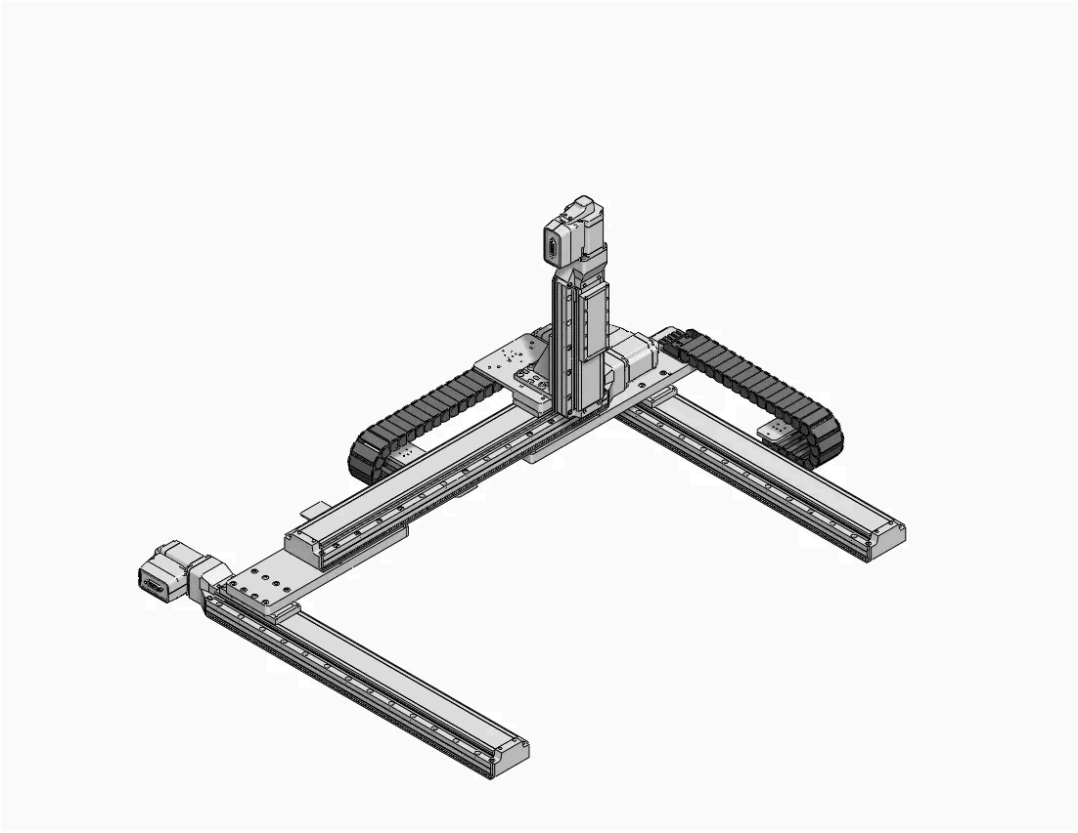
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LRT Gantries Series User's Manual

LRT - High Strength Systems



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Disclaimer

Zaber's products are not intended for use in any critical medical, aviation, or military applications or situations where a product's use or failure could cause personal injury, death, or damage to property. Zaber disclaims any warranty of fitness for a particular purpose. The user of this product agrees to Zaber's general terms and conditions of sale.

Precautions

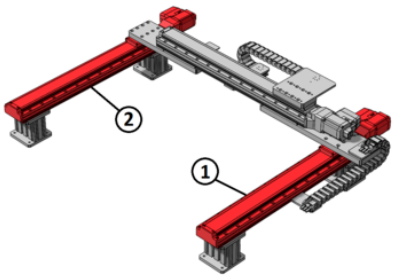
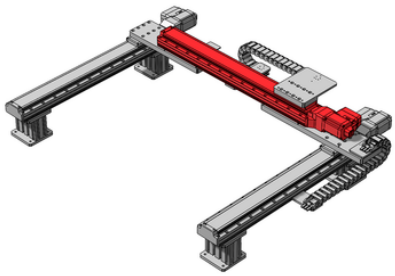
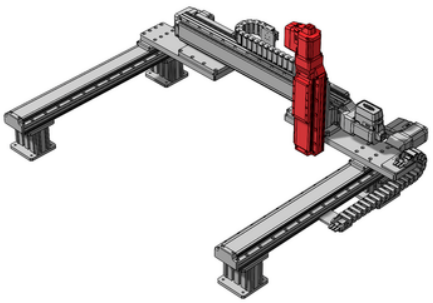
Collision Hazard! Zaber Gantry products contain motion products with significant thrust and load capacities. Take caution to prevent collisions with operators, work surfaces, and sensitive equipment.

Heavy! Completely assembled gantry products, partial assemblies and some stage products can be very heavy. Exercise caution when lifting/moving larger assemblies and products. Loosely fasten risers and stage axes as soon as they are placed during assembly, to prevent tipping and falling hazards.

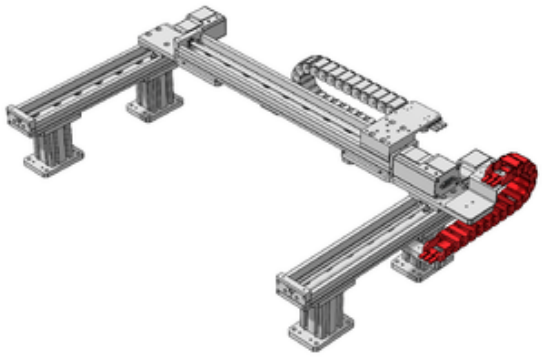
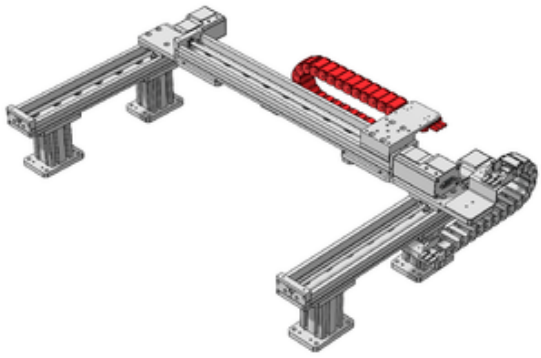
Important: Gantry products must be properly assembled and aligned to function optimally. Follow assembly instructions closely and contact Zaber Customer Support for help at any time, if needed.

Product Overview

The following documentation uses specific terminology to refer to parts of the gantry product, outlined in the diagrams below:

X-Axis Axes 1 and 2	**Y-Axis**	**Z/Theta/End Effectors**
		

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X-Axis Cable Guide for Y-Axis cables and Optional Z/Theta/End Effector Cables	**Y-Axis Cable Guide** for Z/Theta/End Effector cables
	

X-Axis Stage Spacing Between Inner Fasteners	
Y-Axis Stage	Spacing in mm
LRT0500	800
LRT0750	1050
LRT1000	1300
LRT1500	1800

LRT Family Configurations

All axes use CG02 cable guides by default. If your gantry has a Z-axis with a power-off brake, the X and Y axes will use CG06 cable guides instead. Devices with power-off brakes have a B in the options section of the part number (eg. LRT0500HL-**B**E08CT10A).

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Configuration (X-Axis by Y-Axis Travel)	Cable Guide Links for X-Axis Guide		Cable Guide Links for Y-Axis Guide		Recommended Minimum Breadboard Dimensions (mm x mm)
	CG02	CG06	CG02	CG06	
500 x 500	23	28	22	32	625 x 975
500 x 750	23	28	28	36	625 x 1225
500 x 1000	23	28	34	40	625 x 1475
500 x 1500	23	28	47	48	625 x 1975
750 x 500	29	33	22	32	875 x 975
750 x 750	29	33	28	36	875 x 1225
750 x 1000	29	33	34	40	875 x 1475
750 x 1500	29	33	47	48	875 x 1975
1000 x 500	35	37	22	32	1125 x 975
1000 x 750	35	37	28	36	1125 x 1225
1000 x 1000	35	37	34	40	1125 x 1475
1000 x 1500	35	37	47	48	1125 x 1975
1500 x 500	48	45	22	32	1625 x 975
1500 x 750	48	45	28	36	1625 x 1225
1500 x 1000	48	45	34	40	1625 x 1475
1500 x 1500	48	45	47	48	1625 x 1975

Z-Axis Travel	Cable Guide Links for Z-Axis Guide (CG02)
100	17
250	24
500	25

Cables Lengths

Most stages use the MC10T3 series of cables. If your gantry has a Z-axis with a power-off brake, the Z-axis will use a MC10 series cable. Devices with power-off brakes have a B in the options section of the part number (eg. LRT0500HL-**B**E08CT10A).

Calculate the required cable length for each axis using the equations in the table below for the XY cable guides used on your gantry. Round these lengths up to the next available cable length shown in the cable part numbers table.

Minimum Recommended Cable Lengths

Axis	Cable Length (mm)	
	CG02 XY Cable Guides	CG06 XY Cable Guides
X-Axis 1	1500	1500
X-Axis 2	XAxisTravel / 2 + YAxisTravel + 1000	XAxisTravel / 2 + YAxisTravel + 1000
Y-Axis	XAxisTravel / 2 + 900	XAxisTravel / 2 + 1400
Z-Axis	XAxisTravel / 2 + YAxisTravel + ZAxisTravel + 1400	XAxisTravel / 2 + YAxisTravel + ZAxisTravel + 2400

Cable Part Numbers

Cable Length (mm)	MC10T3 Series Cable Part Number	MC10 Series Cable Part Number
600	MC10T3L060	MC10L060
1500	MC10T3	MC10
3000	MC10T3L300	MC10L300
4500	MC10T3L450	MC10L450

If a required cable length is longer than 4500mm, two 3000mm cables will be provided. They can be joined together between the X and Y axis cable guides. Do not locate the connectors within the cable guides.

Gantry Assembly and Setup

Zaber's gantry products require some assembly and set-up upon arrival. These gantries can be disassembled, packed, and transported for use in new locations, or re-configured with new motion control axes to suit new applications. To set up your gantry, complete the following steps (where applicable).

Note: Instructions are provided for all hardware variants used in different gantry configurations. Not all hardware will be used in your configuration. Section headings will contain applicable part numbers.

Contact Zaber Customer Support at any time for help or additional information.

Preparation

1. Unpack the high-flex motor cables and hang them vertically by one end for 24 hours to relieve packaging stresses. If the cables are too long to be hung up in one piece, loosely coil them on a flat surface into a large diameter such as 60 cm (2 ft).
2. Unpack the brackets, tools (provided with AP201 cross-members), cable guides and other hardware.
    - Keep fasteners with their labelled bags to easily identify/locate the correct fastener for a step.
3. Unpack the stage axes and identify the two identical X-axis stages, Y-axis stage and any additional axes you may have.
4. Determine your mounting surface. The instructions provided assume a metric optical breadboard is used to mount the X-axis stages (or optional risers). See Product Overview for determining stage spacing and recommended breadboard dimensions.
5. Determine stage orientations and locations of cable guide(s) and controller. The controller is typically located on the end of the gantry near the motor cable connections on the peripheral devices. It's preferable to mount it closer to X-axis 1, as this axis will carry the cable tracking. If the controller is required to be mounted at a significant distance from the gantry, longer cables or cable extensions may be necessary. See MC10T3(Lxxx) for longer 15 pin female to 26 pin male cables or MC10(Lxxx) for 26 pin female to 26 pin male extensions cables here: Zaber Accessories.
    - *Note: 'xxx' denotes a length in cm*

6. Identify the cables intended for each axis using the matching configuration table in the Product Overview.

Tips

1. Whenever allowable in your application, mount the CGxxT cable guide terminations to provide the largest bend radius for your cable.

X-MCC Setup and Stage Connection

Related Products

 X-MCC Universal Motor Controller	 MC10T3 MC10T3L060 MC10T3L300 MC10T3L450	 MC10

Precautions

Important! Review the X-MCC User Manual for complete device precautions and operation instructions.

Important! Always remove power to the X-MCC controller before connecting or disconnecting peripherals.

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Assembly



- Determine which MC motor cables are required for each gantry peripheral. See the configuration table in Product Overview.

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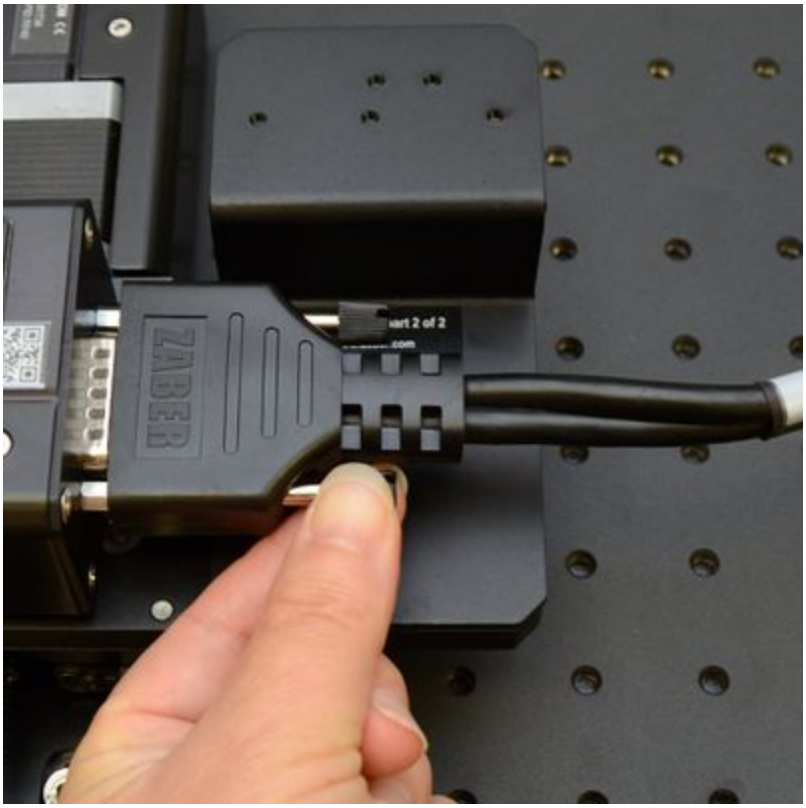
- Connect the 26 pin male end of the MC cables to the X-MCC controller axes. Connect the cable for:
  - •X-axis 1 to X-MCC axis 1
  - •X-axis 2 to X-MCC axis 2
  - •Y-axis to X-MCC axis 3
  - •Optional Z/theta to X-MCC axis 4 (if present)

  Tighten locking connector screws.
  See Product Overview to identify the gantry axes.

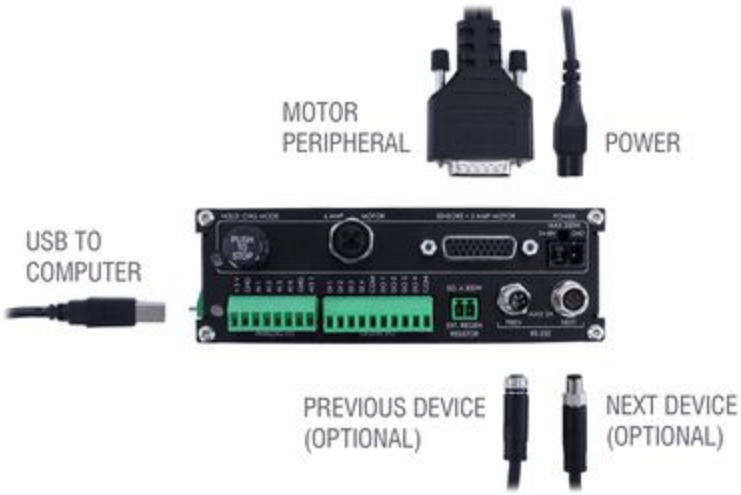
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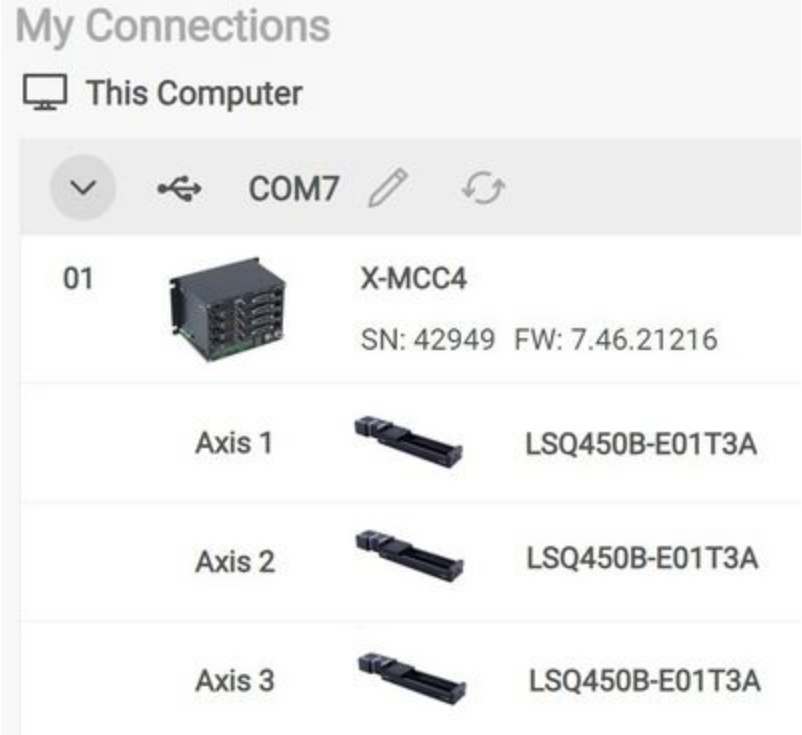
- If desired, mount the X-MCC controller. See instructions in the X-MCC User Manual.
  Note: Ensure the E-stop connector is reconnected with either the 'E-stop off' jumper or an E-stop (such as the ES01) to ensure controller function.



- Connect the other end of each MC motor cable to the matching peripheral and tighten the locking connector screws.
  Important: During gantry assembly you may wish to disconnect one or more peripherals. Always remove power to the X-MCC before connecting or disconnecting any peripheral.



- Connect the X-MCC controller to your computer using the USB cable (U-DC06) or to an X-JOY3 joystick with an X-DC cable (if a joystick is present).
  Connect the X-MCC controller to one or more power supplies.



- Open Zaber Launcher. Confirm that three stages are detected and activated. If a stage is not activated, an "Activate" button will appear next to it. See the X-MCC manual for more information on activating peripherals and setup.

LRT X-Axis Stages to Breadboard

Related Products



LRT-EC Linear Stages

Precautions

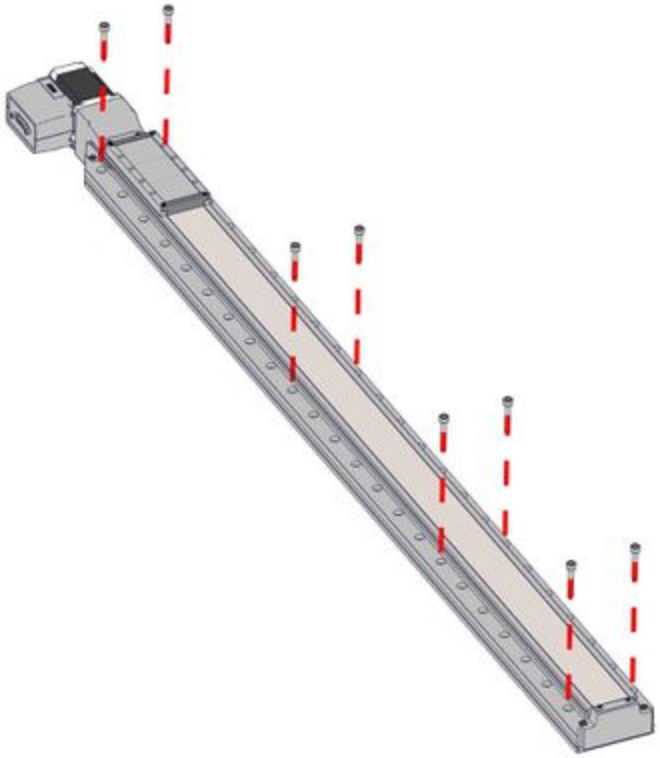
Heavy

Required Tools

- 5 mm hex key

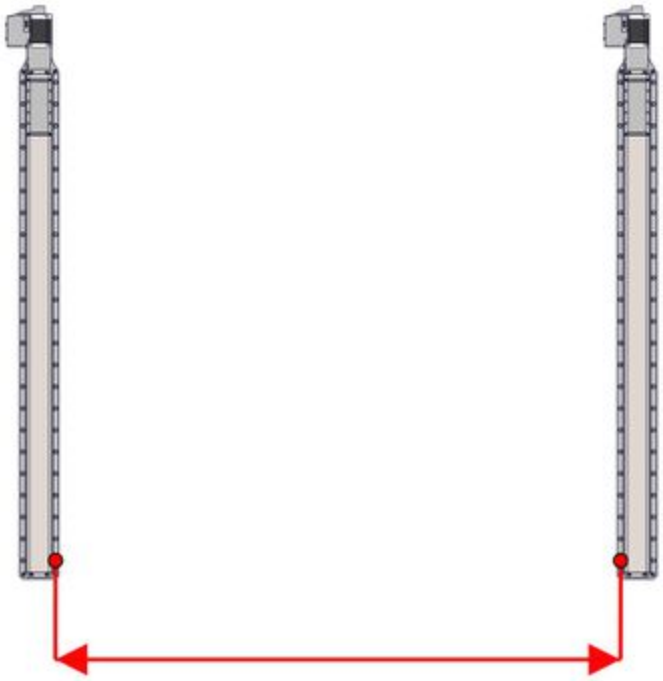
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Assembly

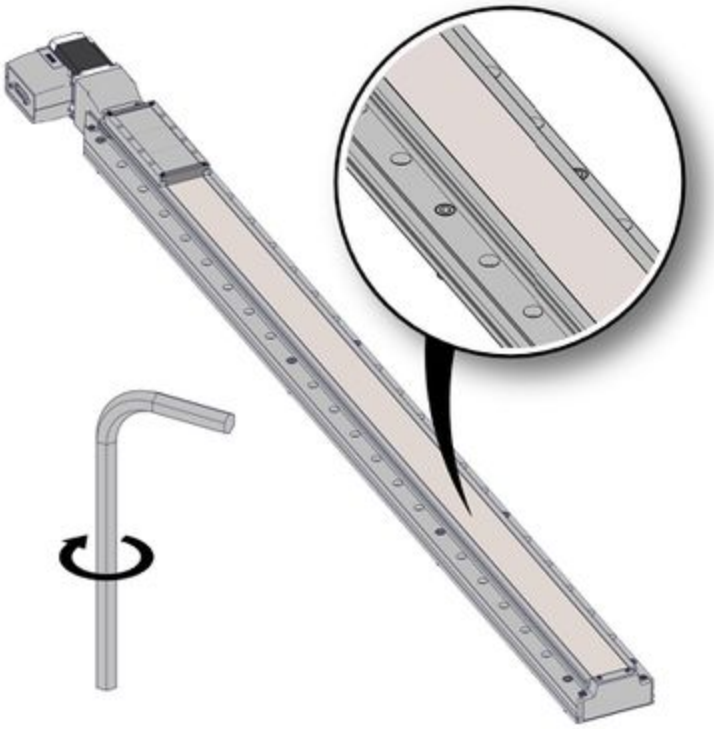


- Mount the first X-axis stage to a breadboard or other mounting surface using the eight provided black M6 screws and a 5 mm hex key. Where possible, mount the stage using fasteners at each end of travel.

