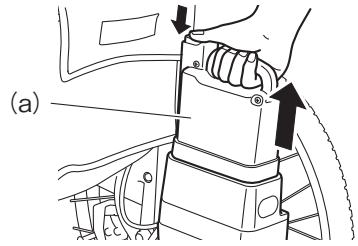
Note

- There are identification marks (n) showing the connection direction on the end of the L/R connecting cable (connection to the left side) (l) and the coupler (connection to the right side) (m). Connect the cables so that the identification marks match those on the coupler box, using the location of the pin jack (o) as a reference.
- Fit the grommet (p) securely into the slot in the cover (i).
- When attaching the cover (i), take care not to trap or pinch the cable.
- When fitting the battery box (f) into the bag, align the plug cap (q) with the position of the hole in the bag (a).

5.8 Adding and Removing the Springs

The handrims are equipped with 1 or 2 set(s) of spring(s).
You can adjust the force in the springs by adding or removing a spring. (There are 3 spring slots on the unit)

Required tools: 1.5 mm and 4.0 mm hexagonal wrenches (Allen keys)

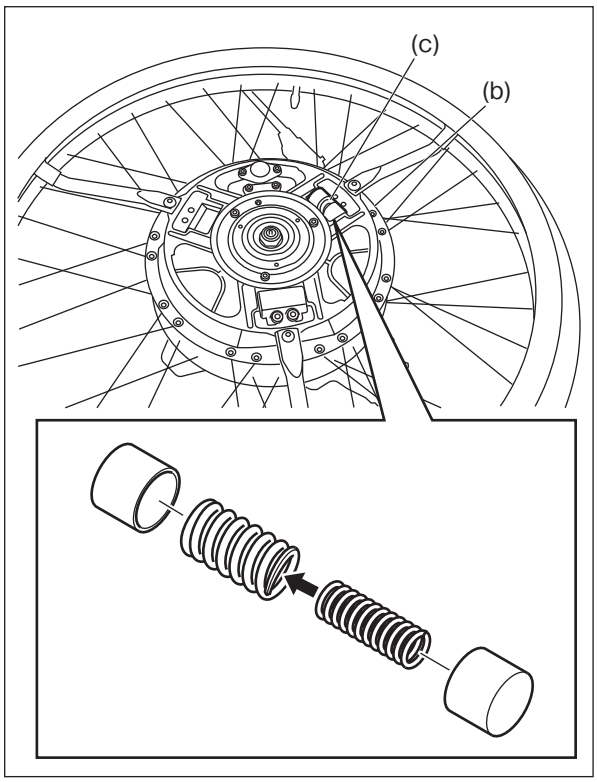


The figure shows the procedure for a nickel-metal hydride battery.

Step 1 Remove the battery (a).

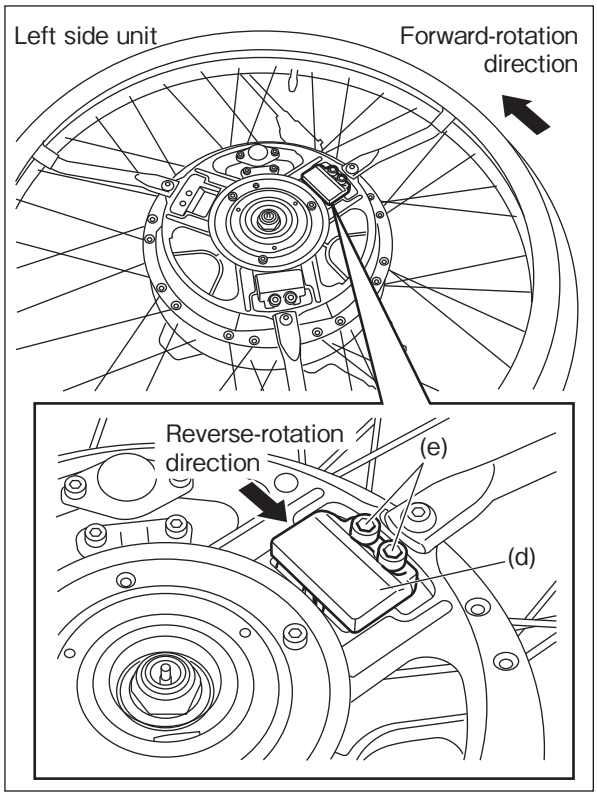
Step 2 Remove the handle plate and the wheel cap.

See “5.1 Removing and Re-installing the Handrim”.



Step 3 Add or remove the spring (c).

Install the spring (c) in the wheel assembly (b).
Alternatively, remove the spring.
At least one set of springs must be installed on one of the wheels.



Step 4 Re-install the cover (d).

Re-install the cover (d) and tighten the hexagon-socket head bolts (e).

Tightening torque	6.0 – 9.5 N·m

Note

- **Apply force to the cover (d) in the reverse-rotation direction to ensure that there is no play, and then tighten the hexagon-socket head bolts (e) to lock the cover in place.**
- **The figure shows the procedure for the left unit. For the right side unit, apply force to the cover (d) in the reverse direction.**

Step 5 Re-install the removed components.

To re-install the components, use the removal procedure in reverse.

Step 6 Calibrate the torque sensor neutral position.

See “5.10 Calibrating the Handrim Sensor Neutral Position”.

