

X-axis Nut-rotation Type Cartesian Robot Assembly Procedures First Edition

Thank you for purchasing an IAI product.
Assemble your product correctly by referring to this Assembly Procedures.

NS (nut-rotation type actuator) + ISA configuration unit

No.	Number of configured axes	Z-axis installation method	Model	Drawing No.
1	2 axes		ICSPA2-B1N (B2N) □ H (M)	GMM07-061
2	3 axes	Z-axis base mount	ICSPA3-B1N (B2N) □ H (M) B3H (M)	GMM07-062
3	3 axes	Z-axis slider mount	ICSPA3-B1N (B2N) □ H (M) S3M	GMM07-063
4	4 axes		ICSPA4-B3N1H (M)	GMM07-064
5	6 axes	Z-axis base mount	ICSPA6-B3N1H (M) B3H (M)	GMM07-065
6	6 axes	Z-axis slider mount	ICSPA6-B3N1H (M) S3M	GMM07-066

X-axis Nut-rotation Type Cartesian Robot – High-precision 2-axis Specification

[Model]
ICSPA2-B1N □ H (M)
ICSPA2-B2N □ H (M)

H: X-axis high-speed type
M: X-axis medium-speed type
[1] XY configuration direction
1: Stroke 500 to 2200
2: Stroke 2250 to 3000

[1] XY configuration directions

[Assembled parts]

[1] XY bracket [2] Track mounting bracket [3] Guide rail
[4] Cable track [5] Connector box [6] Box cover
[7] Joint cover [8] Grommet with film [9] Controller-actuator cable with cable fix cap
[10] Cable guard [11] Metal cover

[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMS-□-400-40<20>- (stroke) -T2-AQ-RT
Y-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ

* □ in the above models indicates either A (absolute) or I (incremental).

[Assembly Procedure] Drawing No.: GMM07-061

X-axis Nut-rotation Type Cartesian Robot – High-precision 3-axis Specification, Z-axis Base Mount

[Model]
ICSPA3-B1N □ H (M) B3H (M)
ICSPA3-B2N □ H (M) B3H (M)

H: Z-axis high-speed type
M: Z-axis medium-speed type
H: X-axis high-speed type
M: X-axis medium-speed type
[1] XY configuration direction
1: Stroke 500 to 2200
2: Stroke 2250 to 3000

[1] XY configuration directions

[Assembled parts]

[1] XY bracket [2] Track mounting bracket 1 [3] Guide rail [12] YZ plate [13] Track mounting plate [14] Track support bracket
[4] Cable track 1 [5] Connector box 1 [6] Box cover 1 [15] Track mounting bracket 2 [16] Cable track 2 [17] Connector box
[7] Joint cover 1 [8] Grommet with film [9] Controller-actuator cable with cable fix cap [18] Box cover 2 [19] Joint cover 2 [20] Cable fix cap
[10] Cable guard [11] Metal cover

[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMS-□-400-40<20>- (stroke) -T2-AQ-RT
Y-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Z-axis	ISPA-MXM-□-200-20/10- (stroke) -T2-AQ-B

* □ in the above models indicates either A (absolute) or I (incremental).

[Assembly Procedure] Drawing No.: GMM07-062

X-axis Nut-rotation Type Cartesian Robot – High-precision 3-axis Specification, Z-axis Slider Mount

[Model]
ICSPA3-B1N □ H (M) S3M
ICSPA3-B2N □ H (M) S3M

H: Z-axis high-speed type
M: Z-axis medium-speed type
H: X-axis high-speed type
M: X-axis medium-speed type
[1] XY configuration direction
1: Stroke 500 to 2200
2: Stroke 2250 to 3000

[1] XY configuration directions

[Assembled parts]

[1] XY bracket [2] Track mounting bracket 1 [3] Guide rail [12] YZ plate [13] Track mounting plate [14] Track support bracket
[4] Cable track 1 [5] Connector box 1 [6] Box cover 1 [15] Track mounting bracket 2 [16] Track mounting bracket 3 [17] Cable track 2
[7] Joint cover 1 [8] Grommet with film [9] Controller-actuator cable with cable fix cap [18] Connector box 2 [19] Box cover 2 [20] Joint cover 2
[10] Cable guard [11] Metal cover

[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMS-□-400-40<20>- (stroke) -T2-AQ-RT
Y-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Z-axis	ISPA-MXM-□-200-20/10- (stroke) -T2-AQ-S-NM

* □ in the above models indicates either A (absolute) or I (incremental).

[Assembly Procedure] Drawing No.: GMM07-063

X-axis Nut-rotation Type Cartesian Robot – High-precision 4-axis Specification

[Model]
ICSPA4-B3N1 H (M)

H: X-axis high-speed type
M: X-axis medium-speed type
[1] XY configuration direction

[1] XY configuration directions

[Assembled parts]

[1] XY bracket [2] XY bracket [3] Track mounting bracket
[4] Guide rail [5] Cable track [6] Wiring box bracket
[7] Wiring box cover [8] Grommet with film [9] Controller-actuator cable with cable fix cap
[10] Cable guard [11] Metal cover

[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMM-□-400-40<20>- (stroke) -T2-AQ-RT
Y1-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Y2-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ

* □ in the above models indicates either A (absolute) or I (incremental).

[Assembly Procedure] Drawing No.: GMM07-064

X-axis Nut-rotation Type Cartesian Robot – High-precision 6-axis Specification, Z-axis Base Mount

[Model]
ICSPA6-B3N1 H (M) B3H (M)

H: Z-axis high-speed type
M: Z-axis medium-speed type
H: X-axis high-speed type
M: X-axis medium-speed type
[1] XY configuration direction

[1] XY configuration directions

[Assembled parts]

[1] XY bracket [2] XY bracket [3] Track mounting bracket [12] YZ plate [13] Track mounting plate [14] Track support bracket
[4] Guide rail [5] Cable track [6] Wiring box bracket [15] Track mounting bracket 2 [16] Cable track 2 [17] Connector box 2
[7] Wiring box cover [8] Grommet with film [9] Controller-actuator cable with cable fix cap [18] Box cover 2 [19] Joint cover 2
[10] Cable guard [11] Metal cover

[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMM-□-400-40<20>- (stroke) -T2-AQ-RT
Y1-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Y2-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Z1-axis	ISPA-MXM-□-200-20/10- (stroke) -T2-AQ-B
Z2-axis	ISPA-MXM-□-200-20/10- (stroke) -T2-AQ-B

* □ in the above models indicates either A (absolute) or I (incremental).

[Assembly Procedure] Drawing No.: GMM07-065

X-axis Nut-rotation Type Cartesian Robot – High-precision 6-axis Specification, Z-axis Slider Mount

[Model]
ICSPA6-B3N1 H (M) S3M

H: Z-axis high-speed type
M: Z-axis medium-speed type
H: X-axis high-speed type
M: X-axis medium-speed type
[1] XY configuration direction

[1] XY configuration directions

[Assembled parts]

[1] XY bracket [2] XY bracket [3] Track mounting bracket [12] YZ plate [13] Track mounting plate [14] Track support bracket
[4] Guide rail [5] Cable track [6] Wiring box bracket [15] Track mounting bracket 2 [16] Track mounting bracket 3 [17] Cable track 2
[7] Wiring box cover [8] Grommet with film [9] Controller-actuator cable with cable fix cap [18] Connector box 2 [19] Box cover 2 [20] Joint cover 2
[10] Cable guard [11] Metal cover

[Constituent axes]

Constituent axis	Model
X-axis	NS-LXMM-□-400-40<20>- (stroke) -T2-AQ-RT
Y1-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Y2-axis	ISPA-MYM-□-200-20- (stroke) -T2-AQ
Z1-axis	ISPA-MXM-□-200-10- (stroke) -T2-AQ-B-NM
Z2-axis	ISPA-MXM-□-200-10- (stroke) -T2-AQ-B-NM

* □ in the above models indicates either A (absolute) or I (incremental).

[Assembly Procedure] Drawing No.: GMM07-066

1

[Tools] Allen wrench, spanner wrench

In the case of configuration direction types 2 to 4, the actuator and bracket directions are different.

Parallel pin (2 pcs)

Y-axis: ISPA

Hexagonal socket head bolt M8x30 + high-tension washer (4 sets)

Hexagonal bolt M8x40 + high-tension washer (4 sets)

[1] XY bracket

Parallel pin (1 pc or 2 pcs)

X-axis: NS

X-axis base, reamed-hole side

Configuration direction: 2 (Reverse of 1) (Range of operation)

Configuration direction: 3 (Y-axis installed on opposite side) (Range of operation)

Configuration direction: 4 (Reverse of 3) (Range of operation)

[Installation of X-axis: NS on XY bracket [1]]

Parallel pin	Hexagonal bolt	Tightening torque
φ 8h7×18	M8×40mm	306kgf・cm / 2997N・cm

[Installation of Y-axis: ISPA on XY bracket [1]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
φ 8h7×18	M8×30mm	306kgf・cm / 2997N・cm

Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

2

Install the grommet with film [8] onto the Y-axis actuator cable and guide the cable through the hole in the track mounting bracket [2].

[2] Track mounting bracket

[4] Cable track

Hexagonal socket head bolt M4x10 (2 pcs)

Hexagonal socket head bolt M5x10 (2 pcs)

[1] XY bracket

X-axis: NS

[8] Grommet with film

[5] Connector box

Hexagonal socket head bolt M4x10 + hexagonal nut (2 sets)

Flange socket (hexagonal socket head type) M4x10 + hexagonal nut (4 sets)

Hexagonal socket head bolt M4x6 + hexagonal nut (2 sets)

Affixing positions of guide rail [3], cable track [4] and connector box [5]

[3] Guide rail

[3] Guide rail

[5] Connector box

Align the guide rail [3] surface with the end face of the base.

[Installation of track mounting bracket [2] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf・cm / 727N・cm

[Installation of X-axis: NS side of guide rail [3] in T-slot]

Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf・cm / 176N・cm

[Installation of cable track [4] on track mounting bracket [2]]
[Installation of guide rail [3] for cable track [4] in T-slot]

Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf・cm / 359N・cm

3

Tie-mount KR5G5 (by HellermannTyton) + hexagonal socket head button bolt M4x6 (1 set)

[5] Connector box

Detail view of A

[2] Track mounting bracket

[3] Guide rail

Tie-mount KR5G5 (by HellermannTyton) + hexagonal socket head button bolt M4x6 (1 set)

Cable inside track

Hexagonal socket head bolt M3x12 (8 pcs)

Hexagonal socket head bolt M3x3

Ground terminal

Detail view of A

Place the X-axis cable and PG cable (LS cable) into the cable guard [10] and take them out from the top.

[10] Cable guard

Hexagonal socket head bolt M4x6 (2 pcs)

[11] Metal cover

Thin-head bolt M3x12 (4 pcs)

[6] Box cover

[7] Joint cover

[9] Controller-actuator cable with cable fix cap

Cable connector connection

[2] Track mounting bracket

Connector joint for ISPA M cable and PG cable (LS cable)

Ground terminal

Connector joint for NS M cable and PG cable (LS cable)

[5] Connector box

Connector joint for cable inside track and controller-actuator cable

Make sure the numbers on the connectors to be connected match.

Secure the cables using wraps.

⚠ Caution: The cables for X-axis (axis 1) and Y-axis (axis 2) are placed in tracks. Install each cable correctly.
[Cable markings]
● X-axis (axis 1): 1 ● Y-axis (axis 2): 2

[Installation of box cover [6] on connector box [5]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm / 54N・cm

[Installation of cable guard [10] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf・cm / 359N・cm

[Installation of metal cover [11] on track mounting bracket [2]]

Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm / 69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

[Installation of tie-mount on track mounting bracket [2]]
[Installation of tie-mount on guide rail [3]]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm / 114N・cm

[Installation of ground terminal on [1] XY bracket]

Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf・cm / 154N・cm

⚠ Caution: Secure the wires to prevent the cables and connectors from contacting each axis when the axis is moved over its entire stroke. When manually moving the actuator with brake, connect the controller, supply the power, and then release the brake release switch (by turning the switch to the RLS side).

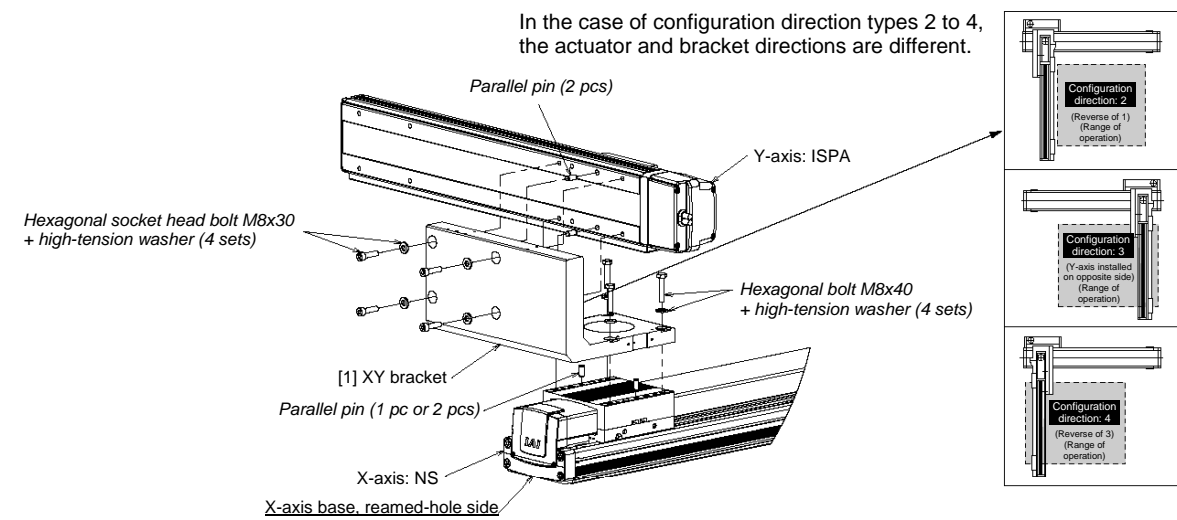
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Secure the cables using wraps.

⚠ Caution: Secure the wires to prevent the cables and connectors from contacting each axis when the axis is moved over its entire stroke. When manually moving the actuator with brake, connect the controller, supply the power, and then release the brake release switch (by turning the switch to the RLS side).

* This assembly procedure applies to configuration direction 1. If other configuration direction such as 2, 3 or 4 is used, the actuator and bracket directions vary. However, you can still use this assembly drawing as a reference.