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- Locate the second stage at a distance from the first determined by the Y-axis travel (see chart in Product Overview) then repeat the previous step to mount the second stage.
  To calculate the spacing for any length of Y-axis, use 300 mm + Y-axis travel.



- Firmly tighten all fasteners mounting the X-axis stages.

Using AP203 Risers

Related Products

 AP203H0100 Risers AP203H0300 Risers AP203H0500 Risers	 LRT-EC Linear Stages

Precautions

Mounting/Tipping Hazard! The LRT-EC stages and AP203 risers can be heavy and may create a falling/tipping hazard during assembly. We recommend mounting the risers to a breadboard or other mounting surface before placing X-axis stages on top. Where possible, loosely install several screws between the stage and at least one riser to prevent accidental motion.

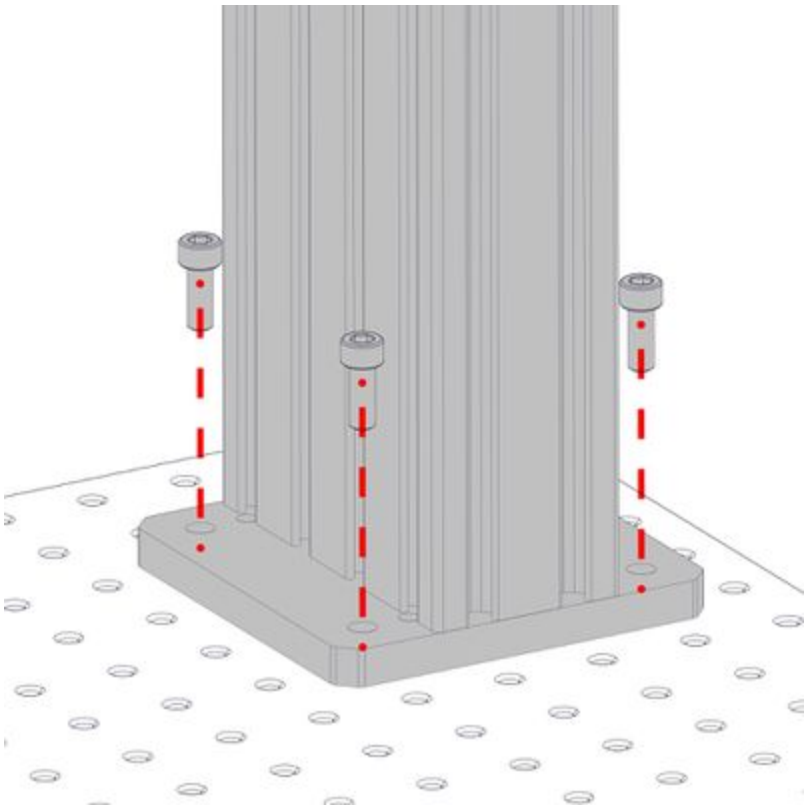
Important: Do not disassemble AP203 risers. They have been carefully aligned.

Required Tools

- 5 mm hex key

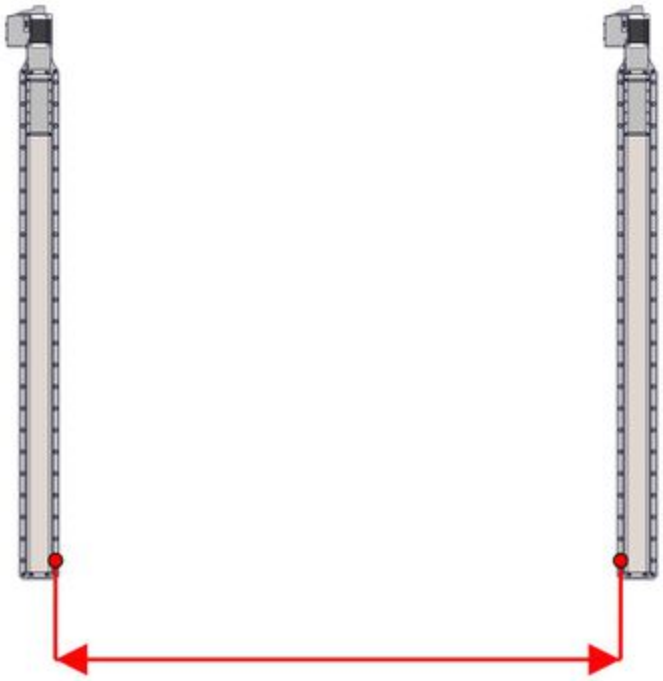
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Assembly



- Loosely mount AP203 risers to a breadboard or other mounting surface using M6 x 16 screws (the shorter of the provided screws) and a 5 mm hex key. Install screws until snug, then back off a little to allow alignment.
  Repeat until all screws are present. You may wish to leave the risers loose or just snug until complete assembly is done, then loosen and re-align as needed.

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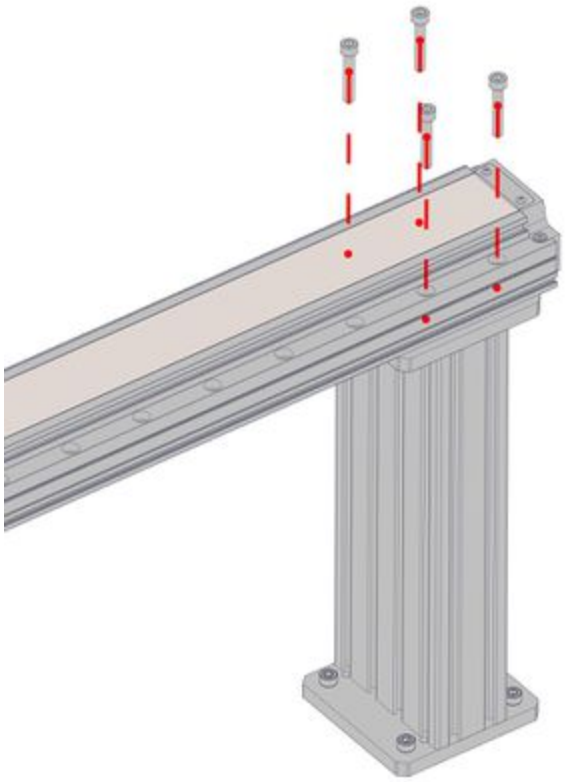


- See Product Overview for spacing between the indicated holes for your gantry configuration. To calculate the spacing for any length of Y-axis, use 300 mm + Y-axis travel.



- Space the additional riser(s) *for a single stage* as far apart as possible or approximately* equally spaced if using more than two per stage, along the travel of the X-axis stages.

  **Note: If using an odd number of risers per stage, mount the mid-point riser slightly off of the centre of stage travel, to leave room for cable guide support mounting.*



- Mount stages to top of risers using the provided black M6 x 35 screws. Start by installing two screws diagonally for each riser, leaving screws just a bit loose. Snug them after all screws have been added.

Assembly of AP201 Crossmembers and Lockstep Setup

Related Products

 AP201 Crossmember Plate Set	 LRT-EC Linear Stages

Precautions

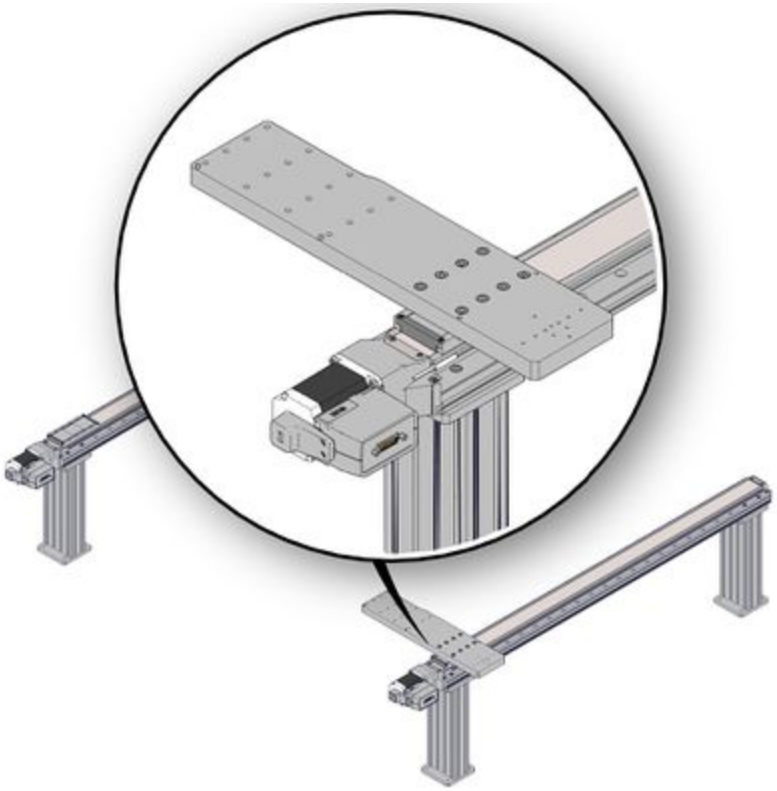
Mounting Hazard! The LRT-EC Y-axis stage may be heavy and could create a falling hazard during assembly.

Important: If using AB209 brackets to mount the Y-axis of your system on its side, see Assembly of AP201 Crossmembers, AB209 Angle Brackets, and Lockstep Setup.

Required Tools

- 5 mm hex key

Assembly

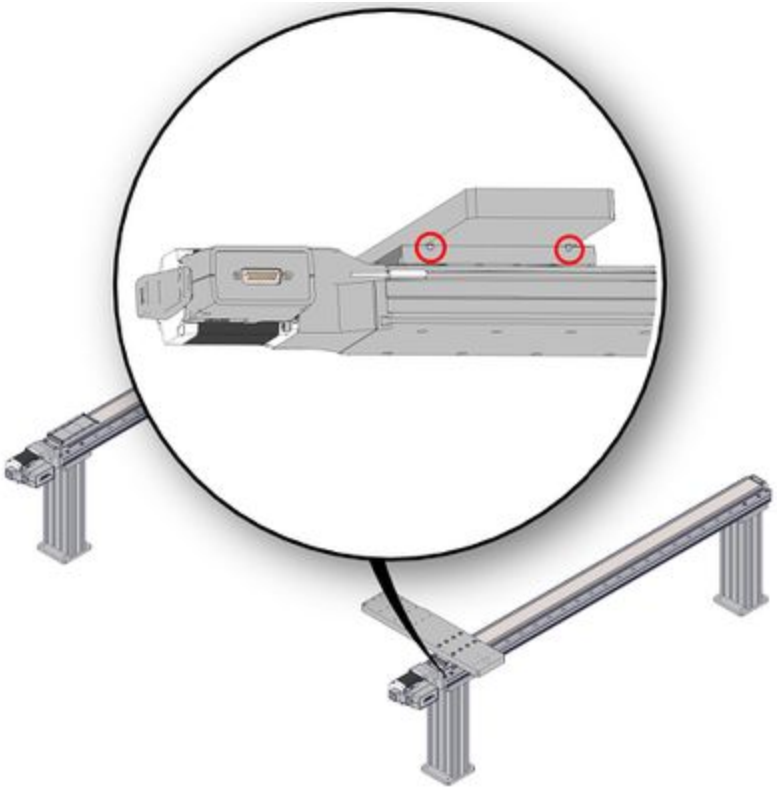


- Loosely mount AP201 part 1 (longer of the two plates) on the X-axis 1 stage using a 5 mm hex key and eight of the provided M6 x 20 screws (the shorter of the two provided lengths).

  Note: X-axis 1 is the stage closest to the controller and cable guide.

  Note: The following steps show one orientation for the X- and Y-axis stages, but it is possible to assemble in other orientations.

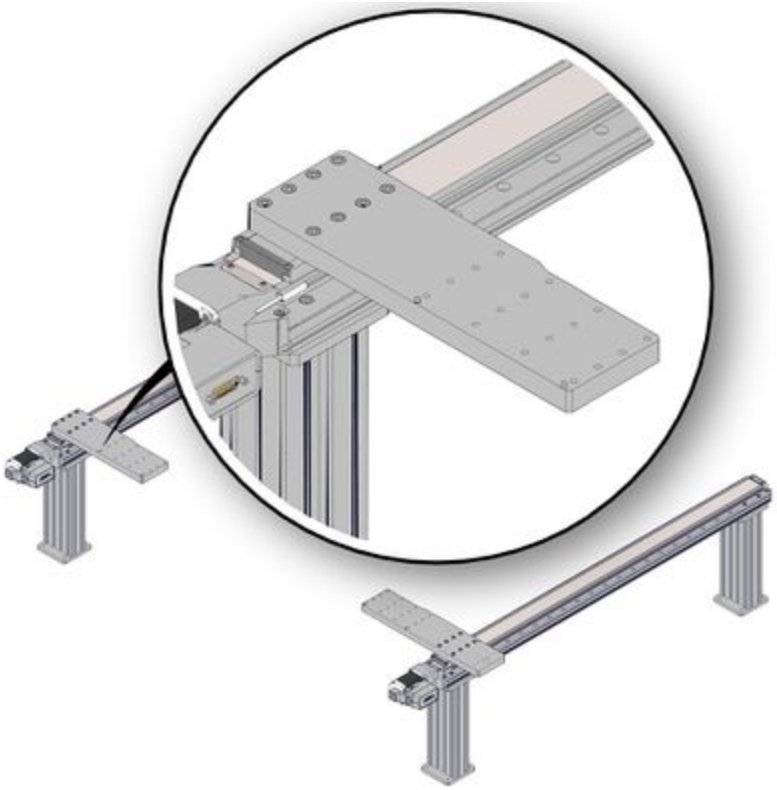
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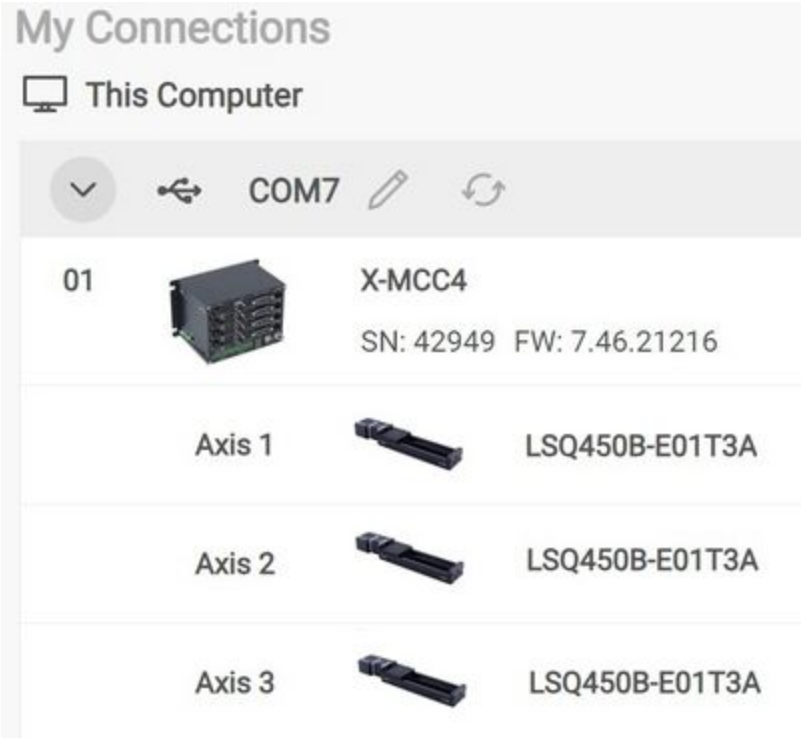
- Push the AP201 part 1 as shown until the dowels on the bottom of the plate are both firmly in contact with the edge of the LRT carriage - this provides Y-axis alignment. While holding the AP201 in place, firmly tighten the M6 fasteners using the 5 mm hex key.

  Note: Tightening in several steps, while alternating screws diagonally, may help prevent the plate from moving during this step.

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- Loosely mount AP201 part 2 on the X-axis 2 stage using a 5 mm hex key and eight of the provided M6 x 20 screws.
  Snug the plate down, but do not torque the screws. This plate will be loosened and aligned later.

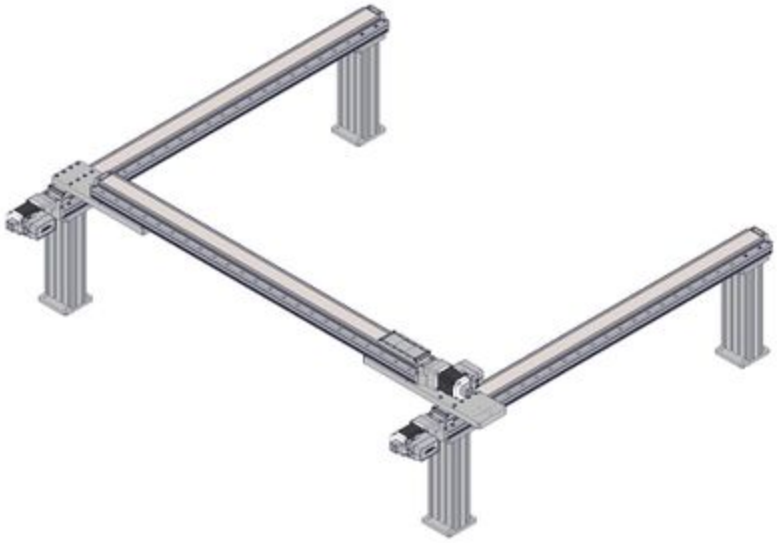


- See X-MCC Setup and Stage Connection if you have not already connected your stages.
  Open Zaber Launcher. Confirm that three stages are detected and activated.

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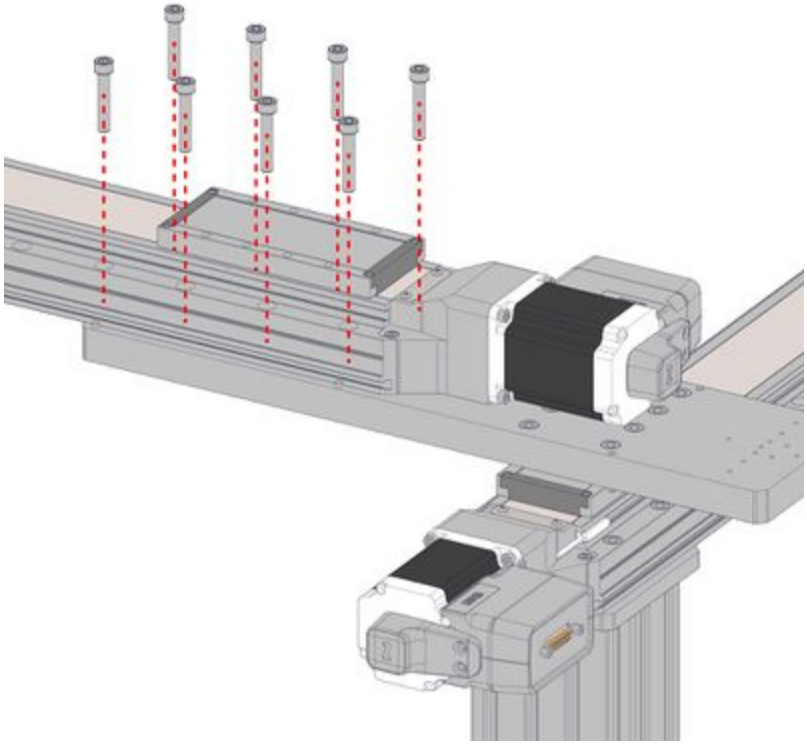


- Using Zaber Launcher, send a home command to each of the two X-axis stages to move them to their home positions.