Note

- **Always calibrate the neutral position whenever you add or remove springs. Failing to calibrate the neutral position will cause an error when the power is switched on or cause the unit to malfunction.**

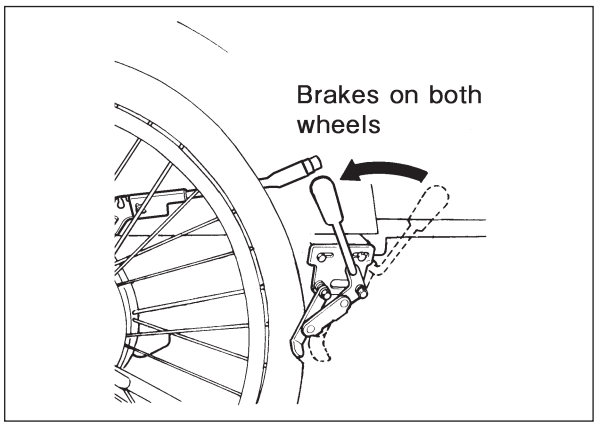
5.9 Copying Setting Data

When the circuit board is replaced, first, copy the setting data with the way described in this section, and calibrate the sensor neutral position next. When the circuit board is replaced, the setting data for the driving parameters set by “JW Smart Tune” is lost, so the setting data should be copied. The copying way from the left-hand to the right-hand circuit board is described below.

Important

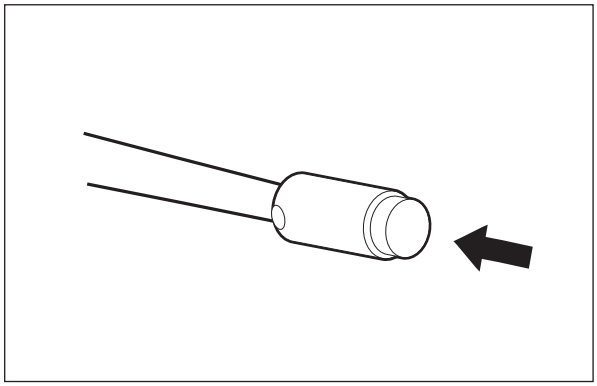
- The same setting data values are stored on the left and right circuit boards. So the stored setting data can be copied.
- The example given here describes the procedure for copying setting data from the left-hand to the right-hand circuit board. To copy the data from the right-hand to the left-hand circuit board, simply use the same procedure replacing “right” with “left” .

Copying from Left unit to Right unit



Step 1 Park the wheelchair.

Park the wheelchair on a level place. Apply the parking brake.

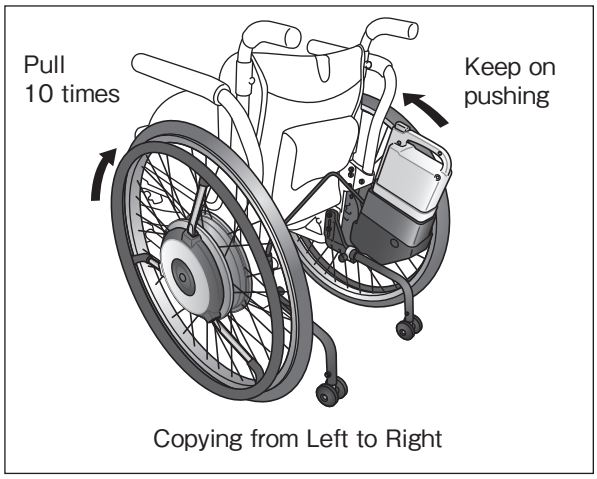


Step 2 Switch to Service mode.

Set the power switch to ON.
In case one of the circuit boards was replaced to the new one, an error will be detected, the buzzer emits a single beep and the unit switches to Service mode.

Important

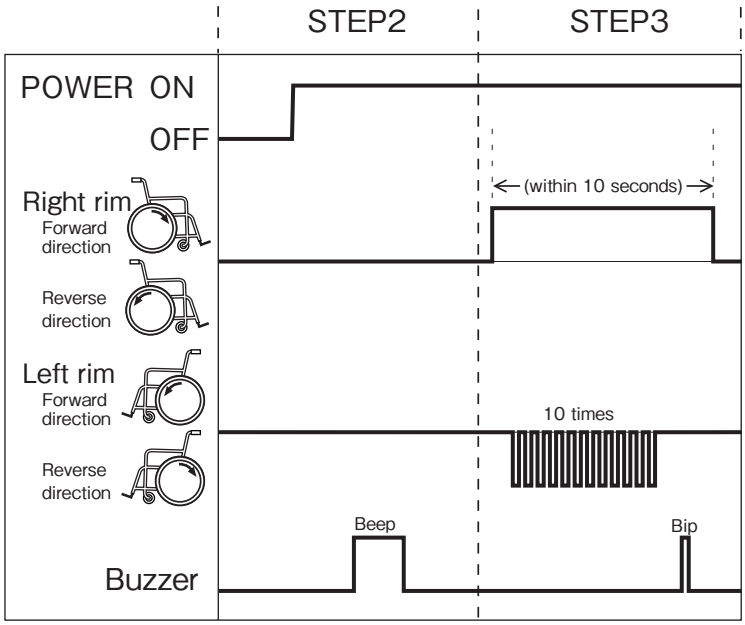
- If you have replaced the circuit board, simply setting the power switch to ON switches the unit to Service mode.



Copying from Left to Right

*Step*3 Copy the setting data.

1. Push the right-hand wheel assembly handrim forward and hold it in that position as you pull the left-hand handrim in the reverse direction 10 times. Ensure that you start pulling the left-hand handrim within 10 seconds of pushing the right-hand handrim forward.
   On the 10_{th} push, the buzzer will emit a single short beep indicating that setting data copying is completed.
2. Return the handrim to the neutral position. (Slowly let go off the handrim.)