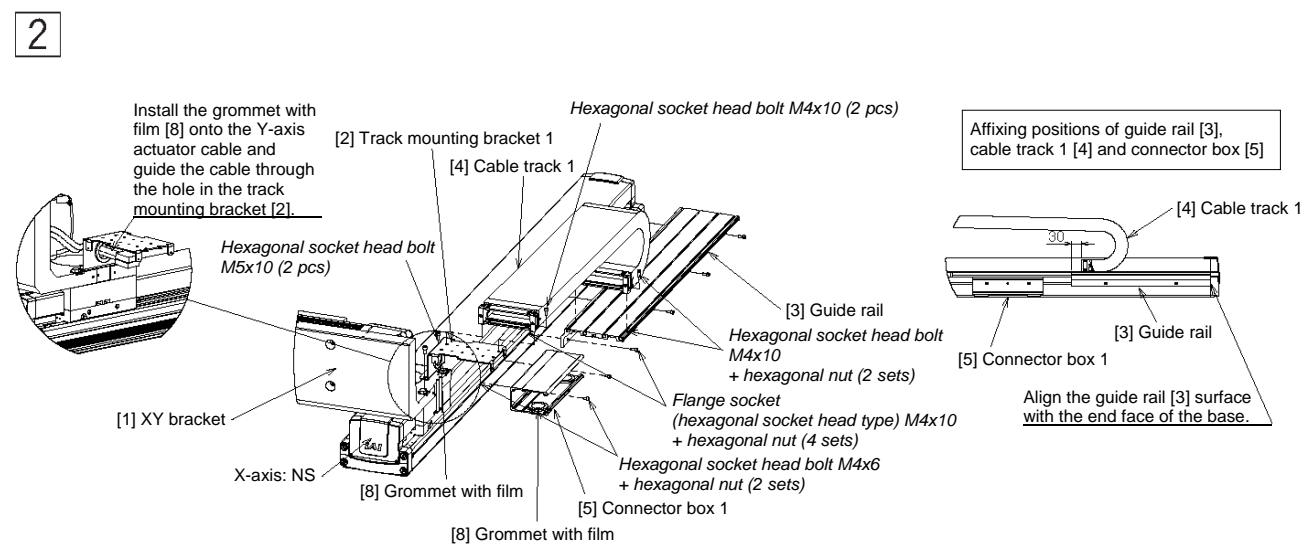
1 [Tools] Allen wrench, spanner wrench



[Installation of X-axis: NS on XY bracket [1]]		
Parallel pin	Hexagonal bolt	Tightening torque
φ 8h7×18	M8×40mm	306kgf · cm / 2997N · cm

[Installation of Y-axis: ISPA on XY bracket [1]]		
Parallel pin	Hexagonal socket head bolt	Tightening torque
φ 8h7×18	M8×30mm	306kgf · cm / 2997N · cm

Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

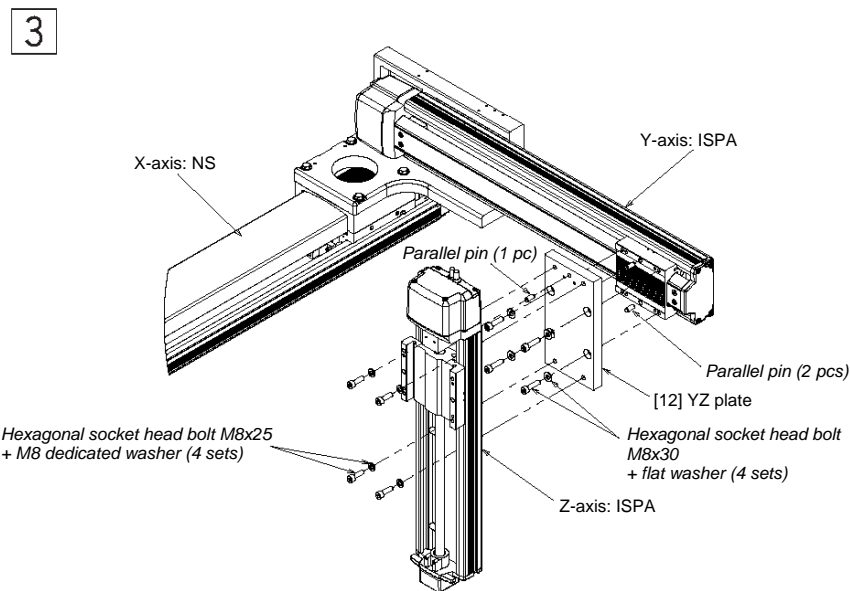


[Installation of track mounting bracket 1 [2] on XY bracket [1]]	
Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf · cm / 727N · cm

[Installation of X-axis: NS side of connector box 1 [5] in T-slot]	
Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf · cm / 176N · cm

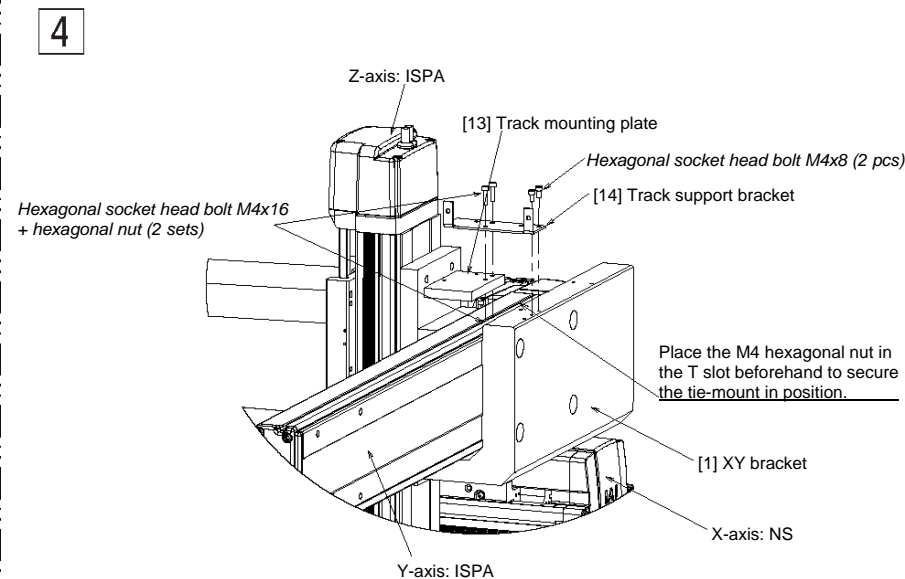
[Installation of X-axis: NS side of guide rail [3] in T-slot]	
Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf · cm / 176N · cm

[Installation of cable track 1 [4] on track mounting bracket 1 [2]] [Installation of guide rail [3] for cable track 1 [4] in T-slot]	
Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf · cm / 359N · cm



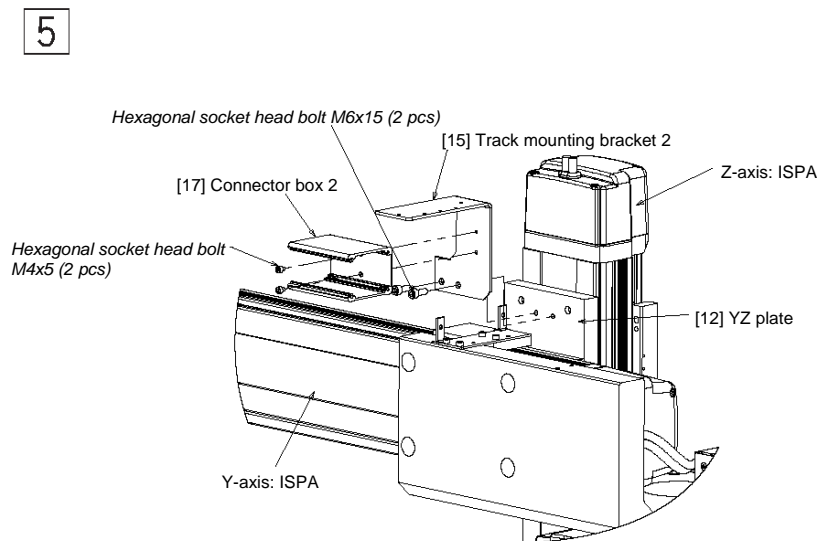
[Installation of YZ plate [12] on Y-axis: ISPA]		
Parallel pin	Hexagonal socket head bolt	Tightening torque
φ 8h7×18	M8×30mm	306kgf · cm / 2997N · cm

[Installation of Z-axis: ISPA on YZ plate [12]]		
Parallel pin	Hexagonal socket head bolt	Tightening torque
φ 8h7×25	M8×25mm	306kgf · cm / 2997N · cm



[Installation of track support bracket [14] on XY bracket [1]]	
Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf · cm / 359N · cm

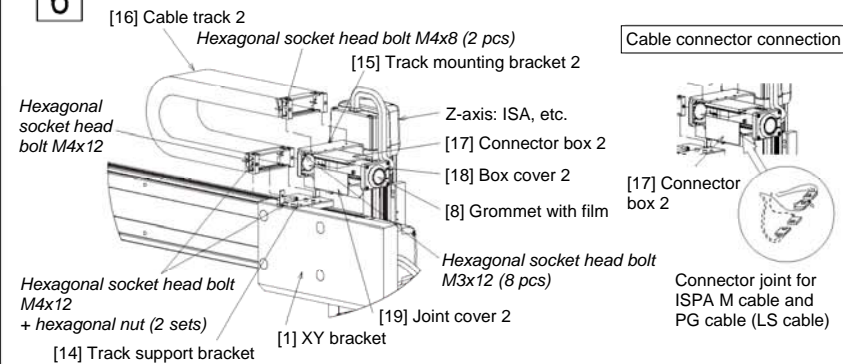
[Installation of track support metal [14] on track mounting plate [13]]	
Hexagonal socket head bolt	Tightening torque
M4×16mm	36.7kgf · cm / 359N · cm



[Installation of track mounting bracket 2 [15] on YZ plate [12]]	
Hexagonal socket head bolt	Tightening torque
M6×15mm	126kgf · cm / 1234N · cm

[Installation of connector box 2 [17] on track mounting bracket 2 [15]]	
Hexagonal socket head bolt	Tightening torque
M4×5mm	18.0kgf · cm / 176N · cm

6



[Installation of cable track 2 [16] on track support bracket [14]]

Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

[Installation of cable track 2 [16] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

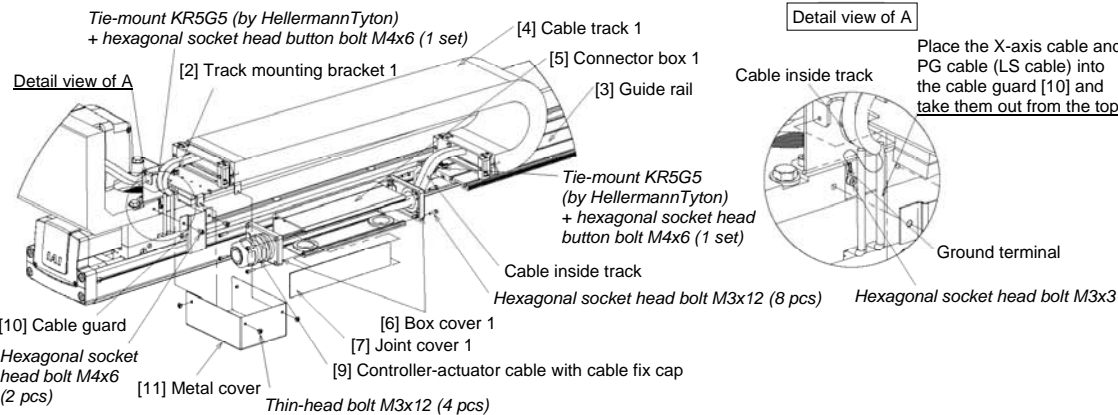
[Installation of cable track 2 [16] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

[Installation of box cover 2 [18] on connector box 2 [17]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm／54N・cm

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⚠ Caution: The cables for X-axis (axis 1), Y-axis (axis 2) and Z-axis (axis 3) are placed in tracks. Install each cable correctly.
[Cable markings]
• X-axis (axis 1): 1 • Y-axis (axis 2): 2 • Z-axis (axis 3): 3

[Installation of box cover 1 [6] on connector box 1 [5]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm／54N・cm

[Installation of cable guard [10] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf・cm／359N・cm

[Installation of metal cover [11] on track mounting bracket 1 [2]]

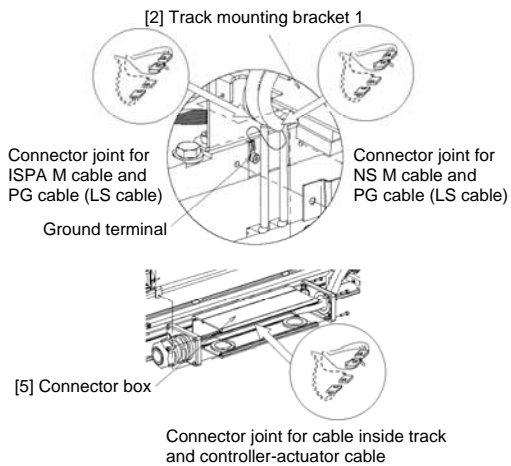
Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

[Installation of tie-mount on track mounting bracket 1 [2]]
[Installation of tie-mount in T slot of guide rail [3]]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

Cable connector connection

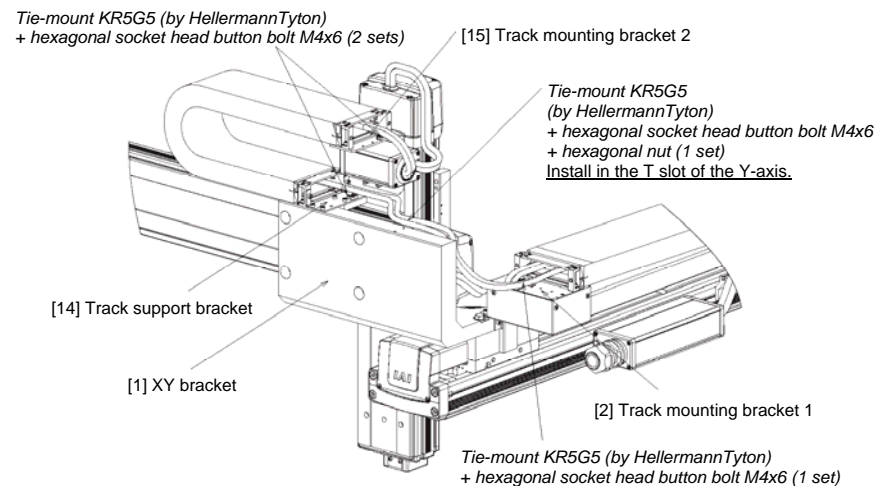


Make sure the numbers on the connectors to be connected match.

[Installation of ground terminal on [1] XY bracket]

Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf・cm／154N・cm

8

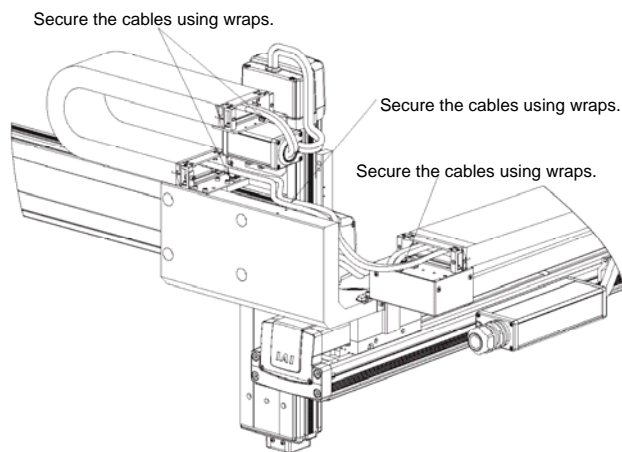


[Installation of tie-mount in track mounting bracket 2 [15]]
[Installation of tie-mount on track support bracket [14]]
[Installation of tie-mount in T slot of XY bracket [1]]
[Installation of tie-mount on track mounting bracket 1 [2]]

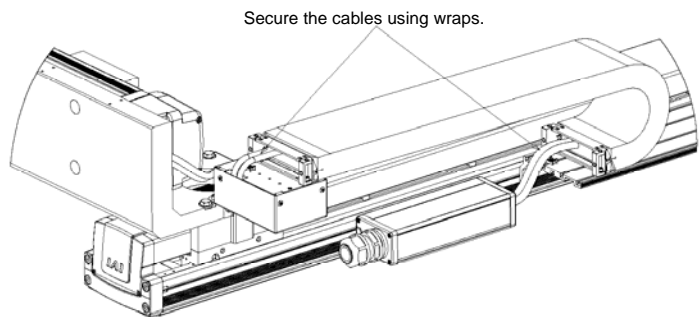
Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

9

Z-axis cables

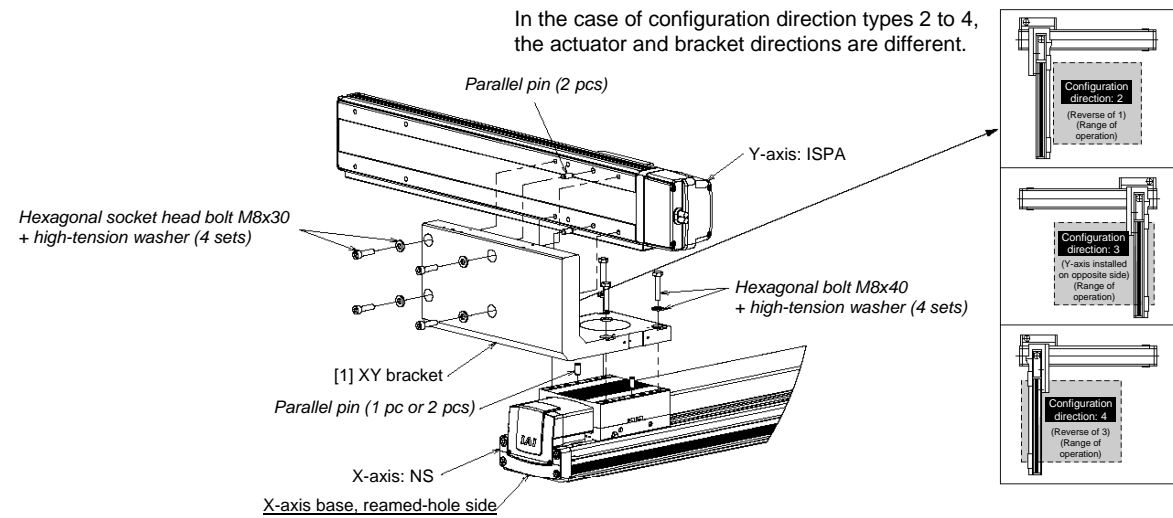


X-axis, Y-axis cables



⚠ Caution: Secure the wires to prevent the cables and connectors from contacting each axis when the axis is moved over its entire stroke.
When manually moving the actuator with brake, connect the controller, supply the power, and then release the brake release switch (by turning the switch to the RLS side).