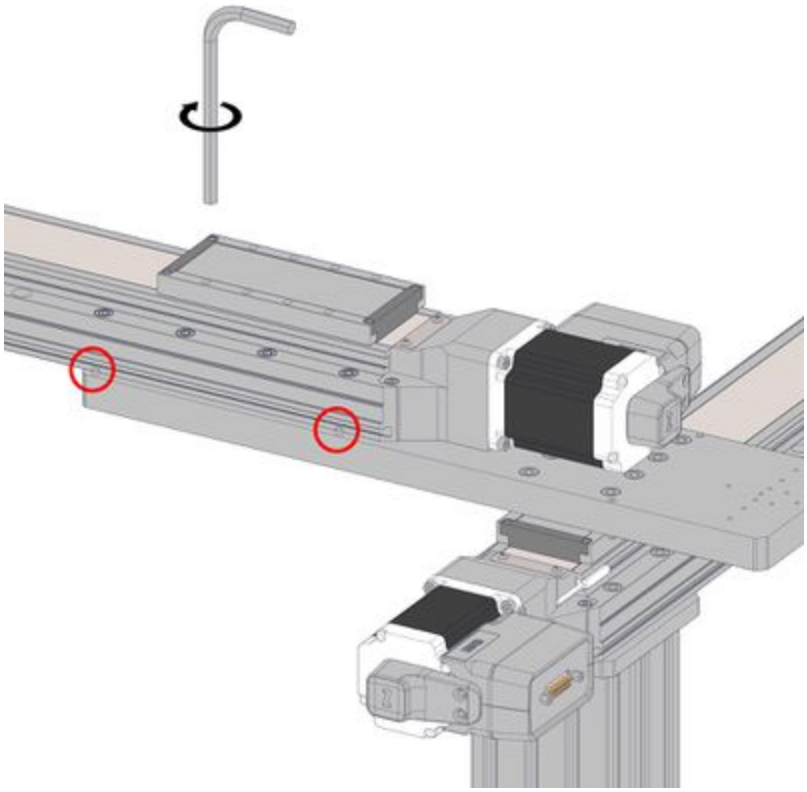
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- Place the Y-axis stage on top of the two AP201 plates with the connector end closest to the X-axis 1 stage, on the longer of the two plates.



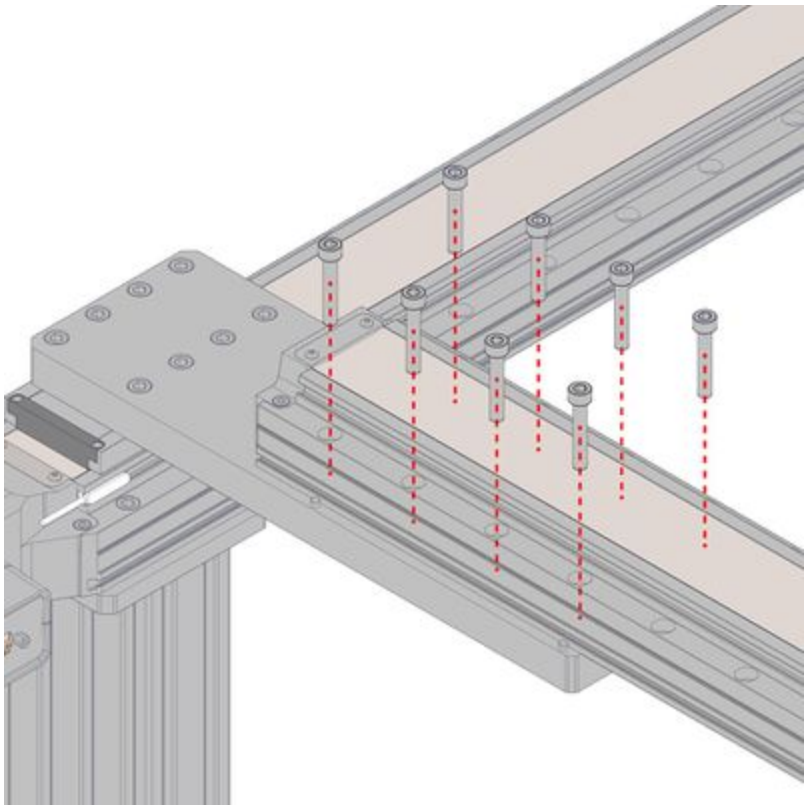
- Using eight of the M6 x 35 screws with the AP201, loosely assemble the Y-axis stage to the AP201 part 1 (the longer plate).

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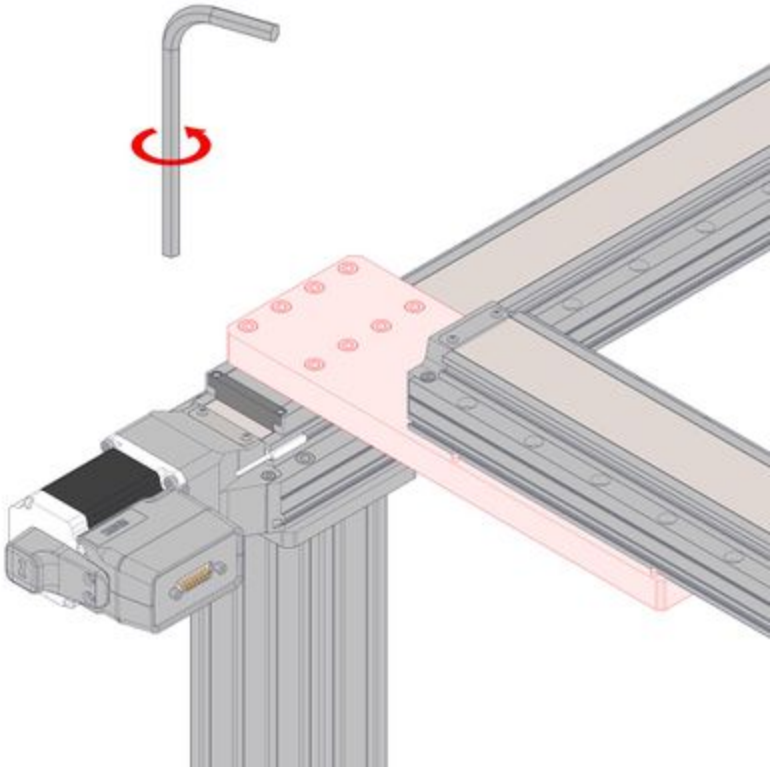


- With screws still loose, push the Y-axis stage firmly against the two dowels on the AP201 part 1 (the longer plate). With both dowels in contact, firmly tighten the M6 screws between the AP201 part 1 (larger plate) and the Y-axis stage.
  Important: Do not loosen these screws again - they provide the alignment between X- and Y-axes.

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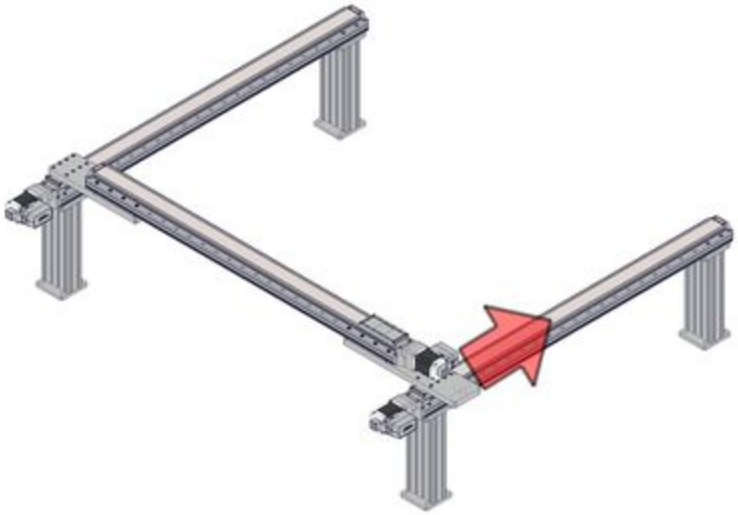


- Loosely add screws between the Y-axis stage and the AP201 part 2 (the shorter plate).



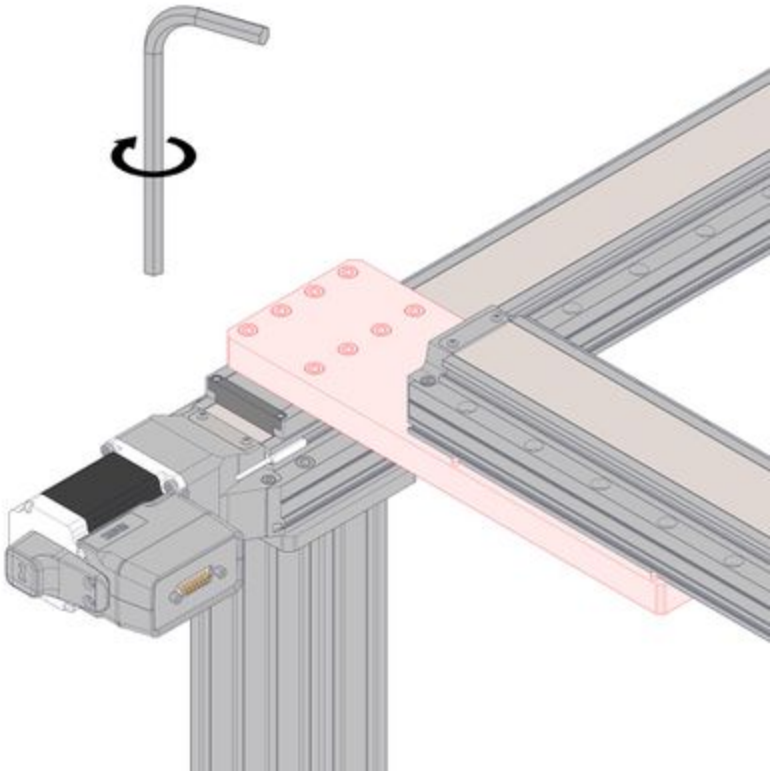
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- If the screws do not align with the threaded holes, loosen the AP201 part 2 plate from the X-axis stage. Support the Y-axis and move the AP201 plate around until the Y-axis stage screws can start to thread in.

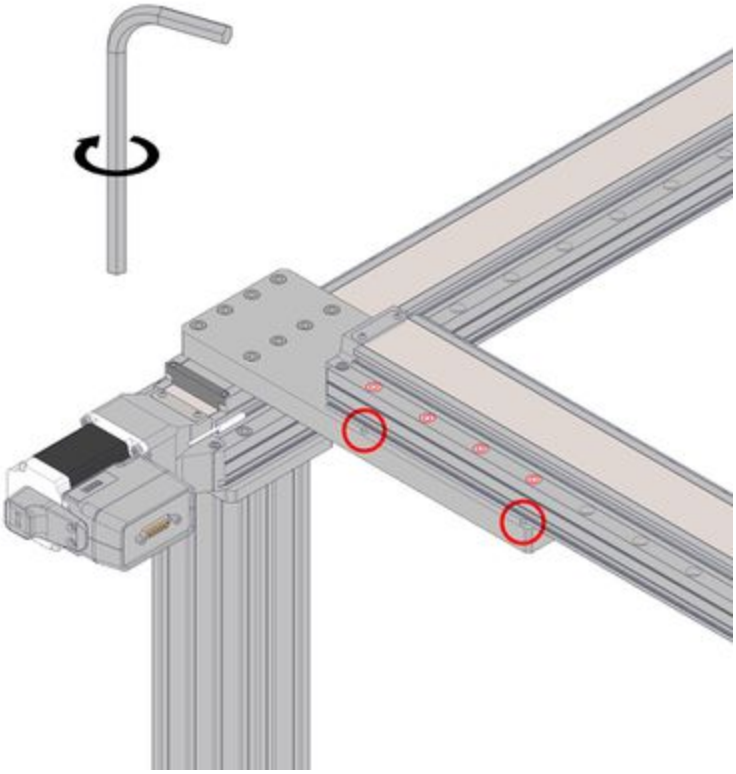


- If the plates are not well aligned (the Y-axis stage can not sit flat against all dowels at the same time), move one X-axis stage forward in steps by sending small *move rel* commands (100 um to 500um is recommended).

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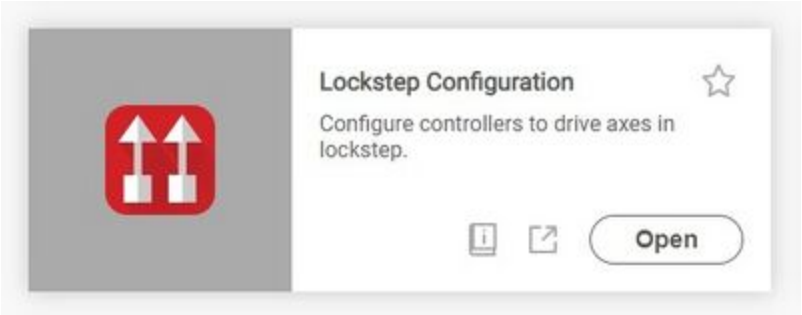


- Thread in several screws loosely between the Y-axis stage at the AP201 plate, then firmly re-tighten the screws between the AP201 part 2 and the X-axis 2 stage.

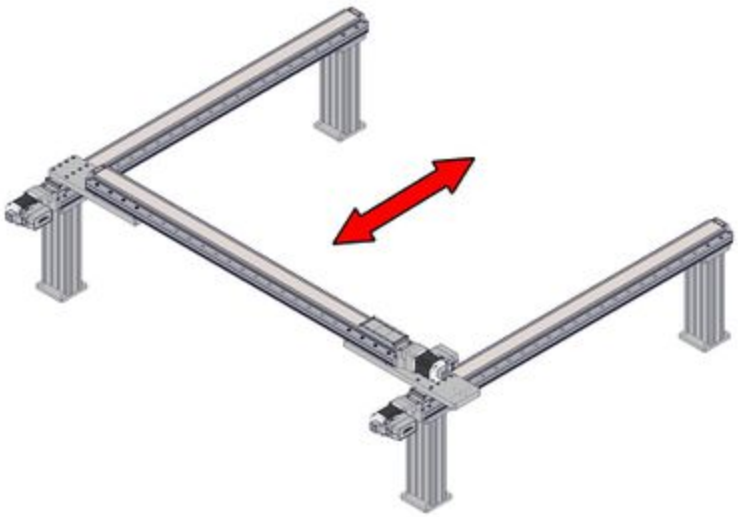


- Do not tighten the Y-axis stage screws unless the stage rests on all 4 AP201 dowels simultaneously.

  When the Y-axis stage aligns well with all dowels, firmly tighten the fasteners between the Y-axis stage and the AP201 part 2.



- In Zaber Launcher, use the Lockstep Configuration App to lock the motion of the two X-axis stages together.



- Home the lockstep group in Zaber Launcher, then move the X-axis stages throughout their travel ranges slowly using the manual control knob for axis 1 or 2. If the stages move well, move them at higher speeds using the Zaber software or the manual control knobs.

  See Troubleshooting if stages are not moving well together.

Assembly of AP201 Crossmembers, AB209 Angle Brackets, and Lockstep Setup

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Related Products

 AP201 Crossmember Plate Set	 LRT-EC Linear Stages	 AB209 Angle Brackets

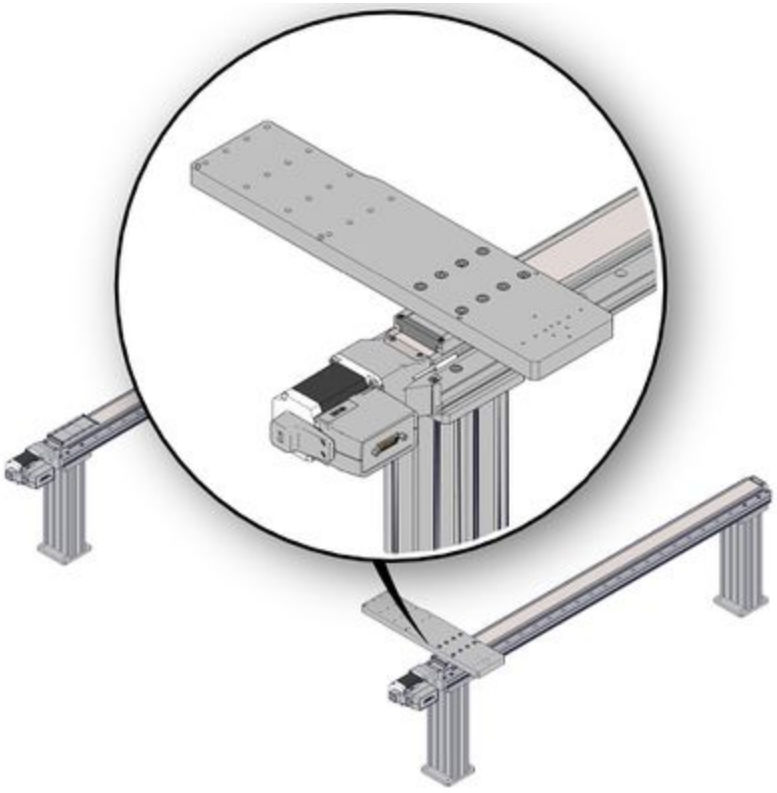
Precautions

Mounting Hazard! The LRT Y-axis stage may be heavy and could create a falling hazard during assembly. It is recommended that multiple people work together to perform the Y-axis assembly steps to support the stages while performing alignment.

Required Tools

- 5 mm hex key

Assembly

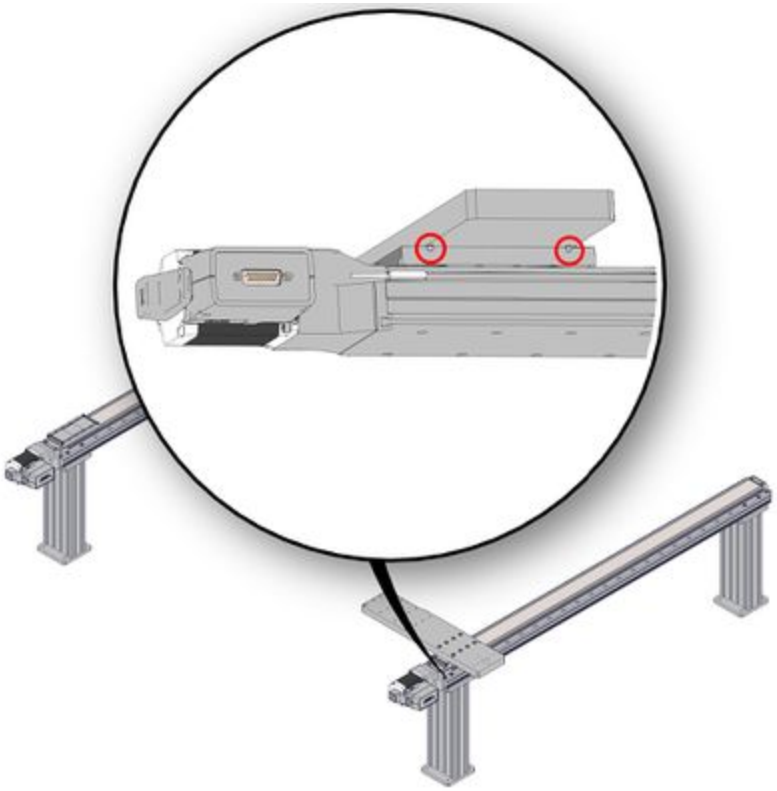


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- Loosely mount AP201 part 1 (longer of the two plates) on the X-axis 1 stage using a 5 mm hex key and eight of the provided M6 x 20 screws (the shorter of the two provided lengths).