Copying from Left to Right

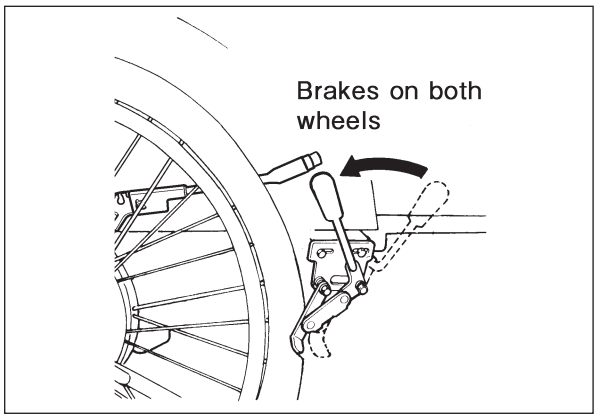
5.10 Calibrating the Handrim Sensor Neutral Position

If you have replaced the wheel assembly or circuit board, you should also calibrate the handrim sensor neutral position since the neutral position will have been lost. The calibration way for RIGHT-HAND is described bellow. In case the circuit board was replaced, copy the setting data before calibrate the neutral position.

Important

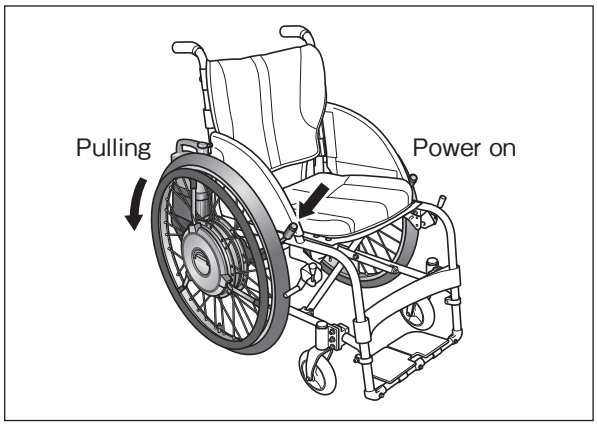
- The example given here describes neutral position calibration for the right-hand wheel assembly. For the left-hand wheel assembly, simply use the same procedure replacing "right" with "left" .

Right unit calibration



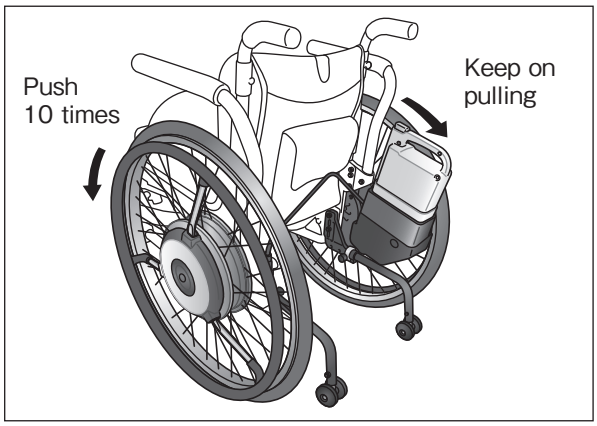
Step 1 Park the wheelchair.

Park the wheelchair on a level place. Apply parking brake.



Step 2 Switch to Service mode.

1. Set the power switch to On while pulling the right-hand wheel assembly handrim in the reverse direction.
   An error is detected, the buzzer emits a single beep and the unit switches to Service mode.
2. Return the handrim to the neutral position. (Slowly let go off the handrim.)

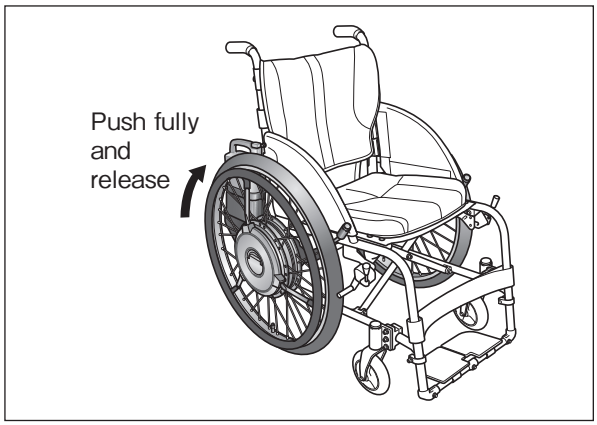


Step 3 Switch to Neutral Point Calibration mode.

1. Pull the right-hand wheel assembly handrim in the reverse direction and hold it there as you push the left-hand handrim in the forward direction 10 times.
   On the 10_{th} push, the buzzer will emit a single short beep ("bip").
2. Return the handrim to the neutral position. (Slowly let go off the handrim.)

Important

- Step 3 should be performed within 10 seconds. If the procedure fails, briefly set the power switch to OFF and repeat the procedure from the beginning.

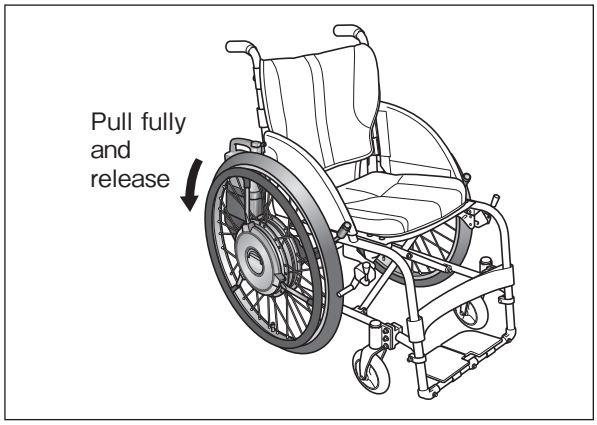


Step 4 Store the forward direction signal.

When the buzzer emits a series of 12 short beeps, push the right-hand wheel assembly handrim forward once as far as it will go and then return the handrim to the neutral position. (Slowly let go off the handrim.)