1 [Tools] Allen wrench, spanner wrench



[Installation of X-axis: NS on XY bracket [1]]

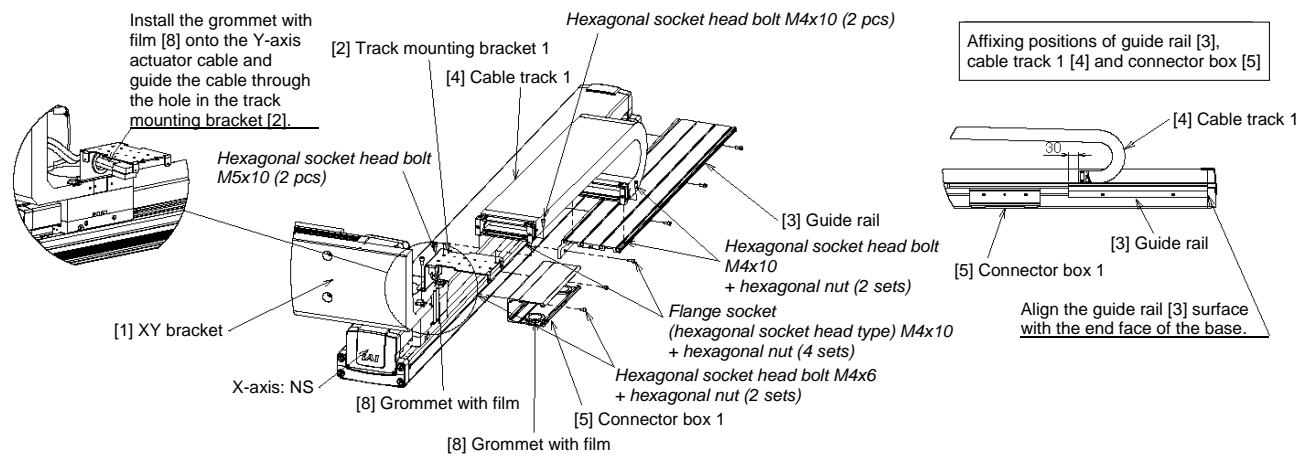
Parallel pin	Hexagonal bolt	Tightening torque
φ 8h7×18	M8×40mm	306kgf · cm / 2997N · cm

[Installation of Y-axis: ISPA on XY bracket [1]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
φ 8h7×18	M8×30mm	306kgf · cm / 2997N · cm

Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

2



[Installation of track mounting bracket 1 [2] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf · cm / 727N · cm

[Installation of X-axis: NS side of connector box 1 [5] in T-slot]

Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf · cm / 176N · cm

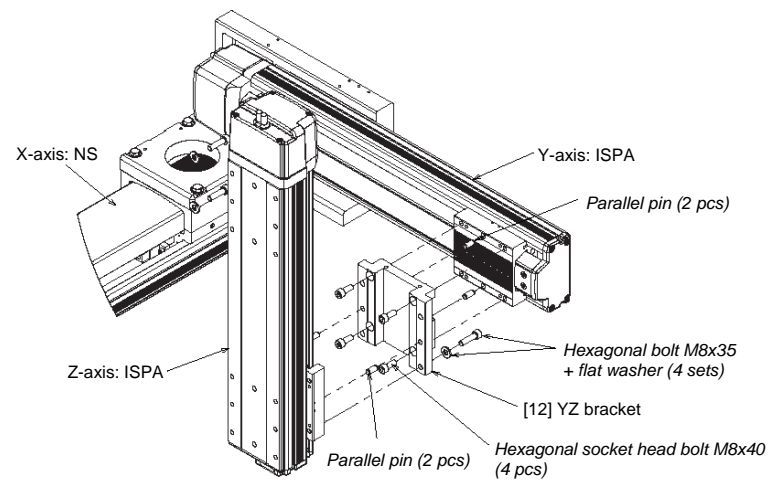
[Installation of X-axis: NS side of guide rail [3] in T-slot]

Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf · cm / 176N · cm

[Installation of cable track 1 [4] on track mounting bracket 1 [2]]
[Installation of guide rail [3] for cable track 1 [4] in T-slot]

Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf · cm / 359N · cm

3



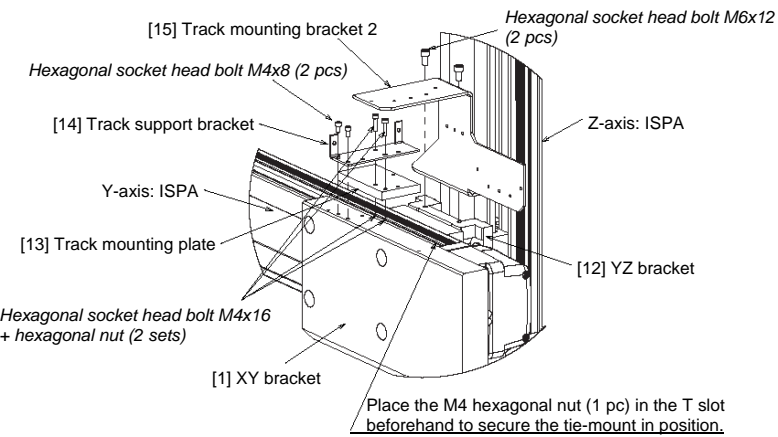
[Installation of YZ bracket [12] on Y-axis: ISPA]

Parallel pin	Hexagonal socket head bolt	Tightening torque
φ 8h7×18	M8×35mm	117kgf · cm / 1148N · cm

[Installation of Z-axis: ISPA on YZ bracket [12]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
φ 8h7×18	M8×40mm	306kgf · cm / 2997N · cm

4



[Installation of track support bracket [14] and track mount [13] on Y-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M4×16mm	36.7kgf · cm / 359N · cm

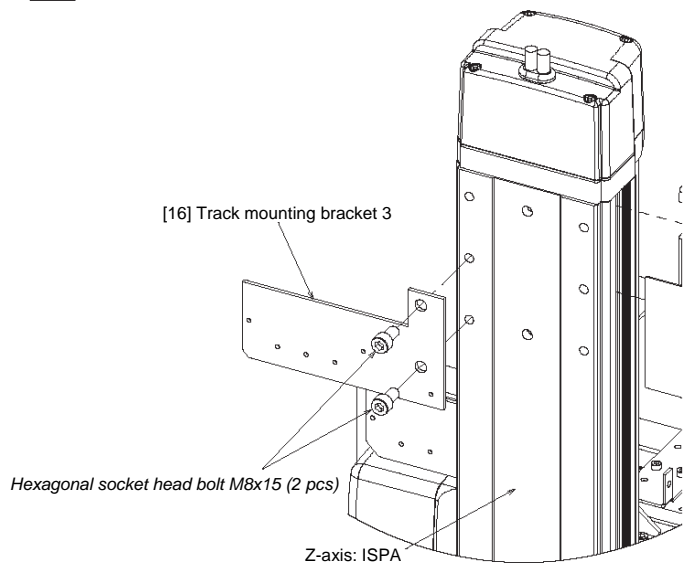
[Installation of track support bracket [14] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf · cm / 359N · cm

[Installation of track mounting bracket 2 [15] on YZ bracket [12]]

Hexagonal socket head bolt	Tightening torque
M6×12mm	126kgf · cm / 1234N · cm

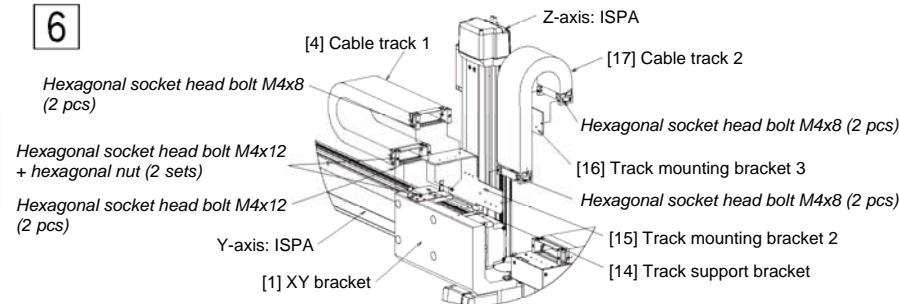
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[Installation of track mounting bracket 3 [16] on Z-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M8×15mm	306kgf · cm / 2997N · cm

6



[Installation of cable track 1 [4] on track support bracket [14]]	
Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

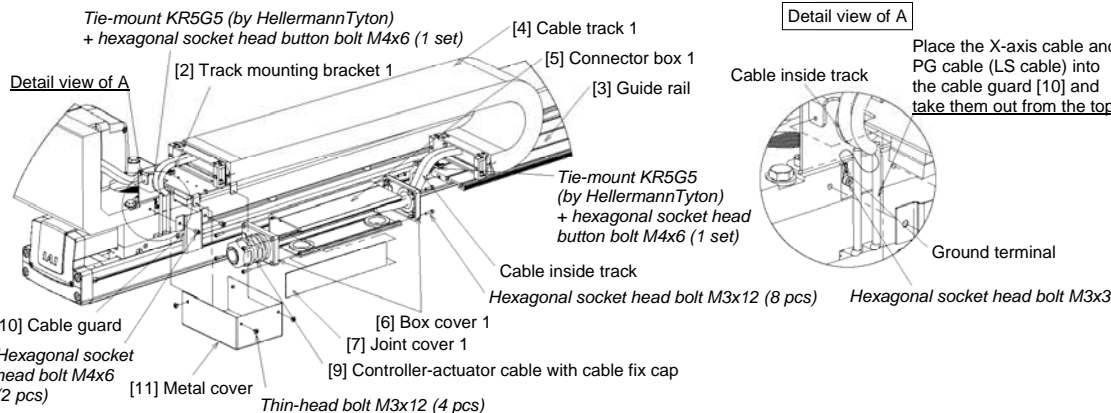
[Installation of cable track 1 [4] on XY bracket [1]]	
Hexagonal socket head bolt	Tightening torque
M4×12mm	36.7kgf・cm／359N・cm

[Installation of cable track 1 [4] on track mounting bracket 2 [15]]	
Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

[Installation of cable track 2 [17] on track mounting bracket 3 [16]]	
Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

[Installation of cable track 2 [17] on track mounting bracket 2 [15]]	
Hexagonal socket head bolt	Tightening torque
M4×8mm	36.7kgf・cm／359N・cm

7



⚠ Caution: The cables for X-axis (axis 1), Y-axis (axis 2) and Z-axis (axis 3) are placed in tracks. Install each cable correctly.
[Cable markings]
● X-axis (axis 1): 1 ● Y-axis (axis 2): 2 ● Z-axis (axis 3): 3

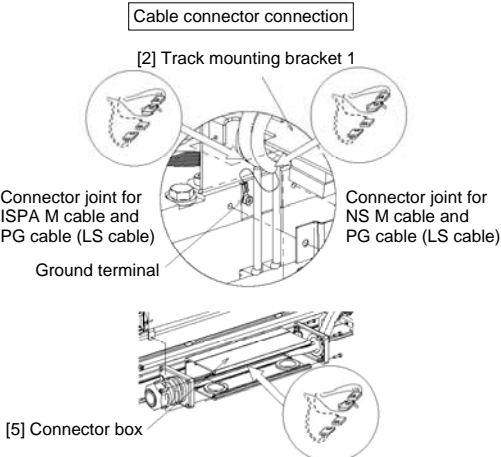
[Installation of box cover 1 [6] on connector box 1 [5]]	
Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf・cm／54N・cm

[Installation of cable guard [10] on XY bracket [1]]	
Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf・cm／359N・cm

[Installation of metal cover [11] on track mounting bracket 1 [2]]	
Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

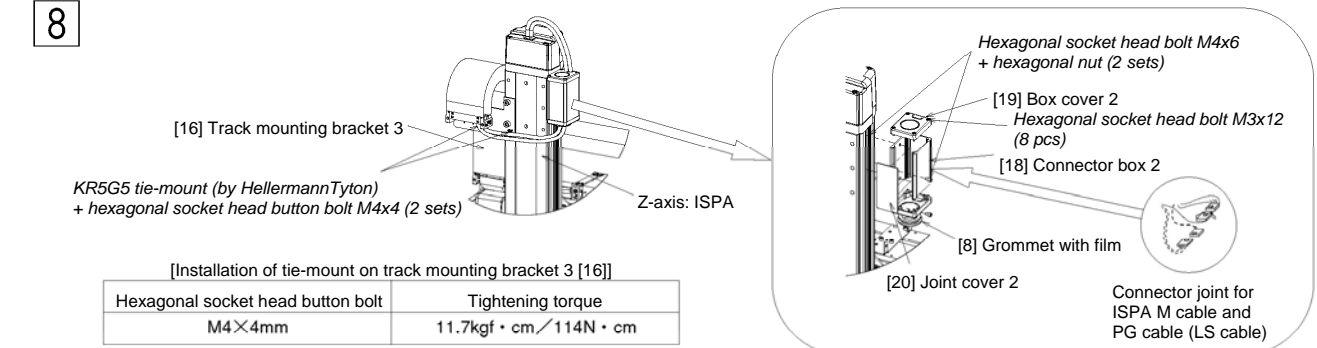
[Installation of tie-mount on track mounting bracket 1 [2]] [Installation of tie-mount in T slot of guide rail [3]]	
Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm



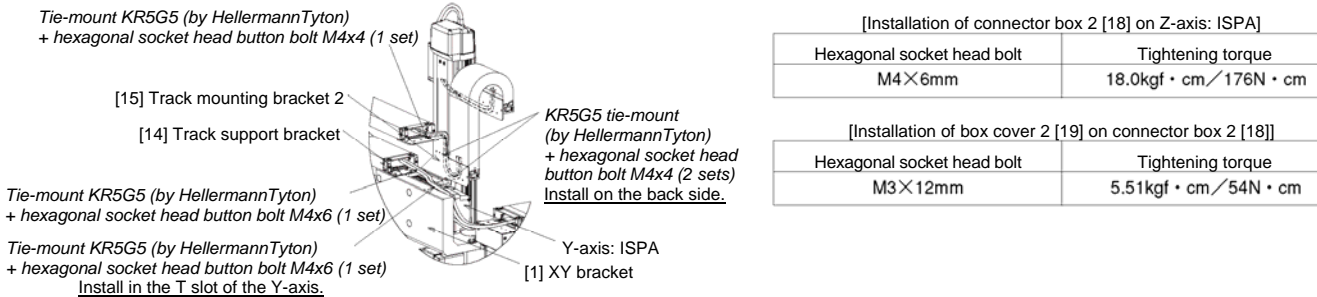
Make sure the numbers on the connectors to be connected match.