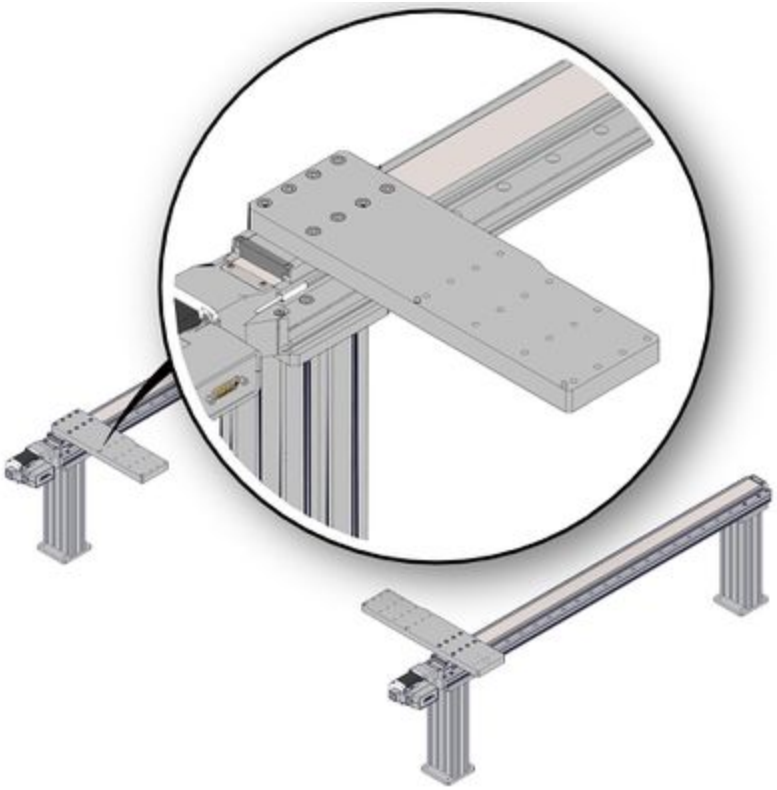
  X-axis 1 is the stage closest to the controller and cable guide.

  Note: The following steps show one orientation for the X- and Y-axis stages, but it is possible to assemble in other orientations.

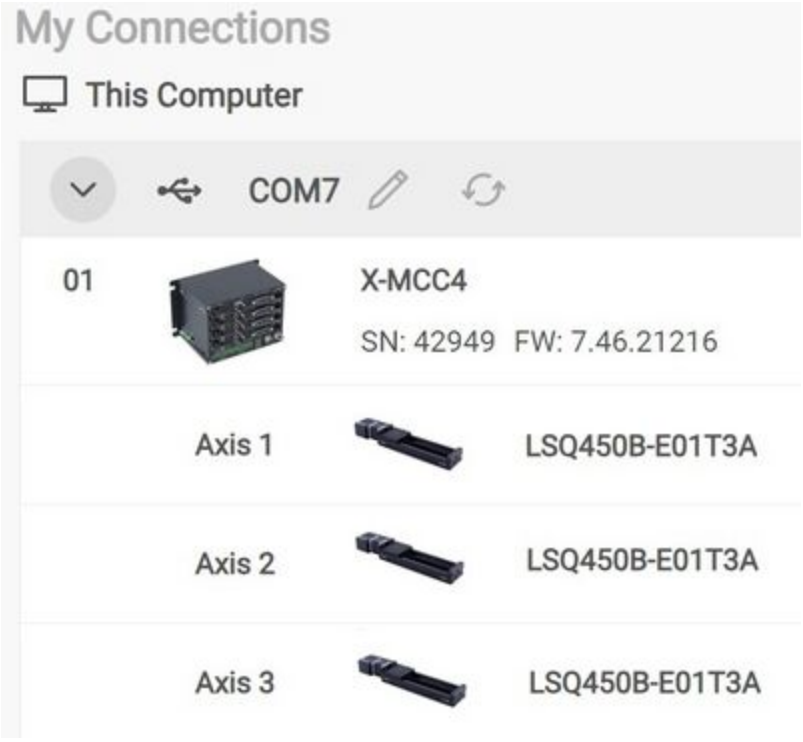


- Push the AP201 part 1 as shown until the dowels on the bottom of the plate are both firmly in contact with the edge of the LRT carriage - this provides Y-axis alignment. While holding the AP201 in place, firmly tighten the M6 fasteners using the 5 mm hex key.
  Note: Tightening in several steps, while alternating screws diagonally, may help prevent the plate from moving during this step.

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- Loosely mount AP201 part 2 on the X-axis 2 stage using a 5 mm hex key and eight of the provided M6 x 20 screws.
  Snug the plate down, but do not torque the screws. This plate will be loosened and aligned later.



- See X-MCC Setup and Stage Connection if you have not already connected your stages.
  Open Zaber Launcher. Confirm that three stages are detected and activated.

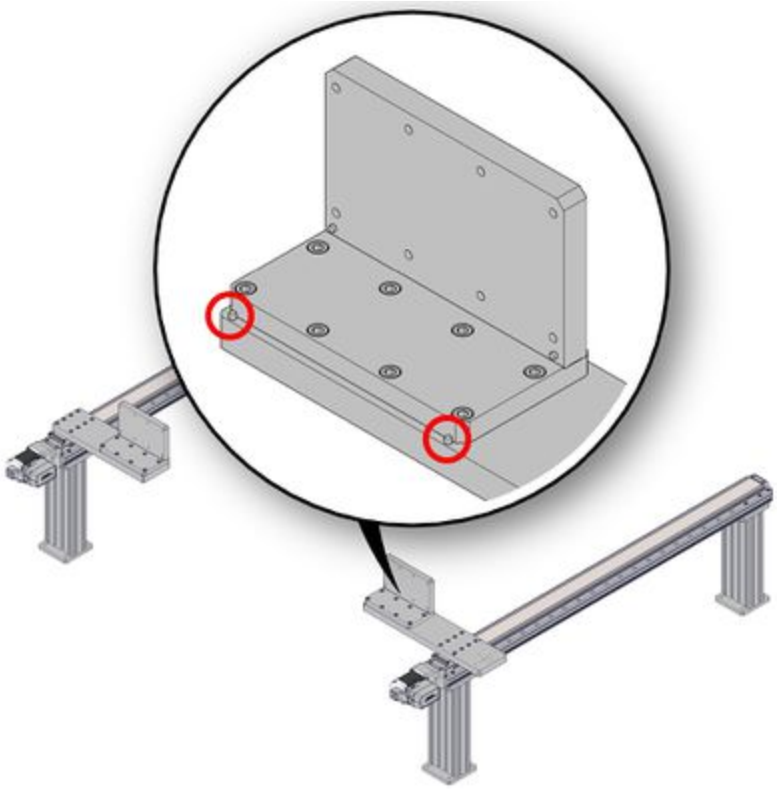
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- Using Zaber Launcher, send a home command to each of the two X-axis stages to move them to their home positions.

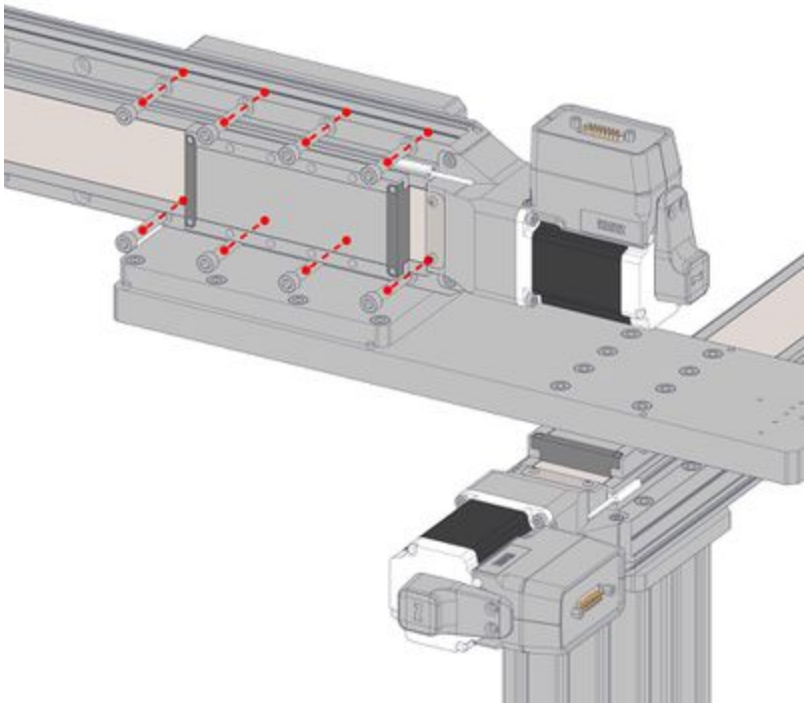


- Mount the two AB209 brackets to the AP201 part 1 and part 2. Use the shorter screws provided with the AB209 (M6 x 16 mm).
  The AB209 brackets can be mounted in two orientations, depending on the desired mounting for the Y-axis stage. Only one orientation is shown here.



- Align the AB209 to the AP201 dowel pins and firmly tighten the provided mounting screws using a 5 mm hex key.

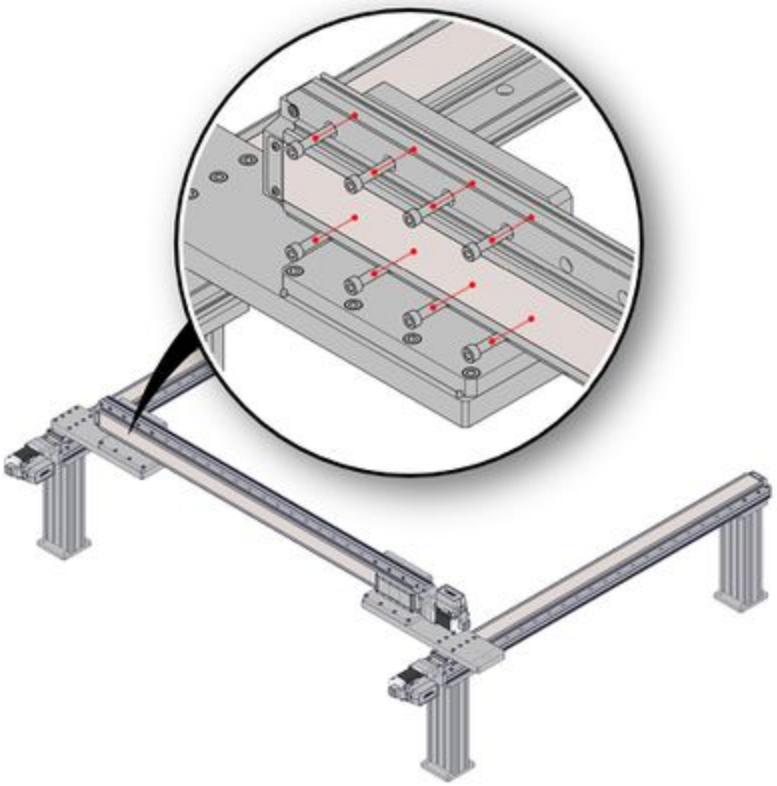
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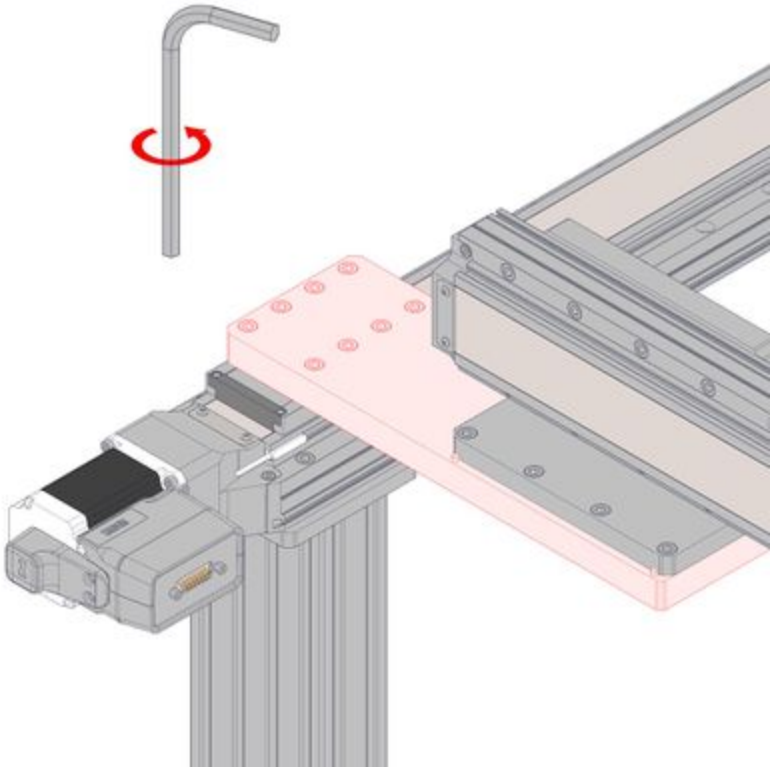
- **Ensure you have mounting screws handy and extra people to support the Y-axis stage during this step.**

  Place the Y-axis stage against the AB209 brackets, resting on the AB209 alignment dowels. Loosely fasten the Y-axis stage to **one** AB209 upright plate, on the X-axis 1 side (with the longer AP201 plate) using M6 x 35 mm screws. Snug the screws down when all screws are in place.

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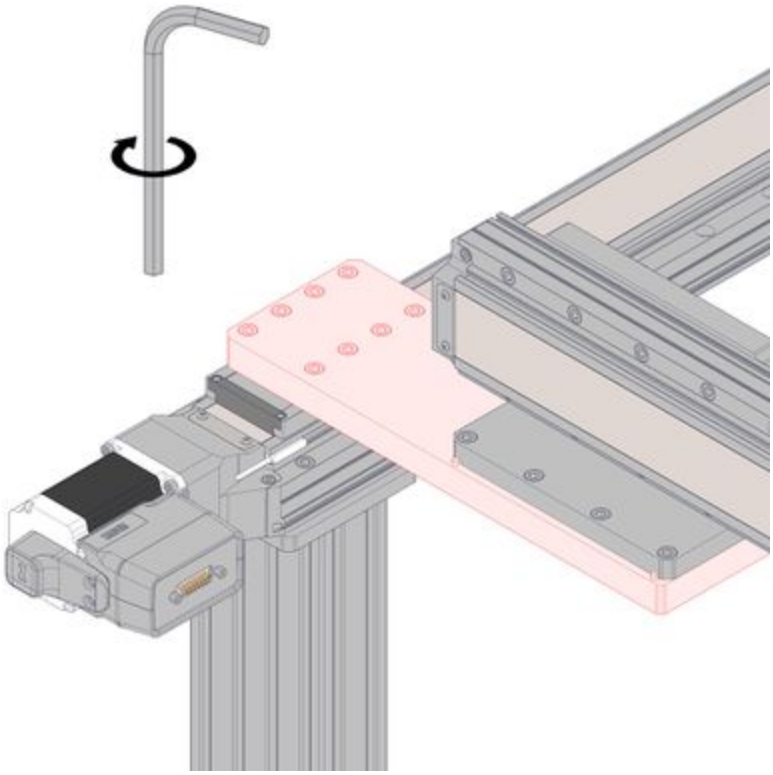


- Loosely add screws to the second AB209 bracket.



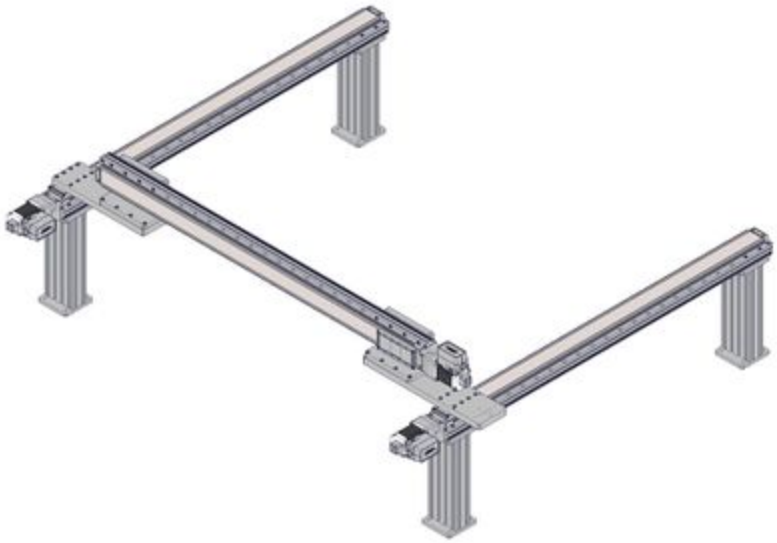
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- If the screws do not align with the threaded holes, loosen the **AP201 part 2** plate. Continue supporting the Y-axis and move the AP201 plate around until the screws can start to thread in and the plate is parallel to the Y-axis stage (even if there is a gap).



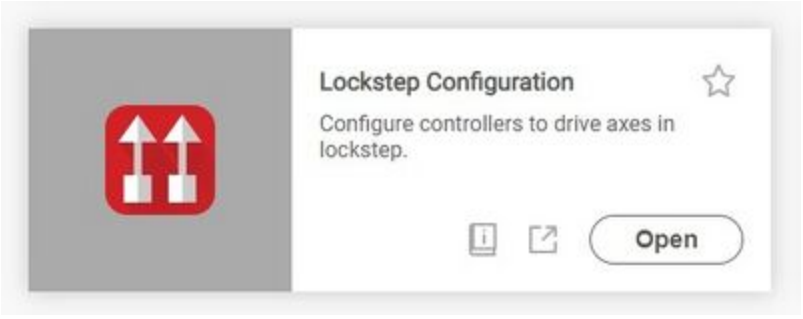
- Firmly re-tighten the screws between the AP201 part 2 and the X-axis 2 stage.

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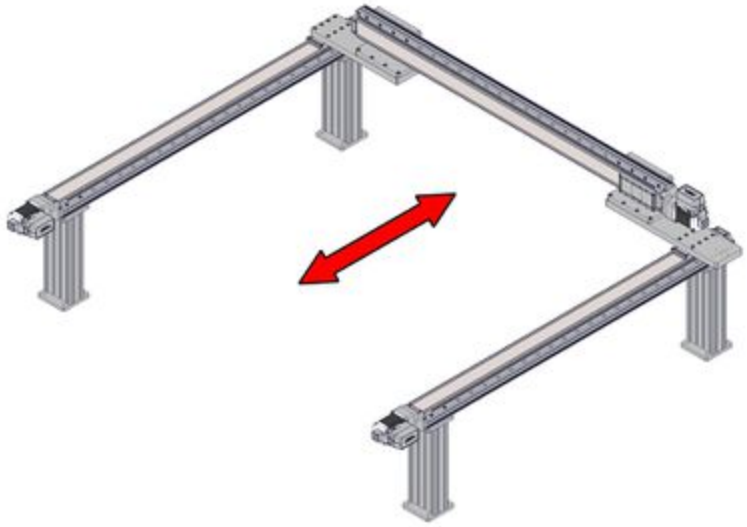


- Do not tighten the AB209 screws unless the stage sits flat against both AB209 plates and rests on all 4 dowels simultaneously. If the AB209 plates are not well aligned (the Y-axis stage does not freely sit flat against both brackets at the same time), move one X-axis stage forward in steps by sending small *move rel* commands (100 um to 500um is recommended).

  When the Y-axis stage aligns well with the two AB209 plates, firmly tighten the fasteners between the AB209 brackets and the Y-axis stage.



- In Zaber Launcher, use the Lockstep Configuration App to lock the motion of the two X-axis stages together.



- Home the lockstep group in Zaber Launcher, then move the X-axis stages throughout their travel ranges slowly using the manual control knob for axis 1 or 2. If the stages move well, move them at higher speeds using the Zaber software or the manual control knobs.

  See Troubleshooting if stages are not moving well together.

Installing AP207 Cable Guide Mounts for Y- or Z-Axis Cable Guides

Related Products

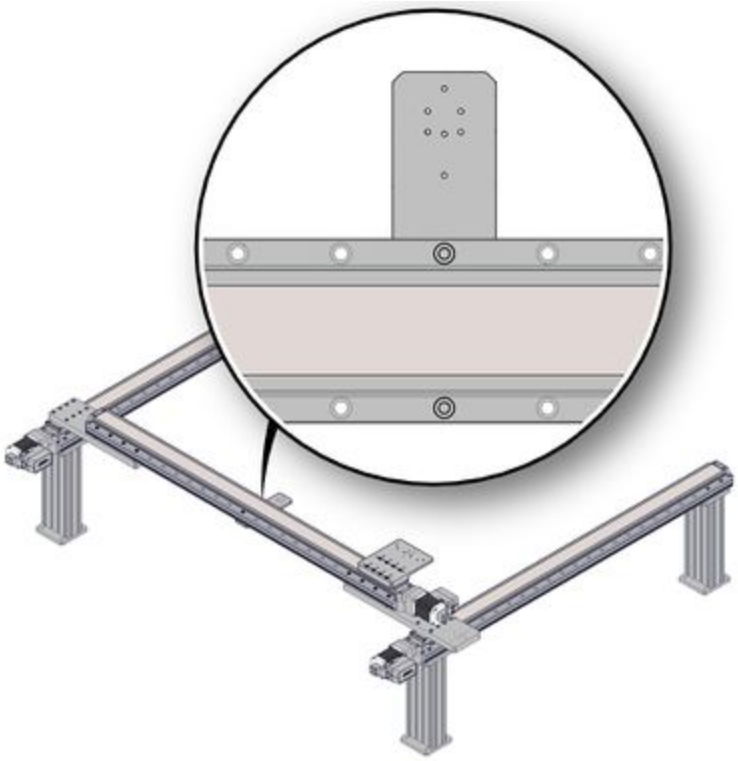
 AP207 Cable Guide Mounting Bracket Set	 LRT-EC Linear Stages

Required Tools

- 5 mm hex key

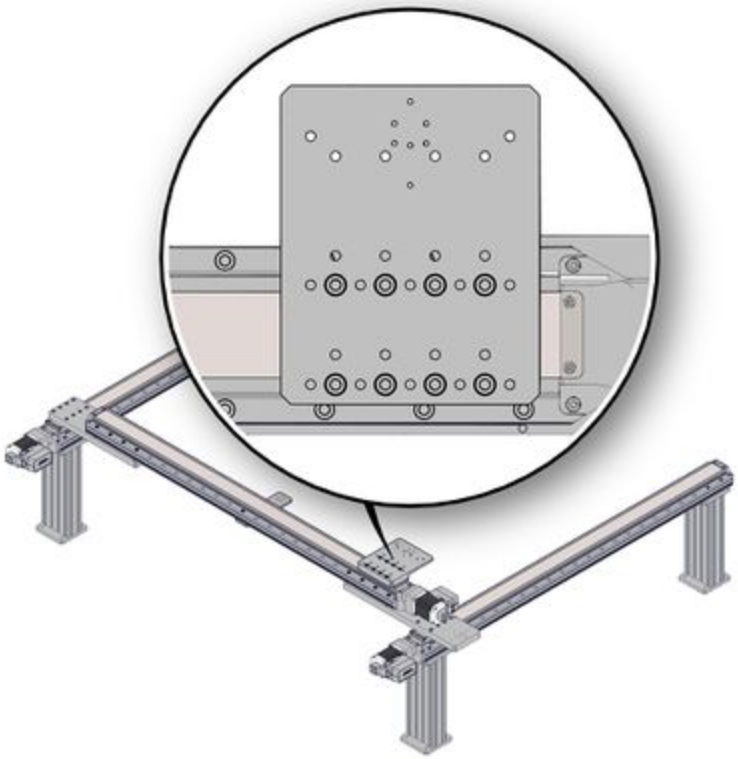
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Assembly



- Mount the AP207 part 1 to the LRT X-axis 1 stage in mid-travel, using the provided M6 x 30 screws and a 5 mm hex key.