Important

- Move the handrim while the buzzer is emitting the series of 12 short beeps.
- The buzzer emits a series of 12 short beeps in almost 7 seconds followed by a single long beep.

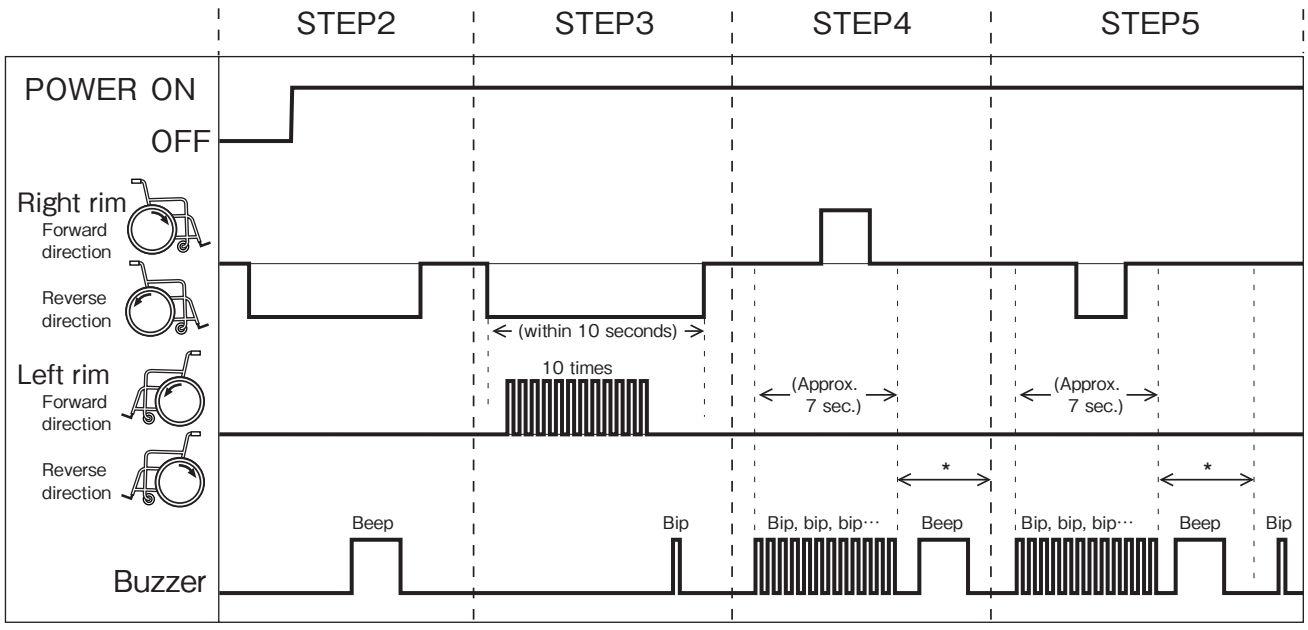


Step 5 Store the reverse direction signal.

1. When the buzzer again emits a series of 12 short beeps, pull the right-hand wheel assembly handrim in the reverse direction once as far as it will go and then return the handrim to the neutral position. (Slowly let go off the handrim.)

Important

- Move the handrim while the buzzer is emitting the series of 12 short beeps.
- The buzzer emits a series of 12 short beeps followed by a single long beep.



* You must let go of the handrim during this period.

Right side neutral position calibration.

6. JW Smart Tune

The E-Move features the “JW Smart Tune” dedicated software that allows its functions and running charac-teristics to be tailored to suit the user’s physical condition and the way the unit is used. The running characteristics can also be stored as Mode 1 and Mode 2, and installing the optional mode switch makes it easy to switch between the two modes.

JW Smart Tune configures the “Function parameters” and the “Driving parameters”.

Function parameters
- ① Auto power off time
- ② Buzzer tone
- ③ Switch brightness
- ④ Mode switch setting

Driving parameters
- ① Assisting motor power
- ② Assist speed limit
- ③ Going Straight/Turning Characteristics setting
- ④ Response Level and left/right balance adjustment

For more details, refer to the JW Smart Tune Instruction Manual supplied separately.

7. Warnings

7.1 Warnings List

If the E-Move malfunctions while it is being used, or if an error occurs that can be recovered through a sim-ple procedure, the buzzer sounds and a warning is displayed on the LED.
When a warning is issued, resolve the problem as outlined below.