[Installation of ground terminal on [1] XY bracket]	
Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf・cm／154N・cm

8



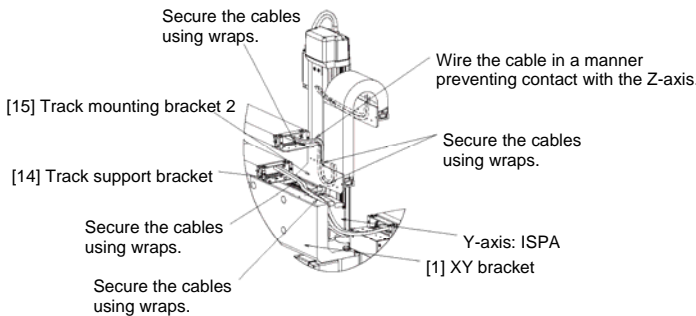
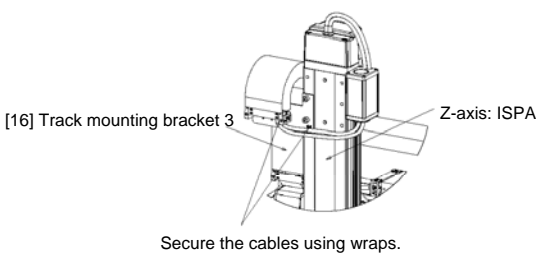
[Installation of tie-mount on track mounting bracket 3 [16]]	
Hexagonal socket head button bolt	Tightening torque
M4×4mm	11.7kgf・cm／114N・cm



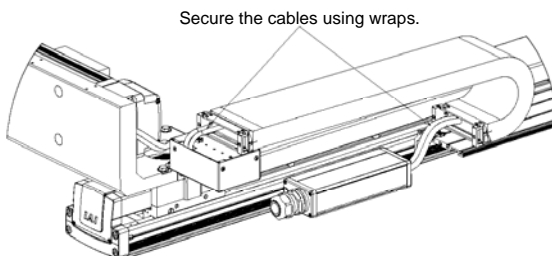
[Installation of tie-mount on track mounting bracket 2 [15]]	
Hexagonal socket head button bolt	Tightening torque
M4×4mm	11.7kgf・cm／114N・cm

[Installation of tie-mount on track support bracket [14]] [Installation of tie-mount in T slot of Y-axis: ISPA]	
Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm／114N・cm

Z-axis cables



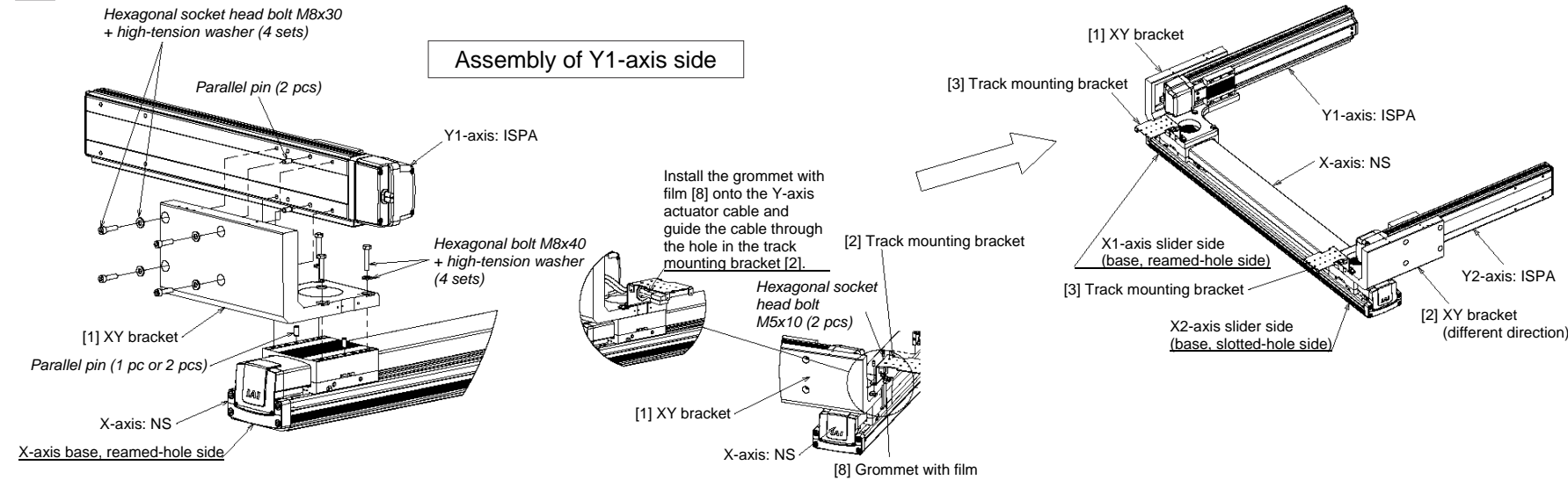
X-axis, Y-axis cables



⚠ Caution: Secure the wires to prevent the cables and connectors from contacting each axis when the axis is moved over its entire stroke.
When manually moving the actuator with brake, connect the controller, supply the power, and then release the brake release switch (by turning the switch to the RLS side).

⚠ Caution: ● Although each part has been chamfered to remove sharp edges, exercise due caution during the assembly to prevent injury. If necessary, wear gloves or other protective gears.
● Exercise due caution during the assembly to prevent pinching of hands and fingers.

1 [Tools] Allen wrench, spanner wrench



Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

[Installation of X-axis: NS on XY bracket [1]]

Parallel pin	Hexagonal bolt	Tightening torque
φ 8h7×18	M8×40mm	306kgf · cm / 2997N · cm

[Installation of Y1-axis: ISPA on XY bracket [1]]

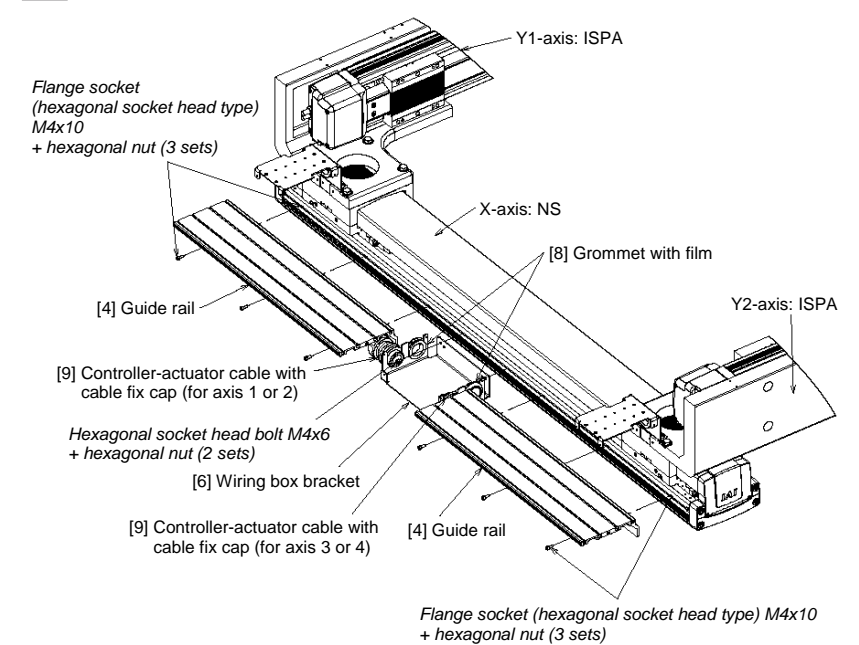
Parallel pin	Hexagonal socket head bolt	Tightening torque
φ 8h7×18	M8×30mm	306kgf · cm / 2997N · cm

[Installation of track mounting bracket [2] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf · cm / 727N · cm

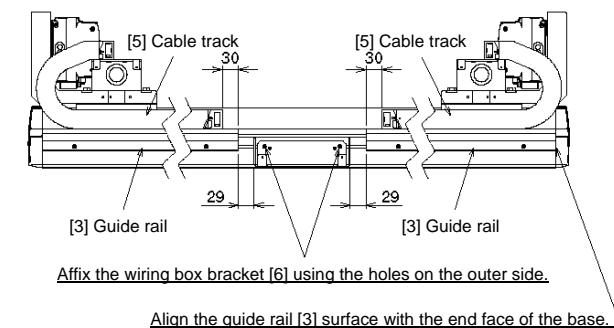
* The direction is different on the Y2-axis side. Assemble the parts by referring to the Y1-axis side.

2



⚠ Caution: The cables for Y1-axis side (axes 1 and 2) and Y2-axis side (axes 3 and 4) are placed in tracks. Install each cable correctly.
[Cable markings]
● Y1-axis side (axes 1 and 2): 1-M, PG, (LS), 2-M, PG, (LS)
● Y2-axis side (axes 3 and 4): 3-M, PG, (LS), 4-M, PG, (LS)

Affixing positions of guide rail [4], cable track [5] and wiring box bracket [6]



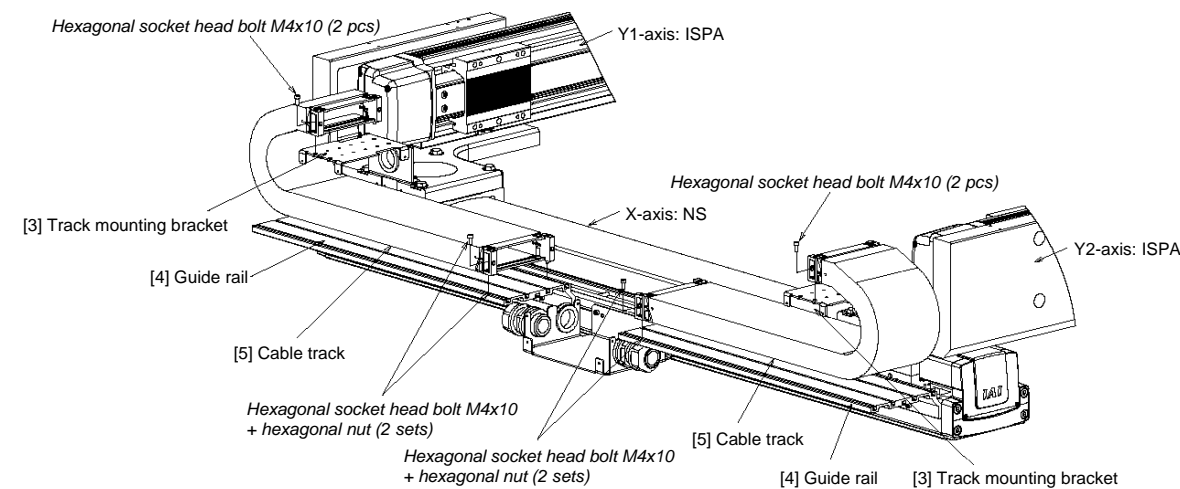
[Installation of wiring box bracket [6] in T slot on X-axis: NS side]

Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf · cm / 176N · cm

[Installation of guide rail [4] in T slot on X-axis: NS side]

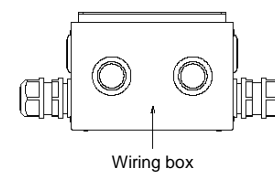
Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf · cm / 176N · cm

3

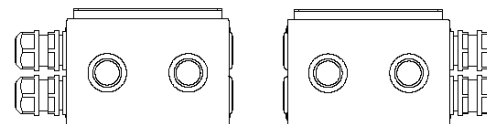


[Installation of cable track [5] on track mounting bracket [3]]
[Installation of guide rail [4] for cable track [5] in T-slot]

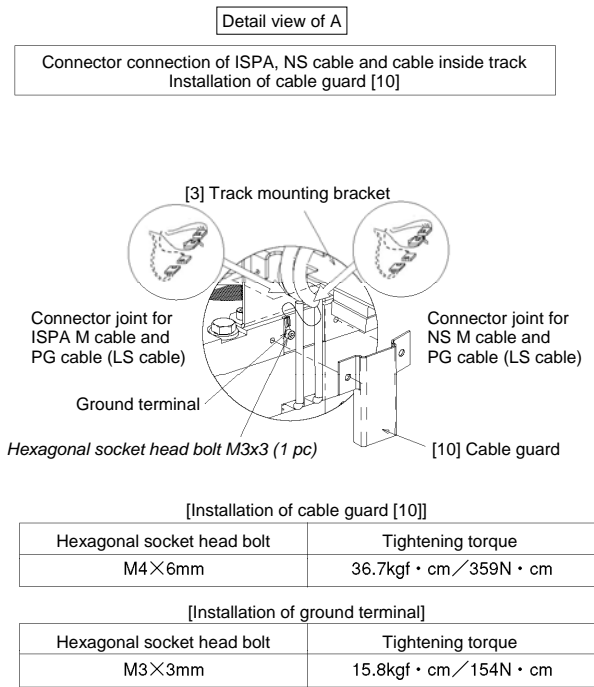
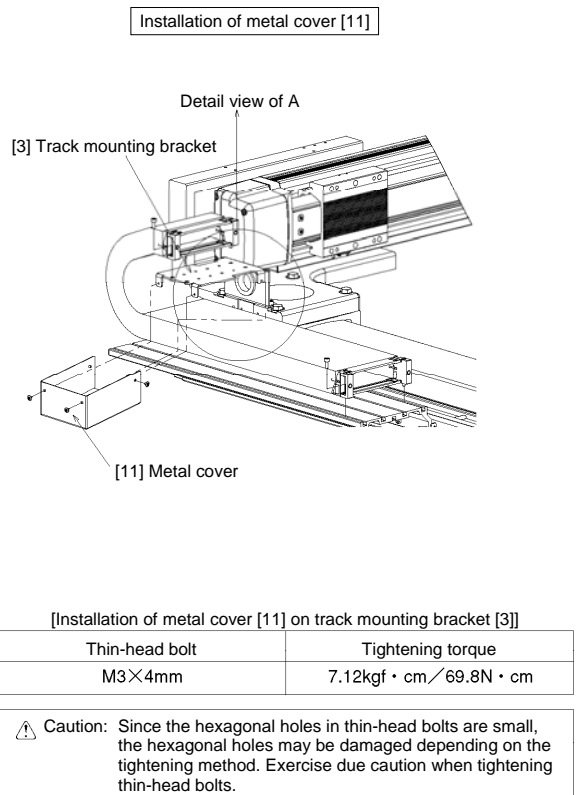
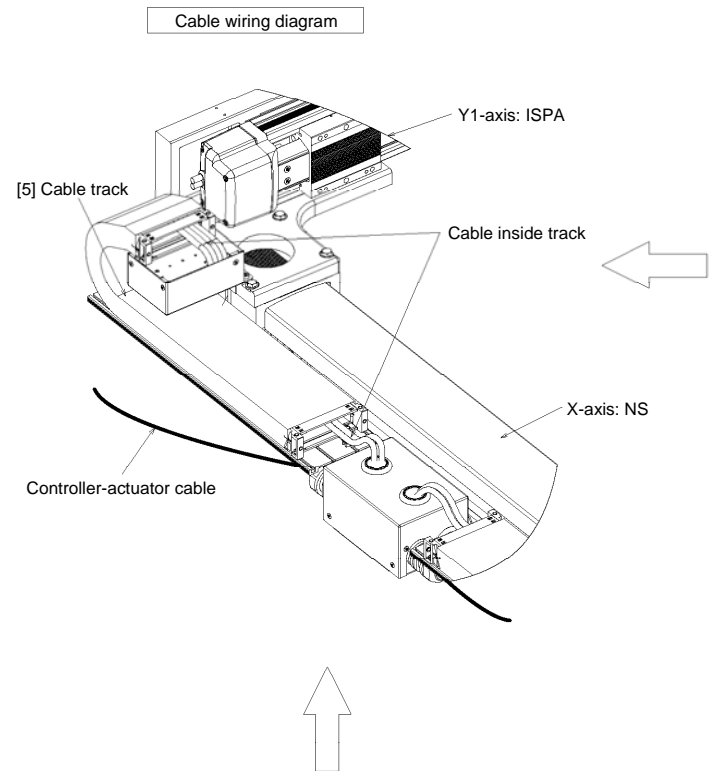
Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf · cm / 359N · cm



In this assembly procedure, the controller-actuator cable is taken out from the wiring box in the direction shown above. The cable can also be taken out in the directions shown below.