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- Install AP207 part 2 onto the top of the Y axis LRT stage using four M6 x 20 mm screws and the 5 mm hex key. Align the stage top and AP207 part 2 edges to each other. Alternate tightening fasteners in a diagonal pattern to snug, then tightly secure.

Z-Axis Installation

Related Products



X-MCC Universal Motor Controller



AP207 Cable Guide Mounting Bracket Set



LRT-EC Linear Stages

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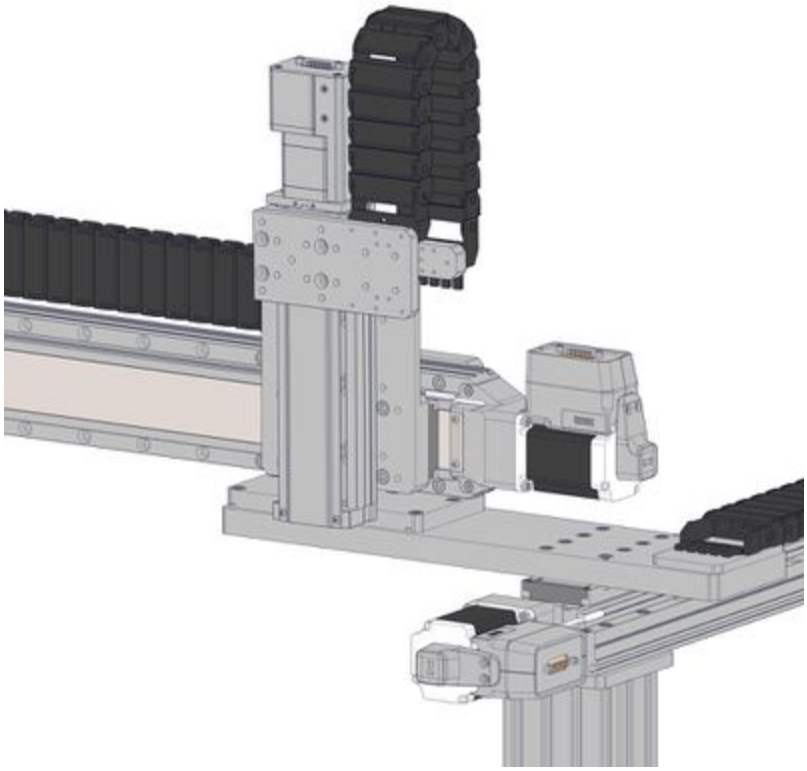
Precautions

Important: Where possible, mount all Z/theta/end effector axes as close to the Y-axis stage as possible to reduce moment loading and off-axis motion errors.

Required Tools

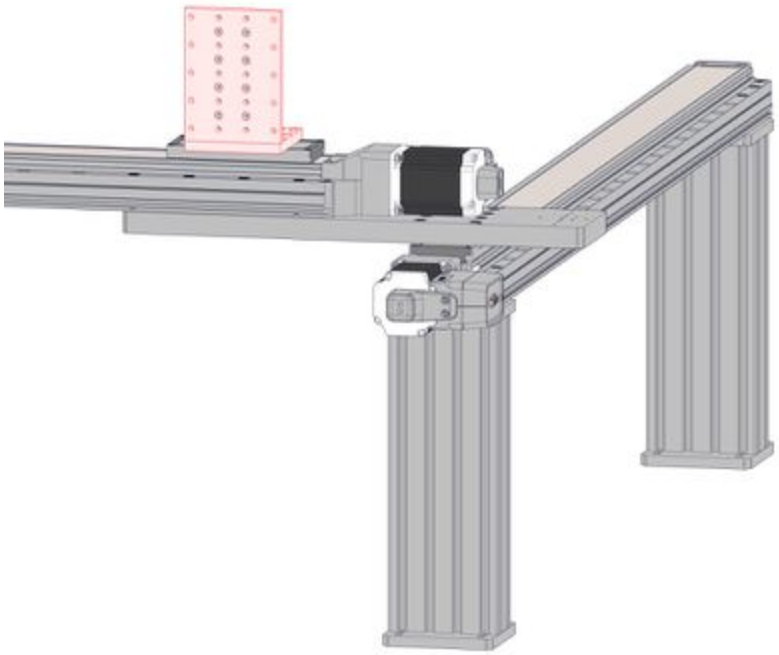
- 5 mm hex key

Assembly

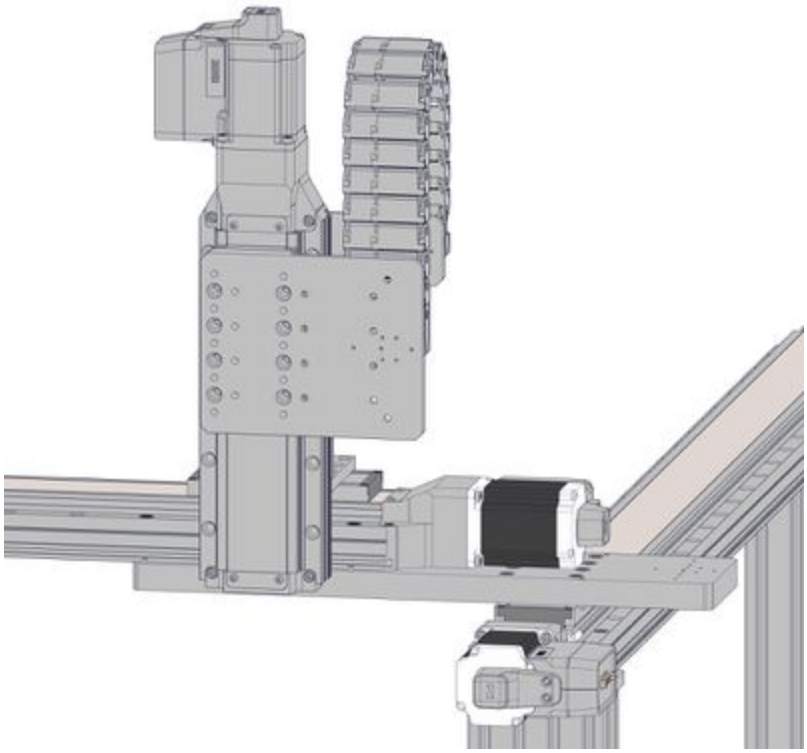


- Additional axes can be mounted directly to the top of the AP207 part 2 as shown.

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- For additional axes at 90 degrees to the AP207 part 2, add an angle bracket such as the AB210. Use the provided M6 mounting screws and a 5 mm hex key to attach the bracket.



- An LRT Z-axis stage and cable guide assembly mounted with an AB210 bracket is shown here.

CG Cable Guide and Cable Assembly

Related Products



CG01



CG02



CG06



CG01T



CG02T



CG06T



MC10T3
MC10T3L060
MC10T3L300
MC10T3L450



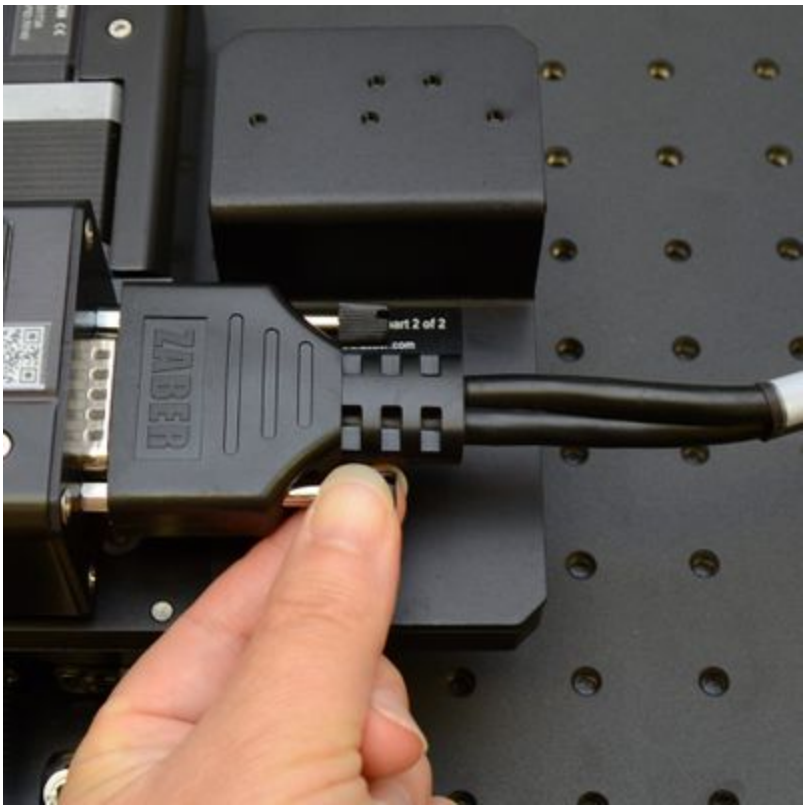
MC10

Precautions

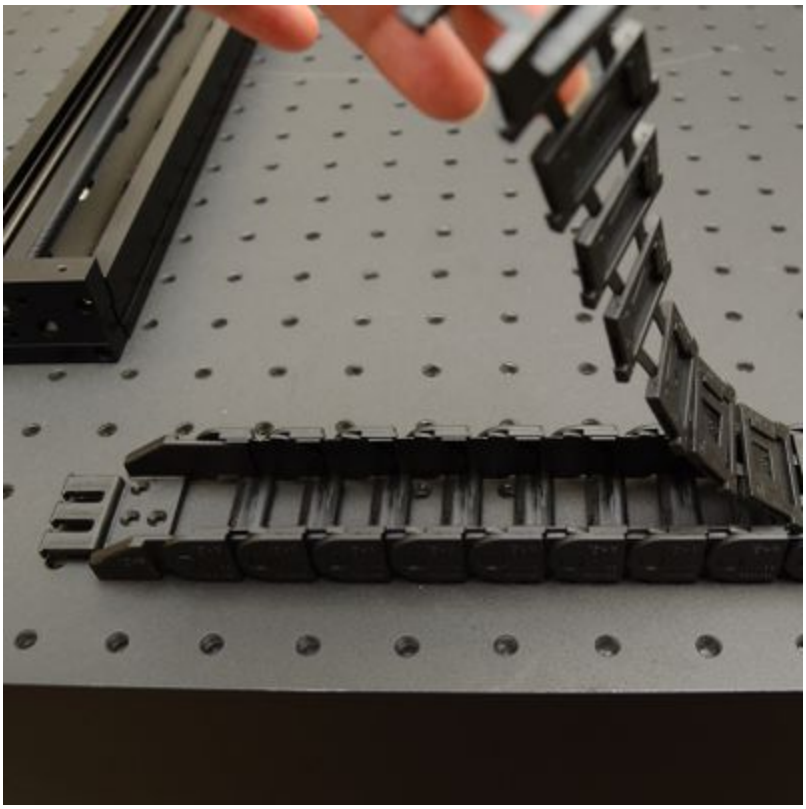
Important: Ensure cables are not twisted along their length. This can reduce cable lifetime.

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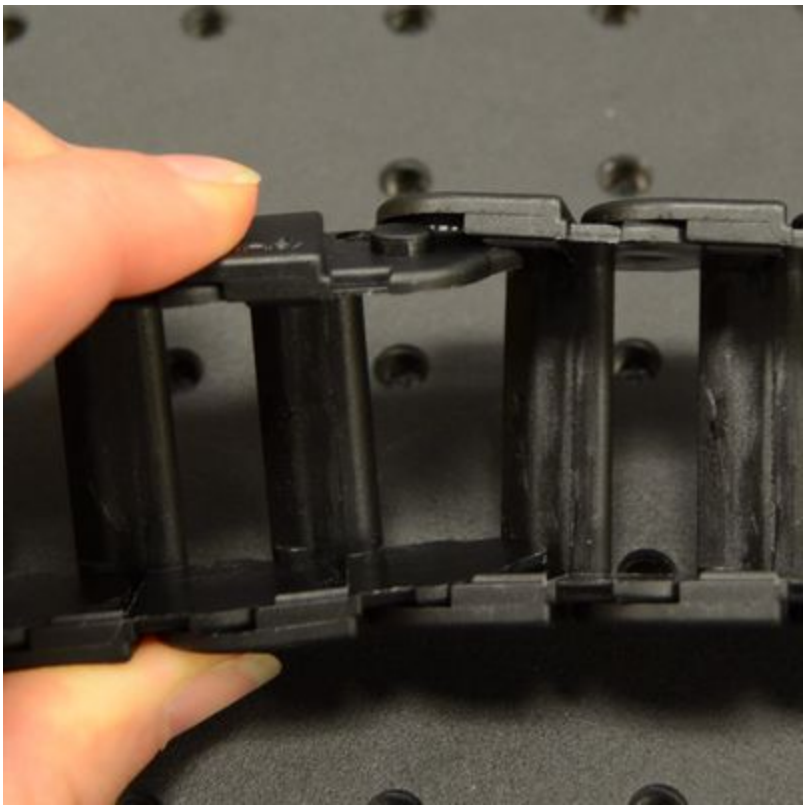
Assembly



- Ensure all motor cables are connected to the correct peripherals before building the cable guides.

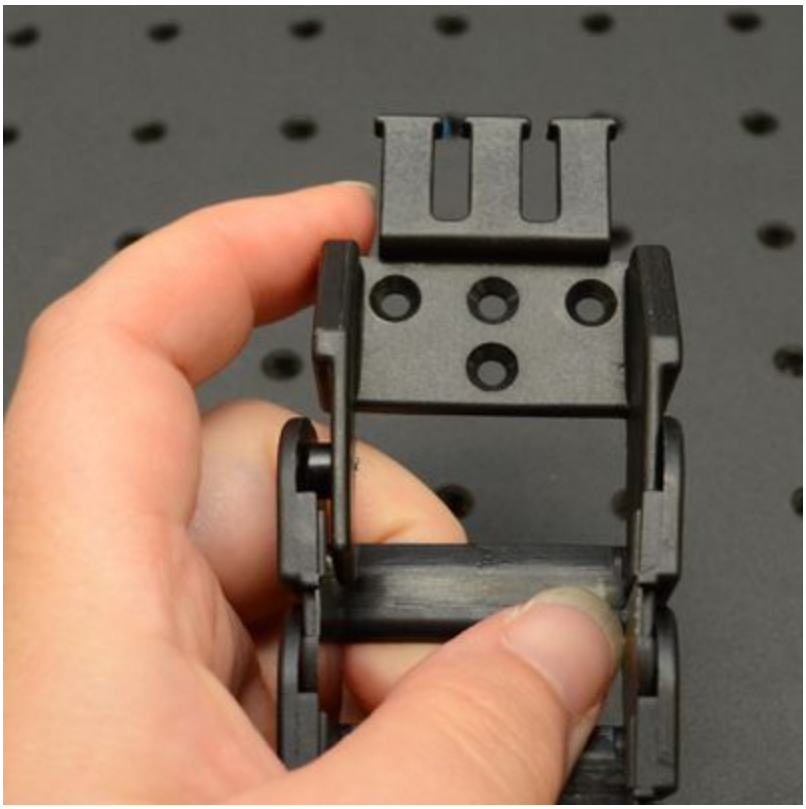


- Determine the number of links required for the X-axis guide and, if present, the Y-axis guide. See the Product Overview for configuration specific quantities.
  Peel open the cable guide.

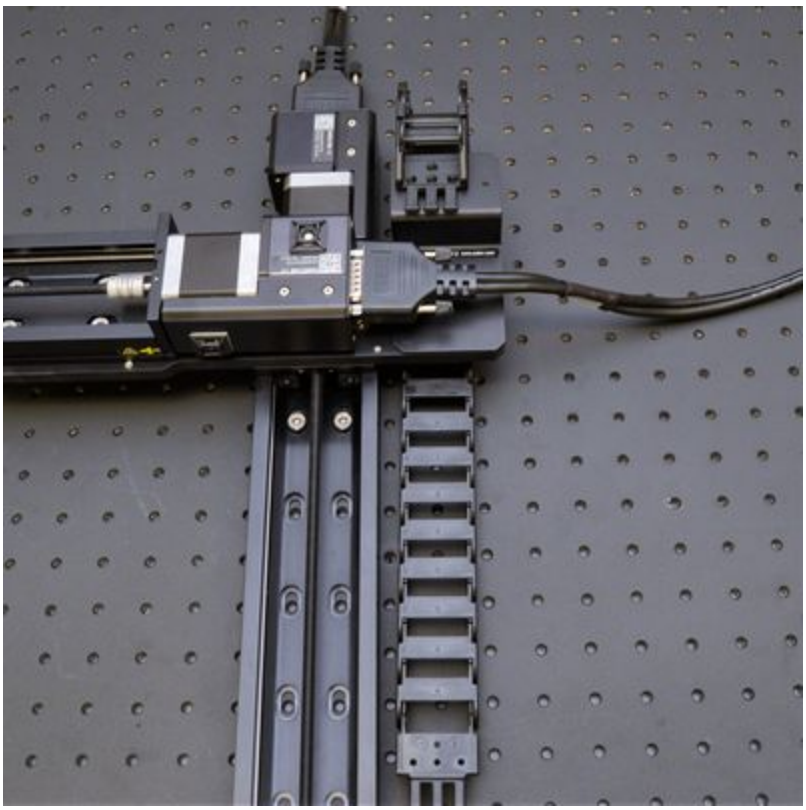


- Break the CGxx chain at the appropriate position.

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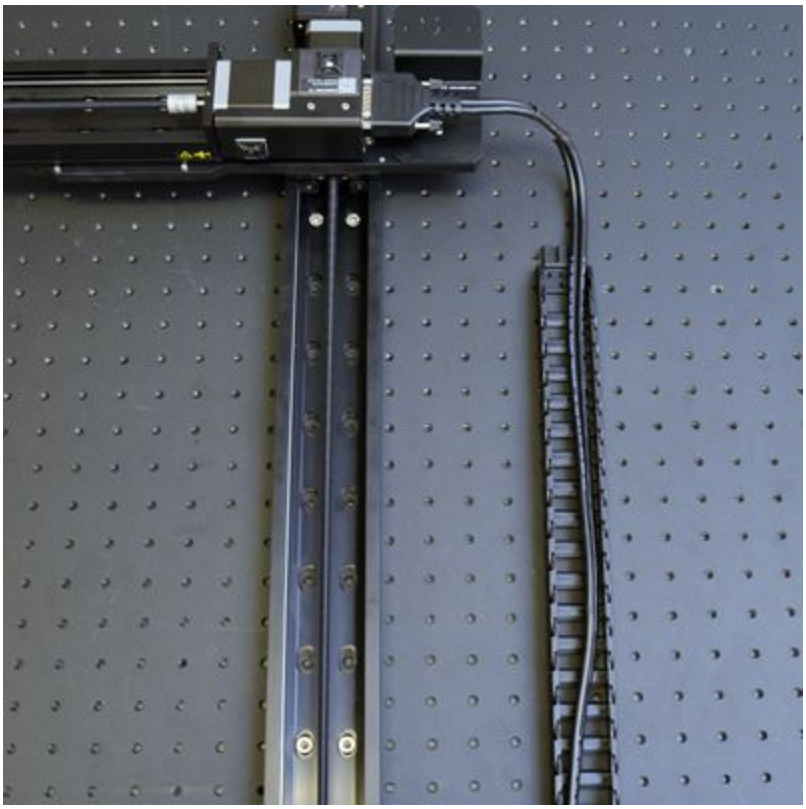


- Attach the CGxxT parts to the mating ends of the CGxx.
  Note: You may need to remove these temporarily to attach them to the mounting adaptors.