Related circuit board	Warning detail display					Item	Occurrence conditions	System response	Recovery conditions
	Right-hand unit		Left-hand unit		Buzzer				
	Alarm LED	3-color LED	Alarm LED	3-color LED					
Right driver board	Blinks	Blinks yellow	Blinks		Short beeps (continuous)	Torque limit 1	The temperature of the motor or circuit board has exceeded the specified value.	Limits maximum motor current to 75%	Temperature drops.
	Blinks	Blinks yellow	Blinks			No BMC communication	No signals are coming from the battery (BMC).	Able to continue running	Signals from the BMC will resume.
	Blinks	Blinks yellow	Blinks		Short beeps (continuous)	Battery current limit	The battery is outside its normal temperature range (1: –5° C or below; 2: –10° C or below; 3: 60° C or above), or the BMC has exceeded its normal temperature range (4: 100° C or above).	1: Limits the battery current to 16A or below 2: Limits the battery current to 8A or below 3: Limits the battery current to 10A or below 4: Limits the battery current to 10A or below	Restore normal temperature.
	Blinks	Blinks yellow	Blinks		Emits 4 short beeps 4 times	Battery low warning (communication normal)	Battery level at 5–10% or less	Able to continue running	Charge the battery and turn the power on again.
	On		On		Emits 5 beeps, pauses 5 seconds and then beeps for 2.5 seconds	Battery flat (communication normal)	Battery level is at 0.	Slows down and stops to assist.	Charge the battery and turn the power on again.
	Blinks	Blinks yellow	Blinks		Emits 4 short beeps 4 times	Battery low warning (no communication)	With no communication, the battery voltage is at “specified value 2” or below.	Able to continue running	Charge the battery, turn the power on again and signals from the BMC will resume.
	On		On		Emits 5 beeps, pauses 5 seconds and then beeps for 2.5 seconds	Battery flat (no communication)	With no communication, the battery voltage is at “specified value 1” or below.	Slows down and stops to assist.	Charge the battery, turn the power on again and signals from the BMC will resume.
	Blinks	Blinks yellow	Blinks		Repeated 1-second beeps (intermittent)	Heavy load warning	Excessive load on the motor.	Able to continue running	Reduce the load on the motor.
	Blinks	Blinks yellow	Blinks		Short beeps (continuous)	Torque limit 2	Wheelchair stuck against an obstacle for between 16 and 24 seconds.	Limits maximum motor current to 50%	Clear the obstacle.
	Blinks	Blinks red	Blinks		Beeps for 2.5-seconds	Overload warning	Wheelchair stuck against an obstacle for 24 seconds or more.	Slows down and stops to assist.	Clear the obstacle.

Related circuit board	Warning detail display					Item	Occurrence conditions	System response	Recovery conditions
	Right-hand unit		Left-hand unit						
	Alarm LED	3-color LED	Alarm LED	3-color LED	Buzzer				
Left driver board	Blinks		Blinks	Blinks yellow	Short beeps (continuous)	Torque limit 1	The temperature of the motor or circuit board has exceeded the specified value.	Limits maximum motor current to 75%	Temperature drops.
	Blinks		Blinks	Blinks yellow	Repeated 1-second beeps (intermittent)	Heavy load warning	Excessive load on the motor.	Able to continue running	Reduce the load on the motor.
	Blinks		Blinks	Blinks yellow	Short beeps (continuous)	Torque limit 2	Wheelchair stuck against an obstacle for between 16 and 24 seconds.	Limits maximum motor current to 50%	Clear the obstacle.
	Blinks		Blinks	Blinks yellow	Beeps for 2.5-seconds	Overload warning	Wheelchair stuck against an obstacle for 24 seconds or more.	Slows down and stops to assist.	Clear the obstacle.

8. Self-diagnosis

8.1 Self-diagnosis (Self-diagnosis Function)

When the E-Move experiences an unrecoverable error, the buzzer sounds, an error is displayed on the self-powered LED, and the system stops to assist the operation. In this event, use the table below to diagnose the fault.

8.2 Fault Detection Chart

Related circuit board	Fault type	Fault detail display: Right-hand unit Alarm LED	Fault detail display: Right-hand unit 3-color LED	Fault detail display: Left-hand unit Alarm LED	Fault detail display: Left-hand unit 3-color LED	Buzzer	Item	Considerable replacement for the repair: Right-hand unit DRV	Right-hand unit Motor	Right-hand unit ENC	Right-hand unit Handrim sensor	Left-hand unit DRV	Left-hand unit Motor	Left-hand unit ENC	Left-hand unit Handrim sensor	Cable	Battery	Fault determination condition
Right driver board	System	Blinks once	Blinks red once	Blinks once		Beeps for 2.5-seconds	Setting switch fault	○				○						Left and right driver board settings differ.
	Right power supply	Blinks twice	Blinks red twice	Blinks twice		Beeps for 2.5-seconds	5-volt power fluctuation	○								△		Power to the microprocessor has fluctuated beyond the specified value.
							12-volt power fluctuation	○								△		12-volt power supply for control is not at the specified value.
							Wheelchair overvoltage	△										The voltage in the power cable has exceeded the specified value. (This can occur if the battery is removed when the wheelchair is descending a steep slope.)
							Battery overvoltage										△	The BMC has detected that the battery voltage has exceeded the specified value. (This can occur due to power regeneration when the wheelchair descends a long slope with a fully charged battery.)
							Power cable cut	△								○	○	The voltage is not at the specified value.
	Handrim sensor	Blinks 3 times	Blinks red 3 times	Blinks 3 times		Beeps for 2.5-seconds	With handrim sensor input				△							Occurs if there is handrim sensor input when the power is turned on.
							Handrim sensor neutral position adjustment defect	△			○							This occurs when the handrim sensor neutral position value and output voltage range are outside the specified range of values.
							Handrim sensor error	△			○							The handrim sensor output value is outside the specified range.
	Motor/ Drive	Blinks 4 times	Blinks red 4 times	Blinks 4 times		Beeps for 2.5-seconds	Arm short-circuit	○										The motor drive circuit current exceeded the specified value.
							Motor overamperage	○	△									The motor current exceeded the specified value.
							Current offset	○										Motor current sensor error
							Motor disconnected		○									Occurs when the motor is disconnected.
							Encoder error	△		○								Encoder error
							Motor driver IC fault	○										Motor driver IC fault

Important

- DRV: Indicates the circuit board.
- ENC: Indicates the encoder in the wheel assembly.
- Cable: Indicates the L/R connecting cable.
- BMC: Indicates the microprocessor in the battery.
- CAN: Indicates the network information exchange software.
- In the table, a circle (○) indicates the most likely cause of the fault, while a triangle (△) indicates the next most likely cause of the fault.