4

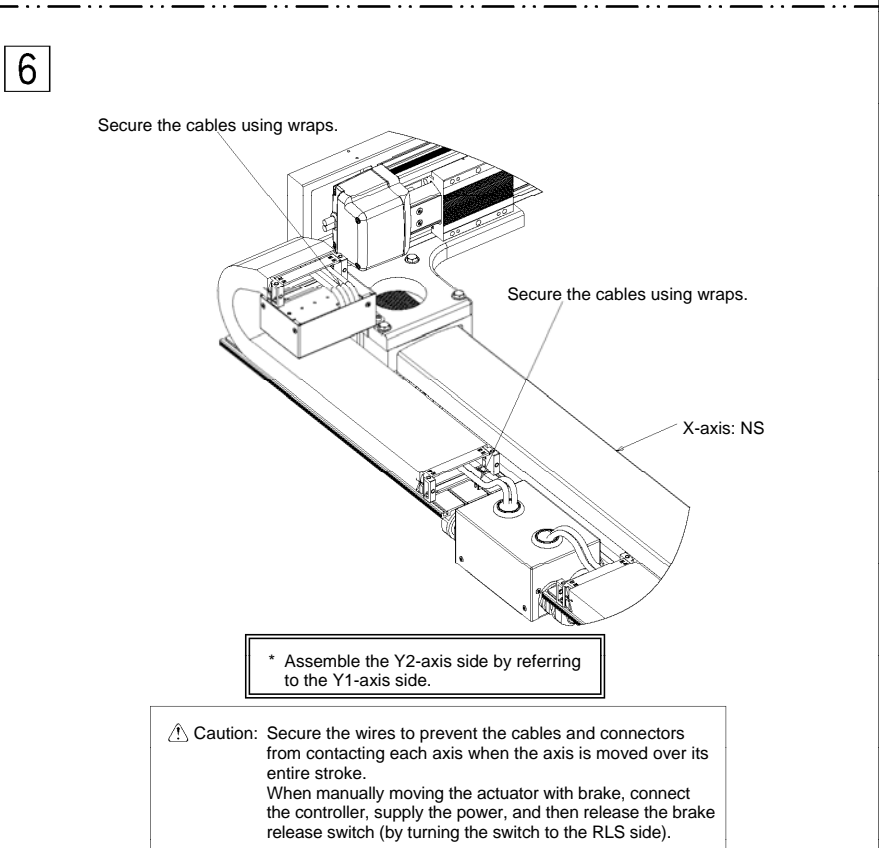
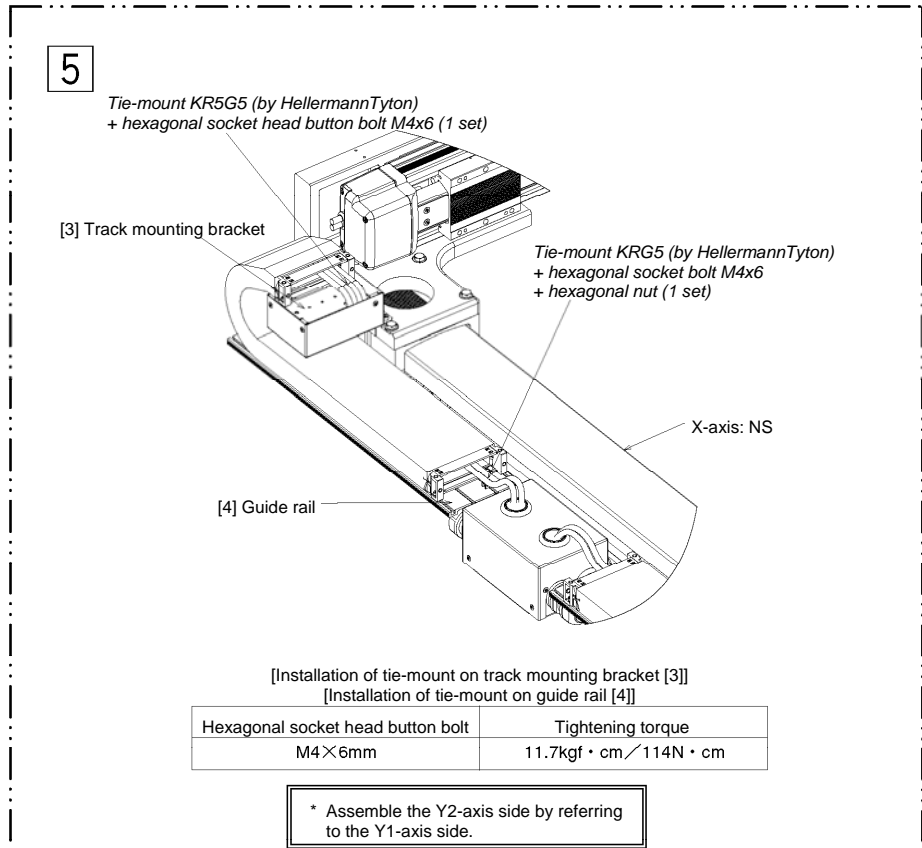
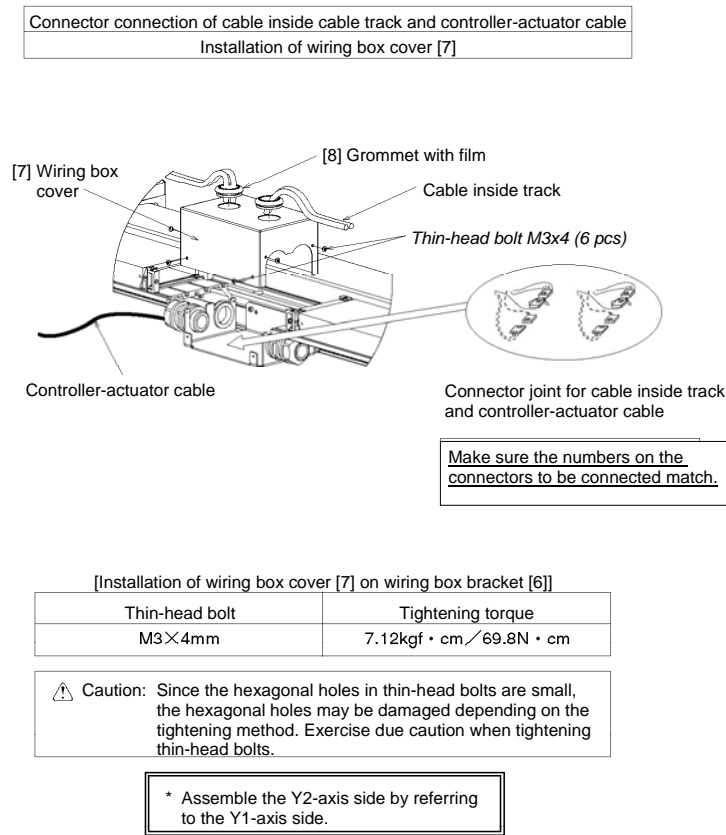


⚠ Caution: The cables for X-axis slider on Y1-axis side (axis 1), Y1-axis (axis 2), X-axis slider on Y2-axis side (axis 3) and Y2-axis (axis 4) are placed in tracks. Install each cable correctly.

[Cable markings]

- X-axis on Y1-axis side (axis 1): 1
- Y1-axis (axis 2): 2
- X-axis on Y2-axis side (axis 3): 3
- Y2-axis (axis 4): 4

* Assemble the Y2-axis side by referring to the Y1-axis side.



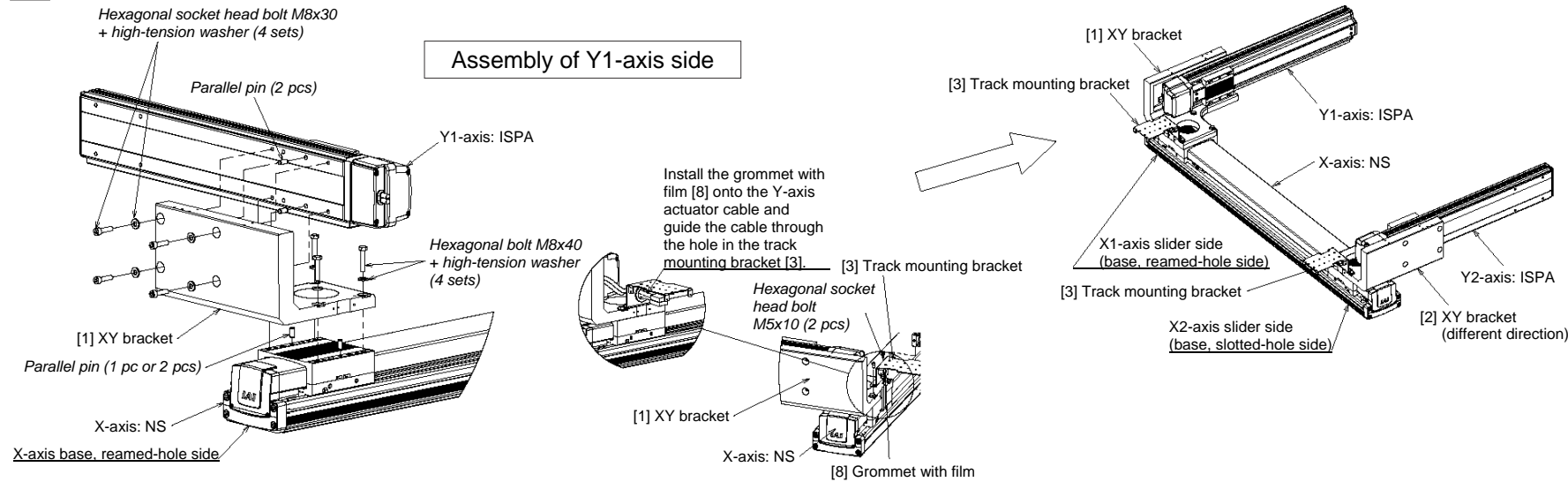
Caution:

● Although each part has been chamfered to remove sharp edges, exercise due caution during the assembly to prevent injury. If necessary, wear gloves or other protective gears.

● Exercise due caution during the assembly to prevent pinching of hands and fingers.

1

[Tools] Allen wrench, spanner wrench



Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

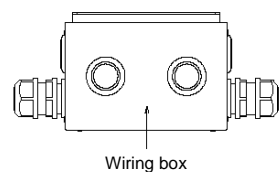
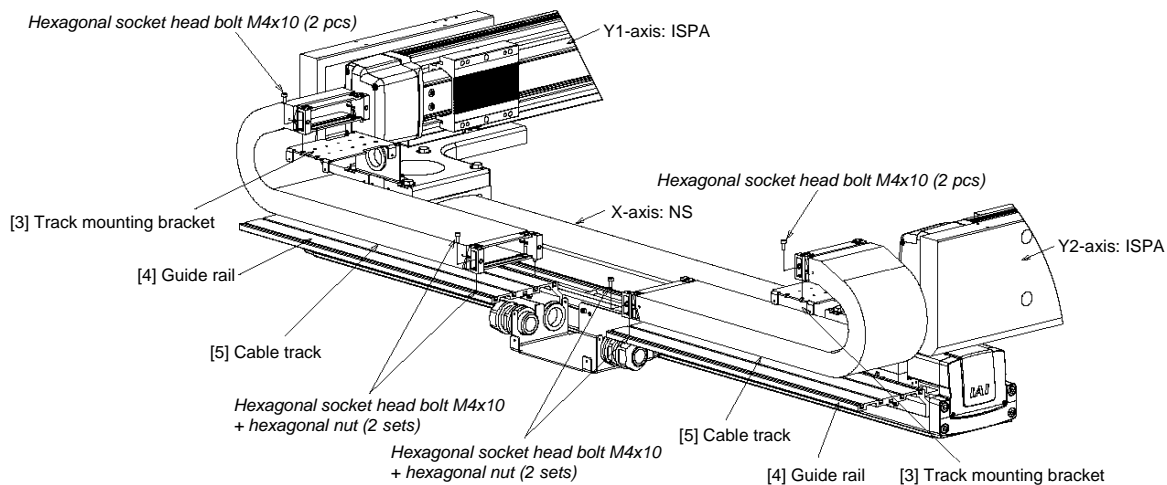
[Installation of X-axis: NS on XY bracket [1]]		
Parallel pin	Hexagonal bolt	Tightening torque
φ 8h7×18	M8×40mm	306kgf・cm / 2997N・cm

[Installation of Y1-axis: ISPA on XY bracket [1]]		
Parallel pin	Hexagonal socket head bolt	Tightening torque
φ 8h7×18	M8×30mm	306kgf・cm / 2997N・cm

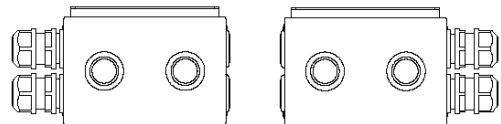
[Installation of track mounting bracket [3] on XY bracket [1]]	
Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf・cm / 727N・cm

* The direction is different on the Y2-axis side. Assemble the parts by referring to the Y1-axis side.

3

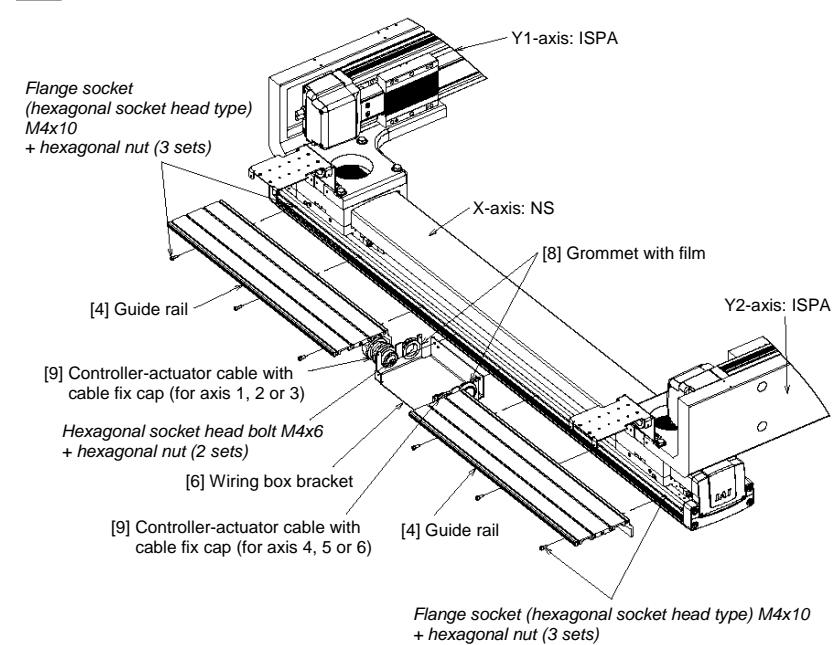


In this assembly procedure, the controller-actuator cable is taken out from the wiring box in the direction shown above. The cable can also be taken out in the directions shown below.



[Installation of cable track [5] on track mounting bracket [3]] [Installation of guide rail [4] for cable track [5] in T-slot]	
Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf・cm / 359N・cm

2



Caution:

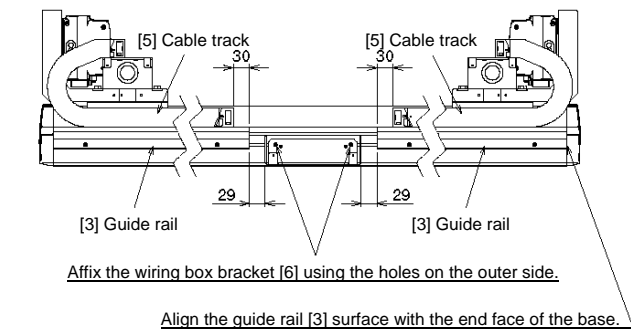
The controller-actuator cables for Y1-axis side (axes 1, 2 and 3) and Y2-axis side (axes 4, 5 and 6) are available. Install each cable correctly.