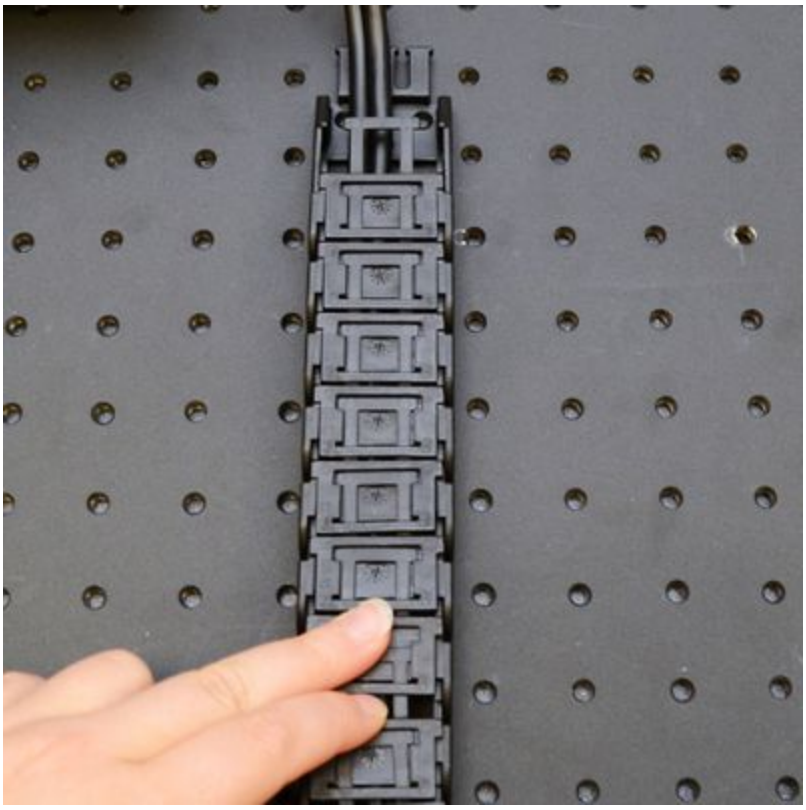
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- Lay out the cable guide and determine which way it will bend and where the CGxxT terminations will mount to the cable guide adaptors.
  Note: If using CG06T, the pivoting termination should mount to the upper cable guide adapter.

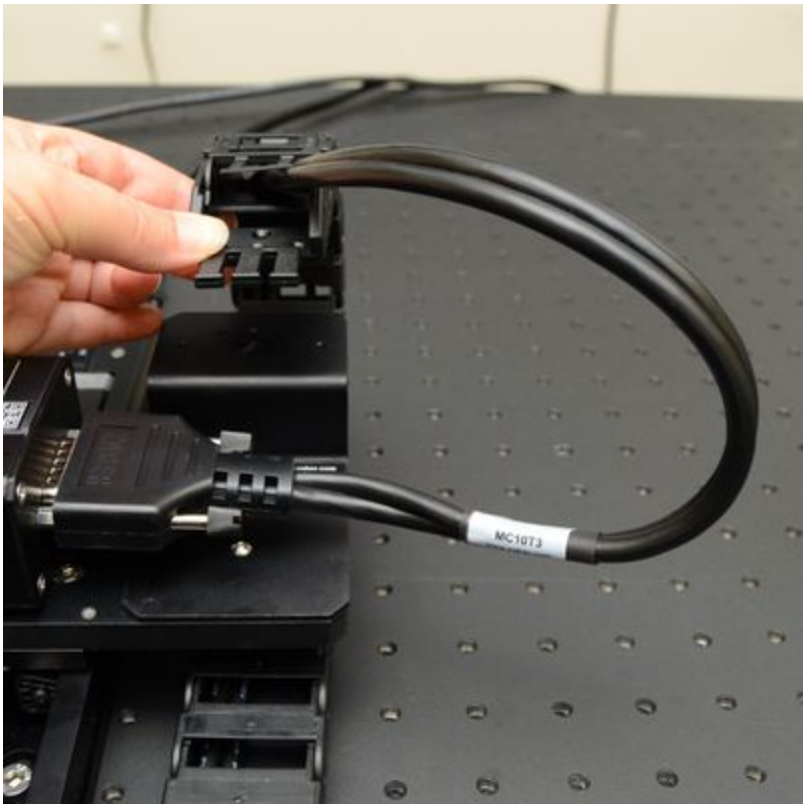


- Lay cables in the guides, ensuring that the peripheral connectors are exiting the top end of the guide. Remove any twists in the cable(s) and lay them in the centre of the guide. Minimize twists outside the cable guide.
  Important: If you are using a Y-axis cable guide, ensure that the cable(s) for the Z/theta axis and any end effectors are also included in the X-axis cable guide.

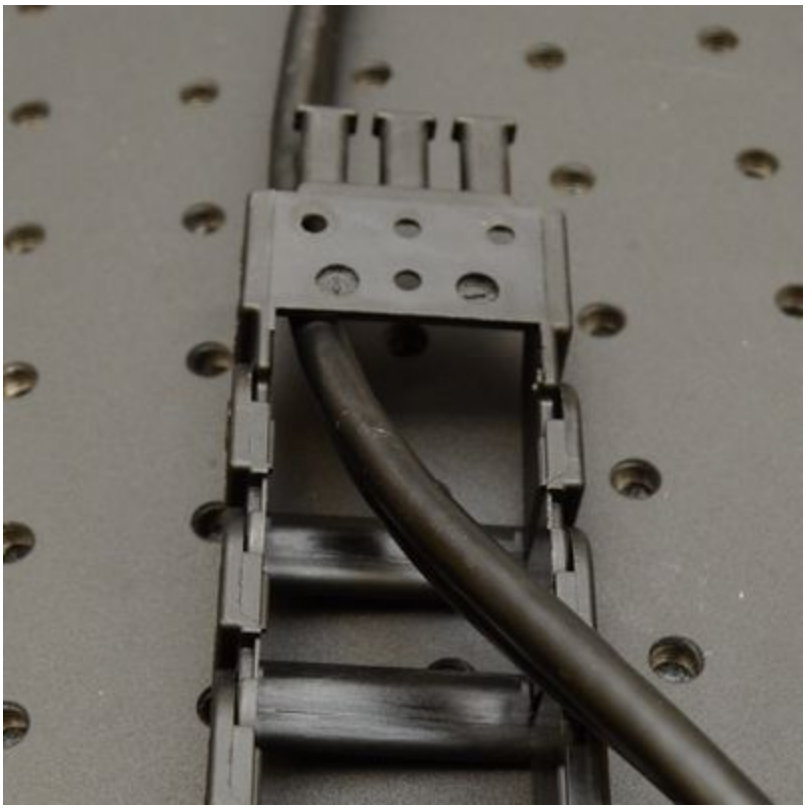
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- Close the CGxx cable guide by clicking the parts together.
  Note: The CGxx cable guide parts must be oriented as shown to click together.



- Ensure 150-200 mm (6-8 inches) of cable length extends from the top end of the cable guide where it will connect.



- Terminations can be attached in two orientations, depending on how they will attach to the mounting adaptors. If the termination needs to be flipped, you will need to assemble the cable in the guide then remove and re-attach the termination as shown.

Installing AP205 Cable Guide Mounts for X-Axis Cable Guides

Related Products

 AP205 Cable Guide Mounting Bracket Set	 LRT-EC Linear Stages	 CG01T	 CG02T	 CG06T

Precautions

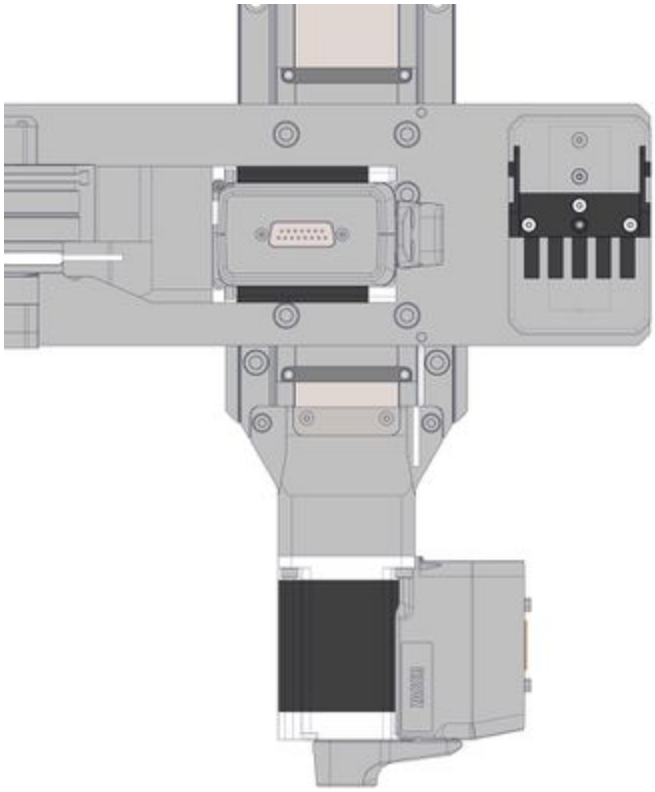
Important: Creating a loop in the cable of 150-200 mm (6-8 inches) between the top cable guide mount and the Y-axis stage protects the cable and increases cycle lifetime.

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Required Tools

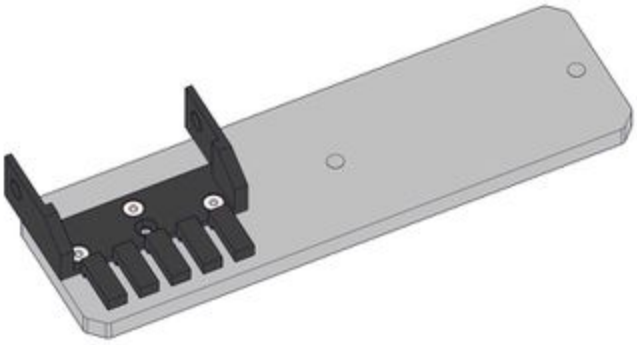
- 5 mm hex key
- 2 mm hex key

Assembly (CG01 or CG02)



- Attach the upper termination of the cable guide to the AP201 part 1 using M3 flathead screws and the 2 mm hex key.

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- Attach the lower termination of the cable guide to AP205.



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- Mount the AP205 to the LRT X-axis 1 stage in mid-travel, using the provided M6 x 30 screws and a 5 mm hex key.



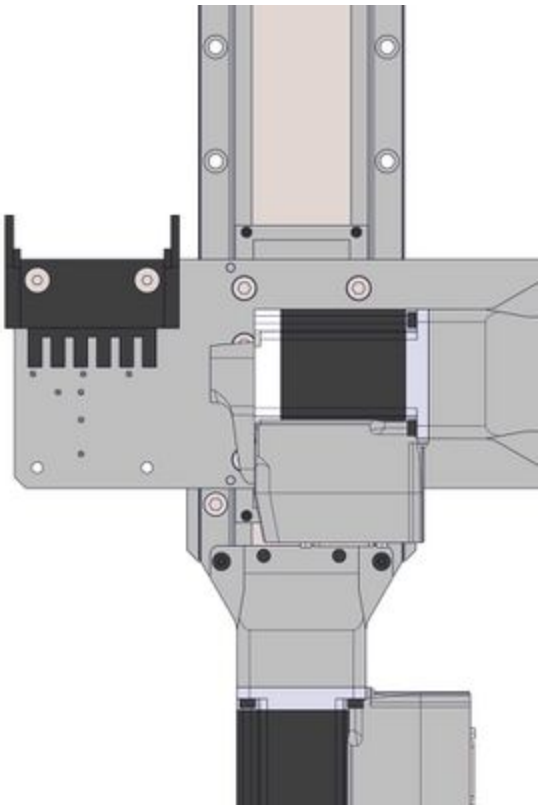
- Confirm that the cable guide is in the desired orientation.

Assembly (CG06)

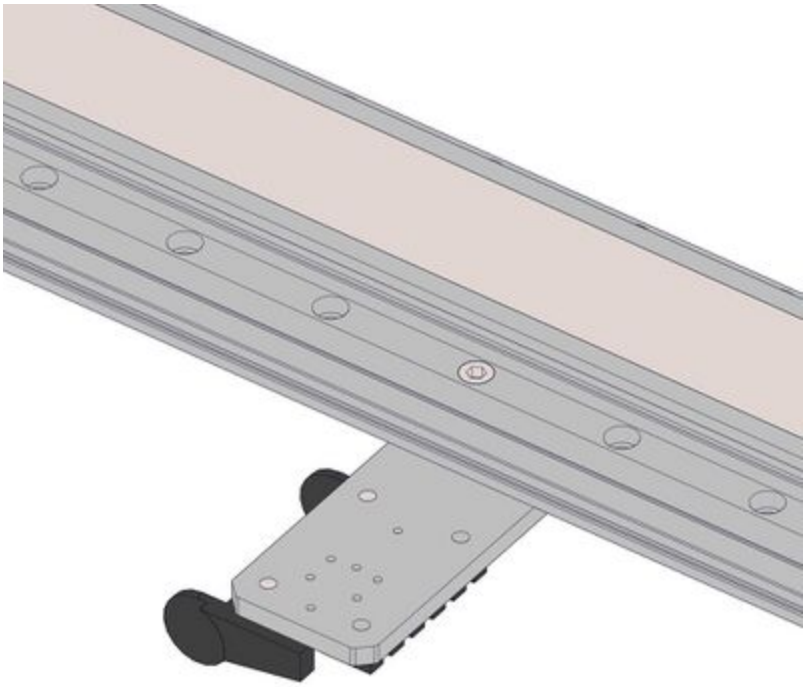


- Identify the pivoting termination of CG06T. This is the termination with the holes for connecting the cable guide links.

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- Attach the upper pivoting termination of the cable guide to the AP201 part 1 using two M6 flathead screws and the 4 mm hex key.

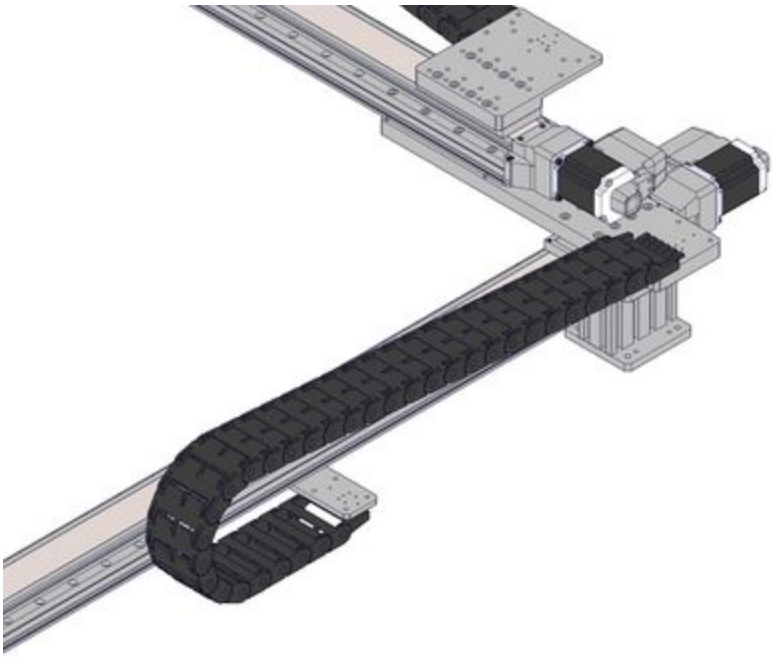


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- Attach the lower termination of the cable guide to AP205.



- Mount the AP205 to the LRT X-axis 1 stage in mid-travel, using the provided M6 x 30 screws and a 5 mm hex key.



- Confirm that the cable guide is in the desired orientation.

Installing AP206 Cable Guide Mounts for X-Axis Cable Guides

Related Products

 AP206 Cable Guide Mounting Bracket Set, Breadboard Mounting	 LRT-EC Linear Stages	 CG01T	 CG02T

Precautions

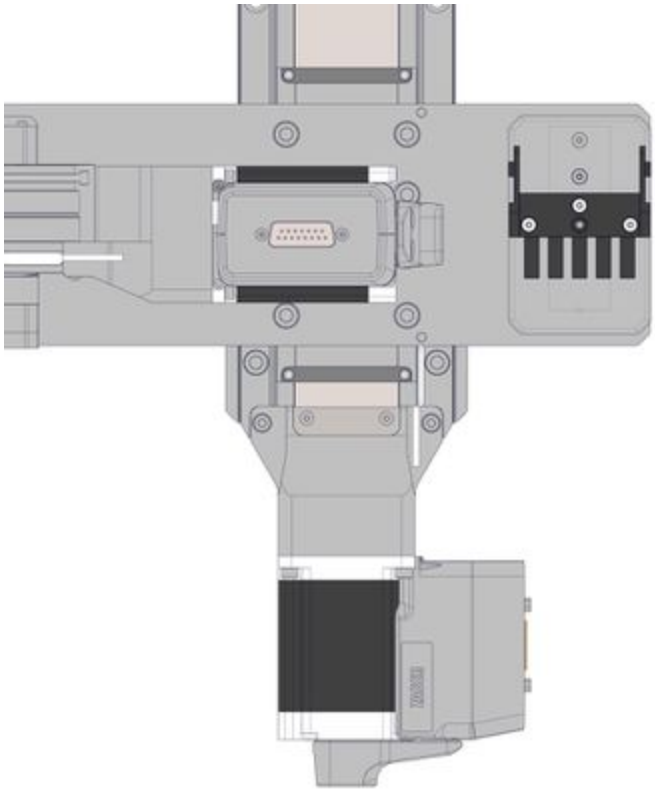
Important: Creating a loop in the cable of 150-200 mm (6-8 inches) between the top cable guide mount and the Y-axis stage protects the cable and increases cycle lifetime.

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Required Tools

- 5 mm hex key
- 2 mm hex key

Assembly

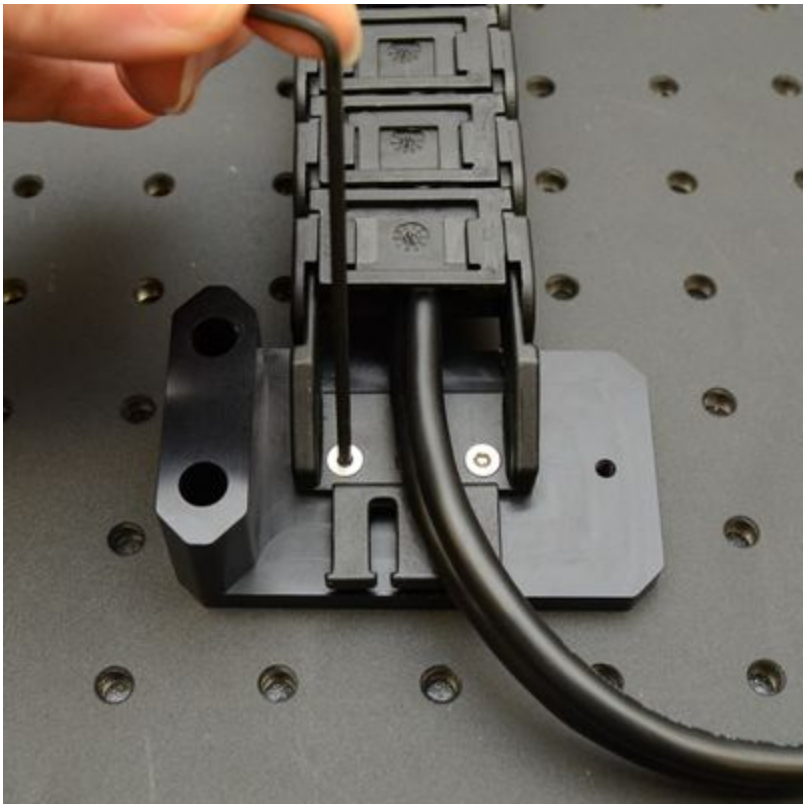


- Attach the upper termination of the cable guide to the AP201 part 1 using M3 flathead screws and the 2 mm hex key.

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- Hold the cable guide up as it will be installed to determine how the adaptors should be oriented.



- Attach the AP206 to the lower termination of the cable guide (CG01T shown here).

  Mount the AP206 to the breadboard near the mid-point of X-axis travel, using the provided M6 screws and a 5 mm hex key.

Installing AP268 Cable Guide Mounts for CG06 X-Axis Cable Guides

Related Products

 AP268 Cable Guide Mounting Bracket Set, Breadboard Mounting	 LRT-EC Linear Stages	 CG06T

Precautions

Important: Creating a loop in the cable of 150-200 mm (6-8 inches) between the top cable guide mount and the Y-axis stage protects the cable and increases cycle lifetime.