Related circuit board	Fault type	Fault detail display: Right-hand unit: Alarm LED	Fault detail display: Right-hand unit: 3-color LED	Fault detail display: Left-hand unit: Alarm LED	Fault detail display: Left-hand unit: 3-color LED	Buzzer	Item	Considerable replacement for the repair: Right-hand unit: DRV	Right-hand unit: Motor	Right-hand unit: ENC	Right-hand unit: Handrim sensor	Left-hand unit: DRV	Left-hand unit: Motor	Left-hand unit: ENC	Left-hand unit: Handrim sensor	Cable	Battery	Fault determination condition
Right driver board	Protection devices	Blinks 5 times	Blinks red 5 times	Blinks 5 times		Beeps for 2.5-seconds	Relay contact melted	○										Relay fault on the driver board
							FET thermistor fault	○										Thermistor fault on the driver board
							Motor temperature thermistor fault			○								Thermistor fault on the encoder board
							Overload stop 1-1 (FET overheating)											Occurs when the board protection temperature is reached.
							Overload stop 1-2 (motor overheating)											Occurs when the motor protection temperature is reached.
							Overload stop 2 (overheat protection/blocking movement)											Occurs when a blocking occurs and the conditions for blocking protection are met.
	Communication	Blinks 6 times	Blinks red 6 times	Blinks 6 times		Beeps for 2.5-seconds	CAN timeout	△				△				○		Occurs when CAN communication fails.
	Operation	Blinks 7 times	Blinks red 7 times	Blinks 7 times		Beeps for 2.5-seconds	Input operation error				△							The specified time has elapsed and the handrim sensor has not returned to the neutral position.
							Operation fault					△						Occurs when there is a fault in the left-hand driver board.
							Assist totaling error					△						Occurs when there is a fault in the left-hand driver board.
	CPU self check	Blinks 8 times	Blinks red 8 times	Blinks 8 times		Beeps for 2.5-seconds	AD buffer error	○										Occurs when there is a fault in the AD converter on the driver board.
Left driver board	System	Blinks once		Blinks once	Blinks red once	Beeps for 2.5-seconds	Setting switch fault	○				○						Left and right driver board settings differ.
	Power supply	Blinks twice		Blinks twice	Blinks red twice	Beeps for 2.5-seconds	5-volt power fluctuation					○				△		Power to the microprocessor has fluctuated beyond the specified value.
							12-volt power fluctuation					○				△		12-volt power supply for control is not at the specified value.
							Wheelchair overvoltage					△						The voltage in the power cable has exceeded the specified value. (This can occur if the battery is removed when the wheelchair is descending a steep slope.)
							Power cable cut					△				○	○	The voltage is not at the specified value.
	Handrim sensor	Blinks 3 times		Blinks 3 times	Blinks red 3 times	Beeps for 2.5-seconds	With handrim sensor input								△			Occurs if there is handrim sensor input when the power is turned on.
							Handrim sensor neutral position adjustment defect					△			○			This occurs when the handrim sensor neutral position value and output voltage range are outside the specified range of values.
							Handrim sensor error					△			○			The handrim sensor output value is outside the specified range.
	Motor/ Drive	Blinks 4 times		Blinks 4 times	Blinks red 4 times	Beeps for 2.5-seconds	Arm short-circuit					○						The motor drive circuit current exceeded the specified value.
							Motor overamperage					○	△					The motor current exceeded the specified value.
							Current offset					○						Motor current sensor error
							Motor disconnected						○					Occurs when the motor is disconnected.
							Encoder error					△		○				Encoder error
							Motor driver IC fault					○						Motor driver IC fault

Important

- DRV: Indicates the circuit board.
- ENC: Indicates the encoder in the wheel assembly.
- Cable: Indicates the L/R connecting cable.
- BMC: Indicates the microprocessor in the battery.
- CAN: Indicates the network information exchange software.
- In the table, a circle (○) indicates the most likely cause of the fault, while a triangle (△) indicates the next most likely cause of the fault.

Related circuit board	Fault type	Fault detail display				Buzzer	Item	Considerable replacement for the repair										Fault determination condition
		Right-hand unit		Left-hand unit				Right-hand unit				Left-hand unit				Cable	Battery	
		Alarm LED	3-color LED	Alarm LED	3-color LED			DRV	Motor	ENC	Handrim sensor	DRV	Motor	ENC	Handrim sensor			
Left driver board	Protection devices	Blinks 5 times		Blinks 5 times	Blinks red 5 times	Beeps for 2.5-seconds	Relay contact melted					○						Relay fault on the driver board
							FET thermistor fault					○						Thermistor fault on the driver board
							Motor temperature thermistor fault							○				Thermistor fault on the encoder board
							Overload stop 1-1 (FET overheating)											Occurs when the board protection temperature is reached.
							Overload stop 1-2 (motor overheating)											Occurs when the motor protection temperature is reached.
							Overload stop 2 (overheat protection/blocking movement)											Occurs when a blocking occurs and the conditions for blocking protection are met.
	Communication	Blinks 6 times		Blinks 6 times	Blinks red 6 times	Beeps for 2.5-seconds	CAN timeout	△				△				○		Occurs when CAN communication fails.
	Operation	Blinks 7 times		Blinks 7 times	Blinks red 7 times	Beeps for 2.5-seconds	Input operation error								△			The specified time has elapsed and the handrim sensor has not returned to the neutral position.
							Operation fault	△										Occurs when there is a fault in the right-hand driver board.
							Assist totaling error	△										Occurs when there is a fault in the right-hand driver board.
	CPU self check	Blinks 8 times		Blinks 8 times	Blinks red 8 times	Beeps for 2.5-seconds	AD buffer error					○						Occurs when there is a fault in the AD converter on the driver board.

Important

- DRV: Indicates the circuit board.
- ENC: Indicates the encoder in the wheel assembly.
- Cable: Indicates the L/R connecting cable.
- BMC: Indicates the microprocessor in the battery.
- CAN: Indicates the network information exchange software.
- In the table, a circle (○) indicates the most likely cause of the fault, while a triangle (△) indicates the next most likely cause of the fault.