[Cable markings]

● Y1-axis side (axes 1, 2 and 3): 1-M, PG, (LS), 2-M, PG, (LS), 3-M, PG, (LS)

● Y2-axis side (axes 4, 5 and 6): 4-M, PG, (LS), 5-M, PG, (LS), 6-M, PG, (LS)

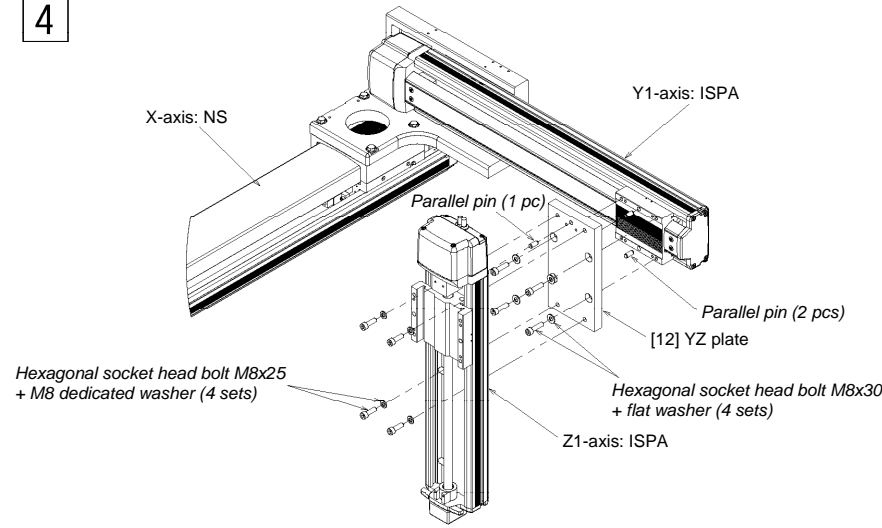
Affixing positions of guide rail [4], cable track [5] and wiring box bracket [6]



[Installation of wiring box bracket [6] in T slot on X-axis: NS side]	
Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf・cm / 176N・cm

[Installation of guide rail [4] in T slot on X-axis: NS side]	
Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf・cm / 176N・cm

4



[Installation of YZ plate [12] on Y1-axis: ISPA]

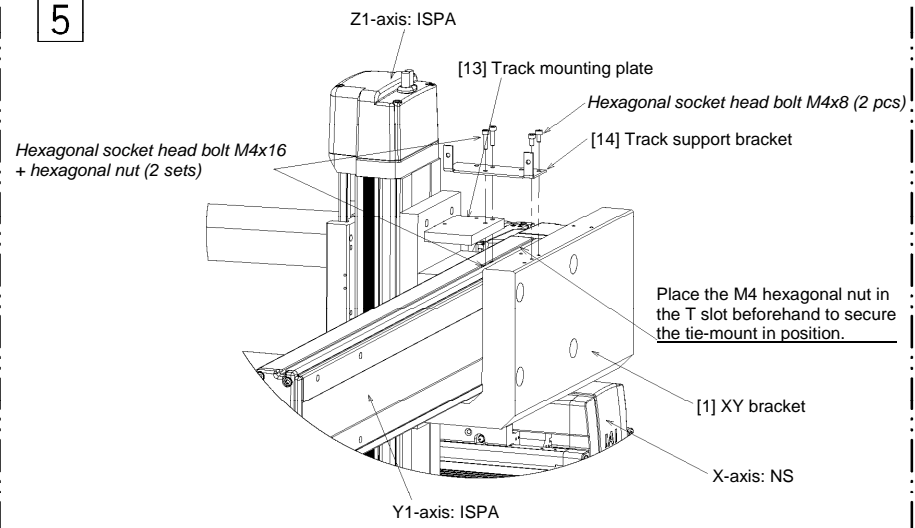
Parallel pin	Hexagonal socket head bolt	Tightening torque
ϕ 8h7 \times 18	M8 \times 30mm	306kgf \cdot cm / 2997N \cdot cm

[Installation of Z1-axis: ISPA on YZ plate [12]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
ϕ 8h7 \times 25	M8 \times 25mm	306kgf \cdot cm / 2997N \cdot cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

5



[Installation of track support bracket [14] on XY bracket [1]]

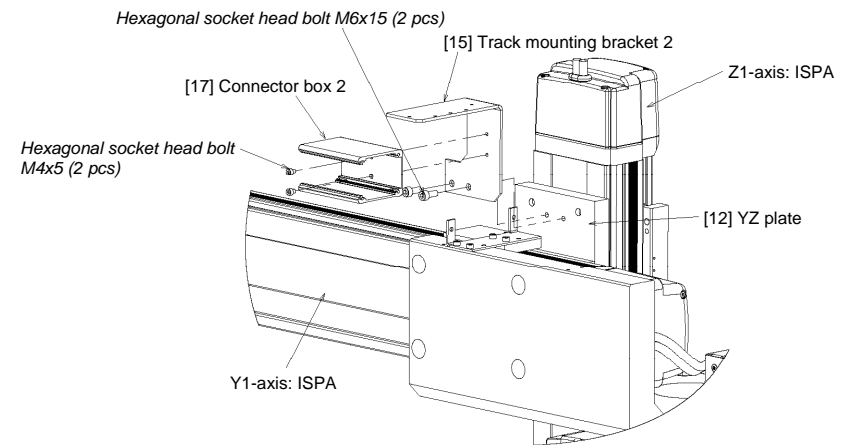
Hexagonal socket head bolt	Tightening torque
M4 \times 8mm	36.7kgf \cdot cm / 359N \cdot cm

[Installation of track support metal [14] on track mounting plate [13]]

Hexagonal socket head bolt	Tightening torque
M4 \times 16mm	36.7kgf \cdot cm / 359N \cdot cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

6



[Installation of track mounting bracket 2 [15] on YZ plate [12]]

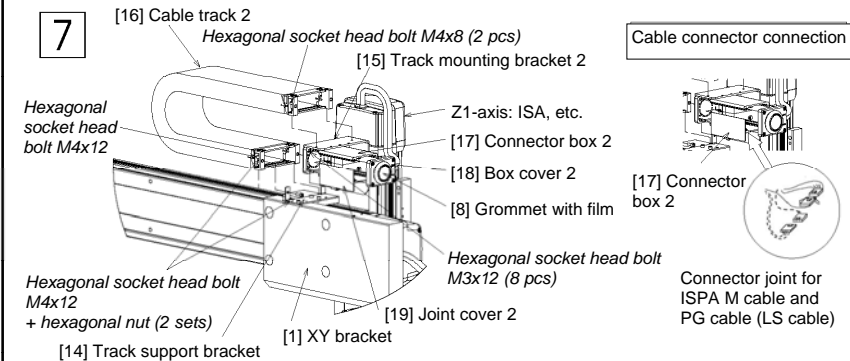
Hexagonal socket head bolt	Tightening torque
M6 \times 15mm	126kgf \cdot cm / 1234N \cdot cm

[Installation of connector box 2 [17] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4 \times 5mm	18.0kgf \cdot cm / 176N \cdot cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

7



[Installation of cable track 2 [16] on track support bracket [14]]

Hexagonal socket head bolt	Tightening torque
M4 \times 12mm	36.7kgf \cdot cm / 359N \cdot cm

[Installation of cable track 2 [16] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4 \times 12mm	36.7kgf \cdot cm / 359N \cdot cm

[Installation of cable track 2 [16] on track mounting bracket 2 [15]]

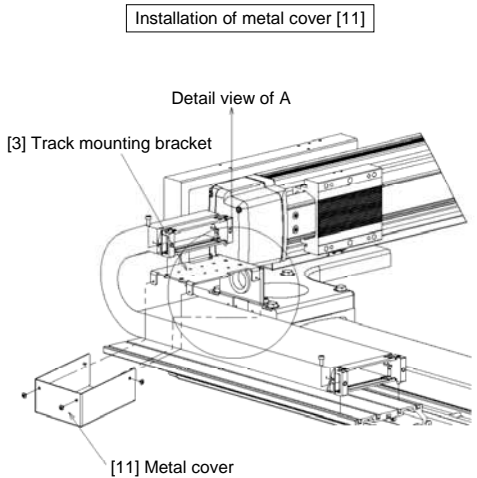
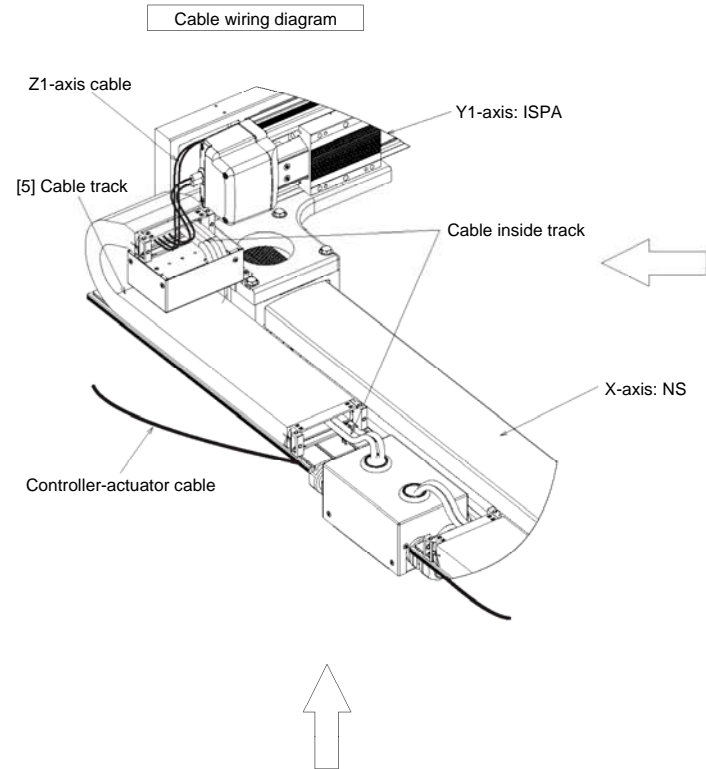
Hexagonal socket head bolt	Tightening torque
M4 \times 8mm	36.7kgf \cdot cm / 359N \cdot cm

[Installation of box cover 2 [18] on connector box 2 [17]]

Hexagonal socket head bolt	Tightening torque
M3 \times 12mm	5.51kgf \cdot cm / 54N \cdot cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

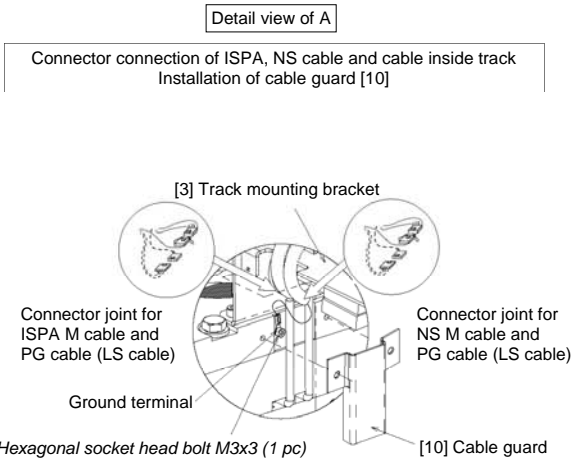
8



[Installation of metal cover [11] on track mounting bracket [3]]

Thin-head bolt	Tightening torque
M3×4mm	7.12kgf · cm / 69.8N · cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.



[Installation of cable guard [10]]

Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf · cm / 359N · cm

[Installation of ground terminal]

Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf · cm / 154N · cm

* Assemble the Y2-axis side by referring to the Y1-axis side.

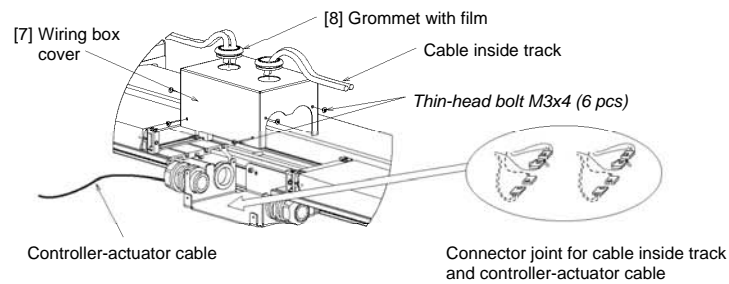
⚠ Caution: The cables for X-axis slider on Y1-axis side (axis 1), Y1-axis (axis 2), Z1-axis (axis 3), X-axis slider on Y2-axis side (axis 4), Y2-axis (axis 5) and Z2-axis (axis 6) are placed in tracks. Install each cable correctly.

[Cable markings]

- X-axis slider on Y1-axis side (axis 1): 1
- Y1-axis (axis 2): 2
- Z1-axis (axis 3): 3
- X-axis slider on Y2-axis side (axis 4): 4
- Y2-axis (axis 5): 5
- Z2-axis (axis 6): 6

Connector connection of cable inside cable track and controller-actuator cable

Installation of wiring box cover [7]



Make sure the numbers on the connectors to be connected match.

[Installation of wiring box cover [7] on wiring box bracket [6]]

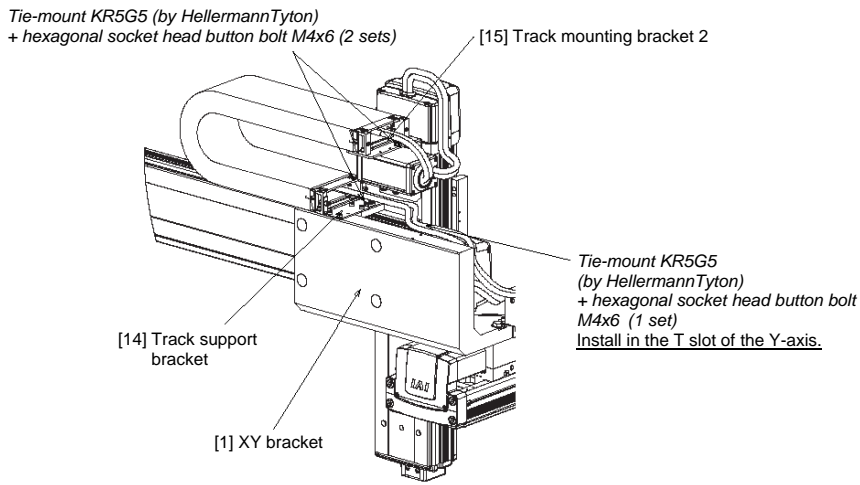
Thin-head bolt	Tightening torque
M3×4mm	7.12kgf · cm / 69.8N · cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

* Assemble the Y2-axis side by referring to the Y1-axis side.

9

Z1-axis cables

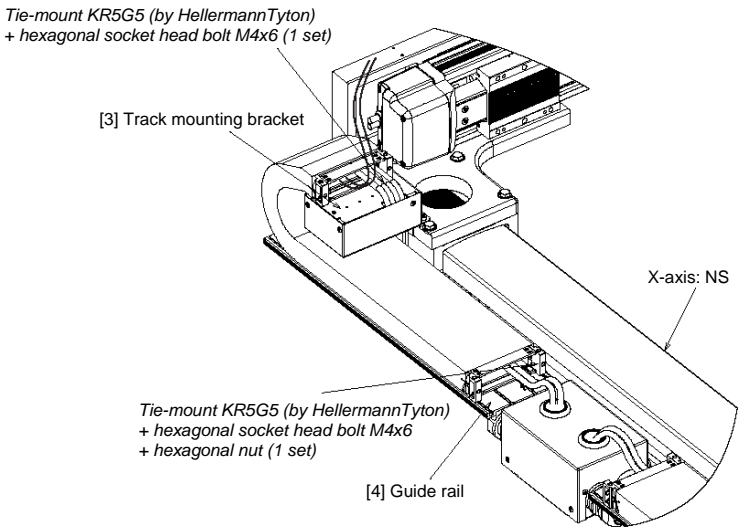


[Installation of tie-mount in track mounting bracket 2 [15]]
[Installation of tie-mount on track support bracket [14]]
[Installation of tie-mount in T slot of Y1-axis: ISPA]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm / 114N・cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

X-axis, Y1-axis cables



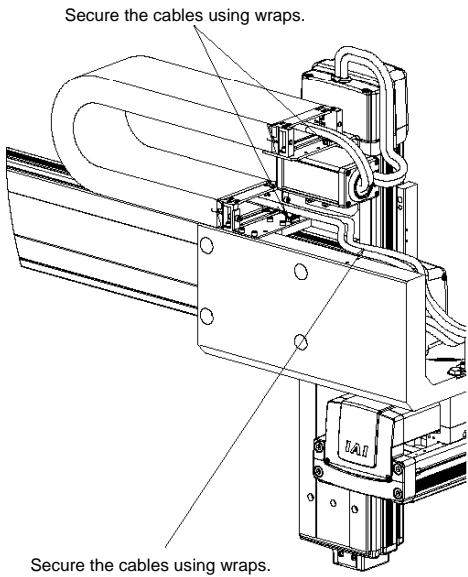
[Installation of tie-mount on track mounting bracket [3]]
[Installation of tie-mount in T slot of guide rail [4]]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf・cm / 114N・cm

* Assemble the Y2-axis side by referring
to the Y1-axis side.