Required Tools

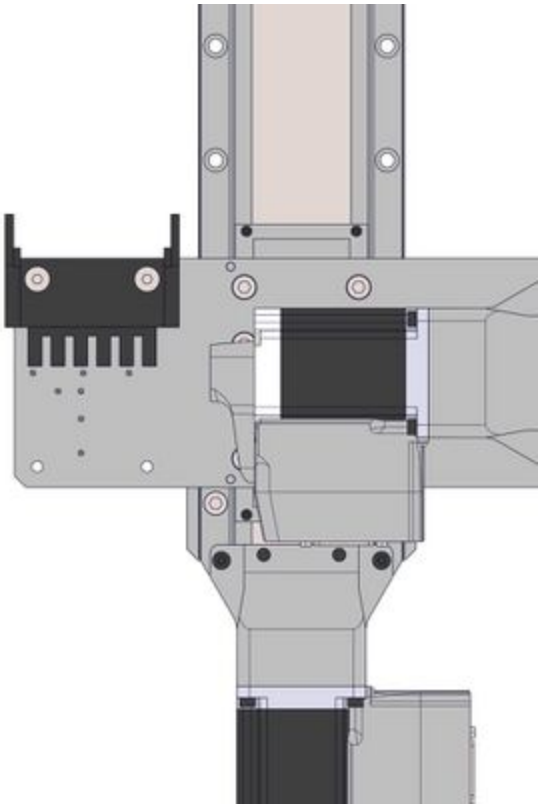
- 5 mm hex key
- 4 mm hex key

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Assembly

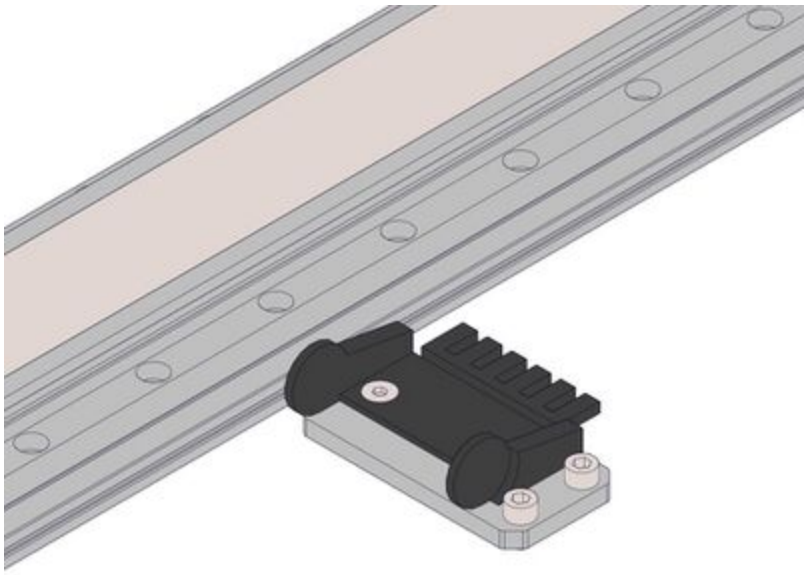


- Identify the pivoting termination of CG06T. This is the termination with the holes for connecting the cable guide links.



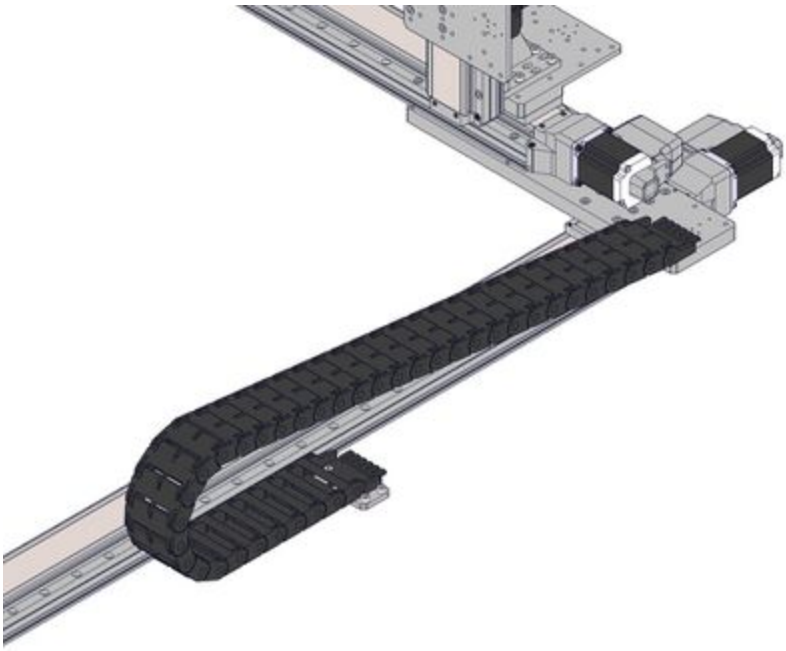
- Attach the upper pivoting termination of the cable guide to the AP201 part 1 using two M6 flathead screws and the 4 mm hex key.

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- Attach the lower termination of the cable guide to AP268.

  Mount the AP268 to the breadboard near the mid-point of X-axis travel, using the provided M6 screws and a 5 mm hex key.



- Confirm that the cable guide is in the desired orientation.

Installing CG Cable Guides with AP207

Related Products

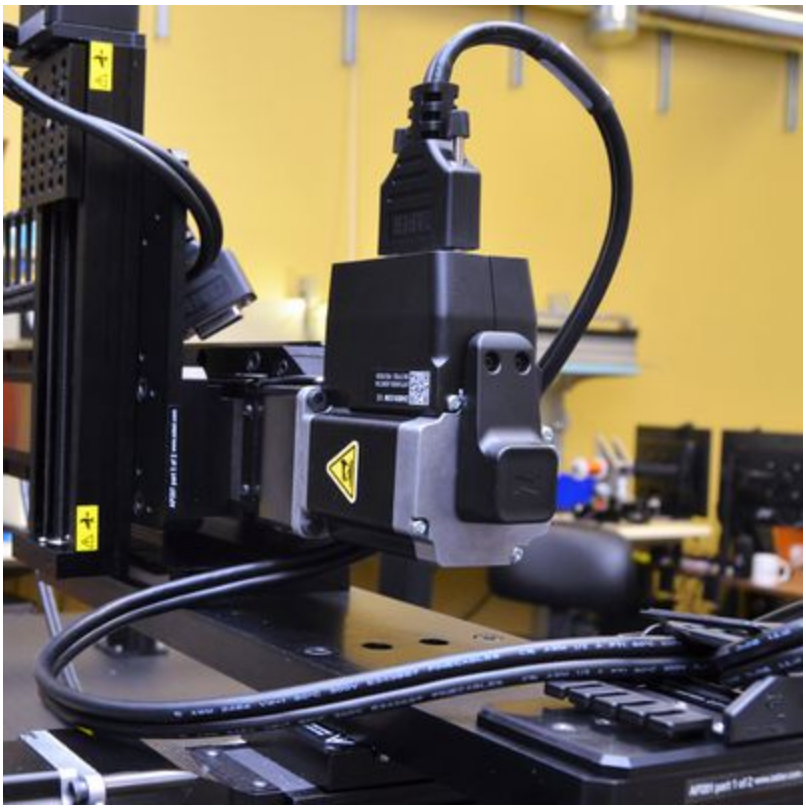
 AP207 Cable Guide Mounting Bracket Set	 LRT-EC Linear Stages	 CG01T	 CG02T	 CG06T

Precautions

Important: Creating a loop in the cable of 150-200 mm (6-8 inches) between the top cable guide mount and the Y-axis stage protects the cable and increases cycle lifetime.

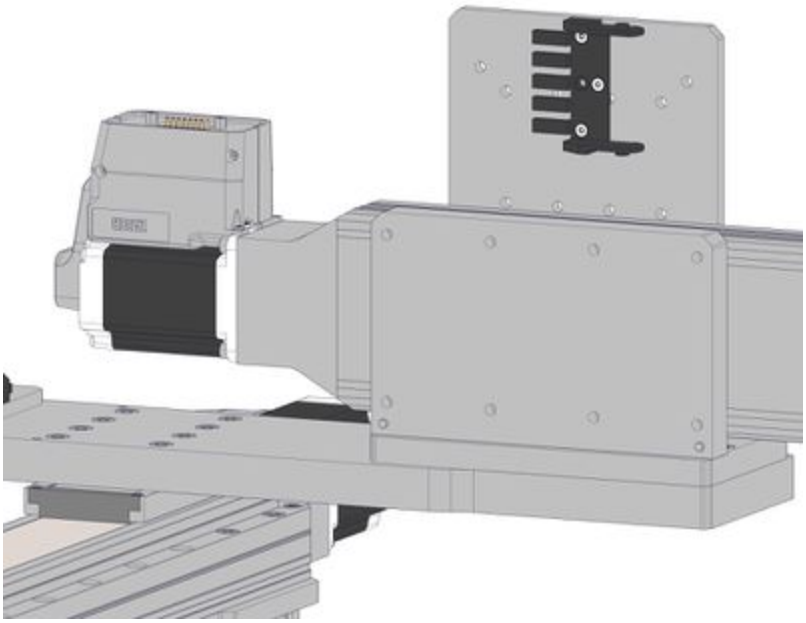
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Assembly (CG01 or CG02)

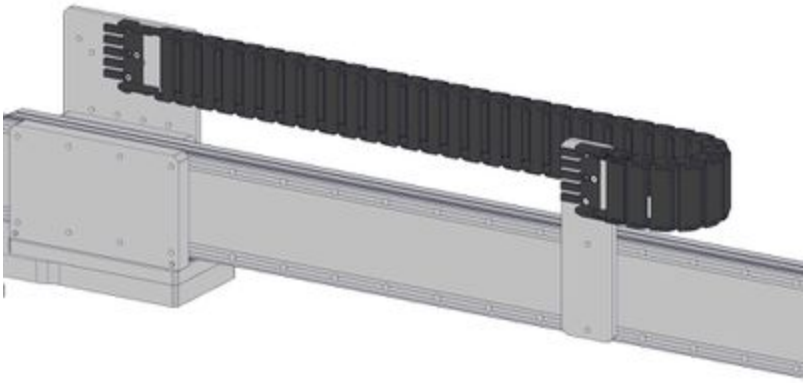


- Ensure cables for Y-axis, additional axes, and end effectors have a 150-200 mm (6-8 inches) loop as they exit the X-axis cable guide.

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- Connect upper cable guide termination to AP207 part 2 as shown.



- Connect the cable guide to the bottom side of AP207 part 1 as shown.

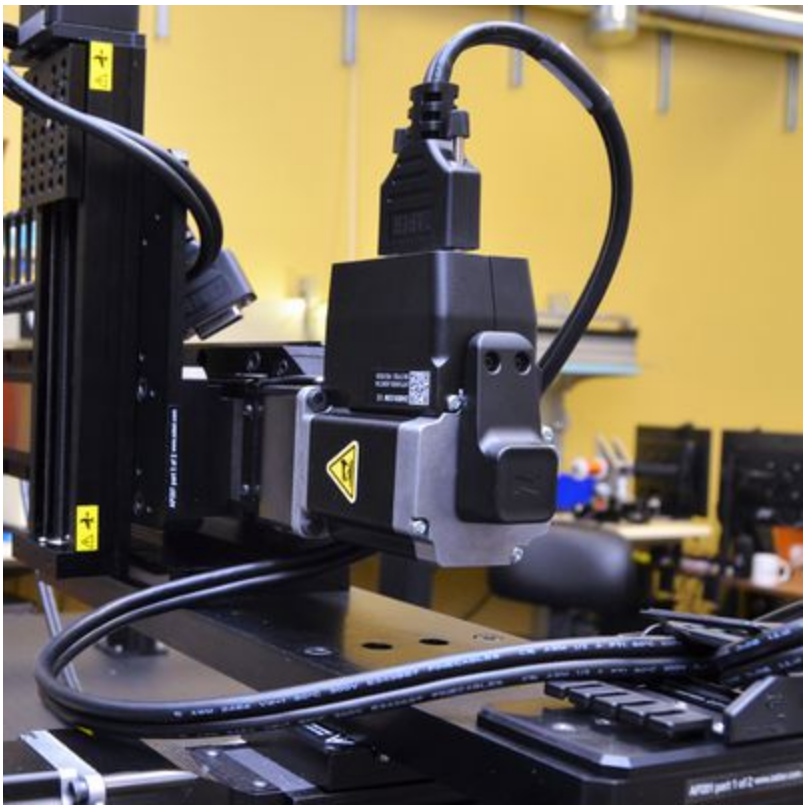
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- The Y-axis of a LRT gantry is shown here with the cable guide installed.

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Assembly (CG06)



- Ensure cables for Y-axis, additional axes, and end effectors have a 150-200 mm (6-8 inches) loop as they exit the X-axis cable guide.

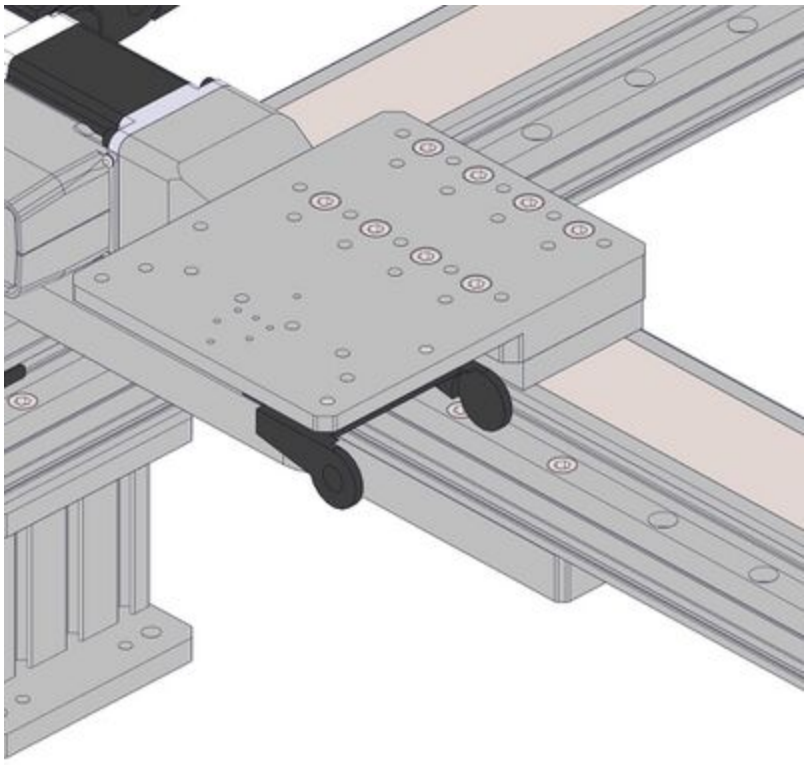


- Identify the pivoting termination of CG06T. This is the termination with the holes for connecting the cable guide links.

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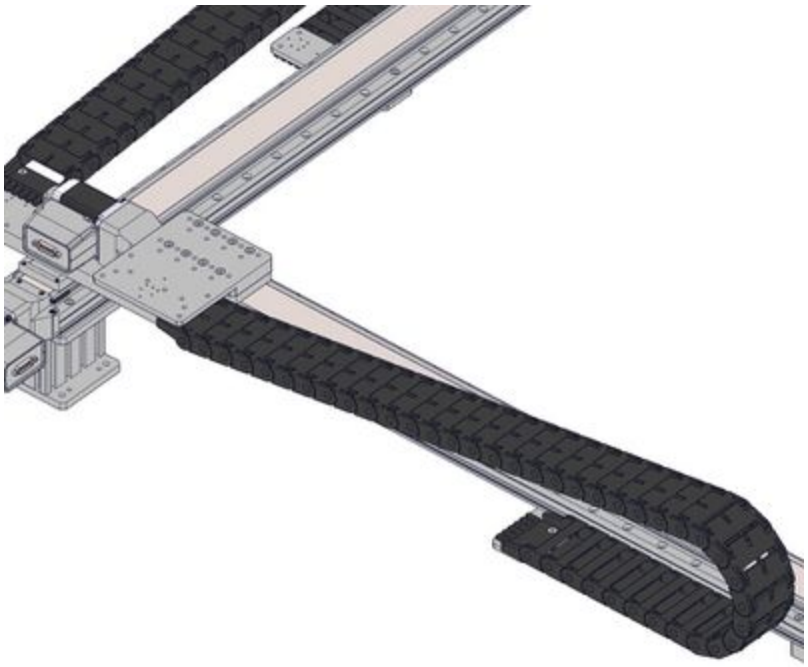


- Attach the upper pivoting termination of CG06T to AP207 part 2 as shown using M6 flathead screws.



- Attach the lower termination of the cable guide to the top of AP207 part 1 as shown.

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- Confirm that the cable guide is in the orientation shown.

Installing AP211 Cable Guide Supports

Related Products

 AP211 Cable Guide Support	 LRT-EC Linear Stages

Precautions

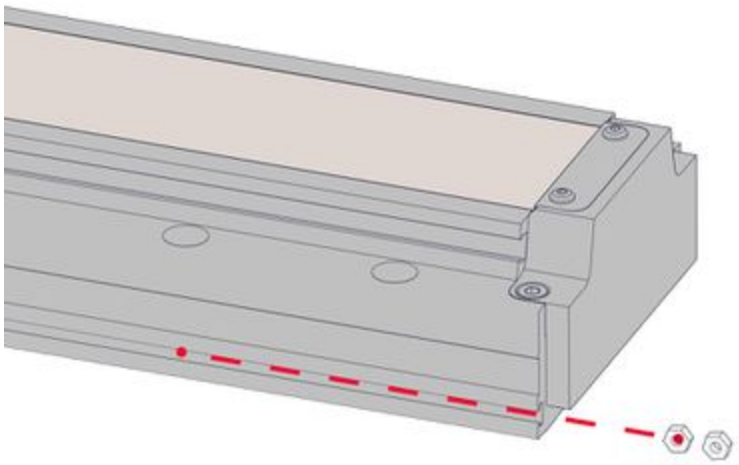
Important: AP211 cable guide supports are not compatible with CG06 cable guides. Supports are not required for CG06.

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Required Tools

- 2 mm hex key

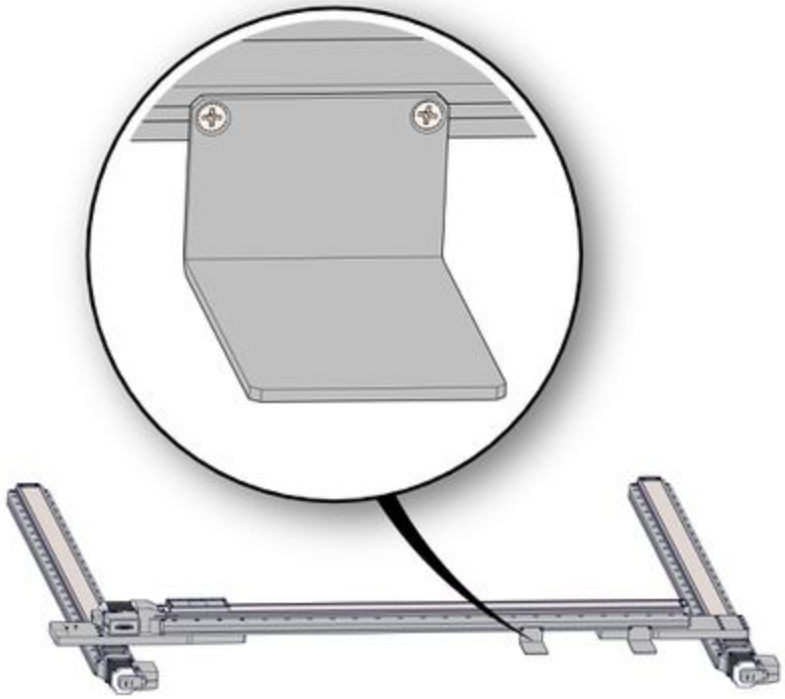
Assembly



- Insert the two M3 nuts into the slot on the side of the LRT Y-axis stage where the cable guide will be mounted.

  Note: Cable guide mounting location may vary depending on your configuration. The configuration shown here may not match your assembly.

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- Loosely attach two M3 flathead screws through the AP211 to the nuts in the LRT stage slot.
  Slide the AP211 along the Y-axis stage to the desired location before tightening the fasteners.
  Place a single adaptor at approximately 3/4 of the travel of the Y-axis stage (away from the motor).
  For two adaptors, space them equally between 2/3 of the travel and the end of travel of the Y-axis stage.



- Install AP211 adaptors for additional axes as needed, including support for X-axis cable guides when risers are used.