9. Inspections and Maintenance

9.1 Inspection Checklist

Use the checklist below when carrying out an inspection.

Inspection item	Location	Criteria	Check
Power switch	Damage, deformation, play	• No damage, deformation or play in the screws	
	Power switch	• Switches on and off firmly	
	Wire placement, damage	• No twisting, looseness or damage	
Mode switch	Damage, deformation, play	• No damage, deformation or play in the screws	
	Mode switch	• Switches on and off firmly	
	Wire placement, damage	• No twisting, looseness or damage	
Unit	Abnormal noise or vibration	• Operates with no abnormal noise or vibration	
	Tire pressure, wear, cracking, valve play	• The tire pressure is correct • There is no wear, cracking or damage	
	Handrim play and damage	• No play, damage or harmful scratches, burrs or splintering, etc. where the handrim is attached	
	Wheel deformation	• No deformation	
	Handle plate	• Can be securely locked	
	Play, deformation or damage in the anti-tip device	• No play, deformation or damage	
	Loose screws in battery exterior	• No loose or missing screws	
	Cable connection play or damage	• Cables are securely connected • Cables are undamaged	
Battery and charger	Usage status and deterioration	• Frequency of use and deterioration level (battery simple diagnostic check)	

Important

- The frame and casters should comply with the standards set out by the frame manufacturer.

10. Specifications and Other Information

10.1 Specifications

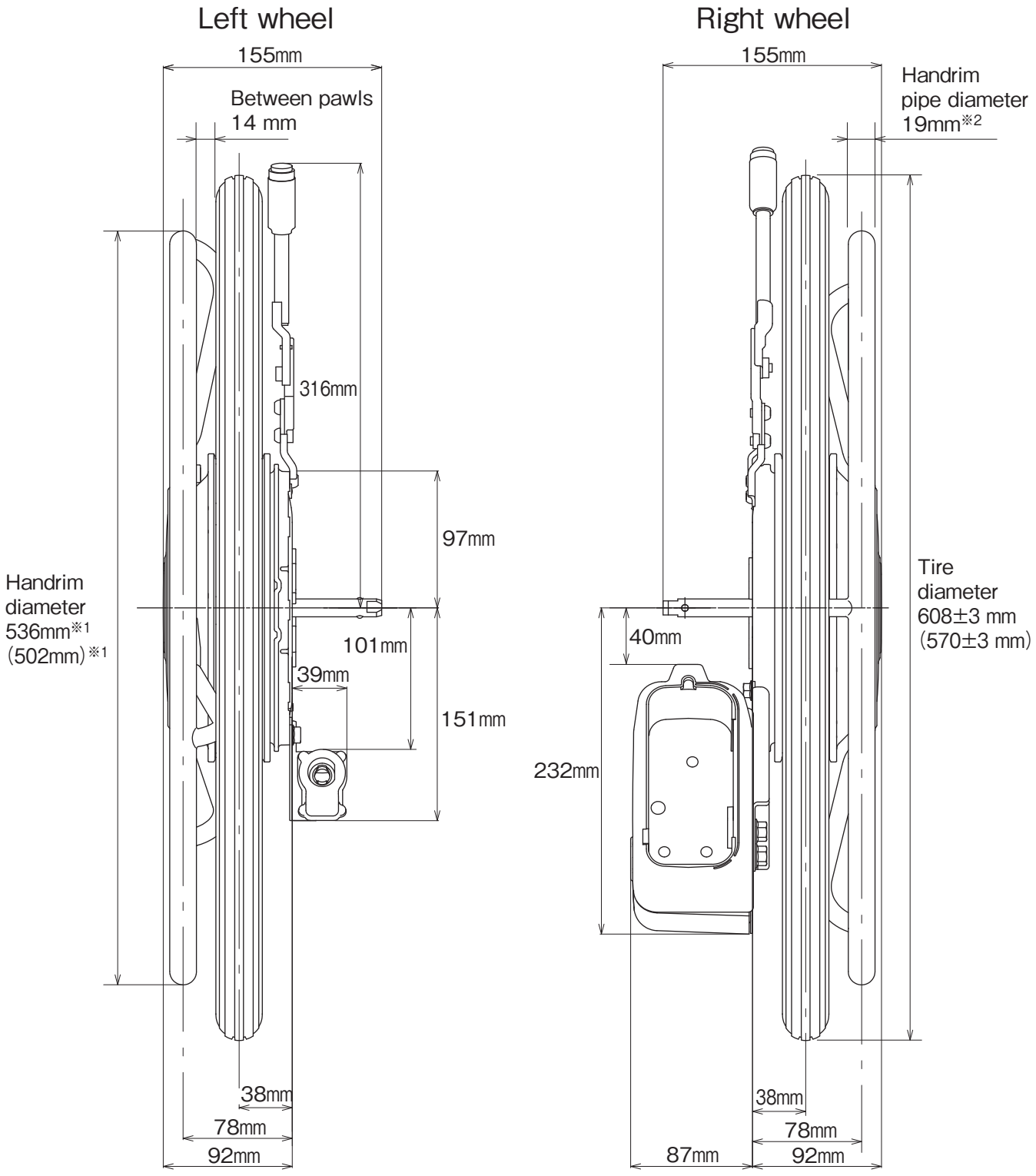
Item			Specification
Model			X0EA
Unit weight	With battery	Nickel-metal hydride	18.5 kg
		Lithium-ion	19.2 kg
	Without battery		15.6 kg
Tire size		22 inch	37-501 (22 × 1 3/8)
		24 inch	37-540 (24 × 1 3/8)
Battery (built-in microprocessor)		Nickel-metal hydride	JWB2 (24 V, 6.7 Ah) (1) (5 hour rate)
		Lithium-ion	ESB1 (25 V, 11.8 Ah) (1) (5 hour rate)
Charger		For nickel-metal hydride	JWC-2 (rated output 29 V, 2.6 A) (during charging) Automatic charging controlled by microprocessor
		For lithium-ion	ESC1 (rated output 29.2 V, 3 A) (during charging) Automatic charging controlled by microprocessor
Drive motor type			AC servo motor
Drive motor rated output			24 V, 110 W (2), (30 minute rated output)
Control system			Microprocessor control
Drive system			Rear-wheel direct drive
Steering system			L/R handrim steering
Braking system			Motor generative brake + Handrim braking assist
Assisted speed range			0 – 6 km/h
Assisted travel range	Continuous travel range*1	Nickel-metal hydride	18 km
		Lithium-ion	30 km
Hill climbing ability			6° (approx. 10% slope)
Max. user weight (including any carried items)			May differ depending on the wheelchair used