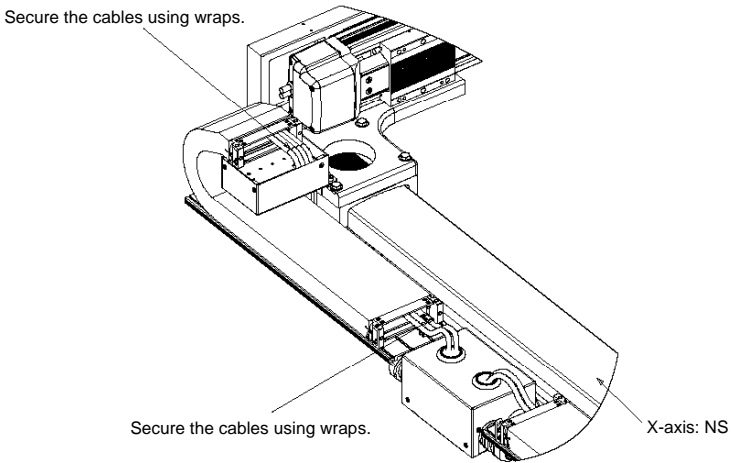
10

Z1-axis cables



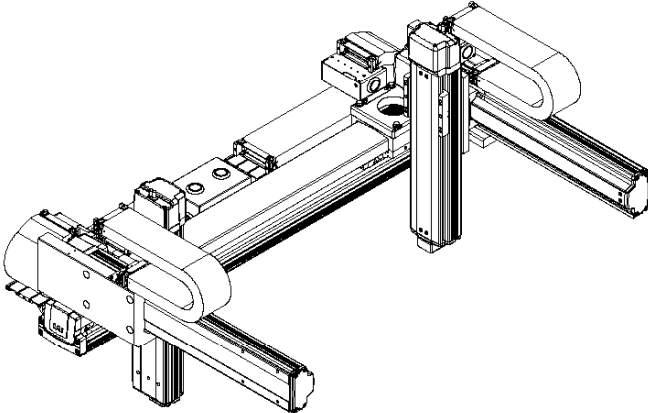
* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

X-axis, Y1-axis, Z1-axis cables

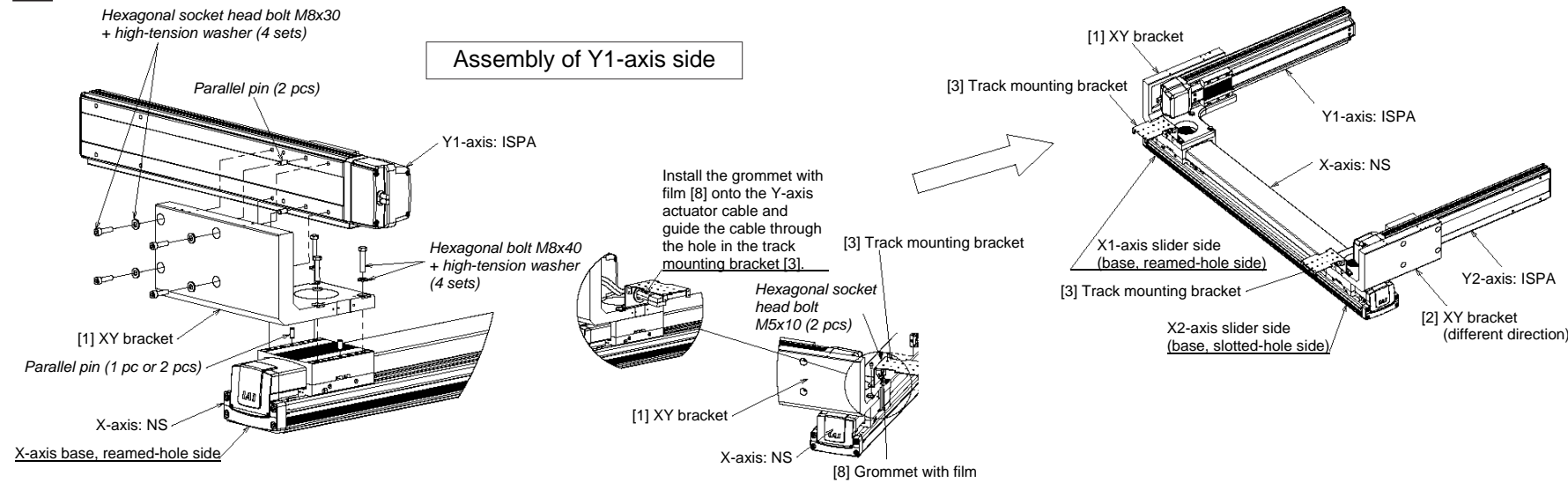


* Assemble the Y2-axis side by referring
to the Y1-axis side.

⚠ Caution: Secure the wires to prevent the cables and connectors
from contacting each axis when the axis is moved over its
entire stroke.
When manually moving the actuator with brake, connect
the controller, supply the power, and then release the brake
release switch (by turning the switch to the RLS side).



1 [Tools] Allen wrench, spanner wrench



Note: To ensure squareness between the X-axis and Y-axis, insert one parallel pin. Adjust the angle between the X-axis and Y-axis to the right angle, and then mount the hexagonal bolts.

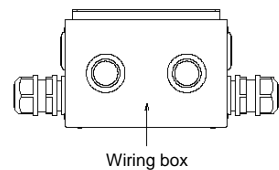
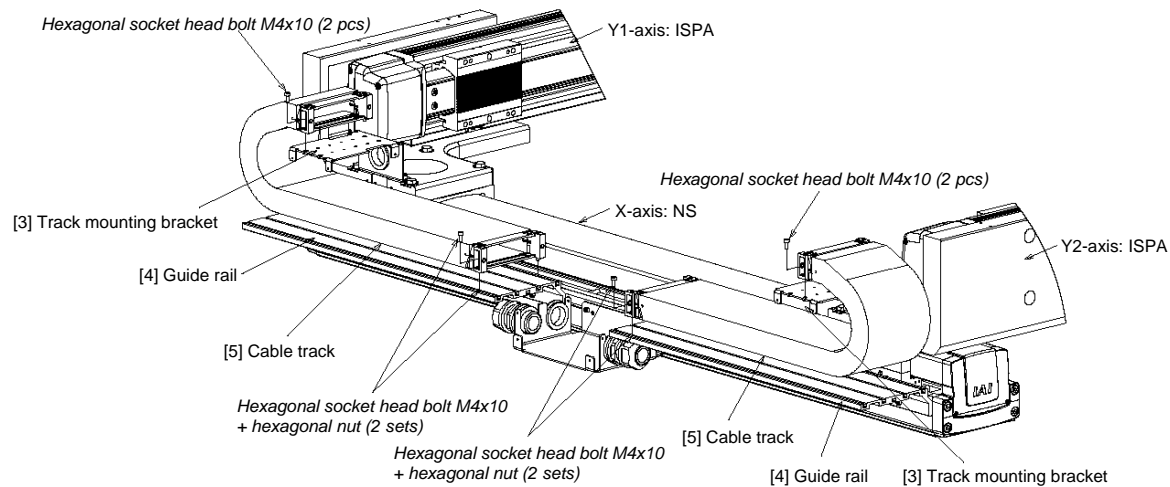
[Installation of X-axis: NS on XY bracket [1]]		
Parallel pin	Hexagonal bolt	Tightening torque
φ 8h7×18	M8×40mm	306kgf・cm/2997N・cm

[Installation of Y1-axis: ISPA on XY bracket [1]]		
Parallel pin	Hexagonal socket head bolt	Tightening torque
φ 8h7×18	M8×30mm	306kgf・cm/2997N・cm

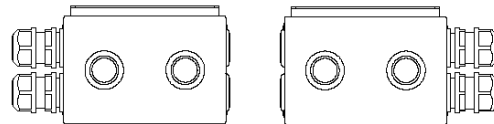
[Installation of track mounting bracket [3] on XY bracket [1]]	
Hexagonal socket head bolt	Tightening torque
M5×10mm	74.2kgf・cm/727N・cm

* The direction is different on the Y2-axis side. Assemble the parts by referring to the Y1-axis side.

3

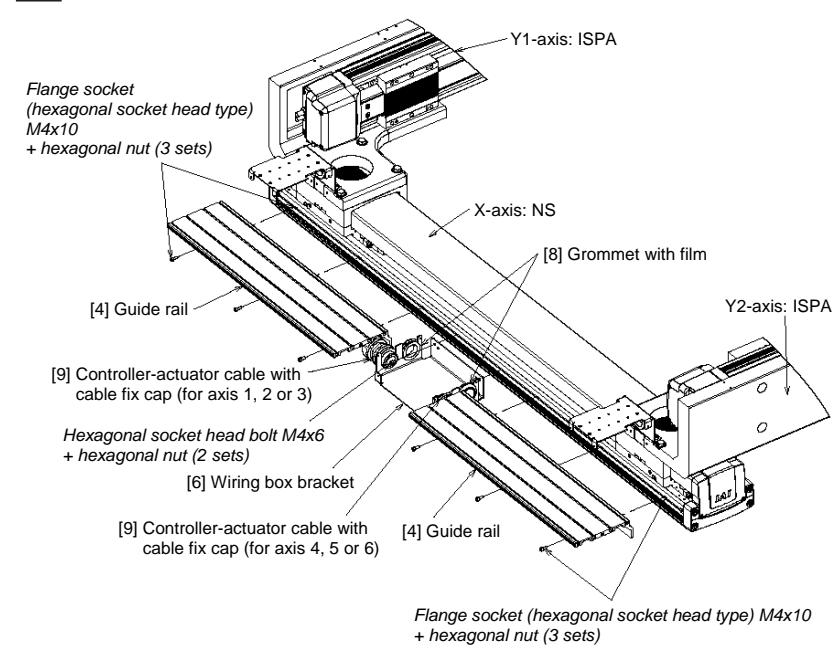


In this assembly procedure, the controller-actuator cable is taken out from the wiring box in the direction shown above. The cable can also be taken out in the directions shown below.



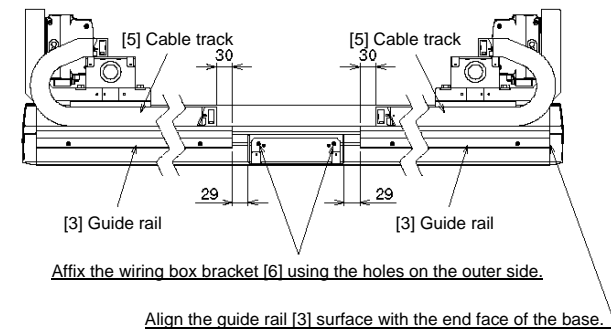
[Installation of cable track [5] on track mounting bracket [3]] [Installation of guide rail [4] for cable track [5] in T-slot]	
Hexagonal socket head bolt	Tightening torque
M4×10mm	36.7kgf・cm/359N・cm

2



⚠ Caution: The controller-actuator cables for Y1-axis side (axes 1, 2 and 3) and Y2-axis side (axes 4, 5 and 6) are available. Install each cable correctly.
[Cable markings]
• Y1-axis side (axes 1, 2 and 3): 1-M, PG, (LS), 2-M, PG, (LS), 3-M, PG, (LS)
• Y2-axis side (axes 4, 5 and 6): 4-M, PG, (LS), 5-M, PG, (LS), 6-M, PG, (LS)

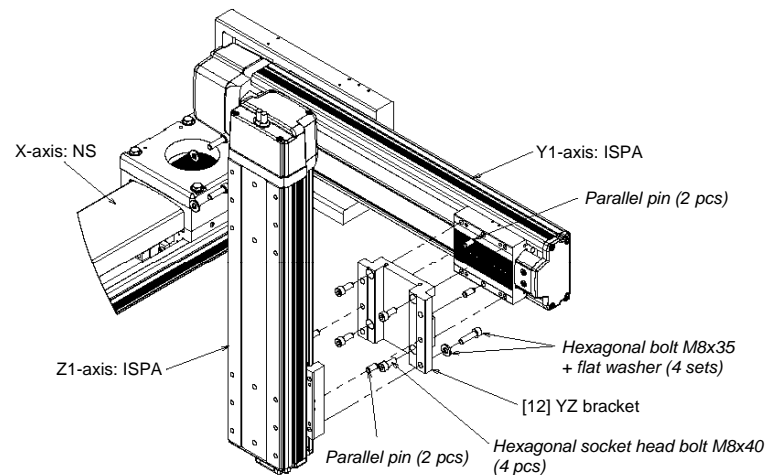
Affixing positions of guide rail [4], cable track [5] and wiring box bracket [6]



[Installation of wiring box bracket [6] in T slot on X-axis: NS side]	
Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf・cm/176N・cm

[Installation of guide rail [4] in T slot on X-axis: NS side]	
Flange socket (hexagonal socket head type)	Tightening torque
M4×10mm	18.0kgf・cm/176N・cm

4



[Installation of YZ bracket [12] on Y1-axis: ISPA]

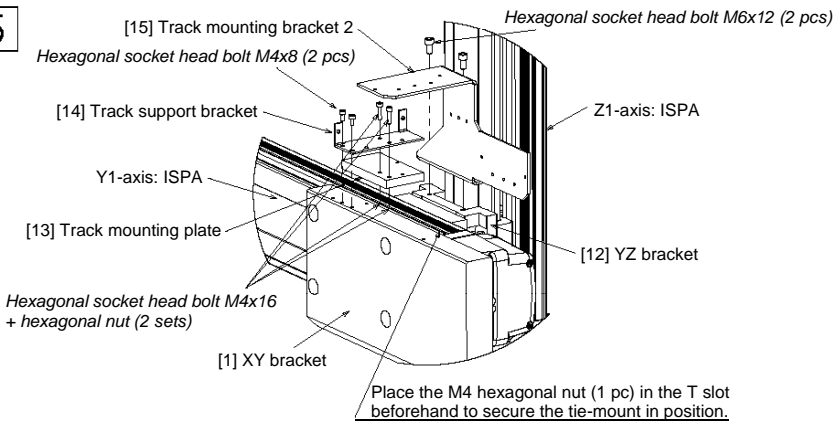
Parallel pin	Hexagonal bolt	Tightening torque
$\phi 8h7 \times 18$	M8 \times 35mm	117kgf \cdot cm/1148N \cdot cm

[Installation of Z1-axis: ISPA on YZ bracket [12]]

Parallel pin	Hexagonal socket head bolt	Tightening torque
$\phi 8h7 \times 18$	M8 \times 40mm	306kgf \cdot cm/2997N \cdot cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

5



[Installation of track support bracket [14] and track mount [13] on Y1-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M4 \times 16mm	36.7kgf \cdot cm/359N \cdot cm

[Installation of track support bracket [14] on XY bracket [1]]