Cable Management

Related Products

 CG01T	 CG02T	 MC10T3 MC10T3L060 MC10T3L300 MC10T3L450

Precautions

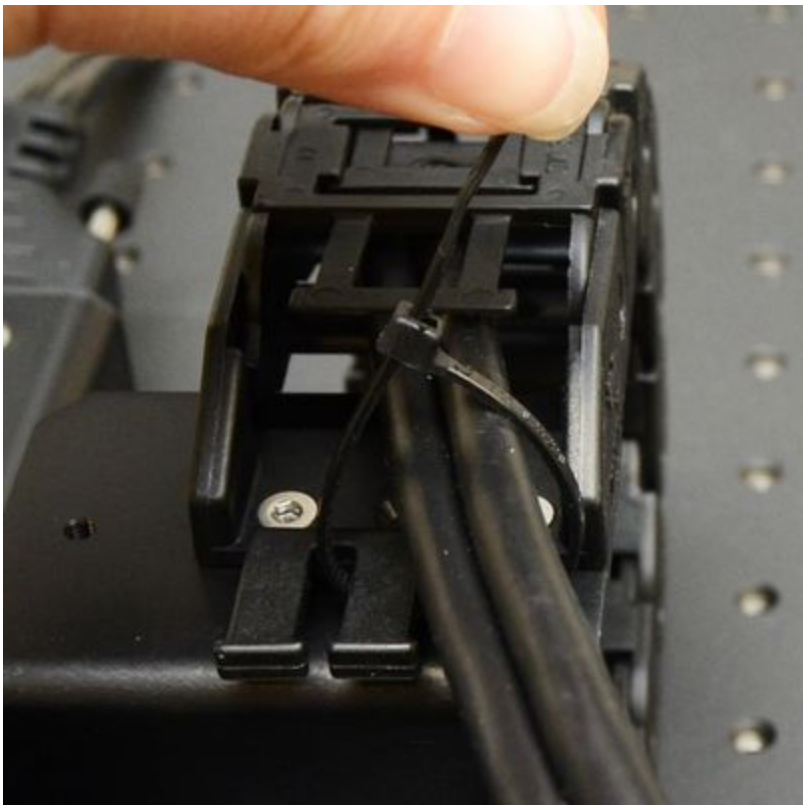
Important: Creating a loop in the cable of 150 to 200 mm (6-8 inches), between the top cable guide mount and the Y-axis stage, protects the cable and increases cycle lifetime.

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Required Tools

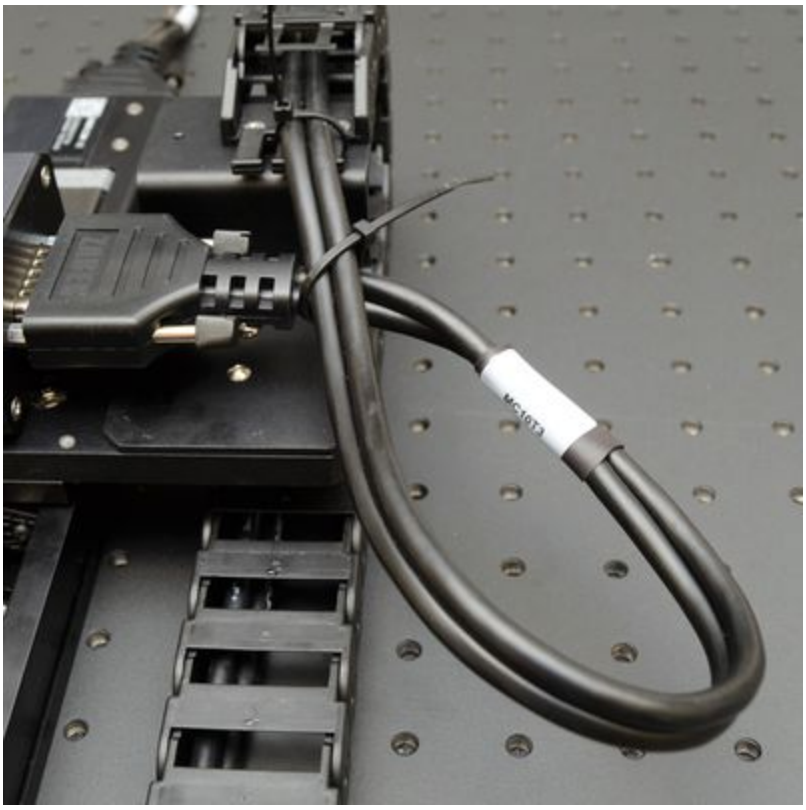
- cable ties
- cable tie mounts
- scissors

Assembly

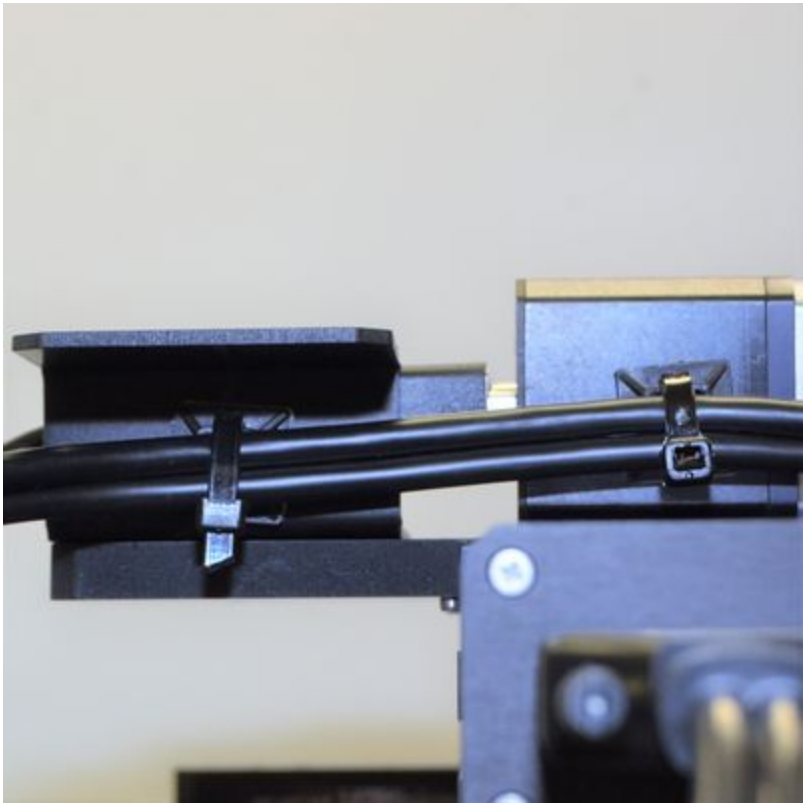


- Use cable ties (provided in CGxxT kit) to loosely secure cables to the prongs on the CGxxT as shown, to restrict their motion.

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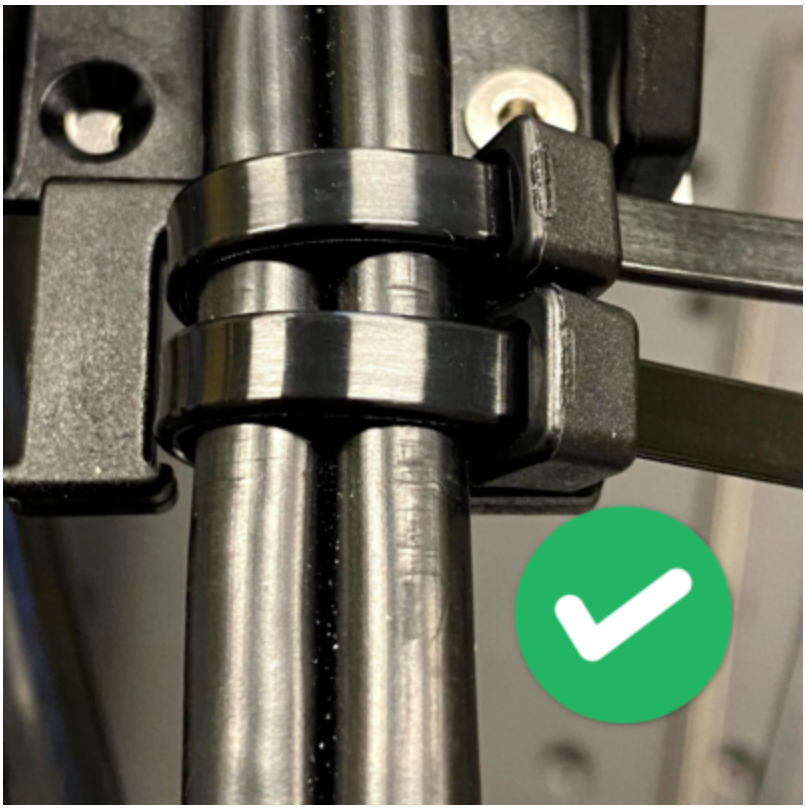


- Create the loop of cable using at least 150 to 200 mm (6-8 inches) of cable, for each cable as it exits the guide.



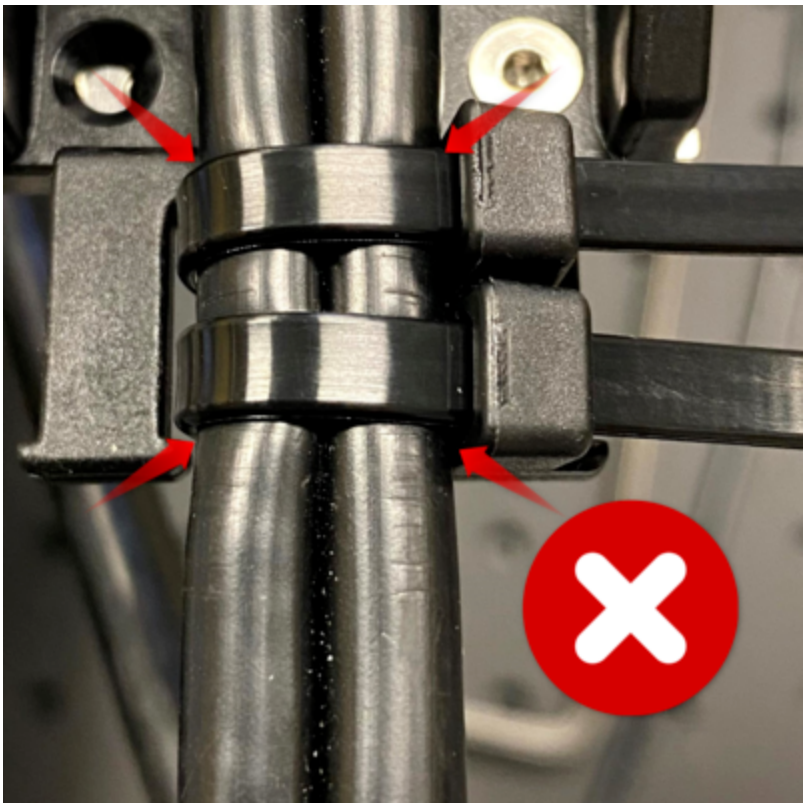
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- For cables to Z/theta and end effector devices, route the cable(s) beside the Y-axis stage and use an adhesive-backed cable tie mount (provided in the CGxxT kit) and a cable tie to hold the cable in place as shown.

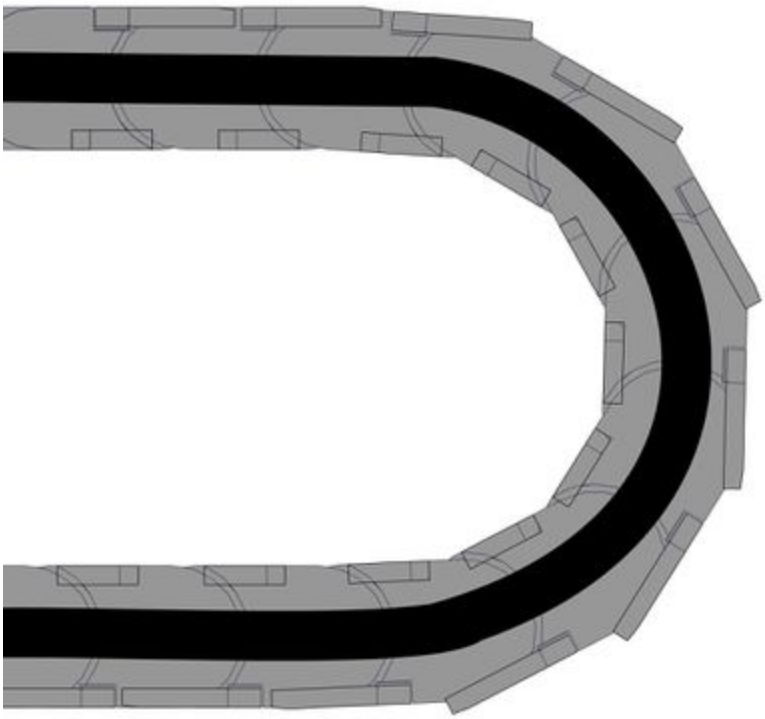


- To create the upper strain relief tighten two cable ties on the upper prongs of the CGxxT and the cable. The cable ties should be loose enough that you can move the cable though them fairly easily by hand, but tight enough to constrain the external cable jacket. This allows the internal cable wires to move through the strain relief to relieve bending stresses during motion.

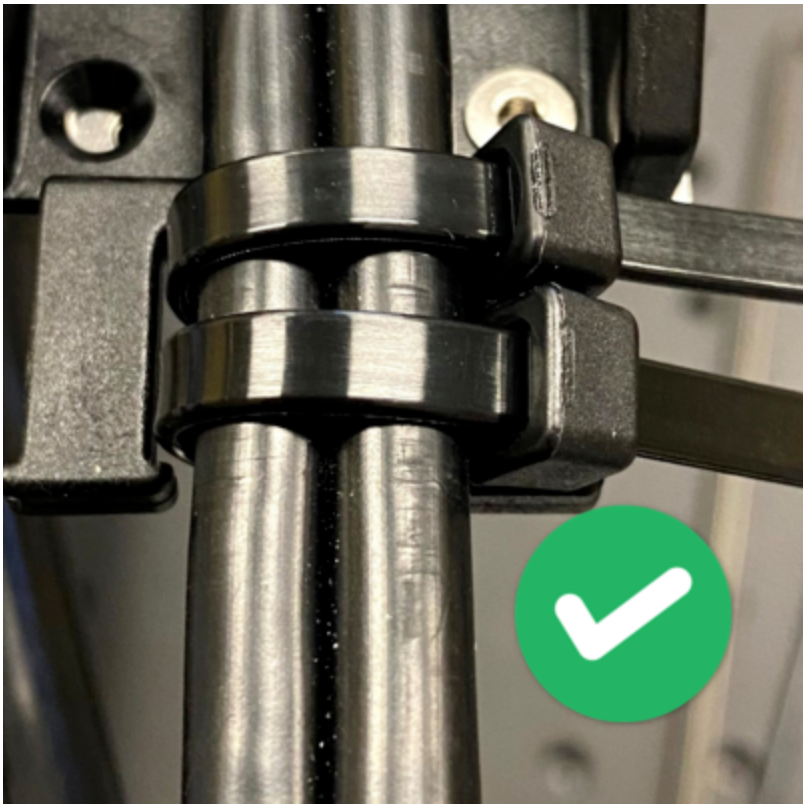
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- The cable ties in this image have been overtightened and are pinching the cable jacket. Remove ties and start again if needed.



- Adjust the cable position inside the guide.
  1. The cable should be in the centre of the guide, not pulled tight against the inner radius or pushed against the outer radius of the bend.
  2. Holding the cable gently on the controller side of the cable, move the stage along its entire range of travel several times and ensure the cable runs freely in the guide.



- Tighten the cable tie on the second CGxxT prongs to create the lower strain relief, matching the snugness of the first termination.
  Trim the ends of the cable ties.

Disassembly

To disassemble, follow the assembly procedures in reverse. Please keep the following guidelines in mind:

- Remove power before attempting to disassemble devices to prevent unexpected motion
- Retain fasteners for future use
- Keep cable guide assemblies intact

Operation

Setting Lockstep Tolerance

The lockstep tolerance limits the amount of twist between the two lockstepped stages as they travel. If the tolerance is exceeded, the devices will be brought to a stop, to prevent device damage from excessive twist. We recommend adjusting the default setting to larger values (up to the maximum safe values presented below for your specific configuration). Setting a larger tolerance reduces the risk of unexpected or jarring stops and should not affect the typical operating performance of the lockstepped stages.

X-Axis Part Number	Y-Axis Part Number[1]	Maximum Lockstep Tolerance Setting (microsteps)[2]
LRTxxxxAx	LRT0500xx	9472
	LRT0750xx	12178
	LRT1000xx	14884
	LRT1500xx	20297
LRTxxxxBx	LRT0500xx	2368
	LRT0750xx	3045
	LRT1000xx	3721
	LRT1500xx	5074
LRTxxxxDx	LRT0500xx	592
	LRT0750xx	761
	LRT1000xx	930
	LRT1500xx	1269
LRTxxxxHx	LRT0500xx	3007
	LRT0750xx	3867
	LRT1000xx	4726
	LRT1500xx	6444

[1] Assumes standard mounting using AP201 hardware to determine spacing between X-axis stages.
[2] Allows misalignment to a maximum of 0.10 degrees.

Device Product Manuals

Zaber's gantry products include combinations of several Zaber motion control devices. For device operation, maintenance procedures and troubleshooting, consult the detailed product manuals for these devices:

X-MCC Universal Drive Controller
These controllers are available with 1-4 axes. In a gantry, a three or four axis controller is typically used to operate the two X-axis stages in lockstep, and to provide coordinated motion for up to two additional axes of motion. This controller may be daisy-chained with other Zaber controllers or motion devices with integrated control.
LSQ-E Linear Stage
Provides X,Y and optional Z axis linear motion in LSQ-E Gantries.
LSQ-EC Linear Stage
Provides X,Y and optional Z axis linear motion in LSQ-EC Gantries.
LRT-EC Linear Stage
Provides X,Y and optional Z axis linear motion in LRT-EC Gantries.
LC40B-KM01 Linear Guide with Integrated Controller Motor Kit
Provides X,Y linear motion in LC40 Gantries.
LC40B-KM02 Linear Guide with Motor Kit for External Controller
Provides X,Y linear motion in LC40 Gantries.
LC40C-KM03 Linear Cantilever Axis with Integrated Controller Motor Kit
Provides X,Y linear motion in LC40 Gantries.

LC40C-KM04 Linear Cantilever Axis with Motor Kit for External Controller
Provides X,Y linear motion in LC40 Gantries.
RSW Rotary Stage
Provides and optional rotary axis to a gantry.

Additional Zaber motion products can be used in any Zaber gantry. Product Manuals can be found through their product pages here: Zaber Products

Troubleshooting a Gantry product

The following sections contain tips for troubleshooting gantry behavior. Please also see the Device Product Manuals for individual stage behavior, indicator information, and additional troubleshooting.

Unexpected Behaviour

An axis doesn't respond to a move command.
The axis stage(s) may need to be homed before use. Send the home command, or the lockstep home command if the axis is in a lockstep group (X-axis).
Ensure commands addressed to lockstep group stages (X-axis) are lockstep motion commands.
A peripheral won't move and move commands are rejected.
The peripheral may have been unplugged and plugged back in to the wrong axis. Send the activate command the peripheral to continue using it.
The device is moving on its own and running against the ends of travel.
The position encoder has de-synchronized.
Reset the device by power cycling it or sending the system reset (T:0) command, then re-initialize it with the home (T:1) command.
The X-axis stages have stopped unexpectedly during a move.
See warning flags for more information.
A stage may have stalled. See X-MCC Troubleshooting.
Lockstep twist tolerance may have been exceeded. Consider adjusting lockstep tolerance. See Operation section for maximum recommended settings.
Lockstepped Stages Stuck or Not Moving Well
Alignment may not be ideal or stages may have become twisted.
Disable the lockstep group by sending lockstep setup disable. Typically this will look like 'lockstep 1 setup disable'.
Perform alignment steps, homing, and lockstep setup again.

Warranty and Repair

For Zaber's policies on warranty and repair, please refer to the Ordering Policies.

Standard products

Standard products are any part numbers that do not contain the suffix ENG followed by a 4 digit number. Most, but not all, standard products are listed for sale on our website. All standard Zaber products are backed by a one-month satisfaction guarantee. If you are not satisfied with your purchase, we will refund your payment minus any shipping charges. Goods must be in brand new saleable condition with no marks. Zaber products are guaranteed for one year. During this period Zaber will repair any products with faults due to manufacturing defects, free of charge.

Custom products

Custom products are any part numbers containing the suffix ENG followed by a 4 digit number. Each of these products has been designed for a custom application for a particular customer. Custom products are guaranteed for one year, unless explicitly stated otherwise. During this period Zaber will repair any products with faults due to manufacturing defects, free of charge.

How to return products

Customers with devices in need of return or repair should contact Zaber to obtain an RMA form which must be filled out and sent back to us to receive an RMA number. The RMA form contains instructions for packing and returning the device. The specified RMA number must be included on the shipment to ensure timely processing.

Email Updates

If you would like to receive our periodic email newsletter including product updates and promotions.

Contact Information

Contact Zaber Technologies Inc by any of the following methods:

Phone	1-604-569-3780 (direct) 1-888-276-8033 (toll free in North America)
Fax	1-604-648-8033
Mail	#2 - 605 West Kent Ave. N., Vancouver, British Columbia, Canada, V6P 6T7
Web	www.zaber.com
Email	Please visit our website for up to date email contact information.

The original instructions for this product are available at https://www.zaber.com/manuals/LRT-GANTRY.

Appendix A: Default Settings

Please see the Zaber Support Page for default settings for this device.

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