● Note that the above data, including the specifications and appearance, is subject to change without notice for the purposes of product improvement.

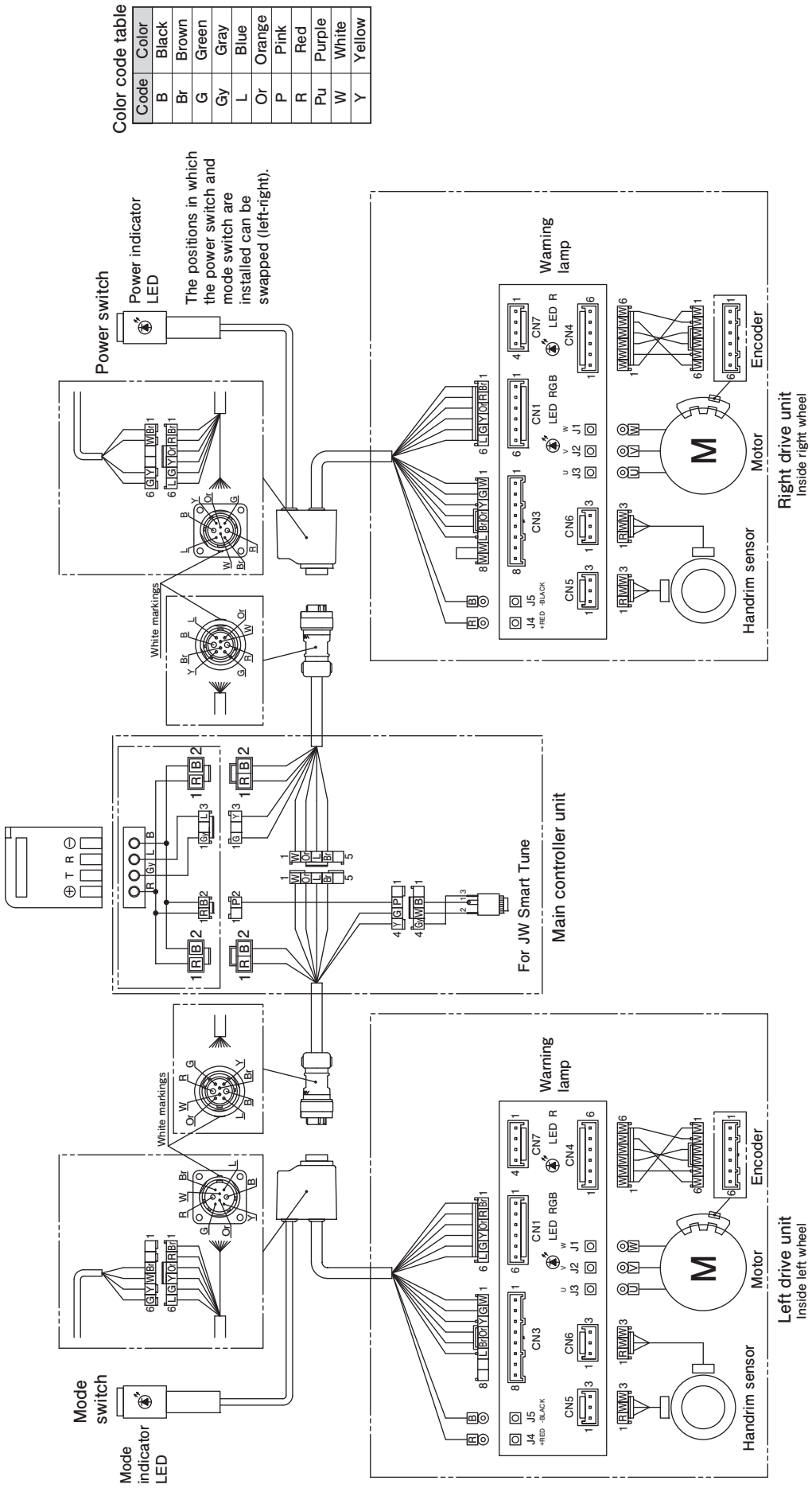
*1 Yamaha pattern operation: 24-inch, new battery, fully charged, temperature 15 – 25°C, weight 75 kg, continuous running in a straight line on a level surface at 5 km/h, mode 2 (factory default setting)

10.2 Dimensions and Diagrams

The dimensions shown here are for the 24-inch model.
Only the dimensions shown in parentheses ( ) differ on 22-inch models.
*1: Tire sizes are shown on the side of the tire.
*2: Handrim dimensions do not include any coatings.



10.3 Wiring Diagram (Separated Battery Seat Type)



10.4 Wiring Diagram (Standard Battery Seat Type)