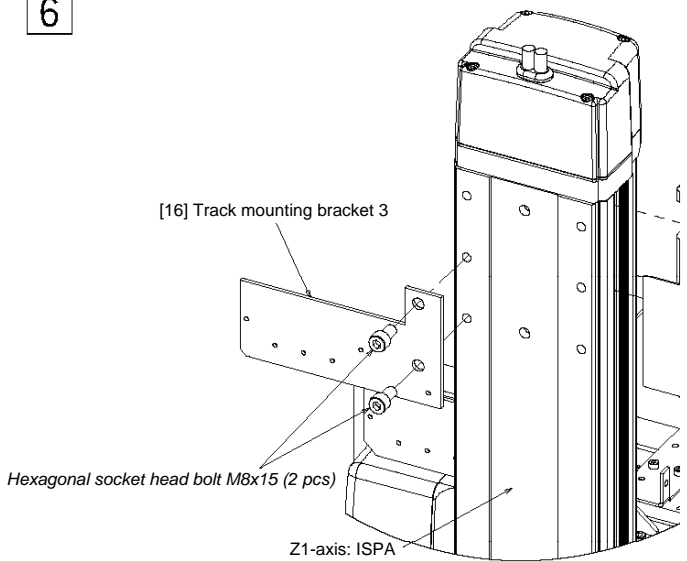
Hexagonal socket head bolt	Tightening torque
M4 \times 8mm	36.7kgf \cdot cm/359N \cdot cm

[Installation of track mounting bracket 2 [15] on YZ bracket [12]]

Hexagonal socket head bolt	Tightening torque
M6 \times 12mm	126kgf \cdot cm/1234N \cdot cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

6

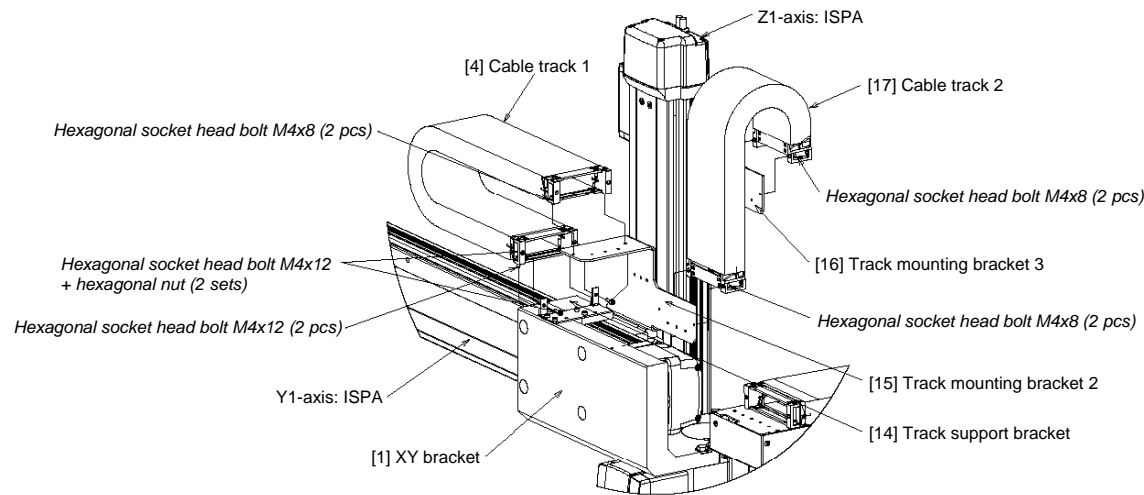


[Installation of track mounting bracket 3 [16] on Z1-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M8 \times 15mm	306kgf \cdot cm/2997N \cdot cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

7



[Installation of cable track 1 [4] on track support bracket [14]]

Hexagonal socket head bolt	Tightening torque
M4 \times 12mm	36.7kgf \cdot cm/359N \cdot cm

[Installation of cable track 1 [4] on XY bracket [1]]

Hexagonal socket head bolt	Tightening torque
M4 \times 12mm	36.7kgf \cdot cm/359N \cdot cm

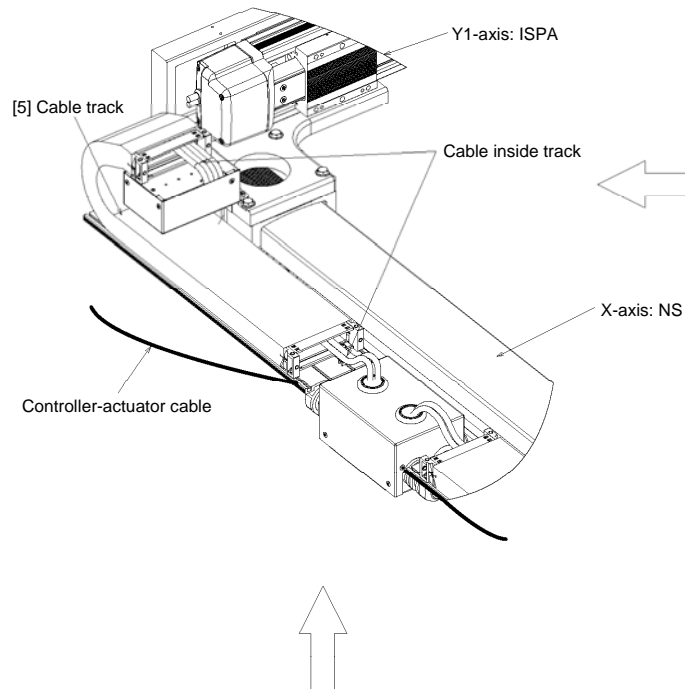
[Installation of cable track 1 [4] on track mounting bracket 2 [15]]

Hexagonal socket head bolt	Tightening torque
M4 \times 8mm	36.7kgf \cdot cm/359N \cdot cm

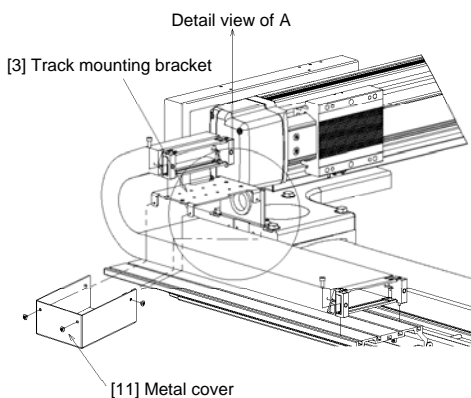
* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

8

Cable wiring diagram



Installation of metal cover [11]



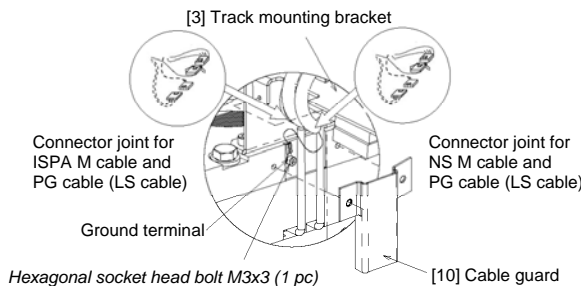
[Installation of metal cover [11] on track mounting bracket [3]]

Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

Detail view of A

Connector connection of ISPA, NS cable and cable inside track
Installation of cable guard [10]



[Installation of cable guard [10]]

Hexagonal socket head bolt	Tightening torque
M4×6mm	36.7kgf・cm／359N・cm

[Installation of ground terminal]

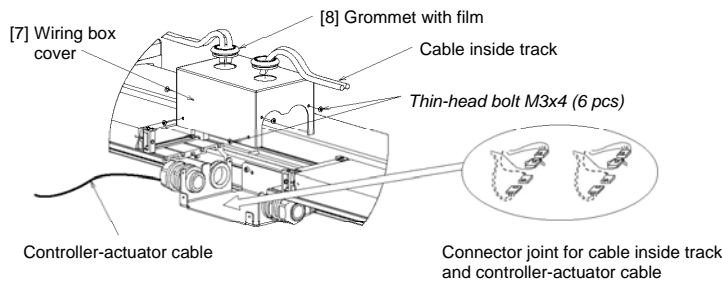
Hexagonal socket head bolt	Tightening torque
M3×3mm	15.8kgf・cm／154N・cm

* Assemble the Y2-axis side by referring to the Y1-axis side.

⚠ Caution: The cables for X-axis slider on Y1-axis side (axis 1), Y1-axis (axis 2), Z1-axis (axis 3), X-axis slider on Y2-axis side (axis 4), Y2-axis (axis 5) and Z2-axis (axis 6) are placed in tracks. Install each cable correctly.
[Cable markings]

- X-axis slider on Y1-axis side (axis 1): 1
- Y1-axis (axis 2): 2
- Z1-axis (axis 3): 3
- X-axis slider on Y2-axis side (axis 4): 4
- Y2-axis (axis 5): 5
- Z2-axis (axis 6): 6

Connector connection of cable inside cable track and controller-actuator cable
Installation of wiring box cover [7]



Make sure the numbers on the connectors to be connected match.

[Installation of wiring box cover [7] on wiring box bracket [6]]

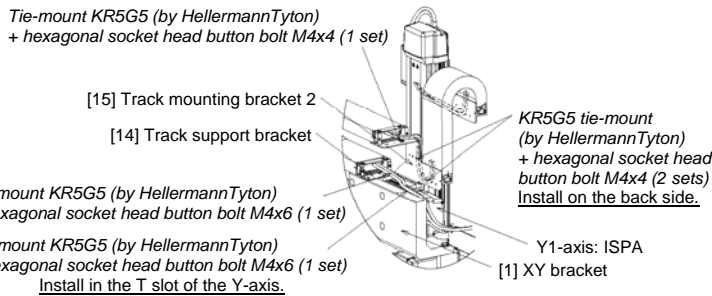
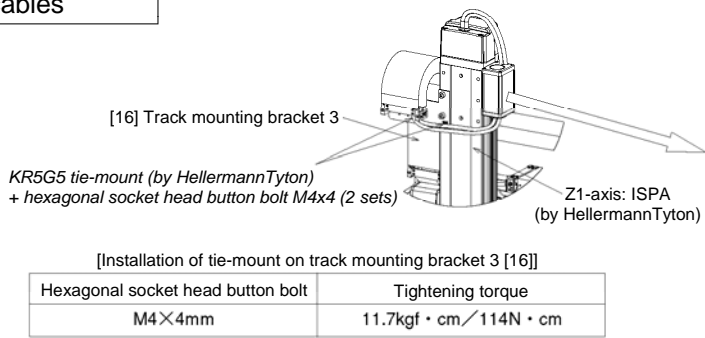
Thin-head bolt	Tightening torque
M3×4mm	7.12kgf・cm／69.8N・cm

⚠ Caution: Since the hexagonal holes in thin-head bolts are small, the hexagonal holes may be damaged depending on the tightening method. Exercise due caution when tightening thin-head bolts.

* Assemble the Y2-axis side by referring to the Y1-axis side.

9

Z1-axis cables



[Installation of connector box 2 [18] on Z1-axis: ISPA]

Hexagonal socket head bolt	Tightening torque
M4×6mm	18.0kgf · cm / 176N · cm

[Installation of box cover 2 [19] on connector box 2 [18]]

Hexagonal socket head bolt	Tightening torque
M3×12mm	5.51kgf · cm / 54N · cm

[Installation of tie-mount on track mounting bracket 2 [15]]

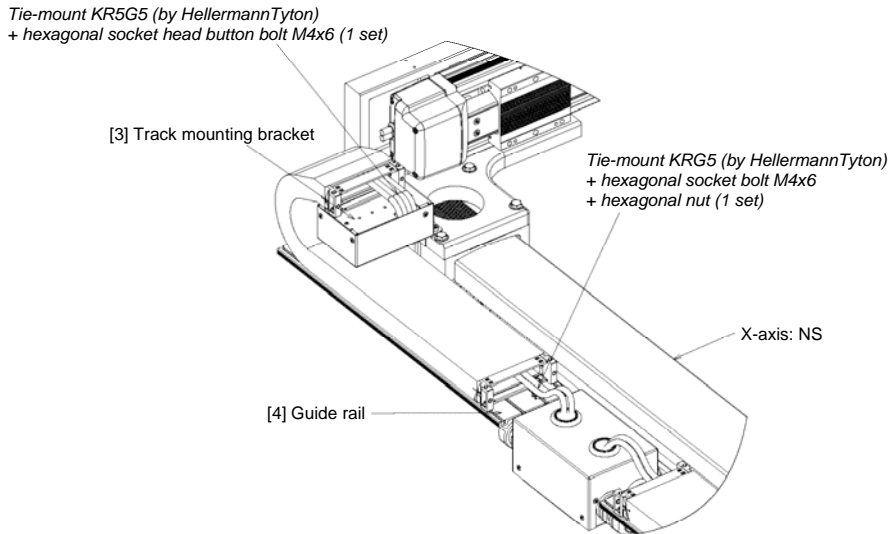
Hexagonal socket head button bolt	Tightening torque
M4×4mm	11.7kgf · cm / 114N · cm

[Installation of tie-mount on track support bracket [14]]
[Installation of tie-mount in T slot of Y1-axis: ISPA]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf · cm / 114N · cm

* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

X-axis, Y1-axis cables



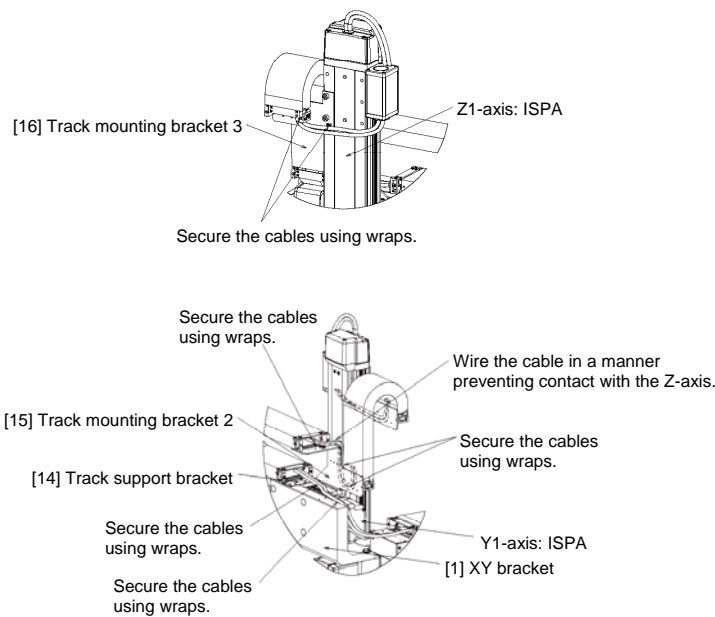
[Installation of tie-mount on track mounting bracket [3]]
[Installation of tie-mount in T slot of guide rail [4]]

Hexagonal socket head button bolt	Tightening torque
M4×6mm	11.7kgf · cm / 114N · cm

* Assemble the Y2-axis side by referring
to the Y1-axis side.

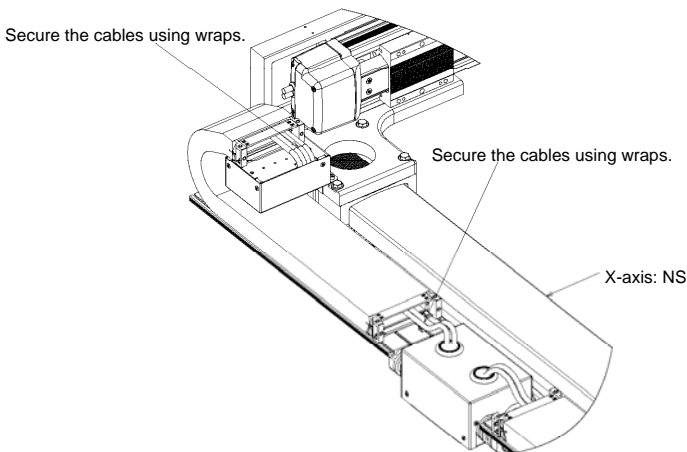
10

Z1-axis cables



* The direction is different on the Z2-axis side.
Assemble the parts by referring to the Z1-axis side.

X-axis, Y1-axis, Z1-axis cables



* Assemble the Y2-axis side by referring
to the Y1-axis side.

⚠ Caution: Secure the wires to prevent the cables and connectors
from contacting each axis when the axis is moved over its
entire stroke.
When manually moving the actuator with brake, connect
the controller, supply the power, and then release the brake
release switch (by turning the switch to the RLS side).

